Acre Homes Limited

Bath Road

Air Quality Assessment

October 2023

Contents

Introduction

DJC Housing Consultants has been instructed by Acre Homes Limited to undertake an Air Quality Assessment (AQA) based on the potential impacts of existing and future traffic levels in respect of development proposals at Bath Road, Harlington, West Drayton, UB3 5JJ, within the jurisdiction of the London Borough of Hillingdon.

The scheme will involve the construction of 60 residential units.

The impacts of vehicle emissions have been assessed using the techniques detailed within Volume 11, Section 3 of the Design Manual for Roads and Bridges (DMRB)1 and the London Local Air Quality Management Technical Guidance (LLAQM.TG(19))2.

The impact of road traffic emissions both on new residents, and by traffic from the new development, will be assessed using the latest version of ADMS-Roads air dispersion model. ADMS has been developed by Cambridge Environmental Research Consultants (CERC). Over 70 Local Authorities utilise ADMS to review and assess their own Air Quality Action Plans. The ADMS models have also successfully been used for examining planning applications and EIA for proposed industrial, retail and domestic developments.

In addition to this, the assessment has also assessed the potential impact on local air quality from demolition and construction activities at the site.

[1] Design Manual for Roads and Bridges, Sustainability & Environment Appraisal LA 105 Air Quality – November 2019
[2] https://laqm.defra.gov.uk/air-quality/guidance/technical-guidance/

Pollutant Legislation

Pollutant Overview

In each UK city traffic generated pollutants have become the most common pollutants. This air quality assessment focuses on NO2 and PM10, as these pollutants are least likely to meet their Air Quality Strategy objectives near roads. Table 1 provides an overview of NO2 and PM10.

Table 1 – Overview of NO2 and PM10

Pollutant	Properties	Anthropogenic Sources	Natural Sources	Potential Effects
Particles (PM10)	Tiny particulates of solid or liquid nature suspended in the air	Road transport; Power generation plants; Production processes e.g. windblown dust	Soil erosion; Volcanoes; Forest fires; Sea salt crystals	Asthma; Lung cancer; Cardiovascular problems
Nitrogen Dioxide (NO2)	Reddish-brown coloured gas with a distinct odour	Road transport; Power generation plants; Fossil fuels – extraction & distribution; Petroleum refining	No natural sources, although nitric oxide (NO) can form in soils	Pulmonary oedema; Various environmental impacts e.g. acid rain

Air Quality Strategy

The UK Government and the devolved administrations published the latest Air Quality Strategy for England, Scotland, Wales and Northern Ireland on 17 July 2007[3]. The Strategy provides an over-arching strategic framework for air quality management in the UK.

The Air Quality Strategy guides this assessment by providing national air quality objectives, established by the UK government as a benchmark for human health. These include multiple gasses and particulates. Relevant to this assessment this includes NO2, PM10, and PM2.5. These relevant pollutants can be seen via Table 2.

[3] The Air Quality Strategy for England, Scotland, Wales and Northern Ireland, Department for Environment, Food and Rural Affairs in partnership with the Scottish Executive, Welsh Assembly Government and Department of the Environment Northern Ireland, July 2007

Table 2 – UK Air Quality Objectives for Nitrogen Dioxide and Particulate Matter

Pollutant	Objective	Concentration measured as
Particles (PM10)	50µg/m3 not to be exceeded more than 35 times a year	24 hour mean
	40µg/m3	Annual mean
Particles (PM2.5)	25µg/m3 (except Scotland)	Annual Mean
Nitrogen Dioxide (NO2)	200µg/m3 not to be exceeded more than 18 times a year	1 hour mean
	40µg/m3	Annual mean

The objectives for PM2.5 were introduced by the Government in 2010. These are not included in regulations within the Air Quality Strategy as they are only present in a few localised hotspot areas. Where background concentrations of PM2.5 are less than 25.0 µg/m3, these are considered well below the limit. Table 4 in this report demonstrates that this is the case. As such PM2.5 is not considered any further. *This target is superseded by the Environment Regulations below.*

The Environment (Miscellaneous Amendments) (EU Exit) Regulations 2020[4]

The Environment EU Exit Regulations (2020) is an amendment to the Air Quality Standards Regulations (2010) which reduces the threshold for PM2.5 from 25 µg/m3 to 20 µg/m3.

Clean Air Strategy

The Clean Air Strategy[5] was published in January 2019 and describes the UK Government's stance to Air Pollution. This will be underpinned by new England-wide powers to control major sources of air pollution, in line with the risk they pose to public health and the environment, plus new local powers to take action in areas with an air pollution problem. These will support the creation of Clean Air Zones to lower emissions from all sources of air pollution, backed up with clear enforcement mechanisms.

[4] https://www.legislation.gov.uk/uksi/2020/1313
[5] Clean Air Strategy 2019, Department for Environment, Food and Rural Affairs, January 2019

London Local Air Quality Management (LLAQM)

At the core of LLAQM delivery are three pollutant objectives; these are: nitrogen dioxide (NO2), particulate matter (PM10) and sulphur dioxide (SO2). All current Air Quality Management Areas (AQMAs) across the UK are declared for one or more of these pollutants, with NO2 accounting for the majority. In Greater London, AQMAs are declared for NO2 and PM10 in equal proportions. It is a statutory requirement for local authorities to regularly review and assess air quality in their area and take action to improve air quality when objectives set out in regulation cannot be met.

Environment Act 2021

The Environmental Act (2021)[6] is a bill to make provision about targets, plans and policies for improving the natural environment; for statements and reports about environmental protection; for the Office for Environmental Protection; about waste and resource efficiency; about air quality; for the recall of products that fail to meet environmental standards; about water; about nature and biodiversity; for conservation covenants; about the regulation of chemicals; and for connected purposes.

The Act will aim to clean up the country's air, restore natural habitats, increase biodiversity, reduce waste and make better use of our resources. This includes the setting of new legally binding long-term targets to improve air quality and reduce fine particulate (PM2. 5) emissions by October 2022

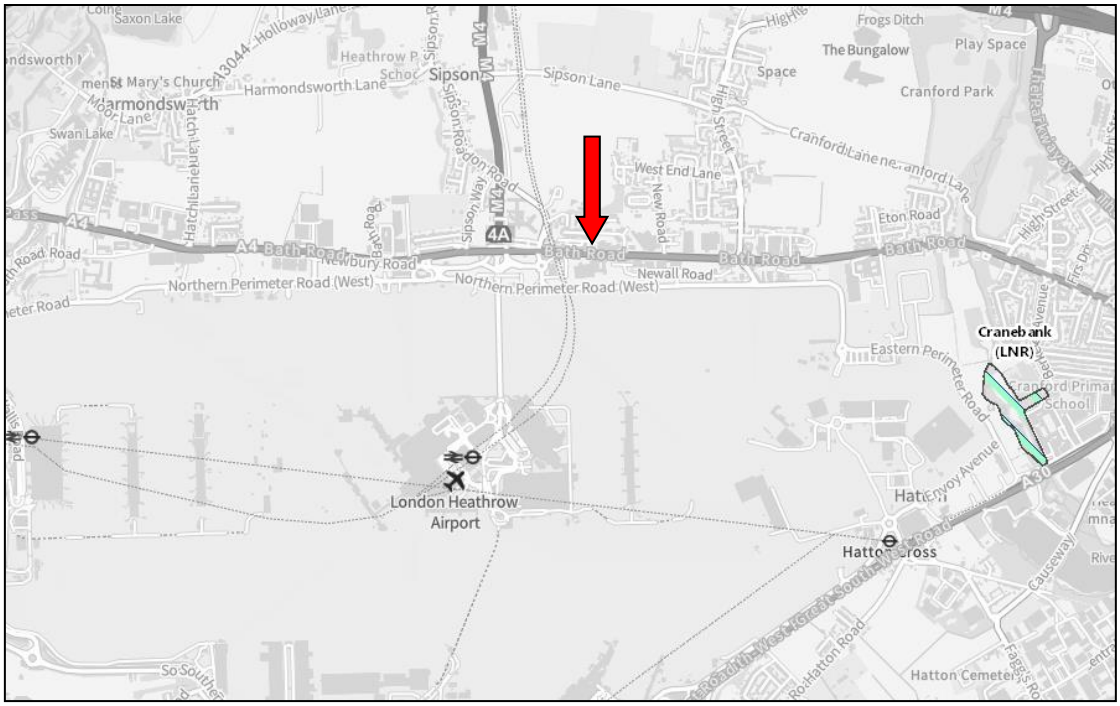
A guide to the assessment of air quality impacts on designated nature conservation sites (May 2020) Version 1.1 (IAQM).

