Kairus Ltd

Air Quality Assessment

Hayes Bridge Retail Park

Hillingdon

Project Reference	AQ051908AQA
Revision	V3 DRAFT
Issue Date	19/05/2023
Author	SCH
Approved	JK

Client:

OXW Hayes Sarl
17A Rue des Bains
L-1212 Luxembourg

Prepared by:

Jo Kirk
Kairus Ltd
Higher Metcombe
Devon
EX11 1SL

T: 01404 811572
www.kairus.co.uk

Contents

1 Introduction

1.1 General

Kairus Ltd was commissioned by OXW Hayes Sarl to carry out an air quality assessment in relation to the proposed re-development of Hayes Bridge Retail Park, located to the south of Uxbridge Road (the 'Site'), to provide a single warehouse/commercial unit for B8/B2 use. The new unit would replace the existing retail units currently located on the Site.

The Site falls within the London Borough of Hillingdon (LBH) and the Council has declared the bottom two thirds of the borough an Air Quality Management Area (AQMA) due to exceedances of the annual mean nitrogen dioxide (NO_2) objective. The Site is also located partly within the LBH Ossie Garvin to Southall Park Air Quality Focus Area 94 (AQFA94) and approximately 0.8 km to the east southeast of AQFA97. AQFA's are areas, agreed between the Greater London Authority (GLA) and individual London boroughs, where pollution levels are in exceedance of the objectives and public exposure is highest. The boroughs must work towards improvements in these areas and all new development is expected to bring with it the highest standards on design and operation to ensure improvements can be secured from the outset.

This report addresses the impact of the proposed development on local air quality. Potential sources of emissions are identified and assessed in the context of existing air quality and emission sources and the nature and location of receptors.

A glossary of common air quality terminology is provided in Appendix A.

1.2 Scope of Assessment

The proposed development will provide a single warehouse/commercial unit for B8/B2 use of 16,522 m^2 floor area. Traffic data provided by Apex Transport Planning Ltd indicates an overall decline in vehicle trips associated with the new warehouse of 2593 per day compared to the existing retail use. This consists of an increase in HGV movements of 268 per day but a decline in LGV movements of 2861 per day (Appendix C).

Criteria set out within the air quality planning guidance provided by the Environmental Protection UK (EPUK) and the Institute of Air Quality Management (IAQM)[1] indicates that more detailed assessment of traffic impacts is required where a development results in a change in light goods vehicles (LGV) of more than 100 per day and a change in HDV of more than 25 per day in locations within or adjacent to an AQMA. However, any increase in emissions associated with the additional HGV movements would be counteracted by the significant decline in LGV movements. As the proposed development will bring about an overall reduction in the total number of vehicles associated with the operational development, the need for assessment has been scoped out. Therefore, impacts on local air quality as a result of operational traffic emissions is considered to be negligible and has not been assessed further.

The development has been assessed against the London Plan Air Quality Neutral (AQN) policy[2] in accordance with the Greater London Authority (GLA) AQN guidance[3]. The warehouse will be unheated with capped of services for future fit out by the occupier and the offices will be heated via

1 EPUK & IAQM (May 2017) Land-Use Planning and Development Control: Planning for Air Quality v.1.2.

2 Greater London Authority (March 2015) The London Plan: The Spatial Development Strategy for London Consolidated with Alterations Since 2011

3 Greater London Authority (2023) London Plan Guidance, Air Quality Neutral, February 2023

external condensing units and hot water provided by localised electric heaters and ventilated by MVHR units. Therefore, no gas usage is applicable to these spaces. However, the heating source for the warehouse spaces is not known at this stage and a gas supply will be provided. The assessment has therefore assumed gas heating (in the form of gas fired boilers) for these spaces both traffic and building related emissions have been assessed within the AQN calculations.

An assessment of air quality impacts associated with the construction of the proposed development has also been undertaken to determine measures for inclusion within a Construction Management Plan (CMP).

The scope of the assessment is based on that agreed with Val Beale at LBH during email correspondence dated 3rd December 2021. Subsequent correspondence has been undertaken relating to assessment of the Site in accordance with the new AQN guidance. Comments received via email dated 17th May 2023 have been taken into account when undertaking the AQN assessment.

2 Site Description

2.1 The Existing Site

The Site is located on the existing Hayes Bridge Retail Park in Hillingdon, London. The Site is bounded to the north by Uxbridge Road, to the south by Bullsbrook Road and Yeading Brook to the east. The surrounding area to the east, south and west of the Site is predominately retail /light industrial, however there are residential properties located beyond Uxbridge Road to the north.

The Site extends to approximately 3.17 hectares (ha). The location of the Site is shown below in Figure 2.1. The location of the nearest AQFA's is also shown.

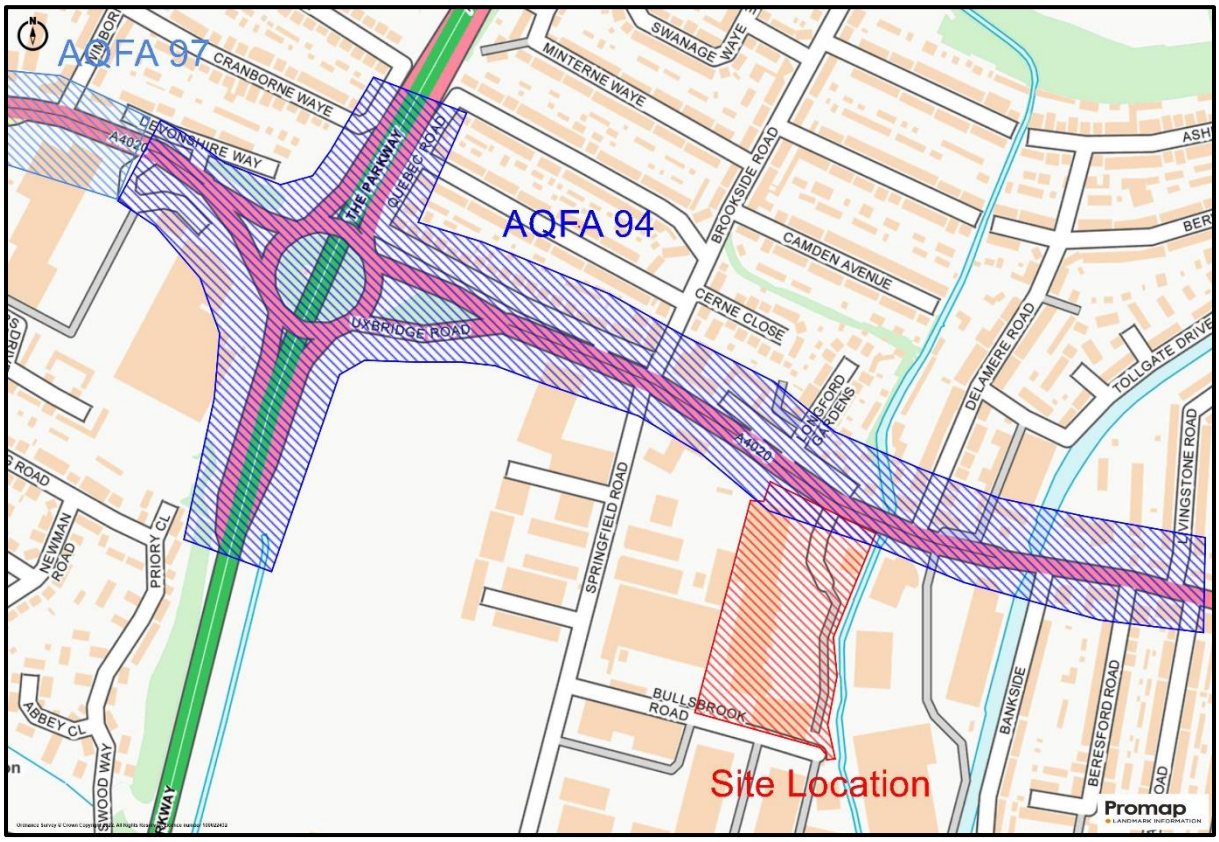

Figure 2.1: Site Location (approximate position of AQFA's)

2.2 The Proposed Development

The proposed application is for the demolition of the existing retail units and construction of a new single warehouse providing 16,522 m^2 (GIA) of B8/B2 space. The proposals include a two-storey office block on the northern façade of the building and a further three-storey office block adjacent to the northern boundary of the Site accessed via a bridged area spanning the entrance to the car park. Externally the Site will provide 91 car parking spaces incorporating 20 electric vehicle (EV) charging points (22% of parking provision) and 5 disabled bays, 16 HGV parking spaces and 16 HGV loading bays.

On site cycle parking will also be provided 36 long-term and 16 short-term spaces. The proposals also include for a green roof totaling 1,755 m^2 and a green wall with an area of 164 m^2 plus additional landscaping and access arrangements.

An indicative layout of the site is shown in Figure 2.2.

Figure 2.2: Indicative Layout of Proposed Development

3 Policy Context

3.1 Air Quality

3.1.1 International Legislation and Policy

The EU Directive 2008/50/EC[4] on ambient air quality and cleaner air for Europe (the CAFE directive) sets out the ambient air quality standards for a number of pollutants and the dates by which these objectives should be met. The Air Quality Standards Regulations 2010[5] implements the requirements of the Directive into UK legislation. The Directive contains a series of limit values for the protection of human health and critical levels for the protection of vegetation. These limit values are legally binding and the UK may incur infringement action if it does not meet the required objective limits within the agreed time limits. The UK is currently exceeding the objective limits for NO_2 and PM_{10} within London and a number of other air quality zones within the UK.

3.1.2 National Legislation and The UK Air Quality Strategy

The Government's policy on air quality within the UK is set out in the Air Quality Strategy (AQS) for England, Scotland, Wales and Northern Ireland (AQS) published in July 2007[6], pursuant to the requirements of Part IV of the Environment Act 1995. The AQS sets out a framework for reducing hazards to health from air pollution and ensuring that international commitments are met in the UK. The AQS is designed to be an evolving process that is monitored and regularly reviewed.

The AQS sets standards and objectives for ten main air pollutants to protect health, vegetation and ecosystems. These are benzene (C_6H_6), 1,3-butadiene (C_4H_6), carbon monoxide (CO), lead (Pb), nitrogen dioxide (NO_2), oxides of nitrogen (NO_x), particulate matter (PM_{10}, $PM_{2.5}$), sulphur dioxide (SO_2), ozone (O_3) and polycyclic aromatic hydrocarbons (PAHs).

The air quality standards are long-term benchmarks for ambient pollutant concentrations which represent negligible or zero risk to health, based on medical and scientific evidence reviewed by the Expert Panel on Air Quality Standards (EPAQS) and the World Health Organisation (WHO). These are general concentration limits, above which sensitive members of the public (e.g. children, the elderly and the unwell) might experience adverse health effects.

The air quality objectives are medium-term policy based targets set by the Government which take into account economic efficiency, practicability, technical feasibility and timescale. Some objectives are equal to the EPAQS recommended standards or WHO guideline limits, whereas others involve a margin of tolerance, i.e. a limited number of permitted exceedances of the standard over a given period.

