Redmore environmental

Air Quality Assessment

66 Cavendish Road, London

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Executive Summary

Redmore Environmental Ltd was commissioned by ANX Developments Ltd to undertake an Air Quality Assessment in support of a residential development on land off 66 Cavendish Road, London.

The proposed development has the potential to cause air quality impacts at sensitive locations during construction and operation, as well as expose future occupants to any existing air quality issues. As such, an Air Quality Assessment was undertaken in order to determine baseline conditions at the site, consider its suitability for the proposed end-use and assess potential impacts associated with the scheme.

Potential construction phase air quality impacts from fugitive dust emissions were assessed as a result of demolition, earthworks, 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.

During the operational phase of the development there is the potential for air quality impacts as a result of traffic exhaust emissions associated with vehicles travelling to and from the site. These were assessed using standard screening criteria. Due to the low number of trips associated with the scheme, air quality impacts were not predicted to be significant.

During the operational phase of the development there is also the potential for the exposure of future occupants to elevated pollution levels. Dispersion modelling was therefore undertaken in order to predict concentrations across the proposed development site as a result of emissions from the highway network. Results were subsequently verified using local monitoring data.

The results of the assessment demonstrated that predicted pollutant levels were below the relevant criteria at the proposed site boundary. As such, the site is considered suitable for the proposed end use from an air quality perspective.

Potential emissions from the proposals were assessed in order to determine compliance with the air quality neutral requirements of the London Plan. The building energy strategy does not produce emissions to atmosphere. In addition, transport emissions from the development were considered to be acceptable. As such, the development was considered to be air quality neutral.

Based on the assessment results, air quality issues are not considered a constraint to planning consent for the proposals.

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1.0 INTRODUCTION

1.1 Background

1.1.1 Redmore Environmental Ltd was commissioned by ANX Developments Ltd to undertake an Air Quality Assessment in support of a residential development on land off 66 Cavendish Road, London.

1.1.2 The proposed development has the potential to cause air quality impacts at sensitive locations during construction and operation, as well as expose future occupants to any existing air quality issues. As such, an Air Quality Assessment was undertaken in order to determine baseline conditions at the site, consider its suitability for the proposed end-use and assess potential impacts associated with the scheme.

1.2 Site Location and Context

1.2.1 The site is located on land off 66 Cavendish Road, London, NW6 7YA, at approximate National Grid Reference (NGR): 524377, 184200. Reference should be made to Figure 1 for a site location plan.

1.2.2 The proposals comprise demolition of an existing four-storey block and subsequent erection of a 21-unit part-five/part-six storey block of flats, providing a mix of 1,2 and 3-bedroom apartments.

1.2.3 An Air Quality Management Area (AQMA) has been declared by London Borough of Brent (LBoB) due to exceedences of the Air Quality Objectives (AQOs) for annual mean nitrogen dioxide (NO_2) and 24-hour mean particulate matter with an aerodynamic diameter of less than 10µm (PM_{10}) concentrations. The development is located within the AQMA. As such, there is the potential for exposure of future residents to poor air quality. An Air Quality Assessment was therefore undertaken in order to determine baseline conditions, consider site suitability for the proposed end-use and define any requirement for mitigation. Potential impacts associated with the construction and operation of the scheme have also been assessed using standard screening methodologies. This is detailed in the following report.

2.0 LEGISLATION AND POLICY

2.1 Legislation

2.1.1 The Air Quality Standards Regulations (2010) came into force on 11th June 2010 and include Air Quality Limit Values (AQLVs) for the following pollutants:

- NO_2;
- Sulphur dioxide;
- Lead;
- PM_{10};
- Particulate matter with an aerodynamic diameter of less than 2.5µm;
- Benzene; and,
- Carbon monoxide.

2.1.2 Air quality target values have also been provided for several additional pollutants.

2.1.3 Part IV of the Environment Act (1995) 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 the Department for Environment, Food and Rural Affairs (DEFRA) and published in July 2007[1]. The AQS sets out AQOs that are maximum ambient pollutant concentrations that are not to be exceeded either without exception or with a permitted number of exceedences over a specified timescale. These are generally in line with the AQLVs, although the requirements for the determination of compliance vary.