Road transport emissions near to designated nature conservation sites are often the result of many projects and plans located some distance from the site. It is normal in an air quality assessment to include traffic growth estimates using the Department of Transport's TEMPRO36 growth factors or from a strategic transport model that explicitly includes traffic from other projects and/or plans.

A quantitative air quality assessment is required if European Sites are within 200 m of affected roads.

[6] https://www.legislation.gov.uk/ukpga/2021/30/enacted

Based on this guidance, and using the tool provided by DEFRA (Magic[7]) there are no European or UK Designations (Statutory – NNRs, Areas of Outstanding Natural Beauty, Ramsar Sites, SSSIs, SACs, SPAs) within 200m of the site at Smith's Farm. There is one designation closest to the site, and is 2100km from the site (Cranebank LNR), and as such this falls out of the acceptable distance of consideration.



[7] https://magic.defra.gov.uk/MagicMap.aspx

Planning Policy

National Planning Policy & Guidance

National Planning Policy Framework (2023)

On a national level, air quality can be a material consideration in planning decisions. The updated National Planning Policy Framework (NPPF) for England, updated in September 2023, is considered a key part of the Governments reforms to make the planning system less complex and more accessible, to protect the environment and to promote sustainable growth.

Paragraph 105 within the NPPF states that the "The planning system should actively manage patterns of growth in support of these objectives. Significant development should be focused on locations which are or can be made sustainable, through limiting the need to travel and offering a genuine choice of transport modes. This can help to reduce congestion and emissions and improve air quality and public health. However, opportunities to maximise sustainable transport solutions will vary between urban and rural areas, and this should be taken into account in both plan-making and decision-making.".

It goes on to state in paragraph 186 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".

Land-Use Planning & Development Control

In January 2017, Environmental Protection UK (EPUK) and the Institute of Air Quality Management (IAQM) produced guidance to ensure that air quality is adequately considered in the land-use planning and development control processes[8].

The guidance document is particularly applicable to assessing the effect of changes in exposure of members of the public resulting from residential and mixed-use developments, especially those within urban areas where air quality is poorer. It is also relevant to other forms of development where a proposal could affect local air quality and for which no other guidance exists.

[8] Land-Use Planning & Development Control: Planning for Air Quality. Guidance from Environmental Protection UK and the Institute of Air Quality Management for the consideration of air quality within the land-use planning and development control processes. EPUK & IAQM. January 2017

Planning Practice Guidance – Air Quality

In November 2019 the UK Government provided updated guidance[9] on how planning can take account of the impact of new development on air quality.

All development plans can influence air quality in a number of ways, for example through what development is proposed and where, and the provision made for sustainable transport. Consideration of air quality issues at the plan-making stage can ensure a strategic approach to air quality and help secure net improvements in overall air quality where possible.

This planning Practice Guidance also provides routes to the sources used throughout this report, including but not limited to:

- the UK Air Information Resource (UK-AIR), which contains information on historic and current air quality across the UK, including a GIS portal of Defra's national assessment against relevant Limit Values and air quality management areas;

- air quality management area records and modelled background pollution concentrations;

- the Clean Air Strategy sets out actions for dealing with 5 major sources of air pollution. A detailed National Air Pollution Control Programme was published by the Department for Environment, Food and Rural Affairs in April 2019.

Regional Planning Policy

The Mayor's Air Quality Strategy

In October 2010, the Mayor's Air Quality Strategy[10] was released. The strategy sets out a framework for delivering improvements to London's air quality and includes measures aimed at reducing emissions from transport, homes, offices and new developments, as well as raising awareness of air quality issues and its impact on health.

[9] https://www.gov.uk/guidance/air-quality--3
[10] Clearing the Air: The Mayor's Air Quality Strategy. October 2010

London Plan 2021 & London Planning Guidance

The London Plan Guidance (LPG)[11] and London Plan information for undertaking Air Quality Assessments (AQA) has been used as primary methodology guidance for this report. The LPG has been primarily used to aid in the Air Quality Neutral Assessment (AQNA) within this AQA., this is by new draft Air Quality Neutral Guidance. In March 2021, the new London Plan was published by the Greater London Authority[12]. The London Plan provides an overall strategic plan for London, setting out an integrated economic, environmental, transport and social framework for the development of London over the next 20–25 years. The Plan brings together the geographic and locational aspects of the Mayor's other strategies, including a range of environmental issues such as climate change (adaptation and mitigation), air quality, noise and waste.

Policy SI1 relates specifically to air quality and states the following:

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

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

1) Development proposals should not:

a) lead to further deterioration of existing poor air quality

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

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

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

a) development proposals must be at least Air Quality Neutral

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

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

11 https://www.london.gov.uk/sites/default/files/air_quality_neutral_lpg_-_consultation_draft_0.pdf
12 https://www.london.gov.uk/what-we-do/planning/london-plan/new-london-plan/publication-london-plan

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 will achieve this.

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

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

Sustainable Design and Construction SPG

The Greater London Authority (GLA) released the "Sustainable Design and Construction" SPG in July 2014[13]. The SPG aims to support developers, local planning authorities and neighbourhoods to achieve sustainable development. It provides guidance on to how to achieve the London Plan objectives effectively, supporting the Mayor's aims for growth, including the delivery of housing and infrastructure.

[13] Sustainable Design and Construction SPG. Greater London Authority, July 2014

Local Planning Policy

Hillingdon Local Plan (2012)

Policy EM8: Land, Water, Air and Noise

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 the 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 Actions 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.

Assessment Method

Construction Phase

Based on the "Control of Dust and Emissions during Construction and Demolition" SPG discussed in the previous section, the main air quality impacts that may arise during construction activities are:

- Dust deposition, resulting in the soiling of surfaces;
- Visible dust plumes, which are evidence of dust emissions;
- Elevated PM10 concentrations, as a result of dust generating activities on site; and
- An increase in concentrations or airborne particles and nitrogen dioxide due to exhaust emissions from diesel powered vehicles and equipment on site.

In relation to the most likely impacts, the guidance states the following:

"The most common impacts are dust soiling and increased ambient PM10 concentrations due to dust arising from activities on the site. Dust soiling will arise from the deposition of particulate matter in all size fractions.

