



Redrow Homes Ltd

Land at Burbage Fields Farm

Air Quality Assessment

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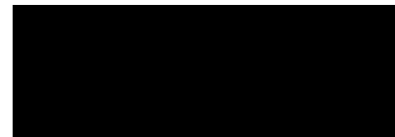
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Summary

RSK Environment Ltd (RSK) was commissioned to prepare an assessment of the potential air quality impacts associated with the proposed development on Land at Burbage Fields Farm.

The application site lies within the administrative area of Hinckley and Bosworth District Council (HBDC). The assessment has been undertaken with reference to existing air quality in the area and relevant air quality legislation, policy and guidance.

Construction phase impacts of the proposed development on local air may potentially arise due to the generation and re-suspension of dust and particulate matter during the construction phase. The risk of dust impacts were assessed according to a widely used methodology published by the Institute of Air Quality Management (IAQM). Mitigation measures are recommended based on the potential dust risks and with the implementation of appropriate mitigation measures, no significant impacts are anticipated during the construction phase.

The main potential operational phase air quality impact is likely to be emissions from road traffic associated with the proposed development (i.e. changes in flow volume and distribution). A detailed assessment of operational impacts has been undertaken using the ADMS-Roads atmospheric dispersion model. Latest guidance and data were used within the assessment. The assessment methodology and results are presented within this report.

The key air pollutants of concern were nitrogen dioxide (NO₂) and particulate matter (PM₁₀ and PM_{2.5}). Concentrations of these key pollutants were predicted at the most relevant receptor locations using the dispersion model for four scenarios - the base year 2022 (S1), the proposed opening year 2026 with (S2) and without (S3) the proposed development in place.

The modelling predicts that the air quality standards for NO₂, PM₁₀ and PM_{2.5} will be met at all receptor locations considered in the assessment, for both the S2 and S3 scenarios. The impacts of the proposed development on NO₂, PM₁₀ and PM_{2.5} concentrations, without mitigation, are predicted to be 'negligible' at all receptor locations. Predicted concentrations across the proposed development site itself are predicted to meet the air quality standards for both the S2 and S3 scenarios, therefore the development will not introduce new exposure to poor air quality.

It is not considered that any specific mitigation measures will be required for the operational phase. Nevertheless, it is recommended that best practice mitigation measures (such as a travel plan and the provision of electric vehicle charging points) should be included to minimise the potential impact of the development on local air quality.

Abbreviations

AADT	Annual Average Daily Traffic
ADMS-Roads	Atmospheric Dispersion Modelling System – Roads (a dispersion modelling software application)
AQAP	Air Quality Action Plan
AQMA	Air Quality Management Area
AQS	Air Quality Standards
CHP	Combined Heat and Power
Defra	Department for Environment, Food and Rural Affairs
DfT	Department for Transport
DMP	Dust Management Plan
EC	European Commission
EFT	Emission Factors Toolkit – developed by Defra
EPUK	Environmental Protection UK
EU	European Union
HBDC	Hinckley and Bosworth District Council
HDV	Heavy Duty Vehicle
IAQM	Institute of Air Quality Management
LAQM	Local Air Quality Management
NPPF	National Planning Policy Framework
NO ₂	Nitrogen dioxide
NO _x	Oxides of nitrogen
PM _{2.5}	Particulate matter of size fraction approximating to <2.5mm diameter
PM ₁₀	Particulate matter of size fraction approximating to <10mm diameter
RSK	RSK Environment Limited
VOC	Volatile Organic Compounds

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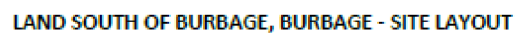
1 INTRODUCTION

RSK Environment Ltd (RSK) was commissioned to prepare an assessment of the potential air quality impacts associated with the proposed development on Land at Burbage Fields Farms. The proposed Burbage Fields development is a hybrid planning application for a full planning application for 422 dwellings, public open space and associated infrastructure and an outline planning application for a residential care home and up to 11no. self-build plots. The proposed Burbage Fields development has two vehicular accesses. The development will connect to Flanders Close, thus providing highway access to the Passchendaele Drive / Lutterworth Road junction; and a new priority junction is proposed to the north of the development to connect to Coventry Road

The Site extends to approximately 89 hectares (ha) and is enclosed by existing urban development to the east. Coventry Road forms the northern boundary of the Site. To the west is the B4109 and green field, and the M69 bounds the Site to the southwest.

The approximate grid reference for the centre of the application site is 443993, 291666. The site lies within the administrative area of Hinckley & Bosworth Borough Council (HBBC). Figure 1.1 shows the proposed development site layout.

This report presents the findings of an assessment of existing baseline air quality, the potential impacts on local air quality during the construction phase of the proposed development and predicted impacts on existing and proposed sensitive receptors as a result of additional traffic emissions generated by the proposed development once operational. Mitigation measures are recommended, where appropriate.



2 LEGISLATION, PLANNING POLICY AND GUIDANCE

2.1 Air Quality Strategy

UK air quality policy is published under the umbrella of the Environment Act 1995, Part IV and specifically Section 80, the National Air Quality Strategy. The latest *Air Quality Strategy for England, Scotland, Wales and Northern Ireland – Working Together for Clean Air*, published in July 2007 sets air quality standards and objectives for ten key air pollutants to be achieved between 2003 and 2020.

The Air Quality Framework Directive (1996) established a framework under which the European Commission (EC) could set limit or target values for specified pollutants. The directive identified several pollutants for which limit or target values have been, or will be set in subsequent 'daughter directives'. The framework and daughter directives were consolidated by Directive 2008/50/EC on Ambient Air Quality and Cleaner Air for Europe, which retains the existing air quality standards and introduces new objectives for fine particulates (PM_{2.5}).

The Clean Air Strategy 2019 supersedes the policies outlined in the 2007 strategy. This latest strategy aims to have a more joined-up approach, outlining actions the Government plans to take to reduce emissions from transport, homes, agriculture and industry. However, the air quality objectives remain as previously detailed within the 2007 strategy.

2.1.1 Air Quality Standards

The air quality standards (AQSs) in the United Kingdom are derived from EC directives and are adopted into English law via the Air Quality (England) Regulations 2000 and Air Quality (England) Amendment Regulations 2002. The Air Quality Limit Values Regulations 2003 and subsequent amendments implement the Air Quality Framework Directive into English Law. Directive 2008/50/EC was translated into UK law in 2010 via the Air Quality Standards Regulations 2010.

The relevant¹ standards for England and Wales to protect human health are summarised in Table 2.1.

Table 2.1: Air Quality Standards (AQS) Relevant to the Proposed Development

Substance	Averaging period	Exceedances allowed per year	Ground level concentration limit (µg/m ³)
Nitrogen dioxide (NO ₂)	1 calendar year	N/A	40
	1 hour	18	200
Fine particles (PM ₁₀)	1 calendar year	N/A	40
	24 hours	35	50

¹ Relevance, in this case, is defined by the scope of the assessment.

Substance	Averaging period	Exceedances allowed per year	Ground level concentration limit ($\mu\text{g}/\text{m}^3$)
Fine particles ($\text{PM}_{2.5}$)	1 year	N/A	20

2.1.2 The Environment Act (2021)

The Environment Act (2021) introduces a commitment to create a legally binding duty on government to reduce the concentrations of fine particulate matter ($\text{PM}_{2.5}$) in ambient air.

2.1.3 The Environmental Targets (Fine Particulate Matter) (England) Regulations 2023

The Environmental Targets (Fine Particulate Matter) (England) Regulations 2023 was published on 31st January 2023, and came into force the following day. The 2023 Regulations introduce a reduced long-term annual average Air Quality Objective for $\text{PM}_{2.5}$ of $10 \mu\text{g}/\text{m}^3$ by 2040, a reduction from the current Air Quality objective of $20 \mu\text{g}/\text{m}^3$ set out within the Environment (Miscellaneous Amendments) (EU Exit) Regulations 2020. Additionally, the 2023 Regulations introduce an interim target of $12 \mu\text{g}/\text{m}^3$ by January 2028 and 35% reduction in average population exposure by 2040, with an interim target of a 22% reduction by January 2028, both compared to a 2018 baseline.

2.2 Planning Policy

The land use planning process is a key means of improving air quality, particularly in the long term, through the strategic location and design of new developments. Any air quality concern that relates to land use and its development can, depending on the details of the proposed development, be a material consideration in the determination of planning applications.

2.2.1 National Planning Policy Framework

In September 2023 the revised National Planning Policy Framework (NPPF) was published, superseding the previous 2021 NPPF with immediate effect. The NPPF includes a presumption in favour of sustainable development.

Section 15 of the NPPF deals with Conserving and Enhancing the Natural Environment, and states that the intention is that the planning system should prevent '*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, taking into account relevant information such as river basin management plans.*'

With specific regard to air quality, the NPPF 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.’

2.2.2 Local Planning Policy

The HBDC Local Plan 2006 to 2026 includes the following objectives:

- To have the right facilities, housing, and infrastructure in the right places
- To support the local communities by addressing the needs and opportunities of an area
- To help to support the growth of the local economy and tourism.

The Local Plan is made up of a series of documents. The Site Allocations and Development Management Policies Development Plan Document (DPD) contains DM7 Preventing Pollution and Flooding which states:

“Adverse impacts from pollution and flooding will be prevented by ensuring that development proposals demonstrate that:

.....

F) It will not contribute to poor air quality”.

The document goes on to state:

“Applicants will be required to demonstrate that new development should not result in adverse impacts, including cumulative impacts upon air quality. Appropriate construction design and mitigation measures, appropriate distances and screening between developments and sensitive uses will protect the amenity of residents and workers and the environment.”

The HBDC draft Local Plan 2020 to 2039 includes relevant policies within the Chapter 6 Place Making and Design. The local plan includes PMD01 High Quality Design which states:

‘The amenity and privacy of nearby residents are not adversely affected, including by matters of lighting, air quality, odour, noise, vibration and visual intrusion’

The local plan also includes PMD03 Preventing Pollution which states:

‘Air pollution is the release of greenhouse gas and other emissions, dust, fumes, odours and particulates being released into the atmosphere resulting in adverse impacts on health, amenity and the natural environment. Impacts can arise from construction, demolition and site works, related transport movements and industrial processes. Applicants will be required to demonstrate that new development should not result in adverse impacts, including cumulative impacts upon air quality. Appropriate construction design and mitigation measures, appropriate distances and screening between developments and sensitive uses will protect the amenity of residents and workers and the environment.’

2.3 Best Practice Guidance Documents

2.3.1 Guidance on the assessment of dust from demolition and construction

The Institute of Air Quality Management (IAQM) published a guidance document in 2014 and revised in 2023 (Stoaling et al., 2023) on the assessment of construction phase impacts. The guidance was produced to provide advice to developers, consultants and environmental health officers on how to assess the impacts arising from construction activities. The emphasis of the methodology is on classifying sites according to the risk of impacts (in terms of dust nuisance, PM₁₀ impacts on public exposure and impact upon sensitive ecological receptors) and to identify mitigation measures appropriate to the level of risk identified.

2.3.2 Local Air Quality Management Review and Assessment Technical Guidance

The Department for Environment, Food and Rural Affairs (Defra) has published technical guidance for use by local authorities in their air quality review and assessment work. This guidance, referred to in this document as LAQM.TG(22), has been used where appropriate in the assessment presented herein.

2.3.3 Land-Use Planning & Development Control: Planning for Air Quality

Environmental Protection UK (EPUK) and the IAQM jointly published a revised version of the guidance note ‘Land-Use Planning & Development Control: Planning for Air Quality’ in 2017 (herein the ‘EPUK-IAQM’ guidance) to facilitate the consideration of air quality in the land-use planning and developmental control process. It provides a framework for air quality considerations within local development control processes, promoting a consistent approach to the treatment of air quality issues within development control decisions.

The guidance includes a method for screening the requirement for an air quality assessment, the undertaking of an air quality assessment, the determination of the air quality impact associated with a development proposal and whether this impact is significant.

3 ASSESSMENT SCOPE AND METHODOLOGY

3.1 Overall Approach

The approach taken for assessing the potential air quality impacts of the proposed development may be summarised as follows:

- Consultation with the Environmental Health Officer (EHO) at HBDC;
- Baseline characterisation of local air quality;
- Qualitative assessment of the construction phase of the development using the 2023 IAQM guidance (v1.1);
- Quantitative assessment of air quality impacts during the operational phase of the proposed development with reference to the 2017 EPUK-IAQM guidance;
- Recommendation of mitigation measures, where appropriate, to ensure any adverse effects on air quality are minimised.

It is understood that no significant stationary sources (for example, boilers or combined heat and power (CHP) plant) are proposed with the development and therefore, this report has not considered emissions related to energy generation any further.

