217 High Street, West Drayton, UB7 7GN
Air Quality Assessment

784-B042436
3rd November 2023

PRESENTED TO

Home Bargains

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EXECUTIVE SUMMARY

This report presents the findings of an air quality assessment undertaken to assess road traffic emission and construction dust impacts in support of a planning application for the refurbishment of existing retail unit (Class E), including installation of new shopfront, reconfiguration of car park, landscaping, external plant, and associated works at the site located at 217 High Street, West Drayton, UB7 7GN.

Construction Phase

The potential effects during the demolition and construction phases include fugitive dust emissions from site activities, such as earthworks, construction and trackout.

During the construction phase, site specific mitigation measures detailed within this assessment will be implemented. With these mitigation measures in place, the effects from the construction phase are not predicted to be significant.

Operational Phase

Detailed dispersion modelling of traffic pollutants has been undertaken for the proposed development. An operational year assessment for 2023 traffic emissions has been undertaken to assess the effects of the Proposed Development. The impacts during the operational phase take into account exhaust emissions from additional road traffic generated due to the proposed development.

The long-term (annual) assessment of the effects associated with the proposed development with respect to Nitrogen Dioxide (NO_2), PM_{10} and $PM_{2.5}$ is determined to be ‘negligible’.

The proposed development will not include installation of CHP or other heat source emissions and can therefore be considered air quality neutral. The development trip rate is below the benchmark trip rate and therefore, the development can be considered Air Quality Neutral.

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ACRONYMS/ABBREVIATIONS

Acronyms/Abbreviations	Definition
AADT	Annual Average Daily Traffic
ADMS	Atmospheric Dispersion Modelling Software
AQAL	the Air Quality Assessment Level
AQAP	Air Quality Action Plan
AQMA	Air Quality Management Area
AQO	Air Quality Objectives
AQS	Air Quality Standards
CHP	Combined Heat and Power
CL	Critical Level
CO	Carbon Monoxide
DEFRA	Department for Environment Food & Rural Affairs
EAL	Environmental Assessment Limits
EC	European Commission
EFT	The Emissions Factors Toolkit
EPUK	Environmental Protection UK
EU	European Union
EPAQS	The Expert Panel on Air Quality Standards
IAQM	The Institute of Air Quality Management
LA	Local Authority
LAQM	Local Air Quality Management
NGR	The United Kingdom National Grid Reference
NO	Nitric Oxide
NO_2	Nitrogen Dioxide
PC	Process Contribution
MHCLG	the Ministry for Housing, Communities and Local Government
NPPF	The National Planning Policy Framework
OS	the UK Ordnance Survey
PEC	Predicted Environment Concentration
PPG	Planning Policy Guidance
PPS	Planning Policy Statements
SAC	Special Areas of Conservation
SPA	Special Protection Area
SSSI	Sites of Special Scientific Interest
VOC	Volatile organic compounds
WHO	World Health Organization
UK	The United Kingdom

1.0 INTRODUCTION

This report presents the findings of an air quality assessment undertaken to assess road traffic emission and construction dust impacts in support of a planning application for the refurbishment of existing retail unit (Class E), including installation of new shopfront, reconfiguration of car park, landscaping, external plant, and associated works at the site located at 217 High Street, West Drayton, UB7 7GN.

1.1 SITE LOCATION

The central Grid Reference is approximately 505717,180867. The application site is bounded to the north by industrial units situated along High Street, to the east by a car park off High Street, to the south by Industrial units and Chantry Close, and to the west by the grand union canal and residential properties.

Reference should be made to **Figure 1-1** for a map of the application site and surrounding area.

Figure 1-1. Satellite Image of Site and Surrounding Area

Google Imagery (2023)

1.2 CONTEXT

The primary source of the air quality associated with the proposed scheme is from vehicle movements, arriving and departing the proposed development. The traffic data generated by the development has been assessed at the surrounding sensitive receptors.

The following assessment stages have been undertaken as part of this assessment:

- Baseline evaluation;
- Assessment of potential air quality impacts during the construction phase;
- Assessment of potential air quality impacts during the operational phase;
- Air Quality Neutral Assessment;
- Air Quality Damage Cost Assessment; and,
- Identification of mitigation measures (as required).

The results of the assessment are detailed in the following sections of this report.

The construction phase assessment considers the potential effects of dust and particulate emissions from site activities and materials movement using a qualitative risk assessment method based on the Institute of Air Quality Management's (IAQM) 'Guidance on the Assessment of Dust from Demolition and Construction' document, published in 2023.

The assessment of the potential air quality impacts that are associated with the operational phase has focused on the predicted impact of changes in ambient nitrogen dioxide (NO_2) and particulate matter with an aerodynamic diameter of less than 10 µm (PM_{10}) and less than 2.5 µm ($PM_{2.5}$) as a result of the development at key local receptor locations. The changes have been referenced to EU air quality limits and UK air quality objectives and the magnitude and impact description of the changes have been referenced to non-statutory guidance issued by the IAQM and Environmental Protection UK (EPUK).

1.3 REPORT STRUCTURE

Following this introductory section, the remainder of this report is structured as follows:

- Section 2.0: Policy and Legislative Context
- Section 3.0: Assessment Methodology
- Section 4.0: Baseline Conditions
- Section 5.0: Assessment of Air Quality Impacts – Construction Phase
- Section 6.0: Assessment of Air Quality Impacts – Operational Phase
- Section 7.0: Air Quality Neutral Assessment
- Section 8.0: 'Damage Costs' Assessment
- Section 9.0: Mitigation
- Section 10.0: Conclusions

All technical Appendices are included at the end of this report for information.

2.0 POLICY AND LEGISLATIVE CONTEXT

2.1 DOCUMENTS CONSULTED

The following documents were consulted during the undertaking of this assessment:

Legislation and Best Practice Guidance

- National Planning Policy Framework, Ministry for Housing, Communities and Local Government, Revised July 2021;
- Planning Practice Guidance: Air Quality, Ministry for Housing, Communities and Local Government, November 2019;
- The Air Quality Standards Regulations (Amendments), 2016;
- The Air Quality Strategy for England, Scotland, Wales and Northern Ireland, Defra, 2007;
- The Environment Act 1995;
- The Environment Act 2021;
- The Environmental Targets (Fine Particulate Matter) (England) Regulations 2023;
- London Local Air Quality Management Technical Guidance LLAQM.TG(19), Mayor of London, 2019;
- Design Manual for Roads and Bridges, Volume 11, Section 3, Part 1, LA 105 Air quality, Highways England, November 2019;
- Land-Use Planning & Development Control: Planning for Air Quality, EPUK & IAQM, 2017;
- Guidance on the Assessment of Dust from Demolition and Construction, IAQM, 2023;
- A Guide to the Assessment of Air Quality Impacts on Designated Nature Conservation Sites (Version 1.1), IAQM, May 2020;
- Ecological Assessment of Air Quality Impacts, CIEEM, January 2021;
- London Plan Supplementary Planning Guidance (SPG) 'The Control of Dust and Emissions during Construction and Demolition', July 2014;
- Greater London Authority (GLA) London Environment Strategy, May 2018;
- Greater London Authority (GLA) The London Plan, March 2021;
- Greater London Authority, Sustainable Design & Construction Supplementary Planning Guidance, April 2014;
- Air Quality Neutral Planning Support Guidance, Greater London Authority, 2014;
- Air Quality Positive, Greater London Authority, February 2023; and
- London Planning Guidance, Air Quality Neutral, February 2023.

Websites Consulted

- Google maps (maps.google.co.uk);
- The UK National Air Quality Archive (www.airquality.co.uk);
- Department for Transport: Road Traffic Statistics (https://roadtraffic.dft.gov.uk/);
- Multi-Agency Geographic Information for the Countryside (http://magic.defra.gov.uk/);
- Planning Practice Guidance (http://planningguidance.planningportal.gov.uk/); and

- London Borough of Hillingdon, (www.hillingdon.gov.uk)

Site Specific Reference Documents

- London Borough of Hillingdon, Local Plan: Part 1, Strategic Policies (Adopted November 2012);
- London Borough of Hillingdon, Local Plan: Part 2, Development Management Policies (Adopted January 2020);
- London Borough of Hillingdon, Air Quality Annual Status Report 2019; and
- London Borough of Hillingdon, Air Quality Action plan 2019 – 2024.

2.2 AIR QUALITY LEGISLATIVE FRAMEWORK

European Legislation

European air quality legislation is consolidated under Directive 2008/50/EC, which came into force on 11th June 2008. This Directive consolidates previous legislation which was designed to deal with specific pollutants in a consistent manner and provides new air quality objectives for fine particulates. The consolidated Directives include:

- **Directive 1999/30/EC** – the First Air Quality 'Daughter' Directive – sets ambient air limit values for NO_2 and oxides of nitrogen, sulphur dioxide, lead and PM_{10};
- **Directive 2000/69/EC** – the Second Air Quality 'Daughter' Directive – sets ambient air limit values for benzene and carbon monoxide; and
- **Directive 2002/3/EC** – the Third Air Quality 'Daughter' Directive – seeks to establish long-term objectives, target values, an alert threshold and an information threshold for concentrations of ozone in ambient air.

The fourth daughter Directive was not included within the consolidation and is described as:

- **Directive 2004/107/EC** – sets health-based limits on polycyclic aromatic hydrocarbons, cadmium, arsenic, nickel and mercury, for which there is a requirement to reduce exposure to as low as reasonably achievable.

The European Commission (EC) Directive Limits, outlined above, have been transposed in the UK through the Air Quality Standards Regulations. In the UK responsibility for meeting ambient air quality limit values is devolved to the national administrations in Scotland, Wales and Northern Ireland.

The European Union (Withdrawal) Act 2018 (EUWA) provides a new framework for the continuity of 'retained EU law' in the UK. EU Directives no longer have to be implemented by the UK except to any extent agreed or decided by the UK unilaterally.

EUWA retains the domestic effect of EU Directives to the extent already implemented in UK law, by preserving the relevant domestic implementing legislation enacted in UK law before 'Implementation Period' completion day. Though the EU Directives are not retained, following the UK's departure from the EU, the EUWA converts the current framework of Air Quality targets, however the role that the EU instructions were party to are lost.

UK Legislation

The Air Quality Standards Regulations (Amendments 2016) seek to simplify air quality regulation and provide a new transposition of the Air Quality Framework Directive, First, Second and Third Daughter Directives and also transpose the Fourth Daughter Directive within the UK. The Air Quality Limit Values are transposed into the updated Regulations as Air Quality Standards, with attainment dates in line with the European Directives. SI 2010 No. 1001, Part 7 Regulation 31 extends powers, under Section 85(5) of the Environment Act (1995), for the Secretary of State to give directions to Local Authorities (LAs) for the implementation of these Directives.

The UK Air Quality Strategy is the method for implementation of the air quality limit values in England, Scotland, Wales and Northern Ireland and provides a framework for improving air quality and protecting human health from the effects of pollution.

For each nominated pollutant, the Air Quality Strategy sets clear, measurable, outdoor air quality standards and target dates by which these must be achieved; the combined standard and target date is referred to as the Air Quality Objective (AQO) for that pollutant. Adopted national standards are based on the recommendations of the Expert Panel on Air Quality Standards (EPAQS) and have been translated into a set of Statutory Objectives within the Air Quality (England) Regulations (2000) SI 928, and subsequent amendments. The Environment (Miscellaneous Amendments) (EU Exit) Regulations 2020 amends the AQO for $PM_{2.5}$ outlined within the Air Quality Standards Regulations (2010 & 2016 Amendments).

The AQOs for pollutants included within the Air Quality Strategy and assessed as part of the scope of this report are presented in **Table 2-1** and **Table 2-2** along with European Commission (EC) Directive Limits and World Health Organisation (WHO) Guidelines. The ecological levels are based on WHO and CLRTAP (Convention on Long-range Transboundary Air Pollution) guidance.

Table 2-1. Air Quality Standards, Objectives, Limits and Target Values

Pollutant	Applies	Objective	Concentration Measured as[10]	Date to be achieved and maintained thereafter	European Obligations	Date to be achieved and maintained thereafter	New or existing
PM_{10}	UK	50µg/m³ by end of 2004 (max 35 exceedances a year)	24-hour Mean	1st January 2005	50µg/m³ by end of 2004 (max 35 exceedances a year)	1st January 2005	Retain Existing
	UK	40µg/m³ by end of 2004	Annual Mean	1st January 2005	40µg/m³	1st January 2005	
$PM_{2.5}$	UK	10µg/m³	Annual Mean	31st December 2040	-	-	New
NO_2	UK	200µg/m³ not to be exceeded more than 18 times a year	1-Hour Mean	31st December 2005	200µg/m³ not to be exceeded more than 18 times a year	1st January 2010	Retain Existing
	UK	40µg/m³	Annual Mean	31st December 2005	40µg/m³	1st January 2010	

Table 2-2. Ecological Air Quality Standards, Objectives, Limit and Target Values

Pollutant	Applies	Objective	Concentration Measured as
NO_X	UK	30µg/m^3	Annual Mean

Within the context of this assessment, the annual mean objectives are those against which facades of residential receptors will be assessed and the short-term objectives apply to all other receptor locations, where people may be exposed over a short duration, both residential and non-residential such as using gardens, balconies, walking along streets, using playgrounds, footpaths or external areas of employment uses.

