Air Quality Assessment

Burringham Road, Scunthorpe

Client: Keepmoat Homes Ltd

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Executive Summary

Redmore Environmental Ltd was commissioned by Keepmoat Homes Ltd to undertake an Air Quality Assessment in support of a planning application for a residential development at Lincolnshire Lakes, land east of M181 and north of Burringham Road, Scunthorpe.

The proposals have the potential to cause air quality impacts as a result of fugitive dust emissions during construction and road traffic exhaust emissions associated with vehicles travelling to and from the site during operation, as well as expose future residents to any existing air quality issues. As such, an Air Quality Assessment was undertaken in order to determine baseline conditions, consider site suitability for the proposed end use and assess potential effects as a result of the scheme.

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

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

Review of the dispersion modelling results indicated that predicted air quality impacts as a result of traffic generated by the development were not 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 air quality standards at all locations across the development. As such, the site is considered suitable for the proposed use from an air quality perspective.

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 Background

1.1.1 Redmore Environmental Ltd was commissioned by Keepmoat Homes Ltd to undertake an Air Quality Assessment in support of a planning application for a residential development at Lincolnshire Lakes, land east of M181 and north of Burringham Road, Scunthorpe.

1.1.2 The proposed development has 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. As such, an Air Quality Assessment was undertaken in order to determine baseline conditions, consider site suitability for the proposed end-use and assess potential effects associated with the scheme.

1.2 Site Location and Context

1.2.1 The site is located at Lincolnshire Lakes, land east of M181 and north of Burringham Road, Scunthorpe, at approximate National Grid Reference (NGR): 486146, 408602. Reference should be made to Figure 1 for a map of the site and surrounding area.

1.2.2 The proposals comprise an application for full planning permission for the development of 599no. dwellings and lake, along with associated infrastructure, including landscaping, public open space and play area, pedestrian and cycle links, pumping station and sub-station.

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

2.0 LEGISLATION AND POLICY

2.1 Legislation

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

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

2.1.2 Air Quality Target Values were also provided for several additional pollutants. It should be noted that the AQLV for $PM_{2.5}$ stated in the Air Quality Standards Regulations (2010) was amended in the Environment (Miscellaneous Amendments) (EU Exit) Regulations (2020).

2.1.3 The Air Quality Strategy (AQS) was produced by the Department for Environment, Food and Rural Affairs (DEFRA) and published in April 2023[1]. 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 2023[2] was published in January 2023, providing long term and Interim Targets in order to reduce population exposure to $PM_{2.5}$. The concentration target for 2040 was subsequently adopted in the Environmental Targets (Fine Particulate Matter) (England) Regulations (2023).

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

[2] Environmental Improvement Plan 2023, DEFRA, 2023.

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

Table 1 Air Quality Objectives/Interim Target

Pollutant	Air Quality Objective/ Air Quality Limit Value	
	Concentration (µg/m³)	Averaging Period
NO_2	40	Annual mean
	200	1-hour mean, not to be exceeded on more than 18 occasions per annum
PM_{10}	40	Annual mean
	50	24-hour mean, not to be exceeded on more than 35 occasions per annum
$PM_{2.5}$	12[(a)]	Annual mean

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

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

Table 2 Examples of Where the Air Quality Objectives Apply

Averaging Period	Objective Should Apply At	Objective Should Not Apply At
Annual mean	All locations where members of the public might be regularly exposed Building façades of residential properties, schools, hospitals, care homes etc.	Building façades of offices or other places of work where members of the public do not have regular access Hotels, unless people live there as their permanent residence Gardens of residential properties Kerbside sites (as opposed to locations at the building façade), or any other location where public exposure is expected to be short term
24-hour mean	All locations where the annual mean objective would apply, together with hotels Gardens of residential properties	Kerbside sites (as opposed to locations at the building façade), or any other location where public exposure is expected to be short term

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

Averaging Period	Objective Should Apply At	Objective Should Not Apply At
1-hour mean	All locations where the annual mean and 24 and 8-hour mean objectives apply. Kerbside sites (for example, pavements of busy shopping streets) Those parts of car parks, bus stations and railway stations etc which are not fully enclosed, where members of the public might reasonably be expected to spend one hour or more Any outdoor locations where members of the public might reasonably be expected to spend one hour or longer	Kerbside sites where the public would not be expected to have regular access

2.2 Local Air Quality Management

2.2.1 Local Authorities (LAs) are required to periodically review and assess air quality within their area of jurisdiction under the system of Local Air Quality Management (LAQM). This review and assessment of air quality involves comparing present and likely future pollutant concentrations against the AQOs. If it is predicted that levels at locations of relevant exposure, as summarised in Table 2, are likely to be exceeded, the LA is required to declare an Air Quality Management Area (AQMA). For each AQMA the LA is required to produce an Air Quality Action Plan (AQAP), the objective of which is to reduce pollutant concentrations in pursuit of the AQOs.

2.3 Dust

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

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

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

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

2.4 National Planning Policy

2.4.1 The revised National Planning Policy Framework[4] (NPPF) was published in July 2021 and sets out the Government's planning policies for England and how these are expected to be applied.

2.4.2 The purpose of the planning system is to contribute to the achievement of sustainable development. In order to ensure this, the NPPF recognises three overarching objectives including the following of relevance to air quality:

> "c) An environmental objective - to protect and enhance our natural, built and historic environment; including making effective use of land, improving biodiversity, using natural resources prudently, minimising waste and pollution, and mitigating and adapting to climate change, including moving to a low carbon economy."

2.4.3 Chapter 15 of the NPPF details objectives in relation to conserving and enhancing the natural environment. It states that:

> "Planning policies and decisions should contribute to and enhance the natural and local environment by:
>
> […]
>
> e) preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability. Development should, wherever possible, help to improve local environmental conditions such as air and water quality […]."

[4] NPPF, Ministry of Housing, Communities and Local Government, 2021.

2.4.4 The NPPF specifically recognises air quality as part of delivering sustainable development and states that:

> "Planning policies and decisions should sustain and contribute towards compliance with relevant limit values or national objectives for pollutants, taking into account the presence of Air Quality Management Areas and Clean Air Zones, and the cumulative impacts from individual sites in local areas. Opportunities to improve air quality or mitigate impacts should be identified, such as through traffic and travel management, and green infrastructure provision and enhancement. So far as possible these opportunities should be considered at the plan-making stage, to ensure a strategic approach and limit the need for issues to be reconsidered when determining individual applications. Planning decisions should ensure that any new development in Air Quality Management Areas and Clean Air Zones is consistent with the local air quality action plan."

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

2.5 National Planning Practice Guidance

2.5.1 The National Planning Practice Guidance[5] (NPPG) web-based resource was launched by the Department for Communities and Local Government on 6th March 2014 and updated on 1st November 2019 to support the NPPF and make it more accessible. The air quality pages are summarised under the following headings:

1. What air quality considerations does planning need to address?
2. What is the role of plan-making with regard to air quality?
3. Are air quality concerns relevant to neighbourhood planning?
4. What information is available about air quality?
5. When could air quality considerations be relevant to the development management process?
6. What specific issues may need to be considered when assessing air quality impacts?
7. How detailed does an air quality assessment need to be?
8. How can an impact on air quality be mitigated?

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

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

2.6 Local Planning Policy

2.6.1 The statutory Development Plan for North Lincolnshire comprises 'The saved Policies North Lincolnshire Local Plan'[6] (NLLP) (adopted in May 2003), The North Lincolnshire Core Strategy[7] (NLCS) (adopted June 2011); and The Housing and Employment Land Allocations (HELA) DPD[8] (adopted March 2016). Review of these documents did not indicate any planning policies of relevance to this assessment nor in the emerging North Lincolnshire Local Plan[9].

6 Policies contained in the North Lincolnshire Local Plan Adopted May 2003, NLC, 2003.

7 Core Strategy - North Lincolnshire Local Development Framework, NLC, 2011.

8 The Housing and Employment Land Allocations DPD, NLC, 2016.

9 North Lincolnshire Local Plan - Local Development Scheme, NLC, 2022.

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, as well as expose future residents to elevated pollution levels. These issues have been assessed in accordance with the following methodology, which was agreed with Annie Ward, Environmental Team Leader at NLC, on 8th July 2022.

3.2 Construction Phase Assessment

3.2.1 There is the potential for fugitive dust emissions to occur as a result of construction phase activities. These have been assessed in accordance with the methodology outlined within the Institute of Air Quality Management (IAQM) document 'Guidance on the Assessment of Dust from Demolition and Construction V1.1'[10].

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

- Earthworks;
- Construction; and,
- Trackout.

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

- Annoyance due to dust soiling;
- Harm to ecological receptors; and,
- The risk of health effects due to a significant increase in exposure to PM_{10}.

3.2.4 The assessment steps are detailed below.

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

Step 1

3.2.5 Step 1 screens the requirement for a more detailed assessment. Should human receptors be identified within 350m from the boundary or 50m from the construction vehicle route up to 500m from the site entrance, then the assessment proceeds to Step 2. Additionally, should ecological receptors be identified within 50m of the site or the construction vehicle route up to 500m from the site entrance, then the assessment also proceeds to Step 2.

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

Step 2

3.2.7 Step 2 assesses the risk of potential dust impacts. A site is allocated a risk category based on two factors:

- The scale and nature of the works, which determines the magnitude of dust arising as: small, medium or large (Step 2A); and,
- The sensitivity of the area to dust impacts, which can be defined as low, medium or high sensitivity (Step 2B).

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

3.2.9 Step 2A defines the potential magnitude of dust emission through the construction phase. The relevant criteria are summarised in Table 3.

Table 3 Construction Dust - Magnitude of Emission

Magnitude	Activity	Criteria
Large	Earthworks	• Total site area greater than 10,000m^2 • 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 8m in height • More than 100,000 tonnes of material moved

Magnitude	Activity	Criteria
	Construction	• Total building volume greater than 100,000m^3 • On site concrete batching • Sandblasting
	Trackout	• More than 50 Heavy Duty Vehicle (HDV) trips per day • Potentially dusty surface material (e.g. high clay content) • Unpaved road length greater than 100m
Medium	Earthworks	• Total site area 2,500m^2 to 10,000m^2 • Moderately dusty soil type (e.g. silt) • 5 to 10 heavy earth moving vehicles active at any one time • Formation of bunds 4m to 8m in height • Total material moved 20,000 tonnes to 100,000 tonnes
	Construction	• Total building volume 25,000m^3 to 100,000m^3 • Potentially dusty construction material (e.g. concrete) • On site concrete batching
	Trackout	• 10 to 50 HDV trips per day • Moderately dusty surface material (e.g. high clay content) • Unpaved road length 50m to 100m
Small	Earthworks	• Total site area less than 2,500m^2 • Soil type with large grain size (e.g. sand) • Less than 5 heavy earth moving vehicles active at any one time • Formation of bunds less than 4m in height • Total material moved less than 20,000 tonnes • Earthworks during wetter months
	Construction	• Total building volume less than 25,000m^3 • Construction material with low potential for dust release (e.g. metal cladding or timber)
	Trackout	• Less than 10 HDV trips per day • Surface material with low potential for dust release • Unpaved road length less than 50m

3.2.10 Step 2B defines the sensitivity of the area around the development to potential dust impacts. The influencing factors are shown in Table 4.

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

Receptor Sensitivity	Examples	
	Human Receptors	Ecological Receptors
High	• Users expect high levels of amenity • High aesthetic or value property • People expected to be present continuously for extended periods of time • Locations where members of the public are exposed over a time period relevant to the AQO for PM_{10}. e.g. residential properties, hospitals, schools and residential care homes	• Internationally or nationally designated site e.g. Special Area of Conservation
Medium	• Users would expect to enjoy a reasonable level of amenity • Aesthetics or value of their property could be diminished by soiling • People or property wouldn't reasonably be expected to be present here continuously or regularly for extended periods as part of the normal pattern of use of the land e.g. parks and places of work	• Nationally designated site e.g. Sites of Special Scientific Interest
Low	• Enjoyment of amenity would not reasonably be expected • Property would not be expected to be diminished in appearance • Transient exposure, where people would only be expected to be present for limited periods. e.g. public footpaths, playing fields, shopping streets, farmland, short term car parks and roads	• Locally designated site e.g. Local Nature Reserve

3.2.11 The guidance also provides the following factors to consider when determining the sensitivity of an area to potential dust impacts:

- Any history of dust generating activities in the area;
- The likelihood of concurrent dust generating activity on nearby sites;
- Any pre-existing screening between the source and receptors;
- Any conclusions drawn from analysing local meteorological data which accurately represent the area; and if relevant the season during which works will take place;
- Any conclusions drawn from local topography;
- Duration of the potential impact, as a receptor may become more sensitive over time; and,

- Any known specific receptor sensitivities which go beyond the classifications given in the document.

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

3.2.13 The criteria for determining the sensitivity of the area to dust soiling effects on people and property is summarised in Table 5.

Table 5 Construction Dust - Sensitivity of the Area to Dust Soiling Effects on People and Property

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

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

Table 6 Construction Dust - Sensitivity of the Area to Human Health Impacts

Receptor Sensitivity	Background Annual Mean PM_{10} Concentration	Number of Receptors	Distance from the Source (m)				
			Less than 20	Less than 50	Less than 100	Less than 200	Less than 350
High	Greater than 32µg/m^3	More than 100	High	High	High	Medium	Low
		10 - 100	High	High	Medium	Low	Low
		1 - 10	High	Medium	Low	Low	Low
	28 - 32µg/m^3	More than 100	High	High	Medium	Low	Low
		10 - 100	High	Medium	Low	Low	Low
		1 - 10	High	Medium	Low	Low	Low

Receptor Sensitivity	Background Annual Mean PM_{10} Concentration	Number of Receptors	Distance from the Source (m)				
			Less than 20	Less than 50	Less than 100	Less than 200	Less than 350
	24 - 28µg/m^3	More than 100	High	Medium	Low	Low	Low
		10 - 100	High	Medium	Low	Low	Low
		1 - 10	Medium	Low	Low	Low	Low
	Less than 24µg/m^3	More than 100	Medium	Low	Low	Low	Low
		10 - 100	Low	Low	Low	Low	Low
		1 - 10	Low	Low	Low	Low	Low
Medium	Greater than 32µg/m^3	More than 10	High	Medium	Low	Low	Low
		1 - 10	Medium	Low	Low	Low	Low
	28 - 32µg/m^3	More than 10	Medium	Low	Low	Low	Low
		1 - 10	Low	Low	Low	Low	Low
	24 - 28µg/m^3	More than 10	Low	Low	Low	Low	Low
		1 -10	Low	Low	Low	Low	Low
	Less than 24µg/m^3	More than 10	Low	Low	Low	Low	Low
		1 - 10	Low	Low	Low	Low	Low
Low	-	1 or more	Low	Low	Low	Low	Low

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

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

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

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

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

3.2.17 Table 8 outlines the risk category from earthworks and construction activities.

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

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

3.2.18 Table 9 outlines the risk category from trackout activities.

Table 9 Construction Dust - Dust Risk Category from Trackout Activities

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

Step 3

3.2.19 Step 3 requires the identification of site specific mitigation measures within the IAQM guidance[11] to reduce potential dust impacts based upon the relevant risk categories

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

identified in Step 2. For sites with **negligible** risk, mitigation measures beyond those required by legislation are not required. However, additional controls may be applied as part of good practice.

Step 4

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

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

3.3 Operational Phase Assessment

3.3.1 The development has the potential to affect existing air quality as a result of road traffic exhaust emissions associated with vehicles travelling to and from the site, as well as expose future residents 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:

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

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

Potential Development Impacts

3.3.3 Locations sensitive to potential changes in pollutant concentrations were identified within 200m of the highway network in accordance with the guidance provided within the Design Manual for Roads and Bridges (DMRB)[12] on the likely limits of pollutant dispersion from road sources. The criteria provided within DEFRA guidance[13] on where the AQOs apply, as summarised in Table 2, was utilised to determine appropriate receptor positions.

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'[14]. Using this methodology impacts were defined based on the interaction between the predicted pollutant concentration from the DS scenario and the magnitude of change between the DM and DS scenarios, as outlined in Table 10.

Table 10 Significance of Road Vehicle Exhaust Emission Impacts

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

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

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

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

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

3.3.6 Following the prediction of impacts at discrete receptor locations, the IAQM document[15] 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 guidance[16] 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 NO_2, PM_{10} and $PM_{2.5}$ concentrations across the development site, detailed dispersion modelling was undertaken. The results were subsequently compared with the relevant AQOs and Interim 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.

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

16 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), NLC has undertaken Review and Assessment of air quality within their area of jurisdiction. This process has indicated that 24-hour mean PM_{10} concentrations are above the AQO within the district. As such, one AQMA has been declared, this is described as follows:

> "An area incorporating part of the town of Scunthorpe and an area to the east of Scunthorpe including the site of the steelworks."

4.2.2 The Lyndhurst AQMA is located approximately 4.3km east of the development. As such, there is the potential for vehicles travelling to and from the site to increase pollution levels in this sensitive area. This has been considered throughout the assessment.

4.2.3 NLC have 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 NLC throughout their area of jurisdiction. Recent results recorded in the vicinity of the development are shown in Table 11.

