



AIR QUALITY ASSESSMENT

**PROVEWELL LIMITED
SEVEN SISTERS - WAREHOUSE LIVING, HARINGEY**

BY

AIR QUALITY SOLUTIONS LTD

PROJECT CODE: AQ14780

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STATUS: REV 1

ISSUE DATE: 22/02/2023

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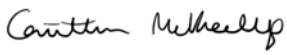
Issue / Revision	Issue	Revision 1	Revision 2
Remarks	Air Quality Assessment	Air Quality Assessment	
Date	16/11/2022	22/02/2023	
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Project Number	AQ14780	AQ14780	

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EXECUTIVE SUMMARY

Air Quality Solutions (AQS) were commissioned by Kempton Investments Limited to undertake an Air Quality Assessment in support of a proposed mixed use scheme development at Warehouse District, Haringey.

The proposals comprise the redevelopment of the site to accommodate a mixed development comprising two new warehouse living buildings and associated commercial development

Due to the scale of the development, there is potential for the proposals to cause impacts at sensitive receptors during the construction and operational phases. Additionally, given the proximity to the A503 there is potential to expose future site users to elevated pollutant concentrations. An Air Quality Assessment is therefore required in order to determine baseline conditions at the site, assess site suitability for the proposed end-use and assess the potential impacts as a result of the proposed development.

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

Dispersion modelling was undertaken in order to predict annual mean pollutant concentrations across the application site to determine exposure risk to future occupiers. Results were subsequently verified using local monitoring results provided by London Borough of Haringey (LBoH).

The dispersion modelling results indicated that annual mean pollutant concentrations across the application site were below the relevant air quality objectives at proposed sensitive locations. The site is therefore considered suitable for proposed end use without the implementation of protective mitigation techniques.

The level of anticipated traffic generation from the site concluded that impacts on existing pollutant levels as a result of operational phase pollutant emissions were predicted to be **not significant** in accordance with relevant screening criteria. The use of robust assumptions, where necessary, was considered to provide sufficient results confidence for an assessment of this nature.

The London Plan states that new developments must be considered Air Quality Neutral. Pollutant emissions associated with anticipated traffic flows were compared to relevant benchmarks. Following assessment, annual pollutant transport emissions were predicted below the development specific benchmarks. Subsequently, the Proposed Development is considered Air Quality Neutral.

Based on the assessment results the site is considered suitable for the proposed end use and complies with the LBoH Local Plan, the Greater London Authority Policy and the National Planning Policy Framework.

1.0 INTRODUCTION

1.1 Background

AQS has been commissioned by Provewell Limited, hereafter referred to as “the Client” to undertake an Air Quality Assessment in support of a proposed development, comprising of the redevelopment of the site to accommodate residential development and community space alongside associated infrastructure and parking herein after referred to as the “Proposed Development”.

1.2 Site Location and Context

The application site is located in Warehouse District, Haringey at approximate National Grid Reference (NGR) 532720, 187990. Reference should be made to Figure 1 within Appendix A for a location plan.

The application site is located within Haringey Air Quality Management Area (AQMA) which has been declared due to exceedances of the annual mean Air Quality Objective (AQO) for nitrogen dioxide (NO₂). Subsequently, the Proposed Development has the potential to introduce future residential occupants into an area of elevated NO₂ and particulate matter (PM₁₀ and PM_{2.5}) concentrations, as well as to cause impacts at sensitive receptor locations during the construction and operational phases.

An Air Quality Assessment has therefore been produced to quantify annual mean NO₂, PM₁₀ and PM_{2.5} concentrations across the site to consider suitability for the proposed end-use, and to assess potential impacts as a result of the development. The assessment will be undertaken in accordance with the requirements of the National Planning Policy Framework (NPPF), the Greater London Authority (GLA) Policy and the LBoH Local Planning Policy.

1.3 Limitations

This report has been produced in accordance with AQS standard terms of engagement. AQS prepared this report solely for the use of the Client and those parties with whom a warranty agreement has been executed, or with whom an assignment has been agreed. Should any third party wish to use or rely upon the contents of the report, written approval must be sought from AQS, a charge may be levied against such approval.

2.0 LEGISLATION, GUIDANCE AND POLICY

The following legislation, guidance and policy will be considered and adhered to during the preparation of the Air Quality Assessment:

- European Union (EU) Directive 2008/50/EC;
- The NPPF, updated on 20th July 2021;
- The National Planning Practice Guidance (NPPG), relevant chapters produced on 1st November 2019;
- Section 82 of the Environment Act (Part IV), updated 9th November 2021;
- The Air Quality Strategy for England, Scotland, Wales and Northern Ireland, Department for Environment, Food and Rural Affairs (DEFRA), 2007¹;
- The Air Quality Standards (Amendment) Regulations (2016);
- London Local Air Quality Management (LLAQM) Technical Guidance 2016, LLAQM.TG(16), GLA, 2016²;
- The Control of Dust and Emissions During Construction and Demolition Supplementary Planning Guidance, GLA, 2016³;
- Land-Use Planning and Development Control: Planning for Air Quality, Environmental Protection UK (EPUK) and Institute of Air Quality Management (IAQM), January 2017⁴;
- London Councils Air Quality and Planning Guidance, London Councils, 2007⁵; and
- Air Quality Neutral (AQN) Planning Support: GLA 80371, Air Quality Consultants Ltd in association with ENVIRON UK Ltd, 2014.⁶;
- The London Plan 2021, Mayor of London, March 2021⁷;
- Haringey's Local Plan Strategic Policies 2013-2026, LBoH, March 2013⁸; and
- Haringey Development Management Development Plan Document (DPD), LBoH, July 2017⁹

2.1 UK Legislation and Guidance

The Air Quality Standards (Amendment) Regulations (2016) came into force on 31st December 2016. These Regulations amend the Air Quality Standards Regulations 2010 and transpose the EU Directive 2008/50/EC into UK law. Air Quality Limit Values (AQLVs) were published in these regulations for 7 pollutants, as well as Target Values for an additional 6 pollutants.

Part IV of the Environment Act (2021) requires UK government to produce a national Air Quality Strategy (AQS) which contains standards, objectives and measures for improving ambient air quality. The most recent AQS was produced by DEFRA and published in July 2007¹. The AQS sets out Air Quality Objectives (AQOs) that are maximum ambient pollutant concentrations that are not to be exceeded either without exception or with a permitted number of exceedances over a specified timescale. These are generally in line with the AQLVs, although the requirements for compliance vary slightly.

Table 1 presents the AQOs for pollutants considered within this assessment.

1 The Air Quality Strategy for England, Scotland, Wales and Northern Ireland, DEFRA, 2007

2 London Local Air Quality Management Technical Guidance 2016 LLAQM (TG16), GLA, 2016.

3 The Control of Dust and Emissions During Construction and Demolition Supplementary Planning Guidance, GLA, 2016.

4 Land-Use Planning and Development Control: Planning for Air Quality, EPUK and IAQM, January 2017.

5 London Councils Air Quality and Planning Guidance, London Councils, 2007.

6 Air Quality Neutral Planning Support: GLA 80371, Air Quality Consultants Ltd in association with ENVIRON UK Ltd, 2014.

7 The London Plan, The Spatial Development Strategy For Greater London, Mayor of London, 2021

8 Haringey's Local Plan Strategic Policies 2013-2026, LBoH, 2013

9 Haringey DPD, LBoH, 2017

Table 1: Air Quality Objectives

Pollutant	Air Quality Objectives	
	Concentration ($\mu\text{g}/\text{m}^3$)	Averaging Periods
NO ₂	40	Annual mean
	200	1-hour mean; not to be exceeded more than 18 times a year
PM ₁₀	40	Annual mean
	50	24-hour mean; not to be exceeded more than 35 times a year
PM _{2.5}	25	Annual mean

Table 2 summarises the advice provided in GLA guidance LLAQM.TG(16)² on where the AQOs for pollutants considered within this report apply.

Table 2: Examples of Where the Air Quality Objectives Apply

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

The monitoring results provided by LBoH and background concentrations provided by DEFRA will be compared against the relevant AQOs detailed in Table 1, as well as the Air Pollution Exposure Criteria (APEC) contained within the London Councils Air Quality and Planning Guidance⁵ to determine onsite exposure.

The APEC are outlined in Table 3.

Table 3: Air Pollution Exposure Criteria

Category	Applicable Range Annual Mean: NO ₂ and PM ₁₀	Applicable Range 24hr Daily Mean: PM ₁₀	Recommendation
APEC - A	Below 5% of the annual mean AQO	> 1-day less than national objective	No air quality grounds for refusal; however mitigation of any emissions should be considered
APEC - B	Between 5% below or above the annual mean AQO	Between 1-day above or below national objective	May not be sufficient air quality grounds for refusal, however appropriate mitigation must be considered e.g. maximise distance from pollutant source, proven ventilation systems, parking considerations, winter gardens, internal layout considered and internal pollutant emissions minimised
APEC - C	Above 5% of the annual mean AQO	>1-day more than national objective	Refusal on air quality grounds should be anticipated, unless the LA has a specific policy enabling such land use and ensure best endeavours to reduce exposure are incorporated. Worker exposure in commercial/industrial land uses should be considered further. Mitigation measures must be presented with air quality assessment, detailing anticipated outcomes of mitigation measures

It should be noted that a significant area of London would fall under APEC - C due to high NO₂ concentrations throughout the city. As such, a presumption against planning consent in these locations may result in large areas of land becoming undevelopable and prevent urban regeneration. The inclusion of suitable mitigation measures to protect future users is therefore considered a suitable way to progress sustainable schemes in these locations and has been considered within this assessment.

2.2 Local Planning Policy

2.2.1 The London Plan

The Mayor of London formerly adopted The Publication London Plan⁷ as the new London Plan in March 2021. The plan outlines the Spatial Development Plan for London and part of the statutory Development Plan for Greater London from 2019 to 2041. A review of the London Plan Publication indicated the following policy in relation to air quality:

- **Policy SI1 - Improving air quality**
 - 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.

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
 - 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.

2.2.2 London Borough of Haringey Local Plan

LBoH's current Local Plan⁸ is made up of the Strategic Policies (2013) and will shape the location and scale of development within the borough up until 2026. A review of the Local Plan indicated the following policies in relation to air quality that are relevant to this assessment:

- **Strategic Policy 4 – Working towards a Low Carbon Haringey**
- **Strategic Policy 7 – Transport**

A review of LBoH DPD (2017)⁹ policies indicated the following policies in relation to air quality that are relevant to this assessment:

- **DM1 – Delivering High Quality Design**
- **DM23 – Environmental Protection**

Reference has been made to these policies during the undertaking of this Air Quality Assessment.

3.0 METHODOLOGY

There is the potential for the Proposed Development to expose future site users to elevated NO₂, PM₁₀ and PM_{2.5} concentrations, as well as to cause impacts at sensitive locations during the construction and operational phases.

Consultation with LBoH was made on the 06/10/2022 to discuss the assessment scope and proposed methodologies. Further details on the proposed methodologies are provided below.

3.1 Construction Phase Assessment

There is the potential for fugitive dust emissions to occur as a result of construction phase activities. These have been assessed in accordance with the methodology outlined within the GLA supplementary planning document 'Control of Dust and Emissions During Construction and Demolition'³.

Reference should be made to Appendix C for details of the relevant GLA construction phase assessment criteria, which were utilised in conjunction with site specific information.

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

- Earthworks;
- Construction; and
- Trackout

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

- Annoyance due to dust soiling;
- Harm to ecological receptors; and
- The risk of health effects due to a significant increase in exposure to PM₁₀ and PM_{2.5}

A desk top survey will be undertaken to identify human and ecological receptors within the relevant assessment buffers specified by the GLA guidance³ (provided in Appendix C). Should sensitive receptors not be present within the relevant distances then negligible impacts would be expected and further assessment is not necessary.

Following the identification of sensitive receptors, a site is then allocated a risk category which is assigned to each activity, based on the scale and nature of the works, as well as the sensitivity of the area to dust impacts.

The assigned magnitude and sensitivity will then determine the overall risk and appropriate mitigation measures to be employed during construction phase activities.