Local Air Quality Management

Under Section 82 of the Environment Act (1995) (Part IV) Local Authorities (LAs) are required to periodically review and assess air quality within their area of jurisdiction under the system of Local Air Quality Management (LAQM). This review and assessment of air quality involves assessing present and likely future air quality against the AQOs. If it is predicted that levels at the façade of buildings where members of the public are regularly present (normally residential properties) are likely to be exceeded, the LA is required to declare an Air Quality Management Area (AQMA).

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 ($PM_{2.5}$) in ambient air, and to set a long-term target expected to be 10 µg/m^3, a reduction from the current Air Quality objective of 20 µg/m^3 set out within the Environment (Miscellaneous Amendments) (EU Exit) Regulations 2020. A draft of a statutory instrument (or drafts of statutory instruments) containing regulations setting the $PM_{2.5}$ air quality target must be laid before Parliament on or before 31st October 2022 and is expected to come into force thereafter.

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 $PM_{2.5}$ of 10 µg/m^3, a reduction from the current Air Quality objective of 20 µg/m^3 set out within the Environment (Miscellaneous Amendments) (EU Exit) Regulations 2020. Additionally, the 2023 Regulations introduce a population exposure target for $PM_{2.5}$ where there is at least a 35% reduction in population exposure by the end of 31st December 2040, as compared with the average population exposure in the three-year period from 1st January 2016 to 31st December 2018.

2.3 PLANNING AND POLICY GUIDANCE

National Policy

The National Planning Policy Framework (NPPF), revised July 2021, principally brings together and summarises the suite of Planning Policy Statements (PPS) and Planning Policy Guidance (PPG) which previously guided planning policy making. The NPPF states that:

Paragraph 174

"Planning policies and decisions should contribute to and enhance the natural and local environment by:

e) preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability. Development should, wherever possible, help to improve local environmental conditions such as air and water quality, taking into account relevant information such as river basin management plans."

Paragraph 186

"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."

Paragraph 188

"The focus of planning policies and decisions should be on whether proposed development is an acceptable use of land, rather than the control of processes or emissions (where these are subject to separate pollution control regimes). Planning decisions should assume that these regimes will operate effectively. Equally, where a planning decision has been made on a particular development, the planning issues should not be revisited through the permitting regimes operated by pollution control authorities."

The Planning Practice Guidance (PPG) web-based resource was updated by the Ministry for Housing, Communities and Local Government (MHCLG) on 1st November 2019 to support the National Planning Policy Framework and make it more accessible. A review of PPG: Air Quality identified the following guidance (Paragraph: 001 Reference ID: 32-001-20191101):

"The 2008 Ambient Air Quality Directive sets legally binding limits for concentrations in outdoor air of major air pollutants that affect public health such as particulate matter (PM10 and PM2.5) and nitrogen dioxide (NO_2).

The UK also has national emission reduction commitments for overall UK emissions of 5 damaging air pollutants:

- *fine particulate matter ($PM_{2.5}$);*
- *ammonia (NH_3);*

- *nitrogen oxides (NO_x);*
- *Sulphur dioxide (SO_2); and*
- *non-methane volatile organic compounds (NMVOCs).*

As well as having direct effects on public health, habitats and biodiversity, these pollutants can combine in the atmosphere to form ozone, a harmful air pollutant (and potent greenhouse gas) which can be transported great distances by weather systems. Odour and dust can also be a planning concern, for example, because of the effect on local amenity."

Regional Policy

The London Borough of Hillingdon (LBoH) lies within the Greater London Authority (GLA) Area. The 2021 London Plan addresses the improvement of air quality. Following a review of policies within the 2021 Local Plan, the following were identified as being relevant to the proposed development from an air quality perspective:

"Policy SD4 The Central Activities Zone (CAZ)

D. Taking account of the dense nature of the CAZ, practical measures should be taken to improve air quality, using an air quality positive approach where possible (Policy SI 1 Improving air quality) and to address issues related to climate change and the urban heat island effect."

"Policy D1 London's form, character and capacity for growth

A. Boroughs should undertake area assessments to define the characteristics, qualities and value of different places within the plan area to develop an understanding of different areas' capacity for growth. Area assessments should cover the elements listed below:

5)air quality and noise levels."

"Policy D3 Optimising site capacity through the design-led approach

Experience

9) help prevent or mitigate the impacts of noise and poor air quality."

"Policy E5 Strategic Industrial Locations (SIL)

D. Development proposals within or adjacent to SILs should not compromise the integrity or effectiveness of these locations in accommodating industrial type activities and their ability to operate on a 24-hour basis. Residential development adjacent to SILs should be designed to ensure that existing or potential industrial activities in SIL are not compromised or curtailed. Particular attention should be given to layouts, access, orientation, servicing, public realm, air quality, soundproofing and other design mitigation in the residential development."

"Policy E7 Industrial intensification, co-location and substitution

D. The processes set out in Parts B and C above must ensure that: f)) air quality, including dust, *odour and emissions and potential contamination."*

***"**<u>*Policy SI1 Improving Air Quality*</u>*

A. Development plans, through relevant strategic, site specific and area-based policies should seek opportunities to identify and deliver further improvements to air quality and should not reduce air quality benefits that result from the Mayor's or boroughs' activities to improve air quality.

B. To tackle poor air quality, protect health and meet legal obligations the following criteria should be addressed:

1. Development proposals should not:

a) lead to further deterioration of existing poor air quality

b) create any new areas that exceed air quality limits, or delay the date at which compliance will be achieved in areas that are currently in exceedance of legal limits

c) create unacceptable risk of high levels of exposure to poor air quality.

2. In order to meet the requirements in Part 1, as a minimum:

a) Development proposals must be at least air quality neutral

b) Development proposals should use design solutions to prevent or minimise increased exposure to existing air pollution and make provision to address local problems of air quality in preference to post-design or retrofitted mitigation measures

c) Major development proposals must be submitted with an Air Quality Assessment. Air quality assessments should show how the development will meet the requirements of B1

d) Development proposals in Air Quality Focus Areas or that are likely to be used by large numbers of people particularly vulnerable to poor air quality, such as children or older people, should demonstrate that design measures have been used to minimise exposure.

C. Masterplans and development briefs for large-scale development proposals subject to an Environmental Impact Assessment should consider how local air quality can be improved across the area of the proposal as part of an Air Quality Positive approach. To achieve this a statement should be submitted demonstrating:

a) How proposals have considered ways to maximise benefits to local air quality, and

b) What measures or design features will be put in place to reduce exposure to pollution, and how they will achieve this

D. In order to reduce the impact on air quality during the construction and demolition phase Development proposals must demonstrate how they plan to comply with the Non-Road Mobile Machinery Low Emission Zone and reduce emissions from the demolition and construction of buildings following best practice guidance.

E. Development proposals should ensure that where emissions need to be reduced to meet the requirements of Air Quality Neutral or to make the impact of development on local air quality acceptable, this is done on-site. Where it can be demonstrated that emissions cannot be further reduced by on-site measures, off-site measures to improve local air quality may be acceptable, provided that equivalent air quality benefits can be demonstrated within the area affected by the development."

"*Policy SI8 Waste capacity and net waste self-sufficiency*

E. Developments proposals for new waste sites or to increase the capacity of existing sites should be evaluated against the following criteria:4) the impact on amenity in surrounding areas (including but not limited to noise, odours, air quality and visual impact) – where a site is likely to produce significant air quality, dust or noise impacts, it should be fully enclosed."

"*Policy T6.2 Office Parking*

D. Outer London boroughs wishing to adopt more generous standards are required to do so through an evidence-based policy in their Development Plan that identifies the parts of the borough in which the higher standards will be applied, and justifies those standards, including: 3) the impact on congestion and air quality locally and on neighbouring boroughs and districts outside London as appropriate."

"*Policy T8 Aviation*

E. The environmental and health impacts of aviation must be fully acknowledged and aviation-related development proposals should include mitigation measures that fully meet their external and environmental costs, particularly in respect of noise, air quality and climate change. Any airport expansion scheme must be appropriately assessed and if required demonstrate that there is an overriding public interest or no suitable alternative solution with fewer environmental impacts.

F. The Mayor will oppose the expansion of Heathrow Airport unless it can be shown that no additional noise or air quality harm would result, and that the benefits of future regulatory and technology improvements would be fairly shared with affected communities."

Local Policy

Following a review of the London Borough of Hillingdon, Air Quality Action Plan 2019 – 2024 and Hillingdon Local Plan (Adopted November 2012), the following policy concerning air quality was identified.

"Policy EM8

… All development should avoid deterioration in local air quality and ensure the protection of both existing and new sensitive receptors …"

"Policy DMEI 14: Air Quality

… A) Development proposals should demonstrate appropriate reductions in emissions to sustain compliance with and contribute towards meeting EU limit values and national air quality objectives for pollutants.

B) Development proposals should, as a minimum:

i) be at least "air quality neutral";

ii) include sufficient mitigation to ensure there is no unacceptable risk from air pollution to sensitive receptors, both existing and new; and

iii) actively contribute towards the improvement of air quality, especially within the Air Quality Management Area. …"

3.0 ASSESSMENT METHODOLOGY

There is potential for environmental effects during the operational phase of the proposed development due to emissions from proposed vehicle movements. The significance of potential environmental effects is assessed according to the latest guidance produced by EPUK and IAQM in January 2017 '*Land-Use Planning & Development Control: Planning for Air Quality*' and May 2020 '*A Guide to the Assessment of Air Quality Impacts on Designated Nature Conservation Sites*'.

The methodology used to determine the potential air quality effects of the construction phase of the proposed development has been derived from the IAQM '*Guidance on the Assessment of the Impacts of Dust from Demolition and Construction'* document and is summarised in Section 5.0.

Consideration of the potential effects from construction traffic has been scoped out of the assessment. As set out in DMRB LA 105 the impact of construction activities on vehicle movements shall be assessed where construction activities are programmed to last for more than 2 years. The construction program is anticipated to last for less than 24 months and therefore consideration of the potential air quality effects associated with construction vehicle emissions was scoped out.

3.1 DETERMINING IMPACT DESCRIPTION OF THE AIR QUALITY EFFECTS

The impact description of the effects during the operational phase of the development is based on the latest guidance produced by EPUK and IAQM in January 2017. The guidance provides a basis for a consistent approach that could be used by all parties associated with the planning process to professionally judge the overall impact description of the air quality effects based on severity of air quality impacts.

The following rationale is used in determining the severity of the air quality effects at individual receptors:

1. The change in concentration of air pollutants, air quality effects, are quantified and evaluated in the context of AQOs. The effects are provided as a percentage of the Air Quality Objective (AQO), which may be an AQO, EU limit or target value, or an Environment Agency 'Environmental Assessment Level (EAL)';
2. The absolute concentrations are also considered in terms of the AQO and are divided into categories for long term concentration. The categories are based on the sensitivity of the individual receptor in terms of harm potential. The degree of harm potential to change increases as absolute concentrations are close to or above the AQO;
3. Severity of the effect is described as qualitative descriptors; negligible, slight, moderate or substantial, by taking into account in combination the harm potential and air quality effect. This means that a small increase at a receptor which is already close to or above the AQO will have higher severity compared to a relatively large change at a receptor which is significantly below the AQO;
4. The effects can be adverse when pollutant concentrations increase or beneficial when concentrations decrease as a result of development;
5. The judgement of overall impact description of the effects is then based on severity of effects on all the individual receptors considered; and

6. Where a development is not resulting in any change in emissions itself, the impact description of effect is based on the effect of surrounding sources on new residents or users of the development, i.e., will they be exposed to levels above the AQO.

Table 3-1. Impact Descriptors for Individual Receptors

Long term average concentration at receptor in assessment year	% Change in concentration relative to AQO			
	1	2-5	6-10	>10
≤75% of AQO	Negligible	Negligible	Slight	Moderate
76-94% of AQO	Negligible	Slight	Moderate	Moderate
95-102% of AQO	Slight	Moderate	Moderate	Substantial
103-109 of AQO	Moderate	Moderate	Substantial	Substantial
≥110 of AQO	Moderate	Substantial	Substantial	Substantial

In accordance with explanation note 2 of Table 6.3 of the EPUK & IAQM guidance, the Table is intended to be used by rounding the change in percentage pollutant concentration to whole numbers, which then makes it clearer which cell the impact falls within. The user is encouraged to treat the numbers with recognition of their likely accuracy and not assume a false level of precision. Changes of 0%, i.e. less than 0.5%, will be described as Negligible.