Table 11 Monitoring Results - NO_2

Monitoring Site		Monitored NO_2 Concentration (µg/m³)		
		2018	2019	2020
CM1	Scunthorpe Town AURN	18.0	15.0	13.0
1	Frodingham Road	19.0	21.0	23.8
2	Scotter Road (North side of roundabout)	24.0	24.0	21.5
3	B&Q	19.0	18.0	17.5
4	Hilton Ave	20.0	20.0	19.0
5	Britannia Corner	24.0	24.0	21.5
6	Oswald Road	23.0	24.0	21.5
7	Queensway Pub	24.0	22.0	21.2
8	Ashby Road	25.0	26.0	22.5
9	Queensway	19.0	20.0	17.8
10	Mortal Ash Hill	34.0	34.0	28.5
11	Front of Ashby Lodge Pub	20.0	20.0	20.7
18, 19, 20	Rowland Road AQ station (Triplicate)	15.7	15.0	13.6
21	ASDA Carlton Street	21.0	22.0	19.4

4.3.2 As shown in Table 11, annual mean NO_2 concentrations were below the relevant AQO at all monitoring locations in recent years.

4.3.3 Concentrations of NO_2 during 2020 were lower than previous years due to a reduction in traffic and associated emissions caused by the COVID-19 pandemic. The results should therefore be viewed with caution.

4.3.4 NLC undertake monitoring of PM_{10} concentrations at three locations within the vicinity of the site. Recent results are shown in Table 12.

Table 12 Monitoring Results - PM_{10}

Monitoring Site		Monitored PM_{10} Concentration (µg/m³)		
		2018	2019	2020
CM2	East Common Lane	21.0	22.0	19.0
CM4	Amvale	20.0	21.0	22.0
CM5	High Street East	22.0	21.0	18.0

4.3.5 As shown in Table 12, annual mean PM_{10} concentrations were below the AQO at the CM2, CM4 and CM5 monitors in recent years.

4.3.6 NLC undertake monitoring of $PM_{2.5}$ concentrations at one location within the vicinity of the site. Recent results are shown in Table 13.

Table 13 Monitoring Results - $PM_{2.5}$

Monitoring Site		Monitored PM_{10} Concentration (µg/m³)		
		2018	2019	2020
CM2	East Common Lane	10.0	7.0	7.0

4.3.7 As shown in Table 13, annual mean $PM_{2.5}$ concentrations were below the Interim Target at the CM2 monitor in recent years.

4.3.8 Reference should be made to Figure 2 for a map of the survey positions.

4.4 Background Pollutant Concentrations

4.4.1 Predictions of background pollutant concentrations on a 1km by 1km grid basis have been produced by DEFRA for the entire of the UK to assist LAs in their Review and Assessment of air quality. The proposed development site is located in grid square NGR: 486500, 408500. Data for this location was downloaded from the DEFRA website[17] for the purpose of the assessment and is summarised in Table 14.

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

Table 14 Background Pollutant Concentration Predictions

Pollutant	Predicted Background Pollutant Concentration (µg/m³)	
	2019	2025
NO_2	9.76	7.89
PM_{10}	16.65	15.68
$PM_{2.5}$	9.08	8.31

4.4.2 As shown in Table 14, predicted background NO_2, PM_{10} and $PM_{2.5}$ concentrations are below the relevant AQOs and Interim Target at the development site.

4.5 Sensitive Receptors

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

Construction Phase Sensitive Receptors

4.5.2 Receptors sensitive to potential dust impacts during earthworks and construction were identified from a desk-top study of the area up to 350m from the development boundary. These are summarised in Table 15.

Table 15 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	10 - 100	-
Up to 350	10 - 100	-

4.5.3 Receptors sensitive to potential dust impacts from trackout were identified from a desk-top study of the area up to 50m from the road network within 500m of the site access. These are summarised in Table 16.

Table 16 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 development boundary or the access route within 500m of the site entrance. As such, ecological impacts have not been assessed further within this report.

4.5.5 A number of additional factors have been considered when determining the sensitivity of the surrounding area. These are summarised in Table 17.

Table 17 Additional Area Sensitivity Factors to Potential Dust Impacts

Guidance	Comment
Whether there is any history of dust generating activities in the area	The desk top study did not indicate any dust generating activities in the local area
The likelihood of concurrent dust generating activity on nearby sites	A review of the planning portal indicated that a number of applications have recently been submitted in the vicinity of the site. It is therefore possible that there will be concurrent dust generation should these be granted permission and the construction phases overlap with the proposed development
Pre-existing screening between the source and the receptors	Trees and shrubs are located sporadically along the site boundary. These may act as a barrier between emission sources and receptors should they be retained during the construction phase
Conclusions drawn from analysing local meteorological data which accurately represent the area: and if relevant the season during which works will take place	As shown in Figure 3, the predominant wind bearing at the site is from the south-west. As such, receptors to the north-east of the boundary are most likely to be affected by dust releases
Conclusions drawn from local topography	There are no significant topographical constraints to dust dispersion
Duration of the potential impact, as a receptor may become more sensitive over time	Currently it is unclear as to the duration of the construction phase. However, it is possible that it will extend over one year. The sensitivity of nearby receptors is unlikely to change during this time

Guidance	Comment
Any known specific receptor sensitivities which go beyond the classifications given in the document	No specific receptor sensitivities identified during the baseline assessment

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

4.5.7 The sensitivity of the receiving environment to specific potential dust impacts, based on the criteria shown in Section 3.2, is shown in Table 18.

Table 18 Sensitivity of the Surrounding Area to Potential Dust Impacts

Potential Impact	Sensitivity of the Surrounding Area		
	Earthworks	Construction	Trackout
Dust Soiling	High	High	High
Human Health	Low	Low	Low

Operational Phase Sensitive Receptors

4.5.8 Locations sensitive to potential operational phase road vehicle exhaust emission impacts were identified from a desk-top study and are summarised in Table 19. It should be noted that these include locations within, and adjacent to, the AQMA to the east of the proposed development.

Table 19 Operational Phase Road Vehicle Exhaust Emissions Sensitive Receptor Locations

Receptor		NGR (m)	
		X	Y
R1	Residential - B1450, Burringham Road	486145.5	408336.9
R2	Lindsey Lodge Hospice - B1450, Burringham Road	486707.7	408393.7
R3	Residential - B1450, Burringham Road	486985.4	408386.0
R4	Residential - B1450, Burringham Road	487174.0	408348.5

Receptor		NGR (m)	
		X	Y
R5	Residential - B1450, Burringham Road	487424.4	408347.7
R6	Residential - Scotter Road South	487400.5	408283.7
R7	Residential - B1450, Burringham Road	487447.5	408387.8
R8	Residential - B1450, Burringham Road	487734.3	408377.9
R9	Residential - B1450, Burringham Road	487684.7	408368.6
R10	Residential - B1450, Burringham Road	487681.1	408405.8
R11	Residential - Scotter Road	487400.6	408462.4
R12	Residential - Scotter Road	487385.9	408870.8
R13	Residential - Scotter Road	487328.5	409419.0
R14	Residential - Scotter Road	487275.3	409475.1
R15	Residential - Scotter Road	487299.7	409762.3
R16	Residential - West Common Lane	487343.9	409427.3
R17	Residential - West Common Lane	487720.4	409442.3
A1	Residential - A18, Queensway	490836.9	408818.5
A2	Residential - B1501, Grange Lane North	490833.9	408862.8
A3	Residential - B1501, Grange Lane North	490782.7	408912.8
A4	Residential - A18, Queensway	490726.2	408915.7
A5	Residential - A18, Queensway	490681.4	408874.4
A6	Residential - East Common Lane	490328.5	409767.7
A7	Residential - East Common Lane	490313.9	409780.4
A8	Residential - East Common Lane	490315.0	409815.0
A9	Residential - East Common Lane	490330.3	409822.6
A10	Residential - East Common Lane	490607.1	409836.0
A11	Residential - B1501, Grange Lane North	490873.3	409245.1
A12	Residential - A18, Queensway	491115.9	408665.2

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

5.0 ASSESSMENT

5.1 Introduction

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

5.2 Construction Phase Assessment

Step 1

5.2.1 The undertaking of activities such as excavation, ground works, cutting, construction, concrete batching and storage of materials has the potential to result in fugitive dust emissions throughout the construction phase. Vehicle movements both on-site and on the local road network also have the potential to result in the re-suspension of dust from haul roads and highway surfaces.

5.2.2 The potential for impacts at sensitive locations depends significantly on local meteorology during the undertaking of dust generating activities, with the most significant effects likely to occur during dry and windy conditions.

5.2.3 The desk-study undertaken to inform the baseline identified a number of sensitive receptors within 350m of the site boundary. As such, a detailed assessment of potential dust impacts was required.

Step 2

Earthworks

5.2.4 Earthworks will primarily involve excavating material, haulage, tipping and stockpiling, as well as site levelling and landscaping. The proposed development site covers an area greater than 10,000m^2. In accordance with the criteria outlined in Table 3, the magnitude of potential dust emissions from earthworks activities is therefore **large**.

5.2.5 Table 18 indicates the sensitivity of the area to dust soiling effects on people and property is **high**. In accordance with the criteria outlined in Table 8, the development is considered to be a **high** risk site for dust soiling as a result of earthworks.

5.2.6 Table 18 indicates the sensitivity of the area to human health impacts is **low**. In accordance with the criteria outlined in Table 8 the development is considered to be a **low** risk site for human health impacts as a result of earthworks.

Construction

5.2.7 Due to the size of the development, the total building volume is likely to be greater than 100,000m^3. In accordance with the criteria outlined in Table 3, the magnitude of potential dust emissions from construction is therefore **large**.

5.2.8 Table 18 indicates the sensitivity of the area to dust soiling effects on people and property is **high**. In accordance with the criteria outlined in Table 8, the development is considered to be a **high** risk site for dust soiling as a result of construction activities.

5.2.9 Table 18 indicates the sensitivity of the area to human health impacts is **low**. In accordance with the criteria outlined in Table 8, the development is considered to be a **low** risk site for human health impacts as a result of construction activities.

Trackout

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

5.2.11 Table 18 indicates the sensitivity of the area to dust soiling effects to people and property is **high**. In accordance with the criteria outlined in Table 9, the development is considered to be a **high** risk site for dust soiling as a result of trackout activities.

5.2.12 Table 18 indicates the sensitivity of the area to human health impacts is **low**. In accordance with the criteria outlined in Table 9, the development is considered to be a **low** risk site for human health impacts as a result of trackout activities.

Summary of the Risk of Dust Effects

5.2.13 A summary of the risk from each dust generating activity is provided in Table 20.

Table 20 Summary of Potential Unmitigated Dust Risks

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

5.2.14 As indicated in Table 20, the potential risk of dust soiling is **high** from earthworks, construction and trackout activities. The potential risk of human health impacts is **low** from earthworks, construction and trackout activities.

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

Step 3

5.2.16 The IAQM guidance[18] 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 21. These may be reviewed prior to the commencement of construction works and incorporated into a Construction Environmental Management Plan (CEMP) or similar if required by the LA.

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

Table 21 Fugitive Dust Emission Mitigation Measures

Issue	Control Measure
Communications	• Display the name and contact details of person(s) accountable for air quality and dust issues on the site boundary. This may be the environment manager/engineer or the site manager • Display the head or regional office contact information • Develop and implement a Dust Management Plan (DMP), which may include measures to control other emissions, approved by the LA
Site management	• Record all dust and air quality complaints, identify cause(s), take appropriate measures to reduce emissions in a timely manner, and record the measures taken • Make the complaints log available to the LA upon request • Record any exceptional incidents that cause dust and/or air emissions, either on- or offsite, and the action taken to resolve the situation in the log book
Monitoring	• Undertake daily on-site and off-site inspection to monitor dust, record inspection results, and make the log available to the LA upon request • Carry out regular site inspections to monitor compliance with the DMP, record inspection results, and make an inspection log available to the LA upon request • Increase the frequency of site inspections when activities with a high potential to produce dust are being carried out and during prolonged dry or windy conditions
Site preparation	• Plan site layout so that machinery and dust causing activities are located away from receptors, as far as is possible • Fully enclose site or specific operations where there is a high potential for dust production and they are active for an extensive period • Avoid site runoff of water or mud • Keep site fencing, barriers and scaffolding clean using wet methods • Remove materials that have a potential to produce dust from site as soon as possible, unless being re-used • Cover, seed or fence stockpiles to prevent wind whipping
Operating vehicle/machinery and sustainable travel	• Ensure all vehicles switch off engines when stationary - no idling vehicles • Avoid the use of diesel or petrol powered generators and use mains electricity or battery powered equipment where practicable • Produce a Construction Logistics Plan to manage the sustainable delivery of goods and materials

Issue	Control Measure
Operations	• Only use cutting, grinding or sawing equipment fitted or in conjunction with suitable dust suppression techniques • Ensure an adequate water supply on the site for effective dust suppression, using non-potable water where possible and appropriate • Use enclosed chutes and conveyors and covered skips • Minimise drop heights and use fine water sprays wherever appropriate • Ensure equipment is available to clean any dry spillages, and clean up spillages as soon as reasonably practicable using wet cleaning methods
Waste management	• Avoid bonfires or burning of waste materials
Earthworks	• Re-vegetate earthworks and exposed areas/soil stockpiles to stabilise surfaces as soon as practicable • Use Hessian, mulches or trackifiers where it is not possible to re-vegetate or cover with topsoil as soon as practicable • Only remove cover in small areas during work and not all at once
Construction	• Avoid scabbling (roughening of concrete surfaces) if possible • Ensure sand and other aggregates are stored in bunded areas and are not allowed to dry out • For smaller supplies of fine powder materials ensure bags are sealed after use and stored appropriately to prevent dust
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 hall routes and any subsequent action in a site log book • Record all inspections of haul routes and any subsequent action in a site log book • Implement a wheel washing system, if required • Ensure there is an adequate area of hard surfaced road between the wheel wash facility and the site exit, wherever site size and layout permits • Access gates to be located at least 10m from receptors where possible

Step 4

5.2.17 Assuming the relevant mitigation measures outlined in Table 21 are implemented, the residual impacts from all dust generating activities is predicted to be **not significant**, in accordance with the IAQM guidance[19].

5.3 Operational Phase Assessment

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

5.3.2 The assessment considered the following scenarios:

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

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

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

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

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

Potential Development Impacts

Predicted Concentrations

5.3.6 Annual mean NO_2 concentrations were predicted at the sensitive receptor locations for the DM and DS scenarios. These are summarised in Table 22.

Table 22 Predicted Annual Mean NO_2 Concentrations

Receptor		Predicted Annual Mean NO_2 Concentration (µg/m³)		
		DM	DS	Change
R1	Residential - B1450, Burringham Road	14.36	14.46	0.10
R2	Lindsey Lodge Hospice - B1450, Burringham Road	14.48	14.74	0.26
R3	Residential - B1450, Burringham Road	15.77	16.17	0.40
R4	Residential - B1450, Burringham Road	14.40	14.63	0.23
R5	Residential - B1450, Burringham Road	15.93	16.09	0.16
R6	Residential - Scotter Road South	15.42	15.51	0.09
R7	Residential - B1450, Burringham Road	18.55	18.84	0.29
R8	Residential - B1450, Burringham Road	15.99	16.12	0.13
R9	Residential - B1450, Burringham Road	15.68	15.81	0.13
R10	Residential - B1450, Burringham Road	17.20	17.39	0.19
R11	Residential - Scotter Road	16.14	16.34	0.20
R12	Residential - Scotter Road	14.74	14.85	0.11
R13	Residential - Scotter Road	17.51	17.71	0.20
R14	Residential - Scotter Road	15.51	15.59	0.08
R15	Residential - Scotter Road	14.77	14.83	0.06
R16	Residential - West Common Lane	17.00	17.16	0.16
R17	Residential - West Common Lane	16.24	16.35	0.11
A1	Residential - A18, Queensway	16.98	17.12	0.14
A2	Residential - B1501, Grange Lane North	16.12	16.26	0.14

Receptor		Predicted Annual Mean NO_2 Concentration (µg/m³)		
		DM	DS	Change
A3	Residential - B1501, Grange Lane North	15.88	16.01	0.13
A4	Residential - A18, Queensway	15.93	16.05	0.12
A5	Residential - A18, Queensway	15.21	15.31	0.10
A6	Residential - East Common Lane	13.56	13.68	0.12
A7	Residential - East Common Lane	14.09	14.27	0.18
A8	Residential - East Common Lane	14.51	14.75	0.24
A9	Residential - East Common Lane	14.49	14.72	0.23
A10	Residential - East Common Lane	14.30	14.50	0.20
A11	Residential - B1501, Grange Lane North	13.63	13.69	0.06
A12	Residential - A18, Queensway	18.43	18.58	0.15

5.3.7 As indicated in Table 22, predicted annual mean NO_2 concentrations were below the relevant AQO at all sensitive receptor locations in both the DM and DS scenarios. Reference should be made to Figures 5 and 6 for graphical representations of annual mean NO_2 concentrations across the assessment area for the DM and DS scenarios, respectively.

5.3.8 Annual mean PM_{10} concentrations were predicted at the sensitive receptor locations for the DM and DS scenarios. These are summarised in Table 23.