3.2 Baseline Characterisation

Existing or baseline air quality refers to the concentrations of relevant substances that are already present in ambient air. These substances are emitted by various sources, including road traffic, industrial, domestic, agricultural and natural sources.

A desk based study has been undertaken including a review of monitoring data available from HBDC and estimated background data from the LAQM Support website maintained by Defra. Consideration has also been given to potential sources of air pollution in the vicinity of the application site. Background concentrations have been mapped by Defra at a grid resolution of 1x1km for the whole of the UK.

3.3 Construction Phase Impact Assessment

3.3.1 Construction Dust and Particulate Matter

Construction works for the proposed development have the potential to lead to the release of fugitive dust and particulate matter. An assessment of the likely significant effects of construction phase dust and particulate matter at sensitive receptors has therefore been undertaken following the IAQM's construction dust guidance.

In order to assess the potential impacts construction activities are divided into four types:

- Demolition;

- Earthworks;
- Construction; and
- Trackout².

Appendix A details how the ‘dust emission magnitude’, associated with each of these activities, is combined with the sensitivity of receptors (human or ecological), to determine the overall ‘dusk risk’. Once the level of risk has been determined, then site specific mitigation proportionate to the level of risk can be identified. Demolition work will not form part of this planning application. Therefore, demolition impact has been scoped out from this assessment.

3.3.2 Emissions to Air from Construction Traffic and Plant

Exhaust emissions from construction phase vehicles and plant may have an impact on local air quality adjacent to the routes used by these vehicles to access the application site and in the vicinity of the application site itself. Information on the number of vehicles and plant associated with the construction phase has been estimated by the client, and a qualitative impact assessment has been undertaken based on professional judgement and considering the following factors:

- The likely duration of the construction phase;
- The potential number and type of construction traffic and plant that could be required; and
- The number and proximity of sensitive receptors to the application site and along the likely construction vehicle routes.

3.4 Operational Phase Impact Assessment

3.4.1 Traffic Emissions

Once operational, the proposed development will generate additional traffic on the surrounding road network; the emissions to air associated with this traffic have the potential to impact on nearby sensitive receptors.

The EPUK-IAQM 2017 guidance provides an approach for determining the significance of air quality impacts associated with a development in relation to emissions from traffic. To assess the impacts of a development on the surrounding area, the guidance recommends that the degree of an impact is described by expressing the magnitude of incremental change as a proportion of the relevant assessment level and examining this change in the context of the new total concentration and its relationship with the assessment criterion. The approach is further described in **Appendix C** including the descriptors for the impact significance.

² Trackout is defined as the transport of dust and dirt from the construction / demolition sites onto public road network, where it may be deposited and then re-suspended by vehicles using the network.

3.4.2 Modelling Software

ADMS-Roads is an advanced dispersion model developed by the UK consultancy CERC (Cambridge Environmental Research Consultants). It is widely used and validated within the UK and Europe. The model allows for the skewed nature of turbulence within the atmospheric boundary layer. ADMS-Roads is capable of processing hourly sequential meteorological data, whilst taking the turbulence caused by vehicles into account in calculating the dispersion profiles of emitted pollutants. ADMS-Roads enables the user to predict concentrations of pollutants of concern at multiple receptor locations.

ADMS-Roads (Version 5.0.0.1) has been used for assessing potential road traffic emission air quality impacts resulting from the operational phase of the proposed development, and the potential exposure of future occupiers at the proposed development to poor air quality.

3.4.3 Modelling Scenarios

The following scenarios have been considered in this assessment:

- S1: 2022 '**Baseline**' scenario³ – representing the existing air quality;
- S2: 2026 Opening Year '**Without Development**' scenario – for the future year of opening of the completed development, without the development but with committed developments; and,
- S3: 2026 Opening Year '**With Development**' scenario – for the future year of opening of the completed development, with the development and with committed developments.

2022 is used as the baseline year in this assessment, for the purpose of model verification (i.e. S1) as the most recent year in which a full year of bias-adjusted and ratified local monitoring data is available. It is understood that the development is anticipated to be operational in 2026.

3.4.4 Traffic Data

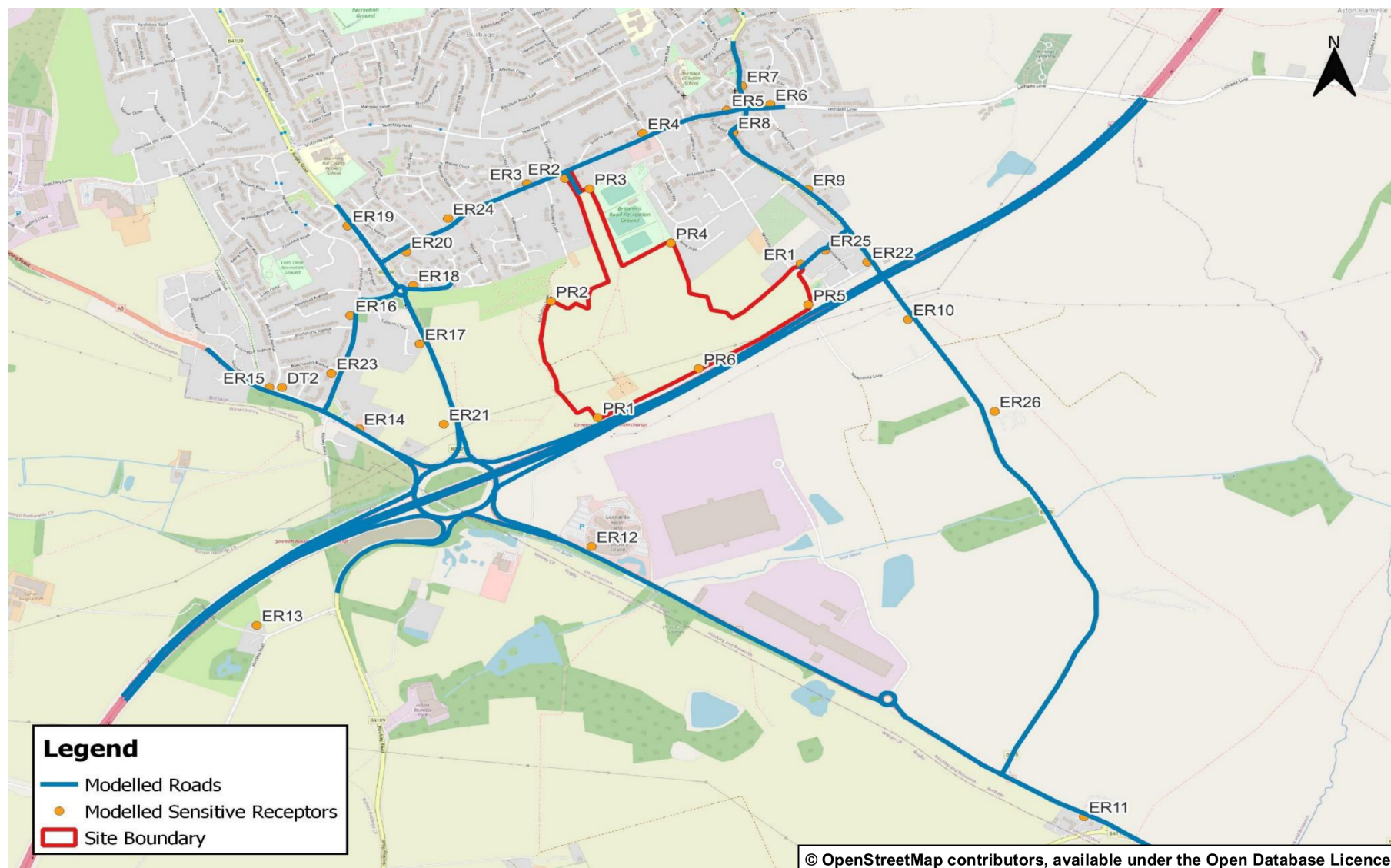
Traffic data used in the air quality assessment was provided by the appointed project transport consultant, Rodgers Leask Limited (RLL). The traffic data used in the air quality dispersion modelling is presented in **Appendix D**. The road network included in the dispersion model is presented in Figure 3.1.

It is understood that no committed developments have been explicitly accounted for in the traffic data, but local developments have been implicitly accounted for through background traffic growth factors from TEMPro.

Guidance in LAQM.TG(22) and professional judgement was used to estimate speeds for use within the assessment, including reduced speeds at junctions.

³ Due to the Covid-19 pandemic in 2020, it was not considered appropriate to use 2020 as a baseline year.

Figure 3.1: The Roads and Receptors Included in the Dispersion Modelling Assessment



3.4.5 Traffic Emission Factors

Version 11.0 of the Emissions Factor Toolkit (EFT), published by Defra, was used to derive vehicle emissions factors (i.e. the amount of pollution emitted from the average vehicle fleet, in g/km/s) for NO_x, PM₁₀ and PM_{2.5}. Within the EFT, emission factors are available for 2018 through to 2050 for England (not London), and 2018 to 2030 for Wales, Scotland, Northern Ireland and London. EFT version 12.0 takes into account the most recent evidence relating to factors such as advances in vehicle and exhaust technology and changes in composition of the vehicle fleet. Hence, emissions factors for 2022 were used to estimate vehicle emissions for the S1 scenario, 2026 for S2 & S3.

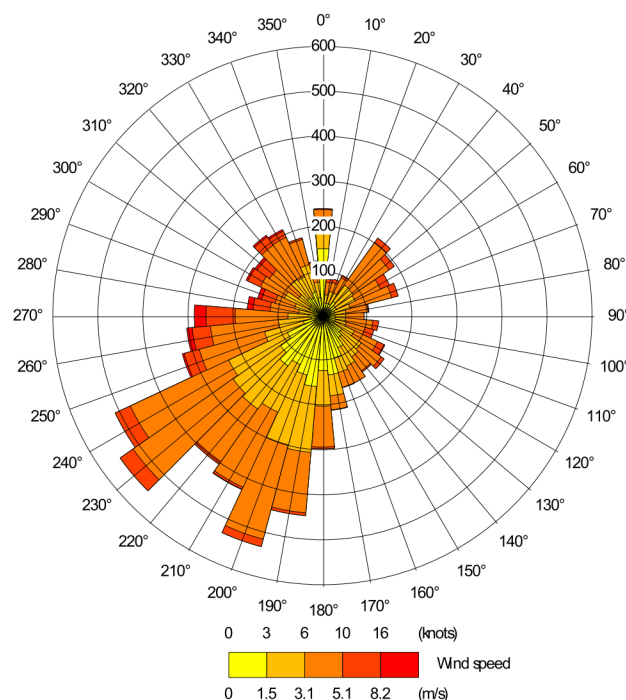
3.4.6 Time-Varying Profile

Vehicle movements vary with time. UK National Profile 2022 published by the Department for Transport (DfT) was applied to all of the assessed roads. The diurnal profile is presented in **Appendix D**. A value of 1 on the y-axis is equivalent to the hourly average flow over 24 hours.

3.4.7 Meteorological Data

2022 hourly sequential meteorological data from the Church Lawford meteorological station was employed in the dispersion model. This meteorological station is located approximately 17.5km south of the application site and is considered the most representative station to the proposed development site with reliable data. The year used matches the baseline year of 2022 to allow consistency for model verification. The windrose derived from the 2022 dataset is presented in Figure 3.2.

Figure 3.2 Windrose from the Church Lawford Meteorological Station in 2022



3.4.8 Sensitive Receptor Locations

Pollutant concentrations were predicted at a number of existing and proposed sensitive receptor locations. Details of all specific receptors included in the modelling study are summarised in Table 3.1 and shown in Figure 3.1.

The existing receptors were selected to represent the sensitive receptors (e.g. residential dwellings) at locations near to the application site, and junctions and main roads in the vicinity, to ensure that 'worst-case' impacts were captured.