3.2 ESTIMATING HOURLY AND DAILY MEAN CONCENTRATIONS

The latest Local Air Quality Management (LAQM) Technical Guidance TG(22) has been used for predicting 1 hourly and 24-hourly pollutant concentrations.

The guidance states that the one hour mean NO_2 AQO of 200 ug/m^3 is not likely to be exceeded at any roadside locations if the annual mean concentration is below 60ug/m^3. Therefore, this assessment evaluates the likelihood of exceeding the hourly average NO_2 objective by comparing predicted annual average NO_2 concentrations at all receptors to an annual average equivalent threshold of 60 µg/m^3 NO_2. Where predicted concentrations are below this value, it can be concluded that the hourly average NO_2 objective is likely to be achieved.

In accordance with the guidance, the short term 24 hourly PM_{10} mean concentrations can be calculated using the following equation as presented below.

$$\textit{Number of 24 hour mean exceedances} = -18.5 + 0.00145\ x\ \textit{annual mean}^3 + \left(\frac{206}{\textit{annual mean}}\right)$$

4.0 BASELINE CONDITIONS

4.1 AIR QUALITY REVIEW

This section provides a review of the existing air quality in the vicinity of the application site in order to provide a benchmark against which to assess potential air quality impacts of the proposed development. Baseline air quality in the vicinity of the application site has been defined from several sources, as described in the following sections.

Local Air Quality Management (LAQM)

As required under section 82 of the Environment Act 1995, LBoH has undertaken an ongoing exercise to review and assess air quality within its area of jurisdiction.

The assessments have indicated that concentrations of NO_2 are above the relevant AQOs at one location of relevant public exposure within LBoH that is shown below.

Table 4-1. Local Authority AQMA Details

AQMA	Description	Date Declared	Date Amended	Pollutants Declared
Hillingdon AQMA	The area from the southern boundary north to the border defined by, the A40 corridor from the western borough boundary, east to the intersection with the Yeading Brook north until its intersection with the Chiltern-Marylebone railway line.	01/09/2003	N/A	Nitrogen Dioxide NO_2

The proposed development site is situated within the Hillingdon AQMA, therefore existing receptors within the AQMA have been included as part of the modelling assessment.

However, it should be noted that the extent of this AQMA is based on work undertaken in 2003 and therefore potentially out of date.

As such, the modelling work in this assessment, which is verified to local monitoring, should be considered to be a more precise and up to date assessment of pollutant levels at the site. The assessment considers potential exposure to pollutants by future occupiers rather than simply considering the extent of the AQMA represents a theoretical delineation of harm. It should be also noted that the AQMA is a management area, where pollutant levels should be 'managed' by the local authority air quality action plan and should not be considered to be a planning constraint in itself.

Air Quality Monitoring

Monitoring of air quality within LBoH has been undertaken through both automatic and non-automatic monitoring methods in 2019. These have been reviewed in order to provide an indication of existing air quality in the area surrounding the application site.

<u>Automatic Monitoring</u>

LBoH undertook automatic pollution monitoring during 2019 at 11 different locations. The most recently available data is from 2019 which is presented in **Table 4-2**.

Table 4-2. Monitored Annual Mean Pollutant Concentrations at Automatic Monitoring Locations

Site ID	Location	Site Type	Distance from Kerb of Nearest Road (m)	Inlet Height (m)	2019 NO_2 Annual Mean Concentration (µg/m³)	2019 PM_{10} Annual Mean Concentration (µg/m³)	2019 $PM_{2.5}$ Annual Mean Concentration (µg/m³)
LHR2	London Heathrow	Airport	N/A	1.5	42	13	9
HIL	London Hillingdon	Urban Background	16	1.5	45	-	-
HI1	Hillingdon 1 - South Ruislip	Roadside	11	1.5	34	17	-
HI3	Hillingdon 3 – Oxford Avenue	Roadside	8	1.5	33	24	-
HRL	London Harlington	Airport	N/A	1.5	31	15	10
SIPS	Hillingdon Sipson	Urban Background	9	1.5	30	-	-
HIL1	London Harmondsworth	Roadside	20	1.5	28	15	-
HIL4	London Harmondsworth Osiris	Urban Background	1	1.5	-	14	5
T55	Heathrow Green Gates	Airport	32	1.5	31	13	8
T54	Heathrow Oaks	Airport	N/A	1.5	26	15	10
HIL5	Hillingdon Hayes	Roadside	15	1.5	41	28	-

As outlined in **Table 4-2**, all monitoring locations monitored annual average concentrations below the AQO for NO_2 (40 µg/m³ annual mean), apart from LHR2, HIL and HIL5. PM_{10} (40 µg/m³ annual mean), and $PM_{2.5}$ (10 µg/m³ annual mean) measurements were all at or below the AQO during 2019.

Non - Automatic Monitoring

LBoH operated a network of 43 passive diffusion tubes during 2019. The closest diffusion tube is diffusion tube HILL19, which is located on Fairfield Road, approximately 479 m south-east of the application site. The most recently available diffusion tube data is from 2019 which is presented in **Table 4-3**.

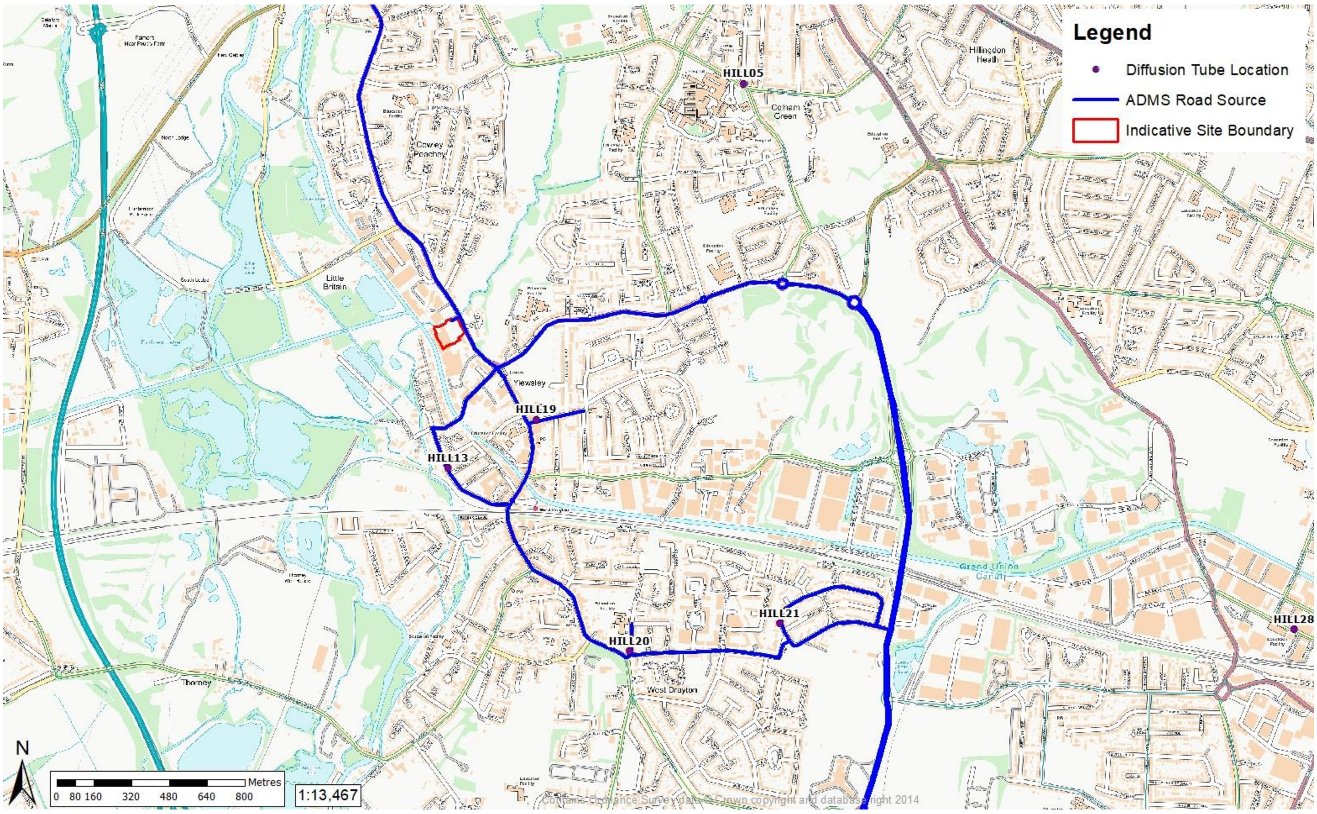
Table 4-3. Monitored Annual Mean NO_2 Concentrations at Diffusion Tubes

Site ID	Location	Site Type	Distance from Kerb (m)	Inlet Height (m)	Monitored 2019 Annual Mean NO_2 Concentration (µg/m³)
HILL13	31 Tavistock Road (on lamp-post outside house)	Roadside	1	1.5	27.9
HILL19	Side of 104 Yiewsley High Street (front of 1A Fairfield Road) Lamp Post (2)	Background	37	1.5	34.6
HILL20	1 Porters Way (corner with Kingston Lane) Lamp Post (1)	Background	9	1.5	36.6
HILL21	7 Mulberry Crescent, West Drayton Lamp Post (18)	Background	9	1.5	32.3

As indicated in **Table 4-3**, all diffusion tubes located within the Air Quality Assessment area monitored annual average NO_2 concentrations below the AQO for NO_2 (40 µg/m³ annual mean) during 2019.

It should be noted that as part of the model verification a review of diffusion tubes locations and monitoring heights was undertaken. As part of this process, the locations and monitoring heights were adjusted following desk-based review using Google Maps.

Figure 4-1. Local Authority Monitoring Locations

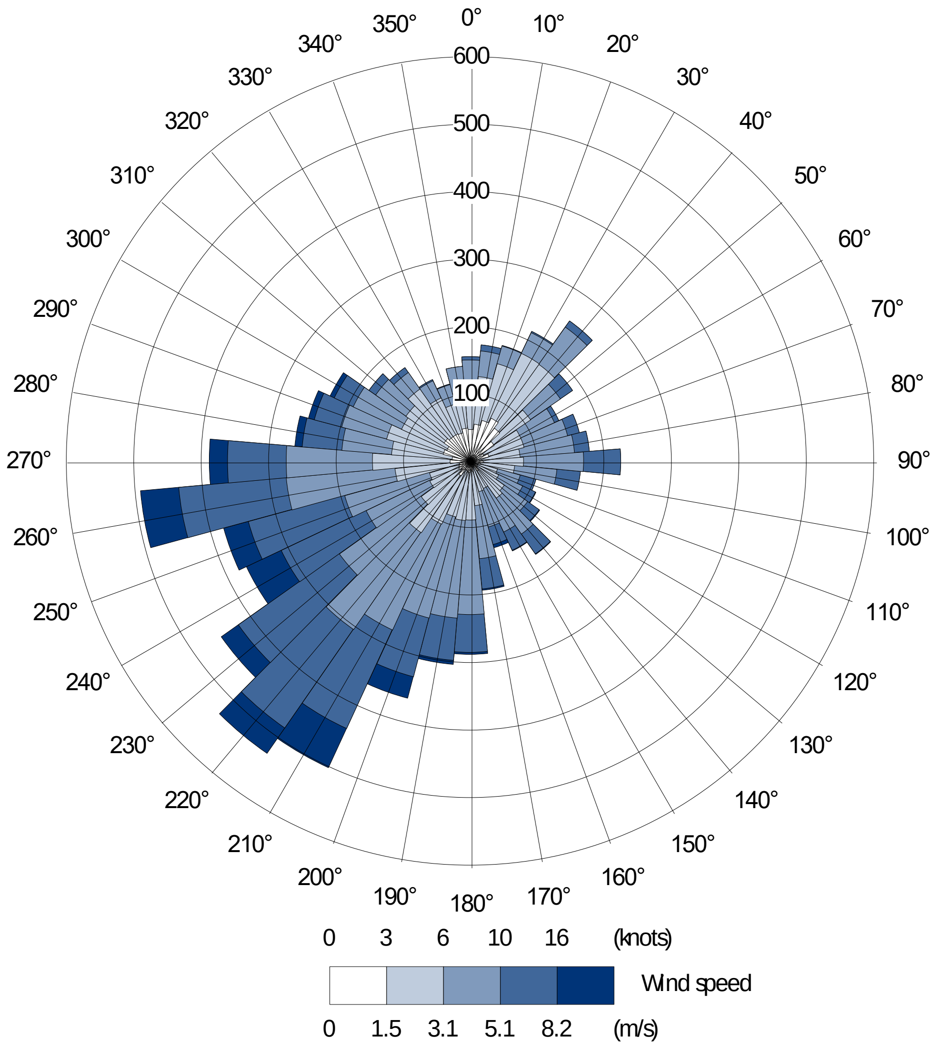


4.2 METEOROLOGY

Meteorological conditions have significant influence over air pollutant concentrations and dispersion. Pollutant levels can vary significantly from hour to hour as well as day to day, thus any air quality predictions need to be based on detailed meteorological data. The ADMS (Atmospheric Dispersion Modelling System) model calculates the dispersion of pollutants on an hourly basis using a year of local meteorological data.