3.2 Operational Phase Assessment

3.2.1 Future Exposure

The Proposed Development is located within Haringey AQMA. Subsequently, the proposals have potential to introduce new receptors into an area of elevated NO₂, PM₁₀ and PM_{2.5}. Detailed dispersion modelling was therefore undertaken to quantify NO₂, PM₁₀ and PM_{2.5} pollutant exposure across the site and determine suitability for the proposed use. The following modelling scenarios were utilised during the assessment:

- 2019 as baseline year for verification against latest ratified data;

- Opening year do-something (DS) (predicted traffic flows in 2024 should the proposals be completed)

In light of expected emission improvements to the national vehicle fleet guided by government policy, it would be unrealistic not to assume a reduction to vehicle emission factors in future years, given the anticipated development year of 2024.

The 2024 scenario assumes an emission drop off based on assumptions provided by the Emission Factor Tool Kit (Eft v11.0) supported by the uptake of low emission vehicles and government incentives and targets concerning fleet proportions by 2030.

The results of the dispersion modelling assessment will also be compared against the relevant AQOs and APEC categories detailed in Table 1 and Table 3 to determine significance. Full details of data used for the modelling assessment are presented in Appendix B of this report.

3.2.2 Road Vehicle Exhaust Impact Assessment

Based on the details of the Proposed Development and anticipated trip generation a screening assessment in accordance with the EPUK and IAQM guidance⁴ was determined a suitable assessment approach. The assessment will determine road traffic exhaust and combustion emission impacts associated with the Proposed Development, and confirm the requirement for detailed assessment work. The EPUK and IAQM document states the following criteria to help establish when an air quality assessment is likely to be considered necessary:

- Proposals that will cause a change in Light Duty Vehicle (LDV) flows of more than 100 Annual Average Daily Traffic (AADT) within or adjacent to an AQMA or more than 500 elsewhere;
- Proposals that will cause a change in Heavy Duty Vehicle (HDV) flows of more than 25 AADT within or adjacent to an AQMA or more than 100 elsewhere;
- Proposals which include either a centralised plant using biofuel, a combustion plant with single or thermal input >300KWh or a standby emergency generator associated with a centralised energy centre; and
- Proposals which include combustion processes of any size.

Should the above criteria not be met, the EPUK and IAQM document considers air quality impacts associated with the scheme to be not significant and no further assessment is required. Conversely, should the criterion be exceeded it may be deemed necessary that further assessment is required.

3.3 Air Quality Neutral Assessment

In line with the requirements of the London Plan, an Air Quality Neutral Assessment is required in order to compare benchmark emissions with the development emissions in accordance with the methodology outlined within the GLA document⁶. The methodology is outlined below:

The following potential scenarios have been considered within the assessment:

- Benchmark; and
- Development.

The benchmark scenario is representative of annual oxides of nitrogen (NO_x) and PM₁₀ benchmark emissions, which are target emissions as defined by the GLA guidance⁶. The development scenario is representative of the annual NO_x and PM₁₀ emissions associated with the operation of the Proposed Development.

It is noted that from 1st of September 2020 there have been amendments to the Town and Country Planning (Use Classes) regulations. Several Use Classes have been revoked and or replaced. The Air Quality Neutral guidance has

not been updated to reflect the new uses classes or new benchmarks included. Where this is the case the most appropriate former land use class, which has a recognised benchmark value, has been used as a substitute.

There is no onsite combustion plant associated with the development and as such, Building Emissions have not been considered further within the Air Quality Neutral Assessment. This assessment has therefore considered transport Emissions (road vehicles travelling to and from the site) only.

The following sources were considered during the assessment:

- **Road vehicles travelling to and from the application site**

The land use Gross Internal Area (GIA) for the development and used for air quality neutral assessment are provided in Table 4.

Table 4: Development Land Use

Land Use Category	Number of Bedrooms /Gross Internal Area (GIA) m ²
C3 Residential	101
A1 Retail	513.6

The following section detail the associated benchmark values.

3.3.1 Transport Emissions Benchmarks

The Transport Emissions Benchmarks (TEBs) for the development have been derived from the Proposed Developments land use classifications and its location within London, in accordance with the GLA guidance⁶.

The standard TEBs within Outer London are summarised in Table 5.

Table 5: Transport Emission Benchmarks

Land Use Category	NO _x TEB (g/m ² /year)	PM ₁₀ TEB (g/m ² /year)
C3 Residential	1553	267
A1 Retail	249	43

3.3.2 Development Transport Emissions

The development Total Transport Emissions is compared against the development specific TEB in order to determine if the Proposed Development is considered to be Air Quality Neutral.

Annual vehicle emissions for the Proposed Development are calculated based on the anticipated traffic generation for the development, with the standard emission factors and the average distance travelled by car per trip for a development. The emissions factors and the average distance travelled were taken from the GLA guidance⁶ and are summarised in Table 6 and Table 7, respectively.

Table 6: Air Quality Neutral Road Transport Emission Factors

Pollutant	g/vehicle-km in Outer London
NO _x	0.353
PM ₁₀	0.0606

Table 7: Average Distance Travelled by Vehicle per Trip

Land Use Category	Average Distance (km)
C3 Residential	11.4
A1 Residential	5.4

4.0 BASELINE

Existing air quality conditions in the vicinity of the application site were identified in order to provide a baseline for assessment. These are detailed in the following sections.

4.1 Local Air Quality Management

As required by the Environment Act (2021), LBoH has undertaken review and assessment of air quality within their borough. This process has indicated that annual mean concentrations of NO₂, and 24-hour mean concentrations of PM₁₀ are above the AQO within their borough. As such, one AQMA has been declared, the closest being described as:

- Haringey AQMA - *the whole area within the London Borough of Haringey*

LBoH have also designated Air Quality Focus Areas (AQFAs) across the borough which are selected hotspots where air quality is predicted to be poor and public exposure is at its highest. The Proposed Development is located 2.4km east of the LBoH Focus Area and within the Haringey AQMA.

Additionally, the site is located adjacent to London Borough of Hackney (LBoHc) which has also as undertaken Review and Assessment of air quality within their area of administration. This process concluded that concentrations of NO₂ are above the AQO within the district. As such, one AQMA has been declared, the nearest of which to the development is described as follows:

- Hackney AQMA – *the whole area within the London Borough of Hackney*

As such, there is potential for the Proposed Development to introduce future site users into an area of elevated annual mean NO₂ concentrations, and to cause air quality impacts within sensitive areas during the construction and operational phases. This has been considered within this report.

4.2 Air Quality Monitoring

Monitoring of pollutant concentrations is undertaken by LBoH using continuous methods throughout their areas of administration. A review of LBoH's most recent Air Quality Monitoring Data¹⁰ indicated that the closest continuous monitor is Haringey South (Priory Park) located approximately 2.6km north west of the Proposed Development. Due to the distance between the development and monitoring site, similar pollutant concentrations would not be anticipated, and this source of data has not been utilised further as it is not considered fully representative of on-site conditions.

LBoH also monitor NO₂ concentrations across the borough using passive diffusion tubes. A review of the most recent air quality monitoring data indicated 1 diffusion tubes located within the vicinity of the application site, presented in Table 8. Exceedances of the AQO are shown in **bold**.

Table 8: Diffusion Tube Monitoring Results

ID	Site Name	Type	NGR (m)		Dist' to Site (m)	Annual Mean Concentration (µg/m ³)		
			X	Y		2017	2018	2019
HR35a	Chestnuts Primary School	Roadside	532324	188766	878	22.0	31.0	30.5

As indicated in Table 8, the annual mean AQO for NO₂ was not exceeded at the monitoring location in recent years.

Neighbouring London Borough of Hackney (LBoHc) also monitor NO₂ concentrations across the borough using passive diffusion tubes. A review of the most recent air quality monitoring data indicated 3 diffusion tubes located within the vicinity of the application site, presented in Table 8.

Table 9: Diffusion Tube Monitoring Results

ID	Site Name	Type	NGR (m)		Dist' to Site (m)	Annual Mean Concentration (µg/m ³)		
			X	Y		2017	2018	2019
134	Woodberry Down 2	Kerbside	532518	187760	299	56.0	47.0	45.0
55	Our Lady 1	Roadside	533491	187892	777	-	-	36.0
19	Green Lanes 2	Roadside	532073	187473	822	66.0	61.0	60.0

As indicated in Table 9, the annual mean AQO for NO₂ was exceeded at the monitoring locations 134 and 19 in recent years.

Reference should be made to Figure 2 within Appendix A for a graphical representation of the monitoring locations.

4.3 Background Pollutant Concentrations

The total concentration of a pollutant is comprised of explicit local emission sources (such as roads and industrial sources) and the background component. The background component consists of indeterminate sources which are transported into an area from further away by meteorological conditions. Background pollutant concentrations are therefore the ambient level of pollution that is not affected by local sources of pollution.

In reality, it is not usually practical to obtain a true representation of background levels in urban areas due to corruption by local sources; background levels used in assessments may contain a mixture of both sources.

Predictions of background pollutant concentrations on a 1km by 1km grid basis have been produced by DEFRA for the entire of the UK to assist LAs in their Review and Assessment of air quality. The Proposed Development site is located across grid square:

- NGR: 532500, 187500

Data for this location was downloaded from the DEFRA website¹¹. For the purpose of this assessment, background concentrations are summarised in Table 10 for the verification year (2019) and the predicted development opening year (2024).

¹¹ <https://uk-air.defra.gov.uk/data/laqm-background-maps?year=2018>

Table 10: Predicted Background Pollutant Concentrations

Pollutant	Predicted Background Concentration ($\mu\text{g}/\text{m}^3$)	
	2019	2024
NO _x	38.55	30.19
NO ₂	25.41	20.76
PM ₁₀	19.21	17.85
PM _{2.5}	12.33	11.46

As indicated in Table 10, background pollutant concentrations of NO₂, PM₁₀ and PM_{2.5} are below the relevant AQOs detailed in Table 1.

4.4 Sensitive Receptors

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

4.4.1 Construction Phase Sensitive Receptors

There are no nationally or European designated ecological receptors within 50m of the Site boundary, or within 50m from a route used by construction vehicles on the public highway (up to 500m from the Site entrance). Therefore, the risk of dust effects at a nationally or European designated ecological receptor site from construction impacts have not been considered further in this assessment.

Human receptors sensitive to potential dust impacts during construction were identified from a desk-top study of the area up to 350m from the Proposed Development boundary. These are summarised in Table 11.

Table 11: Construction Dust Sensitive Receptors

Distance from Site Boundary (m)	Approximate Number of Human Receptors
Less than 20	More than 100
20 – 50	More than 100
50 – 100	More than 100
100 – 350	More than 100

Reference should be made to Figure 3 within Appendix A for a graphical representation of earthworks, and construction dust buffer zones.

Receptors sensitive to potential dust impacts from trackout were identified from a desk-top study of the area up to 50m from the road network within 500m of the site access route. These are summarised in Table 12. The exact construction vehicle access routes were not available for the purpose of this assessment as they will depend on sourcing of materials. This is likely to be decided by the contractor. However, it was assumed that construction traffic would egress the Proposed Development via Seven Sisters Road, to ensure a worst case trackout assessment is undertaken.

Table 12: Trackout Dust Sensitive Receptors

Distance from Trackout Routes (m)	Approximate Number of Human Receptors
Less than 20	More than 100
20 – 50	More than 100

Reference should be made to Figure 4 within Appendix A for a graphical representation of trackout dust buffer zones.

A number of additional factors have been considered when determining the sensitivity of the surrounding area. These are summarised in Table 13.

Table 13: Additional Area Sensitivity Factors

Guidance	Comment
Whether there is any history of dust generating activities in the area	The site is located in a mixed use residential and commercial area. There is likely to have been a history of dust generating activities due to commuting and redevelopment processes in the locality.
The likelihood of concurrent dust generating activity on nearby sites.	A review of the LBoH planning portal indicated that there are no large-scale planning applications within the vicinity of the site.
Pre-existing screening between the source and the receptors	There is no dense vegetation present along the development boundaries. Hence, there is no level of natural protective screening in any directions.
Conclusions drawn from analysing local meteorological data which accurately represent the area: and if relevant the season during which works will take place	The wind direction is predominantly from the south-west of the development. As such, properties to the north-east of the site would be most affected by dust emissions
Conclusions drawn from local topography	The topography of the area appears to be predominantly flat. As such, there are no constraints to dust dispersion.
Duration of the potential impact, as a receptor may become more sensitive over time	Currently the duration of the construction phase is unknown.
Any known specific receptor sensitivities which go beyond the classifications given in the document.	No specific receptor sensitivities identified during the baseline.