Table 3.1: Receptors Included in the Dispersion Modelling Assessment

Receptor ID	Receptor Location	Grid Reference		
		X	Y	Z
Existing Sensitive Residential Receptors				
ER1	Flanders Close next to site entrance	444492.8	291782.2	1.5
ER2	Coventry Road next to site entrance	443769.9	292081.4	1.5
ER3	Coventry Road	443653.8	292063.1	1.5
ER4	Coventry Road	444008.4	292239.9	1.5
ER5	Coventry Road	444266.4	292321.2	1.5
ER6	Lychgate Lane	444399.1	292340.8	1.5
ER7	Church Street	444312.8	292405.9	1.5
ER8	Lutterworth Road	444285.8	292242.8	1.5
ER9	Lutterworth Road	444515.3	292043.5	1.5
ER10	Lutterworth Road	444821.6	291587	1.5
ER11	A5 S	445360.8	289843.6	1.5
ER12	A5 S	443851.3	290790.9	1.5
ER13	Hinckley Road	442825.2	290514.5	1.5
ER14	A5 N	443139	291203.9	1.5
ER15	A5 N	442864.3	291348	1.5
ER16	Wolvey Road	443112.3	291601	1.5
ER17	Rugby Road / Sunloch Close	443324.8	291501.4	1.5
ER18	Canberra Way	443305	291706.3	1.5
ER19	Rugby Road	443103.8	291915.1	1.5
ER20	Coventry Road / Valiant Close	443284.1	291824	1.5
ER21	Rugby Road	443398.8	291219.9	1.5
ER22	Lutterworth Road	444697	291788.2	1.5
ER23	Wolvey Road	443054.3	291398	1.5
ER24	Coventry Road	443411.9	291941.5	1.5
ER25	Flanders Close	444567.5	291829.7	1.5
ER26	Lutterworth Road	445086.8	291264.8	1.5
Proposed Sensitive Residential Receptors				

Receptor ID	Receptor Location	Grid Reference		
		X	Y	Z
PR1	On site	443870.6	291243.1	1.5
PR2	On site	443727.5	291651.2	1.5
PR3	On site	443845.1	292045.4	1.5
PR4	On site	444094.4	291854.9	1.5
PR5	On site	444515.9	291639	1.5
PR6	On site	444179.7	291414.7	1.5

3.4.9 Background Air Quality Data Used in the Modelling

A review of the HBBCs 2023 Air Quality Annual Status Report showed that the nearest monitoring location is a suburban location (1 Rufford Close, Burbage), approximately 0.82m from the application site. This is a suburban location, however the area in which this monitoring location is in does not reflect all other receptor locations. Due to the lack of representative background monitoring data, Defra UK-AIR estimated annual mean background NO₂, PM₁₀ and PM_{2.5} concentrations, for the grid square in which the receptor falls was applied. Table 3.2 details background concentrations used for sensitive human receptors within the assessment.

The Defra LAQM background concentration maps assume that background concentrations will improve (i.e. reduce) over time, in line with predicted reduction in vehicle emissions as well as reduction in emissions from other sources. For a conservative approach, Defra background data for 2022 has been used for both the 2022 baseline scenario and 2026 opening year scenarios.

Table 3.2: Defra LAQM Estimated 2022 Background NO₂, PM₁₀ and PM_{2.5} Concentrations used in the Dispersion Modelling Assessment

Receptor ID	Annual Average NO ₂ (µg/m ³)	Annual Average PM ₁₀ (µg/m ³)	Annual Average PM _{2.5} (µg/m ³)
ER1	12.00	14.55	9.00
ER2	11.21	13.20	8.78
ER3	11.21	13.20	8.78
ER4	10.52	12.79	8.40
ER5	10.52	12.79	8.40
ER6	10.52	12.79	8.40
ER7	10.52	12.79	8.40
ER8	10.52	12.79	8.40
ER9	10.52	12.79	8.40
ER10	12.00	14.55	9.00

Receptor ID	Annual Average NO ₂ (µg/m ³)	Annual Average PM ₁₀ (µg/m ³)	Annual Average PM _{2.5} (µg/m ³)
ER11	9.51	14.13	8.60
ER12	11.79	14.85	9.01
ER13	11.97	15.31	9.16
ER14	12.10	14.32	9.01
ER15	11.55	13.94	8.73
ER16	12.10	14.32	9.01
ER17	12.10	14.32	9.01
ER18	12.10	14.32	9.01
ER19	12.10	14.32	9.01
ER20	12.10	14.32	9.01
ER21	12.10	14.32	9.01
ER22	12.00	14.55	9.00
ER23	12.10	14.32	9.01
ER24	12.10	14.32	9.01
ER25	12.00	14.55	9.00
ER26	9.74	13.62	8.42
PR1	12.10	14.32	9.01
PR2	12.10	14.32	9.01
PR3	11.21	13.20	8.78
PR4	12.00	14.55	9.00
PR5	12.00	14.55	9.00
PR6	12.00	14.55	9.00

3.4.10 Other Model Input Parameters

In order to represent the nature of the proposed development site and surrounding area, a surface roughness length of 0.5m was included in the model. The Monin-Obukhov length (related to atmospheric stability) was assumed to be 30m (large towns/cities). Settings were adjusted at the meteorological data site which is located in an open suburbia type area; a surface roughness length of 0.3m and a Monin-Obukhov length of 10m were used.

3.4.11 Model Verification and Results Processing

The ADMS-Roads dispersion model has been widely validated for this type of assessment and is considered to be fit for purpose. Model validation undertaken by the software developer will not have included validation in the vicinity of the development considered in this assessment. To determine the performance of the model at a local level, a comparison of modelled results with the results of monitoring carried out within the study area was undertaken. This process of verification attempts to minimise modelling uncertainty and systematic error by correcting modelled results by an adjustment factor to gain greater confidence in the final results, and was carried out following the methodology specified in LAQM.TG(22). Full details of the verification calculations are presented within **Appendix E**.

Diffusion tube 'DT2' was used for model verification due to its suburban location and traffic data availability for the road it's next to (1 Rufford Close).

An adjustment factor of 3.12 was obtained, which was applied to the modelled road-NO_x component predicted. The verified annual average modelled road contribution NO_x concentrations have then been converted into annual average road NO₂ by using the Defra NO_x to NO₂ spreadsheet (v8.1). Full details of the verification calculations are presented within **Appendix E**.

LAQM.TG(22) advises that an exceedance of the 1 hour mean NO₂ objective is unlikely to occur where the annual mean concentration is below 60µg/m³, where road transport is the main source of pollution. This concentration has been used to screen whether the hourly mean objective is likely to be achieved.

Local monitoring data is not available for concentrations of PM₁₀ and PM_{2.5} and consequently, the predicted road-PM₁₀ and road-PM_{2.5} contributions have been adjusted using the factor calculated for road-NO_x, before adding the appropriate background concentrations. This approach is consistent with guidance given in LAQM.TG(22). The number of days with PM₁₀ concentrations greater than 50µg/m³ was then estimated using the relationship with the annual mean concentration described in LAQM.TG(22).

Once processed, the predicted concentrations were compared against the current statutory limit values and objectives for NO₂, PM₁₀ and PM_{2.5} set out in Table 2.1.

3.4.12 Interpretation of Modelled Results

To determine whether ambient air quality with the development in place could impact upon future users of the proposed site, or may cause an AQS to be exceeded with the development in place (where an exceedance is not predicted without the development), the total modelled annual mean NO₂, PM₁₀ and PM_{2.5} concentrations predicted at each of the modelled discrete receptor locations (representative of 'relevant exposure') in S2 and S3 were compared to the relevant annual mean AQSs as listed in Table 2.1. In addition, as indicated in Section 3.4.11, the potential for the hourly mean NO₂ and daily

mean PM₁₀ AQS to be exceeded was assessed using the criteria referenced in LAQM TG.22.

To assess the magnitude of impacts of a development on the surrounding area (associated with changes in annual mean NO₂, PM₁₀ and PM_{2.5} concentrations), the mechanism referenced in the EPUK-LAQM 2017 guidance was used. This guidance recommends that the degree of an impact is described by expressing the magnitude of incremental change as a proportion of the relevant air quality assessment level (i.e. the relevant annual mean AQS), and examining this change in the context of the predicted total concentration with the development in place, relative to the AQS. The approach is further described in **Appendix C**, including the impact magnitude descriptors.

The overall significance of effects was determined using professional judgement, with reference to the impact magnitudes assigned at each receptor, and to the number and extent of any modelled exceedances of any of the abovementioned AQSs.

3.4.13 Uncertainties and Assumptions

The following uncertainties and assumptions have been made in the air quality assessment:

- Given the lack of representative background monitoring data, background pollution concentrations have been taken from the Defra LAQM background maps. It is assumed that background data obtained from Defra's website is likely to reasonably represent conditions at site.
- Emissions from the average vehicle fleet using the local road network cannot be known, and therefore vehicle emission factors for NO_x, PM₁₀ and PM_{2.5} were obtained from the Defra EFT v11.0.
- There will be uncertainties introduced because the modelling has simplified real-world processes into a series of algorithms. For example, it has been assumed that wind conditions measured at the Church Lawford meteorological station in 2022 were representative of wind conditions at the site, as this meteorological station is the nearest station where the required meteorological data for predicting air quality impacts of the proposed development are measured on routine basis. Furthermore, it has been assumed that the subsequent dispersion of emitted pollutants will conform to a Gaussian distribution over flat terrain in order to simplify the real-world dilution and dispersion conditions.
- An important step in the assessment is verifying the dispersion model against measured data. The model verification was based on the comparison of model results based on 2022 traffic data with 2022 measured roadside NO₂ diffusion tube data. As no PM₁₀ or PM_{2.5} monitoring data were available near the site area, the adjustment factors used for the predicted roadside NO_x concentrations have been applied to the predicted PM₁₀ and PM_{2.5} concentrations, as per guidance provided in the LAQM.TG(22).
- The national diurnal profile published by the Department for Transport for 2022, has been assumed to be applicable for the roads assessed.
- There is an element of uncertainty in all measured and modelled data. All values presented in this report are best possible estimates.

4 BASELINE AIR QUALITY CHARACTERISATION

4.1 Local Emissions Sources

The application site is located in an area where the main source of air pollution is likely to be roads therefore, the principal pollutants relevant to this assessment are considered to be NO₂, PM₁₀ and PM_{2.5}. Greenspace and residential properties forms the northern boundary of the site. To the east is Workhouse Lane, and adjacent to the south of the site is the M69.

4.2 Local Authority Review and Assessment of Air Quality

As directed by the Environment Act 1995, local authorities are required to review and assess air quality with respect to the standards and objectives for the pollutants specified in the Government's National Air Quality Strategy (2007). Local Authorities are required to undertake annual reporting of the concentrations of defined pollutants in their area.

Where objectives are not predicted to be met, local authorities must declare an AQMA. In addition, local authorities are required to produce an AQAP, which outlines measures aimed at improving air quality within the designated AQMA.

Following a review of local air quality, it is noted that HBDC has no declared AQMAs. Therefore, the proposed development is not located in an AQMA. The closest AQMA is 7km to the west in Nuneaton declared by Nuneaton and Bedworth Borough Council.

4.3 Baseline Monitoring Data

4.3.1 Local Authority Air Quality Monitoring Data

According to HBDC's 2023 Air Quality Annual Status Reports, automatic (continuous) monitoring was not undertaken during 2022. Non- automatic (passive) monitoring of NO₂ was undertaken at 16 sites. The 2018-2022 bias adjusted annual average NO₂ concentrations for the monitoring sites within 2.5km of the proposed development are reproduced in Table 4.1. There are three diffusion tube sites within 2.5km of the site. None of them breached the annual mean NO₂ air quality objective in 2018-2022.

Table 4.1: Annual Mean NO₂ Concentrations at the Diffusion Tube Location within 1 km of the Proposed Development Site

Site ID	Site Type	Approx. Distance from Site (km)	Annual Mean NO ₂ Concentration (µg/m ³)				
			2018	2019	2020	2021	2022
1 Rufford Close	Suburban	1.5	27.4	27.3	23.4	22.8	22.5
207 Rugby Road	Suburban	2.2	20.4	19.8	15.6	17.0	16.4
66 London Road	Suburban	2.3	21.3	21.1	16.9	17.6	18.1
AQS			40				

4.3.2 LAQM-Support Estimated Background Data

Estimated background air quality data are available from the LAQM Support website operated by Defra. The website provides estimated annual average background concentrations of NO₂, PM₁₀ and PM_{2.5} on a 1 km² grid basis.

Table 4.2 reproduces estimated annual average background NO₂, PM₁₀ and PM_{2.5} concentrations at the proposed development site for 2023-2025. No exceedances of the annual average AQSs for NO₂, PM₁₀ or PM_{2.5} have been predicted. As background concentrations are predicted to fall with time, background concentrations in future years would not be expected to exceed their respective annual mean standards after the proposed development opening year. It should also be noted that the Defra website states that *'The projections in the 2018 background maps are based on assumptions which were current before the Covid-19 outbreak in the UK. In consequence these maps do not reflect short or longer term impacts on emissions in 2020 and beyond resulting from behavioural change during national or local lockdowns'*.