For some pollutants, there is both a long-term (annual mean) standard and a short-term standard. In the case of NO_2, the short-term standard is for a 1-hour averaging period, whereas for PM_{10} it is for a 24-hour averaging period. These periods reflect the varying impacts on health of differing exposures to pollutants (e.g. temporary exposure on the pavement adjacent to a busy road, compared with the exposure of residential properties adjacent to a road).

Of the pollutants included in the AQS, NO_2, PM_{10} and $PM_{2.5}$ would be particularly relevant to this project as these are the primary pollutants associated with road traffic. The current statutory standards and objectives for NO_2, PM_{10} and $PM_{2.5}$ in relation to human health are set out in Table 3.1.

4 Directive 2008/50/EC of the European Parliament and of the Council of 21 May 2008 on ambient air quality and cleaner air for Europe

5 Air Quality Regulations 2010 – Statutory Instrument 2010 No. 1001

6 The Air Quality Strategy for England, Scotland, Wales and Northern Ireland – July 2007

The NAQO's for NO_2 and PM_{10} were to have been achieved by 2005 and 2004 respectively, but also continue to apply in all future years thereafter.

In relation to $PM_{2.5}$ the 2019 Clean Air Strategy[7] includes a commitment to set 'new, ambitious, long-term targets to reduce people's exposure to $PM_{2.5}$' which the proposed Environment Bill 2019-2021 commits the Secretary of State to setting. New legal targets are set out in the recently published Environmental Improvement Plan (EIP) 2023[8], and recently published Statutory Instrument 'The Environmental Targets (Fine Particulate Matter) (England) Regulations 2023[9].However, these have yet to be set in legislation. For the purposes of this assessment the EU Directive Stage 2 limit value (provided in Table 3.1) is considered appropriate to apply, however, the new targets set out in the EIP are also set out in Table 3.1 and given consideration within the assessment, where relevant.

Table 3.1: Relevant Objectives set out in the Air Quality Strategy

Pollutant	Concentrations	Measured As	Date to be Achieved By
Nitrogen Dioxide (NO_2)	200 μgm^{-3} not to be exceeded more than 18 times per year	1 hour mean	31 December 2005
	40 μgm^{-3}	Annual mean	31 December 2005
Particulate Matter (PM_{10})	50 μgm^{-3} not to be exceeded more than 35 times per year	24 hour mean	31 December 2004
	40 μgm^{-3}	Annual mean	31 December 2004
EU Directive Particulate Matter ($PM_{2.5}$)	25 $\mu g/m^3$ (EU Stage 1 Limit Value)	Annual Mean	31 December 2010
	20 $\mu g/m^3$ (EU Stage 2 Limit Value)	-	-
Particulate Matter ($PM_{2.5}$)	10 $\mu g/m^3$ (Long-term Target)	Annual mean	31 December 2040
	12 $\mu g/m^3$ (Interim Target)	Annual mean	31 January 2028

The statutory standards and objectives apply to external air where there is relevant exposure to the public over the associated averaging periods within each objective. Guidance is provided within Local Air Quality Management Technical Guidance 2016 (LAQM.TG(22))[10] issued by Defra for Local Authorities on where the objectives apply, as detailed in Table 3.2. The objectives do not apply in workplace locations, to internal air or where people are unlikely to be regularly exposed (i.e. centre of roadways).

3.1.3 Local Air Quality Management

Local authorities are seen to play a particularly important role. Section 82 of the Environment Act 1995 requires every local authority to conduct a review of the air quality from time to time within the authority's area. The recently released Defra technical guidance, LAQM.TG(22), describes a new streamlined approach to the Local Air Quality Management (LAQM) regime, whereby every authority has to undertake and submit a single Annual Status Report/Annual Progress Report within its area,

7 Defra. (2019). Clean Air Strategy. London: HMSO

8 HM Government, Environmental improvement Plan 2023, First Revision of the 25 Year Environment Plan

9 The Environmental Targets (Fine Particulate Matter) (England) Regulations 2023 – Statutory Instrument 2023 No.96

10 Defra (2022) Local Air Quality Management. Technical Guidance LAQM.TG(22)

to identify whether the objectives have been or will be achieved at relevant locations by the applicable date. If the objectives are not being met, the authority must declare an Air Quality Management Area (section 83 of the Act) and prepare an action plan (section 84) which identifies measures that will be introduced in pursuit of the objectives.

Table 3.2: Locations Where Air Quality Objectives Apply

Averaging Period	Objectives should apply at:	Objectives should generally not apply at:
Annual Mean	All locations where members of the public might be regularly exposed. Building facades of residential properties, schools, hospitals, care home etc.	Building facades of offices or other places of work where members of the public do not have regular access. Hotels, unless people live there as their permanent residence. Gardens of residential properties. Kerbside sites (as opposed to locations at the building facade), or any other location where public exposure is expected to be short term.
24 Hour Mean	All locations where the annual mean objective would apply together with hotels. Gardens of residential properties.	Kerbside sites (as opposed to locations at the building façade), or any other location where public exposure is expected to be short term.
1 Hour Mean	All locations where the annual mean and 24-hour mean objectives apply. Kerbside Sites (e.g. pavements of busy shopping streets). Those parts of car parks, bus stations and railway stations etc. which are not fully enclosed, where the public might reasonably be expected to spend 1-hour or more. Any outdoor locations where the public might reasonably be expected to spend 1-hour or longer.	Kerbside sites where the public would not be expected to have regular access.

3.1.4 National Air Quality Plan for Nitrogen Dioxide (NO_2) in the UK

The National Air Quality Plan[11] was written as a joint venture between the Defra and the Department for Transport (DfT) and aims to tackle roadside concentrations of NO_2 in the UK. It includes a number of measures such as those aimed at investing in Ultra Low Emission Vehicles (ULEVs) charging infrastructure, public transport and grants to help local authorities in improving air quality.

The plan requires all local authorities (LAs) in England with areas expected not to meet the Limit Values by 2020 (known as 'air quality hotspots') to develop plans to bring concentrations within these values in "the shortest time possible". These plans are to be reviewed by the government and suggestions included in the plan include actions such as utilising retrofitting technologies, changing road layout and encouraging public transport and ULEV use. Where these approaches are not considered sufficient, the LA may need to consider implementation of a Clean Air Zone (CAZ) which

11 Defra and DfT. (2017). UK plan for tackling roadside nitrogen dioxide concentrations. London: HMSO

places restrictions on vehicle access to an area and may include charging certain (or all) vehicles or restrictions on the type of vehicle allowed to access an area.

3.1.5 Road to Zero Strategy

The 'Road to Zero' strategy[12] sets out the government's plans to encourage zero emissions vehicles. These include the aim that by 2040 all new cars and vans will have zero tailpipe emissions and by 2050 almost every car will have zero emissions. Measures within the Strategy are aimed at encouraging the uptake of the cleanest vehicles and supporting electric charging infrastructure.

3.1.6 Clean Air Strategy

The Clean Air Strategy sets out policies to lower national emissions of pollutants in order to reduce background pollution and human exposure. It aims to create a strong framework to tackle air pollution and to reduce the number of people living in locations with $PM_{2.5}$ concentrations exceeding 10 µg/m^3 by 50% by 2025.

3.1.7 Control of Dust and particulates Associated with Construction

Section 79 of the Environmental Protection Act (1990)[13] states that where a statutory nuisance is shown to exist, the local authority must serve an abatement notice. Statutory nuisance is defined as:

- *'any dust or other effluvia arising on industrial, trade or business premises and being prejudicial to health or a nuisance', and*
- *'any accumulation or deposit which is prejudicial to health or a nuisance'.*

Failure to comply with an abatement notice is an offence and if necessary, the local authority may abate the nuisance and recover expenses.

In the context of the proposed development, the main potential for nuisance of this nature would arise during the construction phase - potential sources being the clearance, earthworks, construction and landscaping processes.

There are no statutory limit values for dust deposition above which 'nuisance' is deemed to exist - 'nuisance' is a subjective concept and its perception is highly dependent upon the existing conditions and the change which has occurred. However, research has been undertaken by a number of parties to determine community responses to such impacts and correlate these to dust deposition rates. However, impacts remain subjective and statutory limits have yet to be derived.

3.2 Planning Policy

3.2.1 National Planning Policy

The National Planning Policy Framework (NPPF)[14] sets out the Government's planning policies for England and how these are expected to be applied. At the heart of the NPPF is a presumption in favour of sustainable development. It requires Local Plans to be consistent with the principles and policies set out in the NPPF with the objective of contributing to the achievement of sustainable development.

12 HM Government. (2018). Road to Zero Strategy. London: HMSO

13 Secretary of State, The Environment Act 1990 HMSO

14 Ministry of Housing, Communities and Local Government: National Planning Policy Framework (July 2021)

The NPPF states that the planning system has three overarching objectives in achieving sustainable development including a requirement to *'contribute to protecting and enhancing our natural, built and historic environment; including making effective use of land, helping to improve biodiversity, using natural resources prudently, minimising waste and pollution, and mitigating and adapting to climate change, including moving to a low carbon economy*.'

Under Section 15: Conserving and Enhancing the Natural Environment, the NPPF (paragraph 174) requires that *'planning policies and decisions should contribute to and enhance the natural local environment by …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*.'

In dealing specifically with air quality the NPPF (paragraph 186) states that *'planning policies and decisions should sustain and contribute towards compliance with relevant limit values or national objectives for pollutants, taking into account the presence of Air Quality Management Areas and Clean Air Zones, and the cumulative impacts from individual sites in local areas. Opportunities to improve air quality or mitigate impacts should be identified, such as through traffic and travel management, and green infrastructure provision and enhancement. So far as possible these opportunities should be considered at the plan-making stage, to ensure a strategic approach and limit the need for issues to be reconsidered when determining individual applications. Planning decisions should ensure that any new development in Air Quality Management Areas and Clean Air Zones is consistent with the local air quality action plan.*'

Paragraph 188 states that *'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'*.

3.3 Regional Legislation and Policy

3.3.1 The Major of London's Air Quality Strategy

The Mayor of London's AQS[15] sets out a series of policies and proposals for the implementation of the UK AQS and for the achievement of the air quality standards and objectives in Greater London. With regards new developments the following policies are of relevance:

Policy '1 - Encouraging smarter choices and sustainable travel': The Mayor will support a shift to public transport, by only supporting developments that generate high levels of trips in locations with good public transport accessibility, by supporting car free developments and encouraging the inclusion of infrastructure to support sustainable travel, such as cycling, electric vehicle recharging points and car clubs;

Policy '6 - Reducing emissions from construction and demolition sites': The London Council's Best Practice guidance will be reviewed and updated, and more vigorously implemented;

Policy '7 - Using the planning process to improve air quality - new developments in London as a minimum shall be 'air quality neutral': The Mayor will encourage boroughs to require emissions assessments to be carried out alongside conventional air quality assessments. Where air quality impacts are predicted to arise from developments these will have to be offset by developer

15 Mayor of London (2010) Clearing the Air, The Mayor's Air Quality Strategy, December 2010

contributions and mitigation measures secured through planning conditions, section 106 agreements or the Community Infrastructure Levy;

Policy '8 - Maximising the air quality benefits of low to zero carbon energy supply': The Mayor will apply emission limits for both PM and NOx for new biomass boilers and NOx emission limits for Combined Heat and Power Plant (CHPP). Air quality assessments will be required for all developments proposing biomass boilers or CHPPs and operators will be required to provide evidence yearly to demonstrate compliance with the emission limits;

Policy '9 - Energy efficient buildings': The Mayor will set CO_2 reduction targets for new developments which will be achieved using the Mayor's Energy Hierarchy. These measures will result in reductions of NO_x emissions; and

Policy '10 - Improved air quality in the public realm': The Mayor will encourage the improvement of air quality in the public realm by planting vegetation to trap particulate matter. Through the planning system the Mayor will increase the number of green roofs and living walls across London. Additionally, he will encourage the planting of trees in areas of poor air quality.