4.4.2 Operational Phase Sensitive Receptors

A desk top study was undertaken to identify the closest receptor locations to the application site. This indicated residential locations within close proximity to all development boundaries. There are educational and medical facility in vicinity of the application site and affected road networks, with the nearest education facility, Sir Thomas Abney School, and medical facility, St Anns Hospital, located approximately 560m south and 560m north of the site, respectively.

5.0 ASSESSMENT

5.1 Construction Phase Assessment

5.1.1 Step 1 – Screening

The desk-study detailed in Section 4.4.1 identified a number of receptors with a high classification of sensitivity within 350m of the site boundary, and within 50m of the anticipated trackout routes. As such, a detailed assessment of potential dust impacts was required, and summarised in the below sections.

5.1.2 Step 2A – Magnitude

The scale and nature of the works was determined to assess the magnitude of dust arising from each construction phase activity. The determination of magnitude was based upon the criteria detailed in Appendix C, with the outcome of Step 2A is summarised below in Table 14.

Demolition

There is no scope for demolition in order to prepare the site for construction. Subsequently, this aspect of the construction phase dust risk assessment has not been considered further.

Earthworks

The Proposed Development site is estimated to cover an area of approximately 2,400m². The magnitude of potential dust emissions related to earthwork activities is therefore considered small.

Construction

The proposals comprise the construction of two new warehouse living buildings. Given the scale of the Proposed Development the total building and infrastructure volume is less than 25,000m³. The magnitude of potential dust emissions related to construction activities is therefore considered small.

Trackout

Information on the number of HDV trips to be generated during the construction phase of the Proposed Development was not available at the time of assessment. Similarly, the surface material and unpaved road length was not known at this stage of the project. Based on the site area, it is anticipated that the unpaved road length is likely to be between 50m to 100m. The magnitude of potential dust emissions from trackout is therefore considered medium.

Table 14: Dust Emission Magnitude

Magnitude of Activities		
Earthworks	Construction	Trackout
Small	Small	Medium

5.1.3 Step 2B – Sensitivity

The next step (Step 2B) is to determine the sensitivity of the surrounding area, based on general principles such as amenity and aesthetics, as well as human exposure sensitivity.

Dust Soiling

As shown in Section 4.4.1, the desk top study indicated are approximately more than 100 sensitive receptors within 350m of the Proposed Development boundary and also more than 100 within 50m of the anticipated trackout routes.

Based on the assessment criteria detailed in Appendix C, the sensitivity of the receiving environment to potential dust soiling impacts was considered to be high for all construction phase activities. This is because the site is situated in a predominantly residential area and the people or property would reasonably be expected to be present here for extended periods of time.

Human Health

The annual mean concentration of PM₁₀ is 19.21µg/m³ as detailed in Section 4. Based on the receptor counts provided above, the area is considered to be of low sensitivity for all construction phase activities.

The sensitivity of the receiving environment to specific potential dust impacts, based on the criteria detailed in Appendix C is summarised in Table 15.

Table 15: Sensitivity of the Surrounding Area

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

5.1.4 Step 2C – Risk

Both the magnitude and sensitivity factors are combined in Step 2C to determine the risk of dust impacts without the application of best practice mitigation measures.

It should be noted that the potential for impacts depends significantly on the distance between the dust generating activity and receptor location. Risk was predicted based on a worst-case scenario of works being undertaken at the site boundary closest to each sensitive area. Therefore, actual risk is likely to be lower than that predicted during the majority of the construction phase. A summary of the risk from each dust generating activity is provided in Table 16.

Table 16: Summary of Potential Unmitigated Dust Risks

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

5.1.5 Step 3 – Mitigation

The GLA guidance³ provides a number of potential mitigation measures to reduce impacts during the construction phase. These measures have been adapted for the Proposed Development site as summarised in Table 17.

Table 17: Fugitive Dust Mitigation Measures

Issue	Control Measure
Site Management	• Develop and implement a stakeholder communications plan that includes community engagement before work commences on site. • Develop a Dust Management Plan. • 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 make 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 log book.
Preparing & Maintaining Site	• Plan site layout: machinery and dust causing activities should be located away from receptors. • Erect solid screens or barriers around dust activities or the site boundary that are, at least, as high as any stockpiles on site. • Fully enclosure site or specific operations where there is a high potential for dust production and the site is active for an extensive period. • Install green walls, screens or other green infrastructure to minimise the impact of dust and pollution. • Avoid site runoff of water or mud. • Keep site fencing, barriers and scaffolding clean using wet methods. • Remove materials from site as soon as possible. • Cover, seed or fence stockpiles to prevent wind whipping. • Carry out regular dust soiling checks of buildings within 100m of site boundary and cleaning to be provided if necessary. • Agree monitoring locations with the Local Authority • Where possible, commence baseline monitoring at least three months before phase begins.

Issue	Control Measure
	Put in place real-time dust and air quality pollutant monitors across the site and ensure they are checked regularly.
Operating Vehicle/Machinery & 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. - Impose and signpost a maximum-speed-limit of 10mph on surfaced haul routes and work areas (if long haul routes are required these speeds may be increased with suitable additional control measures provided, subject to the approval of the nominated undertaker and with the agreement of the local authority, where appropriate). - Produce a Construction Logistics Plan to manage the sustainable delivery of goods and materials. - Implement a Travel Plan that supports and encourages sustainable travel (public transport, cycling, walking, and car-sharing).
Operations	- Only use cutting, grinding or sawing equipment fitted or in conjunction with suitable dust suppression techniques such as water sprays or local extraction, e.g. suitable local exhaust ventilation systems. - Ensure an adequate water supply on the site for effective dust/particulate matter mitigation (using recycled water where possible). - Use enclosed chutes, 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.
Earthworks and Construction	- Avoid scabbling (roughening of concrete surfaces) if possible - Ensure sand and other aggregates are stored in bunded areas and are not allowed to dry out, unless this is required for a particular process, in which case ensure that appropriate additional control measures are in place
Trackout	- Regularly use a water-assisted dust sweeper on the access and local roads, as necessary, to remove any material tracked out of the site. - Avoid dry sweeping of large areas.

Issue	Control Measure
	• Ensure vehicles entering and leaving sites are securely covered to prevent escape of materials during transport. • Record all inspections of haul routes and any subsequent action in a site log book. • Install hard surfaced haul routes, which are regularly damped down with fixed or mobile sprinkler systems and regularly cleaned. • Inspect haul routes for integrity and instigate necessary repairs to the surface as soon as reasonably practicable; • Implement a wheel washing system (with rumble grids to dislodge accumulated dust and mud prior to leaving the site where reasonably practicable). • Ensure there is an adequate area of hard surfaced road between the wheel wash facility and the site exit, wherever site size and layout permits. • Access gates to be located at least 10m from receptors where possible. • Apply dust suppressants to locations where a large volume of vehicles enter and exit the construction site

5.1.6 Step 4 – Residual Impacts

Assuming the relevant mitigation measures outlined in Table 17 are implemented, the residual effect from all dust generating activities is predicted to be negligible and therefore **not significant** in accordance with the GLA guidance³.

5.2 Operational Phase Assessment

The assessment was undertaken in accordance with the methodology detailed in Section 3.2.

5.2.1 Future Exposure

Annual mean NO₂, PM₁₀ and PM_{2.5} concentrations were predicted across the Proposed Development for the 2024 DS scenario at a height of 1.5m to represent exposure across the ground floor level, as shown in Figures 7 to 9 within Appendix A.

Background NO₂ PM₁₀ and PM_{2.5} levels are likely to be lower at elevated heights due to increased distance from emission sources, such as roads. Therefore, predicted concentrations at heights above ground floor level are considered acceptable in regards to future exposure and have not been assessed further.

Annual Mean Nitrogen Dioxide (NO₂)

Predicted annual mean NO₂ concentrations across the Proposed Development site during the DS scenario are summarised in Table 18.

Table 18: Modelling Results - Annual Mean NO₂ at Proposed Development

Floor Level	Predicted 2024 Annual Mean NO ₂ Concentration (µg/m ³)	APEC Category
Ground (1.5m)	23.0 – 32.0	A

The predicted concentrations shown in Table 18 indicate that there were no exceedances of the AQO across the Proposed Development. In addition, concentrations across the Proposed Development are classified as APEC-A (no air quality grounds for refusal).

As such, it is considered that annual mean NO₂ levels at the Proposed Development site should not be viewed as a constraint to development.

Based on the results of the dispersion modelling assessment, the site is considered to be suitable for residential use without the implementation of mitigation techniques to protect future site users from elevated NO₂ concentrations.

1-Hour Mean Nitrogen Dioxide (NO₂)

Predictions of 1-hour NO₂ concentrations were not produced as part of the dispersion modelling assessment. LLAQM.(TG16)² states if annual mean NO₂ concentrations are below 60µg/m³ then it is unlikely that the 1-hour AQO will be exceeded. As such, based on the results in Table 18, it is not predicted that on-site concentrations will exceed the 1-hour mean AQO for NO₂.

Annual Mean Particulate Matter (PM₁₀ & PM_{2.5})

Predicted annual mean PM₁₀ and PM_{2.5} concentrations across the Proposed Development site during the DS scenario are summarised in Table 19.

Table 19: Modelling Results - Annual Mean PM₁₀ and PM_{2.5} at Proposed Development

Floor Level	Predicted 2024 Annual Mean Concentration (µg/m ³)		APEC Category
	PM ₁₀	PM _{2.5}	
Ground (1.5m)	18.4 - 20.8	11.8 – 13.1	A

The predicted concentrations shown in Table 19 indicate that there were no exceedances of the annual mean AQOs for PM₁₀ or PM_{2.5} throughout the modelling area. In addition, concentrations across the Proposed Development are classified as APEC-A (no air quality grounds for refusal).

As such, it is considered that annual mean PM₁₀ or PM_{2.5} levels at the Proposed Development site should not be viewed as a constraint to development.

Based on the results of the dispersion modelling assessment, the site is considered to be suitable for proposed end use without the implementation of mitigation techniques to protect future site users from elevated PM₁₀ and PM_{2.5} concentrations.

24-hour Particulate Matter (PM₁₀)

For consideration of the 24-hour mean PM₁₀ AQO, the number of days with 24-hour mean PM₁₀ concentrations greater than 50µg/m³ must not exceed 35 in any given calendar year. In order to assess modelled results against the 24-hour mean AQO for PM₁₀, the guidance document LLAQM.TG(16)² confirms the method by which the number of days in which the PM₁₀ 24-hour AQO is exceeded can be obtained based on a relationship with the predicted PM₁₀ annual mean concentration using the formula below, where (C) denotes the annual mean concentration of PM₁₀:

$$\text{No. of Exceedances} = 0.0014 * C^3 + \frac{206}{C} - 18.5$$

The number of days was calculated to be between 1 - 3 days across the Proposed Development. As such, the permitted number of 35 days has not been exceeded, and onsite 24-hour mean PM₁₀ concentrations are classified as APEC-A.

Based on the results of the dispersion modelling assessment, the site is considered to be suitable for the proposed end use without the implementation of mitigation techniques to protect future site users from elevated 24-hour mean PM₁₀ concentrations.

5.2.2 Road Vehicle Exhaust Emission Impacts

Any additional vehicle movements associated with the Proposed Development will generate exhaust emissions, such as NO₂, PM₁₀ and PM_{2.5} on the local and regional road networks.

Traffic data provided by Velocity, the appointed traffic consultant for the scheme, indicated the Proposed Development is anticipated to generate a maximum AADT flow of 80 on the local road network. As such, it is considered that the operational phase of the site will not result in a change of AADT flows of more than 100, produce over 25 HDV movements per day or significantly affect average speeds on the local road network.

Subsequently, potential air quality impacts associated with operational phase road vehicle exhaust emissions are predicted to be **not significant** in accordance the EPUK and IAQM⁴ screening criteria shown in Section 3.2.2.

5.3 Air Quality Neutral Assessment

In line with the GLA guidance⁶, and due to development generated emissions, an Air Quality Neutral assessment is required.

5.3.1 Transport Emissions Benchmarks

The Proposed Developments TEBs have been calculated using the GIA details provided in Table 4 and the standard TEBs for each land use, as outlined in Table 5. The development specific TEBs are detailed in Table 20.