Table 4.2: Defra LAQM Estimated Background Annual Average NO₂, PM₁₀ and PM_{2.5} Concentrations at the Proposed Development Site (from 2018 base map)

Assessment Year	Estimated Annual Average Pollutant Concentrations Derived from the LAQM Support Website		
	Annual Average NO ₂ (µg/m ³)	Annual Average PM ₁₀ (µg/m ³)	Annual Average PM _{2.5} (µg/m ³)
2023	11.66	14.17	8.89
2024	11.12	14.03	8.78
2025	10.66	13.89	8.66
AQS	40	40	20

Notes: Presented concentrations for 1km² grid centred on 443500, 291500; approximate centre of the Site is 443993, 291666.

5 IMPACT ASSESSMENT

5.1 Construction Phase

5.1.1 Construction Dust and Particulate Matter

Fugitive dust emissions arising from construction activities are likely to be variable in nature and will depend upon the type and extent of the activity, soil type and moisture, road surface conditions and weather conditions. Periods of dry weather combined with higher than average wind speeds have the potential to generate more dust.

Construction activities that are often the most significant potential sources of fugitive dust emissions are:

- Demolition activities;
- Earth moving, due to the handling, storage and disposal of soil and subsoil materials;
- Construction aggregate usage, due to the transport, unloading, storage and use of dry and dusty materials (such as cement and sand);
- Movement of heavy site vehicles on dry or untreated haul routes; and,
- Movement of vehicles over surfaces where muddy materials have been transferred off-site (for example, on to public highways).

Fugitive dust arising from construction and demolition activities is mainly of a particle size greater than the PM₁₀ fraction (that which can potentially impact upon human health), however it is noted that construction activities may contribute to local PM₁₀ concentrations. Appropriate dust control measures can be highly effective for controlling emissions from potentially dust generating activities identified above, and adverse effects can be greatly reduced or eliminated.

5.1.2 Potential Dust Emission Magnitude

With reference to the IAQM criteria outlined in **Appendix A**, the dust emission magnitudes for demolition, earthworks, construction and trackout activities are summarised in Table 5.1. Information was provided by the client, and for any information not available assumptions have been made based on the size of the development and professional judgement.

Table 5.1: Summary of Dust Emission Magnitudes (Before Mitigation)

Activity	IAQM Criteria	Dust Emission Magnitude
Demolition	- The total building volume to be demolished is assumed to be 12,000 – 75,000 m². - Demolition materials are potentially dusty. - On-site crushing and screening is not expected to take place. - The height of demolition activities above ground is estimated to be 6 - 12 m.	Medium
Earthworks	- Total site area is >110,000m². - The soil at the site is expected to be silt based over siltstone with slowly permeable subsoils. Therefore, soil type is considered to be moderately dusty. - The number of heavy earthmoving vehicles active at any one time is unknown. - The height of stockpiled materials is assumed to be 4m – 6m.	Large
Construction	- Total building volume is estimated to be >75,000m³. - On-site concrete batching and sandblasting is not proposed. - Construction materials are considered to be potentially dusty.	Large
Trackout	- The number of HDV outward movements in any one day is estimated to be 20-50. - The extent as to which vehicles are to travel on unpaved roads is assumed to be 50m – 100m. - The surface soil type is assumed to be a mixture of clay, sand and silt soil.	Medium

5.1.3 Sensitivity of the Area

As per the IAQM guidance, the sensitivity of the area takes into account a number of factors, including:

- The specific sensitivities of receptors in the area;
- The proximity and number of those receptors;
- In the case of PM₁₀, the local background concentration; and,
- Site specific factors, such as whether there are natural shelters, such as trees, to reduce the risk of wind-blown dust.

Consideration is given to human and ecological receptors and the trackout route proposed. With regard to trackout routes, it is considered that construction traffic could access and exit the application site via Coventry Road or Flanders Close.

Table 5.2 show maps indicating the demolition, earthworks/construction and trackout buffers for identifying the sensitivity of the area and Table 5.2 presents the determined sensitivity of the area. Construction activities are relevant up to 350m from the proposed

development site boundary whereas trackout activities are only considered relevant up to 50m from the edge of the roads likely to be affected by trackout (up to 500m from site entrance as per 'large' dust emission magnitude), as per the IAQM guidance.

No designated ecological receptors have been identified within 50m of the site boundary.

Table 5.2: Sensitivity of the Area

Potential Impact		Sensitivity of the surrounding area		
		Demolition	Earthworks and Construction	Trackout
Dust soiling	Receptor sensitivity	High	High	High
	Number of receptors	10-100	10-100	10-100
	Distance from source	<20m	<20m	<20m
	Overall Sensitivity of the Area	High	High	High
Human health	Receptor sensitivity	High	High	High
	Annual mean PM ₁₀ concentration	<24µg/m ³	<24µg/m ³	<24µg/m ³
	Number of receptors	10-100	10-100	10-100
	Distance from Source	<20m	<20m	<20m
	Overall Sensitivity of the Area	Low	Low	Low
Ecological	Receptor sensitivity	N/A	N/A	N/A
	Distance from source	N/A	N/A	N/A
	Overall Sensitivity of the Area	N/A	N/A	N/A

Figure 5.1: Demolition, Earthworks and Construction Activities Buffer Map

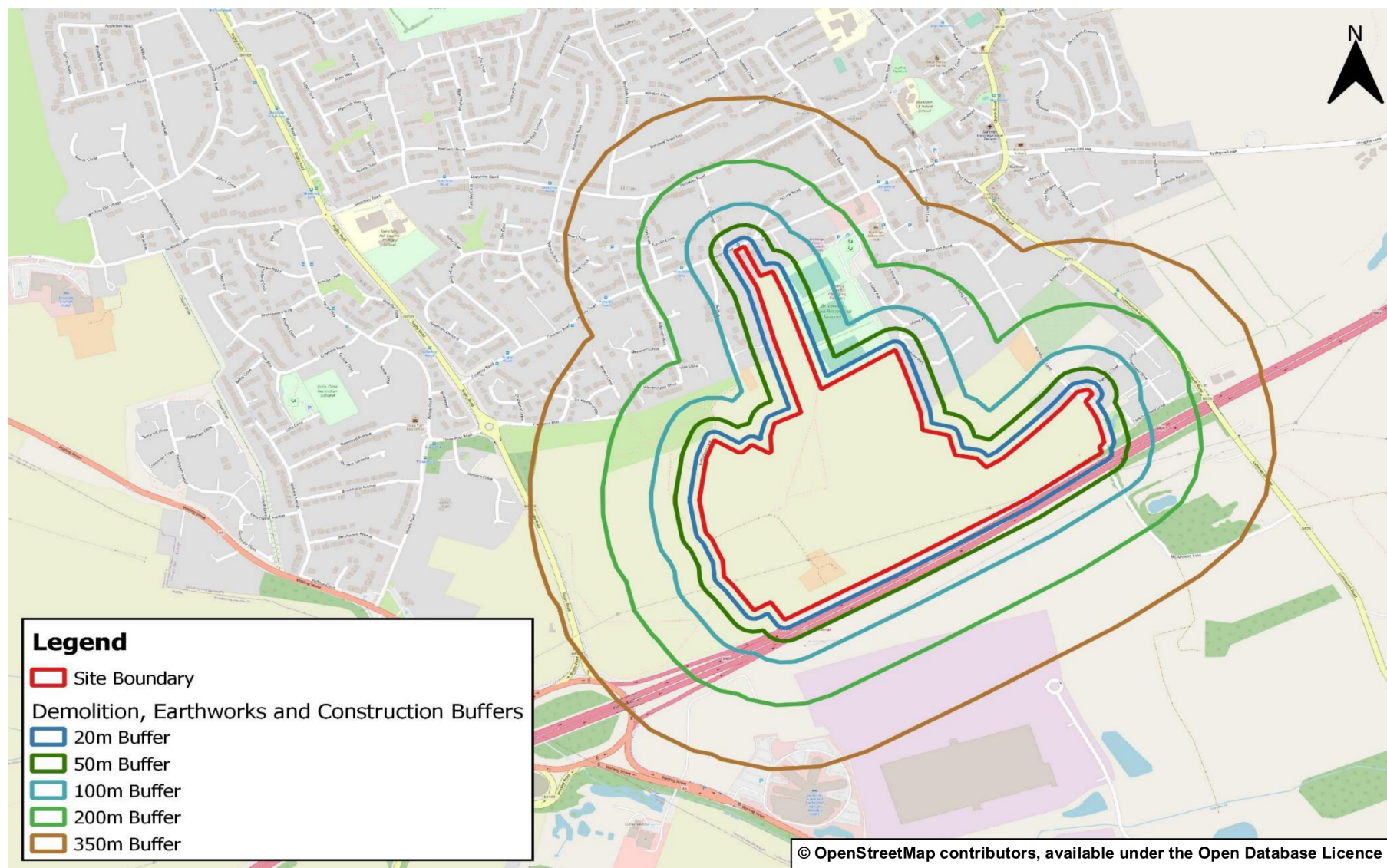
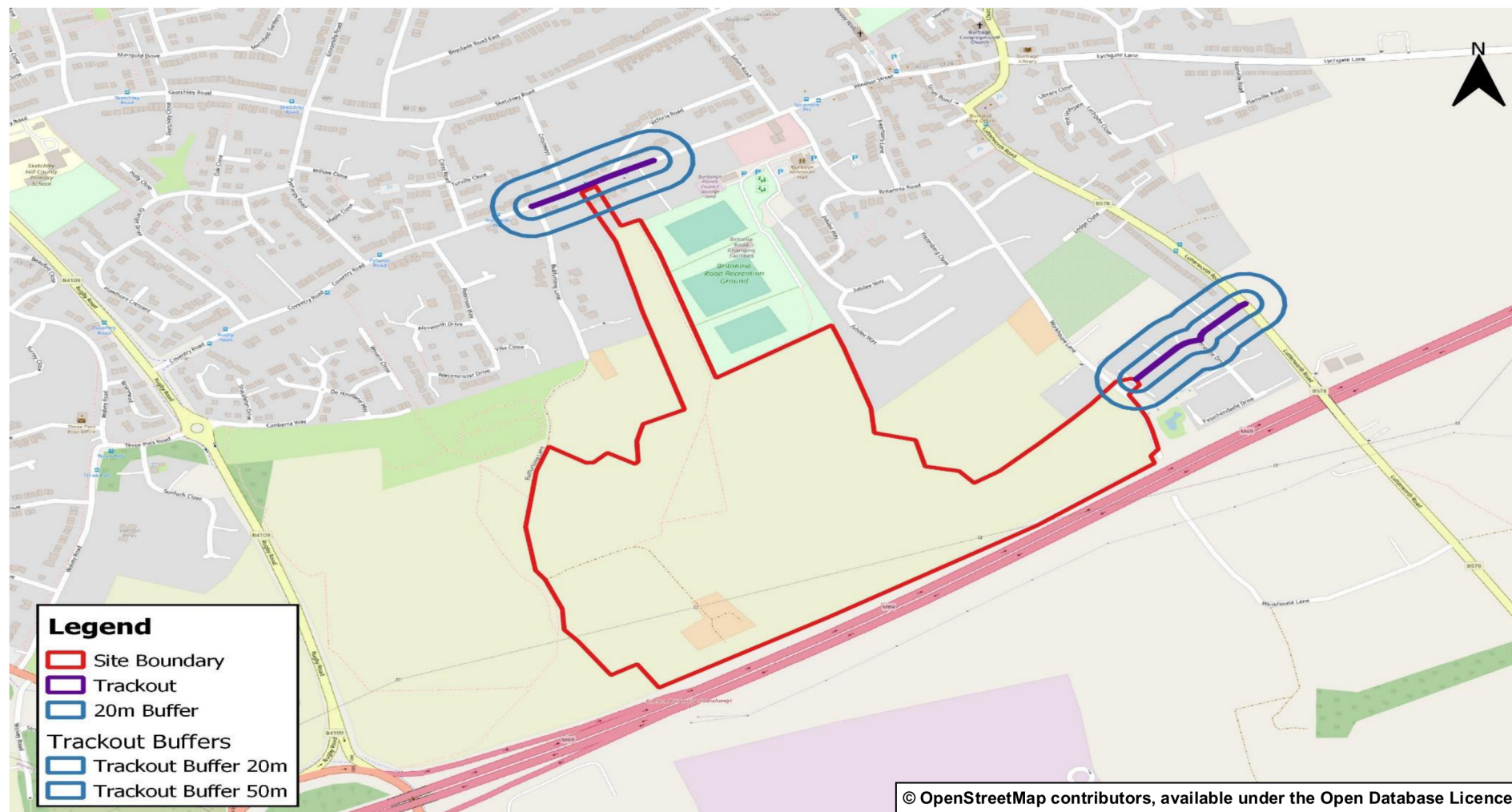


Figure 5.2: Trackout Activities Buffer Map



5.1.4 Risk of Impacts

The dust emission magnitudes from Table 5.1 have been combined with the sensitivity of the area from Table 5.2, to determine the risk of impacts of construction activities before mitigation, as summarised in Table 5.3. Based on these dust risk categories, site specific mitigation measures have been defined as detailed in Section 6 and **Appendix B**.