3.3.2 The London Plan

The London Plan 2021[16] was published in March 2021[17]. The Plan is the overall Spatial Development Strategy (SDS) for London setting out an integrated economic, environmental, transport and social framework for the development of London over the next 20-25 years. It specifically addresses how development can help support the implementation of the Mayor's Air Quality Strategy and achieve a reduction in pollutant emissions and public exposure to pollution.

Policy SI 1 – Improving Air Quality sets out the following to reduce emissions and exposure across the city:

A Development Plans, through relevant strategic, site-specific and area-based polices, 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 of 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 retro-fitted mitigation measures

16 Greater London Authority (2021) The London Plan 2021: The Spatial Development Strategy for Greater London, March 2021

17 Greater London Authority (2015) Further Alterations to the London Plan

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:

1) how proposals have considered ways to maximise benefits to local air quality, and

2) what measures or design features will be put in place to reduce exposure to pollution, and how they 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.

3.3.3 London Environment Strategy

The London Environmental Strategy[18] considers policies aimed at improving the environment in London, across a number of different areas such as air quality, noise and climate change. There are a number of objectives but notable in relation to air quality is the objective: "for London to have the best air quality of any major world city by 2050, going beyond the legal requirements to protect human health and minimise inequalities."

Chapter 4 of the Environmental Strategy relates specifically to air quality and identifies a number of key issues to be addressed:

- Achieving legal compliance as quickly as possible;
- Diesel vehicles, especially cars and vans;
- Tackling all sources of pollution;
- Government action;
- Maximising co-benefits between air quality and climate change policies; and
- Further reductions are needed in PM_{10} and $PM_{2.5}$, particularly from transboundary pollution, tyre and brake wear and wood burning.

18 Mayor of London (2018) London Environment Strategy

3.4 Local Legislation and Policy

3.4.1 Hillingdon Local Plan: Part 1 Strategic Policies

The Hillington Local Plan: Part 1 Strategic policies document[19] was adopted in November 2012 and is the key strategic planning document for Hillingdon. It sets out the long-term vision and objectives for the borough.

Under Policy EM8: Land, Water, Air and Noise the Council sets out the following:

Air Quality

All development should not cause deterioration in the local air quality levels and should ensure the protection of both existing and new sensitive receptors.

All major development within the Air Quality Management Area (AQMA) should demonstrate air quality neutrality (no worsening of impacts) where appropriate; actively contribute to the promotion of sustainable transport measures such as vehicle charging points and the increased provision for vehicles with cleaner transport fuels; deliver increased planting through soft landscaping and living walls and roofs; and provide a management plan for ensuring air quality impacts can be kept to a minimum.

The Council seeks to reduce levels of pollutants referred to in the Government's National Air Quality Strategy and will have regard to the Mayor's Air Quality Strategy. London Boroughs should also take account of the findings of the Air Quality Review and Assessments and Action Plans, in particular where Air Quality Management Areas have been designated.

The Council has a network of Air Quality Monitoring stations but recognises that this can be widened to improve understanding of air quality impacts. The Council may therefore require new major development in an AQMA to fund additional air quality monitoring stations to assist in managing air quality improvements.

3.4.2 Hillingdon Local Plan: Part 2 Development Management Policies

The Hillington Local Plan: Part 2 Development Management Policies[20] was adopted on 16th January 2020 and sets out detailed policies to guide planning decisions.

Policy DMEI 1: Living Walls and Roofs and on-site Vegetation sets out the following requirements:

'All development proposals are required to comply with the following:

i) All major development should incorporate living roofs and/or walls into the development. Suitable justification should be provided where living walls and roofs cannot be provided; and

ii) Major development in Air Quality Management Areas must provide onsite provision of living roofs and/or walls. A suitable offsite contribution may be required where onsite provision is not appropriate'.

Policy DMEI 14 deals specifically with air quality and sets out the following:

'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.

19 London Borough of Hillingdon (2012) Hillingdon Local Plan: Part 1 Strategic Policies, November 2012

20 London Borough of Hillingdon (2012) Hillingdon Local Plan: Part 2 Development Management Policies, 2020

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;

iii) Actively contribute towards the improvement of air quality especially within the Air Quality Management Area

3.5 Air Quality Guidance

3.5.1 DEFRA Technical Guidance, LAQM.TG(22)

LAQM.TG(22) sets out detailed guidance on how air quality should be assessed and monitored by local authorities. The document provides useful guidance on how air quality from specific sources should be screened and the approaches that should be used to undertake detailed assessment where potentially significant emissions are identified, including details on model verification and consideration of monitoring data for use in assessments.

3.5.2 IAQM Land-Use Planning and Development Control: Planning for Air Quality

Institute of Air Quality Management (IAQM) and Environmental Protection UK (EPUK) have published joint guidance on the assessment of air quality impacts for planning purposes. This includes information on when an air quality assessment is required, what should be included in an assessment and criteria for assessing the significance of any impacts.

3.5.3 Mayor of London The Control of Dust and Emissions During Construction and Demolition SPG

The Mayor of London has published guidance on assessing the risk of significant effects during construction[21]. The approach is based on guidance set out in the IAQM guidance on assessing impacts from construction and demolition activities[22]. Both guidance documents have therefore been used for this assessment. The methodology sets out an initial approach for identifying the risk magnitude of potential dust sources associated with demolition, construction, earthworks and trackout. This is then used to identify the level of mitigation necessary in order for the impacts to be not significant.

21 Mayor of London (2014) The Control of Dust and Emissions During Construction and Demolition SPG

22 IAQM (June 2016) Guidance on the assessment of dust from demolition and construction Version 1.1

4 Methodology

4.1 Baseline Assessment

A Baseline Assessment of air quality in the vicinity of the Site and the surrounding area has been carried out through a review of monitoring data available within the LBH air quality review and assessment reports, most notably the LBH 2022 Air Quality Annual Status Report (ASR)[23]. Additional data has been obtained from the UK Air Information Resource (UK-AIR) background pollution maps.

4.2 Construction Phase

4.2.1 Construction Traffic

During construction of the proposed development, lorries will require access to the Site to deliver and remove materials; earthmoving plant and other mobile machinery may also work on site including generators and cranes. These machines produce exhaust emissions; of particular concern are emissions of NO_2 and PM_{10}.

Based on the development proposals and experience of other similar developments it is anticipated that there would be no more than 15-20 Heavy-Duty Vehicle (HDV) movements per day on the adjacent road network during the construction period.

Based on the criteria set out within the EPUK & IAQM air quality planning guidance the proposed development would result in a negligible impact on local NO_2 and PM_{10} concentrations as a result of construction vehicles, i.e. less than 25 HDV per day within or adjacent to an AQMA and less than 100 LGV. Impacts relating to construction vehicle emissions have not been considered any further in this assessment.

4.2.2 Construction/Fugitive Dust Emissions

Construction phase activities associated with the Proposed Development may result in the generation of fugitive dust emissions (i.e. dust emissions generated by site-specific activities that disperse beyond the construction site boundaries).

If transported beyond the site boundary, dust can have an adverse impact on local air quality. The Mayor of London's SPG on the control of dust and emissions during construction considers the potential for dust nuisance and impacts to human health and ecosystems to occur due to activities carried out during the following stages of construction:

- Demolition (removal of existing structures);
- Earthworks (soil-stripping, ground-leveling, excavation and landscaping);
- Construction (activities involved in the provision of a new structure); and
- Trackout (the transport of dust and dirt from the construction site onto the public road network where it may be deposited and then re-suspended by vehicles using the network).

A qualitative assessment of air quality impacts due to the release of fugitive dust and particulates (PM_{10}) during the construction phase was undertaken in accordance with the methodology detailed in the IAQM guidance.

23 London Borough of Hillingdon (2022) Air Quality Annual Status Report 2022, May 2022

The assessment takes into account the nature and scale of the activities undertaken for each source and the sensitivity of the area to an increase in dust and PM_{10} levels, thus enabling a level of risk to be assigned. Risks are described in terms of there being a low, medium or high risk of dust impacts.

Once the level of risk has been ascertained, then site specific mitigation proportionate to the level of risk is identified, and the significance of residual effects determined.

A summary of the IAQM assessment methodology is provided in Appendix B.

4.3 Air Quality Neutral Assessment

The London Plan requires all developments in London to be Air Quality neutral (AQN).

The GLA AQN guidance, published in February 2023, has been used for undertaking the assessment. The guidance sets out benchmarks for different land use classes against which the calculated transport and building emissions from a development can be compared. Where a development falls below these benchmarks it can be classed as 'Air Quality Neutral' and no mitigation is considered necessary.

4.3.1 Building Emissions

All office space will be heated using external condensing pumps therefore, emissions associated with these spaces will be negligible and have not been included in the assessment.

The warehouse will be unheated but a gas supply will be provided, giving the occupiers the option of installing gas boilers for the provision of heating and hot water. The assessment has therefore assumed that the future occupiers of the warehouse space will make use of the gas supply as a worst-case and this has formed the basis of the calculated gas usage for each unit.

To calculate the building emission from the proposed development the following data has been collated:

- gross internal floor area (GIA) (m^2) of the warehouse area;
- annual on-site energy demand from the warehouse (kWh/annum);
- NO_x emission factor for gas fired boilers. This is based on the assumption that any gas boiler installed on site would meet the minimum standard of <40 $mgNO_x/kWh$.

The Building Emission Benchmark (BEB) for B8 land-use class has been used for the Site as this is the lowest BEB for the B2 and B8 land-use classes so ensures a worst-case assessment.

Emissions of PM_{10} are not considered to be significant from natural gas and therefore the assessment of building emissions has concentrated on emission of NO_x.

A building emissions rate has been calculated for the warehouse on the Site for comparison against the BEB.

Where the development building emissions are found to exceed the BEB appropriate mitigation is discussed and recommended.

The approach to calculating both the BEB and the building related emissions is set out in Appendix D.

4.3.2 Transport Emissions

The TEB is calculated as the annual trip rate per year from each identified land-use. The calculation of transport trip rates for the purpose of the AQN assessment excludes trips associated with non-operational vehicles (i.e. it excludes trips associated with taxi, delivery and servicing vehicles as well as HGV).

The calculated annual trip rate for the development is then compared to the transport emission benchmark (TEB).

Where the development trip rate falls below the TEB then the development is considered to be AQN and no further consideration is required.