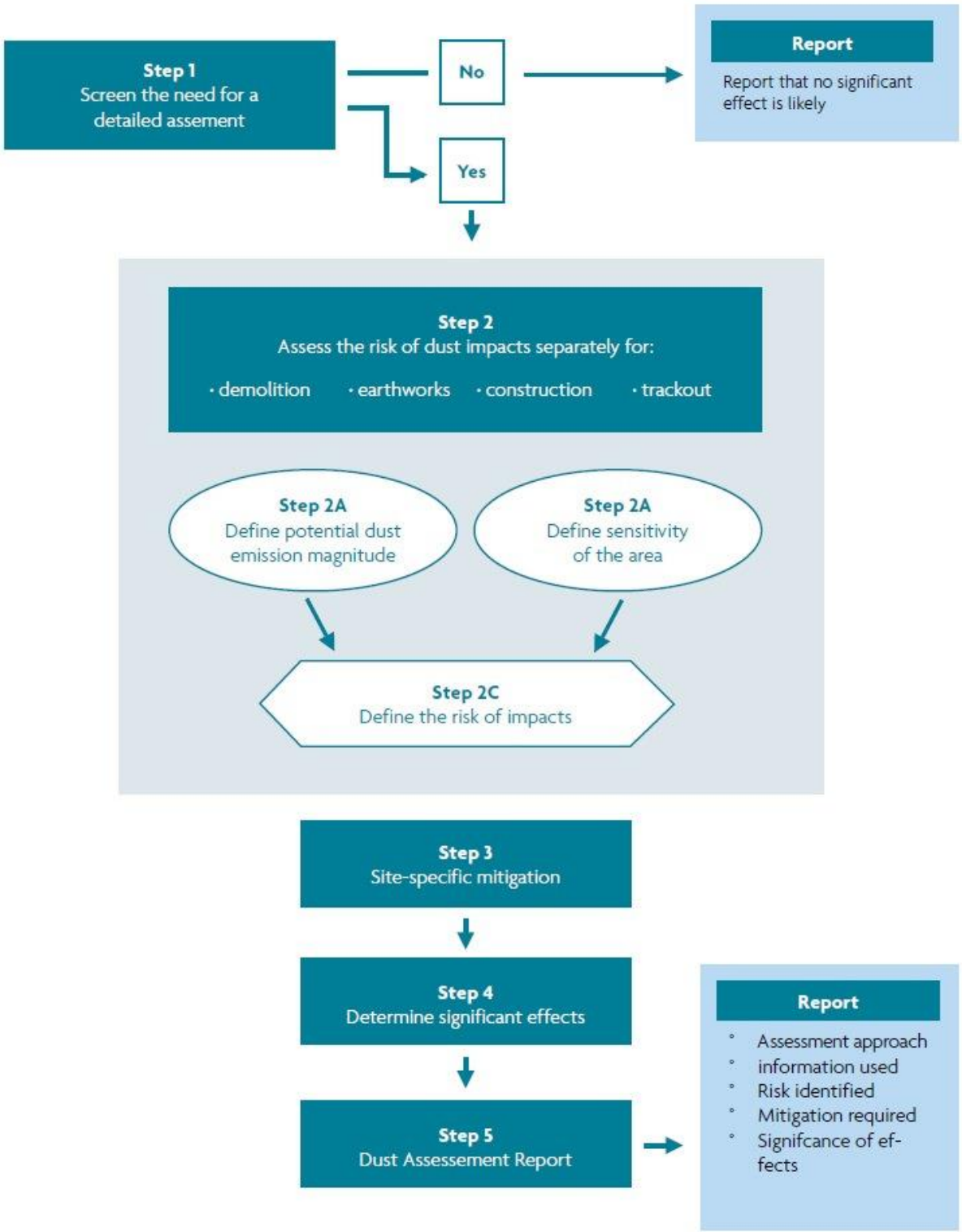
Experience of assessing the exhaust emissions from on-site plant (also known as non-road mobile machinery or NRMM) and site traffic suggests that they are unlikely to make a significant impact on local air quality, and in the vast majority of cases they will not need to be quantitatively assessed".

The guidance continues by providing an assessment procedure. This includes sub-dividing construction activities into four types to reflect their different potential impacts. These are as follows:

- Demolition;
- Earthworks;
- Construction; and
- Track out.

With regards to the proposed development the potential for dust emissions is assessed for each activity that is likely to take place. The assessment procedure assumes no mitigation measures are applied. The conditions with no mitigation thus form the baseline or "do- nothing" situation for a construction site. The assessment procedure uses the steps provided in the guidance and summarised in Figure 1.

Figure 1 - Dust Assessment Procedure



Operational Phase (Traffic Emissions)

Modelled Scenarios

Two scenarios have been modelled as part of this assessment. These are as follows:

- **Scenario 1 (2022)** – existing levels of air quality / model verification (baseline); and
- **Scenario 2 (2027)** – future impact of traffic emissions on the proposed development i.e., introduction of new exposure.

This **2027** year includes two further scenarios of

i) 'Do nothing' (no modelled future emissions from proposed development) and
ii) 'Do something' (modelled future emissions from proposed development).

Emission Factors

Defra and the Devolved Administrations have provided an updated Emission Factors Toolkit (Version 11) which incorporates updated NOx emissions factors and vehicle fleet information[14]. These emission factors have been integrated into the latest ADMS-Roads modelling software.

Traffic Data

Baseline traffic flows along the local roads are available from the Department for Transport (DfT)[15]. Projection of traffic data has been undertaken using growth factors specific to the London Borough of Hillingdon, obtained from TEMPro[16]. The projected flow rates are provided in Table 3. It is assumed that the percentage HDV and speed will remain unchanged in future years.

The modelled speeds have been derived from the London Atmospheric Emissions Inventory (LAEI)[17], specifically for major road networks and local roads. However, where a link approaches a junction a speed of 20 kph has been modelled in order to represent queuing traffic at a junction.

Data from the junction Cranford lane ended in 2019. As such, this was projected from 2019 to 2022, and then following the same methodology as above, projected to 2027.

[14] https://laqm.defra.gov.uk/review-and-assessment/tools/emissions-factors-toolkit.html
[15] http://www.dft.gov.uk/traffic-counts/
[16] TEMPro (Trip End Model Presentation Program) version 7, Department for Transport
[17] LAEI (2019), Greater London Authority

Table 3 – Annual Average Daily Traffic Flows, Percentage HDV and Speeds for Modelled Roads

Link Name	AADT 2022	AADT 2027	AADT 2027 - DS	HDV (%)	Speed (kph)
A408	6503	6731	6736	1.49	32
Cranford Lane	2915	3018	3022	0.49	32
Faggs Road	26643	27578	27583	5.59	32
A30	38834	40197	40201	5.21	32
A437	15900	16458	16462	1.02	32
A4 Bath Road	16180	16748	16752	2.40	32
M4 East	149022	154253	154257	5.26	32
M4 (Section south)	54931	56859	56863	1.16	32

Street Canyons

The term street canyon generally refers to a relatively narrow street with buildings lined up continuously along both sides, this requires facades taller than the width of streets with no gaps for a continued period. Street canyons can cause an elevation of traffic-borne pollutants as they disrupt the dispersion of the air column and trap pollutants. Street canyons have not been modelled as part of this assessment. Furthermore, street canyons are not present at this local geographic area. Street Canyons are not present at the site.

Background Concentrations

Background NOx, NO2 and PM10 concentrations have been obtained from Defra[18] and can be seen in Table 4.