Table 20: Development Specific Transport Emission Benchmark

Land Use Category	Number of bedspaces/ Gross Internal Area (GIA) m ²	TEB - NO _x per Land Use (kg/year)	TEB - PM ₁₀ per Land Use (kg/year)
C3 Residential	101	156.9	27.0
A1 Retail	513.6	249.0	42.9
Total	/	405.9	69.9

As indicated in Table 20, the total development specific TEBs are **405.9kg/year** for annual NO_x and **69.9kg/year** PM₁₀ emissions, respectively.

5.3.2 Development Transport Emissions

The total transport emissions for the Proposed Development were calculated based on the standard emission factors and the average distance travelled by car per trip outlined in Table 6 and Table 7, respectively and the anticipated annual traffic generation, provided by Velocity. The development Total Transport Emissions are summarised in Table 21.

Table 21: Development Total Transport Emissions

Land Use Category	Daily Vehicle Movements	NO _x Emission (kg/year)	PM ₁₀ Emission (kg/year)
C3 Residential	4	5.88	1.01
A1 Retail	76	52.88	9.08
Total	80	58.75	10.09

The development specific TEBs were then subtracted from the development total transport emissions to determine if the development transport emissions are within the benchmark. The results are summarised in Table 22.

Table 22: Comparison of Total Transport Emissions with TEBs

Scenario	NO _x Emission (kg/year)	PM ₁₀ Emission (kg/year)
Development Specific TEB	405.9	69.9
Development Total Transport Emission	58.75	10.09
Difference	-347.15	-59.81

As indicated in Table 22, annual NO_x and PM₁₀ transport emissions associated with the development are predicted to be **below** the TEB by **347.15kg/year** for NO_x and **59.81kg/year** for PM₁₀. As such, the development is considered to be Air Quality Neutral and no further action is required to reduce excess emissions.

6.0 CONCLUSION

AQS were commissioned by the Client to undertake an Air Quality Assessment in support of a proposed development at Warehouse District, Haringey.

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

Dispersion modelling was undertaken to quantify annual mean NO₂, PM₁₀ and PM_{2.5} concentrations across the application to assess suitability for proposed use. Modelling results were subsequently verified using LBoHc local monitoring data.

The dispersion modelling results indicated that annual mean NO₂, PM₁₀ and PM_{2.5} concentrations across the application site were below the relevant AQOs at the proposed sensitive use.

An assessment was undertaken using the EPUK and IAQM screening criteria to determine the potential for vehicle trips generated by the Proposed Development to affect local air quality. The traffic data provided by Velocity, indicated that Proposed Development is anticipated to generate a maximum AADT flow of 80 on the local road network. Anticipated development traffic flows are **below** the relevant EPUK and IAQM assessment thresholds and operational impacts could be screened out as **not significant**.

There is also no onsite combustion plant associated with the Proposed Development. As a result, building emissions from combustion processes were also screened as **not significant** throughout the operational phase.

The GLA states that new developments must be considered Air Quality Neutral. Transport associated with Proposed Development were compared against the development specific TEBs. This indicated that the total transport emissions generated by the Proposed Development were below the development specific benchmarks. Subsequently, the Proposed Development is considered Air Quality Neutral.

Based on the assessment results the site is considered suitable for the proposed end use subject to the inclusion of relevant mitigation measures to offset excess emissions associated with the development and complies with the LBoH Local Plan, the GLA Policy and the NPPF.

7.0 ABBREVIATIONS

AADT	Annual Average Daily Traffic
ADM	Atmospheric Dispersion Modelling
APEC	Air Pollution Exposure Criteria
APPLE	Air Pollution Planning and the Local Environment
AQLV	Air Quality Limit Value
AQMA	Air Quality Management Area
AQO	Air Quality Objectives
AQS	Air Quality Strategy
CERC	Cambridge Environmental Research Consultants
DEFRA	Department for Environment, Food and Rural Affairs
DfT	Department for Transport
DM	Do Minimum
DS	Do Something
DMP	Dust Management Plan
EPUK	Environmental Protection UK
EU	European Union
GIA	Gross Internal Area
GLA	Gross Internal Area
HDV	Heavy Duty Vehicle
IAQM	Institute of Air Quality Management
LLAQM	London Local Air Quality Management
LA	Local Authority
LBoH	London Borough of Haringey
LBoHc	London Borough of Hackney
LDV	Light Duty Vehicle
NGR	National Grid Reference
NO ₂	Nitrogen dioxide
NO _x	Oxides of nitrogen
NPPF	National Planning Policy Framework
NPPG	National Planning Practice Guidance
NRMM	Non Road Mobile Machinery
PM _{2.5}	Particulate matter with an aerodynamic diameter of less than 2.5µm
PM ₁₀	Particulate matter with an aerodynamic diameter of less than 10µm
TEB	Transport Emission Benchmark
TEMPRO	Trip End Model Presentation Program
z ₀	Roughness Length

END OF REPORT

APPENDIX A - FIGURES



Legend

 Site Boundary

Title

Figure 1
Site Location

Project

Warehouse District Living,
Haringey

Project Number

AQ14780

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Air Quality Solutions



Legend

-  Site Boundary
-  Diffusion Tube Monitoring Locations

Title

Figure 2
Diffusion Tube Monitoring Locations

Project

Warehouse District Living,
Haringey

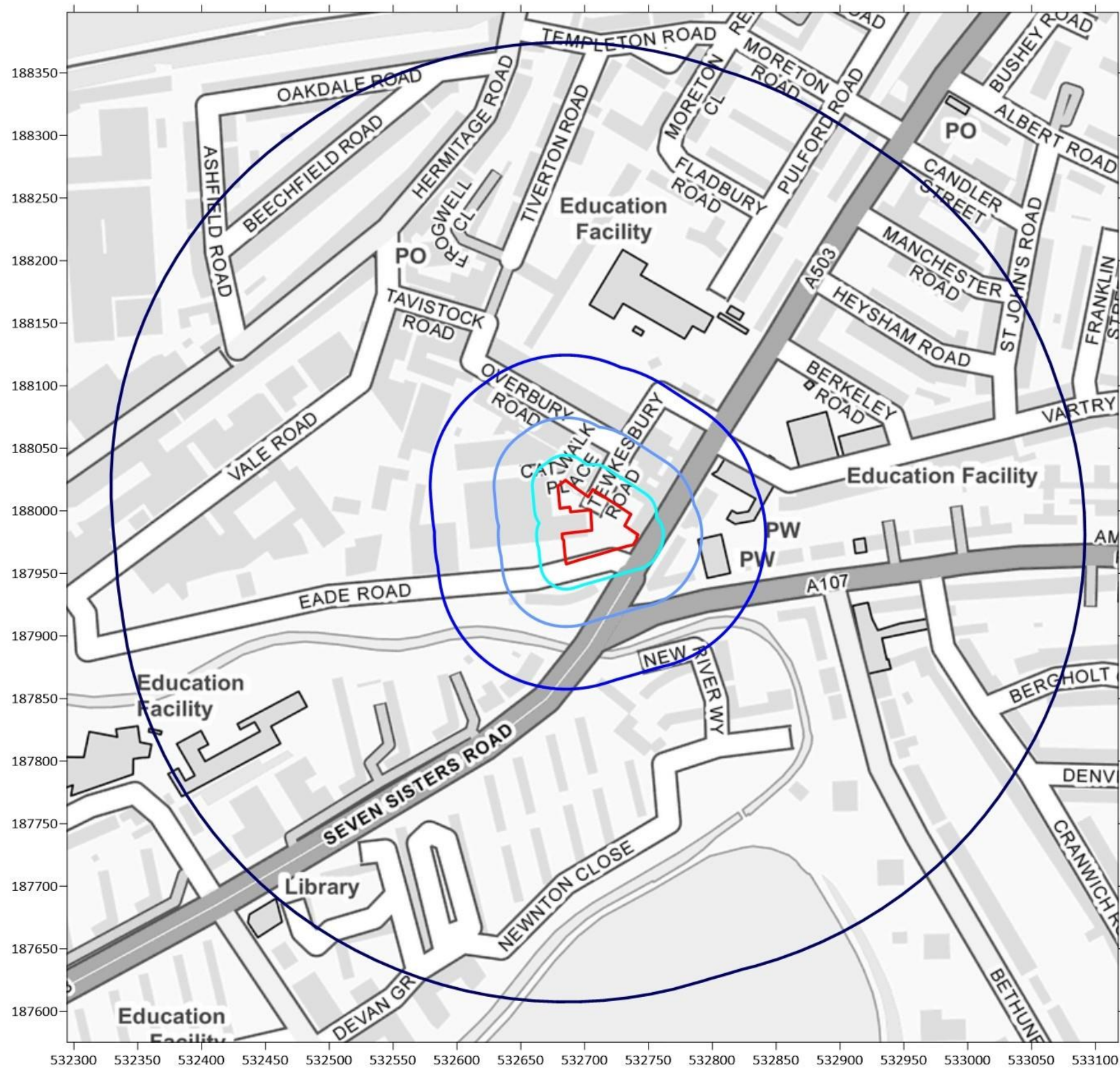
Project Number

AQ14780

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Air Quality Solutions



Legend

- Site Boundary
- 20m from Site Boundary
- 50m from Site Boundary
- 100m from Site Boundary
- 350m from Site Boundary