The TEB has been calculated based on the approach detailed in Appendix D.

The development annual trip rate has been provided by Apex Transport Planning Ltd and is based on the trip rates set out in the Transport Assessment (TA) for the development, but with non-operational trips removed. This is based on full B2 use as this represents the highest overall trip rate for the Site when considering non-operational trips.

Full details on the approach to calculating the TEB and development trip rates is provided in Appendix D.

4.3.3 Mitigation and Off-Setting

Where the development proposals fail to meet the building or transport benchmarks, mitigation of emissions is required to reduce both building emissions and transport emissions to meet the relevant BEB and TEB.

If, following the implementation of measures or design amendments the benchmarks are still not being achieved then it may be possible, at the discretion of the Local Authority, for an off-setting payment to be calculated by multiplying the excess emissions above the benchmarks (tonnes/annum) by the Defra damage costs[24] over a 30-year period, with a 2% annual uplift.

Following discussions with LBH, they have requested that where the benchmarks are exceeded an off-setting amount is calculated in accordance with the guidance. The calculated off-setting amount can then be reduced based on mitigation measures proposed at the Site. However, these would be discussed and agreed with the Council subsequent to planning permission being granted when any trip reduction provision and associated cost reductions associated with agreed mitigation measure can be discussed and agreed by the relevant Hillingdon transport officers, air quality officers and planning officers.

Where the assessment has found the TEB and BEB to be exceeded, an off-setting calculation has been undertaken in accordance with the approach set out in the guidance, as detailed in Appendix D.

24 https://www.gov.uk/government/publications/assess-the-impact-of-air-quality/air-quality-appraisal-damage-cost-guidance

5 Baseline Air Quality Assessment

5.1 London Borough of Hillingdon Review and Assessment of Air Quality

The LBH have carried out detailed assessments of air quality and as a result have declared the bottom two thirds of the borough an AQMA due to exceedances of the annual mean NO_2 objective. The proposed development Site is located within the AQMA.

LBH, in conjunction with GLA, have also designated a number of AQFAs within the borough. The Site is partially located within AQFA94 and approximately 0.8 km to the east southeast of AQFA97, which are shown in Figure 2.1.

5.2 Air Quality Monitoring

5.2.1 Nitrogen Dioxide Monitoring

LBH operates twelve automatic monitoring stations within the borough. The closest of these is a roadside site located at the junction of North Hyde Road and North Hyde Gardens, Hillingdon (HIL5) approximately, 1.9 km south southwest of the Site.

Details of the site are provided in Table 5.1 below and NO_2 concentrations recorded at the site over the last 7 years are provided in Table 5.2.

Table 5.1: Automatic Monitoring Site Hillingdon Hayes

Site	Classification	OS Grid Ref	Pollutants Monitored	In AQMA	Distance to Kerb of nearest Road (m)
HIL5 Hillingdon, Hayes	Roadside	510303, 178882	NO_2, PM_{10}	Yes	1

Table 5.2: NO_2 Concentrations recorded at the Hillingdon, Hayes Automatic Site

Site	Year							
	2014	2015	2016	2017	2018	2019	2020[1]	2021[1]
Annual Mean (µg/m³)								
HIL5 Hillingdon Hayes	**52.9**	**46.2**	**45.9**	**47.0**	**43.0**	**41.0**	31.0	34
Number of exceedances of the 1-hour mean								
HIL5 Hillingdon Hayes	2	2	1	12	0	0	0	0

[1]As a result of the Covid-19 pandemic and associated behavioral changes and measures implemented by the governing authorities (e.g. lockdowns, travel restrictions etc.) measured concentrations during 2020 and 2021 are not considered to be representative of 'normal' conditions. As such, measured 2020 and 2021 concentrations are presented for information only, and have not been discussed or given weight in determining the conclusions of this assessment.

The data presented in Table 5.2 shows NO_2 concentrations above the annual mean 40 µg/m³ objective at the Hillingdon, Hayes site since 2014, apart from 2020 when concentrations were below

the objective. However, due to the COVID-19, traffic emissions were severely suppressed for a significant part of 2020, resulting in significant reductions in NO_2 concentrations. Data for 2020 should be treated with caution and cannot be used to determine appropriate baseline air quality.

Data recorded at the site shows an overall downward trend in concentrations since 2014.

Exceedances of the 1-hour objective limit were recorded at the monitoring site in 2014, 2015, 2016 and 2017, however as the objective allows for up to 18 exceedances of the 200 µg/m^3 in any one year, the objective was not exceeded at any of the three sites. Since 2018 no exceedances of the limit have been recorded.

LBH also measured NO_2 using diffusion tubes at 44 locations during 2020. The tubes are supplied and analysed by Gradko International Services using the 50% Triethanolamine (TEA) in acetone preparation method. Diffusion tubes are a passive form of monitoring, which, due to their relative in-expense, allow for a much greater spatial coverage than with automatic monitoring sites. Diffusion tubes are acknowledged as a less accurate method of monitoring ambient air pollutants than automatic monitors, with diffusion tubes over or under estimating concentrations by as much as 30 %.

To allow the results to be reliably compared with the AQ Objectives, the data should be bias corrected using data collected from tubes co-located with continuous monitoring sites. The data provided below has been adjusted by LBH using nationally derived bias correction factors. The bias correction factor for 2019 was 0.89 and 2020 was 0.84.

No monitoring of pollution concentrations is carried out in the immediate vicinity of the development Site. The closest to the Site is a background site located at the end of Dorchester Waye (HILL31) approximately 0.58 km northwest of the Site and another background site at St Christopher's Drive, which is now discontinued, which is approximately 0.74 km west northwest of the Site (HD208).

There are also NO_2 diffusion tube sites within the neighbouring borough of Ealing (LBE) located at 11 The Broadway, which is approximately 1.2 km to the east of the development Site and at 25 Lady Margaret Road, approximately 1.2 km east northeast from the development Site.

Details of these diffusion tube monitoring sites along with data recorded since 2014 is presented in Table 5.3[24] and their locations in Figure 5.1.

Table 5.3: Diffusion Tube Annual Average Nitrogen Dioxide Concentrations (µgm^{-3})

Site	Classification	OS Grid Ref	Year							
			2014	2015	2016	2017	2018	2019	2020[1]	2021[1]
London Borough of Hillingdon										
HILL31 Dorchester Waye	B	511103, 181097	-	-	-	-	-	32.5	24.3	23.2
HD208 St Christopher's Drive	B	510761, 180766	30.5	27.3	28.9	27.3	30.8	26.5	Dis	-
HILL17 Silverdale Gardens	B	510361, 179820	35.5	26.7	26.1	32.7	31.0	31.6	24.7	24.2

Table 5.3: Diffusion Tube Annual Average Nitrogen Dioxide Concentrations (µgm^{-3})										
Site	Classification	OS Grid Ref	Year							
			2014	2015	2016	2017	2018	2019	2020[1]	2021[1]
London Borough of Ealing										
EA13 11 The Broadway	R	512768, 180400	**54.2**	**53.5**	**52.7**	**45.1**	**46.0**	**44.3**	35.2	33
EA14 25 Lady Margaret Road	R	512812, 180516	-	-	**48.0**	**44.1**	**40.2**	**41.2**	29.6	32

R = roadside

B = background

Dis - discontinued

[1]As a result of the Covid-19 pandemic and associated behavioral changes and measures implemented by the governing authorities (e.g. lockdowns, travel restrictions etc.) measured concentrations during 2020 and 2021 are not considered to be representative of 'normal' conditions. As such, measured 2020 and 2021 concentrations are presented for information only, and have not been discussed or given weight in determining the conclusions of this assessment.

The data presented in Table 5.3. shows annual mean NO_2 concentrations below the annual mean objective of 40 µg/m^3 at the three Hillingdon sites since 2014 but exceeding the objective at the two Ealing sites every year apart from 2020, but again this would be due to the suppressed traffic emissions as a result of the pandemic.

The data from Hillingdon indicates no significant upward or downward trend in concentrations during the monitoring period however the data from Ealing shows an overall downward trend in concentrations in the period.

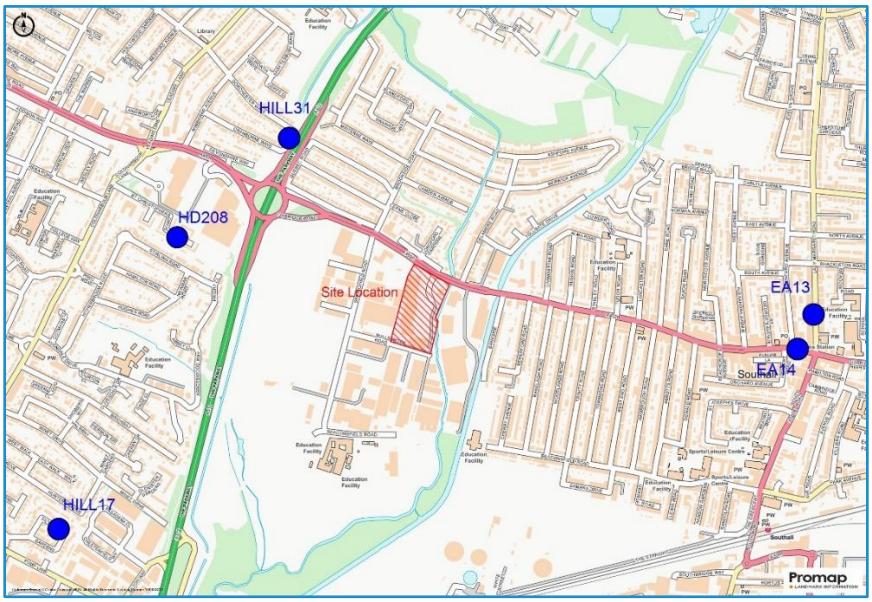

Figure 5.1: Location of Diffusion Tube Monitoring Locations

It is not possible to monitor short-term NO_2 concentrations using diffusion tubes, however, analysis of long-term monitoring data[25] suggests that if the annual mean NO_2 concentration is less than 60 µg/m^3 then the one-hour mean NO_2 objective is unlikely to be exceeded where road transport is the main source of pollution. Monitoring data shows concentrations below 60 µg/m^3 at all monitoring sites over the seven years of data presented.

5.2.2 Particulate Matter (PM_{10} and $PM_{2.5}$)

LBH monitor PM_{10} at nine locations within the borough. Monitoring data at Hillingdon Hayes, which is the closest site is set out in Table 5.4.

Monitoring of PM_{10} shows annual mean concentrations consistently below the 40 µg/m^3 objective at the Hillingdon Hayes monitoring site, and the data shows no consistent trend in concentrations with some years showing an increase and others a decrease.

Table 5.4: PM_{10} Concentrations recorded at the Bowes Road Automatic Site

Site	Year							
	2014	2015	2016	2017	2018	2019	2020[1]	2021[1]
Annual Mean (µg/m^3)								
HIL5 Hillingdon Hayes	28.0	28.0	28.0	27.0	30.0	28.0	25	26
Number of Days >50µg/m^3)								
HIL5 Hillingdon Hayes	17 (46)	14 (60)	32	26	22	25	16	25

ND – no data available

[1]As a result of the Covid-19 pandemic and associated behavioral changes and measures implemented by the governing authorities (e.g. lockdowns, travel restrictions etc.) measured concentrations during 2020 and 2021 are not considered to be representative of 'normal' conditions. As such, measured 2020 and 2021 concentrations are presented for information only, and have not been discussed or given weight in determining the conclusions of this assessment.