Table 23 Predicted Annual Mean PM_{10} Concentrations

Receptor		Predicted Annual Mean PM_{10} Concentration (µg/m³)		
		DM	DS	Change
R1	Residential - B1450, Burringham Road	22.42	22.44	0.02
R2	Lindsey Lodge Hospice - B1450, Burringham Road	22.44	22.49	0.05
R3	Residential - B1450, Burringham Road	22.64	22.71	0.08
R4	Residential - B1450, Burringham Road	22.38	22.43	0.04

Receptor		Predicted Annual Mean PM_{10} Concentration (µg/m³)		
		DM	DS	Change
R5	Residential - B1450, Burringham Road	22.64	22.67	0.03
R6	Residential - Scotter Road South	22.62	22.64	0.02
R7	Residential - B1450, Burringham Road	23.12	23.17	0.05
R8	Residential - B1450, Burringham Road	22.61	22.63	0.02
R9	Residential - B1450, Burringham Road	22.56	22.59	0.02
R10	Residential - B1450, Burringham Road	22.81	22.85	0.03
R11	Residential - Scotter Road	22.67	22.70	0.04
R12	Residential - Scotter Road	22.50	22.53	0.02
R13	Residential - Scotter Road	22.88	22.92	0.03
R14	Residential - Scotter Road	22.54	22.56	0.02
R15	Residential - Scotter Road	22.51	22.52	0.01
R16	Residential - West Common Lane	22.81	22.84	0.03
R17	Residential - West Common Lane	22.73	22.75	0.02
A1	Residential - A18, Queensway	22.88	22.91	0.03
A2	Residential - B1501, Grange Lane North	22.67	22.70	0.02
A3	Residential - B1501, Grange Lane North	22.63	22.65	0.02
A4	Residential - A18, Queensway	22.70	22.72	0.02
A5	Residential - A18, Queensway	22.56	22.58	0.02
A6	Residential - East Common Lane	22.21	22.24	0.02
A7	Residential - East Common Lane	22.30	22.33	0.03
A8	Residential - East Common Lane	22.37	22.41	0.04
A9	Residential - East Common Lane	22.37	22.40	0.04
A10	Residential - East Common Lane	22.37	22.41	0.04
A11	Residential - B1501, Grange Lane North	22.25	22.26	0.01
A12	Residential - A18, Queensway	23.27	23.30	0.03

5.3.9 As indicated in Table 23, predicted annual mean PM_{10} concentrations were below the relevant AQO at all sensitive receptors in both the DM and DS scenarios. Reference should be made to Figures 7 and 8 for graphical representations of annual mean PM_{10} concentrations across the assessment area for the DM and DS scenarios, respectively.

5.3.10 The number of days with 24-hour PM_{10} concentrations above 50µg/m³ were predicted at the sensitive receptor locations for the DM and DS scenarios. These are summarised in Table 24.

Table 24 Predicted Number of Days with 24-hour Mean PM_{10} Concentrations above 50µg/m³

Receptor		Predicted Number of Days with 24-hour Mean PM_{10} Concentrations above 50µg/m³ (Days)		
		DM	DS	Change
R1	Residential - B1450, Burringham Road	7	7	0
R2	Lindsey Lodge Hospice - B1450, Burringham Road	7	7	0
R3	Residential - B1450, Burringham Road	7	8	0
R4	Residential - B1450, Burringham Road	7	7	0
R5	Residential - B1450, Burringham Road	7	7	0
R6	Residential - Scotter Road South	7	7	0
R7	Residential - B1450, Burringham Road	8	8	0
R8	Residential - B1450, Burringham Road	7	7	0
R9	Residential - B1450, Burringham Road	7	7	0
R10	Residential - B1450, Burringham Road	8	8	0
R11	Residential - Scotter Road	7	8	0
R12	Residential - Scotter Road	7	7	0
R13	Residential - Scotter Road	8	8	0
R14	Residential - Scotter Road	7	7	0
R15	Residential - Scotter Road	7	7	0
R16	Residential - West Common Lane	8	8	0

Receptor		Predicted Number of Days with 24-hour Mean PM_{10} Concentrations above 50µg/m³ (Days)		
		DM	DS	Change
R17	Residential - West Common Lane	8	8	0
A1	Residential - A18, Queensway	8	8	0
A2	Residential - B1501, Grange Lane North	7	8	0
A3	Residential - B1501, Grange Lane North	7	7	0
A4	Residential - A18, Queensway	8	8	0
A5	Residential - A18, Queensway	7	7	0
A6	Residential - East Common Lane	7	7	0
A7	Residential - East Common Lane	7	7	0
A8	Residential - East Common Lane	7	7	0
A9	Residential - East Common Lane	7	7	0
A10	Residential - East Common Lane	7	7	0
A11	Residential - B1501, Grange Lane North	7	7	0
A12	Residential - A18, Queensway	9	9	0

5.3.11 As indicated in Table 24, the number of days with PM_{10} concentrations above 50µg/m³ was below the permitted number of 35 at all sensitive receptors. Reference should be made to Figures 9 and 10 for graphical representations of the number of days with PM_{10} concentrations above 50µg/m³ across the assessment area for the DM and DS scenarios, respectively.

5.3.12 Annual mean $PM_{2.5}$ concentrations were predicted at the sensitive receptor locations for the DM and DS scenarios. These are summarised in Table 25.

Table 25 Predicted Annual Mean $PM_{2.5}$ Concentrations

Receptor		Predicted Annual Mean $PM_{2.5}$ Concentration (µg/m³)		
		DM	DS	Change
R1	Residential - B1450, Burringham Road	7.24	7.25	0.01
R2	Lindsey Lodge Hospice - B1450, Burringham Road	7.25	7.28	0.03
R3	Residential - B1450, Burringham Road	7.37	7.42	0.04
R4	Residential - B1450, Burringham Road	7.22	7.25	0.02
R5	Residential - B1450, Burringham Road	7.37	7.39	0.02
R6	Residential - Scotter Road South	7.36	7.37	0.01
R7	Residential - B1450, Burringham Road	7.65	7.68	0.03
R8	Residential - B1450, Burringham Road	7.36	7.37	0.01
R9	Residential - B1450, Burringham Road	7.33	7.35	0.01
R10	Residential - B1450, Burringham Road	7.48	7.50	0.02
R11	Residential - Scotter Road	7.39	7.41	0.02
R12	Residential - Scotter Road	7.29	7.30	0.01
R13	Residential - Scotter Road	7.52	7.54	0.02
R14	Residential - Scotter Road	7.32	7.33	0.01
R15	Residential - Scotter Road	7.29	7.30	0.01
R16	Residential - West Common Lane	7.48	7.49	0.02
R17	Residential - West Common Lane	7.43	7.44	0.01
A1	Residential - A18, Queensway	7.51	7.53	0.02
A2	Residential - B1501, Grange Lane North	7.39	7.41	0.01
A3	Residential - B1501, Grange Lane North	7.37	7.38	0.01
A4	Residential - A18, Queensway	7.41	7.42	0.01
A5	Residential - A18, Queensway	7.32	7.34	0.01
A6	Residential - East Common Lane	7.13	7.14	0.01
A7	Residential - East Common Lane	7.18	7.19	0.02
A8	Residential - East Common Lane	7.22	7.24	0.02

Receptor		Predicted Annual Mean $PM_{2.5}$ Concentration (µg/m³)		
		DM	DS	Change
A9	Residential - East Common Lane	7.22	7.24	0.02
A10	Residential - East Common Lane	7.22	7.24	0.02
A11	Residential - B1501, Grange Lane North	7.15	7.15	0.01
A12	Residential - A18, Queensway	7.73	7.75	0.02

5.3.13 As indicated in Table 25, predicted annual mean $PM_{2.5}$ concentrations were below the Interim Target at all sensitive receptors in both the DM and DS scenarios. Reference should be made to Figures 11 and 12 for graphical representations of annual mean $PM_{2.5}$ concentrations across the assessment area for the DM and DS scenarios, respectively.

Predicted Impacts

5.3.14 Predicted impacts on annual mean NO_2 concentrations at the sensitive receptor locations are summarised in Table 26.

Table 26 Predicted Impacts - NO_2

Receptor		Predicted Annual Mean NO_2 Concentration	Predicted Concentration Change as Proportion of AQO (%)	Impact Significance
R1	Residential - B1450, Burringham Road	Below 75% of AQO	0	Negligible
R2	Lindsey Lodge Hospice - B1450, Burringham Road	Below 75% of AQO	1	Negligible
R3	Residential - B1450, Burringham Road	Below 75% of AQO	1	Negligible
R4	Residential - B1450, Burringham Road	Below 75% of AQO	1	Negligible
R5	Residential - B1450, Burringham Road	Below 75% of AQO	0	Negligible
R6	Residential - Scotter Road South	Below 75% of AQO	0	Negligible

Receptor		Predicted Annual Mean NO_2 Concentration	Predicted Concentration Change as Proportion of AQO (%)	Impact Significance
R7	Residential - B1450, Burringham Road	Below 75% of AQO	1	Negligible
R8	Residential - B1450, Burringham Road	Below 75% of AQO	0	Negligible
R9	Residential - B1450, Burringham Road	Below 75% of AQO	0	Negligible
R10	Residential - B1450, Burringham Road	Below 75% of AQO	0	Negligible
R11	Residential - Scotter Road	Below 75% of AQO	1	Negligible
R12	Residential - Scotter Road	Below 75% of AQO	0	Negligible
R13	Residential - Scotter Road	Below 75% of AQO	1	Negligible
R14	Residential - Scotter Road	Below 75% of AQO	0	Negligible
R15	Residential - Scotter Road	Below 75% of AQO	0	Negligible
R16	Residential - West Common Lane	Below 75% of AQO	0	Negligible
R17	Residential - West Common Lane	Below 75% of AQO	0	Negligible
A1	Residential - A18, Queensway	Below 75% of AQO	0	Negligible
A2	Residential - B1501, Grange Lane North	Below 75% of AQO	0	Negligible
A3	Residential - B1501, Grange Lane North	Below 75% of AQO	0	Negligible
A4	Residential - A18, Queensway	Below 75% of AQO	0	Negligible
A5	Residential - A18, Queensway	Below 75% of AQO	0	Negligible
A6	Residential - East Common Lane	Below 75% of AQO	0	Negligible
A7	Residential - East Common Lane	Below 75% of AQO	0	Negligible
A8	Residential - East Common Lane	Below 75% of AQO	1	Negligible
A9	Residential - East Common Lane	Below 75% of AQO	1	Negligible
A10	Residential - East Common Lane	Below 75% of AQO	1	Negligible
A11	Residential - B1501, Grange Lane North	Below 75% of AQO	0	Negligible

Receptor		Predicted Annual Mean NO_2 Concentration	Predicted Concentration Change as Proportion of AQO (%)	Impact Significance
A12	Residential - A18, Queensway	Below 75% of AQO	0	Negligible

5.3.15 As indicated in Table 26, impacts on annual mean NO_2 concentrations as a result of the proposed development were predicted to be **negligible** at all receptor locations.

5.3.16 Predicted impacts on annual mean PM_{10} concentrations at the sensitive receptor locations are summarised in Table 27.

Table 27 Predicted Impacts - PM_{10}

Receptor		Predicted Annual Mean PM_{10} Concentration	Predicted Concentration Change as Proportion of AQO (%)	Impact Significance
R1	Residential - B1450, Burringham Road	Below 75% of AQO	0	Negligible
R2	Lindsey Lodge Hospice - B1450, Burringham Road	Below 75% of AQO	0	Negligible
R3	Residential - B1450, Burringham Road	Below 75% of AQO	0	Negligible
R4	Residential - B1450, Burringham Road	Below 75% of AQO	0	Negligible
R5	Residential - B1450, Burringham Road	Below 75% of AQO	0	Negligible
R6	Residential - Scotter Road South	Below 75% of AQO	0	Negligible
R7	Residential - B1450, Burringham Road	Below 75% of AQO	0	Negligible
R8	Residential - B1450, Burringham Road	Below 75% of AQO	0	Negligible
R9	Residential - B1450, Burringham Road	Below 75% of AQO	0	Negligible
R10	Residential - B1450, Burringham Road	Below 75% of AQO	0	Negligible
R11	Residential - Scotter Road	Below 75% of AQO	0	Negligible

Receptor		Predicted Annual Mean PM_{10} Concentration	Predicted Concentration Change as Proportion of AQO (%)	Impact Significance
R12	Residential - Scotter Road	Below 75% of AQO	0	Negligible
R13	Residential - Scotter Road	Below 75% of AQO	0	Negligible
R14	Residential - Scotter Road	Below 75% of AQO	0	Negligible
R15	Residential - Scotter Road	Below 75% of AQO	0	Negligible
R16	Residential - West Common Lane	Below 75% of AQO	0	Negligible
R17	Residential - West Common Lane	Below 75% of AQO	0	Negligible
A1	Residential - A18, Queensway	Below 75% of AQO	0	Negligible
A2	Residential - B1501, Grange Lane North	Below 75% of AQO	0	Negligible
A3	Residential - B1501, Grange Lane North	Below 75% of AQO	0	Negligible
A4	Residential - A18, Queensway	Below 75% of AQO	0	Negligible
A5	Residential - A18, Queensway	Below 75% of AQO	0	Negligible
A6	Residential - East Common Lane	Below 75% of AQO	0	Negligible
A7	Residential - East Common Lane	Below 75% of AQO	0	Negligible
A8	Residential - East Common Lane	Below 75% of AQO	0	Negligible
A9	Residential - East Common Lane	Below 75% of AQO	0	Negligible
A10	Residential - East Common Lane	Below 75% of AQO	0	Negligible
A11	Residential - B1501, Grange Lane North	Below 75% of AQO	0	Negligible
A12	Residential - A18, Queensway	Below 75% of AQO	0	Negligible

5.3.17 As indicated in Table 27, impacts on annual mean PM_{10} concentrations as a result of the proposed development were predicted to be **negligible** at all receptor locations.

5.3.18 Predicted impacts on 24-hour mean PM_{10} concentrations at the sensitive receptor locations are summarised in Table 27.

Table 28 Predicted Impacts - 24-hour Mean PM_{10}

Receptor		Predicted Number of Days with Concentrations above 50µg/m³	Predicted Change in Number of Days as Proportion of Permitted Number (%)	Impact Significance
R1	Residential - B1450, Burringham Road	Below 75% of permitted number	0	Negligible
R2	Lindsey Lodge Hospice - B1450, Burringham Road	Below 75% of permitted number	0	Negligible
R3	Residential - B1450, Burringham Road	Below 75% of permitted number	0	Negligible
R4	Residential - B1450, Burringham Road	Below 75% of permitted number	0	Negligible
R5	Residential - B1450, Burringham Road	Below 75% of permitted number	0	Negligible
R6	Residential - Scotter Road South	Below 75% of permitted number	0	Negligible
R7	Residential - B1450, Burringham Road	Below 75% of permitted number	0	Negligible
R8	Residential - B1450, Burringham Road	Below 75% of permitted number	0	Negligible
R9	Residential - B1450, Burringham Road	Below 75% of permitted number	0	Negligible
R10	Residential - B1450, Burringham Road	Below 75% of permitted number	0	Negligible
R11	Residential - Scotter Road	Below 75% of permitted number	0	Negligible
R12	Residential - Scotter Road	Below 75% of permitted number	0	Negligible
R13	Residential - Scotter Road	Below 75% of permitted number	0	Negligible
R14	Residential - Scotter Road	Below 75% of permitted number	0	Negligible
R15	Residential - Scotter Road	Below 75% of permitted number	0	Negligible
R16	Residential - West Common Lane	Below 75% of permitted number	0	Negligible

Receptor		Predicted Number of Days with Concentrations above 50µg/m³	Predicted Change in Number of Days as Proportion of Permitted Number (%)	Impact Significance
R17	Residential - West Common Lane	Below 75% of permitted number	0	Negligible
A1	Residential - A18, Queensway	Below 75% of permitted number	0	Negligible
A2	Residential - B1501, Grange Lane North	Below 75% of permitted number	0	Negligible
A3	Residential - B1501, Grange Lane North	Below 75% of permitted number	0	Negligible
A4	Residential - A18, Queensway	Below 75% of permitted number	0	Negligible
A5	Residential - A18, Queensway	Below 75% of permitted number	0	Negligible
A6	Residential - East Common Lane	Below 75% of permitted number	0	Negligible
A7	Residential - East Common Lane	Below 75% of permitted number	0	Negligible
A8	Residential - East Common Lane	Below 75% of permitted number	0	Negligible
A9	Residential - East Common Lane	Below 75% of permitted number	0	Negligible
A10	Residential - East Common Lane	Below 75% of permitted number	0	Negligible
A11	Residential - B1501, Grange Lane North	Below 75% of permitted number	0	Negligible
A12	Residential - A18, Queensway	Below 75% of permitted number	0	Negligible

5.3.19 As indicated in Table 27, impacts on 24-hour mean PM_{10} concentrations as a result of the proposed development were predicted to be **negligible** at all locations.

5.3.20 Predicted impacts on annual mean $PM_{2.5}$ concentrations at the sensitive receptor locations are summarised in Table 29.

Table 29 Predicted Impacts - $PM_{2.5}$

Receptor		Predicted Annual Mean $PM_{2.5}$ Concentration	Predicted Concentration Change as Proportion of Interim Target (%)	Impact Significance
R1	Residential - B1450, Burringham Road	Below 75% of Interim Target	0	Negligible
R2	Lindsey Lodge Hospice - B1450, Burringham Road	Below 75% of Interim Target	0	Negligible
R3	Residential - B1450, Burringham Road	Below 75% of Interim Target	0	Negligible
R4	Residential - B1450, Burringham Road	Below 75% of Interim Target	0	Negligible
R5	Residential - B1450, Burringham Road	Below 75% of Interim Target	0	Negligible
R6	Residential - Scotter Road South	Below 75% of Interim Target	0	Negligible
R7	Residential - B1450, Burringham Road	Below 75% of Interim Target	0	Negligible
R8	Residential - B1450, Burringham Road	Below 75% of Interim Target	0	Negligible
R9	Residential - B1450, Burringham Road	Below 75% of Interim Target	0	Negligible
R10	Residential - B1450, Burringham Road	Below 75% of Interim Target	0	Negligible
R11	Residential - Scotter Road	Below 75% of Interim Target	0	Negligible
R12	Residential - Scotter Road	Below 75% of Interim Target	0	Negligible
R13	Residential - Scotter Road	Below 75% of Interim Target	0	Negligible
R14	Residential - Scotter Road	Below 75% of Interim Target	0	Negligible
R15	Residential - Scotter Road	Below 75% of Interim Target	0	Negligible
R16	Residential - West Common Lane	Below 75% of Interim Target	0	Negligible

Receptor		Predicted Annual Mean $PM_{2.5}$ Concentration	Predicted Concentration Change as Proportion of Interim Target (%)	Impact Significance
R17	Residential - West Common Lane	Below 75% of Interim Target	0	Negligible
A1	Residential - A18, Queensway	Below 75% of Interim Target	0	Negligible
A2	Residential - B1501, Grange Lane North	Below 75% of Interim Target	0	Negligible
A3	Residential - B1501, Grange Lane North	Below 75% of Interim Target	0	Negligible
A4	Residential - A18, Queensway	Below 75% of Interim Target	0	Negligible
A5	Residential - A18, Queensway	Below 75% of Interim Target	0	Negligible
A6	Residential - East Common Lane	Below 75% of Interim Target	0	Negligible
A7	Residential - East Common Lane	Below 75% of Interim Target	0	Negligible
A8	Residential - East Common Lane	Below 75% of Interim Target	0	Negligible
A9	Residential - East Common Lane	Below 75% of Interim Target	0	Negligible
A10	Residential - East Common Lane	Below 75% of Interim Target	0	Negligible
A11	Residential - B1501, Grange Lane North	Below 75% of Interim Target	0	Negligible
A12	Residential - A18, Queensway	Below 75% of Interim Target	0	Negligible

5.3.21 As indicated in Table 29, impacts on annual mean $PM_{2.5}$ concentrations as a result of the proposed development were predicted to be **negligible** at all receptor locations.