Title

Figure 3
Earthworks and Construction
Dust Buffer Zones

Project

Warehouse District Living,
Haringey

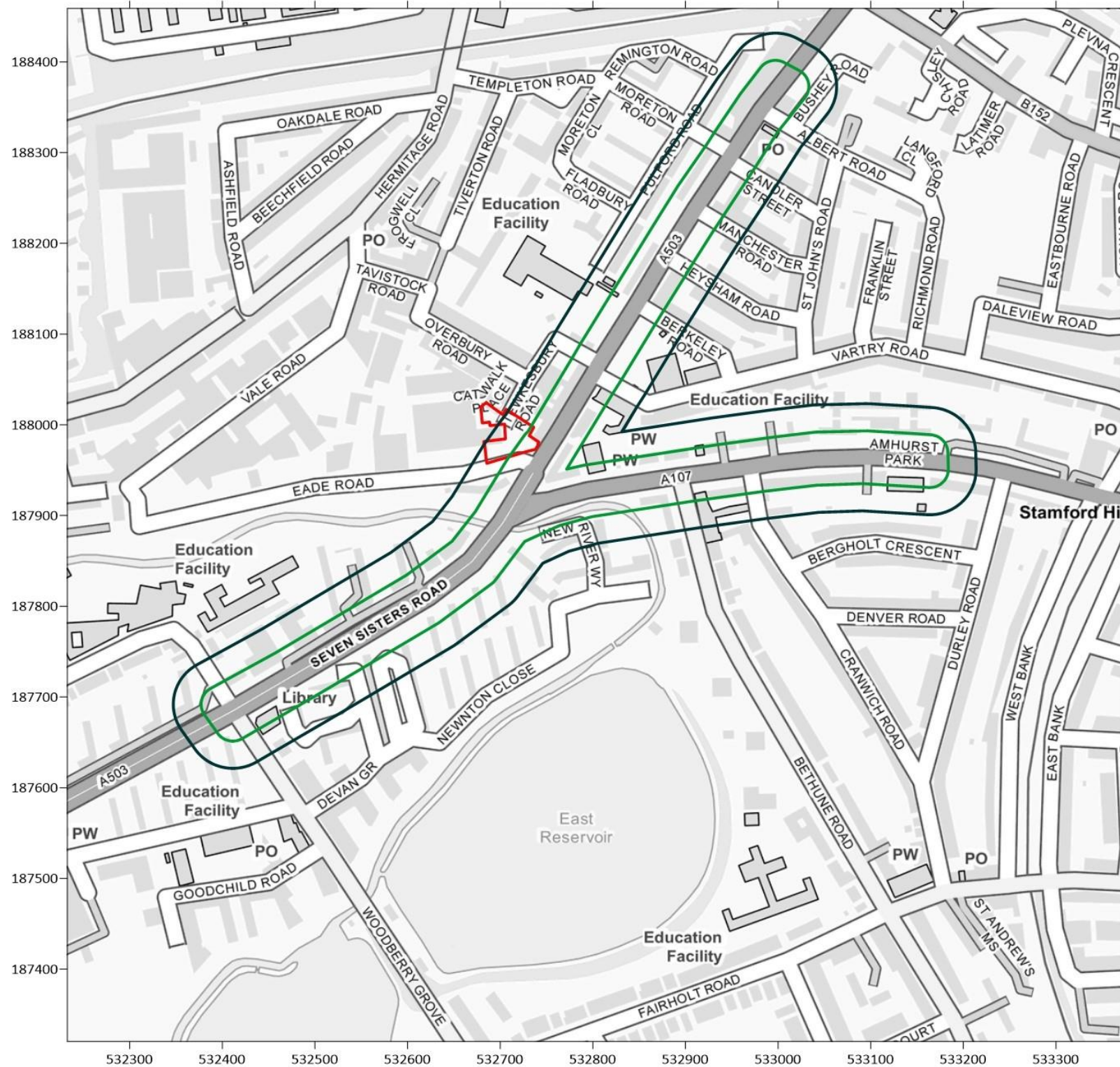
Project Number

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Air Quality Solutions



Legend

- Site Boundary
- 20m from Site Access Route
- 50m from Site Access Route

Title

Figure 4
Trackout Dust Buffer Zones

Project

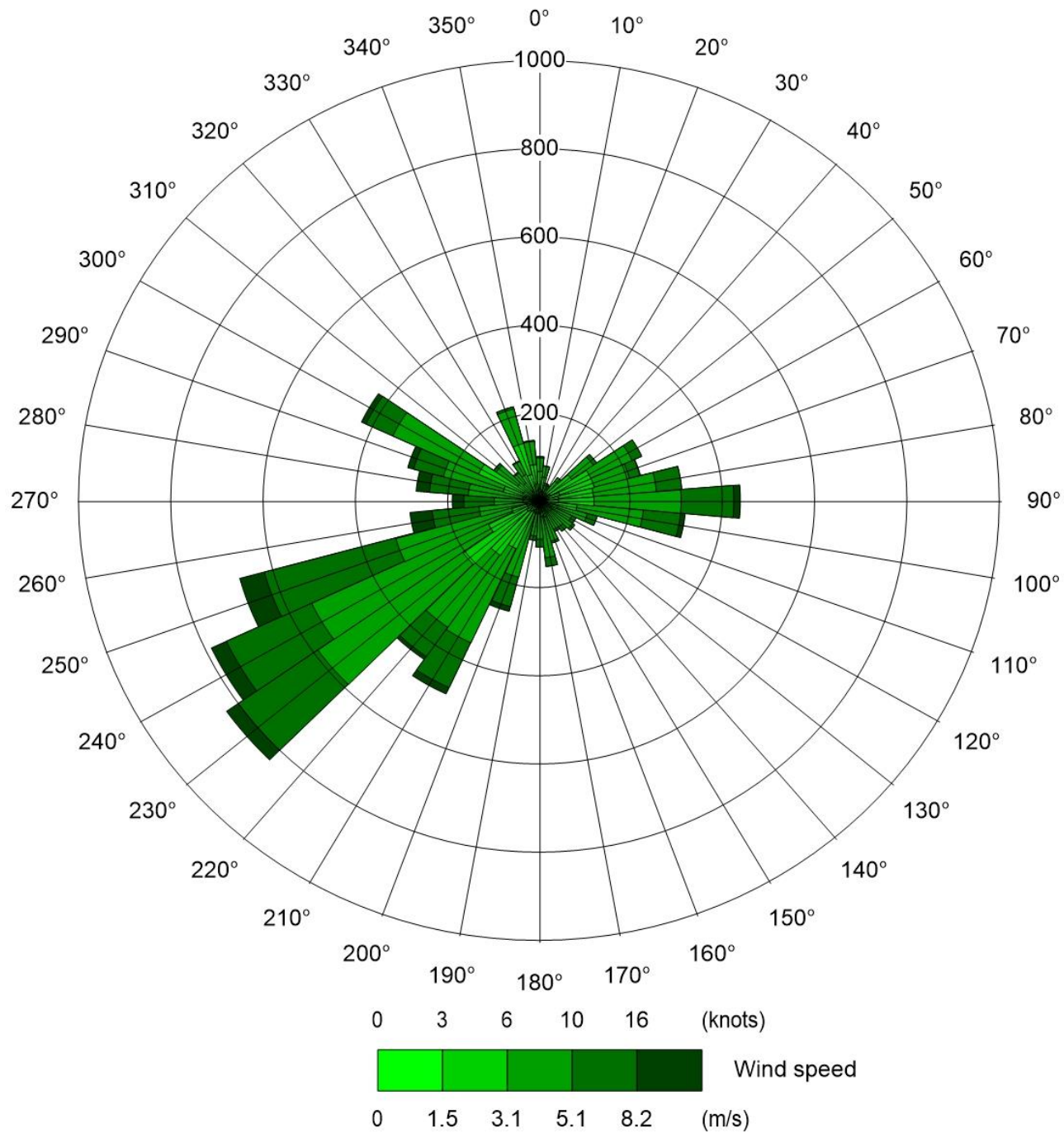
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Air Quality Solutions



Title

Figure 5
Wind Rose 2019 London City
Meteorological Station

Project

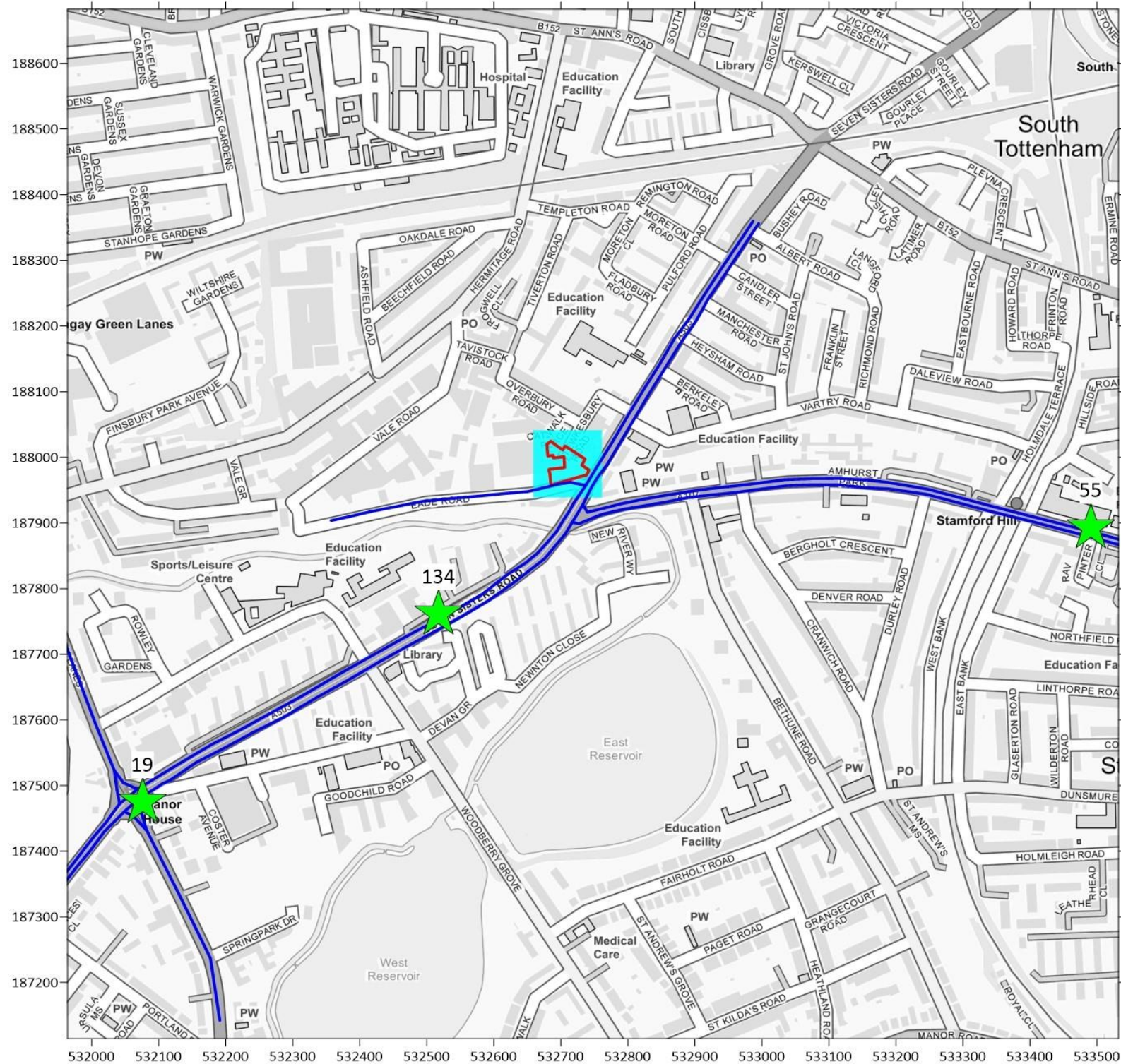
Warehouse District Living,
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Project Number

AQ14780



Air Quality Solutions



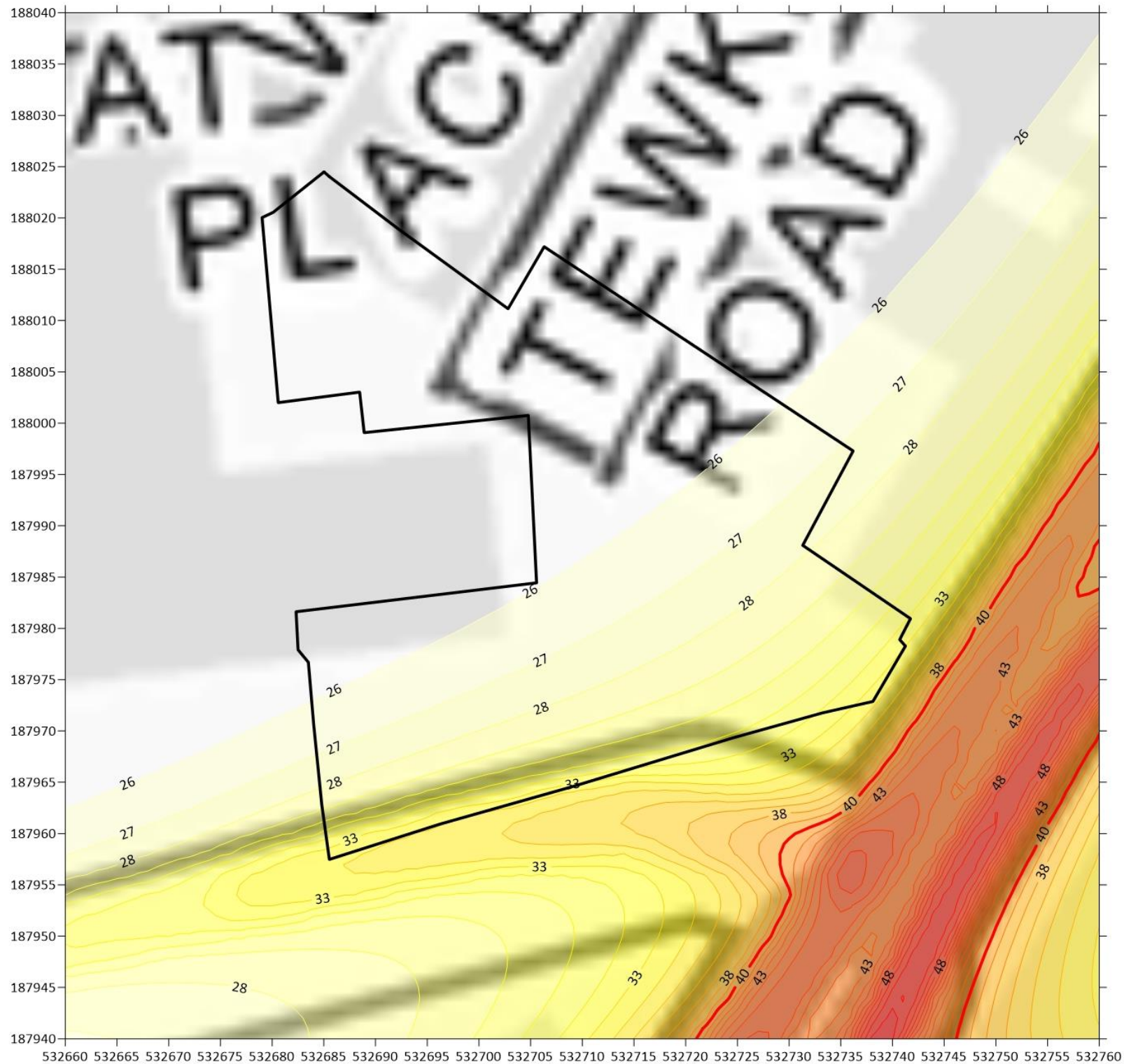
- Legend**
- Site Boundary
 - Modelled Road Link
 - Cartesian Grid
 - Diffusion Tube Monitoring