Table 5.3: Summary of the Dust Risk from Construction Activities

Potential Impact	Dust Risk Impact			
	Demolition	Earthworks	Construction	Trackout
Dust soiling	Medium Risk	High Risk	High Risk	Medium Risk
Human health	Low Risk	Low Risk	Low Risk	Low Risk
Ecological	N/A	N/A	N/A	N/A

5.1.5 Exhaust Emissions from Construction Plant and Vehicles

The operation of vehicles and equipment powered by internal combustion engines results in the emission of exhaust gases containing pollutants including NO_x, PM₁₀, volatile organic compounds, and carbon monoxide. The quantities emitted depend on factors such as engine type, service history, pattern of usage and fuel composition.

Construction traffic will comprise haulage/construction vehicles and vehicles used for workers' trips to and from the application site. The greatest impact on air quality due to emission from construction phase vehicles will be in areas adjacent to the application site access and nearby road network. It is anticipated that construction traffic will access the application site via Rochdale Road or Thornham New Road. The number of HDV outward movements per day is estimated to be 20-50 HDVs, which is considered unlikely to bring about a significant change in air quality.

The operation of site equipment and machinery will result in emissions to the atmosphere of exhaust gases, but with suitable controls and site management such emissions are unlikely to be significant (as per LAQM.TG(22)).

5.2 Operational Phase

5.2.1 Traffic Emission Dispersion Modelling Results

Detailed dispersion modelling has been undertaken with the use of the ADMS-Roads dispersion model software, following guidance in accordance with LAQM.TG(22). The modelled concentrations have been verified and results processed as detailed in Section 3.

Based on the traffic data available (provided by the project transport consultant), 2026 has been assessed as the opening year of the proposed development and two scenarios have been assessed for 2026, which are S2 '2026 without proposed development' and

S3 '2026 with proposed development'. The modelling results are presented and summarised as below:

Nitrogen Dioxide – NO₂

The AQS for annual mean NO₂ concentrations is 40µg/m³. The results of the assessment indicate that in the anticipated opening year of 2026 in both S2 and S3, annual mean NO₂ concentrations for all receptor locations will be below the objective.

Table 5.4 shows the comparison of annual mean NO₂ concentrations between the S2 '2026 without proposed development' and S3 '2026 with proposed development' scenarios at existing sensitive receptor locations. The results as percentages of the Air Quality Assessment Level (AQAL) (i.e. the UK AQSS) are also presented which are used in the determination of significance of impacts (based on the EPUK-IAQM guidance – see **Appendix C**).

The results indicate that in the opening year of 2026 in both S2 and S3, no exceedances of the annual mean NO₂ concentration AQS are predicted at any of the assessed or proposed receptors within the development site. The changes in annual mean NO₂ concentrations at existing receptor locations, in both S2 and S3, are predicted to be '**negligible**' at all receptor locations. The effect of the proposed development on NO₂ concentrations, prior to mitigation, is therefore considered to be not significant.

LAQM.TG(22) notes that 'exceedances of the 1-hour mean objective for NO₂ are only likely to occur where annual mean concentrations are 60µg/m³ or above'. In the opening year of 2026 in both S2 and S3 annual mean NO₂ concentrations (see Table 5.4) are not predicted to exceed 60µg/m³ at any receptors. EPUK-IAQM guidance recommends it is not normally necessary to consider impacts on short-term concentrations unless there is a risk of the AQAL being exceeded due to the proposed development. As the annual mean NO₂ concentrations are well below 60µg/m³, the significance of short-term results is likely to be **negligible** and has not been assessed further.

Table 5.4: Predicted Annual Mean NO₂ Concentrations for S2 '2026 Without Proposed Development' and S3 '2026 With Proposed Development' and Potential Impacts on Annual Mean NO₂ Concentrations

Receptor	S2 '2026 Without Proposed Development' NO ₂ Concentration (µg/m ³)	S3 '2026 With Proposed Development'		NO ₂ Concentration Change Between S2 and S3 as % of AQAL* (%)	S3 Impact**
		NO ₂ Concentration (µg/m ³)	NO ₂ Concentration as % of AQAL (%)		
ER1	16.80	16.92	42	0.3	Negligible
ER2	14.68	15.33	38	1.6	Negligible
ER3	15.94	16.53	41	1.5	Negligible
ER4	14.64	15.08	38	1.1	Negligible
ER5	16.92	17.76	44	2.1	Negligible
ER6	14.5	14.65	37	0.4	Negligible
ER7	21.15	21.7	54	1.4	Negligible
ER8	17.91	18.47	46	1.4	Negligible
ER9	17.41	17.86	45	1.1	Negligible
ER10	16.97	17.06	43	0.2	Negligible
ER11	27.05	27.88	70	2.1	Negligible
ER12	19.67	19.72	49	0.1	Negligible
ER13	15.77	15.78	39	<0.1	Negligible
ER14	30.41	30.41	76	<0.1	Negligible
ER15	23.45	23.45	59	<0.1	Negligible
ER16	16.19	16.25	41	0.1	Negligible
ER17	18.97	19.09	48	0.3	Negligible
ER18	21.51	21.7	54	0.5	Negligible
ER19	18.14	18.26	46	0.3	Negligible
ER20	18.4	18.86	47	1.2	Negligible
ER21	20.34	20.37	51	0.1	Negligible
ER22	21.12	21.24	53	0.3	Negligible
ER23	16.75	16.78	42	0.1	Negligible
ER24	16.67	16.96	42	0.7	Negligible

Receptor	S2 '2026 Without Proposed Development'	S3 '2026 With Proposed Development'		NO ₂ Concentration Change Between S2 and S3 as % of AQAL* (%)	S3 Impact**
	NO ₂ Concentration (µg/m ³)	NO ₂ Concentration (µg/m ³)	NO ₂ Concentration as % of AQAL (%)		
ER25	17.02	17.25	43	0.6	Negligible
ER26	12.98	13.08	33	0.2	Negligible
PR1	27.15	27.2	68		
PR2	15.78	15.79	39		
PR3	13.94	14.17	35		
PR4	15.36	15.38	38		
PR5	23.75	23.79	59		
PR6	24.54	24.57	61		
*As recommended in the EPUK-IAQM guidance, changes less than 0.5% will be described as 'negligible'. **Impacts are determined in accordance with EPUK-IAQM guidance.					

Particulate Matter - PM₁₀

The AQS for annual mean PM₁₀ concentrations is 40µg/m³. The results of the assessment indicate that in the anticipated opening year of 2026 in both S2 and S3, annual mean PM₁₀ concentrations for all receptor locations will be well below the objective.

Table 5.5 shows the comparison of annual mean PM₁₀ concentrations between the S2 '2026 without proposed development' and S3 '2026 with proposed development' scenarios at existing sensitive receptor locations. The results as percentages of the AQAL are also presented which are used in the determination of significance of impacts (based on the EPUK-IAQM guidance – see **Appendix C**).

The results indicate that in the opening year of 2026 in both S2 and S3, no exceedances of the annual mean PM₁₀ concentration AQS are predicted at any of the proposed receptors within the development site. The changes in annual mean PM₁₀ concentrations at existing receptor locations, in both S2 and S3, are predicted to be '**negligible**' at all receptor locations. The effect of the proposed development on PM₁₀ concentrations, prior to mitigation, is considered to be not significant.

Table 5.6 presents results for the predicted 24-hour mean PM₁₀ concentrations as number of days greater than 50µg/m³ for S2 and S3. The objective for 24-hour mean PM₁₀ concentrations is 50µg/m³ to be exceeded no more than 35 times a year. The number of days exceeding 50µg/m³ is predicted to be a maximum of 10 days in S2 and S3 which is well below the objective.

Table 5.5: Predicted Annual Mean PM₁₀ Concentrations for S2 '2026 Without Proposed Development' and S3 '2026 With Proposed Development' and Potential Impacts on Annual Mean PM₁₀ Concentrations

Receptor	S2 '2026 Without Proposed Development' PM ₁₀ Concentration (µg/m ³)	S3 '2026 With Proposed Development'		PM ₁₀ Concentration Change Between S2 and S3 as % of AQAL * (%)	S3 Impact**
		PM ₁₀ Concentration (µg/m ³)	PM ₁₀ Concentration as % of AQAL (%)		
ER1	15.88	15.92	40	0.1	Negligible
ER2	14.49	14.73	37	0.6	Negligible
ER3	15.04	15.28	38	0.6	Negligible
ER4	14.32	14.49	36	0.4	Negligible
ER5	15.18	15.51	39	0.8	Negligible
ER6	14.23	14.29	36	0.1	Negligible
ER7	16.50	16.70	42	0.5	Negligible
ER8	15.47	15.68	39	0.5	Negligible
ER9	15.35	15.53	39	0.4	Negligible
ER10	16.04	16.07	40	0.1	Negligible
ER11	19.96	20.28	51	0.8	Negligible
ER12	17.51	17.53	44	0.1	Negligible
ER13	15.18	15.18	38	<0.1	Negligible
ER14	22.99	22.99	57	<0.1	Negligible
ER15	19.56	19.56	49	<0.1	Negligible
ER16	15.69	15.71	39	0.1	Negligible
ER17	16.57	16.61	42	0.1	Negligible
ER18	17.50	17.57	44	0.2	Negligible
ER19	16.58	16.63	42	0.1	Negligible
ER20	16.52	16.70	42	0.4	Negligible
ER21	16.95	16.96	42	<0.1	Negligible
ER22	17.13	17.18	43	0.1	Negligible
ER23	15.96	15.98	40	<0.1	Negligible
ER24	15.86	15.98	40	0.3	Negligible

Receptor	S2 '2026 Without Proposed Development' PM ₁₀ Concentration (µg/m ³)	S3 '2026 With Proposed Development'		PM ₁₀ Concentration Change Between S2 and S3 as % of AQAL* (%)	S3 Impact**
		PM ₁₀ Concentration (µg/m ³)	PM ₁₀ Concentration as % of AQAL (%)		
ER25	15.96	16.04	40	0.2	Negligible
ER26	14.84	14.87	37	0.1	Negligible
PR1	17.81	17.82	45		
PR2	15.42	15.43	39		
PR3	14.20	14.28	36		
PR4	15.51	15.52	39		
PR5	17.66	17.67	44		
PR6	17.85	17.86	45		
*As recommended in the EPUK-IAQM guidance, changes less than 0.5% will be described as 'negligible'. **Impacts are determined in accordance with EPUK-IAQM guidance.					

Table 5.6: Predicted 24-Hour Mean PM₁₀ Concentration Results (as number of days > 50µg/m³) for S2 '2026 Without Proposed Development' and S3 '2026 With Proposed Development'

Receptor ID	24-Hour Mean PM ₁₀ * (number of day >50µg/m ³)		
	S2 '2026 Without Proposed Development'	S3 '2026 With Proposed Development'	Change between S2 and S3
ER1	0	0	0
ER2	0	0	0
ER3	0	0	0
ER4	0	0	0
ER5	0	0	0
ER6	0	0	0
ER7	0	1	1
ER8	0	0	0
ER9	0	0	0
ER10	0	0	0
ER11	3	4	1
ER12	1	1	0
ER13	0	0	0
ER14	8	8	0
ER15	3	3	0
ER16	0	0	0
ER17	1	1	0
ER18	1	1	0
ER19	1	1	0
ER20	1	1	0
ER21	1	1	0
ER22	1	1	0
ER23	0	0	0

Receptor ID	24-Hour Mean PM ₁₀ * (number of day >50µg/m ³)		
	S2 '2026 Without Proposed Development'	S3 '2026 With Proposed Development'	Change between S2 and S3
ER24	0	0	0
ER25	0	0	0
ER26	0	0	0
PR1	1	1	0
PR2	0	0	0
PR3	0	0	0
PR4	0	0	0
PR5	1	1	0
PR6	1	1	0
*Rounded to whole days			

Particulate Matter - PM_{2.5}

The AQS for annual mean PM_{2.5} concentrations is 20µg/m³. The results of the assessment indicate that in the anticipated opening year of 2026 in both S2 and S3, annual mean PM_{2.5} concentrations for all receptor locations will be well below the objective.

Table 5.7 shows the comparison of annual mean PM_{2.5} concentrations between the S2 '2026 without proposed development' and S3 '2026 with proposed development' scenarios at existing sensitive receptor locations. The results as percentages of the AQAL are also presented which are used in the determination of significance of impacts (based on the EPUK-IAQM guidance – see **Appendix C**).