Potential Future Exposure

5.3.22 The proposed development has the potential to expose future residents to poor air quality. As such, annual mean pollutant concentrations were predicted across the site.

Reference should be made to Figures 6, 8, 10 and 12 for graphical representations of the results.

5.3.23 As shown in Figure 6, annual mean NO_2 concentrations were predicted to be below the AQO of 40µg/m^3 across the site. The maximum level at the boundary was 23.19µg/m^3.

5.3.24 As shown in Figure 8, annual mean PM_{10} concentrations were predicted to be below the AQO of 40µg/m^3 across the site. The maximum level at the boundary was 23.78µg/m^3.

5.3.25 As shown in Figure 10, the number of days with PM_{10} concentrations greater than 50µg/m^3 was predicted to be below the permitted number of 35 across the site. The maximum number of days with concentrations above 50µg/m^3 at the site boundary was 9.

5.3.26 As shown in Figure 12, annual mean $PM_{2.5}$ concentrations were predicted to be below the Interim Target of 20µg/m^3 across the site. The maximum level at the boundary was 8.05µg/m^3.

5.3.27 Based on the assessment results, future residents are not predicted to be exposed to pollutant concentrations above the relevant AQOs and Interim Target. The site is therefore considered suitable for the proposed use from an air quality perspective.

Overall Impact Significance

5.3.28 The overall significance of operational phase road traffic emission impacts was determined as **negligible**. This was based on the overall predicted impacts at discrete receptor locations and the considerations outlined previously. Further justification is provided in Table 30.

Table 30 Overall Operational Phase Impact Significance

Guidance	Comment
The existing and future air quality in the absence of the development	Predicted annual mean NO_2, PM_{10} and $PM_{2.5}$ and 24-hour mean PM_{10} concentrations were below the relevant AQOs and Interim Target at all locations in the DM scenario It is considered unlikely that future air quality conditions will change significantly in the absence of the development given the relatively established nature of the area

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

5.3.29 The IAQM guidance[20] 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.

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

6.0 CONCLUSION

6.1.1 Redmore Environmental Ltd was commissioned by Keepmoat Homes Ltd to undertake an Air Quality Assessment in support of a planning application for a residential development at Lincolnshire Lakes, land east of M181 and north of Burringham Road, Scunthorpe.

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

6.1.3 During the construction phase of the development there is the potential for air quality impacts as a result of fugitive dust emissions from the site. These were assessed in accordance with the IAQM methodology. Assuming good practice dust control measures are implemented, the residual significance of potential air quality impacts from dust generated by earthworks, construction and trackout activities was predicted to be **not significant**.

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

6.1.5 Review of the dispersion modelling results indicated that impacts on annual mean NO_2, PM_{10} and $PM_{2.5}$ concentrations as a result of traffic generated by the development were predicted to be **negligible** at all sensitive receptor locations.

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

6.1.7 Following consideration of the relevant issues, air quality impacts as a result of the operation of the development were considered to be **not significant**, in accordance with the IAQM guidance.

6.1.8 Based on the assessment results, air quality factors are not considered a constraint to the development.

7.0 ABBREVIATIONS

AADT	Annual Average Daily Traffic
ADM	Atmospheric Dispersion Modelling
AQAP	Air Quality Action Plan
AQLV	Air Quality Limit Value
AQMA	Air Quality Management Area
AQO	Air Quality Objective
AQS	Air Quality Strategy
CEMP	Construction Environmental Management Plan
CERC	Cambridge Environmental Research Consultants
DEFRA	Department for Environment, Food and Rural Affairs
DfT	Department for Transport
DM	Do-Minimum
DMP	Dust Management Plan
DMRB	Design Manual for Roads and Bridges
DS	Do-Something
EB	Eastbound
EFT	Emission Factor Toolkit
HDV	Heavy Duty Vehicle
IAQM	Institute of Air Quality Management
LA	Local Authority
LAQM	Local Air Quality Management
NB	Northbound
NGR	National Grid Reference
NLC	North Lincolnshire Council
NO_2	Nitrogen dioxide
NO_x	Oxides of nitrogen
NPPF	National Planning Policy Framework
NPPG	National Planning Policy Guidance
PM_{10}	Particulate Matter with an aerodynamic diameter of less than 10µm
$PM_{2.5}$	Particulate Matter with an aerodynamic diameter of less than 2.5µm
SB	Southbound
SP	Slow Phase
WB	Westbound
z_0	Roughness length

Figures

Legend

Site Boundary

Title
Figure 1 - Site Location Plan

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Air Quality Assessment
Burringham Road, Scunthorpe

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5386

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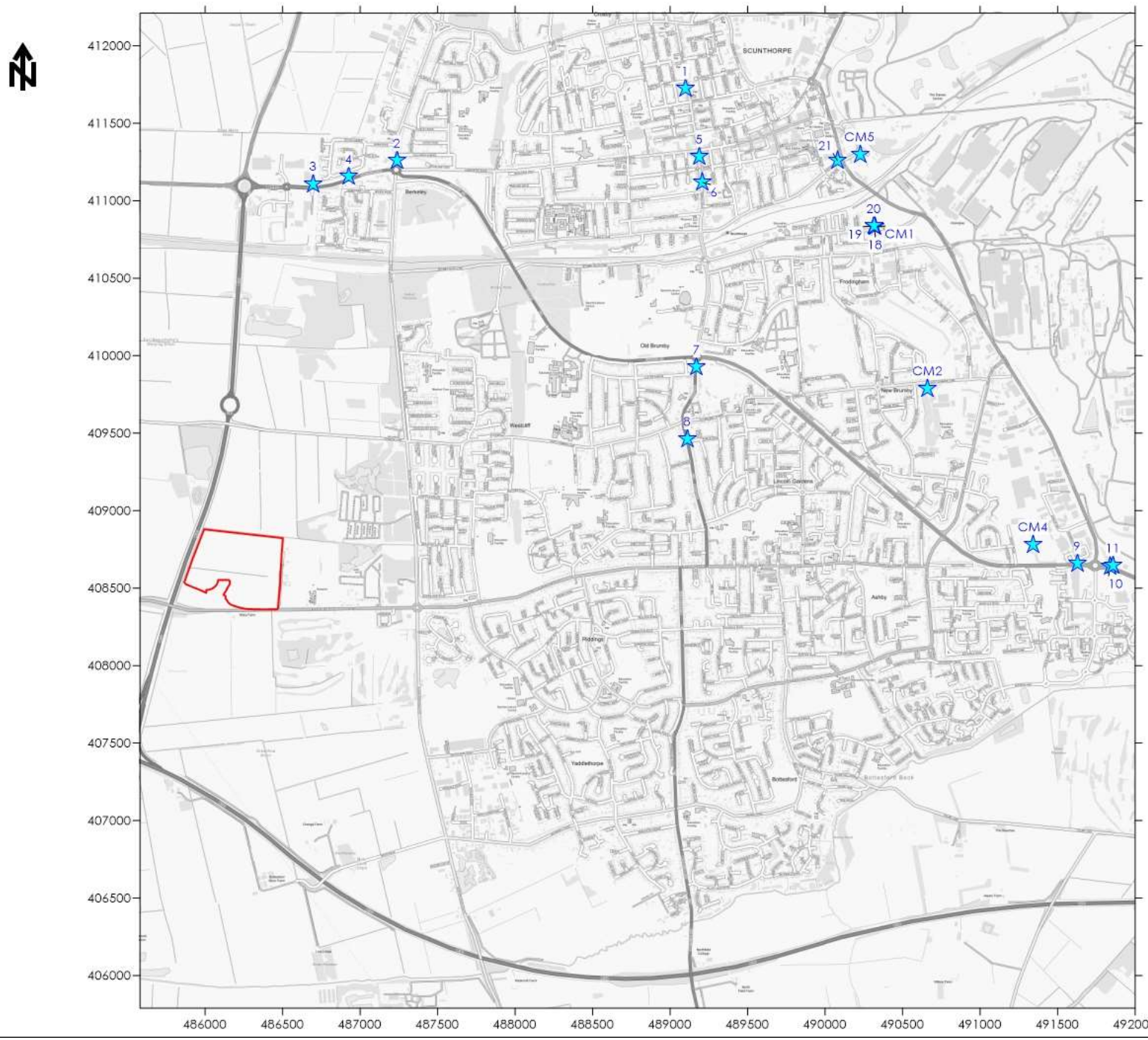

Legend

Site Boundary

Monitor

Title
Figure 2 - Monitorin Locations

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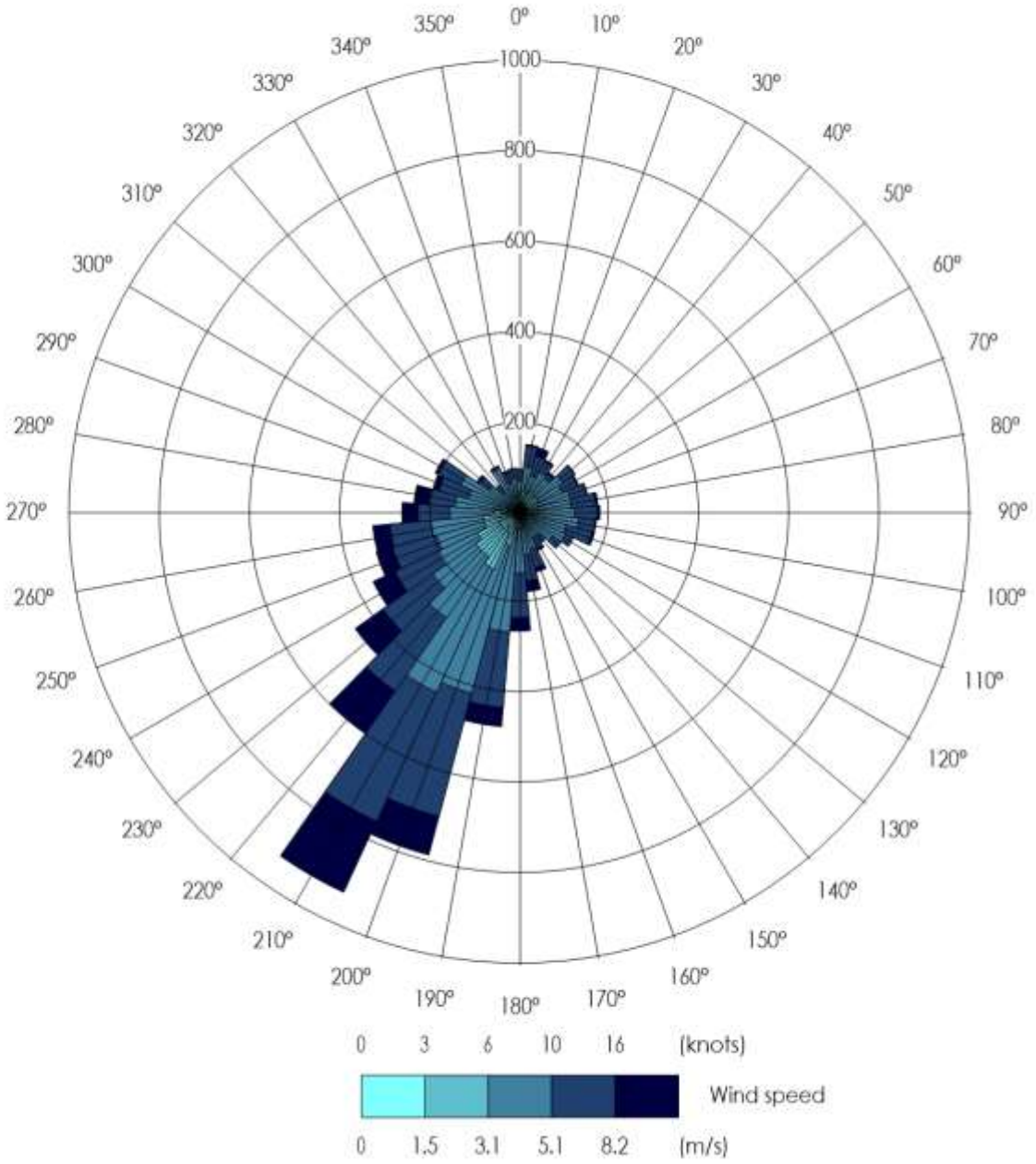

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Figure 3 - Wind Rose of 2019
Humberside Meteorological Data

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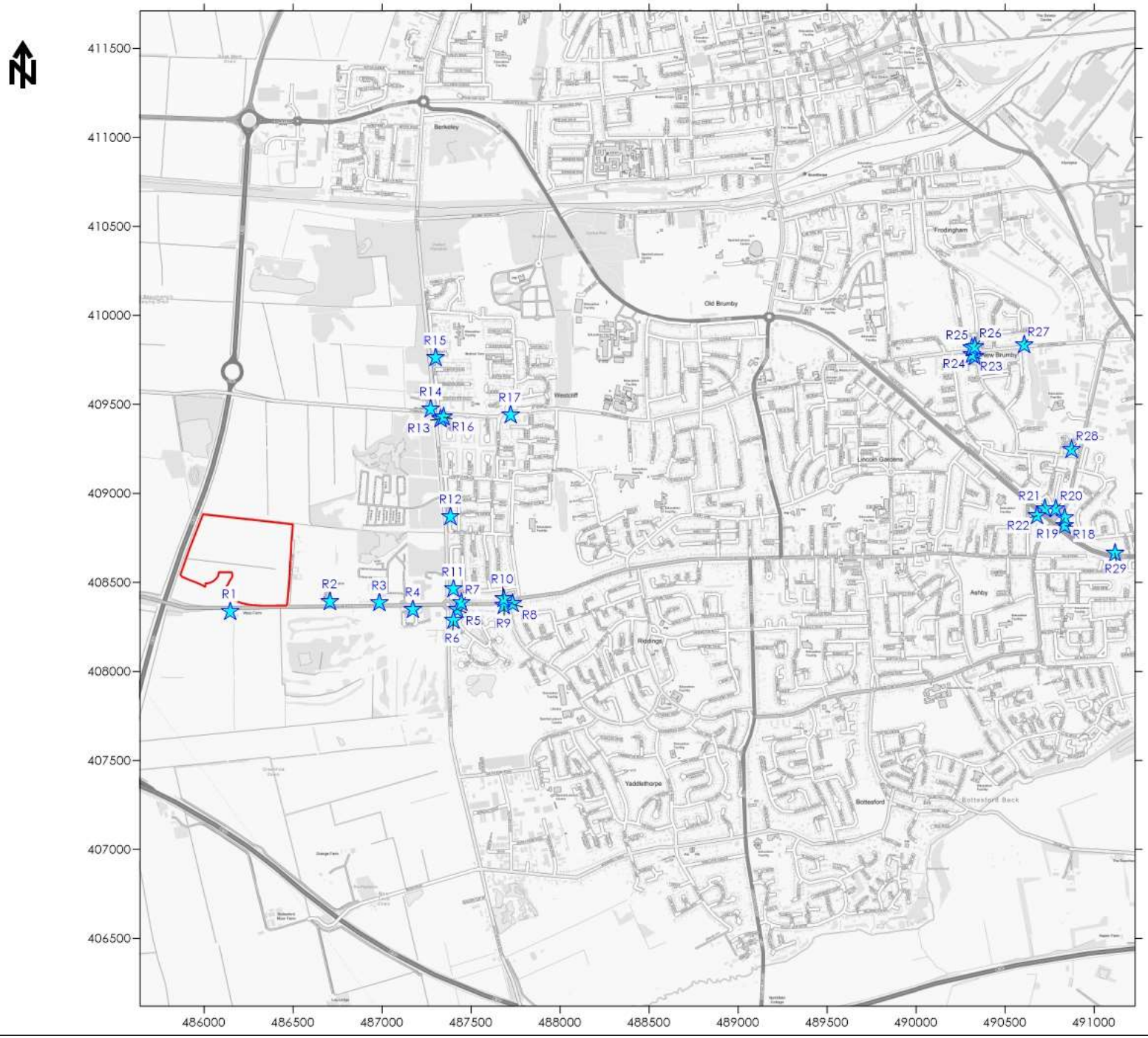