Title
Figure 6
ADMS-Roads Input

Project
Warehouse District Living,
Haringey

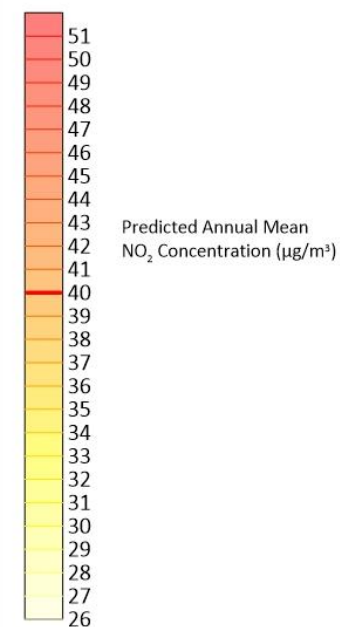
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Legend

 Site Boundary



Title

Figure 7

Predicted Annual Mean NO₂
Concentrations (µg/m³) 2024 DS

Project

Warehouse District Living,
Haringey

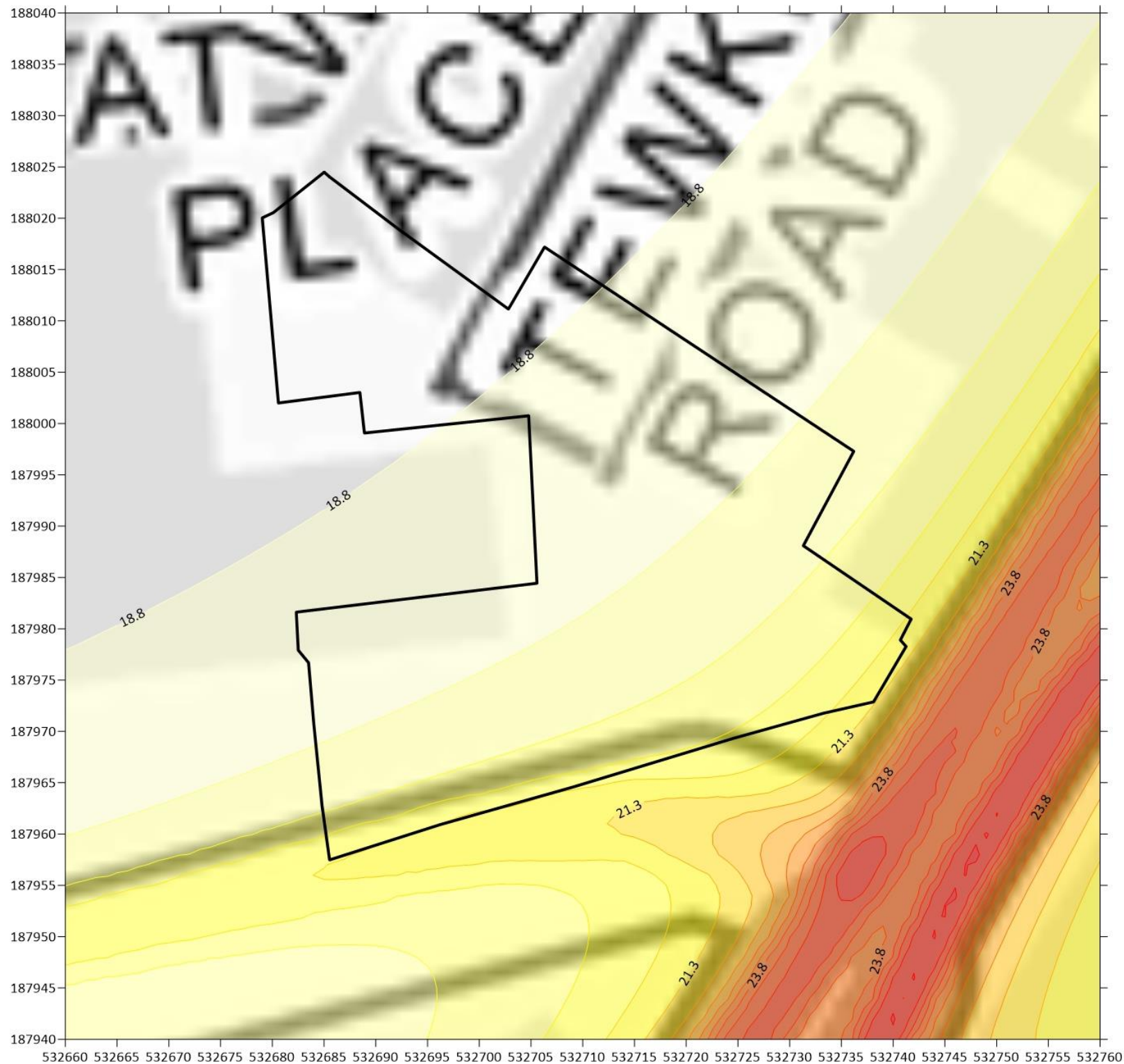
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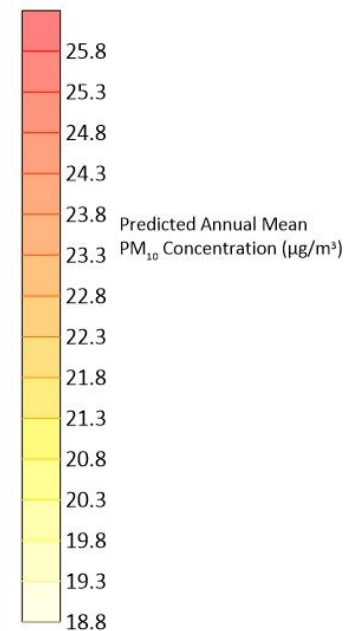


Air Quality Solutions



Legend

 Site Boundary



Title

Figure 8
Predicted Annual Mean PM₁₀
Concentrations (µg/m³) 2024 DS

Project

Warehouse District Living,
Haringey

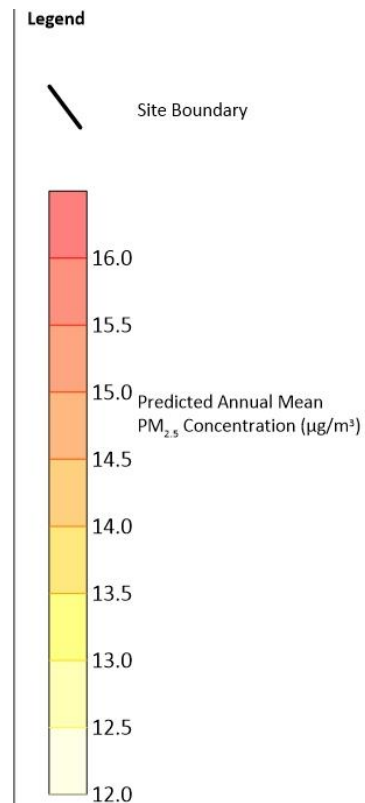
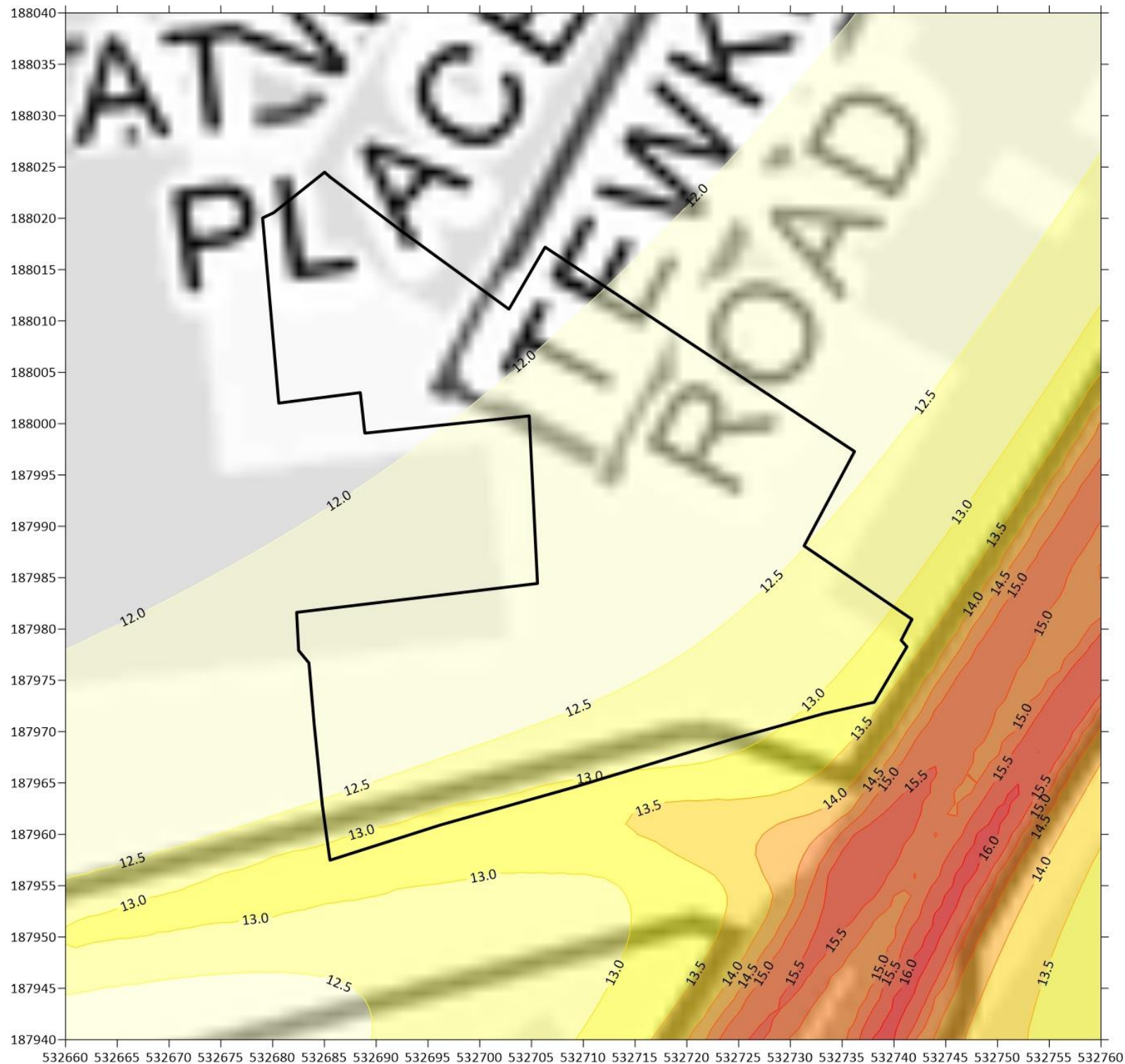
Project Number

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Air Quality Solutions



Title
Figure 8
Predicted Annual Mean $PM_{2.5}$
Concentrations ($\mu g/m^3$) 2024 DS

Project
Warehouse District Living,
Haringey

Project Number
AQ14780

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APPENDIX B – ASSESSMENT INPUTS

ASSESSMENT INPUTS

The Proposed Development has the potential to introduce future site users to poor air quality. Dispersion modelling using ADMS Roads was therefore undertaken to predict pollutant concentrations across the site to consider site suitability for the proposed end-use.

The assessment was undertaken in accordance with the guidance contained within the DEFRA document LLAQM.TG(16)² and the EPUK and IAQM guidance⁴.

Dispersion Model

Dispersion modelling was undertaken using the ADMS-Roads dispersion model (version 5.0). ADMS-Roads is developed by Cambridge Environmental Research Consultants (CERC) and is routinely used throughout the world for the prediction of pollutant dispersion from road sources. Modelling predictions from this software package are accepted within the UK by the Environment Agency and DEFRA.

The model requires input data that details the following parameters:

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

Assessment Area

Ambient concentrations were predicted over the Proposed Development site and surrounding highway network. One Cartesian grid was included in the model over the area at approximately NGR: 532660, 187940 and 532760, 188040 at height of 1.5m to represent the proposed ground floor level for the 2024 opening year scenario.

Results were subsequently used to produce contour plots within the Surfer software package. Reference should be made to Figure 6 within Appendix A for a graphical representation of the verification inputs and operation phase DS extents, respectively.