The results indicate that in the opening year of 2026 in both S2 and S3, no exceedances of the annual mean PM_{2.5} concentration AQS are predicted at any of the proposed receptors within the development site. The changes in annual mean PM_{2.5} concentrations at existing receptor locations, in both S2 and S3, are predicted to be '**negligible**' at all receptor locations. The effect of the proposed development on PM_{2.5} concentrations, prior to mitigation, is considered to be not significant.

Table 5.7: Predicted Annual Mean PM_{2.5} Concentrations for S2 '2026 Without Proposed Development' and S3 '2026 With Proposed Development' and Impacts on Annual Mean PM_{2.5} Concentrations

Receptor	S2 '2026 Without Proposed Development'	S3 '2026 With Proposed Development'		PM _{2.5} Concentration Change Between S2 and S3 as % of AQAL* (%)	S3 Impact**
	PM _{2.5} Concentration (µg/m ³)	PM _{2.5} Concentration (µg/m ³)	PM _{2.5} Concentration as % of AQAL (%)		
ER1	9.92	9.94	50	0.1	Negligible
ER2	9.63	9.76	49	0.5	Negligible
ER3	9.93	10.07	50	0.5	Negligible
ER4	9.38	9.48	47	0.4	Negligible
ER5	9.86	10.05	50	0.7	Negligible
ER6	9.33	9.37	47	0.1	Negligible
ER7	10.60	10.72	54	0.4	Negligible
ER8	10.02	10.14	51	0.5	Negligible
ER9	9.96	10.06	50	0.4	Negligible
ER10	9.99	10.01	50	0.1	Negligible
ER11	12.06	12.24	61	0.7	Negligible
ER12	10.90	10.91	55	0.1	Negligible
ER13	9.60	9.60	48	<0.1	Negligible
ER14	13.91	13.91	70	<0.1	Negligible
ER15	11.95	11.95	60	<0.1	Negligible
ER16	9.91	9.92	50	<0.1	Negligible
ER17	10.40	10.43	52	0.1	Negligible
ER18	10.92	10.96	55	0.2	Negligible
ER19	10.40	10.42	52	0.1	Negligible
ER20	10.37	10.47	52	0.4	Negligible
ER21	10.63	10.63	53	<0.1	Negligible
ER22	10.66	10.69	53	0.1	Negligible
ER23	10.06	10.07	50	<0.1	Negligible

Receptor	S2 '2026 Without Proposed Development' PM _{2.5} Concentration (µg/m ³)	S3 '2026 With Proposed Development'		PM _{2.5} Concentration Change Between S2 and S3 as % of AQAL * (%)	S3 Impact**
		PM _{2.5} Concentration (µg/m ³)	PM _{2.5} Concentration as % of AQAL (%)		
ER24	10.00	10.07	50	0.3	Negligible
ER25	9.96	10.01	50	0.2	Negligible
ER26	9.23	9.26	46	0.1	Negligible
PR1	11.25	11.25	56		
PR2	9.77	9.77	49		
PR3	9.47	9.51	48		
PR4	9.69	9.69	48		
PR5	11.02	11.03	55		
PR6	11.14	11.14	56		
*As recommended in the EPUK-IAQM guidance, changes less than 0.5% will be described as 'negligible'.					
**Impacts are determined in accordance with EPUK-IAQM guidance.					

Summary

The AQSS for NO₂, PM₁₀ and PM_{2.5} are predicted to be met at all receptor locations considered in the assessment for both the S2 and S3 scenarios.

In accordance with EPUK-IAQM guidance, the impacts of the proposed development on NO₂, PM₁₀ and PM_{2.5} concentrations, without mitigation, are predicted to be '**negligible**' at all receptor locations. Overall, the effect of the proposed development on NO₂, PM₁₀ and PM_{2.5} concentrations, prior to mitigation, is considered to be **not significant**.

Predicted NO₂, PM₁₀ and PM_{2.5} concentrations at proposed receptors on the development site itself for S2 and S3 meet the relevant AQSS and future residents are not predicted to be exposed to air quality exceeding the AQSS.

6 MITIGATION MEASURES & RESIDUAL IMPACTS

6.1 Construction Phase Mitigation

The dust emitting activities outlined in Section 5.1 can be effectively controlled by appropriate dust control measures and any adverse effects can be greatly reduced or eliminated.

Prior to commencement of construction activities, it is anticipated that an agreement on the scope of a dust management plan (DMP, this may be as part of a Construction Environmental Management Plan (CEMP)) for the construction phase will be reached with the Local Authority to ensure that the potential for adverse environmental effects on local receptors is minimised. The DMP should include *inter alia*, measures for controlling dust and general pollution from site construction operations, and include details of any monitoring activities, if appropriate. Controls should be applied through the construction period to ensure that emissions are mitigated.

The dust risk categories identified have been used to recommend appropriate, site-specific mitigation measures, and are presented in **Appendix B**.

6.2 Operational Phase Mitigation

As identified in Section 5.2, the proposed development is not expected to have a significant effect on local air quality in the absence of mitigation. The results indicate annual mean concentrations of NO₂, PM₁₀ and PM_{2.5} are predicted to be below the relevant AQs. Therefore, the effect of air quality on existing sensitive receptors and future occupiers of the proposed development is judged to be negligible. Nevertheless, best practice mitigation measures should be considered to further reduce any residual effects on air quality, which could include but are not limited to:

- Implementation of a travel plan;
- Installation of low NO_x boilers and
- Installation of electric vehicle charging points.

7 CONCLUSIONS

An air quality assessment has been prepared for the proposed development on Land at Burbage Fields Farm with reference to existing air quality in the area and relevant air quality legislation, policy and guidance.

An assessment of construction phase impacts has been undertaken following the IAQM guidance. The potential risk of construction phase impacts on local air quality was predicted to be a maximum of 'high risk' for dust nuisance and 'low risk' for human health, prior to the implementation of dust control measures. Mitigation measures have been recommended to reduce the risk of dust and particulate matter being generated and re-suspended. With implementation of the appropriate measures, no significant impacts are anticipated during the construction phase.

The main potential air quality impact once the proposed development is complete and occupied is likely to be emissions from road traffic (i.e. changes in traffic flow volume and distribution) associated with the proposed development. The key air pollutants of concern were NO₂, PM₁₀ and PM_{2.5}. Concentrations of these key pollutants were predicted at the most relevant receptor locations using ADMS-Roads dispersion model for the base year 2022, for the proposed opening year 2026 with and without the proposed development in place.

The impact of the proposed development on NO₂, PM₁₀ and PM_{2.5} concentrations at existing and proposed sensitive human receptors, without mitigation, was 'negligible' at all locations for both the S2 and S3 scenarios. Therefore, it is not considered that any specific mitigation measures will be required for operational phase. Nevertheless, it is recommended that best practice mitigation measures, as detailed in Section 6.2, should be included to minimise the potential impact of the development on local air quality.

Based on the results of the assessment, it is judged that with appropriate construction phase mitigation, the proposed development complies with relevant national and local planning policies and that there are no air quality constraints.

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APPENDIX A - CONSTRUCTION DUST ASSESSMENT METHODOLOGY

This appendix contains the construction dust assessment methodology used in the assessment.

To assess the potential impacts, construction activities are divided into demolition, earthworks, construction and trackout. The descriptors included in this section are based upon the IAQM 2023 guidance. The assessment follows the steps recommended in the guidance.

Step 1: Screen the requirement for assessment

The first step is to screen out the requirement for a construction dust assessment, this is usually a somewhat conservative level of screening. An assessment is usually required where there is:

- a 'human receptor' within:
 - 250m of the boundary of the site; or
 - 50m of the route used by construction vehicles on the public highway, up to 250m from the site entrance(s).
- an 'ecological receptor':
 - 50m of the boundary of the site; or
 - 50m of the route(s) used by construction vehicles on the public highway, up to 250m from the site entrance(s).

Step 2A: Defining the Potential Dust Emission Magnitude

Demolition

The dust emission magnitude category for demolition is varied for each site in terms of timing, building type, duration and scale. Examples of the potential dust emission classes are provided in the guidance as follows:

- **Large:** Total building volume >75,000m³, potentially dusty construction material (e.g. concrete), on-site crushing and screening, demolition activities >12m above ground level;
- **Medium:** Total building volume 12,000m³ – 75,000m³, potentially dusty construction material, demolition activities 6m – 12m above ground level; and
- **Small:** Total building volume <12,000m³, construction material with low potential for dust release (e.g. metal cladding or timber), demolition activities <6m above ground, demolition during wetter months.

Earthworks

The dust emission magnitude category for earthworks is varied for each site in terms of timing, geology, topography and duration. Examples of the potential dust emission classes are provided in the guidance as follows:

- **Large:** Total site area >110,000m², potentially dusty soil type (e.g. clay, which will be prone to suspension when dry due to small particle size), >10 heavy earth moving vehicles active at any one time, formation of bunds >6m in height;
- **Medium:** Total site area 18,000 – 110,000m², moderately dusty soil type (e.g. silt), 5 – 10 heavy earth moving vehicles active at any one time, formation of bunds 4 – 6m in height; and

- **Small:** Total site area <18,000m², soil type with large grain size (e.g. sand), <5 heavy earth moving vehicles active at any one time, formation of bunds <4m in height.

Construction

The dust emission magnitude category for construction is varied for each site in terms of timing, building type, duration, and scale. Examples of the potential dust emissions classes are provided in the guidance as follows:

- **Large:** Total building volume >75,000m³, on site concrete batching, sandblasting;
- **Medium:** Total building volume 12,000 – 75,000m³, potentially dusty construction material (e.g. concrete), on site concrete batching; and
- **Small:** Total building volume <12,000m³, construction material with low potential for dust release (e.g. metal cladding or timber).

Trackout

Factors which determine the dust emission magnitude class of trackout activities are vehicle size, vehicle speed, vehicle number, geology and duration. Examples of the potential dust emissions classes are provided in the guidance as follows:

- **Large:** >50 HDV (>3.5t) outward movements in any one day, potentially dusty surface material (e.g. high clay content), unpaved road length >100m;
- **Medium:** 20 – 50 HDV (>3.5t) outward movements in any one day, moderately dusty surface material (e.g. high clay content), unpaved road length 50 – 100m; and
- **Small:** <20 HDV (>3.5t) outward movements in any one day, surface material with low potential for dust release, unpaved road length <50m.

Step 2B: Defining the Sensitivity of the Area

The sensitivity of the area is defined for dust soiling, human health and ecosystems. The sensitivity of the area takes into account the following factors:

- The specific sensitivities of receptors in the area;
- The proximity and number of those receptors;
- In the case of PM₁₀, the local background concentration; and
- Site-specific factors, such as whether there are natural shelters such as trees, to reduce the risk of wind-blown dust.

Table A1 has been used to define the sensitivity of different types of receptors to dust soiling, health effects and ecological effects.

Table A1: Sensitivity of the Area Surrounding the Site

Sensitivity of Area	Dust Soiling	Human Receptors	Ecological Receptors
High	- Users can reasonably expect enjoyment of a high level of amenity. - The appearance, aesthetics or value of their property would be diminished by soiling. - The people or property would reasonably be expected to be present continuously, or at least regularly for extended periods, as part of the normal pattern of use of the land. - Examples include dwellings, museums and other culturally important collections, medium and long term car parks and car showrooms.	- Locations where members of the public are exposed over a time period relevant to the air quality objective for PM₁₀ (in the case of the 24-hour objectives, a relevant location would be one where individuals may be exposed for eight hours or more in a day) - Examples include residential properties, hospitals, schools and residential care homes should also be considered as having equal sensitivity to residential areas for the purposes of this assessment.	- Locations with an international or national designation <i>and</i> the designated features may be affected by dust soiling. - Locations where there is a community of a particularly dust sensitive species such as vascular species included in the Red Data List For Great Britain. - Examples include a Special Area of Conservation (SAC) designated for acid heathlands or a local site designated for lichens adjacent to the demolition of a large site containing concrete (alkali) buildings.
Medium	- Users would expect to enjoy a reasonable level of amenity, but would not reasonably expect to enjoy the same level of amenity as in their home. - The appearance, aesthetics or value of their property could be diminished by soiling. - The 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. - Examples include parks and places of work.	- Locations where the people exposed are workers and exposure is over a time period relevant to the air quality objective for PM₁₀ (in the case of the 24-hour objectives, a relevant location would be one where individuals may be exposed for eight hours or more in a day). - Examples include office and shop workers, but will generally not include workers occupationally exposed to PM₁₀, as protection is covered by Health and Safety at Work legislation.	- Locations where there is a particularly important plant species, where its dust sensitivity is uncertain or unknown. - Locations with a national designation where the features may be affected by dust deposition. - Example is a Site of Special Scientific Interest (SSSI) with dust sensitive features.