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

Table 1 Air Quality Objectives

Pollutant	Air Quality Objective	
	Concentration ($\mu g/m^3$)	Averaging Period
NO_2	40	Annual mean

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

Pollutant	Air Quality Objective	
	Concentration (µg/m³)	Averaging Period
	200	1-hour mean, not to be exceeded on more than 18 occasions per annum
PM_{10}	40	Annual mean
	50	24-hour mean, not to be exceeded on more than 35 occasions per annum

2.1.5 Table 2 summarises the advice provided in the Greater London Authority (GLA) guidance[2] on where the AQOs for pollutants considered within this report apply.

Table 2 Examples of Where the Air Quality Objectives Apply

Averaging Period	Objective Should Apply At	Objective Should Not Apply At
Annual mean	All locations where members of the public might be regularly exposed Building façades of residential properties, schools (including all of playgrounds), hospitals (and their grounds), care homes (and their grounds) 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 and 8-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

2 London Local Air Quality Management (TG19), Technical Guidance 2019 (LLAQM.TG (2019)), GLA, 2019.

2.2 Local Air Quality Management

2.2.1 Under Section 82 of the Environment Act (1995) (Part IV) Local Authorities (LAs) are required to periodically review and assess air quality within their area of jurisdiction under the system of Local Air Quality Management (LAQM). This review and assessment of air quality involves comparing present and likely future pollutant concentrations against the AQOs. If it is predicted that levels at locations of relevant exposure, as summarised in Table 2, are likely to be exceeded, the LA is required to declare an AQMA. For each AQMA the LA is required to produce an Air Quality Action Plan (AQAP), the objective of which is to reduce pollutant concentrations in pursuit of the AQOs.

2.3 Dust

2.3.1 The main requirements with respect to dust control from industrial or trade premises not regulated under the Environmental Permitting (England and Wales) Regulations (2016) and subsequent amendments, such as construction sites, is that provided in Section 79 of Part III of the Environmental Protection Act (1990). The Act defines nuisance as:

> "any dust, steam, smell or other effluvia arising on industrial, trade or business premises and being prejudicial to health or a nuisance."

2.3.2 Enforcement of the Act, in regard to nuisance, is currently under the jurisdiction of the local Environmental Health Department, whose officers are deemed to provide an independent evaluation of nuisance. If the LA is satisfied that a statutory nuisance exists, or is likely to occur or happen again, it must serve an Abatement Notice under Part III of the Environmental Protection Act (1990). The only defence is to show that the process to which the nuisance has been attributed and its operation are being controlled according to best practicable means.

2.4 National Planning Policy

2.4.1 The revised National Planning Policy Framework[3] (NPPF) was published in July 2021 and sets out the Government's planning policies for England and how these are expected to

3 NPPF, Ministry of Housing, Communities and Local Government, 2021.

be applied.

2.4.2 The purpose of the planning system is to contribute to the achievement of sustainable development. In order to ensure this, the NPPF recognises three overarching objectives, including the following of relevance to air quality:

> "c) An environmental objective - to contribute to protecting and enhancing our natural, built and historic environment; including making effective use of land, helping to improve biodiversity, using natural resources prudently, minimising waste and pollution, and mitigating and adapting to climate change, including moving to a low carbon economy."

2.4.3 Chapter 15 of the NPPF details objectives in relation to conserving and enhancing the natural environment. It states that:

> "Planning policies and decisions should contribute to and enhance the natural and local environment by:
>
> […]
>
> e) preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability. Development should, wherever possible, help to improve local environmental conditions such as air and water quality […]"

2.4.4 The NPPF specifically recognises air quality as part of delivering sustainable development and states that:

> "Planning policies and decisions should sustain and contribute towards compliance with relevant limit values or national objectives for pollutants, taking into account the presence of Air Quality Management Areas and Clean Air Zones, and the cumulative impacts from individual sites in local areas. Opportunities to improve air quality or mitigate impacts should be identified, such as through traffic and travel management, and green infrastructure provision and enhancement. So far as possible these opportunities should be considered at the plan-making

stage, to ensure a strategic approach and limit the need for issues to be reconsidered when determining individual applications. Planning decisions should ensure that any new development in Air Quality Management Areas and Clean Air Zones is consistent with the local air quality action plan."