Traffic Flow Data

Development flow traffic data and associated network distribution was provided by Velocity, the appointed Transport Consultants for the scheme, and indicated that a total flow generation of 80 AADT is anticipated as a result of the Purposed Development.

Baseline traffic data for the following road links were obtained from the Department for Transport (DfT):

- Seven Sister Road;
- A107;
- Green Lanes;
- Hermitage Road (Used a comparable for Eade Road)

The DfT Matrix web tool enables the user to view and download traffic flows on every link of the A-road and motorway network in Great Britain for the years 1999 to 2019. The DfT matrix is referenced in DEFRA guidance LLAQM.TG(16)² as being a suitable source of data for air quality assessments and is therefore considered to provide a reasonable representation of traffic flows in the vicinity of the site.

Growth factors provided by the Trip End Model Presentation Program (TEMPO) software package were utilised to allow for conversion from the obtained 2019 traffic flow to 2024 which was used to represent the opening year scenario. Vehicle speeds were estimated based on the free flow potential of each link and local speed limits. Road widths were estimated from aerial photography and UK highway design standards.

A summary of the traffic data used in the verification scenario is provided in Table B1.

Table B1: 2019 Verification Traffic Data

Road Link		Road Width (m)	24 Hour AADT Flow	HDV Pop (%)	Mean Vehicle Speed (km/hr)	Data Source
L1	Eade Road Eastbound Slowdown	7.0	5,416	1.0	8	DfT
L2	Eade Road Eastbound	7.0	5,416	1.0	24	DfT
L3	Seven Sisters Road Northbound North-East of Site	6.0	11,846	7.2	32	DfT
L4	Seven Sisters Road Southbound North-East of Site	6.0	11,846	7.2	40	DfT
L5	Seven Sisters Road Southbound Slowdown East of Site	4.3	11,846	7.2	16	DfT
L6	Seven Sisters Road Southbound Slowdown South of Site	7.3	11,846	7.2	8	DfT
L7	Seven Sisters Road SW-Bound South-West of Site	5.0	17,864	8.3	40	DfT
L8	Seven Sisters Road NE-Bound South-West of Site	6.0	17,864	8.3	40	DfT
L9	Seven Sisters Road Northbound Slowdown SW of Site	6.0	17,864	8.3	24	DfT
L10	Seven Sisters Road Northbound Slowdown South of Site	6.1	17,864	8.3	8	DfT
L11	Seven Sisters Road joining A107 Slowdown South-East of Site	5.3	6,754	9.5	8	DfT
L12	A107 Eastbound	4.6	6,754	9.5	32	DfT
L13	A107 Westbound	5.1	6,754	9.5	32	DfT
L14	A107 Westbound Slowdown	5.3	6,754	9.5	8	DfT
L15	Seven Sisters Road SW-Bound Slowdown	12.0	17,864	8.3	8	DfT
L16	Seven Sisters Road SW-Bound	5.4	12,870	10.1	32	DfT
L17	Seven Sisters Road NE-Bound	5.7	12,870	10.1	32	DfT
L18	Seven Sisters Road NE-Bound Slowdown	9.4	12,870	10.1	8	DfT
L19	Green Lanes (South of Seven Sister Road) Junction Approach	10.3	7,526	6.4	8	DfT
L20	Seven Sister Road onto Green Lanes (South of Seven Sister Road)	8.9	7,526	6.4	16	DfT
L21	Green Lanes (South of Seven Sister Road)	10.0	15,051	6.4	32	DfT
L22	Seven Sisters Road onto Green Lanes (North of Seven Sister Road)	7.0	13,469	5.0	16	DfT
L23	Green Lanes (North of Seven Sister Road) Junction Approach	8.0	13,469	5.0	8	DfT
L24	Green Lanes (North of Seven Sister Road)	9.8	26,937	5.0	32	DfT

Reference should be made to Figure 6 within Appendix A for a graphical representation of the road link locations used within the verification assessment. The road width and mean vehicle speed shown in Table B1 remained the same for the 2024 scenarios.

A summary of the 2024 traffic data is shown in Table B2.

Table B2: 2024 Traffic Data

Road Link		DS Scenario	
		24 Hr AADT Flow	HDV Prop (%)
L1	Eade Road Eastbound Slowdown	5,848	1.1
L2	Eade Road Eastbound	5,848	1.1
L3	Seven Sisters Road Northbound North-East of Site	12,656	7.2
L4	Seven Sisters Road Southbound North-East of Site	12,656	7.2
L5	Seven Sisters Road Southbound Slowdown East of Site	12,656	7.2
L6	Seven Sisters Road Southbound Slowdown South of Site	12,656	7.2
L7	Seven Sisters Road SW-Bound South-West of Site	19,065	8.3
L8	Seven Sisters Road NE-Bound South-West of Site	19,065	8.3
L9	Seven Sisters Road Northbound Slowdown SW of Site	19,065	8.3
L10	Seven Sisters Road Northbound Slowdown South of Site	19,065	8.3
L11	Seven Sisters Road joining A107 Slowdown South-East of Site	7,233	9.5
L12	A107 Eastbound	7,233	9.5
L13	A107 Westbound	7,233	9.5
L14	A107 Westbound Slowdown	7,233	9.5
L15	Seven Sisters Road SW-Bound Slowdown	19,065	8.3
L16	Seven Sisters Road SW-Bound	13,746	10.1
L17	Seven Sisters Road NE-Bound	13,746	10.1
L18	Seven Sisters Road NE-Bound Slowdown	13,746	10.1
L19	Green Lanes (South of Seven Sister Road) Junction Approach	8,015	6.4
L20	Seven Sister Road onto Green Lanes (South of Seven Sister Road)	8,015	6.4
L21	Green Lanes (South of Seven Sister Road)	16,029	6.4
L22	Seven Sisters Road onto Green Lanes (North of Seven Sister Road)	14,344	5.0
L23	Green Lanes (North of Seven Sister Road) Junction Approach	14,344	5.0
L24	Green Lanes (North of Seven Sister Road)	28,688	5.0

Reference should be made to Figure 6 within Appendix A for a graphical representation of the road link locations used within the operation phase assessment.

Emission Factors

Emission factors for each link were calculated using the relevant traffic flows and the Emissions Factor Toolkit (version 11.0) released in November 2021, which incorporates updated COPERT 5.3 vehicle emissions factors for NO_x, PM₁₀ and PM_{2.5} and EURO 6 vehicle fleet sub-categories.

NO_x to NO₂ Conversion

Predicted annual mean NO_x concentrations from the dispersion model were converted to NO₂ concentrations using the NO_x to NO₂ Calculator (v.8.1) provided by DEFRA, which is the method detailed within LLAQM.TG(16)².

Meteorological Data

Meteorological data used in this assessment was taken from London City meteorological station over the period 1st January 2019 to 31st December 2019 (inclusive).

London City meteorological station is located at approximate NGR: 543000, 180510 which is approximately 12.4km of the Proposed Development. Although there is a large distance between the application site and London City the use of this data is considered to provide a reasonable representation of conditions at the development site.

All meteorological records used in the assessment were provided by Atmospheric Dispersion Modelling (ADM) Ltd, which is an established distributor of data within the UK. Reference should be made to Figure 5 within Appendix A for a wind rose of utilised meteorological data.

Roughness Length

The specific roughness length (z_0) values used to represent conditions during the verification process, DM/DS scenario, as well as conditions at the London City meteorological station are summarised in Table B3.

Table B3: Utilised Roughness Lengths

Scenario	Roughness Length (m)	ADMS Description
Verification, DS Scenario and London City	1.0	Cities, Woodlands

These values of z_0 are considered appropriate for the morphology of the assessment area.

Monin-Obukhov Length

The Monin-Obukhov length provides a measure of the stability of the atmosphere within certain urban or rural contexts. The specific length values used to represent conditions during the verification process, DM/DS scenario, as well as conditions at the London City are summarised in Table B4.

Table B4: Utilised Monin-Obukhov Lengths

Scenario	Monin-Obukhov Length (m)	ADMS Description
Verification, DS Scenario and London City	100	Large conurbations > 1 million

This Monin-Obukhov value is considered appropriate for the morphology of the assessment area.

Background Concentrations

The 2024 annual mean background concentrations detailed in Table 10, was used in the dispersion modelling assessment to represent annual mean pollutant levels at the Proposed Development site.

Table B5 displays the specific background concentrations as predicted by DEFRA, utilised to represent the condition at the monitoring locations used within the verification process.

Table B5: Predicted Background Pollutant Concentrations for Monitoring Locations

Monitoring Location	DEFRA Grid Square	Pollutant	2019 Predicted Background Concentration ($\mu\text{g}/\text{m}^3$)
134, 19	532500, 187500	NO _x	38.55
		NO ₂	25.41
55	533500, 187500	NO _x	39.12
		NO ₂	25.70

Verification

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

- Estimates of background concentrations;
- Uncertainties in source activity data such as traffic flows and emission factors;
- Variations in meteorological conditions;
- Overall model limitations; and
- Uncertainties associated with monitoring data, including locations.

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

For the purpose of this assessment model verification was undertaken for 2024, using traffic data, meteorological data and monitoring results from this year.

LBoHc undertakes periodic monitoring of NO₂ concentrations at 3 roadside monitoring location within the assessment extents. The road contribution to total NO_x concentration was calculated from the monitored NO₂ result for use in the verification process. This was undertaken following the methodology contained within GLA guidance LLAQM.TG(16)². The monitored annual mean NO_x concentration and calculated road NO_x concentration are summarised in Table B6.

Table B6: NO_x Concentrations

Site ID	Monitored Road NO _x Concentration ($\mu\text{g}/\text{m}^3$)	Modelled Road NO _x Concentration ($\mu\text{g}/\text{m}^3$)	% Difference ((Monitored - Modelled)/Monitored) * 100
134	45.22	18.77	59%
55	22.42	7.18	68%
19	88.22	33.54	62%

The monitored and modelled NO_x road contribution concentrations were graphed and the equation of the trend line based on the linear progression through zero was calculated, as shown in Graph 1

This indicated that a verification factor of **2.5960** was required to be applied to all NO_x modelling results, showing the model overestimated pollutant concentrations throughout the assessment extents.

Graph 1 is provided below.