The 2019 meteorological data used in the assessment is derived from London Heathrow. This is the nearest meteorological station, which is considered representative of the application site, with all the complete parameters necessary for the ADMS model. Reference should be made to **Figure 4-2** for an illustration of the prevalent wind conditions at London Heathrow site.

Figure 4-2. London Heathrow 2019 Wind Rose



4.3 EMISSION SOURCES

A desktop assessment has identified that traffic movements are likely to be the most significant local source of pollutants affecting the site and its surroundings. The principal traffic derived pollutants likely to impact local receptors are NO_2, PM_{10} and $PM_{2.5}$.

The assessment has therefore modelled all roads within the immediate vicinity of the application site which are considered likely to experience significant changes in traffic flow as a result of the proposed development. Reference should be made to **Figure A-1** for a graphical representation of the traffic data utilised within the ADMS Roads 5.0.1.3 model.

It should be noted that the pollutant contribution of minor roads and rail sources that are not included within the dispersion model is considered to be accounted for via the use of background air quality levels.

4.4 SENSITIVE RECEPTORS

Receptors that are considered as part of the air quality assessment are primarily those existing receptors that are situated along routes predicted to experience significant changes in traffic flow as a result of the proposed development.

The existing receptor locations are summarised in **Table 4-4** and the spatial locations of all of the receptors are illustrated in **Figure 4-3**.

Table 4-4. Modelled Sensitive Receptor Locations

Existing Sensitive Receptor		X	Y	Receptor Height (m)
R1	Maygoods Farm, High Street	389870	347292	1.5
R2	Fuller's Chiswick, High Road	389875	347337	1.5
R3	64 High Road	390972	347610	1.5
R4	17 Falling Lane	391328	347441	1.5
R5	St Matthew's C of E Primary School, High Street	391292	347423	1.5
R6	2 Colham Mill Road	391319	347408	1.5
R7	West Drayton Academy, Kingston Lane	391658	347225	1.5
R8	2 Mulberry Crescent	391713	347207	1.5
R9	Park Academy West London, Park View Road	390596	346850	1.5

Nine existing sensitive receptors have been assessed to determine the effect of air quality, associated with the proposed development. The locations of the receptors are identified on **Figure 4-3**.

4.5 ECOLOGICAL RECEPTORS

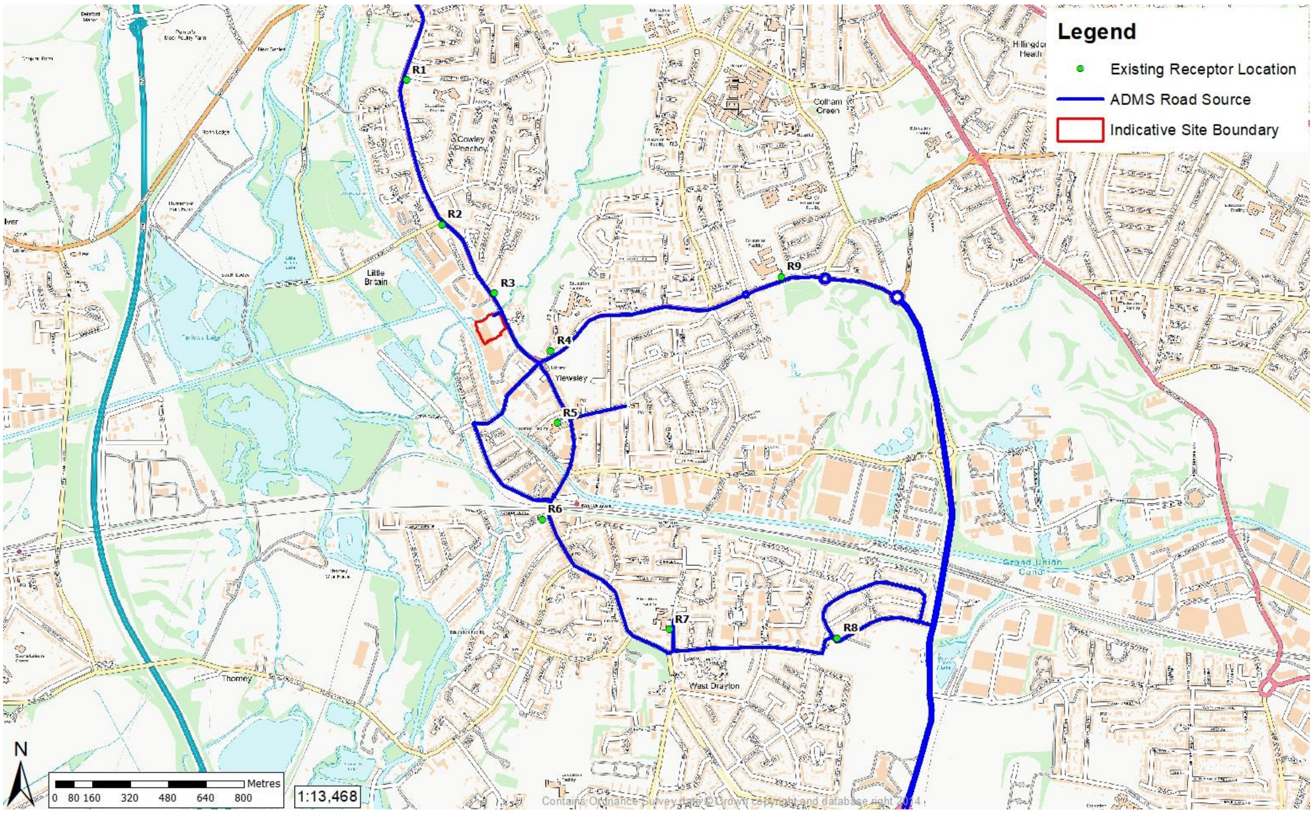
Air quality impacts associated with the proposed development have the potential to impact on receptors of ecological sensitivity within the vicinity of the site. The IAQM guidance on 'Air Quality Impacts on Designated Nature Conservation Sites' (2020) outlines the types of designated nature sites within 2 km of the proposed development which require air quality assessment. These are inclusive of the following:

- Sites of Special Scientific Interest (SSSIs).
- Special Areas of Conservation (SACs).
- Special Protection Areas (SPAs).
- Ramsar Sites.
- Areas of Special Scientific Interest (ASSIs).
- National Nature Reserves (NNRs).
- Local Nature Reserves (LNRs).
- Local Wildlife Sites (LWSs).
- Areas of Ancient Woodland (AW).

The Conservation of Habitats and Species Regulations (2019) additionally requires competent authorities to review planning applications and consents that have the potential to impact on European designated sites (e.g. Special Protection Areas).

A study was undertaken to identify any statutory designated sites of ecological or nature conservation importance within the extents of the dispersion modelling assessment. This was completed using the Multi-Agency Geographic Information for the Countryside (MAGIC) web-based interactive mapping service, which draws together information on key environmental schemes and designations. Following a search within a 2 km radius of the site boundary, no ecological receptors were identified.

Figure 4-3. Sensitive Receptor Locations



5.0 ASSESSMENT OF AIR QUALITY IMPACTS - CONSTRUCTION PHASE

5.1 POLLUTANT SOURCES

The main emissions during construction are likely to be dust and particulate matter generated during earth moving (particularly during dry months) or from construction materials. The main potential effects of dust and particulate matter are:

- Visual - dust plume, reduced visibility, coating and soiling of surfaces leading to annoyance, loss of amenity, the need to clean surfaces;
- Physical and/or chemical contamination and corrosion of artefacts;
- Coating of vegetation and soil contamination; and,
- Health effects due to inhalation e.g. asthma or irritation of the eyes.

A number of other factors such as the amount of precipitation and other meteorological conditions will also greatly influence the amount of particulate matter generated.

Construction activities can give rise to short-term elevated dust/PM_{10} concentrations in neighbouring areas. This may arise from vehicle movements, soiling of the public highway, demolition or windblown stockpiles.

5.2 PARTICULATE MATTER (PM_{10})

The UK Air Quality Standards seek to control the health implications of respirable PM_{10}. However, the majority of particles released from construction will be greater than this in size.

Construction works on site have the potential to elevate localised PM_{10} concentrations in the area. On this basis, mitigation measures should still be taken to minimise these emissions as part of good site practice.

5.3 DUST

Particles greater than 10µm are likely to settle out relatively quickly and may cause annoyance due to their soiling capability. Although there are no formal standards or criteria for nuisance caused by deposited particles, the IAQM 'Guidance on Monitoring in the Vicinity of Demolition and Construction Sites' (October 2018) and the Environment Agency Technical Guidance Note (TGN) M17 states that dust is usually compared with a 'complaints likely' guideline of 200mg/m^2/day. Therefore, a deposition rate of 200mg/m^2/day is often presented as a threshold for serious nuisance though this is usually only applied to long term exposure as people are generally more tolerant of dust for a short or defined period. Significant nuisance is likely when the dust coverage of surfaces is visible in contrast with adjacent clean areas, especially when it happens regularly. Severe dust nuisance occurs when the dust is perceptible without a clean reference surface.

Construction activities have the potential to suspend dust, which could result in annoyance of residents surrounding the site. Measures will be taken to minimise the emissions of dust as part of good site practice.

Recommended mitigation measures proportionate to the risk associated with the development and based on best practice guidance are discussed in the following sections.

5.4 METHODOLOGY

The construction phase assessment utilises the IAQM Guidance on the Assessment of Dust from Demolition and Construction document published in August 2023.

Four construction processes are considered; these are demolition, earthworks, construction and trackout. For each of these phases, the impact description of the potential dust impacts is derived following the determination of a dust emission magnitude and the distance of activities to the nearest sensitive receptor, therefore assessing worst case impacts. A full explanation of the methodology is contained in Appendix A.

5.5 ASSESSMENT RESULTS

Based on the methodology detailed in Appendix A, the scale of the anticipated works has determined the potential dust emission magnitude for each process, as presented in the **Table 5-1** below.

Table 5-1. Dust Emission Magnitude

Construction Process	Site Criteria	Dust Emission Magnitude
Demolition	No demolition required	N/A
Earthworks	Total Site Area: <18,000 m^2	Small
Construction	Total Building Volume 12,000 m^3 – 75,000 m^3	Medium
Trackout	Assumed 20 - 50 HDV outward movements in any one day	Medium

The sensitivity of the surrounding area to each construction process has been determined following stage 2B of the IAQM guidance. The assessment has determined the area sensitivities as shown in the **Table 5-2**.

Table 5-2. Sensitivity of the Area

Source	Area Sensitivity					
	Dust Soiling	Site Sensitivity Criteria	Health Effects of PM_{10}	Site Sensitivity Criteria	Ecological	Site Sensitivity Criteria
Demolition	N/A	No demolition required	N/A	No demolition required	N/A	No demolition required
Earthworks	Medium	10-100 Highly Sensitive Receptors within 50m of site	Low	Annual Mean of <24 ug/m^3 for PM_{10} 10-100 Highly Sensitive Receptors within 50m of site	N/A	>50 m from site boundary
Construction	Medium		Low		N/A	
Trackout	Medium	10-100 Highly Sensitive Receptors within 50m of roads within 500m of site	Low	Annual Mean of <24 ug/m^3 for PM_{10} 10-100 Highly Sensitive Receptors within 50m of roads within 500m of site	N/A	>50 m from roads within 500 m from site boundary

The dust emission magnitude determined in **Table 5-1** has been combined with the sensitivity of the area determined in **Table 5-2**, to determine the risk of impacts prior to the implementation of appropriate mitigation measures. The potential impact significance of dust emissions associated with the development, without mitigation, is presented in **Table 5-3**.

Table 5-3. Impact Description of Construction Activities without Mitigation

Source	Summary Risk of Impacts Prior to Mitigation		
	Dust Soiling	Health Effects of PM_{10}	Ecological
Demolition	N/A	N/A	N/A
Earthworks	Low	Low	N/A
Construction	Medium	Low	N/A
Trackout	Medium	Low	N/A

Appropriate mitigation measures are detailed and presented in Section 9.0. Following the adoption of these measures, the subsequent impact significance of the construction phase is not predicted to be significant.

6.0 ASSESSMENT OF AIR QUALITY IMPACTS - OPERATIONAL PHASE

In the context of the proposed development, road traffic is predicted to decrease from existing use levels but remain as the dominant emission source that is likely to cause potential risk of exposure of air pollutants at receptors.

The operational phase assessment therefore consists of the quantified predictions of the change in NO_2, PM_{10} and $PM_{2.5}$ for the operational phase of the development due to changes in traffic movement. Predictions of air quality at the site have been undertaken for the operational phase of the development using ADMS Roads.