Sensitivity of Area	Dust Soiling	Human Receptors	Ecological Receptors
Low	- The enjoyment of amenity would not reasonably be expected. - Property would not reasonably be expected to be diminished in appearance, aesthetics or value by soiling. - There is transient exposure, where the people or property would reasonably be expected to be present only for limited periods of time as part of the normal pattern of use of the land. - Examples include playing fields, farmland (unless commercially-sensitive horticultural), footpaths, short term car parks and roads.	- Locations where human exposure is transient. - Indicative examples include public footpaths, playing fields, parks and shopping streets.	- Locations with a local designation where the features may be affected by dust deposition. - Example is a local Nature Reserve with dust sensitive features.

Based on the sensitivities assigned of the different types of receptors surrounding the site and numbers of receptors within certain distances of the site, a sensitivity classification for the area can be defined for each. Tables A2 to A4 indicate the method used to determine the sensitivity of the area for dust soiling, human health and ecological impacts, respectively.

For trackout, as per the IAQM construction dust guidance, it is only considered necessary to consider trackout impacts up to 50m from the edge of the road.

Table A2: Sensitivity of the area to dust soiling effects on people and property

Receptor Sensitivity	Number of Receptors	Distances from the Source (m)			
		<20	<50	<100	<350
High	>100	High	High	Medium	Low
	10-100	High	Medium	Low	Low
	1-10	Medium	Low	Low	Low
Medium	>1	Medium	Low	Low	Low
Low	>1	Low	Low	Low	Low

Table A3: Sensitivity of the area to Human Health Impacts

Receptor Sensitivity	Annual Mean PM ₁₀ Conc.	Number of Receptors	Distances from the Source (m)				
			<20	<50	<100	<200	<350
High	>32µg/m ³	>100	High	High	High	Medium	Low
		10-100	High	High	Medium	Low	Low
		1-10	High	Medium	Low	Low	Low
	28-32µg/m ³	>100	High	High	Medium	Low	Low
		10-100	High	Medium	Low	Low	Low

Receptor Sensitivity	Annual Mean PM ₁₀ Conc.	Number of Receptors	Distances from the Source (m)				
			<20	<50	<100	<200	<350
	24-28µg/m ³	1-10	High	Medium	Low	Low	Low
		>100	High	Medium	Low	Low	Low
		10-100	High	Medium	Low	Low	Low
	<24 µg/m ³	1-10	Medium	Low	Low	Low	Low
		>100	Medium	Low	Low	Low	Low
		10-100	Low	Low	Low	Low	Low
		1-10	Low	Low	Low	Low	Low
		1-10	Low	Low	Low	Low	Low
Medium	>32µg/m ³	>10	High	Medium	Low	Low	Low
		1-10	Medium	Low	Low	Low	Low
	28-32µg/m ³	>10	Medium	Low	Low	Low	Low
		1-10	Low	Low	Low	Low	Low
	24-28µg/m ³	>10	Low	Low	Low	Low	Low
		1-10	Low	Low	Low	Low	Low
	<24 µg/m ³	>10	Low	Low	Low	Low	Low
		1-10	Low	Low	Low	Low	Low
Low	-	>1	Low	Low	Low	Low	Low

Table A4: Sensitivity of the area to Ecological Impacts

Receptor Sensitivity	Distances from the Source (m)	
	<20	<50
High	Medium	Medium
Medium	Medium	Low
Low	Low	Low

Step 2C: Defining the Risk of Impacts

The final step is to use both the dust emission magnitude classification with the sensitivity of the area, to determine a potential risk of impacts for each construction activity, before the application of mitigation. Tables A5 to A7 indicate the method used to assign the level of risk for each construction activity.

Table A5: Risk of Dust Impacts from Demolition

Sensitivity of Area	Dust Emission Magnitude		
	Large	Medium	Small
High	High Risk	Medium Risk	Medium Risk
Medium	High Risk	Medium Risk	Low Risk
Low	Medium Risk	Low Risk	Negligible

Table A6: Risk of Dust Impacts from Earthworks/Construction

Sensitivity of Area	Dust Emission Magnitude		
	Large	Medium	Small
High	High Risk	Medium Risk	Low Risk
Medium	Medium Risk	Medium Risk	Low Risk
Low	Low Risk	Low Risk	Negligible

Table A7: Risk of Dust Impacts from Trackout

Sensitivity of Area	Dust Emission Magnitude		
	Large	Medium	Small
High	High Risk	Medium Risk	Low Risk
Medium	Medium Risk	Medium Risk	Negligible
Low	Low Risk	Low Risk	Negligible

APPENDIX B – SITE-SPECIFIC CONSTRUCTION PHASE RECOMMENDED MITIGATION MEASURES

The IAQM 2014 guidance divides site-specific mitigation measures are divided into general measures applicable to all sites, and measures specific to earthworks, construction and trackout. Depending on the level of risk assigned in relation to each type of construction activity, different mitigation is assigned. The method for assigning mitigation measures as detailed in the IAQM guidance has been used. For those ‘general’ mitigation measures, the greatest risk category assigned to the assessed construction activities should be applied. Therefore, in this case, the ‘high risk’ ‘general’ site mitigation measures have been recommended.

There are two categories of mitigation measure – ‘highly recommended’ and ‘desirable’, which are indicated according to the dust risk level identified in Table 5.3. Desirable measures are presented in *italics*.

Communications

- Develop and implement a stakeholder communications plan that includes community engagement before work commences on site.
- Display the name and contact details of people 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.

Dust Management

- Develop and implement a Dust Management Plan (DMP), which may include measures to control other emissions, approved by the Local Authority. The level of detail will depend on the risk, and should include as a minimum the highly recommended measures. The desirable measures should be included as appropriate for the site. The DMP may include monitoring of dust deposition, dust flux, real-time PM10 continuous monitoring and/or visual inspections.

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 local authority when asked.
- Record any exceptional incidents that cause dust and/or air emissions, either on- or off-site or the action taken to resolve the situation in the log book.
- Hold regular liaison meetings with other high risk construction sites within 500 m of the site boundary, to ensure plans are co-ordinated and dust and particulate matter emissions are minimised. It is important to understand the interactions of the off-site transport/ deliveries which might be using the same strategic road network routes.

Monitoring

- Undertake daily on-site and off-site inspection, where receptors (including roads) are nearby, to monitor dust, record inspection results, and make the log available to the local authority if asked. This should include regular dust soiling checks of surfaces such as street furniture, cars and window sills within 100m of site boundary, with cleaning to be provided if necessary.
- Carry out regular site inspections to monitor compliance with any dust management plan, record inspection results, and make an inspection log available to the local authority when asked.
- Increase the frequency of site inspections by the person accountable for air quality and dust issues on site when activities with a high potential to produce dust are being carried out and during prolonged dry or windy conditions.
- Agree dust deposition, dust flux, or real-time PM₁₀ continuous monitoring locations with the Council (if deemed appropriate upon consultation).

Preparing and maintaining the site

- Plan site layout so that machinery and dust causing activities are located away from receptors as far as possible.
- Erect solid screens or barriers around dusty activities or the site boundary that are at least as high as any stockpiles on site.
- Fully enclose site specific operations where there is a high potential for dust production and the site is 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 on site. If they are being re-used on-site cover as described below.
- Cover, seed or fence stockpiles to prevent wind whipping.

Operating Vehicles/Machinery

- Ensure all NRMM meet the required emission standards.
- 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.
- Impose and signpost a maximum-speed-limit of 15mph on surfaced and 10mph on unsurfaced haul roads and work areas.
- Produce a Construction Logistics Plan to manage the sustainable delivery of goods and materials.
- Implement a Travel Plan that supports and encourages sustainable travel (public transport, cycling, walking and car-sharing).

Operations

- Only use cutting, grinding or sawing equipment fitted or in conjunction with suitable dust suppression techniques such as water sprays or local extraction, e.g. suitable local exhaust ventilation systems.
- Ensure an adequate water supply on the site for effective dust/particulate matter suppression/mitigation, using non-potable water where possible and appropriate.
- Use enclosed chutes and covered skips.
- Minimise drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment and use fine water sprays on such equipment wherever appropriate.
- Ensure equipment is readily available on site to clean any dry spillages and clean up as soon as reasonably practicable after the event using wet clean methods.

Waste Management

- Avoid bonfires or burning of waste materials.

Measures Specific to Demolition

- *Soft strip inside buildings before demolition (retaining walls and windows in the rest of the building where possible, to provide a screen against dust).*
- Ensure effective water suppression is used during demolition operations. Hand held sprays are more effective than hoses attached to equipment as the water can be directed to where it is needed. In addition high volume water suppression systems, manually controlled, can produce fine water droplets that effectively bring the dust particles to the ground.
- Avoid explosive blasting, using appropriate manual or mechanical alternatives.
- Bag and remove any biological debris or damp down such material before demolition.

Measures Specific to Earthworks

- Re-vegetate earthworks and exposed areas/soil stockpiles to stabilise surfaces as soon as practicable
- Use Hessian, mulchers or trackifiers where it is not possible to re-vegetate to cover with topsoil, as soon as practicable
- Only remove the cover in small areas during work and not all at once.

Measures Specific to 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, unless this is required for a particular process, in which case ensure that appropriate additional control measures are in place.
- Ensure bulk cement and other fine powder materials are delivered in enclosed tankers and stored in silos with suitable emission control systems to prevent escape of material and overfilling during delivery.
- *For smaller supplies of fine power materials ensure bags are sealed after use and stored appropriately to prevent dust.*

Measures Specific to Trackout

- Use water-assisted dust sweeper(s) on the access and local roads, to remove, as necessary, any material tracked out of the site. This may require the sweeper being continuously in use.
- Avoid dry sweeping of large areas.
- Ensure vehicles entering and leaving sites are covered to prevent the escape of materials during transport.
- Inspect on-site haul routes for integrity and instigate necessary repairs to the surface as soon as reasonably practicable.
-
- Install hard surfaced haul routes, which are regularly damped down with fixed or mobile sprinkler systems, or mobile water bowsers and regularly cleaned.
- Record any inspections of haul routes and subsequent action in site log book.
- Implement wheel washing system (with rumble grids to dislodge accumulated dust and mud prior to leaving the site where reasonably practicable).
- 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 10 m from receptors where possible.

APPENDIX C – OPERATIONAL PHASE IMPACT SIGNIFICANCE CRITERIA

This appendix contains the significance criteria used in the assessment for the operational impact assessment from the 2017 EPUK-IAQM guidance.

To assess the impacts of a development on the surrounding area, the EPUK-IAQM 2017 guidance recommends that the degree of an impact is described by expressing the magnitude of incremental change as a proportion of the relevant assessment level and examining this change in the context of the new total concentration and its relationship with the assessment criterion. Table C1 presents the suggested framework, provided within the EPUK/IAQM guidance, for describing the impacts.

Table C1: Impact Descriptors for Individual Receptors

Long term average concentration at receptors in assessment year	% Change in Concentration Relative to Air Quality Assessment Level (AQAL)			
	1	2-5	6-10	>10
75% or less of AQAL	Negligible	Negligible	Slight	Moderate
76-94% AQAL	Negligible	Slight	Moderate	Moderate
95-102% of AQAL	Slight	Moderate	Moderate	Substantial
103-109% of AQAL	Moderate	Moderate	Substantial	Substantial
110% or more of AQAL	Moderate	Substantial	Substantial	Substantial
Notes AQAL = Air Quality Assessment Level, which for this assessment related to the UK Air Quality Strategy Objectives. Where the % change in concentrations is <0.5%, the change is described as 'negligible' regardless of the concentration. Where concentrations increase the impact is described as adverse, and where it decrease as beneficial.				

The EPUK/IAQM guidance notes that the criteria in Table C1 should be used to describe impacts at individual receptors and should only be considered as a starting point to make a judgement on significance of effects, as other influences may need to be accounted for. The EPUK/IAQM guidance states that the assessment of overall significance should be based on professional judgement, taking into account several factors, including:

- 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.

The EPUK/IAQM guidance states that for most road transport related emissions, long-term average concentrations are the most useful for evaluating the severity of impacts.

APPENDIX D - TRAFFIC DATA

This annex contains the traffic data used in the dispersion modelling assessment, provided by the Transport Consultants (Rodgers Leask) for the development. Included are traffic flow data in 24-hour daily flows, percentage Heavy Duty Vehicle (HDV), the speed data for each road link and the diurnal profile used. Reduced speeds were used at junctions and known areas of congestion.