2.4.5 The implications of the NPPF have been considered throughout this assessment.

2.5 National Planning Practice Guidance

2.5.1 The National Planning Practice Guidance[4] (NPPG) web-based resource was launched by the Department for Communities and Local Government on 6th March 2014 and updated on 1st November 2019 to support the NPPF and make it more accessible. The air quality pages are summarised under the following headings:

1. What air quality considerations does planning need to address?
2. What is the role of plan-making with regard to air quality?
3. Are air quality concerns relevant to neighbourhood planning?
4. What information is available about air quality?
5. When could air quality considerations be relevant to the development management process?
6. What specific issues may need to be considered when assessing air quality impacts?
7. How detailed does an air quality assessment need to be?
8. How can an impact on air quality be mitigated?

2.5.2 These were reviewed and the relevant guidance considered as necessary throughout the undertaking of this assessment.

2.6 Local Planning Policy

The London Plan

2.6.1 The London Plan 2021[5] is the Spatial Development Strategy for Greater London. It sets out a framework for how London will develop over the next 20-25 years and the Mayor's

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4 https://www.gov.uk/guidance/air-quality--3.

5 The London Plan March 2021, GLA, 2021.

vision for Good Growth. Review of this document indicated the following of relevance to this report:

> "Policy SI 1 - 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 exceedence of legal limits
> c) create unacceptable risk of high levels of exposure to poor air quality.
> 2. In order to meet the requirements of Part 1, as a minimum:
> a) development proposals must be at least Air Quality Neutral
> b) development proposals should use design solutions to prevent or minimise increased exposure to existing air pollution and make provision to address local problems of air quality in preference to post-design or retro-fitted mitigation measures.
> c) major development proposals must be submitted with an Air Quality Assessment. Air quality assessments should show how the development will meet the requirements of B1
> d) development proposals in Air Quality Focus Areas or that are likely to be used by large numbers of people particularly vulnerable to poor air quality, such as children or older people, should demonstrate that design measures have been used to minimise exposure.
>
> C. Masterplans and development briefs for large-scale development proposals subject to an Environmental Impact Assessment should consider how local air quality can be improved across the area of the proposal as part of an air quality

positive approach. To achieve this a statement should be submitted demonstrating:

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

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

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

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

2.6.2 The requirements of these policies have been considered throughout this Air Quality Assessment.

Sustainable Design and Construction Supplementary Planning Guidance

2.6.3 The Sustainable Design and Construction Supplementary Planning Guidance (SPG)[6] was published by the GLA in April 2014. The document aims to support developers, local planning authorities and neighbourhoods to achieve sustainable development, as well as providing guidance on to how to achieve the London Plan objectives effectively.

2.6.4 The document provides guidance on the following key areas when undertaking an Air Quality Assessment:

6 Sustainable Design and Construction SPG, GLA, 2014.

- Assessment requirements;
- Construction and demolition;
- Design and occupation;
- Air Quality Neutral policy for buildings and transport, and,
- Emissions standards for combustion plant.

2.6.5 These key areas were taken into consideration during the undertaking of this assessment.

Local Plan

2.6.6 LBoB's Local Plan is a collection of planning documents that set out the strategy for future development in Brent. These include the Core Strategy[7], Development Management Policies (DMP)[8], Site Specific Allocations Development Plan Document[9], The Wembley Area Action Plan[10] and West London Waste Plan[11]. A review of the DMP identified the following policy in relation to air quality of relevance to this assessment:

> "DMP1 Development Management General Policy
>
> Subject to other policies within the development plan, development will be acceptable provided it is:
>
> […]
>
> g. not unacceptably increasing exposure to flood risk, noise, dust, contamination, smells, waste, light, other forms of pollution and general disturbance or detrimentally impacting on air or water quality;
>
> […]."

2.6.7 This policy was considered throughout the assessment as necessary.

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7 The Core Strategy, LBoB, 2010.

8 DMP, LBoB, 2016.

9 Site Specific Allocations Development Plan Document, LBoB, 2011.

10 The Wembley Area Action Plan, LBoB, 2015.

11 West London Waste Plan, LBoB, 2015.

3.0 METHODOLOGY

3.1 Introduction

3.1.1 The proposed development has the potential to cause air quality impacts, as well as expose future residents to elevated pollution levels. These issues were assessed in accordance with the following methodology, which was agreed with Emma Tindall, Environmental Health Enforcement Officer at LBoB, on 8th August 2021.