In accordance with the provided traffic data, the operational phase assessment has been undertaken with an assumed operational opening year of 2023. The assessment scenarios are therefore:

- 2019 Baseline = Existing Baseline Conditions (2019);
- 2023 'Do Minimum' = Baseline Conditions (with current site usage) + Committed Development Flows (through local growth factor); and,
- 2023 'Do Something' = Baseline Conditions + Committed Development (through local growth factor) + Proposed Development.

6.1 EXISTING AND PREDICTED TRAFFIC FLOWS

Baseline 2019 traffic data, projected 2023 'Do Minimum' and 'Do Something' traffic data, and average vehicle speeds have been obtained for the operational phase assessment in the form of Annual Average Daily Traffic figures (AADT). Development traffic flows have been provided by Rappor.

Baseline 2019 traffic data was downloaded from the London Atmospheric Emissions Inventory (LAEI). The proposed development opening year is assumed to be a worst-case year of 2023. To determine the traffic flows for the 2023 'Do Minimum' traffic flows, a TEMPro factor of 1.0422 has been applied to the 2019 Baseline traffic data and combined with existing traffic from the development site provided by Rappor Transport Consultants.

The vehicle movements associated with the extant use of the development site have been replaced with the predicted proposed use development trips and combined with the 2023 'Do Minimum' traffic flows to determine the 'Do Something' 2023 scenario traffic flows.

To calculate the 2023 'Do Something' operational year traffic flows, the proposed development traffic flows have been distributed across the model area and have been added onto the 2023 'Do Minimum' scenario flows.

Emission factors for the 2019 baseline and 2023 projected 'Do Minimum' and 'Do Something' scenarios have been calculated using the Emission Factor Toolkit (EFT) Version 11.0 (November 2021).

It is assumed the average vehicle speeds on the local road network in an opening year of 2023 will be broadly the same as the ones in 2019. A 50 m 20 km/hr slow down phase is included on each link at every junction and roundabout within the assessment. All of the roads within the dispersion model are illustrated in **Figure A-1**. Detailed traffic figures are provided in the **Table 6-1**.

Table 6-1. Traffic Data

Link	Speed (km/h)	2019 Baseline		2023 Do Minimum		2023 Do Something	
		AADT	HGV %	AADT	%HGV	AADT	%HGV
High Road (north of site)	48	25,841	3.8	26,931	3.8	27,298	3.8
High Road (south of site)	48	25,841	3.8	26,931	3.8	27,298	3.8
Falling Lane	48	16,238	7.3	16,923	7.3	17,105	7.2
Park View Road	48	21,598	5.6	22,509	5.6	22,601	5.5
High Street	48	19,409	4.9	20,228	4.9	20,413	4.8
Station Road	22.6	21,040	3.7	21,928	3.7	22,020	3.7
Porters Way	22.6	5,067	23.3	5,281	23.3	5,327	23.1
Lavender Rise	35	5,067	23.3	5,281	23.3	5,327	23.1
Mulberry Crescent	20	5,067	23.3	5,281	23.3	5,281	23.3
Trout Road	35.3	2,587	7.0	2,696	7.0	2,696	7.0
Tavistock Road	23.1	2,587	7.0	2,696	7.0	2,696	7.0
Fairfield Road	16.9	4,415	3.9	4,601	3.9	4,601	3.9
Kingston Lane	17.2	3,390	7.2	3,533	7.2	3,533	7.2
Stockley Road	48	26,634	4.2	27,758	4.2	27,804	4.2
A408	80	42,029	7.8	43,803	7.8	43,872	7.8
Site Access	20	342	1.7	356	1.7	1,090	0.2

6.2 BACKGROUND CONCENTRATIONS

The use of background concentrations within the modelling process ensures that pollutant sources other than traffic are represented appropriately. Background sources of pollutants include industrial, domestic and rail emissions within the vicinity of the study site. Several sources have been used to obtain representative background levels as discussed below.

The background concentrations used within the assessment have been determined with reference to the IAQM Guidance and Technical Guidance (TG(22)).

The IAQM Guidance states:

> "*A matter of judgement should take into account the background and future background air quality and whether it is likely to approach or exceed the value of the AQO.*"

Additionally, TG(22) states:

> "*Typically, only the process contributions from local sources are represented within an output by the dispersion model. In these circumstances, it is necessary to add an appropriate background concentration(s) to the modelled source contributions to derive the total pollutant concentrations.*"

Defra Published Background Concentrations for 2019

The background concentrations shown in **Table 6-2** were referenced from the UK National Air Quality Information Archive database based on the National Grid Co-ordinates of 1 x 1 km grid squares nearest to the application site. In August 2020, Defra issued revised 2018 based background maps for nitrogen oxide (NO_X), NO_2, PM_{10} and $PM_{2.5}$.

Table 6-2. Published Background Air Quality Levels (µg/m³)

Receptor Location		2019			
		NO_X	NO_2	PM_{10}	$PM_{2.5}$
Proposed Site					
505717	180867	34.88	23.24	16.69	11.14
Local Authority Monitoring					
HILL13		14.20	34.88	23.24	16.69
HILL19		18.48	37.87	24.72	16.83
HILL20		29.69	34.90	23.30	16.61
HILL21		10.72	40.89	26.22	17.52
Existing Sensitive Receptors					
R1		31.13	21.31	16.69	11.27
R2		31.13	21.31	16.69	11.27
R3		31.13	21.31	16.69	11.27
R4		34.88	23.24	16.69	11.14
R5		37.87	24.72	16.83	11.34
R6		34.88	23.24	16.69	11.14
R7		34.90	23.30	16.61	11.25
R8		40.89	26.22	17.52	12.02
R9		30.63	20.95	16.22	11.06

All the Defra background concentrations detailed in **Table 6-2** for 2019, show that the background levels are predicted to be below the relevant AQO within the study area, with the exception of $PM_{2.5}$.

A breakdown of the background source apportionment of NO_X concentrations at each monitoring location and receptor is shown in **Table 6-3**.

Table 6-3. Pollutant Source Apportionment of NO_X (µg/m³)

Receptor Location	2019						
	Total NO_x	% of NO_X from Road Sources	% of NO_X from Industrial Sources	% of NO_X from Domestic Sources	% of NO_X from Aircraft Sources	% of NO_X from Rail Sources	% of NO_X from Other Sources
Local Authority Monitoring							
HILL13	35.75	3.65	6.70	7.10	15.77	31.03	35.75
HILL19	32.95	5.77	8.17	7.02	13.41	32.67	32.95
HILL20	38.42	3.47	7.99	11.53	6.27	32.32	38.42
HILL21	33.10	2.95	8.11	10.95	12.22	32.67	33.10
Existing Sensitive Receptors							
R1	40.99	4.07	8.09	5.94	7.00	33.92	40.99
R2	40.99	4.07	8.09	5.94	7.00	33.92	40.99
R3	40.99	4.07	8.09	5.94	7.00	33.92	40.99
R4	35.75	3.65	6.70	7.10	15.77	31.03	35.75
R5	32.95	5.77	8.17	7.02	13.41	32.67	32.95
R6	35.75	3.65	6.70	7.10	15.77	31.03	35.75
R7	38.42	3.47	7.99	11.53	6.27	32.32	38.42
R8	33.10	2.95	8.11	10.95	12.22	32.67	33.10
R9	36.67	4.40	11.12	6.22	7.10	34.49	36.67

Table 6-3 shows that the major background source of NO_X at the monitoring, sensitive receptor locations where sources have been identified are mainly comprised of rail and other sources.

A review of the Defra background site has determined that they are in line with the Local Authority monitoring within LBoH.

Table 6-4 shows the background concentrations utilised within the assessment.

Table 6-4. Utilised Background Concentrations (µg/m^3)

Receptor Location	2019		Source
	NO_x	NO_2	
Local Authority Monitoring			
HILL13	34.88	23.24	Defra Background Maps
HILL19	37.87	24.72	
HILL20	34.90	23.30	
HILL21	40.89	26.22	
Existing Sensitive Receptors			
R1	31.13	21.31	Defra Background Maps
R2	31.13	21.31	
R3	31.13	21.31	
R4	34.88	23.24	
R5	37.87	24.72	
R6	34.88	23.24	
R7	34.90	23.30	
R8	40.89	26.22	
R9	30.63	20.95	

6.3 MODEL VERIFICATION

Model verification involves the comparison of modelled data to monitored data in order to gain the best possible representation of current pollutant concentrations for the assessment years. The verification process is in general accordance with that contained in Section 7 of the TG(22) guidance note and uses the most recently available diffusion tube monitoring data to best represent this. When using modelling techniques to predict concentrations, it is necessary to make a comparison between the modelling results and available roadside monitoring data, to ensure that the model is reproducing actual observations. Where systematic bias is evident in the base year verification, the modelled results are factored to better match the monitoring data and reduce the overall uncertainty in the model predictions. TG(22) (Section 'Model Validation, Verification, Adjustment and Uncertainty', Paragraphs 7.549-7.578) was followed when undertaking the verification.

The verification process consists of using the monitoring data and the published background air quality data in the UK National Air Quality Information Archive to calculate the road traffic contribution of NO_X at the monitoring locations. Outputs from the ADMS Roads model are provided as predicted road traffic contribution NO_X emissions. These are converted into predicted roadside contribution NO_2 exposure at the relevant receptor locations based on the updated approach to deriving NO_2 from NO_X for road traffic sources published in Local Air Quality Management TG(22). The calculation was derived using the NO_X to NO_2 worksheet in the online

LAQM tools website hosted by Defra. **Table 6-5** summarises the final model/monitored data correlation following the application of the model correction factor.

Table 6-5. Comparison of Roadside Modelling & Monitoring Results for NO_2

Monitoring Site	NO_2 µg/m³		
	Monitored NO_2	Modelled NO_2	Difference (%)
HILL13	27.90	26.39	-5.41
HILL19	34.60	35.22	1.78
HILL20	36.60	35.07	-4.18
HILL21	32.30	34.31	6.23

The final model produced data at the monitoring locations to within 10% of the monitoring results at all verification points, as recommended in TG(22) guidance.

HILL19 is the monitoring location closest to the development site. HILL20 displays the highest monitored NO_2 result, however, due to its close proximity to West Drayton Academy, there are extended periods in the morning and afternoon where vehicle engines are idling during school drop off and pick up times, making the tube less representative when compared to the site. Therefore, during the verification process additional focus has been given to HILL19 and HILL21 as the tubes are closest to the site and have the highest representative readings, respectively. These monitoring locations are considered to be most representative of the development site.

The final verification model correlation coefficient (representing the model uncertainty) is 1.00. This was achieved by applying a model correction factor of 2.87 to roadside predicted NO_X concentrations before converting to NO_2. This figure demonstrates that the model predictions were in line with the road traffic emissions at the monitoring locations.

It should be noted that TG(22) states that in the absence of any Particulate Matter (PM_{10} and $PM_{2.5}$) monitoring data for verification, it may be appropriate to apply the NO_X-NO_2 adjustment factor to the modelled Particulate Matter.

TG(22) also states that care needs to be taken when applying model adjustment based on one monitoring site only as the adjustment may not be representative of other locations.

As there is no suitable PM_{10} or $PM_{2.5}$ monitoring data within the study area, it is not possible to perform a model verification for these pollutants. As such, the NO_2 adjustment factor has also been applied to the PM_{10} and $PM_{2.5}$ modelled results, in accordance with LAQM.TG(22).

6.4 ADMS-ROADS MODEL INPUTS

Table 6-6. Summary of ADMS Roads Model Inputs

Parameter	Description	Input Value
Chemistry	A facility within ADMS-Roads to calculate the chemical reactions in the atmosphere between Nitric Oxide (NO), NO_2, Ozone (O_3) and Volatile organic compounds (VOCs).	No atmospheric chemistry parameters included
Meteorology	Representative meteorological data from a local source	**London Heathrow 2019 Meteorological Station**, hourly sequential data
Surface Roughness	A setting to define the surface roughness of the model area based upon its location.	**1.5m** representing a typical surface roughness for the Site and Met. Measurement Site.
Latitude	Allows the location of the model area to be set	United Kingdom = **51.5**
Monin-Obukhov Length	This allows a measure of the stability of the atmosphere within the model area to be specified depending upon its character.	Large Conurbations = **100m** was used for the Site and Met. Measurement site.
Elevation of Road	Allows the height of the road link above ground level to be specified.	All other road links were set at ground level = **0m**.
Road Width	Allows the width of the road link to be specified.	Road width used depended on data obtained from OS map data for the specific road link
Topography	This enables complex terrain data to be included within the model in order to account for turbulence and plume spread effects of topography	No topographical information used
Time Varied Emissions	This enables daily, weekly or monthly variations in emissions to be applied to road sources	No time varied emissions used
Road Type	Allows the effect of different types of roads to be assessed.	**Urban (London)** settings were used for the relevant links
Road Speeds	Enables individual road speeds to be added for each road link	Based on national speed limits and derived from the London Atmospheric Emissions Inventory
Canyon Height	Allows the model to take account turbulent flow patterns occurring inside a street with relatively tall buildings on both sides, known as a 'street canyon'.	No canyons used within the model
Road Source Emissions	Road source emission rates are calculated from traffic flow data using the in-built EFT database of traffic emission factors.	The **EFT** Version **11.0 (2021)** dataset was used.
Year	Predicted EFT emissions rates depend on the year of emission.	**2019** data for verification and baseline Operational Phase Assessment. **2023** data for the Operational Phase Traffic Assessment.