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Site Boundary

Receptor

Title
Figure 4 - Road Vehicle Exhaust Emissions Sensitive Receptor Locations

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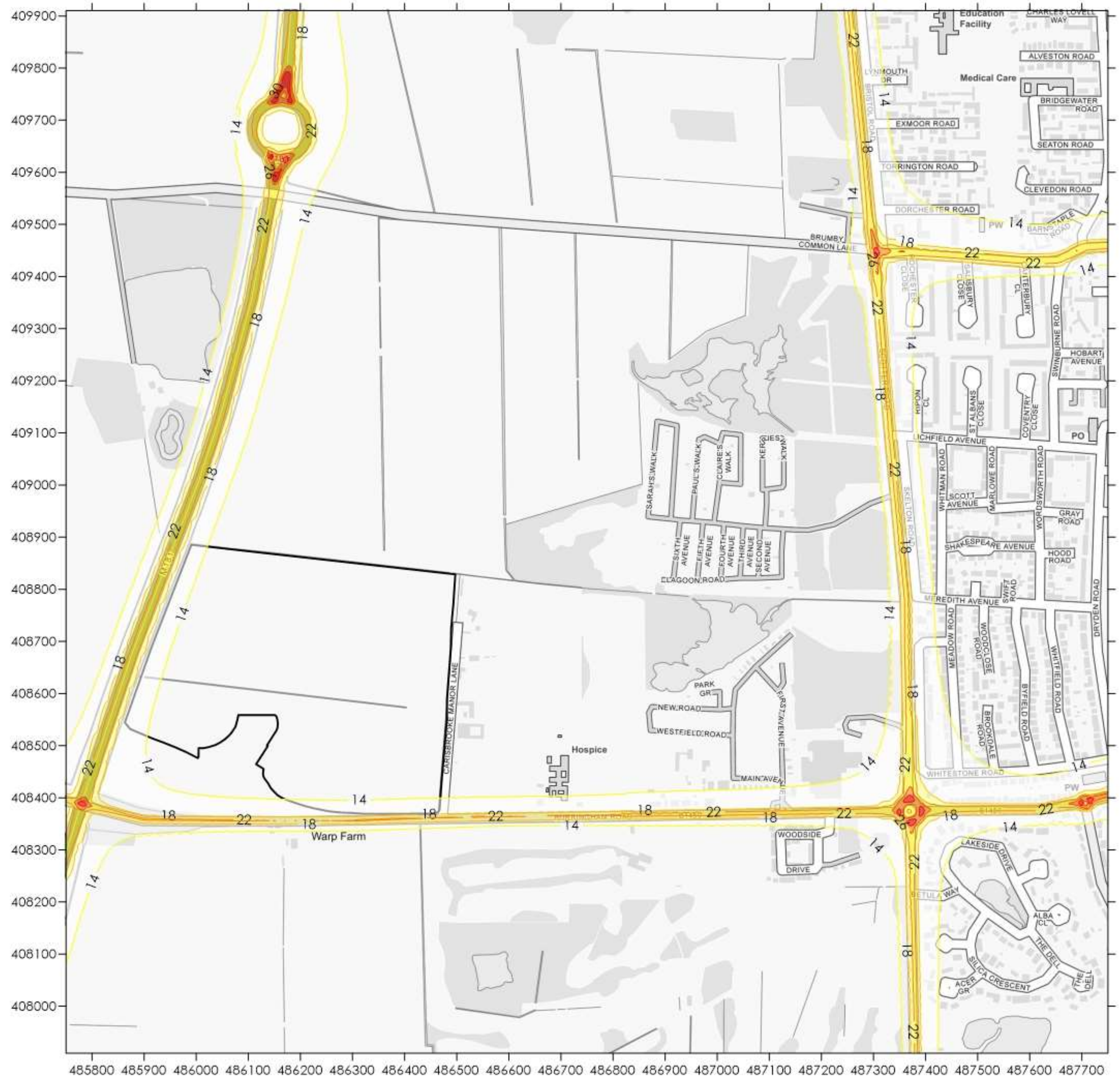

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Site Boundary

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

30

26

22

18

14

Title

Figure 5 - Predicted Annual Mean NO_2 Concentration ($\mu g/m^3$) Do-Minimum

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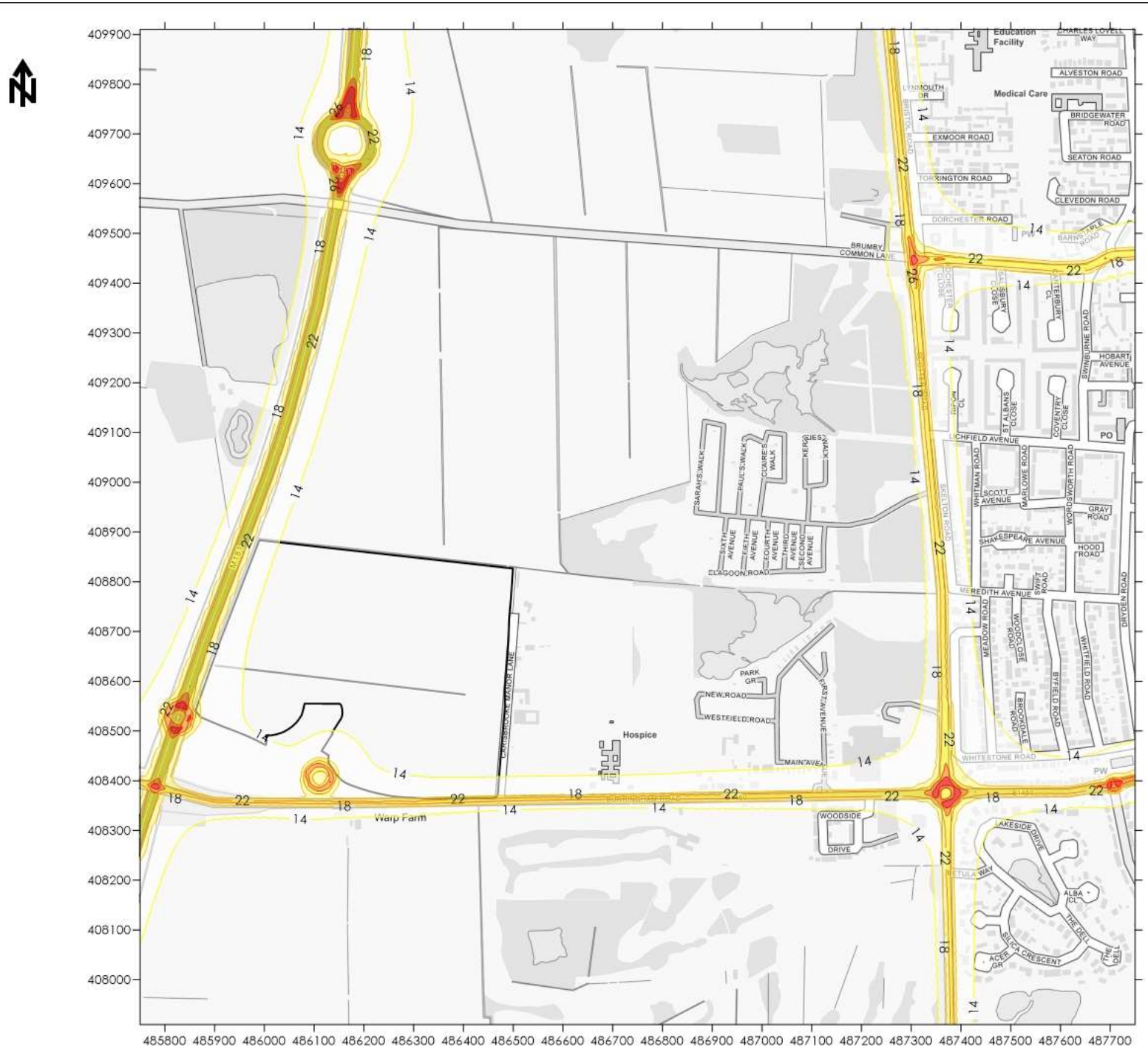

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Site Boundary

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

30
26
22
18
14

Title
Figure 6 - Predicted Annual Mean NO_2 Concentration ($\mu g/m^3$)
Do-Something

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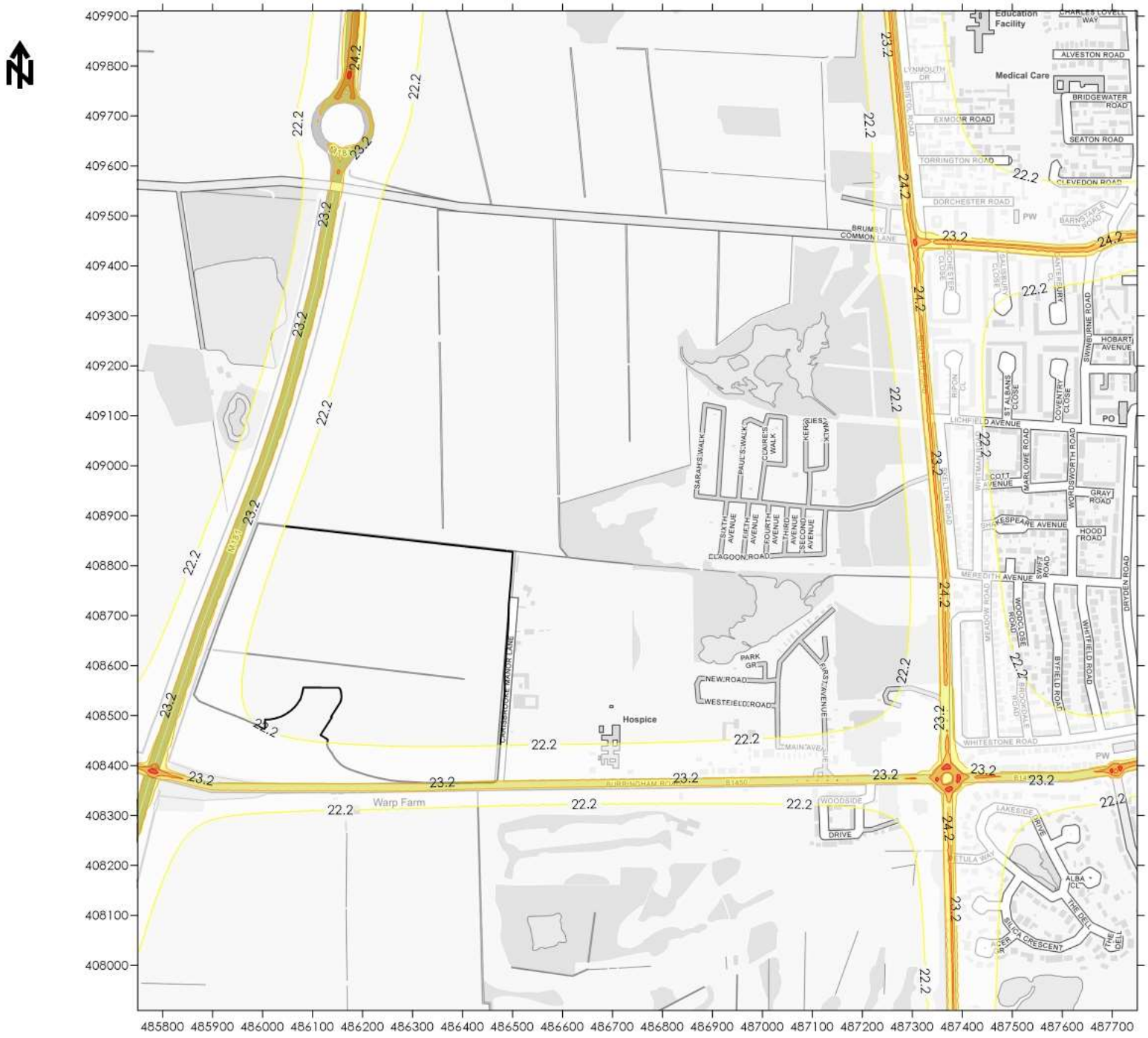

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Site Boundary

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

- 25.2
- 24.2
- 23.2
- 22.2

Title

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

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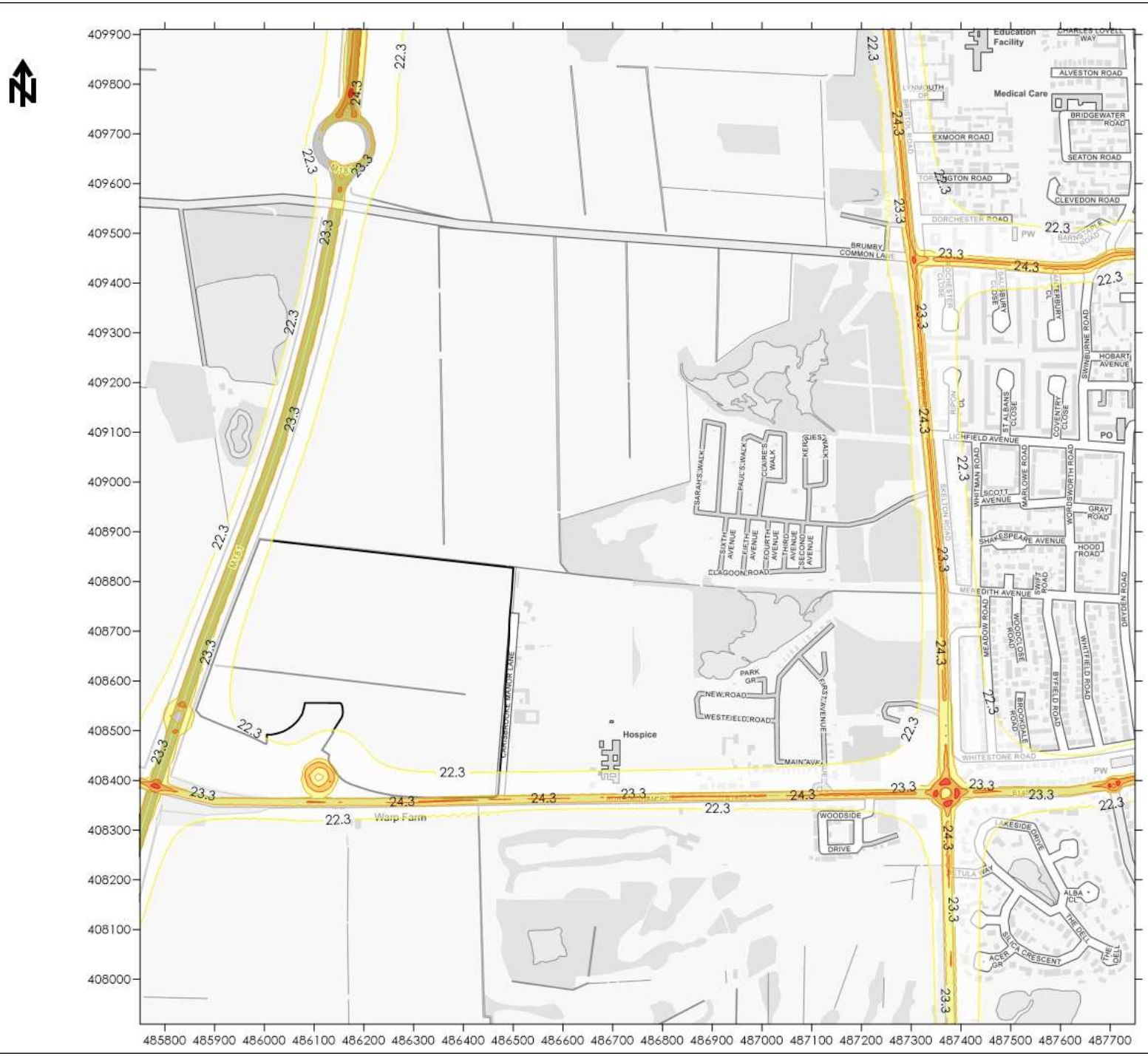

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Site Boundary

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

25.3
24.3
23.3
22.3

Title
Figure 8 - Predicted Annual Mean PM_{10} Concentration ($\mu g/m^3$)
Do-Something

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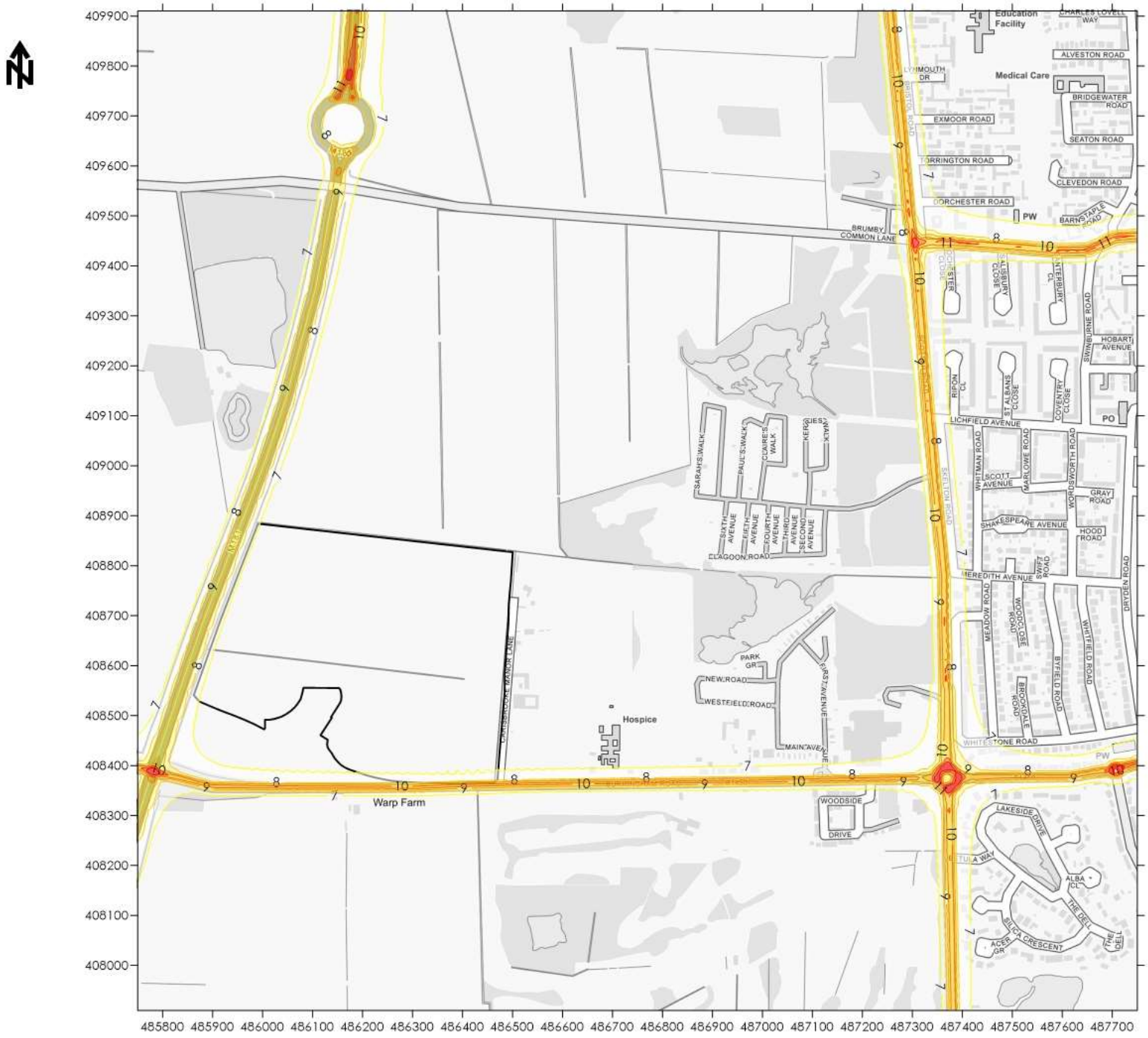