LBH also monitor $PM_{2.5}$ at six locations within the borough. The closest site is located at London Harlington approximately 4.1 km southwest of the Site.

$PM_{2.5}$ concentrations recorded at this site since 2014 are presented in Table 5.5.

Table 5.5: PM_{10} Concentrations recorded at the London Harlington Automatic Site

Site	Year							
	2014	2015	2016	2017	2018	2019	2020	2021
London Harlington HRL	14.0	10.0	10.0	9.0	9.0	10.0	8.0	8.0

[1]As a result of the Covid-19 pandemic and associated behavioral changes and measures implemented by the governing authorities (e.g. lockdowns, travel restrictions etc.) measured concentrations during 2020 and 2021 are not considered to be representative of 'normal' conditions. As such, measured 2020 and 2021 concentrations are presented for information only, and have not been discussed or given weight in determining the conclusions of this assessment.

25 D Laxen and B Marner: Analysis of the relationship between 1-hour and annual mean nitrogen dioxide at UK roadside and kerbside monitoring sites (July 2003).

Data presented in Table 5.5 shows $PM_{2.5}$ concentrations to be well below the stage 2 limit of 20 µg/m^3 at the monitoring location. Concentrations \are also meeting the interim and long-term EIP targets for this pollutant.

The data indicates no significant upward or downward trend over the monitoring period.

5.3 DEFRA Background Maps

Additional information on estimated background pollutant concentrations has been obtained from the DEFRA background maps provided on UK-AIR, the Air Quality Information Resource (http://uk-air.defra.gov.uk). Estimated air pollution concentrations for oxides of nitrogen (NO_x), NO_2, PM_{10} and $PM_{2.5}$ have been extracted from the 2018 based background pollution maps for the UK, which were published in August 2020. The maps are available in 1 km x 1 km grid squares and provide an estimate of concentrations between 2018 and 2030. Concentrations have been taken for 2019 from the grid square representing the Site,

The NO_x and PM background maps are provided not only as total concentrations but are also broken down into sector contributions (i.e. primary A roads and brake tyre). However, as this assessment is considering the impact of the proposed development on existing air quality, background concentrations from all sources should be considered. Therefore, data presented in Table 5.6 provides total background concentrations for all three pollutants.

The data indicates that background concentrations of NO_2, PM_{10} and $PM_{2.5}$ in the vicinity of the Site are comfortably below the annual mean objectives, however concentrations Are exceeding the long-term 2040 EIP for $PM_{2.5}$.

Table 5.6: Annual Mean Background Air Pollution Concentrations from DEFRA maps

Pollutant	2023
NO_2	21.2
PM_{10}	16.9
$PM_{2.5}$	11.3

5.4 Air Quality at the Development Site

The proposed development would not provide any residential accommodation as the proposed warehouse would be for employment use (general industrial/distribution with attached office space). Due to the transient nature of users of the Site the annual mean and 24-hour objective limits do not apply. However, the short-term objective limits such as the 1-hour NO2 objective are considered relevant to the Site in external areas. Exposure at the Site should therefore be considered in relation to the 1-hour NO2 objective but not in relation to the PM objective limits.

The Site boundary is within 3.2 m of the Uxbridge Road; however, the closest building would be set back approximately 20 m from the road. The monitoring site considered most representative of conditions at the Site is located within the neighboring borough of Ealing at 11 The Broadway (EA13).

This site is approximately 4 m from The Broadway and NO_2 concentrations at EA13 have been above the annual mean NO_2 objective of 40 µg/m^3 every year since 2016 (Table 5.3).

Analysis of long-term monitoring data[26] suggests that if the annual mean NO_2 concentration is less than 60 µg/m^3 then the one-hour mean NO_2 objective is unlikely to be exceeded where road transport is the main source of pollution. Therefore, in this assessment the annual mean concentration has been used to screen whether the one-hour mean objective is likely to be achieved, as recommended within LAQM.TG(22). As concentrations at monitoring site EA13 have been less than 60 µg/m^3 it is concluded that the 1-hour objective is being met at roadside locations adjacent to The Broadway and Uxbridge Road and therefore also across the development area.

Concentrations at the Site are therefore expected to be meeting the 1-hour objective limit for NO_2 and the impact of the proposals in relation to new exposure is considered not significant.

26 D Laxen and B Marner: Analysis of the relationship between 1-hour and annual mean nitrogen dioxide at UK roadside and kerbside monitoring sites (July 2003).

6 Construction Impacts

6.1 Site and Surroundings

A summary of the proposed development is provided in Section 2 of this report.

The Site covers an area of approximately 3.17 ha. A review of surrounding land-uses shows that the nearest residential properties are within 50 m to the north of the Site boundary. An assessment of construction related impacts in relation to human receptors is therefore considered necessary.

Dust emissions from construction activities are unlikely to result in significant impacts on ecologically sensitive receptors beyond 50 m from the site boundary. A review of data held on the Defra MAGIC website[27] shows no sites designated as important for wildlife within 50 m of the Site, therefore impacts on ecological receptors has not been considered any further within this assessment.

As discussed in Section 5, the PM_{10} concentrations, taken from the Defra background maps, in the vicinity of the Site are expected to be below the relevant objective limits (Table 5.6). The data indicates background concentrations in the region of 18-19 µg/m^3. Based on professional judgment, it is anticipated that PM_{10} concentrations at the Site and at adjacent properties are unlikely to be much higher than background, therefore PM_{10} concentrations are expected to be below 24µg/m^3.

The precise behaviour of the dust, its residence time in the atmosphere, and the distance it may travel before being deposited would depend upon a number of factors. These include wind direction and strength, local topography and the presence of intervening structures (buildings, etc.) that may intercept dust before it reaches sensitive locations. Furthermore, dust would be naturally suppressed by rainfall.

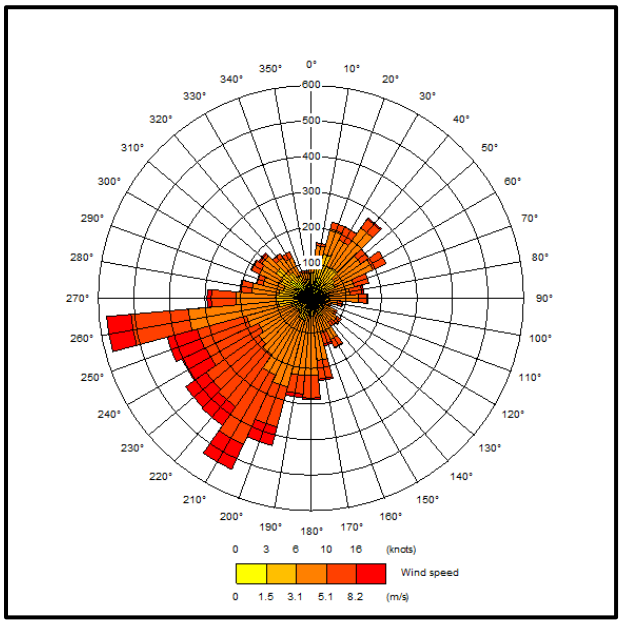

Figure 6.1: Windrose from London Heathrow Meteorological Station (2020)

A windrose from the London Heathrow Meteorological Station is provided in Figure 6.1, which shows that prevailing winds are from a south westerly direction. Areas most consistently affected by dust are influenced by prevailing winds that are generally located downwind of an emission source. Therefore, the highest risk of impacts would occur at receptors immediately to the north-east of the

27 http://magic.defra.gov.uk/

Site, which include residential premises to the north of Uxbridge Road and Hilton Car Supermarket and Exotic Imports & Services which would have a high sensitivity to dust effects.

6.2 Risk Assessment of Dust Impacts

6.2.1 Potential Dust Emission Magnitude

The dust emission magnitude is based on the scale of anticipated works at the Site and has been classified as small, medium or large for each of the four activities: demolition, earthworks, construction and trackout. A summary of the dust emission magnitude for each activity is set out in Table 6.1.

Demolition

The existing retail units will require demolition prior to construction. The total building volume is more than 50,000 m^3. The Site is therefore considered to have a dust emission class of 'large ' with regards to demolition activities.

Earthworks

Earthworks are those activities involved in preparing the Site for construction such as excavation of material, haulage, tipping, stockpiling and leveling.

The Site covers an area of approximately 3.17 ha (31,700 m^2) and during the earthworks stage it is anticipated that there would be more than 100,000 tonnes of material that would be excavated, with more than 10 heavy earth moving vehicles on site at any one time. The Site is therefore considered to have a dust emission class of 'large ' with regards to earthwork activities.

Construction

There are a number of issues that can impact the dust emission class during construction activities including the size of the building, materials used for construction, the method of construction and the duration of the build.

Based on the current design layouts the total building volume proposed for the Site would be more than 100,000 m^3 and the main construction materials would be steel, brick and concrete. The Site is therefore considered to have a dust emission class of 'large ' with regards to construction activities.

Trackout

The risk of impacts occurring during trackout is predominantly dependent on the number of vehicles accessing the Site on a daily basis. However, vehicle size and speed, the duration of activities and local geology are also factors which are used to determine the emission class of the Site as a result of trackout.

Given the size of the Site and nature of the development it is anticipated that there would be in the region of 15 -20 HGV accessing the Site on a daily basis. Furthermore, vehicles would be travelling over unpaved roads, which can result in mud and dust being trackout onto the adjacent road network. The Site is therefore considered to have a dust emissions class of 'medium' with regards to trackout activities.

Table 6.1: Summary of Dust Emission Magnitude for each Activity	
Source	**Magnitude**
Demolition	Large
Earthworks	Large
Construction	Large
Trackout	Medium

6.2.2 Sensitivity of Area

The sensitivity of the surrounding area takes account of the following factors:

- the specific sensitivities of receptors in the area;
- the proximity and number of those receptors;
- in the case of PM_{10}, the local background concentrations; and
- site-specific factors i.e. whether there are natural shelters such as trees, to reduce the risk of wind-blown dust.

Based on the IAQM guidance, residential dwellings and car showrooms are considered as high sensitivity receptors in relation to both dust soiling and health effects of PM_{10}, whilst retail/commercial premises have a medium sensitivity to dust and particulate emissions.

The nearest residential properties are located approximately 40 m to the north of the Site and there is a car showroom located approximately 10 m to the east northeast. There are also a number of retail/commercial warehouses to the south, east and west of the Site, within 10 –120 m and the Hyatt Place West hotel lies approximately 70m to the northwest of the Site. These would be of medium sensitivity to dust effects. The overall sensitivity of the surrounding area is classed as 'medium' in relation to dust soiling.

As previously discussed, annual mean PM_{10} concentrations in the vicinity of the Site are not expected to exceed 24 $\mu g/m^3$. Based on the proximity of sensitive receptors to the site boundary and the local concentrations of PM_{10} the sensitivity of the surrounding area is considered to be 'low' with regards human health impacts.