6.5 ADMS MODELLING RESULTS

6.5.1 Traffic Assessment

The ADMS Model has predicted concentrations of NO_2, PM_{10} and $PM_{2.5}$ at relevant receptor locations adjacent to roads likely to be affected by the development, as summarised in the following tables. Only receptors close to roads where there is predicted to be a change in emissions have been assessed.

6.5.2 Assessment Scenarios

For the operational year of 2023, assessment of the effects of emissions from the proposed traffic associated with the scheme, has been undertaken using the Emissions Factor Toolkit (EFT) 2023 emissions rates which take into account of the rate of reduction in emission from road vehicles into the future with the following factors:

- 2019 Baseline = Existing Baseline conditions;

- 2023 'Do Minimum' = 2023 Baseline (including current site usage) + Committed Development Flows (through local growth factor); and
- 2023 'Do Something' = 2023 Baseline + Committed Development Flows (through local growth factor) + Development Traffic Flows.

6.5.3 Operational Traffic Assessment

Nitrogen Dioxide

Table 6-7 presents a summary of the predicted change in NO_2 concentrations at relevant receptor locations, due to changes in traffic flow associated with the proposed development, based on modelled 'Do Minimum' and 'Do Something' scenarios.

Table 6-7. Predicted Annual Average Concentrations of NO_2 at Receptor Locations

Receptor		NO_2 (µg/m³)			
		2019 Baseline	2023 Do Minimum	2023 Do Something	Development Contribution
R1	Maygoods Farm, High Street	30.45	27.64	27.71	0.07
R2	Fuller's Chiswick, High Road	31.40	28.31	28.39	0.08
R3	64 High Road	30.88	27.92	28.00	0.08
R4	17 Falling Lane	29.96	27.65	27.69	0.04
R5	St Matthew's C of E Primary School, High Street	27.57	26.62	26.63	0.01
R6	2 Colham Mill Road	27.67	26.21	26.22	0.01
R7	West Drayton Academy, Kingston Lane	26.90	25.60	25.60	<0.01
R8	2 Mulberry Crescent	34.02	30.52	30.53	0.01
R9	Park Academy West London, Park View Road	27.55	25.35	25.36	0.01
Annual Mean AQO		**40 µg/m³**			

All modelled existing receptors are predicted to be below the AQO for NO_2 in both the 'Do Minimum' and 'Do Something' scenarios.

As indicated in **Table 6-7**, the maximum predicted increase in annual average exposure to NO_2 at any existing receptor, due to changes in traffic movements associated with the proposed development is likely to be 0.08 µg/m³ at Fuller's Chiswick, High Road (R2) and 64 High Road (R3).

Figure 6-1, **Figure 6-2** and **Figure 6-3**, below, illustrate the total long term annual average Nitrogen Dioxide (NO_2) contribution and concentration at the Proposed Development (µg/m³).

Figure 6-1. Annual Average Long-Term Nitrogen Dioxide (NO_2) Contribution from Proposed Development ($\mu g/m^3$)

Figure 6-2. Total Long Term Annual Average Nitrogen Dioxide (NO_2) Concentration Across the Study Area ($\mu g/m^3$)

Figure 6-3. Total Long Term Annual Average Nitrogen Dioxide (NO_2) Concentration Across the Site Area ($\mu g/m^3$)

The impact description of changes in traffic flow associated with the proposed development with respect to annual mean NO_2 exposure has been assessed with reference to the criteria in Section 3.0. The outcomes of the assessment are summarised in **Table 6-8**.

Table 6-8. Impact Description of Effects at Key Receptors (NO_2)

Impact Description of NO_2 Effects at Key Receptors					
Receptor	**Change Due to Development (DS-DM) (µg/m³)**	**Change due to Development (% of AQO)**	**% Change in Concentration Relative to AQO**	**% Annual Mean Concentration in Assessment Year**	**Impact Description**
R1	0.07	0.18	0%	≤75% of AQO	Negligible
R2	0.08	0.20	0%	≤75% of AQO	Negligible
R3	0.08	0.20	0%	≤75% of AQO	Negligible
R4	0.04	0.10	0%	≤75% of AQO	Negligible
R5	0.01	0.02	0%	≤75% of AQO	Negligible
R6	0.01	0.02	0%	≤75% of AQO	Negligible
R7	<0.01	<0.01	0%	≤75% of AQO	Negligible
R8	0.01	0.03	0%	76-94% of AQO	Negligible
R9	0.01	0.02	0%	≤75% of AQO	Negligible

+0% means a change of <0.5% as per explanatory note 2 of table 6.3 of the EPUK IAQM Guidance.

The impact description of the effects of changes in traffic flow as a result of the proposed development, with respect to NO_2 exposure for existing receptors, is determined to be 'negligible' at all modelled receptors. This is based on the methodology outlined in Section 3.0. Given the quantitative nature of the assessment and the verification of the air quality dispersion model, the level of accuracy of the assessment results is considered to be 'high'.

<u>Particulate Matter (PM_{10})</u>

Table 6-9 presents a summary of the predicted change in annual mean PM_{10} concentrations at relevant receptor locations, due to changes in traffic flow associated with the proposed development, based on modelled 'Do Minimum' and 'Do Something' scenarios.

Table 6-9. Predicted Annual Average Concentrations of PM_{10} at Receptor Locations

Receptor		PM_{10} (µg/m³)			
		2019 Baseline	2023 Do Minimum	2023 Do Something	Development Contribution
R1	Maygoods Farm, High Street	17.91	17.83	17.84	0.01
R2	Fuller's Chiswick, High Road	18.04	17.95	17.97	0.02
R3	64 High Road	17.96	17.87	17.89	0.02
R4	17 Falling Lane	17.44	17.37	17.38	0.01
R5	St Matthew's C of E Primary School, High Street	17.17	17.15	17.15	<0.01
R6	2 Colham Mill Road	17.14	17.10	17.10	<0.01
R7	West Drayton Academy, Kingston Lane	16.94	16.91	16.91	<0.01
R8	2 Mulberry Crescent	18.23	18.17	18.17	<0.01
R9	Park Academy West London, Park View Road	17.05	16.99	16.99	<0.01
Annual Mean AQO		**40 µg/m³**			

All modelled existing receptors are predicted to be below the AQO for PM_{10} in both the 'Do Minimum' and 'Do Something' scenarios.

As indicated in **Table 6-9**, the maximum predicted increase in annual average exposure to PM_{10} at any existing receptor, due to changes in traffic movements associated with the proposed development is 0.02 µg/m³ at Fuller's Chiswick, High Road (R2) and 64 High Road (R3).

The impact description of changes in traffic flow associated with the proposed development with respect to annual mean PM_{10} exposure has been assessed with reference to the criteria in Section 3.0. The outcomes of the assessment are summarised in **Table 6-10**.

Table 6-10. Impact Description of Effects at Key Receptors (PM_{10})

Impact Description of PM_{10} Effects at Key Receptors					
Receptor	Change Due to Development (DS-DM) (µg/m³)	Change due to Development (% of AQO)	% Change in Concentration Relative to AQO	% Annual Mean Concentration in Assessment Year	Impact Description
R1	0.01	0.03	0%	≤75% of AQO	Negligible
R2	0.02	0.05	0%	≤75% of AQO	Negligible
R3	0.02	0.05	0%	≤75% of AQO	Negligible
R4	0.01	0.02	0%	≤75% of AQO	Negligible
R5	<0.01	<0.01	0%	≤75% of AQO	Negligible
R6	<0.01	<0.01	0%	≤75% of AQO	Negligible
R7	<0.01	<0.01	0%	≤75% of AQO	Negligible
R8	<0.01	<0.01	0%	≤75% of AQO	Negligible
R9	<0.01	<0.01	0%	≤75% of AQO	Negligible
+0% means a change of <0.5% as per explanatory note 2 of table 6.3 of the EPUK IAQM Guidance.					
*Located in the AQMA					

The impact description of the effects of changes in traffic as a result of the proposed development, with respect to annual mean PM_{10} exposure for existing receptors is determined to be 'negligible' based on the methodology outlined in Section 3.0. Given the quantitative nature of the assessment and the verification of the air quality dispersion model, the level of accuracy of the assessment results is considered to be 'high'.

Particulate Matter ($PM_{2.5}$)

Table 6-11 presents a summary of the predicted change in annual mean $PM_{2.5}$ concentrations at relevant receptor locations, due to changes in traffic flow associated with the proposed development, based on modelled 'Do Minimum' and 'Do Something' scenarios.

Table 6-11. Predicted Annual Average Concentrations of $PM_{2.5}$ at Receptor Locations

Receptor		$PM_{2.5}$ (μg/m³)			
		2019 Baseline	**2023 Do Minimum**	**2023 Do Something**	**Development Contribution**
R1	Maygoods Farm, High Street	13.30	13.27	13.29	0.02
R2	Fuller's Chiswick, High Road	13.53	13.49	13.51	0.02
R3	64 High Road	13.39	13.35	13.37	0.02
R4	17 Falling Lane	12.37	12.33	12.34	0.01
R5	St Matthew's C of E Primary School, High Street	11.91	11.90	11.90	<0.01
R6	2 Colham Mill Road	11.88	11.85	11.85	<0.01
R7	West Drayton Academy, Kingston Lane	11.77	11.75	11.75	<0.01
R8	2 Mulberry Crescent	13.21	13.17	13.17	<0.01
R9	Park Academy West London, Park View Road	12.44	12.41	12.41	<0.01
Annual Mean AQO		**10 μg/m³**			

The existing receptors exceed the AQO for $PM_{2.5}$ in the 'Do Something' scenario, however, there are exceedances in both the baseline and 'Do Minimum' scenarios also. Therefore, it is concluded that no exceedances of the AQO are seen as a result of the proposed scheme.

As indicated in **Table 6-11**, the maximum predicted increase in annual average exposure to $PM_{2.5}$ at any existing receptor, due to changes in traffic movements associated with the proposed development is 0.02 μg/m³ at Maygoods Farm, High Street (R1), Fuller's Chiswick, High Road (R2) and 64 High Road (R3).

The impact description of changes in traffic flow associated with the proposed development with respect to annual mean $PM_{2.5}$ exposure has been assessed with reference to the criteria in Section 3.0. The outcomes of the assessment are summarised in **Table 6-12**.

Table 6-12. Impact Description of Effects at Key Receptors ($PM_{2.5}$)

Impact Description of $PM_{2.5}$ Effects at Key Receptors					
Receptor	**Change Due to Development (DS-DM) (µg/m³)**	**Change due to Development (% of AQO)**	**% Change in Concentration Relative to AQO**	**% Annual Mean Concentration in Assessment Year**	**Impact Description**
R1	0.02	0.20	0%	≥110 of AQO	Negligible
R2	0.02	0.20	0%	≥110 of AQO	Negligible
R3	0.02	0.20	0%	≥110 of AQO	Negligible
R4	0.01	0.10	0%	≥110 of AQO	Negligible
R5	<0.01	<0.01	0%	≥110 of AQO	Negligible
R6	<0.01	<0.01	0%	≥110 of AQO	Negligible
R7	<0.01	<0.01	0%	≥110 of AQO	Negligible
R8	<0.01	<0.01	0%	≥110 of AQO	Negligible
R9	<0.01	<0.01	0%	≥110 of AQO	Negligible

+0% means a change of <0.5% as per explanatory note 2 of table 6.3 of the EPUK IAQM Guidance.

The impact description of the effects of changes in traffic as a result of the proposed development, with respect to annual mean $PM_{2.5}$ exposure for existing receptors is determined to be 'negligible' based on the methodology outlined in Section 3.0.

Given the quantitative nature of the assessment and the verification of the air quality dispersion model, the level of accuracy of the assessment results is considered to be 'high'.

7.0 AIR QUALITY NEUTRAL

This Air Quality Neutral assessment considers the emissions of atmospheric pollutants from the development at source (i.e. from vehicles and building services plant) and compares the emissions with the benchmark levels that define neutrality.

The requirement for this Air Quality Neutral report is driven by:

- Policy SI 1 in the London Plan. The London Plan states: "[…] development proposals should be at least 'air quality neutral' and not lead to further deterioration of existing poor air quality"; and
- The Mayor's Air Quality Strategy (MAQS). The MAQS includes a policy which states that "New developments in London shall as a minimum be 'air quality' neutral through the adoption of best practice in the management and mitigation of emissions."