3.2 Construction Phase Assessment

3.2.1 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 Mayor of London's 'The Control of Dust and Emissions during Construction and Demolition Supplementary Planning Guidance'[12].

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

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

3.2.3 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 PM_{10}.

3.2.4 The assessment steps are detailed below.

12 The Control of Dust and Emissions During Construction and Demolition Supplementary Planning Guidance, The Mayor of London, 2014.

Step 1

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

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

Step 2

3.2.7 Step 2 assesses the risk of potential dust impacts. A site is allocated 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).

3.2.8 The two factors are combined in Step 2C to determine the risk of dust impacts without mitigation applied.

3.2.9 Step 2A defines the potential magnitude of dust emission through the construction phase. The relevant criteria are summarised in Table 3.

Table 3 Construction Dust - Magnitude of Emission

Magnitude	Activity	Criteria
Large	Demolition	• Total volume of building to be demolished greater than 50,000m^3 • Potentially dusty material (e.g. concrete) • On-site crushing and screening • Demolition activities more than 20m above ground level

Magnitude	Activity	Criteria
	Earthworks	• Total site area greater than 10,000m^2 • Potentially dusty soil type (e.g. clay, which will be prone to suspension when dry due to small particle size) • 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 100,000m^3 • 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 volume of building to be demolished between 20,000m^3 and 50,000m^3 • Potentially dusty construction material • Demolition activities 10m to 20m above ground level
	Earthworks	• Total site area 2,500m^2 to 10,000m^2 • 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 25,000m^3 to 100,000m^3 • 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 volume of building to be demolished less than 20,000m^3 • Construction material with low potential for dust release (e.g. metal cladding or timber) • Demolition activities less than 10m above ground and during wetter months

Magnitude	Activity	Criteria
	Earthworks	• Total site area less than 2,500m^2 • 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 25,000m^3 • Construction material with low potential for dust release (e.g. metal cladding or timber)
	Trackout	• Less than 10 HDV trips per day • Surface material with low potential for dust release • Unpaved road length less than 50m

3.2.10 Step 2B defines the sensitivity of the area around the development to potential dust impacts. The influencing factors are shown in Table 4.

Table 4 Construction Dust - Examples of Factors Defining Sensitivity of an Area

Receptor Sensitivity	Examples	
	Human Receptors	Ecological Receptors
High	• Users expect high levels of amenity • High aesthetic or value property • 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 PM_{10}. e.g. residential properties, hospitals, schools and residential care homes	• Internationally or nationally designated site e.g. Special Area of Conservation
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

Receptor Sensitivity	Examples	
	Human Receptors	Ecological Receptors
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, farmland, short term car parks and roads	• Locally designated site e.g. Local Nature Reserve

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

- 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 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.

3.2.12 These factors were considered in the undertaking of this assessment.

3.2.13 The criteria for determining the sensitivity of the area to dust soiling effects on people and property is summarised in Table 5.

Table 5 Construction Dust - 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

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

3.2.14 Table 6 outlines the criteria for determining the sensitivity of the area to human health impacts.

Table 6 Construction Dust - Sensitivity of the Area to Human Health Impacts

Receptor Sensitivity	Background 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/m³	More than 100	High	High	High	Medium	Low
		10 - 100	High	High	Medium	Low	Low
		1 - 10	High	Medium	Low	Low	Low
	28 - 32µg/m³	More than 100	High	High	Medium	Low	Low
		10 - 100	High	Medium	Low	Low	Low
		1 - 10	High	Medium	Low	Low	Low
	24 - 28µg/m³	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/m³	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/m³	More than 10	High	Medium	Low	Low	Low
		1 - 10	Medium	Low	Low	Low	Low

Receptor Sensitivity	Background 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
	28 - 32µg/m³	More than 10	Medium	Low	Low	Low	Low
		1 - 10	Low	Low	Low	Low	Low
	24 - 28µg/m³	More than 10	Low	Low	Low	Low	Low
		1 -10	Low	Low	Low	Low	Low
	Less than 24µg/m³	More than 10	Low	Low	Low	Low	Low
		1 - 10	Low	Low	Low	Low	Low
Low	-	1 or more	Low	Low	Low	Low	Low