Table 4 – Background NOx, NO2, PM10 and PM2.5 Concentrations

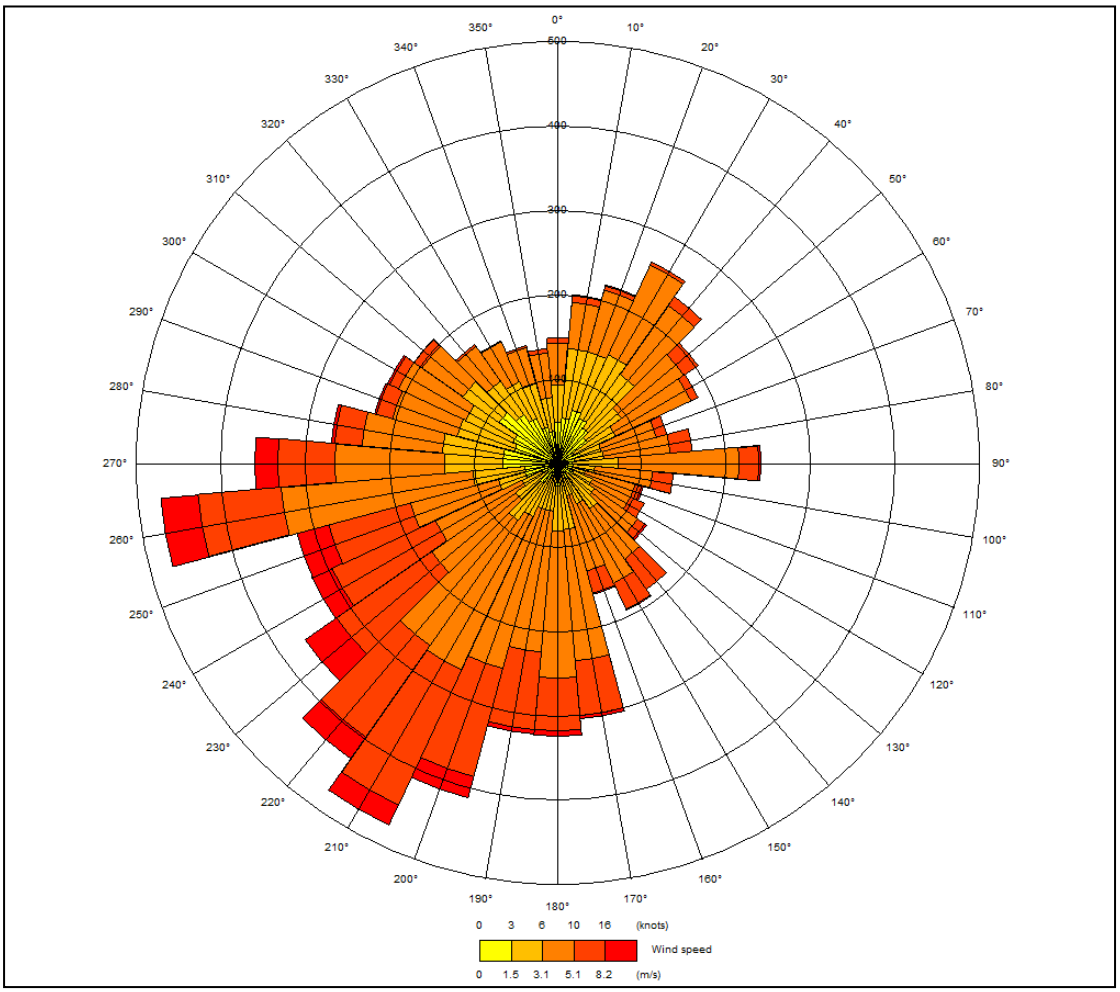
Location	Pollutant	2022
Proposed Development	NO2	34.05
	NOx	62.30
	PM10	15.63
	PM2.5	9.32

[18] https://uk-air.defra.gov.uk/data/gis-mapping/

Meteorological Data

Hourly sequential meteorological data from Heathrow Airport meteorological station has been used. Wind speed and direction data from the Heathrow Airport meteorological station has been plotted as a wind rose in Figure 2.

Figure 2 – Wind Speed and Direction Data, Heathrow Airport (2022)



Model Output

NOx/NO2 Relationship

Following recent evidence that shows the proportion of primary NO2 in vehicle exhaust has increased[19]. As such, a new (version 8.1) NOx to NO2 calculator has been devised[20]. This new calculator has been used to determine NO2 concentrations for this assessment, based on predicted NOx concentrations using ADMS-Roads. Converted NO2 concentrations are initially compared to local monitoring data in order to verify the model output. If the model performance is considered unacceptable, then the NOx concentrations are adjusted before conversion to NO2.

Model Verification

Hillingdon Council undertakes monitoring of NO2 at multiple automatic and non-automatic monitoring stations within the borough. The most local of these have been used for verification. Monitored concentrations from this site have been used for the purposes of model verification during the baseline year (2022), however, these monitoring stations only have data from 2021. As the general trend of Air Quality in the region is improving, these monitoring location readings are worst-case, but still the most suitable for this assessment as they are on the same road. The locations of these sites are provided in Table 5.

Table 5 – Modelled Verification Locations

Monitoring ID	Location
LBHBR (Automatic Monitor)	Bath Road
HILL41 (Diffusion Tube)	Bath Road

Receptor Locations

Several receptors have been chosen representing the different extents of the proposed development. The location of these receptors, together with their height (above ground level) is provided in Table 6 and represented in Figure 3.

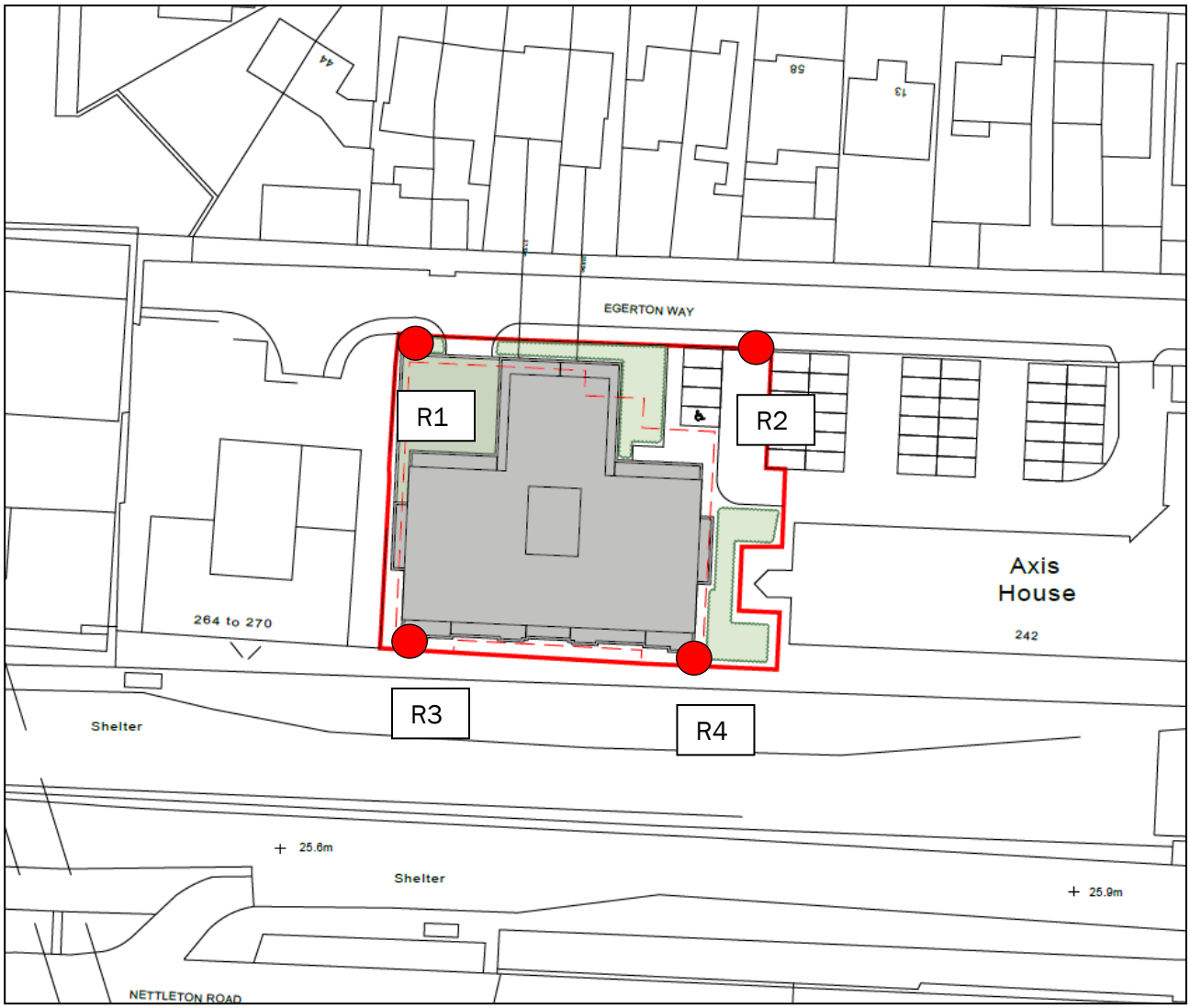
Proposed receptors above the second floor have not been modelled as predicted concentrations at the lower floors will provide a worst-case assessment, this is due to the dispersion of air polluting particles as elevation increases.