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Site Boundary

Number of Days with PM_{10} Concentrations greater than 50µg/m³ (Days)

12
11
10
9
8
7

Title

Figure 9 - Predicted Number of Days with PM_{10} Concentrations greater than 50µg/m³ (Days) Do-Minimum

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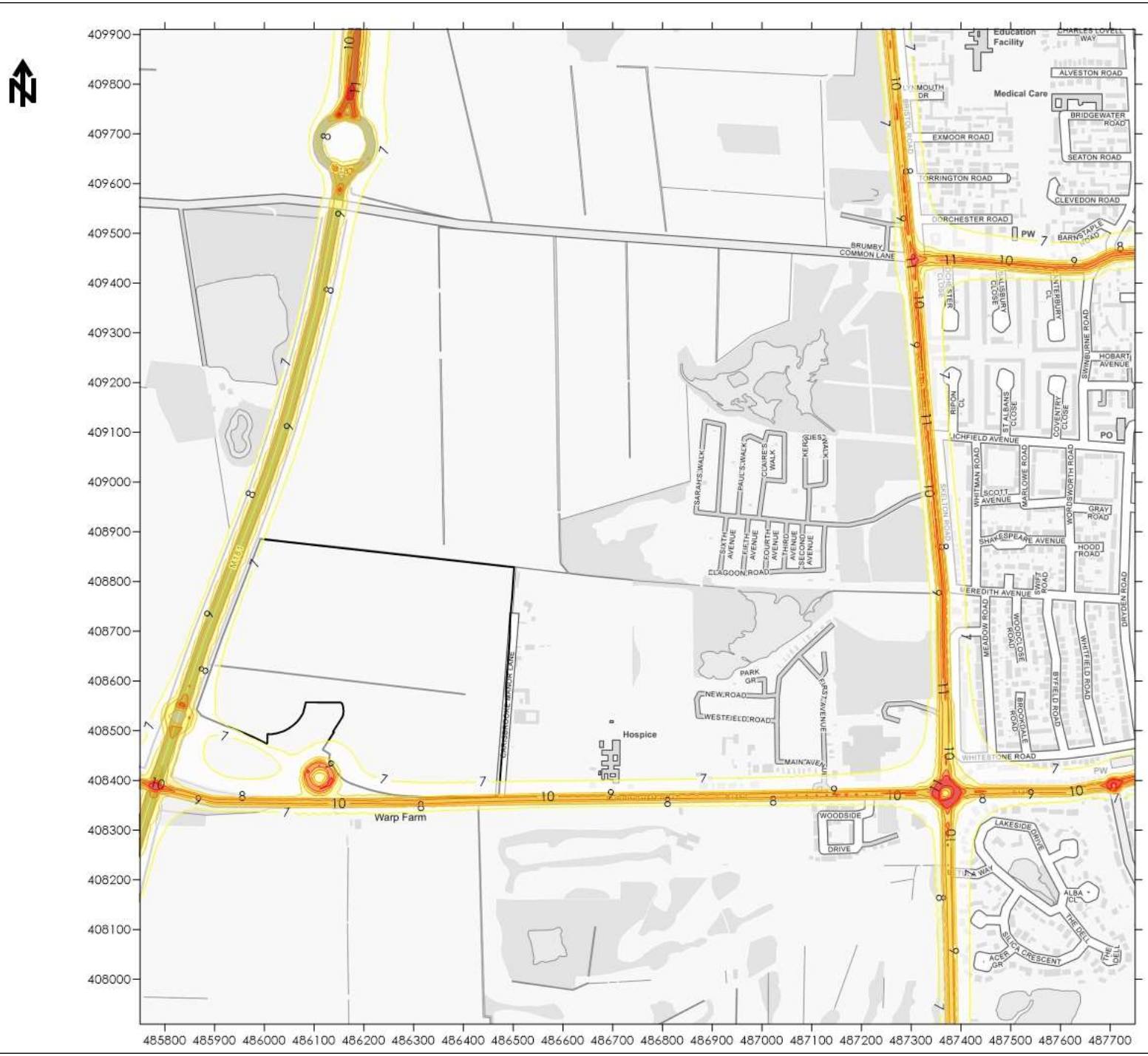

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Site Boundary

12
11
10
9
8
7

Number of Days with PM_{10} Concentrations greater than 50µg/m³ (Days)

Title

Figure 10 - Predicted Number of Days with PM_{10} Concentrations greater than 50µg/m³ (Days) Do-Something

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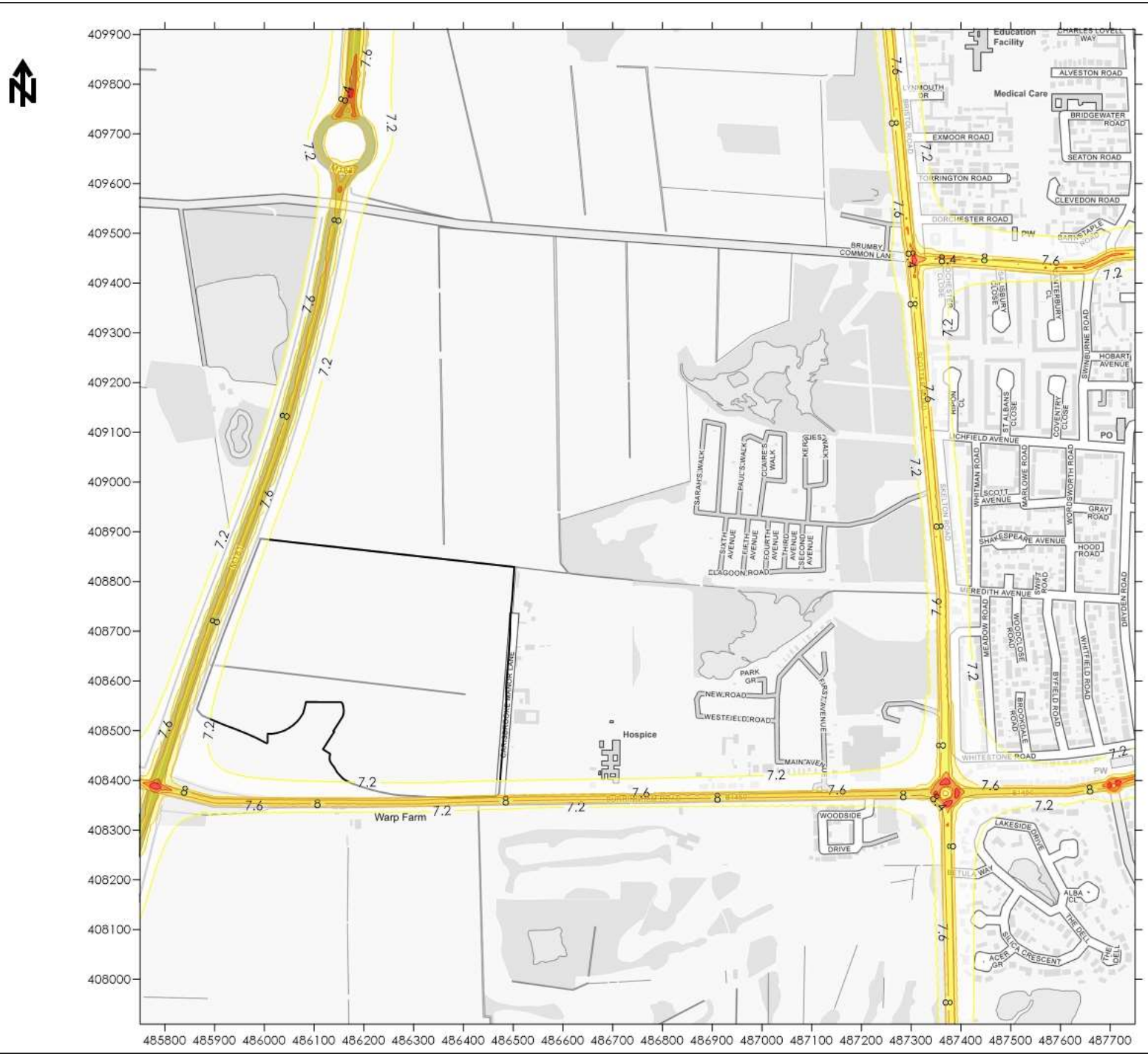

Legend

Site Boundary

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

8.8
8.4
8
7.6
7.2

Title
Figure 11 - Predicted Annual Mean $PM_{2.5}$ Concentration (µg/m³) Do-Minimum

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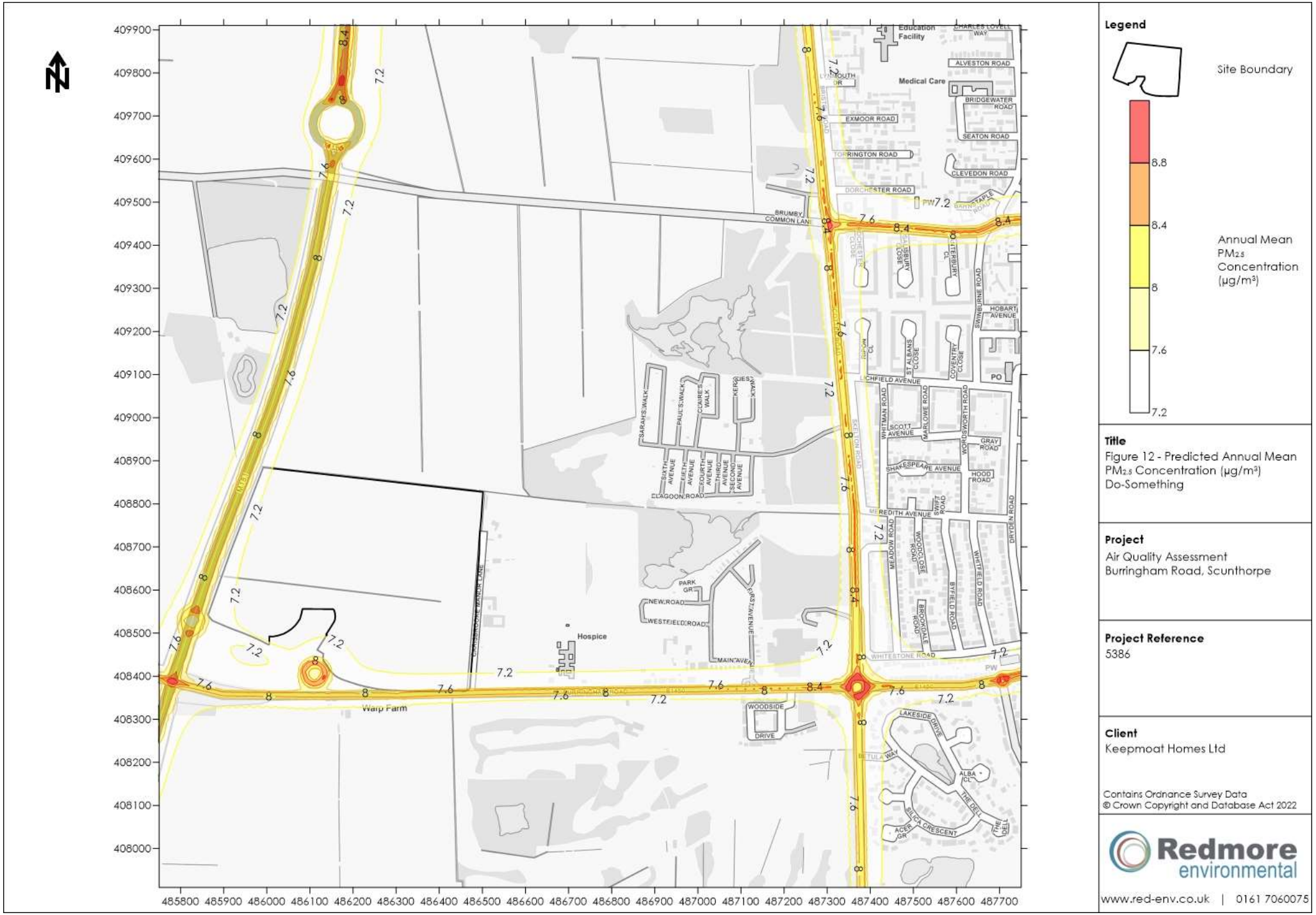

Title
Figure 12 - Predicted Annual Mean $PM_{2.5}$ Concentration (µg/m³)
Do-Something

Project
Air Quality Assessment
Burringham Road, Scunthorpe

Project Reference
5386

Client
Keepmoat Homes Ltd

Redmore environmental
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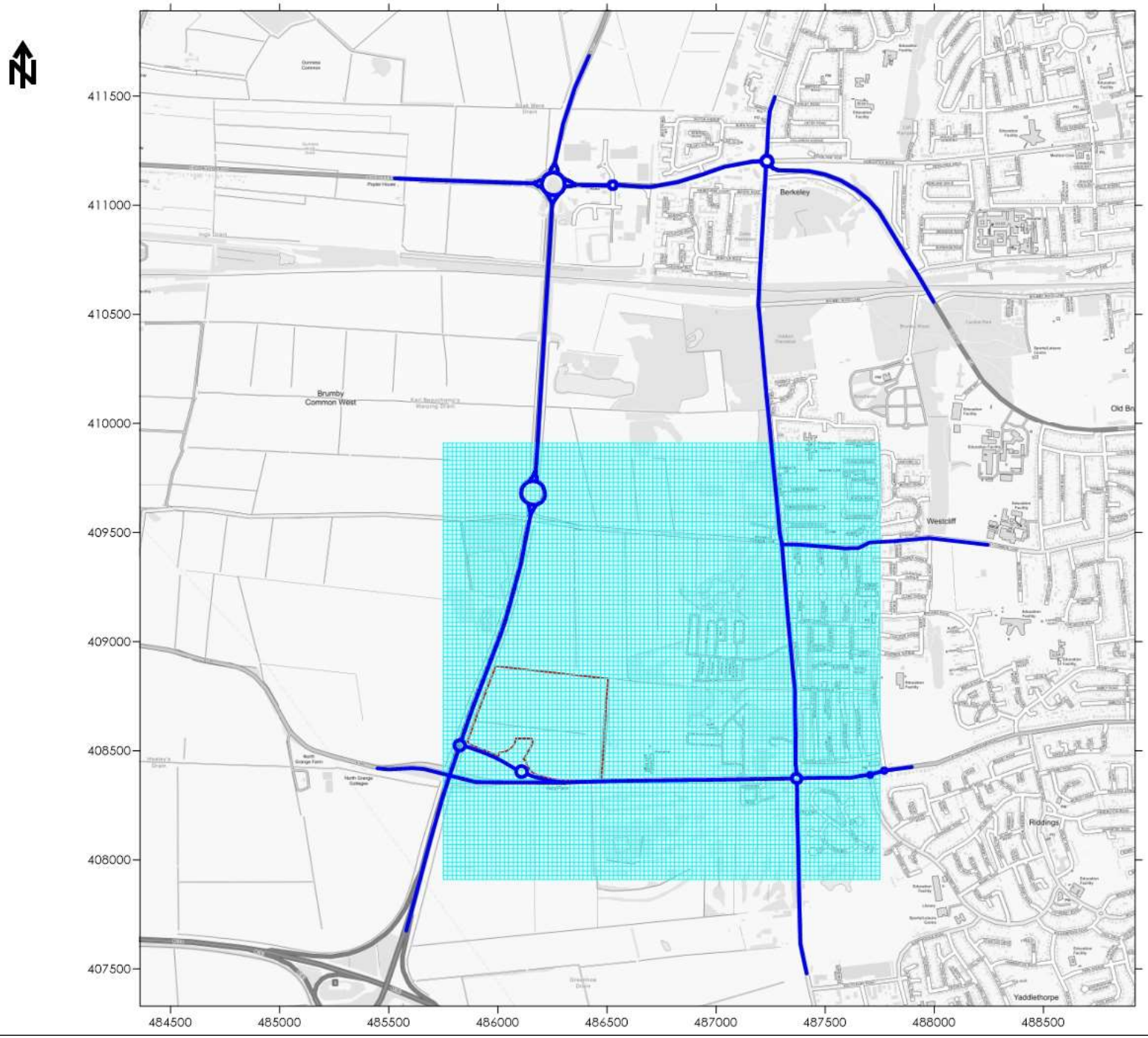