In relation to trackout, it is anticipated that the majority of vehicles would travel to the Site along Uxbridge Road. As a general guidance, significant impacts from trackout may occur up to 500 m from large sites, 200 m from medium sites and 50 m from small sites, as measured from the site exit. There are more than 10 residential properties within 500 m of the Site access point along Uxbridge Road and there are a number of retail /commercial warehouses. The sensitivity of the area to dust soiling effects from trackout is therefore considered to be 'high '.

A summary of the sensitivity of the area surrounding the Site in relation to each activity is provided below in Table 6.2.

Table 6.2: Summary of Sensitivity of Surrounding Area				
Potential Impact	**Sensitivity of Surrounding Area**			
	Demolition	**Earthworks**	**Construction**	**Trackout**
Dust Soiling	Medium	Medium	Medium	High
Human Health	Low	Low	Low	Low

6.2.3 Defining the Risk of Impacts

The dust emission magnitude as set out in Table 6.1 is combined with the sensitivity of the area (Table 6.2) to determine the risk of both dust soiling and human health impacts, assuming no mitigation measures applied at site. The risk of impacts associated with each activity is provided in Table 6.3 below and has been used to identify site-specific mitigation measures, which are discussed in Section 8 and set out in Appendix D.

Table 6.3: Summary of Effects Without Mitigation			
Source	**Dust Soiling**	**PM_{10} Effect**	**Ecological**
Demolition	High Risk	Medium Risk	N/A
Earthworks	Medium Risk	Low Risk	N/A
Construction	Medium Risk	Low Risk	N/A
Trackout	Medium Risk	Low Risk	N/A

7 Air Quality Neutral Assessment

7.1 Building Emissions

The building emissions calculated from the proposed development are set out in Table 7.1 below, along with the required parameters needed to undertake the calculation.

Table 7.1: Calculated Building Emissions				
Emissions Factor ($kgNO_x/kWh$)	**Annual Energy Demand (kWh/yr)**	**Gross Internal Area of Development (m^2)**	**Calculated Building Emissions (kg/yr)**	**BEB (kg/yr)**
0.000039	1,525,000	13,987[2]	61	7.7[3]
[1] as provided by Briar Zenergi [2] area of warehouse space [3] based on B8 (storage and distribution) use				

The building emissions rate has been calculated as 61 Kg NO_x/year for the whole Site which exceeds the BEB of 7.7 $KgNO_x$/year. The Site is not therefore currently meeting the AQN benchmark for building emissions.

7.2 Traffic Emissions

A comparison of the developments annual trip generation for operational staff and visitors is set out in Table 7.2 along with the calculated TEB, based on B2 use, which represents a worst-case trip generation from the Site relating to operational trips.

It is recommended that the AQN calculations are updated once the occupiers of the Site are known, and trip rates can be determined based on the final land-use type.

Table 7.2: Calculated Transport Emissions		
Gross Internal Area of Development (m^2)	**Development Annual Trip Rate (trips per year)[1]**	**TEB (trips per year)**
16522	176532	107393[2]
[1] based on B8 use – operational staff and visitors only as per guidance. [2] based on B8 use		

The data set out in Table 7.2 shows that the annual trip generation exceeds the TEB trip rate and therefore the proposals are not AQN in relation to traffic emissions.

7.3 Off-setting Assessment

As required by the AQN guidance, an off-setting amount has been calculated due to the building emissions exceeding the BEB.

Details of the off-setting calculation are set out in Table 7.3.

The total off-setting amount has been calculated as £595,868.

Table 7.3: Off-setting Calculation Building Emissions

Parameter	Benchmark Emissions (t/yr)	Development emissions (t/yr)	Development Excess Emissions (t/yr)[1]	Damage Cost (£/t)[2]	Annual Off-setting Amount (£)	Total Off-setting Amount (£)[3]
Building Emissions (NO_x)	0.00769	0.0610	0.0533	16,583	884	35,862
Transport Emissions (NO_x)	0.406	0.667	0.261	33,064	8,641	350,554
Transport Emissions ($PM_{2.5}$)	0.032	0.053	0.021	246,942	5,163	209,452
					Total Off-Setting Payment	595,868

[1] difference between benchmark and development emissions

[2] Based on 2023 Damage Costs (2022 prices) for Commercial Sources as set out on the UK Government website (https://www.gov.uk/government/publications/assess-the-impact-of-air-quality/air-quality-appraisal-damage-cost-guidance

[3] calculated over a 30 year period with a 2% annual uplift

8 Mitigation Measures

8.1 Construction Phase

The control of dust emissions from construction site activities relies upon management provisions and mitigation techniques to reduce emissions of dust and limit dispersion. Where dust emission controls have been used effectively, large-scale operations have been successfully undertaken without impacts to nearby properties.

The proposed development has been identified as a high -risk site for dust soiling effects during demolition and a medium risk site for earthworks, construction and trackout. For human health, the Site has been identified as a medium risk site for demolition but a low risk for earthworks, construction and trackout as set out in Table 6.3.

The developer should therefore implement appropriate dust and pollution control measures as set out within the Mayors SPD. A summary of these measures is set out in Appendix E. The proposed measures should be set out within a CMP and approved by LBH prior to commencement of any work on site.

Following implementation of the measures recommended for inclusion within the CMP the impact of emissions during construction of the proposed development would be negligible.

8.2 Operational Phase

The assessment has shown that the operational development will result in an overall reduction in vehicle movements across the network compared to the existing site use and will therefore have a positive impact on local air quality. However, the AQN assessment has found that the proposals will exceed both the BEB and TEB resulting in an off-setting amount of £595,868 being calculated.

These are based on worst-case assumptions and it is recommended that revised AQN calculations are undertaken once the actual occupants of the development and subsequent land-use, has been confirmed.

As detailed in the AQN guidance, the preferred approach is to implement appropriate on-site and off-site mitigation to reduce emissions to below the relevant benchmarks, making the scheme AQN.

The overall development will be building with sustainability in mind, with the building being constructed to be as energy efficient as possible incorporating excellent thermal performance with low U-values within the structure, use of energy efficient lighting and the use of sources for heating and hot water and the provision of proof mounted photo-voltaic (PV) cells to provide a proportion of the site's energy demand from renewable sources.

Furthermore, an area of green roof and a green wall will be provided which will help absorb air borne pollutants in the area.

In addition to the above the following measures have been incorporated into the scheme design aimed at reducing emissions from the operational development:

- A draft Framework Travel Plan (FTP) has been produced to support the application setting out a commitment for occupiers of the development to prepare a Travel Plan Statement or Full Travel Plan in accordance with the FTP . The FTP sets out measures to achieve a 5% reduction in car use within the first five years;
- 22% of parking spaces will be provided with active EV charging units;
- Safe and secure pedestrian and cycle access through the Site will be provided linking the site with existing pedestrian and cycle links along Uxbridge Road;

- 36 long-term secure and covered cycle parking spaces and 16 short-term cycle spaces will be provided along with shower facilities.
- Travel Information Packs will be provided to all new employees at the Site which will contain information relating to walking and cycling routes, a list of free to use route planners, public transport information, guidance on car sharing, information on sustainable travel initiatives, information on location of cycle parking facilities and contact details of the Travel Plan Coordinator (TPC).

The TPC will actively promote car sharing websites and assist employees who wish to join a car share scheme. Car sharing amongst staff will also be encouraged and the provision of dedicated car-sharing spaces will be considered on Site.

It is considered that the above measures will contribute significantly to reducing operational emissions. However, how these contribute to reducing the overall off-setting amount and the need for any further mitigation will be discussed and agreed with the Council following permissions being granted, when any associated trip reductions and emission reductions can be agreed with the relevant transport, air quality and planning officers.

Where it is not possible to reduce the off-setting amount to zero, a financial contribution will be requested by the Council towards implementing the borough's Air Quality Action Plan measures.

9 Conclusion

It is inevitable that with any development, demolition and construction activities will cause some disturbance to those nearby. Dust arising from most construction activities tends to be of a coarse nature, which through dispersion by the wind can lead to soiling of property including windows, cars, external paintwork and laundry. However, as well as giving rise to annoyance due to soiling of surfaces from dust emissions, there is evidence of major construction activities causing increases in long term PM_{10} concentrations and in the number of days exceeding the short term PM_{10} objective of 50 μgm^{-3}.

The IAQM guidance on assessing impacts on air quality from construction activities and determining the likely significance has been used to determine the risk of impacts occurring during the construction of the development and to identify appropriate mitigation measures to be implemented on site to reduce dust emissions and associated impacts.

Due to the proximity of nearby receptors the Site is considered to have a high risk of impacts with regards to dust soiling and PM_{10} concentrations. However, following the implementation of appropriate mitigation measures impacts associated with the construction of the development are likely to be insignificant.

The assessment has shown that the operational development will result in an overall reduction in vehicle movements across the network compared to the existing site use and will therefore have a positive impact on local air quality.

An Air Quality Neutral assessment has been undertaken which has found the development proposals cannot be determined as AQN for building emissions resulting in an off-setting amount of £595,868 being calculated.

These are based on worst-case assumptions and it is recommended that revised AQN calculations are undertaken once the actual occupants of the development and subsequent land-use, has been confirmed.

The development will be built with sustainability in mind, incorporating a number of energy efficient measures and renewable energy sources to reduce both building and transport related emissions. These measures include:

- Low-U-values throughout the site;
- Use of electric water heaters and heat recovery units for the office spaces;
- A draft Framework Travel Plan (FTP) has been produced to support the application setting out a commitment for occupiers of the development to prepare a Travel Plan Statement or Full Travel Plan in accordance with the FTP . The FTP sets out measures to achieve a 5% reduction in car use within the first five years;
- 22% of parking spaces will be provided with active EV charging units;
- Safe and secure pedestrian and cycle access through the Site will be provided linking the site with existing pedestrian and cycle links along Uxbridge Road;
- 36 long-term secure and covered cycle parking spaces and 16 short-term cycle spaces will be provided along with shower facilities.
- Travel Information Packs will be provided to all new employees at the Site which will contain information relating to walking and cycling routes, a list of free to use route planners, public transport information, guidance on car sharing, information on sustainable travel initiatives, information on location of cycle parking facilities and contact details of the Travel Plan Coordinator (TPC).

The TPC will actively promote car sharing websites and assist employees who wish to join a car share scheme. Car sharing amongst staff will also be encouraged and the provision of dedicated car sharing spaces will be considered on Site.

It is considered that the above measures will contribute significantly to reducing operational emissions. However, how these contribute to reducing the overall off-setting amount and the need for any further mitigation will be discussed and agreed with the Council following permissions being granted, when any associated trip reductions and emission reductions can be agreed with the relevant transport, air quality and planning officers.

Where it is not possible to reduce the off-setting amount to zero, a financial contribution will be requested by the Council towards implementing the borough's Air Quality Action Plan measures.