[19] Trends in Primary Nitrogen Dioxide in the UK, Air Quality Expert Group, 2007
[20] https://laqm.defra.gov.uk/documents/Updated_NOx_from_NO2_Calculator_fno2_v8.1.pdf: https://laqm.defra.gov.uk/review-and-assessment/tools/background-maps.html#NOxNO2calc.

Table 6 – Modelled Receptor Locations

AQA ID	Height (m)	Description
R1 – R1.1 – R1.2	1.5, 4.5, 7.5	Ground Floor, First Floor, Second Floor
R2 – R2.1 – R2.2		
R3 – R3.1 – R3.2		
R4 – R4.1 – R4.2		

Figure 3 - Modelled (Proposed) Receptor Locations



Where applicable receptors are projected vertically. These receptors are marked red on Figure 3 above; therefore, one red marker may represent more than one point along a vertical plane.

The figure below displays the existing sensitive offsite receptors relative to the site. **As the development will be electrically heated, this presents a low-risk from development for NO2 priority on off-site receptors.**

Figure 4 – Offsite Receptor Locations

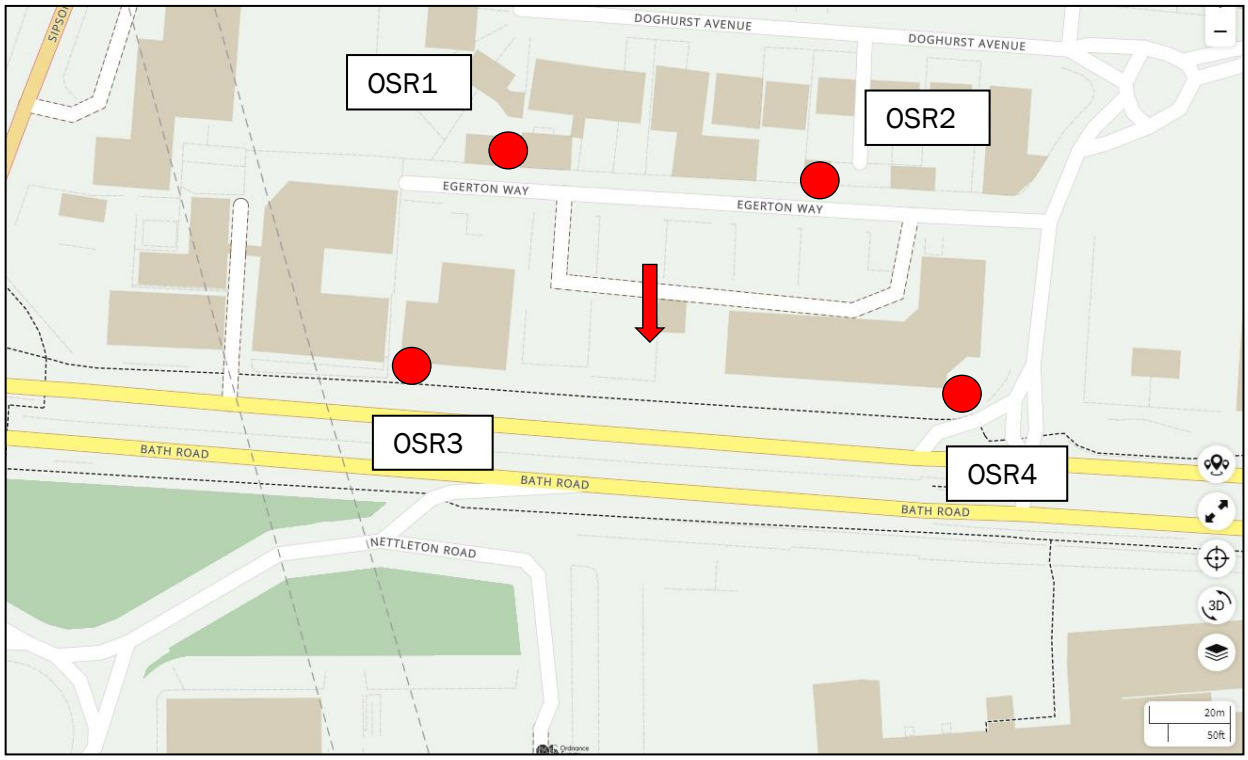


Table 7 – Modelled Receptor Locations

AQA ID	Height (m)	Description
OSR1 – OSR1.1 – OSR1.2	1.5, 4.5, 7.5	Ground Floor, First Floor, Second Floor
OSR2 – OSR2.1 – OSR2.2		
OSR3 – OSR3.1– OSR3.2		
OSR4 – OSR4.1– OSR4.2		

Significance Criteria

Construction Phase

The risk of dust arising in sufficient quantities to cause annoyance and/or health and/or ecological impacts should be determined using four risk categories: negligible, low, medium and high risk. Based on:

- the scale and nature of the works, which determines the potential dust emission magnitude as small, medium or large (see Table 8); and
- the sensitivity of the area to dust impacts, which is defined as low, medium or high sensitivity (see Table 9).

These two factors are combined to determine the risk of dust impacts with no mitigation applied. The risk category assigned to the development can be different for each of the four potential activities (demolition, earthworks, construction and trackout).