Legend

Site Boundary

Road Link

Output Grid

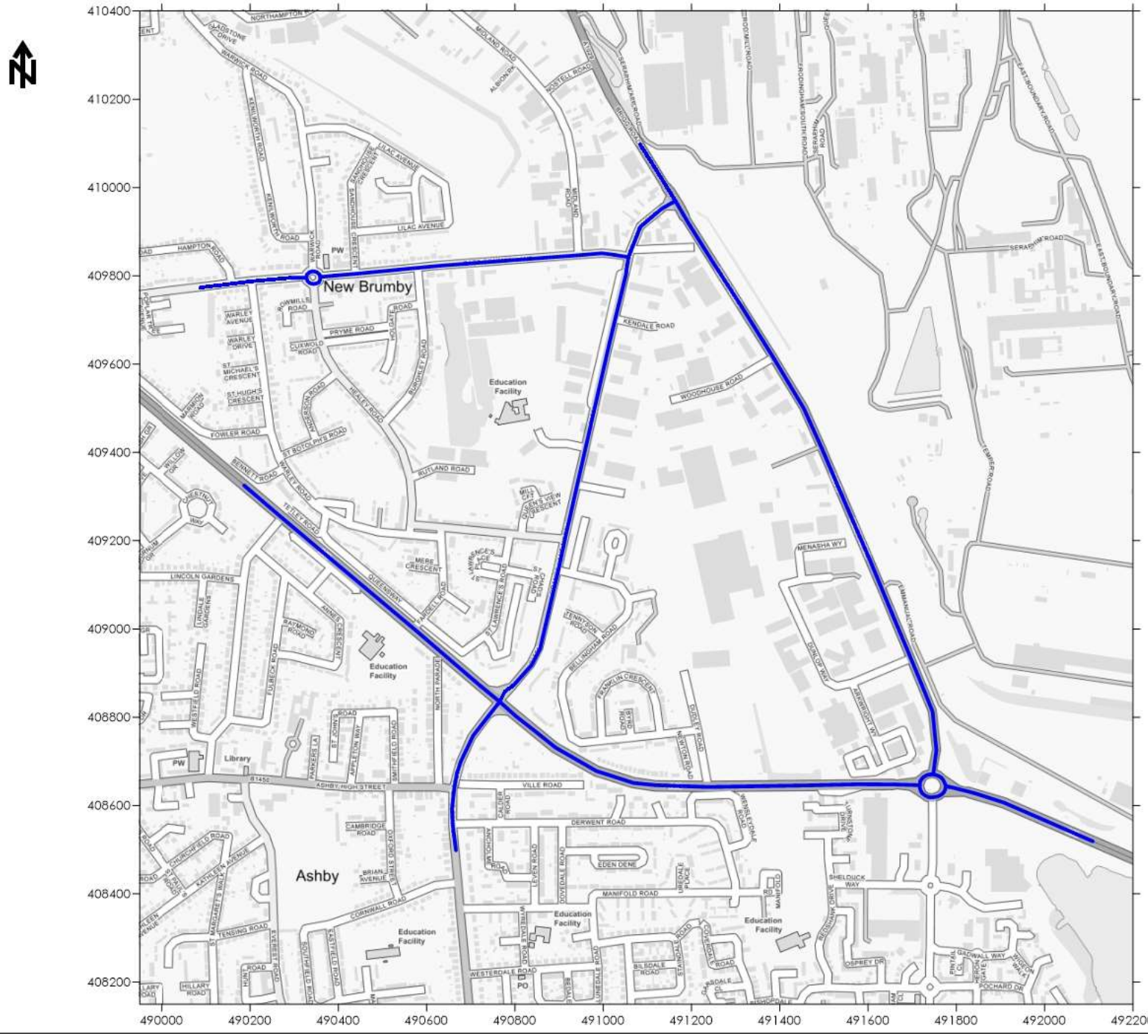
Title
Figure 13 - ADMS-Roads Inputs
Assessment Area 1
Proposed Development Site

Project
Air Quality Assessment
Burringham Road, Scunthorpe

Project Reference
5386

Client
Keepmoat Homes Ltd

Redmore environmental
www.red-env.co.uk | 0161 7060075



Legend

Road Link

Title
Figure 14 - ADMS-Roads Inputs
Assessment Area 2
AQMA

Project
Air Quality Assessment
Burringham Road, Scunthorpe

Project Reference
5386

Client
Keepmoat Homes Ltd

Redmore environmental
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Appendix 1 - Assessment Input Data

Introduction

The proposed development has the potential to cause air quality impacts as a result of vehicles travelling to and from the site, as well as expose future residents to elevated pollution levels. In order to assess NO_2, PM_{10} and $PM_{2.5}$ concentrations at sensitive locations, detailed dispersion modelling was undertaken in accordance with the following methodology.

Modelling was undertaken over two assessment areas:

- Assessment Area 1 - Proposed Development Site; and,
- Assessment Area 2 - AQMA.

The use of two areas allowed for verification and assessment of predicted concentrations in specific areas whilst avoiding issues with model runtime and complications associated with assessment of large spatial extents. This is discussed further below.

Dispersion Model

Dispersion modelling was undertaken using the ADMS-Roads dispersion model (version 5.0.1.3). ADMS-Roads is developed by Cambridge Environmental Research Consultants (CERC) and is routinely used throughout the world for the prediction of pollutant dispersion from road sources. Modelling predictions from this software package are accepted within the UK by the Environment Agency and DEFRA.

The model requires input data that details the following parameters:

- Assessment area;
- Traffic flow data;
- Vehicle emission factors;
- Spatial co-ordinates of emissions;
- Street width;
- Meteorological data;
- Roughness length (z_0); and,
- Monin-Obukhov length.

These are detailed in the following Sections.

Assessment Area 1 - Proposed Development Site

Traffic Flow Data

Baseline Traffic data for use in the assessment was obtained from the Department for Transport (DfT)[21]. The DfT web tool enables the user to view and download traffic flows on every link of the 'A' road and motorway network, as well as selected minor roads, in Great Britain for the years 1999 to 2020. It should be noted that the DfT web tool is referenced in DEFRA guidance[22] as being a suitable source of data for air quality assessments and it is therefore considered to provide a reasonable estimate of traffic flows in the vicinity of the site.

The baseline traffic data was converted to the site opening year utilising a factor obtained from TEMPro (version 7.2). This software package has been development by the DfT to calculate future traffic growth throughout the UK.

Development trip generation and associated distribution was provided by Local Transport Projects Ltd, the Transport Consultants for the project. These were added to the relevant links to provide an estimation of traffic flows with the development in place.

Road widths and vehicle speeds were estimated from aerial photography and UK highway design standards. A summary of the traffic flow data is provided in Table A1.1.

Table A1.1 Traffic Data - Assessment Area 1

Link		24-hour AADT Flow			HDV Prop. of Fleet (%)	Road Width (m)	Average Vehicle Speed (km/h)
		Verif.	2025 DM	2025 DS			
L1	M181, South of New Roundabout Junction	18,213	20,204	20,696	18.80	20.2	90
L2	M181, North of New Roundabout Junction	18,213	20,204	21,752	18.80	19.1	90
L3	A1077, NB, South of A18, Slow Phase (SP)	9,090	10,084	10,858	20.37	8.3	25
L4	A1077, SB, South of A18, SP	9,123	10,120	10,894	17.23	8.4	25

[21] https://roadtraffic.dft.gov.uk/#14/53.5621/-0.6749/basemap-countpoints.

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

Link		24-hour AADT Flow			HDV Prop. of Fleet (%)	Road Width (m)	Average Vehicle Speed (km/h)
		Verif.	2025 DM	2025 DS			
L5	A1077, NB, North of A18, SP	6,606	7,328	7,715	19.24	7.7	25
L6	A1077, SB, North of A18, SP	7,913	8,778	9,165	15.51	7.6	25
L7	A1077, North of A18	14,520	16,107	16,881	17.20	7.8	50
L8	B1450, Burringham Road, West of Site Entrance	13,741	15,244	15,331	3.46	5.6	60
L9	B1450, Burringham Road, East of Site Entrance	13,741	15,244	17,165	3.46	5.9	55
L10	B1450, Burringham Road, West of Scotter Road	13,741	15,244	17,165	3.46	5.9	40
L11	B1450, Burringham Road, West of Scotter Road, SP	13,741	15,244	17,165	3.46	12.4	25
L12	B1450, Burringham Road, East of Scotter Road, SP	13,741	15,244	15,957	3.46	14.2	25
L13	B1450, Burringham Road, West of Enderby Road	13,741	15,244	15,957	3.46	6.6	40
L14	B1450, Burringham Road, West of Enderby Road, SP	13,741	15,244	15,957	3.46	6.9	25
L15	B1450, Burringham Road, East of Enderby Road, SP	13,741	15,244	15,957	3.46	6.4	25
L16	B1450, Burringham Road, East of Dryden Road, SP	13,741	15,244	15,957	3.46	6.5	25
L17	B1450, Burringham Road, East of Dryden Road	13,741	15,244	15,957	3.46	6.6	40
L18	A18, Doncaster Road, West of A1077	23,384	25,940	26,714	3.66	9.3	60
L19	A18, Doncaster Road, Eastbound (EB), West of A1077, SP	11,692	12,970	13,357	3.66	8.9	25
L20	A18, Doncaster Road, Westbound (WB), West of A1077, SP	11,692	12,970	13,357	3.66	8.5	25
L21	A18, Doncaster Road, EB, East of A1077, SP	13,603	15,090	15,090	3.56	8.6	25
L22	A18, Doncaster Road, WB, East of A1077, SP	12,094	13,416	13,416	3.78	8.5	25

Link		24-hour AADT Flow			HDV Prop. of Fleet (%)	Road Width (m)	Average Vehicle Speed (km/h)
		Verif.	2025 DM	2025 DS			
L23	A18, Doncaster Road, WB, East of A1077	25,697	28,506	28,506	3.65	21.8	40
L24	A18, Doncaster Road, West of Gallagher Park, SP	25,697	28,506	28,506	3.65	24.3	25
L25	A18, Doncaster Road, West of Gallagher Park	25,697	28,506	28,506	3.65	14.9	40
L26	A18, Doncaster Road, West of Scotter Road	25,697	28,506	28,506	3.65	10.2	45
L27	A18, Doncaster Road, West of Scotter Road, SP	25,697	28,506	28,506	3.65	14.5	25
L28	A18, Kingsway, East of Scotter Road, SP	15,125	16,778	16,778	2.52	15.9	25
L29	A18, Kingsway	15,125	16,778	16,778	2.52	7.7	60
L30	Scotter Road South, South of B1450	17,530	19,447	19,764	2.95	8.2	60
L31	Scotter Road South, South of B1450, SP	17,530	19,447	19,764	2.95	14.4	25
L32	Scotter Road, North of B1450, SP	17,530	19,447	20,338	2.95	16.8	25
L33	Scotter Road, North of B1450	17,530	19,447	20,338	2.95	11.8	40
L34	Scotter Road, South of Brumby Common Lane	17,530	19,447	20,338	2.95	7.6	60
L35	Scotter Road, South of Brumby Common Lane, SP	17,530	19,447	20,338	2.95	10.6	25
L36	Scotter Road, North of Brumby Common Lane, SP	17,530	19,447	19,862	2.95	9.5	25
L37	Scotter Road, South of Brumby Wood Lane	17,530	19,447	19,862	2.95	7.4	60
L38	Scotter Road, North of Brumby Wood Lane	17,530	19,447	19,862	2.95	6.9	40
L39	Scotter Road, South of A18, SP	17,530	19,447	19,862	2.95	13.5	25
L40	Scotter Road, North of A18, SP	17,530	19,447	19,862	2.95	10.9	25
L41	Scotter Road, North of A18	17,530	19,447	19,862	2.95	6.9	40
L42	West Common Lane, East of Scotter Road, SP	17,530	19,447	19,923	2.95	16.3	25

Link		24-hour AADT Flow			HDV Prop. of Fleet (%)	Road Width (m)	Average Vehicle Speed (km/h)
		Verif.	2025 DM	2025 DS			
L43	West Common Lane, East of Scotter Road	17,530	19,447	19,923	2.95	8.4	40
L44	M181, Northbound (NB), North of Brumbury Common Lane, SP	9,090	10,084	10,858	20.37	8.5	25
L45	M181, Southbound (SB), North of Brumbury Common Lane, SP	9,123	10,120	10,894	17.23	8.5	25
L46	A1077, NB, North of M181, SP	9,090	10,084	10,858	20.37	8.5	25
L47	A1077, SB, North of M181, SP	9,123	10,120	10,894	17.23	8.5	25
L48	A1077, South of A18	18,213	20,204	21,752	18.80	19.6	70
L49	New Link Road, North of B1450	0	0	2,127	0.00	14.4	45
L50	New Link Road, West of M181	0	0	2,127	0.00	12.1	45
R1	A18/A1077 Roundabout	10,227	11,344	12,118	20.37	10.7	35
R2	B1450/Scotter Road Roundabout	15,635	17,345	19,266	3.46	8.7	30
R3	B1450/Enderby Road Roundabout	13,741	15,244	15,601	3.46	4.3	30
R4	B1450/Dryden Road Roundabout	13,741	15,244	15,601	3.46	4.4	30
R5	Gallagher Park/Doncaster Road Roundabout	25,697	28,506	28,506	3.65	7.8	30
R6	A18/Scotter Road Roundabout	18,970	21,044	21,252	3.65	9.9	30
R7	M181/A1077 Roundabout	9,107	10,102	10,876	20.37	11.1	35
R8	New Roundabout, North of B1450	0	0	1,064	0.00	8.7	30
R9	New M181 Roundabout	0	0	1,064	0.00	11.1	30

Reference should be made to Figure 13 for a graphical representation of the road link locations for Assessment Area 1.

Emission Factors

Emission factors for each link were calculated using the relevant traffic flows and the Emissions Factor Toolkit (EFT) (version 11.0). This has been produced by DEFRA and incorporates COPERT 5.3 vehicle emission factors and fleet information.

There is current uncertainty over NO_2 concentrations within the UK, with the implementation of new vehicle emission standards not resulting in the previously expected reduction in roadside levels. Therefore, 2019 emission factors were utilised in preference to the development opening year in order to provide robust model outputs. As predictions for 2019 were verified, it is considered the results are a robust indication of worst case concentrations for the future year.

Meteorological Data

Meteorological data used in the assessment was taken from Humberside meteorological station over the period 1st January 2019 to 31st December 2019 (inclusive). Humberside meteorological station is located at NGR: 509286, 410646, which is approximately 23.4km east of the site. It is anticipated that conditions would be reasonably similar over a distance of this magnitude. The data was therefore considered suitable for an assessment of this nature.

All meteorological records used in the assessment were provided by Atmospheric Dispersion Modelling (ADM) Ltd, which is an established distributor of data within the UK. Reference should be made to Figure 3 for a wind rose of utilised meteorological data.

Roughness Length

The z_0 of 0.5m was used to describe the modelling extents. This value is considered appropriate for the morphology of the area and is suggested within ADMS-Roads as being suitable for 'parkland, open suburbia'.

A z_0 of 0.3m was used to describe the meteorological site. This value is considered appropriate for the morphology of the area and is suggested within ADMS-Roads as being suitable for 'agricultural areas (max)'.

Monin-Obukhov Length

The Monin-Obukhov length provides a measure of the stability of the atmosphere. A minimum Monin-Obukhov length of 30m was used to describe the modelling extents. This value is considered appropriate for the nature of the area and is suggested within ADMS-Roads as being suitable for 'cities and large towns'.

A minimum Monin-Obukhov length of 10m was used to describe the meteorological site. This value is considered appropriate for the nature of the area and is suggested within ADMS-Roads as being suitable for 'small towns <50,000'.

Background Concentrations

A review of DEFRA data and local monitoring results was undertaken in order to identify an appropriate background value for use in the assessment. This indicated that the annual mean PM_{10} and $PM_{2.5}$ concentrations recorded at the CM2 - East Common Lane continuous analyser during 2019 were 22µg/m^3 and 7µg/m^3 respectively. These values were higher than the DEFRA background concentrations, as shown in Table 14. As such, the monitoring results were used to provide a representation of pollution levels without the contribution from road vehicles in order to provide worst-case predictions.

NO_2 is not monitored within the vicinity of the site. The DEFRA background concentration at the CM2 - East Common Lane continuous analyser was therefore utilised in lieu of alternative data.

Similarly to emission factors, the background concentrations from 2019 were utilised in preference to the future year. This provided a robust assessment and is likely to overestimate pollutant concentrations during the operation of the proposal.

NO_x to NO_2 Conversion

Predicted annual mean NO_x concentrations were converted to NO_2 concentrations using the spreadsheet (version 8.1) provided by DEFRA, which is the method detailed within DEFRA guidance[23].

Verification - Assessment Area 1: Proposed Development

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

- Estimates of background concentrations;
- Uncertainties in source activity data such as traffic flows and emission factors;

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

- Variations in meteorological conditions;
- Overall model limitations; and,
- Uncertainties associated with monitoring data, including locations.

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

For the purpose of the assessment, model verification was undertaken for 2019 using traffic data, meteorological data and monitoring results from this year. The choice of 2019 as the verification year aligns with the IAQM position statement 'Use of 2020 and 2021 Monitoring Datasets'[24], which states:

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

Monitoring of NO_2 concentrations was undertaken at three locations within the vicinity of roads included within the model during 2019. The results were obtained and the road contribution to total NO_x concentrations calculated following the methodology contained within DEFRA guidance[25]. The monitored annual mean NO_2 concentrations and calculated road NO_x concentrations are summarised in Table A1.2.