Appendix A – Air Quality Terminology

Term	Definition
Accuracy	A measure of how well a set of data fits the true value.
Air quality objective	Policy target generally expressed as a maximum ambient concentration to be achieved, either without exception or with a permitted number of exceedances within a specific timescale (see also air quality standard).
Air quality standard	The concentrations of pollutants in the atmosphere which can broadly be taken to achieve a certain level of environmental quality. The standards are based on the assessment of the effects of each pollutant on human health including the effects on sensitive sub groups (see also air quality objective).
Ambient air	Outdoor air in the troposphere, excluding workplace air.
Annual mean	The average (mean) of the concentrations measured for each pollutant for one year. Usually this is for a calendar year, but some species are reported for the period April to March, known as a pollution year. This period avoids splitting winter season between 2 years, which is useful for pollutants that have higher concentrations during the winter months.
AQMA	Air Quality Management Area.
Defra	Department for Environment, Food and Rural Affairs.
EIA regulations	Environmental Impact Assessment regulations
Exceedance	A period of time where the concentrations of a pollutant is greater than, or equal to, the appropriate air quality standard.
Fugitive emissions	Emissions arising from the passage of vehicles that do not arise from the exhaust system.
IPPC	Integrated Pollution Prevention and Control
LAQM	Local Air Quality Management.
LAPPC	Local Air Pollution Prevention and Control
NO	Nitrogen monoxide, a.k.a. nitric oxide.
NO_2	Nitrogen dioxide.
NO_x	Nitrogen oxides.
O_3	Ozone.
Percentile	The percentage of results below a given value.
PM_{10}	Particulate matter with an aerodynamic diameter of less than 10 micrometres.
Ratification (Monitoring)	Involves a critical review of all information relating to a data set, in order to amend or reject the data. When the data have been ratified they represent the final data to be used (see also validation).
μgm^{-3} micrograms per cubic metre	A measure of concentration in terms of mass per unit volume. A concentration of $1ug/m^3$ means that one cubic metre of air contains one microgram (millionth of a gram) of pollutant.
UKAS	United Kingdom Accreditation Service.
Uncertainty	A measure, associated with the result of a measurement, which characterizes the range of values within which the true value is expected to lie. Uncertainty is usually expressed as the range within which the true value is expected to lie with a 95% probability, where standard statistical and other procedures have been used to evaluate this figure. Uncertainty is more clearly defined than the closely related parameter 'accuracy', and has replaced it on recent European legislation.
USA	Updating and Screening Assessment.
Validation (modelling)	Refers to the general comparison of modelled results against monitoring data carried out by model developers.
Validation (monitoring)	Screening monitoring data by visual examination to check for spurious and unusual measurements (see also ratification).
Verification (modelling)	Comparison of modelled results versus any local monitoring data at relevant locations.

Appendix B – IAQM Construction Dust Assessment Procedure

In order to assess the potential impacts, the activities on construction sites are divided into four categories. These are:

- demolition (removal of existing structures);
- earthworks (soil-stripping, ground-leveling, excavation and landscaping);
- construction (activities involved in the provision of a new structure); and
- trackout (the transport of dust and dirt from the construction site onto the public road network where it may be deposited and then re-suspended by vehicles using the network).

For each activity, the risk of dust annoyance, health and ecological impact is determined using three risk categories: low, medium and high risk. The risk category may be different for each of the four activities. The risk magnitude identified for each of the construction activities is then compared to the number of sensitive receptors in the near vicinity of the site in order to determine the risks posed by the construction activities to these receptors.

Step 1: Screen the Need for an Assessment

The first step is to screen the requirement for a more detailed assessment. An assessment is required where there is:

- a 'human receptor' within 350m of the boundary of the site or 50m of the route(s) used by construction vehicles on the public highway, up to 500m from the site entrance(s); and/or
- an 'ecological receptor' within 50m of the boundary of the site; or 50m of the route(s) used by the construction vehicles on the public highway, up to 500m from the site entrance(s).

Step 2A: Define the Potential Dust Emission Magnitude

This is based on the scale of the anticipated works and the proximity of nearby receptors. The risk is classified as small, medium or large for each of the four categories.

Demolition: The potential dust emission classes for demolition are:

- Large: Total building volume >50,000m^3, potentially dusty construction material (e.g. Concrete), on site crushing and screening, demolition activities >20m above ground level;
- Medium: total building volume 20,000m^3 – 50,000m^3, potentially dusty construction material, demolition activities 10-20 m above ground level; and
- Small: total building volume <20,000m^3, construction material with low potential for dust release (e.g. metal cladding or timber), demolition activities <10m above ground, demolition during wetter months.

Earthworks: This involves excavating material, haulage, tipping and stockpiling. The potential dust emission classes for earthworks are:

- Large: Total site area >10,000m^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 >8 m in height, total material moved >100,000 tonnes;
- Medium: Total site area 2,500 m^2 – 10,000m^2, moderately dusty soil (e.g. silt), 5 – 10 heavy earth moving vehicles active at any one time, formation of bunds 4m – 8m in height, total material moved 20,000 tonnes- 100,000 tonnes; and
- Small: Total site area <2,500m^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, total material moved <20,000 tonnes, earthworks during wetter months.

Construction: The important issues here when determining the potential dust emission magnitude include the size of the building(s)/infrastructure, method of construction, construction materials, and duration of build. The categories are:

Large: Total building volume >100,000m^3, on site concrete batching, sandblasting;

Medium: Total building volume 25,000m^3 – 100,000m^3, potentially dusty construction material (e.g. concrete), on site concrete batching; and

Small: Total building volume <25,000m^3, construction material with low potential for dust release (e.g. metal cladding or timber).

Trackout: The risk of impacts occurring during trackout is predominantly dependent on the number of vehicles accessing the Site on a daily basis. However, vehicle size and speed, the duration of activities and local geology are also factors which are used to determine the emission class of the Site as a result of trackout. The categories are:

Large: >50 HDV (>3.5t) outward movements in any one day, potentially dusty surface material (e.g. high clay content), unpaved road length > 100m;

Medium: 10-50 HDV (>3.5t) outward movements in any one day, moderately dusty surface material (e.g. high clay content, unpaved road length 50-100m; and

Small: <10 HDV (>3.5t) outward movements in any one day, surface material with low potential for dust release, unpaved road length >50m.

Step 2B: Defining the Sensitivity of the Area

The sensitivity of the area is defined for dust soiling, human health (PM_{10}) and ecological receptors. The sensitivity of the area takes into account the following factors:

the specific sensitivities of receptors in the area;

the proximity and number of receptors;

in the case of PM_{10}, the local background concentration; and

site specific factors, such as whether there are natural shelters, such as trees, to reduce the risk of wind-blown dust.

Table B1 is used to define the sensitivity of different types of receptors to dust soiling, health effects and ecological effects.

Based on the sensitivities assigned to the different receptors surrounding the site and numbers of receptors within certain distances of the site, a sensitivity classification can be defined for each. Tables B2 to B4 indicate the criteria used to determine the sensitivity of the area to dust soiling, human health and ecological impacts.

Table B1: Examples of Factors Defining Sensitivity of an Area			
Sensitivity of Area	**Dust Soiling**	**Human Receptors**	**Ecological Receptors**
High	Users can reasonably expect enjoyment of a high level of amenity The appearance, aesthetics or value of their property would be diminished by soiling' The people or property would reasonably be expected to be present continuously, or at least regularly for extended periods, as part of the normal pattern of use of the land. E.g. dwellings, museums and other important collections, medium and long term car parks and car showrooms.	10 – 100 dwellings within 20 m of site. Local PM_{10} concentrations close to the objective (e.g. annual mean 36 -40 µg/m^3). E.g. residential properties, hospitals, schools and residential care homes.	Locations with an international or national designation and the designated features may be affected by dust soiling. Locations where there is a community of a particularly dust sensitive species such as vascular species included in the Red List for Great Britain. E.g. A Special Area of Conservation (SAC).
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. E.g. parks and places of work.	Less than 10 receptors within 20 m. Local PM_{10} concentrations below the objective (e.g. annual mean 30-36 µg/m^3). E.g. office and shop workers but will generally not include workers occupationally exposed to PM_{10} as protection is covered by the Health and Safety at Work legislation.	Locations where there is a particularly important plant species, where its dust sensitivity is uncertain or unknown. Locations with a national designation where the features may be affected by dust deposition E.g. A Site of Special Scientific Interest (SSSI) with dust sensitive features.
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. E.g. playing fields, farmland unless commercially sensitive horticultural, footpaths, short lived car [parks and roads.	Locations where human exposure is transient. No receptors within 20 m. Local PM_{10} concentrations well below the objectives (less than 75%). E.g. public footpaths, playing fields, parks and shopping streets.	Locations with a local designation where the features may be affected by dust deposition. E.g. Local Nature Reserve with dust sensitive features.

Table B2: Sensitivity of the Area to Dust Soiling on People and Property					
Receptor Sensitivity	**Number of Receptors**	**Distance from the Source (m)**			
		<20	**<50**	**<100**	**<350**
High	>100	High	High	Medium	Low
	10-100	High	Medium	Low	Low
	1-10	Medium	Low	Low	Low
Medium	>1	Medium	Low	Low	Low
Low	>1	Low	Low	Low	Low

Table B3: Sensitivity of the Area to Human Health Impacts							
Receptor Sensitivity	**Annual Mean PM_{10} Concentration**	**Number of Receptors**	**Distance from Source (m)**				
			<20	**<50**	**<100**	**<200**	**<350**
High	>32 µg/m^3	>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	>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	>100	High	Medium	Low	Low	Low
		10-100	High	Medium	Low	Low	Low
		1-10	Medium	Low	Low	Low	Low
	<24 µg/m^3	>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	>10	High	Medium	Low	Low	Low
		1-10	Medium	Low	Low	Low	Low
	28-32 µg/m^3	>10	Medium	Low	Low	Low	Low
		1-10	Low	Low	Low	Low	Low
	24-28 µg/m^3	>10	Low	Low	Low	Low	Low
		1-10	Low	Low	Low	Low	Low
	<24 µg/m^3	>10	Low	Low	Low	Low	Low
		1-10	Low	Low	Low	Low	Low
Low	-	>1	Low	Low	Low	Low	Low

Table B4: Sensitivity of the Area to Ecological Impacts		
Receptor Sensitivity	**Distance from the Source (m)**	
	<20	**<50**
High	High	Medium
Medium	Medium	Low
Low	Low	Low

Define the Risk of Impacts

The final step is to combine the dust emission magnitude determined in step 2A with the sensitivity of the area determined in step 2B to determine the risk of impacts with no mitigation applied. Tables B5 to B7 indicate the method used to assign the level of risk for each construction activity. The identified level of risk is then used to determine measures for inclusion within a site-specific Construction Management Plan (CMP) aimed at reducing dust emissions and hence reducing the impact of the construction phase on nearby receptors. The mitigation measures are drawn from detailed mitigation set out within the IAQM guidance document.