Table 8 – Dust Emission Magnitude

Activity	Dust Emission Class		
	Large	Medium	Small
Demolition	Total building volume >50,000 m3, potentially dusty construction material (e.g. concrete), on-site crushing and screening, demolition activities >20 m above ground level	Total building volume 20,000 – 50 000m3, potentially dusty construction material, demolition activities 10-20 m above ground level	Total building volume <20,000 m3, construction material with low potential for dust release (e.g. metal cladding or timber), demolition activities <10m above ground, demolition during wetter months
Earthworks	Total site area >10,000 m2, 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	Total site area 2,500 – 10,000 m2, moderately dusty soil type (e.g. silt), 5-10 heavy earth moving vehicles active at any one time, formation of bunds 4 m - 8 m in height, total material moved 20,000 tonnes – 100,000 tonnes	Total site area <2,500 m2, 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 <10,000 tonnes, earthworks during wetter months
Construction	Total building volume >100,000 m3, piling, on site concrete batching; sandblasting	Total building volume 25,000 m3 – 100,000 m3, potentially dusty construction material (e.g. concrete), piling, on site concrete batching	Total building volume <25,000 m3, construction material with low potential for dust release (e.g. metal cladding or timber)
Track out	>50 HDV (>3.5t) trips in any one day, potentially dusty surface material (e.g. high clay content), unpaved road length >100 m	10 – 50 HDV (>3.5t) trips in any one day, moderately dusty surface material (e.g. high clay content), unpaved road length 50m – 100 m;	<10 HDV (>3.5t) trips in any one day, surface material with low potential for dust release, unpaved road length <50 m.

Table 9 – Sensitivity of the Area to Dust Soiling Effects on People and Property, and to Human Health Impacts

Sensitivity of the Area to Dust Soiling Effects					
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

Sensitivity of the Area to Human Health Effects							
Receptor Sensitivity	**Annual Mean PM10**	**Number of Receptors**	**Distance from the 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	-	>10	High	Medium	Low	Low	Low
	-	1-10	Medium	Low	Low	Low	Low
Low	-	>1	Low	Low	Low	Low	Low

Table 10 – Risk of Dust Impacts

Construction Activity	**Sensitivity of Area**	**Dust Emission Magnitude**		
		Large	**Medium**	**Small**
Demolition	High	High Risk	Medium Risk	Medium Risk
	Medium	High Risk	Medium Risk	Low Risk
	Low	Medium Risk	Low Risk	Negligible
Earthworks	High	High Risk	Medium Risk	Low Risk
	Medium	Medium Risk	Medium Risk	Low Risk
	Low	Low Risk	Low Risk	Negligible
Construction	High	High Risk	Medium Risk	Low Risk
	Medium	Medium Risk	Medium Risk	Low Risk
	Low	Low Risk	Low Risk	Negligible
Track out	High	High Risk	Low Risk	Low Risk
	Medium	Medium Risk	Low Risk	Negligible
	Low	Low Risk	Low Risk	Negligible

Operational Phase

The meaning of the results of the above emissions will be determined by comparing the predicted results to the Air Pollution Exposure Criteria (APEC) detailed in the Air Quality and Planning Guidance written by the London Air Pollution Planning and the Local Environment (APPLE) working group[21]. This APEC table is provided below. Where results breach or fall under certain APEC categorisations, the explanation and recourse for these is listed alongside within Table 11.

Table 11 – Air Pollution Exposure Criteria (APEC)

APEC Category	NO_2	PM_{10}	Recommendations
A	>5% below national annual mean objective	>5% below national annual mean objective >1-day less than national 24-hour objective	No air quality grounds for refusal; however, mitigation of any emissions should be considered.
B	Between 5% below or above national annual mean objective	Between 5% above or below national annual mean objective Between 1-day above or below national 24-hour objective	May not be sufficient air quality grounds for refusal, however appropriate mitigation must be considered
C	>5% above national annual mean objective	>5% above national annual mean objective >1-day more than national 24-hour objective	Refusal on air quality grounds should be anticipated, unless the Local Authority has a specific policy enabling such land use and ensure best endeavours to reduce exposure are incorporated

Furthermore, the guidance released by Environmental Protection UK also provides steps for a Local Authority to follow in order to assess the significance of air quality impacts of a development proposal.

[21] Air Quality and Planning Guidance, written by the London Air Pollution Planning and the Local Environment (APPLE) working group, January 2007

Impact from Construction Activities

The assessment of construction activities has focused on demolition, earthworks, construction and track out activities at the site. Using the criteria provided in Table 8 the dust emission magnitude for each activity is as follows:

- Demolition = N/A
- Earthworks = Small
- Construction = Medium
- Track out = Small

The sensitivity of the surrounding area to dust soiling and human health (Table 12) is then defined based on the criteria in Table 9, which includes the number of highly sensitive receptors that fall within a certain distance of the proposed construction phase. The annual mean PM10 concentration of the area is also a determinant of sensitivity.

Table 12 – Overall Sensitivity of the Surrounding Area

Potential Impact	Sensitivity of the Surrounding Area			
	Demolition	Earthworks	Construction	Trackout
Dust Soiling	HIGH	HIGH	HIGH	HIGH
Human Health	LOW	LOW	LOW	LOW

The dust emission magnitudes and sensitivity of the surrounding area are combined to determine the risk of dust impacts with no mitigation applied. These are summarised in Table 13.

Table 13 – Summary of Dust Risk

Potential Impact	Risk			
	Demolition	Earthworks	Construction	Trackout
Dust Soiling	N/A	LOW	MEDIUM	LOW
Human Health	N/A	NEGLIGIBLE	LOW	NEGLIGIBLE

It should also be noted that the likelihood of an adverse impact occurring is correlated to wind speed and wind direction. As such, unfavourable wind speeds and wind directions must occur at the same time as a dust generating activity in order to generate an adverse impact. The overall impacts also assume that the dust generating activities are occurring over the entirety of the site meaning that as an activity moves further away from a potential receptor the magnitude and significance of the impact will be further reduced.

Impact of Vehicle Emissions

Model Verification

Based on the method and guidance provided by the London Local Air Quality Management Technical Guidance TG(19) the results of the ADMS model (after NOx to NO2 conversion) have been modelled against existing monitored data from the verified locations via Hillingdon Council.

Table 14 – Comparison of Modelled and Monitored NO2 Concentrations (µg/m3), 2021

Verification Location	Modelled Concentration	Monitored Concentration	Difference [(modelled - monitored)/ monitored] x100
LBRBR	35.62	34	4.65%
HILL41	35.27	32.9	7.0%

As the Technical Guidance (LLAQM.TG19) states, to provide a greater confidence in the accuracy of the model and its predictions the majority of results should be within ±25% (ideally ±10%) of the monitored concentrations. As can be seen from Table 14 it can be stated that the model provides model confidence within the ideal range of ±10%.

Nitrogen Dioxide

Predicted annual mean concentrations for NO2 in **2022** and **2027** are provided in Table 15. As mentioned in Section 4 NO2 concentrations have been calculated from the predicted NOx concentrations using the latest NOx-NO2 conversion spreadsheet available from the Air Quality Archive.