Table A1.2 Assessment Area 1: Verification - Monitoring Results

Monitoring Location		Monitored NO_2 Concentration (µg/m³)	Calculated Road NO_x Concentration (µg/m³)
2	Scotter Road (North side of roundabout)	24.0	22.21
3	B&Q	18.0	10.57
4	Hilton Ave	20.0	14.39

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

[24] Use of 2020 and 2021 Monitoring Datasets, IAQM, 2021.

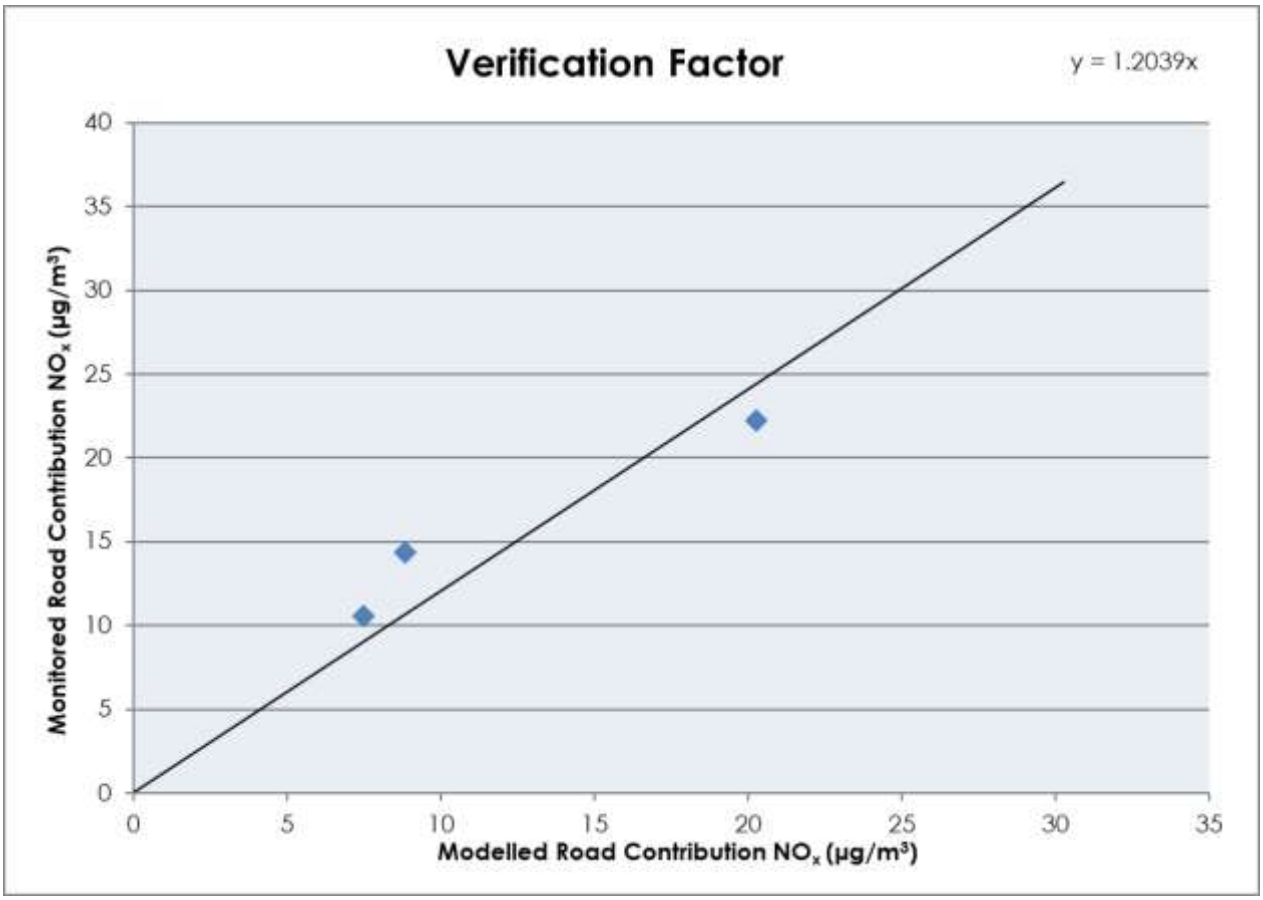
[25] Local Air Quality Management Technical Guidance (TG22), DEFRA, 2022.

Table A1.3 Assessment Area 1: Verification - Modelling Results

Monitoring Location		Calculated Road NO_x Concentration (µg/m³)	Modelled Road NO_x Concentration (µg/m³)
2	Scotter Road (North side of roundabout)	22.21	20.28
3	B&Q	10.57	7.49
4	Hilton Ave	14.39	8.84

The monitored and modelled road NO_x concentrations were graphed and the equation of the trendline based on linear progression through zero calculated. This indicated that a verification factor of 1.2039 was required to be applied to all road NO_x modelling results, as shown in Graph 1.

Graph 1 Assessment Area 1: Verification Factor



Monitoring of PM_{10} and $PM_{2.5}$ concentrations are not undertaken within the vicinity of road links included within Assessment Area 1. 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 guidance[26].

Assessment Area 2 - AQMA

Based on the provided information by Local Transport Projects Ltd, the proposal is predicted to result in an increase in 24-hour AADT flow of more than 100 within the AQMA to the east of the proposed development. Potential impacts were therefore quantified within this area. The relevant model inputs are summarised in the following Sections.

Traffic Flow Data

Baseline traffic data for Assessment Area 2 was obtained from the DfT[27]. Development trip generation and associated distribution was provided by Local Transport Projects Ltd. These were added to the relevant links to provide an estimation of traffic flows with the development in place.

Road widths and vehicle speeds were estimated from aerial photography and UK highway design standards. A summary of the traffic flow data is provided in Table A1.4.

Table A1.4 Traffic Data - Assessment Area 2

Link		24-hour AADT Flow			HDV Prop. of Fleet (%)	Road Width (m)	Average Vehicle Speed (km/h)
		Verif.	2025 DM	2025 DS			
L1	B1501, Grange Lane South, South of A18	10,216	11,333	11,902	2.32	9.9	40
L2	B1501, Grange Lane South, South of A18, SP	10,216	11,333	11,902	2.32	13.9	25
L3	B1501, Grange Lane North, North of A18, SP	10,216	11,333	11,902	2.32	14.1	25
L4	B1501, Grange Lane North, North of A18	10,216	11,333	11,902	2.32	8.9	40
L5	B1501, Grange Lane North, North of East Common Lane	10,216	11,333	11,902	2.32	11.1	35

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

27 https://roadtraffic.dft.gov.uk/#14/53.5621/-0.6749/basemap-countpoints.

Link		24-hour AADT Flow			HDV Prop. of Fleet (%)	Road Width (m)	Average Vehicle Speed (km/h)
		Verif.	2025 DM	2025 DS			
L6	East Common Lane, West of Healey Road	4,669	5,179	5,748	2.70	7.8	40
L7	East Common Lane, West of Healey Road, SP	4,669	5,179	5,748	2.70	11.5	25
L8	East Common Lane, East of Healey Road, SP	4,669	5,179	5,748	2.70	11.6	25
L9	East Common Lane, West of Grange Lane North	4,669	5,179	5,748	2.70	7.1	40
L10	East Common Lane, West of Grange Lane North, SP	4,669	5,179	5,748	2.70	10.7	25
L11	A18, Queensway, West of B1501	16,976	18,831	19,400	2.07	19.5	55
L12	A18, Queensway, West of B1501, SP	16,976	18,831	19,400	2.07	22.1	25
L13	A18, Queensway, East of B1501, SP	20,398	22,628	23,197	2.12	22.3	25
L14	A18, Queensway, West of A1029	20,398	22,628	23,197	2.12	18.4	55
L15	A18, Queensway, West of A1029, SP	20,398	22,628	23,197	2.12	23.4	25
L16	A18, Mortal Ash Hill, East of A1029, SP	32,125	35,636	36,205	5.87	28.9	25
L17	A18, Mortal Ash Hill, East of A1029	32,125	35,636	36,205	5.87	20.6	55
L18	A1029, Briggs Road, North of A18, SP	15,570	17,272	17,841	7.31	23.1	25
L19	A1029, Briggs Road, North of A18	15,570	17,272	17,841	7.31	7,1	55
L20	A1029, Briggs Road, North of B1501	18,929	20,998	21,567	5.92	8.3	55
R1	East Common Lane/Healey Road Roundabout	4,669	5,179	5,748	2.70	6.4	30
R2	A18/A1029 Roundabout	22,698	25,179	25,748	7.31	11.6	30

Reference should be made to Figure 14 for a graphical representation of the road link locations for Assessment Area 2.

All other model inputs, including Monin-Obuhkov length, z_0 the NO_x to NO_2 conversion method, background pollutant concentrations and meteorological data, utilised during AQMA modelling were identical to those described previously for Assessment Area 1 - Proposed Development Site, in order to provide continuity throughout the assessment.

Verification - Assessment Area 2: AQMA

Monitoring of NO_2 concentrations was undertaken at three locations within the vicinity of roads included within Assessment Area 2. The results were obtained and the road contributions to total NO_x concentrations calculated following the methodology contained within DEFRA guidance[28]. The monitored annual mean NO_2 concentrations and calculated road NO_x concentrations are summarised in Table A1.5.

Table A1.5 Assessment Area 2: Verification - Monitoring Results

Monitoring Location		Monitored NO_2 Concentration ($\mu g/m^3$)	Calculated Road NO_x Concentration ($\mu g/m^3$)
9	Queensway	20.0	14.43
10	Mortal Ash Hill	34.0	43.17
11	Front of Ashby Lodge Pub	20.0	14.43

The annual mean road NO_x concentrations predicted from the dispersion model and the 2019 road NO_x concentrations calculated from the monitoring results are summarised in Table A1.6.

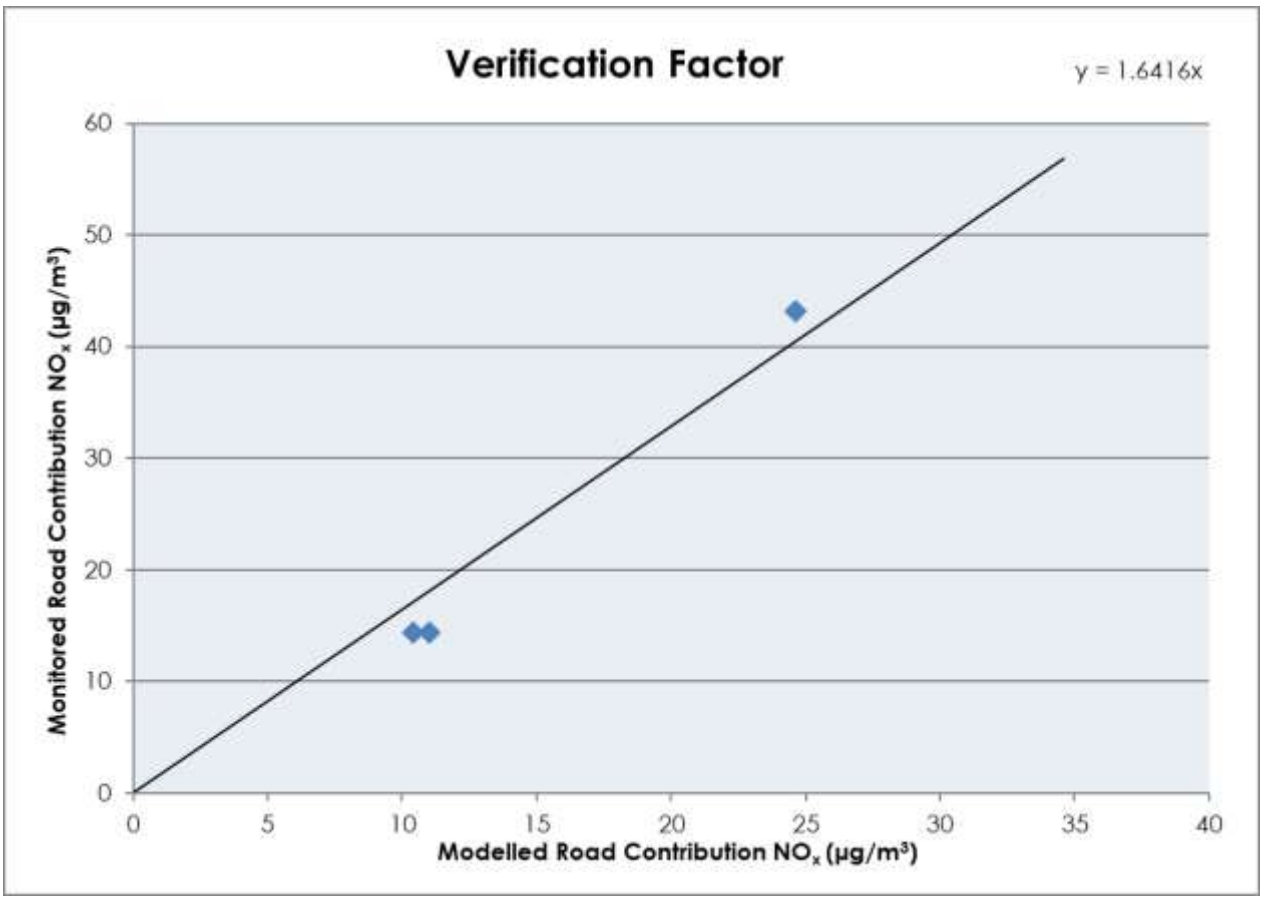
Table A1.6 Assessment Area 2: Verification - Modelling Results

Monitoring Location		Calculated Road NO_x Concentration ($\mu g/m^3$)	Modelled Road NO_x Concentration ($\mu g/m^3$)
9	Queensway	14.43	10.42
10	Mortal Ash Hill	43.17	24.61
11	Front of Ashby Lodge Pub	14.43	11.01

The monitored and modelled road NO_x concentrations were graphed and the equation of the trendline based on linear progression through zero calculated. This indicated that a verification factor of 1.6461 was required to be applied to all road NO_x modelling results, as shown in Graph 2.

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

Graph 2 Assessment Area 2: Verification Factor



Monitoring of PM_{10} concentrations is not undertaken within the vicinity of road links included within Assessment Area 2. 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 guidance[29].

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

Appendix 2 - Curricula Vitae

JETHRO REDMORE

Director

BEng (Hons), MSc, MIAQM, MIEnvSc, PIEMA, CEnv

KEY EXPERIENCE:

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

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

SELECT PROJECTS SUMMARY:

Industrial

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

Tatweer Petroleum - dispersion modelling of Bahrain oil field.

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

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

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

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

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

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

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

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

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

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

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

Residential

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

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

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

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

Elephant and Castle Leisure Centre - baseline AQA for redevelopment.

Carr Lodge, Doncaster - EIA for large residential development.

Queensland Road, Highbury - residential scheme including CHP.

Bicester Ecotown - dispersion modelling of energy centre.

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

York St, Bury - residential development adjacent to AQMA.

Temple Point Leeds - residential development adjacent to M1.

Commercial and Retail

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

Wakefield College - redevelopment of city centre campus in AQMA.

Manchester Airport Cargo Shed - commercial development.

Manchester Airport Apron Extension - EIA including aircraft emission modelling.

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

AMELIA LEATHERBARROW-HURST

Senior Air Quality Consultant

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KEY EXPERIENCE:

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

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

SELECT PROJECTS SUMMARY:

Eagle House, South Ruislip

Air Quality Assessment for the change of use from an office block to a hotel in an Air Quality Management Area (AQMA). Concerns were raised regarding the exposure of future occupants to poor air quality due to road traffic emissions. Detailed dispersion modelling was undertaken using ADMS-roads to assess PM_{10} and NO_2 concentrations across the site as well as an Air Quality Neutral Assessment in accordance with the London Plan requirements. Results revealed that pollution levels were below the air quality standards across the development.

Parr Bridge, Tyldesley

Air Quality Assessment to support a residential development of 154 units. Dispersion modelling was undertaken due to the proximity of the site to an AQMA. Using sensitive receptors located in areas where increased road traffic may affect NO_2 levels, a comparison was made between concentrations with and without the development in place. Results indicated the impacts were not significant.

St James's Street, Westminster

Air Quality Assessment in support of a mixed-use development in an AQMA. Dispersion modelling was undertaken at several different heights reflective of residential units within the development. Predicted concentrations of NO_2 were found to exceed air quality criteria from ground to third floor level. As such, mitigation was specified for the affected units to ensure future residents would not be exposed to poor air quality.

Rookery Avenue, Whiteley, Farnborough

Odour Impact Assessment in support of a hot food takeaway with a drive thru facility in Whiteley. The assessment considered a number of factors, including the scale and nature of potential emissions, the location of nearest receptors and the proposed cooking type in accordance with the relevant DEFRA guidance. An appropriate ventilation system was identified and described on the basis of the assessment results.

Hoole Way, Chester

Air Quality Assessment in support an eight-storey student accommodation block to provide circa 373 units on land off Hoole Way, Chester. Concerns had been raised in relation to the potential exposure of future occupants to elevated pollution concentrations. An assessment was therefore undertaken using dispersion modelling in order to quantify air quality conditions across the site. The results revealed that the use of good practice control measures would provide suitable mitigation for the development.

St James Place, Liverpool

Air Quality Assessment in support of a residential-led development located across three different sites in an AQMA on land off St James Place, Liverpool. Detailed dispersion modelling was undertaken with the inclusion of advanced canyon modelling to evaluate the impact of the urban topography within the locality on the dispersion of traffic related pollutants. The results revealed pollutant concentrations were below the relevant standards across the site.