Table B5: Risk of Dust Impacts from Demolition			
Sensitivity of Area	**Large**	**Medium**	**Small**
High	High Risk	Medium Risk	Medium Risk
Medium	High Risk	Medium Risk	Low Risk
Low	Medium Risk	Low Risk	Negligible

Table B6: Risk of Dust Impacts from Earthworks/ Construction			
Sensitivity of Area	**Large**	**Medium**	**Small**
High	High Risk	Medium Risk	Low Risk
Medium	Medium Risk	Medium Risk	Low Risk
Low	Low Risk	Low Risk	Negligible

Table B7: Risk of Dust Impacts from Trackout			
Sensitivity of Area	**Large**	**Medium**	**Small**
High	High Risk	Medium Risk	Low Risk
Medium	Medium Risk	Low Risk	Negligible
Low	Low Risk	Low Risk	Negligible

Appendix C– Traffic Data used in Assessment

Table C1 – Traffic Data				
	HGV	% HGV	Light Vehicles	Total
Proposed Warehouse Use	306	24.5%	943	1249
Existing Retail Use	38	1.0%	3804	3842
Net Change	268	6.8%	-2861	-2593

Appendix D – Air Quality Neutral Assessment Methodology

Building Emissions Benchmark (BEB)

The BEB is defined in grams of NO_x emitted per m^2 of floor spaces per year ($gNOx/m^2/annum$).

The AQN guidance sets out benchmark NO_x emission rates for different land uses as detailed in Table D1.

Table D1: BEB 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	3.5	5.7	7.8	5.7
Retail	0.53	0.97	4.31	0.97
Restaurants and Bars	1.76	3.23	14.34	3.23
Offices	1.43	2.62	11.68	2.62
Industrial	1.07	1.95	8.73	1.95
Storage and distribution	0.55	1.01	4.50	1.01
Hotels	9.47	15.42	38.16	15.42
Care Homes and Hospitals	9.15	14.90	36.86	14.90
Schools, nurseries, doctors surgeries	0.90	1.66	7.39	1.66
Assembly and leisure	2.62	4.84	21.53	4.84

The BEB is calculated using the following calculation:

GIA (m^2) x benchmark NO_x emissions rate ($gNO_x/m^2/yr$) = total BEB (gNO_x/yr)

The building emissions associated with the proposed development are then calculated and compared with the BEB using the following formula:

Building energy use (kWh/yr) x NO_x emission rate (mg/kWh) = total NO_x building emissions (mg/yr)

Where it is not possible to identify a specific unit being installed and therefore the associated NO_x emission rate the generic emission rates set out in Table D2 can be used.

Table D2: Generic Emission Rates for Combustion Technologies	
Technology Type	**NO_x emission rate**
Gas Boiler	40 mg/kWh
Gas engine with SCR	25 mg/Nm^3
Heat pump	0

Transport Emissions Benchmark (TEB)

The TEB is calculated as the number of single trips per m^2 of floorspace (GIA) over a year (trips/m^2/year) for non-residential use, or the anticipated number of single trips per dwelling (trips/dwelling/year) for residential use.

An outward and return journey to and from a location therefore counts as two trips.

Trip rate benchmarks are based on data from the Trip Rate Information Computer System (TRICS) and are defined for different land uses and different areas of London. These are set out in Table D3.

Table D3: Benchmark Trip Rates				
Land Use	**Annual trips per**	**Central Activities Zone (CAZ)**	**Inner London (excluding CAZ)**	**Outer London**
Residential	Dwelling	68	114	447
Offices/light industrial	m^3 (GIA)	2	1	16
Retail (superstore)	m^3 (GIA)	39	73	216
Retail (convenience)	m^3 (GIA)	18	139	274
Restaurants and Cafes	m^3 (GIA)	64	137	170
Drinking Establishments	m^3 (GIA)	0.8	8	N/A
Hot Food Takeaway	m^3 (GIA)	0	32.4	590
Industrial	m^3 (GIA)	0	5.6	6.5
Storage and distribution	m^3 (GIA)	0	5.5	6.5
Hotels	m^3 (GIA)	1.0	1.4	6.9
Care Homes and Hospitals	m^3 (GIA)	0	1.1	19.5
Schools, nurseries, doctors surgeries	m^3 (GIA)	0.1	30.3	44.4
Assembly and leisure	m^3 (GIA)	3.6	10.5	47.2

The TEB is calculated based on car or light van trips undertaken directly by development occupiers (residents, businesses etc and staff/customers). The TEB does not include 'operational' trips generated by the development (i.e. taxi, deliveries, servicing and HGV movements from non-occupiers).

The TEB is calculated using the following formula:

GIA (m^2)/no. of dwellings x benchmark trip rate = total TEB (trips/yr)

The calculated trip rate is compared to the development annual trip rate calculated as part of the transport assessment for the development, but excluding operational trips.

Mitigation and Off-setting

The guidance states that '*the AQN benchmarks have been calculated to be achievable and designed to be consistent with the energy and transport policies of the London Plan*'.

Where the AQN assessment shows that the development fails to meet one or both of the benchmarks, details of the development should be amended to meet the benchmarks as a first step. This could include changes to the energy or transport strategies, or changes to the overall design of the development.

Where the development is still unable to meet the benchmarks, the next step is to agree with the Local Authority to secure on- or off-site measures. However, it is often the case that appropriate mitigation measures cannot be agreed with the Council until such time as planning permission has been granted and the impact of any measures discussed in detail with relevant LA officers to agree the extent by which they will reduce emissions and will be suitable for the site location.

If it is not possible to identify or agree appropriate mitigation measures then the guidance recommends the calculation of an off-setting payment, which can be used to contribute to implementing the Councils air quality action plan measures.

In some instances, the Council may request that an off-setting amount is calculated as part of the AQN assessment prior to agreeing mitigation, with the total amount being discounted in accordance with agreed specific measure. However, this often can not be agreed until planning permission has been granted and such discussions and be had with the relevant LA officers to agree the impact of any mitigation.

The off-setting payment is calculated using the following approach:

Development emissions (t/yr) - Benchmark (t/yr) = excess emissions (t/yr)

Excess emissions (t/y) x damage cost (£/t) = annual off-setting amount (£)

The annual off-setting amount should then be calculated for a 30 year period with a 2% annual uplift.

The above calculates are undertaken for both the building and transport emissions, where the benchmarks are exceeded, and added together to give the overall off-setting payment for the development.

The transport benchmark and trip rates are set out in trips/yr. These need to be translated into transport emissions to calculate the off-setting payment. This is done using the following formula:

Trip rate (trips/yr) x trip length (km) x emission factor (g/veh-km) = transport emissions (g/yr)

The relevant trip lengths per land use are set out in Table D4 and the relevant emission factors provided in Table D5.

Table D3: Average Distance (km) travelled by car per trip			
Land Use	**CAZ**	**Inner London**	**Outer London**
Residential	4.2	3.4	11.4
Retail	3.0	7.2	10.8
Restaurants and Bars	9.2	5.5	5.4

Table D4: Emission Factors per Vehicle-km (g/veh-km)			
Pollutant	**CAZ**	**Inner London**	**Outer London**
NO_x	0.48	0.39	0.35
$PM_{2.5}$	0.036	0.032	0.028

App1endix E – Construction Mitigation Measures

It is recommended that the 'highly recommended' measures set out below are incorporated into a CMP and approved by LBH prior to commencement of any work on site:

- develop and implement a stakeholder communications plan that includes community engagement before work commences on site;
- display the name and contact details of the person accountable for air quality and dust issues on the site boundary (i.e. the environment manager/engineer or site manager);
- display the head or regional office contact information on the site boundary;
- develop and implement a Dust Management Plan (DMP) setting out measures to control emissions during construction;
- record all dust and air quality complaints, identify cause, 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;
- carry out regular site inspections to monitor compliance with the CMP, record inspection results and make inspection log available to LBH when asked;
- increase 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 periods of dry or windy conditions;
- record any exceptional incidents that cause dust and/or air emissions, either on- or off- site and the action taken to resolve the situation in the log book;
- hold regular liaison meetings with other high risk construction sites within 500 m of the site boundary, to ensure plans are coordinated and dust and particulate matter emissions are minimised.

Preparing and Maintaining the Site

- undertake daily on-site and off-site inspection, where receptors 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 100 m of the site boundary, with cleaning to be provided if necessary;
- 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;
- fully enclose site or specific operations where there is a high potential for dust production and the activities are being undertaken for an extensive period;
- avoid site runoff of water or mud;
- keep site fencing, barriers and scaffolding clean using wet methods;
- remove materials that have a potential to produce dust from site as soon as possible, unless being re-used on site. If being re-used on site, cover as detailed below;
- cover, seed or fence stockpiles to prevent wind whipping;
- agree monitoring locations with the Local Authority;
- where possible commence baseline monitoring at least three months before phase begins;
- put in place real-time dust and air quality pollutant monitors across the site and ensure they are checked regularly.

3.6Operating Vehicle/Machinery and Sustainable Travel

- ensure all on-road vehicles comply with the requirements of the London Low Emissions Zone;
- ensure all non-road machinery (NRMM) comply with the standards set within this guidance;
- ensure all non-road mobile machinery comply with the standards set out within the Mayors SPD;
- ensure all vehicles switch off engines when stationary - no idling vehicles;
- avoid the use of diesel or petrol-powered generators and use mains electricity or battery powered equipment where practicable;
- impose and signpost a maximum speed limit of 10mph on surfaced haul routes and work area (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);
- produce a Construction Logistics Plan to manage the sustainable delivery of goods and materials;
- Implement a Travel Plan that supports and encourages sustainable travel.

Operations

- only use cutting, grinding or sawing equipment fitted or in conjunction with suitable dust suppression techniques such as water sprays or local extraction e.g. suitable local exhaust ventilation systems;
- ensure an adequate water supply on 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.

Waste Management

- reuse and recycle waste to reduce dust from waste materials;
- avoid bonfires and burning of waste materials.

Measures Specific to Demolition

- soft strip inside buildings before demolition (retaining walls and windows in the rest of the building where possible, to provide a screen against dust).
- Ensure water suppression is used during demolition operations;
- Avoid blasting, using appropriate manual or mechanical alternatives;
- Bag and remove any biological debris or damp down such material before demolition.

Measures Specific to Earthworks

- re-vegetate earthworks and exposed areas/soil stockpiles to stabilize 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.

Measures Specific to Construction

- avoid scabbling where 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 powder materials ensure bags are sealed after use and stored appropriately to prevent dust.

Measures Specific to Trackout

- 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;
- use water-assisted dust sweepers on the access and local roads, to remove, as necessary, any material tracked out of the site;
- avoid dry sweeping of large areas;
- ensure vehicles entering and leaving the site are covered to prevent the escape of materials during transport;
- inspect on-site haul routes for integrity and instigate necessary repairs to the surface as soon as reasonably practicable;
- record all inspections of haul routes and any subsequent action in a site logbook;
- 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);
- ensure there is an adequate area of hard surfaced road between the wheel wash facility and the site exist.
- apply dust suppressants to locations where a large volume of vehicles enter and exit the construction site.

To provide additional protection and reduce the risk of dust effects further the following measures should also be considered:

- install green walls, screens or other green infrastructure to minimise the impact of dust and pollution;
- provide showers and ensure a change of shoes and clothes are required before going off-site to reduce transport of dust;
- carry out regular dust soiling checks of buildings within 100m of site boundary and cleaning to be provided if necessary;
- impose and signpost a maximum speed limit of 15 mph on surfaced and 10 mph on unsurfaced haul roads and work areas.