Table 15 – Predicted NO2 Concentrations, Annual Mean (µg/m3)

Receptor ID	2022			2027			2027 - DS		
	GF	1st	2nd	GF	1st	2nd	GF	1st	2nd
R1 – R1.1 – R1.2	37.23	37.18	37.08	37.27	37.22	37.12	37.28	37.22	37.13
R2 – R2.1 – R2.2	37.06	37.02	36.94	37.1	37.05	36.98	37.1	37.06	36.98
R3 – R3.1 – R3.2	**38.26**	37.87	37.38	**38.34**	37.94	37.43	**38.35**	37.95	37.44
R4 – R4.1 – R4.2	**38.08**	37.73	37.29	**38.15**	37.79	37.33	**38.16**	37.8	37.34
Objective	40								

Table 16 – Predicted NO2 Concentrations, Annual Mean (µg/m3) (***Off-Site***)

Receptor ID	2022			2027			2027 - DS		
	GF	1st	2nd	GF	1st	2nd	GF	1st	2nd
OSR1 – OSR1.1 – OSR1.2	36.9	36.87	36.83	36.93	36.9	36.86	36.93	36.91	36.86
OSR2 – OSR2.1 – OSR2.2	37.28	37.23	37.14	37.33	37.28	37.19	37.33	37.28	37.19
OSR3 – OSR3.1 – OSR3.2	37.47	37.31	37.09	37.52	37.36	37.13	37.52	37.36	37.13
OSR4 – OSR4.1 – OSR4.2	38.02	37.8	37.48	38.09	37.87	37.53	38.09	37.87	37.54
Objective	40								

The ADMS predictions for annual mean NO2 concentrations in 2022 and 2027 indicate that the annual mean objective (40 µg/m3) would be breached (APEC-B) at two receptors for each scenario of the Bath Road facing facades of the location, all other receptors at every floor level are at APEC-A categorisation.

Nitrogen dioxide has an additional hourly objective of 200 µg/m3. Which has an annual limit of 18. This hourly mean concentration has not been calculated directly by ADMS Roads. This is as a result of an evaluation of continuous monitoring data from across the UK that revealed that the relationship between the annual mean and hourly mean NO2 concentrations was not consistent and weak. Research undertaken in 2003[22] has indicated that the hourly NO2 objective is unlikely to be exceeded at a roadside location where the annual mean NO2 concentration is less than 60 µg/m3. Given that predicted NO2 concentrations in 2022 and 2027 are below 60 µg/m3 at all modelled receptors the likelihood of the short-term objective for NO2 being exceeded is considered low.

Particulate Matter (PM10)

Predicted annual mean concentrations for PM10 in 2022 and 2027 are provided in Table 17.

Table 17 – Predicted PM10 Concentrations, Annual Mean (µg/m3)

Receptor ID	2022			2027			2027 - DS		
	GF	1st	2nd	GF	1st	2nd	GF	1st	2nd
R1 – R1.1 – R1.2	15.98	15.97	15.94	15.99	15.98	15.95	15.99	15.98	15.95
R2 – R2.1 – R2.2	15.94	15.92	15.90	15.95	15.93	15.91	15.95	15.94	15.91
R3 – R3.1 – R3.2	16.28	16.17	16.03	16.30	16.19	16.04	16.31	16.19	16.04
R4 – R4.1 – R4.2	16.23	16.13	16.00	16.25	16.15	16.02	16.25	16.15	16.02
Objective	40								

[22] Analysis of Relationship between 1-Hour and Annual Mean Nitrogen Dioxide at UK Roadside and Kerbside Monitoring Sites, Laxen and Marner, 2003

Table 18 – Predicted PM10 Concentrations, Annual Mean (µg/m3) (***Off-Site***)

Receptor ID	2022			2027			2027 - DS		
	GF	1st	2nd	GF	1st	2nd	GF	1st	2nd
OSR1 – OSR1.1 – OSR1.2	15.89	15.88	15.87	15.90	15.89	15.88	15.90	15.89	15.88
OSR2 – OSR2.1 – OSR2.2	15.99	15.98	15.95	16.00	15.99	15.97	16.00	15.99	15.97
OSR3 – OSR3.1 – OSR3.2	16.06	16.01	15.95	16.07	16.03	15.96	16.07	16.03	15.96
OSR4 – OSR4.1 – OSR4.2	16.20	16.14	16.05	16.22	16.16	16.07	16.22	16.16	16.07
Objective	40								

The ADMS predictions for annual mean PM10 concentrations in 2022 and 2027 indicate that the annual mean objective (40 µg/m3) would be achieved at all the modelled receptor locations.

In addition, the maximum number of days when PM10 concentrations are more than 50 µg/m3 is 0, which is less than the limit of 35 allowed by regulations.

Table 19 – Predicted PM2.5 Concentrations, Annual Mean (µg/m3)

Receptor ID	2022			2027			2027 - DS		
	GF	1st	2nd	GF	1st	2nd	GF	1st	2nd
R1 – R1.1 – R1.2	9.52	9.51	9.50	9.53	9.52	9.50	9.53	9.52	9.50
R2 – R2.1 – R2.2	9.49	9.49	9.48	9.50	9.49	9.48	9.50	9.49	9.48
R3 – R3.1 – R3.2	9.69	9.63	9.55	9.70	9.64	9.56	9.71	9.64	9.56
R4 – R4.1 – R4.2	9.66	9.61	9.53	9.67	9.62	9.54	9.68	9.62	9.54
Objective	20								

Table 20 – Predicted PM2.5 Concentrations, Annual Mean (µg/m3) (***Off-Site***)

Receptor ID	2022			2027			2027 - DS		
	GF	1st	2nd	GF	1st	2nd	GF	1st	2nd
OSR1 – OSR1.1 – OSR1.2	9.47	9.47	9.46	9.47	9.47	9.46	9.47	9.47	9.46
OSR2 – OSR2.1 – OSR2.2	9.53	9.52	9.51	9.53	9.53	9.51	9.53	9.53	9.51
OSR3 – OSR3.1 – OSR3.2	9.56	9.54	9.50	9.57	9.55	9.51	9.57	9.55	9.51
OSR4 – OSR4.1 – OSR4.2	9.65	9.61	9.56	9.66	9.62	9.57	9.66	9.62	9.57
Objective	20								

The ADMS predictions for annual mean PM2.5 concentrations in 2022 and 2027 indicate that the annual mean objective (20 µg/m3) would be achieved at all the modelled receptor locations. This is in line with the Environmental Act 2021.

AIR QUALITY NEUTRAL ASSESSMENT

Being "air quality neutral" assesses a development's energy and transport impacts to ensure that new developments do not lead to further deterioration of existing poor air quality by heating choices or increasing traffic flow to an extent that would create air pollution issues to local residents.

This air quality neutral assessment has followed the methodology outlined in the London Plan Guidance[23] as this provides up to date guidance on assessing a developments Air Quality Neutral status. Within these documents, benchmarks have been provided in relation to building and transport emissions, together with a methodology for calculating the building and transport related emissions for a particular development.

Building Emissions

The Building Emissions Benchmarks (BEBs) for the land use category applicable to residential properties are provided in Table 21. Emissions of PM10 and PM2.5 have not been considered as oil and/or solid fuel are not proposed to be used at the development. The development will be using Electric Heating and therefore will have an overall NOx and PM10 local contribution of zero. This is because these systems to not produce local NOx or PM10 emissions. **As such these tables have not been produced as the development passes BEBs by default.**

Transport Emissions

The Transport Emissions Benchmarks (TEBs) are calculated by multiplying the relevant tip rate (by location) by the number of residential properties. This is summarised in Table 21.

Table 21 – Transport Emissions Benchmarks

Land use	No of Dwellings / Area	Benchmark Trip Rate	Total Benchmark Trip Rate
C3	60	447	26,820

A trip rate has been provided for this development via the Transport Statement produced by Lanmor Consulting (2023) and as such a trip rate of has been produced. Based on this, the development would produce 105 assessable trips per day, and 38325 per year, and would therefore be over the Benchmark Trip Rate per year of 16,820.