The 'air quality neutral' policy is designed to address the problem of multiple new developments that individually add only a small increment to pollution at the point of human exposure (i.e. ambient concentrations), but cumulatively lead to baseline pollution levels creeping up. The policy requires Developers to design their schemes so that they are at least Air Quality Neutral in terms of emissions at source.

The Greater London Authority (GLA) has adopted a new guidance on Air Quality Neutral Assessments, which supports the London Plan (2021) which altered the approach taken as part of the GLA's Sustainable Design and Construction Supplementary Planning Guidance (SPG), published in April 2014, which provided a formal definition for the term 'air quality neutral' and allowed a transparent and consistent approach to demonstrating whether a development is 'air quality neutral'.

This Air Quality Neutral assessment determines whether the proposed development is air quality neutral using the GLA Air Quality Neutral Guidance (published February 2023) calculation method that separately quantifies building emissions (from heating and power plant) and transport emissions, and introduces a 'damage cost' approach where a development is not determined to be Air Quality Neutral.

7.1 BENCHMARKS

7.1.1 Buildings Emissions Benchmark (BEB)

The GLA Air Quality Neutral Guidance report has defined a Building Emission Benchmarks (BEB) for NO_X for a series of land-use classes. The benchmarks are expressed in terms of g/m^2/annum. The gross internal area (GIA) is used to define the area.

The derived BEBs for NO_X Emissions are shown in **Table 7-1**.

Table 7-1. Building Emissions Benchmark NO_X Emission Rates (gNO_X/m^2/annum)

Land Use		Individual Gas Boilers	Gas Boiler Network	CHP + Gas Boiler Network	Heat Pumps + Gas Boiler Network
Residential	Class C (C3, C4)	3.5	5.7	7.8	5.7
Retail	Class E(a)	0.53	0.97	4.31	0.97
Restaurants and bars	Class E(b)	1.76	3.23	14.34	3.23
Offices	Class E(c)	1.43	2.62	11.68	2.62
Industrial	Class B2	1.07	1.95	8.73	1.95
Storage and distribution	Class B8	0.55	1.01	4.5	1.01
Hotel	Class C1	9.47	15.42	38.16	15.42
Care homes and hospitals	Class C2	9.15	14.9	36.86	14.9
Schools, nurseries, doctors' surgeries, other non-residential institutions	Class F1	0.9	1.66	7.39	1.66
Assembly and leisure	Class F2	2.62	4.84	21.53	4.84

Note 1: These benchmarks have been calibrated for London.

7.1.2 Transport Benchmark Trip Rates (TBTR)

The derived Transport Benchmark Trip Rates (TBTR) are shown in **Table 7-2**.

Table 7-2. Benchmark Trip Rates

Land use		Annual Trips Per	Benchmark Trip Rates		
			CAZ	Inner	Outer
Residential	Class C (C3, C4)	dwelling	68	114	447
Office / Light Industrial	Class E(c)	m2 (GIA)	2	1	16
Retail (Superstore)	Class E(a)	m2 (GIA)	39	73	216
Retail (Convenience)	Class E(a)	m2 (GIA)	18	139	274
Restaurant / Café	Class E(b)	m2 (GIA)	64	137	170
Drinking establishments	Class E(b)	m2 (GIA)	0.8	8	N/A
Hot food takeaway	Class E(b)	m2 (GIA)	N/A	32.4	590
Industrial	Class B2	m2 (GIA)	N/A	5.6	6.5
Storage and distribution	Class B8	m2 (GIA)	N/A	5.5	6.5
Hotels	Class C1	m2 (GIA)	1	1.4	6.9
Care homes and hospitals	Class C2	m2 (GIA)	N/A	1.1	19.5
Schools, nurseries, doctors' surgeries, other non- residential institutions	Class F1	m2 (GIA)	0.1	30.3	44.4
Assembly and leisure	Class F2	m2 (GIA)	3.6	10.5	47.2

7.2 AIR QUALITY NEUTRAL CALCULATION

Building Emissions

The proposed development does not include CHP or other heat sources emissions. Therefore, there will be no exceedance of the building emissions benchmarks and the development will be 'neutral' in terms of buildings.

Transport Trip Generation

The transport assessment provides a summary of daily 2-way trips generation by the proposed development:

<u>Vehicle Trips</u>

Rappor Consultants Ltd, have provided development trips associated with the development purpose of the Air Quality Neutral assessment of transport emissions.

Table 7-3. Benchmark Trip Rate Calculation

Land Use		Area	GIA / Number of Dwellings	Benchmark Trip Rates	Total Benchmark Trip Rate (trips/year)
Retail (Superstore)	Class E(a)	Outer	3,637	216.0	785,592
Total					785,592

Table 7-4. Development Trip Calculations

Land Use		Area	Traffic			
			Light Vehicles	HGVs	Total	Annual Trips
Retail (Superstore)	Class E(a)	Outer	734	0	734	267,910
Total						267,910

The total annual transport rate of 267,910 may be compared with the total benchmarked trip rate of 785,592. The results indicate that the total annual transport rate in **Table 7-4** is below the benchmark criteria in **Table 7-3** and can therefore be considered air quality neutral.

SUMMARY OF AIR QUALITY NEUTRAL ASSESSMENT

The proposed development will not include installation of CHP or other heat source emissions and can therefore be considered air quality neutral. The development trip rate is below the benchmark trip rate and therefore the development can be considered Air Quality Neutral.

8.0 DAMAGE COSTS ASSESSMENT

The pollutant emissions costs calculation identifies the environmental damage costs associated with the proposal and determine the amount (value) of mitigation that is expected to be spent on measures to mitigate the impacts. The calculation utilises the most recent Defra Emissions Factor Toolkit (version 11.0 (November 2021)) to estimate the additional pollutant emissions from a proposed development and the latest Defra Air Quality Damage Costs (published January 2019) for the specific pollutant of interest, to calculate the resultant damage cost.

The Emissions Assessment Calculator has been used in accordance with the methodology described with Land-Use Planning & Development Control: Planning For Air Quality; Guidance from Environmental Protection UK and the Institute of Air Quality Management for the consideration of air quality within the land-use planning and development control processes. (January 2017) as detailed below.

EFT Input:

- 734 cars
- 0 HGVs (0.00% HGV)
- 50 kph
- 10 km (NTS UK avg.)

A Baseline Year of 2023 for 'Road Transport Outer London' has been used within this assessment.

Table 8-1 and **Table 8-2** below shows how the total damage cost calculations have been calculated.

Table 8-1. Annual Emissions Factor Outputs (g/tonnes/year)

Pollutant	Year				
	2023	2024	2025	2026	2027
NO_x	0.60	0.53	0.48	0.44	0.41
$PM_{2.5}$	0.09	0.09	0.08	0.08	0.08

Table 8-2. Central Damage Costs (£)

Pollutant	Year				
	2023	2024	2025	2026	2027
NO_x	£18,851	£16,615	£14,700	£13,319	£12,096
$PM_{2.5}$	£11,710	£11,329	£10,937	£10,661	£10,393

Total Costs

Total NO_X = £75,581

Total $PM_{2.5}$ = £55,030

Cost Reductions

Travel Plan (10%) = £13,061

Green Measures (5%) = £6,530.55

Total Damage Costs = **£111,019.35**

This calculated figure is to be put towards the mitigation measures outlined in Section 9.0 of the report and does not represent a sum owed by the developer.

9.0 MITIGATION

9.1 CONSTRUCTION PHASE

The dust risk categories have been determined in Section 5.0 for each of the four construction activities. The assessment has determined that the potential impact description of dust emissions associated with the construction phase of the proposed development is 'medium risk' at the worst affected receptors.

Using the methodology described in Appendix A, appropriate site-specific mitigation measures associated with the determined level of risk can be found in Section 8.2 of the 'IAQM Guidance on the Assessment of Dust from Demolition and Construction'.

The mitigation measures have been divided into general measures applicable to all sites and measures applicable specifically to demolition, earthworks, construction and trackout. They are categorised into 'highly recommended' and 'desirable' measures.

The mitigation measures for the proposed development are detailed in **Table 9-1** and **Table 9-2**.

Table 9-1. IAQM Guidance on the Assessment of Dust from Demolition and Construction 'Highly Recommended' Mitigation Measures

Communications
Develop and implement a stakeholder communications plan that includes community engagement before work commences on site.
Display the name and contact details of person(s) accountable for air quality and dust issues on the site boundary. This may be the environment manager/engineer or the site manager.
Display the head or regional office contact information.
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 in this document. The desirable measures should be included as appropriate for the site. The DMP may include monitoring of dust deposition, dust flux, real time PM_{10} continuous monitoring and/or visual inspections.
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 offsite, and the action taken to resolve the situation in the log book.
Carry out regular site inspections to monitor compliance with the DMP, 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.
Plan site layout so that machinery and dust causing activities are located away from receptors, as far as is possible.
Erect solid screens or barriers around dusty activities or the site boundary that are at least as high as any stockpiles on site.
Fully enclose site or specific operations where there is a high potential for dust production and the site is actives 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 the 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.
Ensure all vehicles switch off engines when stationary - no idling vehicles.
Avoid the use of diesel- or petrol-powered generators and use mains electricity or battery powered equipment where practicable.
Produce a Construction Logistics Plan to manage the sustainable delivery of goods and materials.

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 conveyors 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 spillages as soon as reasonably practicable after the event using wet cleaning methods.
Avoid bonfires and burning of waste materials.
Earthworks
No Action Required.
Construction
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.
Trackout
Use water-assisted dust sweeper(s) on 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 escape of materials during transport.
Inspect on-site haul routes for integrity and instigate necessary repairs to the surface as soon as reasonably practicable.
Record all inspections of haul routes and any subsequent action in a site log book.
Install hard surfaced haul routes, which are regularly damped down with fixed or mobile sprinkler systems, or mobile water bowsers and regularly cleaned.
Implement a wheel washing system (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 10m from receptors where possible.

Table 9-2. IAQM Guidance on the Assessment of Dust from Demolition and Construction 'Desirable' Mitigation Measures

Communications
No Action Required.
Dust Management
Undertake daily on-site and off-site inspection, where receptors (including roads) are nearby, to monitor dust, record inspection results, and make the log available to the local authority when asked. 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.
Impose and signpost a maximum-speed-limit of 15 mph on surfaced and 10 mph on un-surfaced haul roads and work areas (if long haul routes are required these speeds may be increased with suitable additional control measures provided, subject to the approval of the nominated undertaker and with the agreement of the local authority, where appropriate).
Implement a Travel Plan that supports and encourages sustainable travel (public transport, cycling, walking, and car-sharing).
Earthworks
Re-vegetate earthworks and exposed areas/soil stockpiles to stabilise surfaces as soon as practicable.
Use Hessian, mulches or trackifiers where it is not possible to re-vegetate or cover with topsoil, as soon as practicable.
Only remove the cover in small areas during work and not all at once.
Construction
Avoid scabbling (roughening of concrete surfaces) if possible.
Ensure 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.
Trackout
No Action Required.

Following the implementation of the mitigation measures detailed in the tables above, the impact description of the construction phase is not considered to be significant.

Non-Road Mobile Machinery

All Non-Road Mobile Machinery (NRMM) used on the site shall include CESAR Emissions Compliance Verification (ECV) identification.

All non-road mobile machinery (NRMM) will comply with Stage IIIB NO_X and PM_{10} Emission Standards (or the latest standard if the GLA requirements change) as stated in The Non-Road Mobile Machinery (Type-Approval and Emission of Gaseous and Particulate Pollutants) Regulations 2018 and its subsequent amendments as a minimum if equal to or over 37kW. Where compliance with Stage IIIB requirements is not achievable or practical, an exemption will be sought from the GLA prior to arrival of the equipment on site and the details recorded.

10.0 CONCLUSIONS

This report presents the findings of an air quality assessment undertaken to assess road traffic emission and construction dust impacts in support of a planning application for the refurbishment of existing retail unit (Class E), including installation of new shopfront, reconfiguration of car park, landscaping, external plant, and associated works at the site located at 217 High Street, West Drayton, UB7 7GN.

Construction Phase

Prior to the implementation of appropriate mitigation measures, the potential impact description of dust emissions associated with the construction phase of the proposed development is 'medium risk' at the worst affected receptors without mitigation. However, appropriate site-specific mitigation measures have been proposed based on Section 8.2 of the IAQM Guidance on the Assessment of Dust from Demolition, Earthworks, Construction and Trackout. It is anticipated that with these appropriate mitigation measures in place, the risk of adverse effects due to dust emissions from the construction phase will not be significant.

Operational Assessment

The 2023 assessment of the effect of emissions from traffic associated with the scheme, has determined that the maximum predicted increase in the annual average exposure to NO_2 at any existing receptor is likely to be 0.08 µg/m^3 at Fuller's Chiswick, High Road (R2) and 64 High Road (R3).