Table D1 24-hour Traffic Flows (AADT) and Speed Data used in the Dispersion Modelling Assessment

Figure D1 Diurnal Profile Included in the Dispersion Modelling Assessment

Table D1: 24-hour Traffic Flows (AADT) and Speed Data used in the Dispersion Modelling Assessment

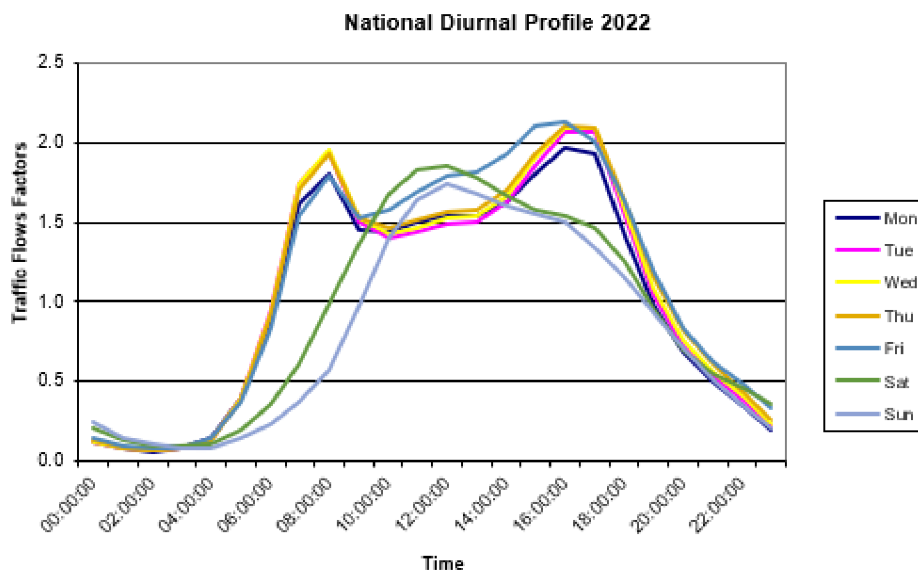
Ref	Road Link	Average Speed (mph)	S1 '2022 base'			S2 2026 'Without the proposed development'			S3 2026 'With the proposed development'		
			Total AADT	HDV	HDV% (%)	Total AADT	HDV	HDV% (%)	Total AADT	HDV	HDV% (%)
1	Proposed Site Access	20	0	0	1.0	0	0	1.0	2726	27	1.0
1	Proposed Site Access	20	0	0	1.0	0	0	1.0	2726	27	1.0
2	Coventry Road - W	30	5929	59	1.0	6576	66	1.0	7904	79	1.0
2	Coventry Road - W	20	5929	59	1.0	6576	66	1.0	7904	79	1.0
2	Coventry Road - W	20	5929	59	1.0	6576	66	1.0	7904	79	1.0
3	Coventry Road - E	30	5378	54	1.0	5904	59	1.0	7278	73	1.0
3	Coventry Road - E	20	5378	54	1.0	5904	59	1.0	7278	73	1.0
3	Coventry Road - E	20	5378	54	1.0	5904	59	1.0	7278	73	1.0
4	Lutterworth Road	30	1585	16	1.0	1729	17	1.0	1837	18	1.0
4	Lutterworth Road	20	1585	16	1.0	1729	17	1.0	1837	18	1.0
5	Rugby Road N before roundabout	40	18550	371	2.0	19226	385	2.0	21662	433	2.0
5	Rugby Road N before roundabout	20	18550	371	2.0	19226	385	2.0	21662	433	2.0
5	Rugby Road N before roundabout	20	18550	371	2.0	19226	385	2.0	21662	433	2.0
5	Rugby Road N before roundabout	20	18550	371	2.0	19226	385	2.0	21662	433	2.0
6	Rugby Road N	40	14511	290	2.0	16921	338	2.0	17418	348	2.0
6	Rugby Road N	20	14511	290	2.0	16921	338	2.0	17418	348	2.0
7	Rugby Road S	20	16718	334	2.0	19226	385	2.0	19936	399	2.0
7	Rugby Road S	20	16718	334	2.0	19226	385	2.0	19936	399	2.0

Ref	Road Link	Average Speed (mph)	S1 '2022 base'			S2 2026 'Without the proposed development'			S3 2026 'With the proposed development'		
			Total AADT	HDV	HDV% (%)	Total AADT	HDV	HDV% (%)	Total AADT	HDV	HDV% (%)
7	Rugby Road S	20	8359	167	2.0	9613	192	2.0	9968	199	2.0
7	Rugby Road S	20	8359	167	2.0	9613	192	2.0	9968	199	2.0
9	Lutterworth Road	30	3737	75	2.0	5889	118	2.0	6348	127	2.0
9	Lutterworth Road	20	3737	75	2.0	5889	118	2.0	6348	127	2.0
9	Lutterworth Road	20	3737	75	2.0	5889	118	2.0	6348	127	2.0
9	Lutterworth Road	30	3737	75	2.0	5889	118	2.0	6348	127	2.0
10	Hinckley Road	60	11390	228	2.0	11708	234	2.0	11750	235	2.0
10	Hinckley Road	30	5695	114	2.0	11708	234	2.0	5875	118	2.0
10	Hinckley Road	20	5695	114	2.0	11708	234	2.0	5875	118	2.0
12	Wolvey Road	30	3489	70	2.0	3122	62	2.0	3284	66	2.0
12	Wolvey Road	20	3489	70	2.0	3122	62	2.0	3284	66	2.0
12	Wolvey Road	30	3489	70	2.0	3122	62	2.0	3284	66	2.0
12	Wolvey Road	20	3489	70	2.0	3122	62	2.0	3284	66	2.0
12	Wolvey Road	20	3489	70	2.0	3122	62	2.0	3284	66	2.0
14	Watling Street (A5) N of 16	40	22500	2700	12.0	24472	2937	12.0	24472	2937	12.0
14	Watling Street (A5) N of 16	20	11250	1350	12.0	12236	1468	12.0	12236	1468	12.0
14	Watling Street (A5) N of 16	20	11250	1350	12.0	12236	1468	12.0	12236	1468	12.0
14	Watling Street (A5) N of 16	60	22500	2700	12.0	24472	2937	12.0	24472	2937	12.0
15	Canberra Way	30	630	13	2.0	643	13	2.0	643	13	2.0
15	Canberra Way	20	630	13	2.0	643	13	2.0	643	13	2.0
16	Stretton Baskerville Interchange	30	22500	2700	12.0	24472	2937	12.0	24472	2937	12.0
17	Watling Street (A5) S of 16	40	15817	2373	15.0	17195	2579	15.0	17411	2612	15.0
17	Watling Street (A5) S of 16	20	15817	2373	15.0	17195	2579	15.0	17411	2612	15.0
17	Watling Street (A5) S of 16	20	7909	1186	15.0	8598	1290	15.0	8706	1306	15.0
18	Watling Street (A5) S of 16	20	7909	1186	15.0	8598	1290	15.0	8706	1306	15.0

Ref	Road Link	Average Speed (mph)	S1 '2022 base'			S2 2026 'Without the proposed development'			S3 2026 'With the proposed development'		
			Total AADT	HDV	HDV% (%)	Total AADT	HDV	HDV% (%)	Total AADT	HDV	HDV% (%)
18	Watling Street (A5) S of 17	30	15817	2373	15.0	19416	2912	15.0	17411	2612	15.0
19	Watling Street (A5) S of 17	20	15817	2373	15.0	19416	2912	15.0	17411	2612	15.0
19	Lutterworth Road	30	3995	80	2.0	6153	123	2.0	6814	136	2.0
19	Lutterworth Road	20	3995	80	2.0	6153	123	2.0	6814	136	2.0
19	Lutterworth Road	30	3995	80	2.0	6153	123	2.0	6814	136	2.0
19	Lutterworth Road	30	3995	80	2.0	6153	123	2.0	6814	136	2.0
19	Lutterworth Road	30	3995	80	2.0	6153	123	2.0	6814	136	2.0
20	Church Street	20	10944	109	1.0	12243	122	1.0	12964	130	1.0
20	Church Street	70	10944	109	1.0	12243	122	1.0	12964	130	1.0
21	M69	30	29410	2941	10.0	32005	3201	10.0	32199	3220	10.0
21	M69	70	9764	879	9.0	10621	956	9.0	10815	973	9.0
22	M69	70	19646	1965	10.0	21384	2138	10.0	21384	2138	10.0
23	M69	50	26305	2630	10.0	28623	2862	10.0	28804	2880	10.0
23	M69	70	6667	467	7.0	7252	508	7.0	7433	520	7.0
24	M69	30	25793	2579	10.0	28069	2807	10.0	28082	2808	10.0
24	M69	70	7182	1005	14.0	7815	1094	14.0	7828	1096	14.0
25	M69	70	18611	1861	10.0	20254	2025	10.0	20254	2025	10.0
26	M69	50	27167	2717	10.0	29561	2956	10.0	29735	2974	10.0
26	M69	30	8557	770	9.0	9307	838	9.0	9481	853	9.0
27	Passchendale Drive	20	488	10	2.0	498	10	2.0	878	18	2.0
27	Passchendale Drive	30	488	10	2.0	498	10	2.0	878	18	2.0
28	Flanders Close	20	488	10	2.0	498	10	2.0	878	18	2.0
28	Flanders Close	30	488	10	2.0	498	10	2.0	878	18	2.0
29	Coventry Road - E	40	4670	47	1.0	5331	53	1.0	6729	67	1.0
30	Watling Street (A5) S of 18	20	17864	2680	15.0	19416	2912	15.0	20527	3079	15.0

Ref	Road Link	Average Speed (mph)	S1 '2022 base'			S2 2026 'Without the proposed development'			S3 2026 'With the proposed development'		
			Total AADT	HDV	HDV% (%)	Total AADT	HDV	HDV% (%)	Total AADT	HDV	HDV% (%)
31	Rugby Road Roundabout N	20	18550	371	2.0	20793	416	2.0	20977	420	2.0
32	A5 Roundabout S	20	15817	2373	15.0	17195	2579	15.0	18181	2727	15.0

Figure D1: Diurnal Profile Included in the Dispersion Modelling Assessment



APPENDIX E - MODELLING OF OPERATIONAL PHASE – VERIFICATION METHODOLOGY AND MODEL RESULTS

The dispersion model results were verified following the relevant guidance in LAQM.TG(22). Predicted results from a dispersion model may differ from measured concentrations for a variety of reasons, these are identified in LAQM.TG(22) to include:

- Estimates of background concentrations;
- Meteorological data uncertainties;
- Uncertainties in source data for example, traffic flow data, stack emissions and emission factors;
- Model input parameters such as roughness length, minimum Monin-Obukhov and overall model limitations; and,
- Uncertainties associated with monitoring data, including locations.

2022 monitored annual mean NO₂ concentrations from diffusion tube DT2 was used for model verification. Table E1 presents details of the location of this tube.

Table E1: Monitoring Location used in Verification Process

Site ID	Receptor Location	Site Type	Grid Reference		Height (m)
			X	Y	
DT2	1 Rufford Close	Suburban	442903	291349	2

In line with the LAQM.TG(22) guidance, modelled versus measured road NO_x at the diffusion tube site is shown in Table E2 and E3.

Table E2: Modelled versus Monitored NO_x/NO₂

Site	Monitored total NO ₂	Background NO ₂	Monitored Road Contribution NO _x	Modelled road contribution NO _x	Ratio of Modelled and Measured Road NO _x
DT2	22.5	11.55	20.76	6.66	3.12

An adjustment factor of **3.12** was obtained and applied to the modelled road-NO_x component predicted at all receptors. The verified annual average modelled road contribution NO_x concentrations have then been converted into annual average road NO₂ by using the Defra NO_x to NO₂ spreadsheet. A comparison of monitored and model adjusted NO₂ concentrations is presented in Table E3. This shows that, following adjustment, the modelled NO₂ result is within +/- 25% of the monitored NO₂ concentration. In accordance with the LAQM.TG(22) guidance, it is not considered that further verification is required.

Table E3: Modelled versus Monitored NO₂ Concentrations

Site	Background NO ₂	Monitored total NO ₂	Modelled total NO ₂ after adjustment	% Difference [(modelled – monitored)/monitored]x100
DT2	11.55	22.5	22.5	0

It is noted that there was no PM₁₀ or PM_{2.5} monitoring data available in the vicinity of the proposed development. Therefore, as per the recommendations in LAQM.TG(22), adjustment factors used for the predicted roadside NO_x concentrations were applied to the modelled PM₁₀ and PM_{2.5} concentration.