23 https://www.london.gov.uk/sites/default/files/air_quality_neutral_lpg_-_consultation_draft_0.pdf

Conclusions

Impact from Construction Activities

A qualitative assessment of dust levels associated with the proposed development has been carried out. The impact of dust soiling and PM10 can be reduced to negligible through appropriate mitigation measures, which are listed in Table 22 and are applicable to low to medium risk sites. Implementation of these Best Practice Measures will help reduce and mitigate the impact of the construction activities.

With these mitigation measures enforced, the likelihood of nuisance dust episodes occurring at those receptors adjacent to the development are considered low. Notwithstanding this, the developer should consider the potential impact of air quality and dust on occupational exposure standards (in order to minimise worker exposure) and breaches of air quality objectives that may occur outside the site boundary. Monitoring is not recommended at this stage; however, continuous visual assessment of the site should be undertaken, and a complaints log maintained in order determine the origin of a dust nuisance. Keeping an accurate and up to date complaints log will isolate site activities to a nuisance dust episode and help prevent it from reoccurring in the future.

It is recommended at this stage that provisions are made for at least 2x MCERTs certified and calibrated dust monitors are on site during development. These should be in place for at least the construction phase. Based on the results of these monitors it may be determined that these are not needed during fit-out as the highest dust-generating activities would have ended.

These should be located along the transect of the local wind direction and placed near sensitive receptors nearby to the development if possible – as per GLA guidance on dust monitoring.

Table 22 – Mitigation of Construction Activities

Construction Activity	Mitigation Measures
Site Management	Display the name and contact details of person(s) accountable for air quality pollutant emissions and dust issues on the site boundary.
	Display the head or regional office contact information.
	Record and respond to all dust and air quality pollutant emissions complaints.
	Make a complaints log available to the local authority when asked.
	Carry out regular site inspections to monitor compliance with air quality and dust control procedures, record inspection results, and create an inspection log available to the local authority when asked.
	Increase the frequency of site inspections by those accountable for dust and air quality pollutant emissions issues when activities with a high potential to produce dust and emissions and dust are being carried out, and during prolonged dry or windy conditions.
	Record any exceptional incidents that cause dust and air quality pollutant emissions, either on or off the site, and the action taken to resolve the situation is recorded in the logbook.
Preparing and Maintaining the Site	Plan site layout: machinery and dust causing activities should be located away from receptors.
	Put in place real-time dust and air quality pollutant monitors across the site and ensure they are checked regularly.
	Fully enclosure site or specific operations where there is a high potential for dust production and the site is active for an extensive period.
	Keep site fencing, barriers and scaffolding clean using wet methods.
	Erect solid screens or barriers around dust activities or the site boundary that are, at least, as high as any stockpiles on site.
	Avoid site runoff of water or mud.
Operating Vehicle / Machinery and Sustainable Travel	Ensure all on-road vehicles comply with the requirements of the London Low Emission Zone.
	Ensure all non-road mobile machinery (NRMM) comply with the standards set within this guidance.
	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 possible.
	Implement a Travel Plan that supports and encourages sustainable travel (public transport, cycling, walking, and car-sharing).
Operations	Only use cutting, grinding or sawing equipment fitted or in conjunction with suitable dust suppression techniques such as water sprays or local extraction, e.g. suitable local exhaust ventilation systems.
	Ensure an adequate water supply on the site for effective dust/particulate matter mitigation (using recycled water where possible).
	Use enclosed chutes, conveyors and covered skips (if present on site)
	Minimise drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment and use fine water sprays on such equipment wherever appropriate (if present on site)
Waste Management	Reuse and recycle waste to reduce dust from waste materials
	Avoid bonfires and burning of waste materials.

Impact of Vehicle Emissions

The predicted concentrations of PM10 in all modelled years are below the relevant objectives. Predicted concentrations at all the modelled receptors fall within APEC Category A, which states that there are "no air quality [PM10] grounds for refusal, however, mitigation of any emissions should be considered". Overall, air quality (PM10) is a low priority consideration at the modelled locations in each of the modelled years.

The ADMS predictions for annual mean NO2 concentrations in 2022 and 2027 indicate that the annual mean concentration would be of APEC-B categorisation and therefore mitigation should be considered.

Building Mitigation

Based on the outcome of this assessment air quality mitigation measures would be required in order to mitigate the impact of poor air quality (NO2 & PM10) at the residential units. This is especially pertinent given the locations proximity to Heathrow Airport.

As such, the following design mitigations options for the development to protect the newly exposed residents of this development is described below.

The Institute of Air Quality Management (IAQM) issued a position statement in relation to the mitigation of development air quality impacts. Based on this statement, the IAQM recommends that the following basic hierarchy be used for mitigating the operational air quality impacts associated with the particular development:

1. Preference should be given to preventing or avoiding exposure/impacts to the pollutant in the first place by eliminating or isolating potential sources or by replacing sources or activities with alternatives.

2. Reduction and minimisation of exposure/impacts should next be considered, once all options for prevention/avoidance have been implemented so far as is reasonably practicable (both technically and economically);

3. Offsetting a new development's air quality impact by proportionately contributing to air quality improvements elsewhere (including those identified in air quality action plans and low emission strategies) should only be considered once the solutions for preventing/avoiding, and then for reducing/minimising.

As such it is a recommendation of this report that **each dwelling** is to be fitted with individual mechanical ventilation with heat recovery units (MVHR), in line with recommendation 2. **These MVHR units are to be fitted with Nitrogen (NO2 & NOx) filters.**

An example of such a Nitrogen filter is the Nuaire IAQ-VALVE. This solution enhances a standard MVHR supply valve with a small but powerful carbon filter, removing up to 91% of Nitrogen Dioxide and other pollutants. These filters will ensure that concentrations of NO2 at the development will be reduced for residents and occupiers of the lower floors.

With opening windows, the developer should advise the future occupants that their health could be at risk due to relatively high levels of air pollution in the area. Such exposure can be avoided if windows are closed when the local roads are heavily trafficked, such as during the morning and afternoon rush hours, or during other high polluting episodes (e.g. long periods of high pressure) and that these are the periods when the mechanical ventilation system could be used.

Furthermore, keeping the windows closed whenever a unit is unoccupied will also reduce the likely exposure, especially if the windows are left open when the unit is empty during periods of higher vehicle flows.

Air Quality Neutral Assessment

The air quality neutral assessment has concluded that the proposed development will meet building and transport emission benchmarks, in line with the most up-to-date London Planning Guidance.

The Air Quality Neutral Assessment has revealed that the property will not reach Transport Emission Benchmarks. In line with the associated Travel Plan, the development is already pursuing mitigation measures that would otherwise be appropriate for not meeting the TEBs.

These include:

- 20% EVCP Contribution (Electric Vehicle Charging Points – Passive and / or active)
- Sustainable Travel Plan with SOV targets
- Appointment of TPC
- Ensure cycle storage is in place prior to occupation;
- Erect notice board in reception area prior to occupation;
- Provide safe network of footways within the development to cycle store.
- Provide travel packs for residents on occupation;
- Encourage bicycle user group;
- Encourage walking user group;
- Provide information on safe walking routes as well as local street maps highlighting direct routes to public transport and cycle routes and
- Provision of up-to-date public transport timetables and bus company contact information to all residents.
- TPC Offering Personal Travel Planning
- The TPC will liaise with resident to discuss transport related issues, ideas and initiatives;
- Provide links to journey planning website to allow resident to plan ahead for their proposed journeys.

End of Report
DJC Housing Consultants Ltd
October 2023

D J C Housing Consultants Ltd