Graph 1 - Verification Adjustment Factor

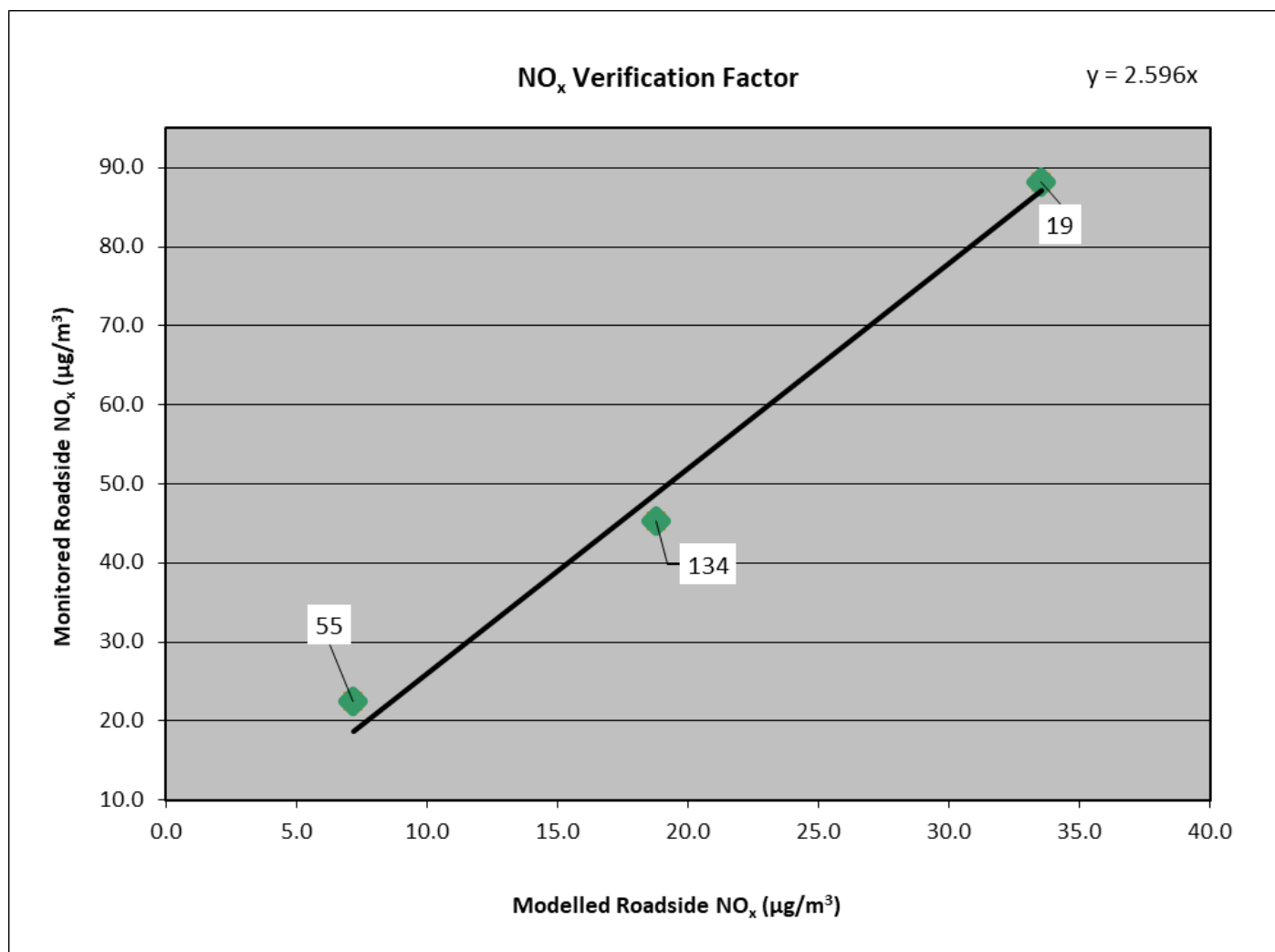


Table B7 presents the monitored annual mean NO₂ concentrations and the adjusted modelled total NO₂ concentration based on the above verification factor. Exceedances of the annual mean NO₂ AQO are highlighted in **bold**.

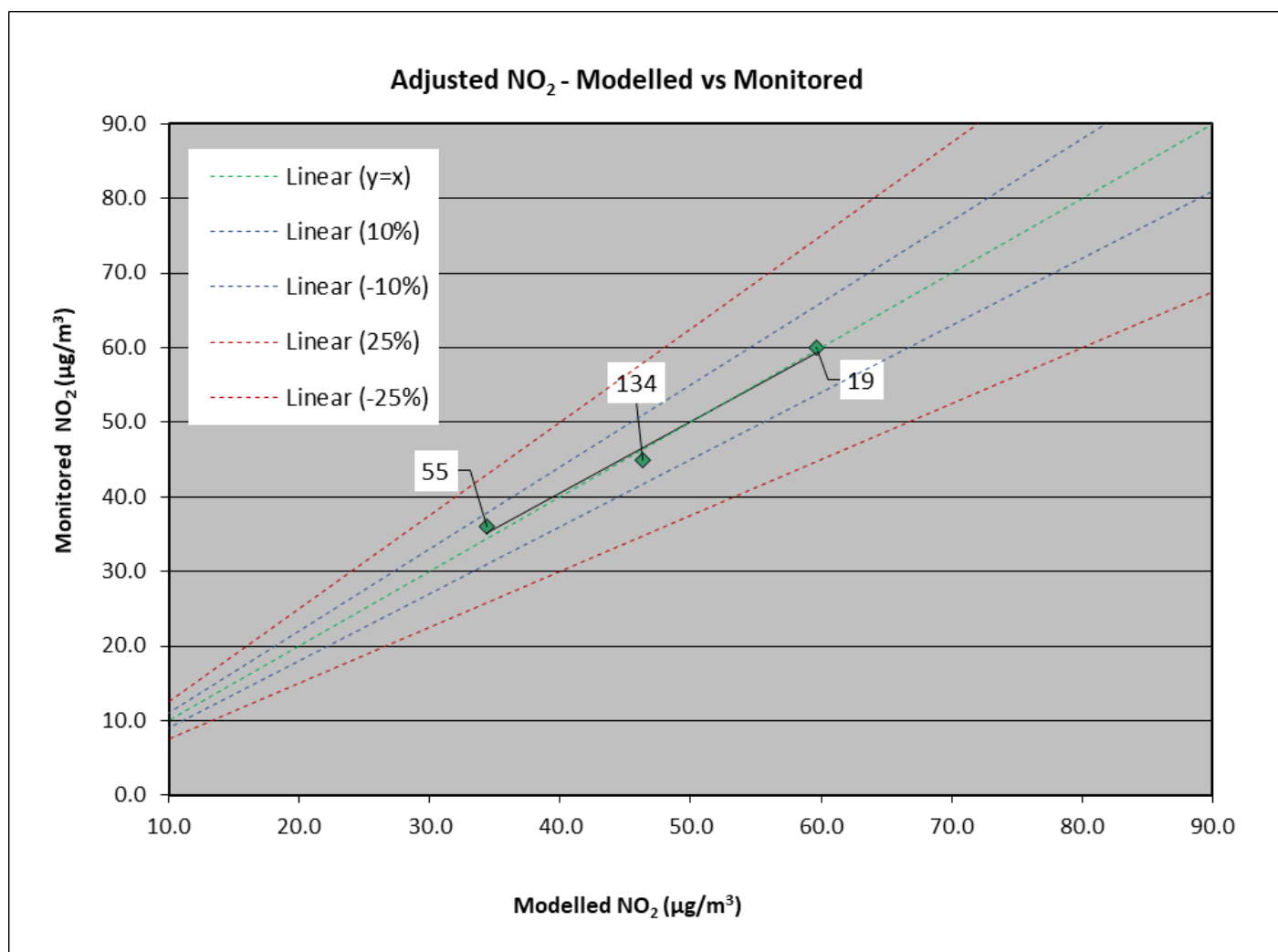
Table B7: NO₂ Concentrations

Site ID	Monitored Total NO ₂ Concentration (µg/m ³)	Adjusted Modelled Total NO ₂ Concentration (µg/m ³)	% Difference ((Monitored - Modelled)/Monitored) * 100
134	45.00	46.33	-3%
55	36.00	34.35	5%
19	60.00	59.63	1%

As demonstrated in Table B7, the percentage difference between modelled and monitored concentrations is deemed acceptable and is less than 25% in all cases, and less than 10% at 3 locations. This reduces uncertainties in the model predictions and provide a robust representation of pollutant concentrations in accordance with the guidance suggested in LLAQM.TG(16)².

A graphical representation of the adjusted NO₂ concentrations is provided within Graph 2.

Graph 2 – Modelled vs Monitored NO₂



As PM₁₀ and PM_{2.5} monitoring is not undertaken within the assessment extents, the NO_x adjustment factor of **2.5960** was utilised to adjust model predictions of PM₁₀ and PM_{2.5} in accordance with the guidance provided within LLAQM.TG(16)².

APPENDIX C – CONSTRUCTION PHASE ASSESSMENT CRITERIA

CONSTRUCTION PHASE METHODOLOGY

There is the potential for fugitive dust emissions to occur as a result of construction phase activities. These have been assessed in accordance with the methodology outlined within the GLA supplementary planning document 'Control of Dust and Emissions During Construction and Demolition'³.

Activities are divided into four types to reflect their different potential impacts. These are:

- Demolition
- Earthworks;
- Construction; and
- Trackout.

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

- Annoyance due to dust soiling;
- Harm to ecological receptors; and
- The risk of health effects due to a significant increase in exposure to PM₁₀ and PM_{2.5}.

The assessment steps are detailed below.

Step 1

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

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

Step 2

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

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

The two factors are combined in Step 2C to determine the risk of dust impacts without mitigation applied. Step 2A defines the potential magnitude of dust emission through the construction phase. The relevant criteria are summarised in Table C1.

Table C1: Construction Dust - Magnitude of Emission

Magnitude	Activity	Criteria
Large	Demolition	• Total building volume greater than 50,000m³ • Potentially dusty construction material (e.g. concrete) • On-site crushing and screening • Demolition activities greater than 20m above ground level
	Earthworks	• Total site area greater than 10,000m² • Potentially dusty soil type (e.g. clay, which will be prone to suspension when dry due to small particle size)

Magnitude	Activity	Criteria
		- More than 10 heavy earth moving vehicles active at any one time - Formation of bunds greater than 8m in height - More than 100,000 tonnes of material moved
	Construction	- Total building volume greater than 100,000m³ - On site concrete batching - Sandblasting
	Trackout	- More than 50 Heavy Duty Vehicle (HDV) trips per day - Potentially dusty surface material (e.g. high clay content) - Unpaved road length greater than 100m
Medium	Demolition	- Total building volume 20,000m³ to 50,000m³ - Potentially dusty construction material - Demolition activities 10m to 20m above ground level
	Earthworks	- Total site area 2,500m² to 10,000m² - Moderately dusty soil type (e.g. silt) 5 to 10 heavy earth moving vehicles active at any one time - Formation of bunds 4m to 8m in height - Total material moved 20,000 tonnes to 100,000 tonnes
	Construction	- Total building volume 25,000m³ to 100,000m³ - Potentially dusty construction material (e.g. concrete) - On site concrete batching
	Trackout	10 to 50 HDV trips per day - Moderately dusty surface material (e.g. high clay content) - Unpaved road length 50m to 100m
Small	Demolition	- Total building volume under 20,000m³ - Construction material with low potential for dust release (e.g. metal cladding or timber) - Demolition activities less than 10m above ground level - Demolition during wetter months
	Earthworks	- Total site area less than 2,500m² - Soil type with large grain size (e.g. sand) - Less than 5 heavy earth moving vehicles active at any one time - Formation of bunds less than 4m in height - Total material moved less than 20,000 tonnes - Earthworks during wetter months
	Construction	- Total building volume less than 25,000m³ - Construction material with low potential for dust release (e.g. metal cladding or timber)
	Trackout	<10 HDV (3.5t) outward movements in any one day - Surface material with low potential for dust release - Unpaved road length <50m

Step 2B defines the sensitivity of the area around the development site for construction, earthworks and trackout. The factors influencing the sensitivity of the area are shown in Table C2.

Table C2: Examples of Factors Defining Sensitivity of an Area

Sensitivity	Examples	
	Human Receptors	Ecological Receptors
High	- Users expect of high levels of amenity - High aesthetic or value property	Internationally or nationally designated site e.g. Special Area of Conservation

Sensitivity	Examples	
	Human Receptors	Ecological Receptors
	- People expected to be present continuously for extended periods of time - Locations where members of the public are exposed over a time period relevant to the AQO for PM₁₀ e.g. residential properties, hospitals, schools and residential care homes	
Medium	- Users would expect to enjoy a reasonable level of amenity - Aesthetics or value of their property could be diminished by soiling - People or property wouldn't reasonably be expected to be present here continuously or regularly for extended periods as part of the normal pattern of use of the land e.g. parks and places of work	Nationally designated site e.g. Sites of Special Scientific Interest
Low	- Enjoyment of amenity would not reasonably be expected - Property would not be expected to be diminished in appearance - Transient exposure, where people would only be expected to be present for limited periods. e.g. public footpaths, playing fields, shopping streets, playing fields, farmland, footpaths, short term car park and roads	Locally designated site e.g. Local Nature Reserve

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

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

These factors were considered in the undertaking of this assessment.

The sensitivity of the area to dust soiling effects on people and property is shown in Table C3.

Table C3: Sensitivity of the Area to Dust Soiling Effects on People and Property

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

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

Table C4 outlines the sensitivity of the area to human health impacts.

Table C4: Sensitivity of the Area to Human Health Impacts

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

Table C5 outlines the sensitivity of the area to ecological impacts.

Table C5: Sensitivity of the Area to Ecological Impacts

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

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

Table C6 outlines the risk category from demolition activities.

Table C6: Dust Risk Category from Demolition

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

Table C7 outlines the risk category from earthworks and construction activities.

Table C7: Dust Risk Category from Earthworks and Construction

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

Table C8 outlines the risk category from trackout.

Table C8: Dust Risk Category from Trackout

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

Step 3

Step 3 requires the identification of site-specific mitigation measures within the GLA guidance to reduce potential dust impacts based upon the relevant risk categories identified in Step 2. For sites with negligible risk mitigation measures beyond those required by legislation are not required. However, additional controls may be applied as part of good practice.

Step 4

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