For PM_{10}, the maximum predicted increase in the annual average exposure is likely to be 0.02 µg/m^3 at Fuller's Chiswick, High Road (R2) and 64 High Road (R3). For $PM_{2.5}$, the maximum predicted increase in the annual average exposure is likely to be 0.02 µg/m^3 at Maygoods Farm, High Street (R1), Fuller's Chiswick, High Road (R2) and 64 High Road (R3).

The impact description of the effects of changes in traffic flow as a result of the proposed development, with respect to NO_2, PM_{10} and $PM_{2.5}$ exposure, is determined to be 'negligible' at all existing receptors except for two existing sensitive receptor locations where the effect is determined to be 'moderate beneficial' with respect to $PM_{2.5}$.

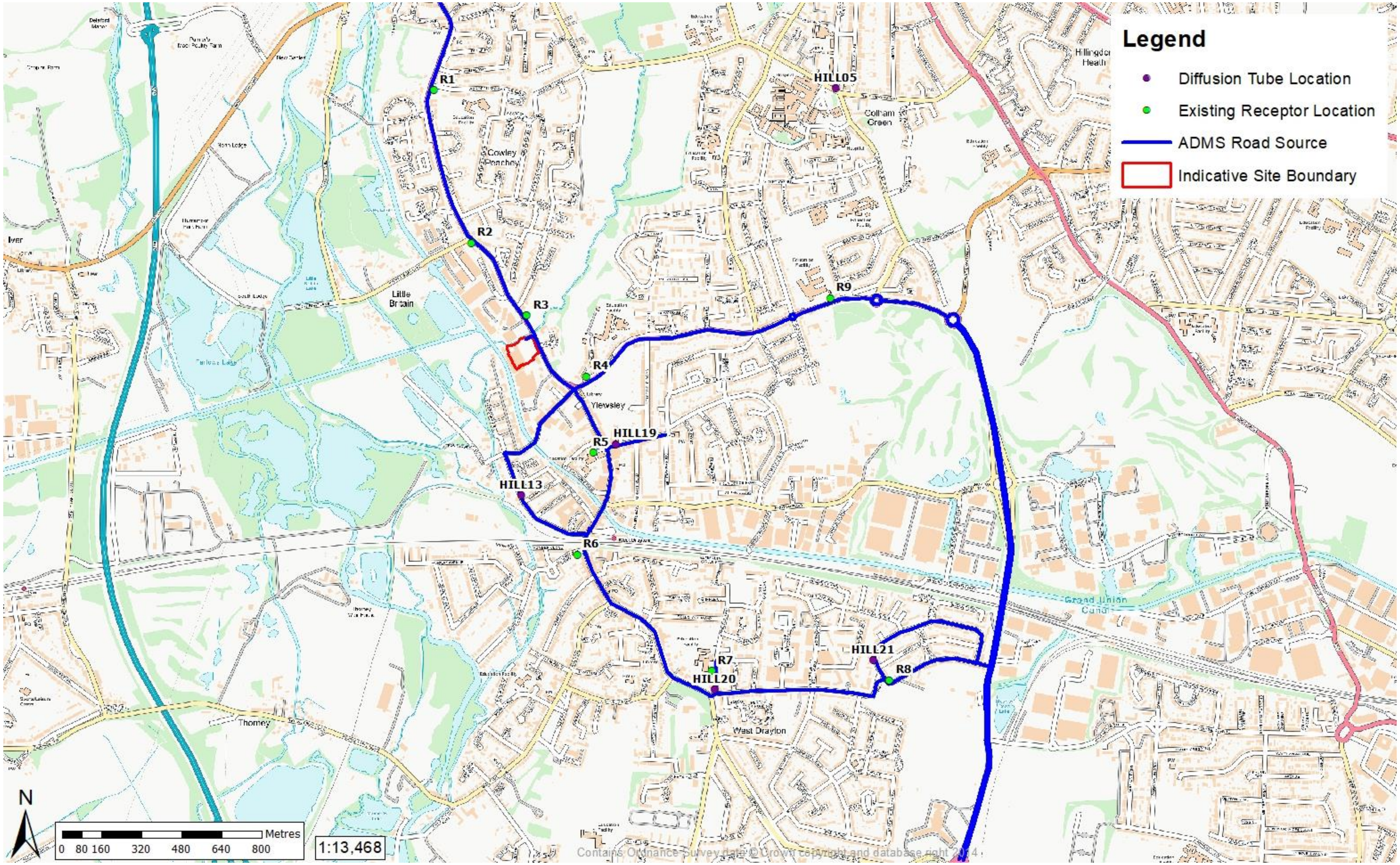
The proposed development will not include installation of CHP or other heat source emissions and can therefore be considered air quality neutral. The development trip rate is below trip rate for the extant use and therefore the development can be considered Air Quality Neutral.

Given the quantitative nature of the assessment and the verification of the air quality dispersion model, the level of accuracy of the assessment results is considered to be 'high'.

In conclusion, the development is not considered to be contrary to any of the national and local planning policies regarding air quality.

APPENDIX A - FIGURES

Figure A-1 Air Quality Assessment Area



APPENDIX B - CONSTRUCTION PHASE ASSESSMENT METHODOLOGY

The following information sets out the adopted approach to the construction phase impact assessment in accordance with the aforementioned IAQM guidance[1].

Step 1 – Screen the Requirement for a more Detailed Assessment

An assessment will normally be required where there is:

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

For specific (high risk) schemes the planning authority may require dust assessment despite the proposed site falling outside the distances above.

Step 2A – Define the Potential Dust Emission Magnitude

Demolition

The dust emission magnitude for the demolition phase has been determined based on the below criteria:

- *Large*: Total building volume >75,000 m^3, potentially dusty construction material (e.g. concrete), on-site crushing and screening, demolition activities >12 m above ground level;
- *Medium*: Total building volume 12,000 m^3 – 75,000 m^3, potentially dusty construction material, demolition activities 6-12 m above ground level; and
- *Small*: Total building volume <12,000 m^3, construction material with low potential for dust release (e.g. metal cladding or timber), demolition activities <6 m above ground, demolition during wetter months.

Earthworks

The dust emission magnitude for the planned earthworks has been determined based on the below criteria:

- *Large*: Total site area >110,000 m^2, 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 >6 m in height;
- *Medium*: Total site area 18,000 m^2 – 110,000 m^2, moderately dusty soil type (e.g. silt), 5-10 heavy earth moving vehicles active at any one time, formation of bunds 3 m – 6 m in height; and
- *Small*: Total site area <18,000 m^2, soil type with large grain size (e.g. sand), <5 heavy earth moving vehicles active at any one time, formation of bunds <4 m in height.

Construction

The dust emission magnitude for the construction phase has been determined based on the below criteria:

- *Large*: Total building volume >75,000 m^3, on site concrete batching, sandblasting;
- *Medium*: Total building volume 12,000 m^3 – 75,000 m^3, potentially dusty construction material (e.g. concrete), on site concrete batching; and
- *Small*: Total building volume <12,000 m^3, construction material with low potential for dust release (e.g. metal cladding or timber).

Trackout

The dust emission magnitude for trackout has been determined based on the below criteria:

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

It should be noted that a vehicle movement is a one way journey. i.e. from A to B, and excludes the return journey. HDV movements during a construction project vary over its lifetime, and the number of movements is the maximum not the average.

[1] Institute of Air Quality Management 2023. *Guidance on the Assessment of dust from demolition and construction.*

Step 2B - Defining the Sensitivity of the Area

Sensitivities of People to Dust Soiling Effects

- *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;
  - indicative examples include dwellings, museums and other culturally important collections, medium and long term car parks and car showrooms.
- *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;
  - indicative examples include parks and places of work.
- *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;
  - indicative examples include playing fields, farmland (unless commercially-sensitive horticultural), footpaths, short term car parks and roads.

The sensitivity of the area should be derived for each of the four activities: demolition, construction, earthworks and trackout, using the following table:

Table B-1. Sensitivity of the Area to Dust Soiling Effects on People and Property

Receptor Sensitivity	Number of Receptors	Distance from the Source (m)			
		<20	<50	<100	<350
High	>100	High	High	Low	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

Note - For trackout, the distances should be measured from the side of the roads used by construction traffic. Without site-specific mitigation, trackout may occur from roads up to 500 m from large sites, 200 m from medium sites and 50 m from small sites, as measured from the site exit. The impact declines with distance from the site, and it is only necessary to consider trackout impacts up to 50 m from the edge of the road.

Sensitivities of People to the Health Effects of PM_{10}

- *High:*
  - locations where members of the public are exposed over a time period relevant to the air quality objective for PM_{10} (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).
  - indicative 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.
- *Medium:*
  - locations where the people exposed are workers, and exposure is over a time period relevant to the air quality objective for PM_{10} (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).
  - indicative examples include office and shop workers, but will generally not include workers occupationally exposed to PM_{10}, as protection is covered by Health and Safety at Work legislation.
- *Low:*
  - locations where human exposure is transient.
  - indicative examples include public footpaths, playing fields, parks and shopping streets.

The sensitivity of the area should be derived for each of the four activities: demolition, construction, earthworks and trackout, using the following table:

Table B-2. Sensitivity of the Area to Human Health Impacts

Receptor Sensitivity	Annual Mean PM_{10} Concentration	Number of Receptors	Distance from the Source (m)				
			<20	<50	<100	<200	<350
High	>32 µg/m^3 (>18 µg/m^3 in Scotland)	>100	High	High	High	Medium	Low
		10-100	High	High	Medium	Low	Low
		1-10	High	Medium	Low	Low	Low
	28 – 32 µg/m^3 (16 – 18 µg/m^3 in Scotland)	>100	High	High	Medium	Low	Low
		10-100	High	Medium	Low	Low	Low
		1-10	High	Medium	Low	Low	Low
	24 – 28 µg/m^3 (14 – 16 µg/m^3 in Scotland)	>100	High	Medium	Low	Low	Low
		10-100	High	Medium	Low	Low	Low
		1-10	Medium	Low	Low	Low	Low
	<24 µg/m^3 (<14 µg/m^3 in Scotland)	>100	Medium	Low	Low	Low	Low
		10-100	Low	Low	Low	Low	Low
		1-10	Low	Low	Low	Low	Low
Medium	>32 µg/m^3 (>18 µg/m^3 in Scotland)	>10	High	Medium	Low	Low	Low
		1-10	Medium	Low	Low	Low	Low
	28 – 32 µg/m^3 (16 – 18 µg/m^3 in Scotland)	>10	Medium	Low	Low	Low	Low
		1-10	Low	Low	Low	Low	Low
	24 – 28 µg/m^3 (14 – 16 µg/m^3 in Scotland)	>10	Low	Low	Low	Low	Low
		1-10	Low	Low	Low	Low	Low
	<24 µg/m^3 (<14 µg/m^3 in Scotland)	>10	Low	Low	Low	Low	Low
		1-10	Low	Low	Low	Low	Low
Low	-	>1	Low	Low	Low	Low	Low

Note - For trackout, the distances should be measured from the side of the roads used by construction traffic. Without site-specific mitigation, trackout may occur from roads up to 500 m from large sites, 200 m from medium sites and 50 m from small sites, as measured from the site exit. The impact declines with distance from the site, and it is only necessary to consider trackout impacts up to 50 m from the edge of the road.

Sensitivities of Receptors to Ecological Effects

- *High:*
  - locations with an international or national designation and the designated features may be affected by dust soiling; or • 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.
  - indicative 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:*
  - locations where there is a particularly important plant species, where its dust sensitivity is uncertain or unknown; or • locations with a national designation where the features may be affected by dust deposition.
  - indicative example is a Site of Special Scientific Interest (SSSI) with dust sensitive features.
- *Low:*
  - locations with a local designation where the features may be affected by dust deposition.
  - indicative example is a local Nature Reserve with dust sensitive features.

The sensitivity of the area should be derived for each of the four activities: demolition, construction, earthworks and trackout, using the following table:

Table B-3. Sensitivity of the Area to Ecological Impacts

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

Note - For trackout, the distances should be measured from the side of the roads used by construction traffic. Without site-specific mitigation, trackout may occur from roads up to 500 m from large sites, 200 m from medium sites and 50 m from small sites, as measured from the site exit. The impact declines with distance from the site.

Step 2C - Defining the Risk of Impacts

The risk of impacts with no mitigation is determined by combining the dust emission magnitude determined in Step 2A and the sensitivity of the area determined in Step 2B.

The following tables provide a method of assigning the level of risk for each activity.

Demolition

Table B-4. Risk of Dust Impacts, 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

Earthworks

Table B-5. Risk of Dust Impacts, Earthworks

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

Construction

Table B-6. Risk of Dust Impacts, 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

Trackout

Table B-7. Risk of Dust Impacts, 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

Step 3 – Site Specific Mitigation

The dust risk categories for each of the four activities determined in Step 2C should be used to define the appropriate, site-specific mitigation measures to be adopted.

These mitigation measures are contained within section 8.2 of the IAQM Guidance on the Assessment of Dust from Demolition and Construction.

APPENDIX C - REPORT TERMS & CONDITIONS

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