3.2.15 Table 7 outlines the criteria for determining the sensitivity of the area to ecological impacts.

Table 7 Construction Dust - 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

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

3.2.17 Table 8 outlines the risk category from demolition activities.

Table 8 Construction Dust - Dust Risk Category from Demolition Activities

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

3.2.18 Table 9 outlines the risk category from earthworks and construction activities.

Table 9 Construction Dust - Dust Risk Category from Earthworks and Construction Activities

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

3.2.19 Table 10 outlines the risk category from trackout activities.

Table 10 Construction Dust - Dust Risk Category from Trackout Activities

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

Step 3

3.2.20 Step 3 requires the identification of site specific mitigation measures within the Mayor of London's guidance[13] 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

3.2.21 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**.

3.2.22 The determination of significance relies on professional judgement and reasoning should be provided as far as practicable. The Mayor of London's guidance suggests the provision of details of the assessor's qualifications and experience. These are provided in Appendix 2.

3.3 Operational Phase Assessment

Potential Development Impacts

3.3.1 The development has the potential to increase concentrations of NO_2 and PM_{10} as a result of road traffic exhaust emissions associated with vehicles travelling to and from the site during the operational phase. A screening assessment was therefore undertaken using the criteria contained within the Institute of Air Quality Management (IAQM) 'Land-Use Planning & Development Control: Planning for Air Quality'[14] guidance to determine the potential for trips generated by the development to affect local air quality.

13 The Control of Dust and Emissions During Construction and Demolition Supplementary Planning Guidance, The Mayor of London, 2014.

14 Land-Use Planning & Development Control: Planning for Air Quality, IAQM, 2017.

3.3.2 The following criteria are provided to help establish when an assessment of potential road traffic impacts on the local area is likely to be considered necessary:

- A change of Light Duty Vehicle (LDV) flows of more than 100 Annual Average Daily Traffic (AADT) within or adjacent to an AQMA or more than 500 AADT elsewhere;
- A change of HDV flows of more than 25 AADT within or adjacent to an AQMA or more than 100 AADT elsewhere;
- Realignment of roads where the change is 5m or more and the road is within an AQMA; or,
- Introduction of a new junction or removal of an existing junction near to relevant receptors

3.3.3 Should these criteria not be met, then the IAQM guidance[15] considers air quality impacts associated with a scheme to be **not significant** and no further assessment is required.

3.3.4 Should screening of the relevant data indicate that any of the above criteria are met, then potential impacts at sensitive receptor locations can be assessed by calculating the change in pollutant concentrations as a result of the proposed development. The significance of predicted impacts can then be determined in accordance with the methodology outlined in the IAQM guidance[16].

Potential Future Exposure

3.3.5 The proposal has the potential to expose future residents to poor air quality. In order to assess NO_2 and PM_{10} concentrations across the development site, detailed dispersion modelling was undertaken. Reference should be made to Appendix 1 for a full description of the assessment input data.

3.3.6 The results of the assessment were compared against the Air Pollution Exposure Criteria (APEC) contained within the London Councils Air Quality and Planning Guidance[17]. These are outlined in Table 11 and allow determination of the significance of predicted pollution

15 Land-Use Planning & Development Control: Planning for Air Quality, IAQM, 2017.

16 Land-Use Planning & Development Control: Planning for Air Quality, IAQM, 2017.

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

levels and associated exposure.

Table 11 Future Exposure Assessment Criteria

Category	Applicable Range		Recommendation
	Annual Mean NO_2 or PM_{10}	24-hour PM_{10}	
APEC - A	Below 5% of the annual mean AQO	> 1-day less than AQO	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 AQO	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 AQO	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

3.3.7 It should be noted that a significant area of London would fall under APEC - C due to high NO_2 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 site users is therefore considered a suitable way to progress sustainable schemes in these locations and has been considered within this assessment.

4.0 BASELINE

4.1 Introduction

4.1.1 Existing air quality conditions in the vicinity of the proposed development site were identified in order to provide a baseline for assessment. These are detailed in the following Sections.

4.2 Local Air Quality Management

4.2.1 As required by the Environment Act (1995), LBoB has undertaken Review and Assessment of air quality within their area of jurisdiction. This process has indicated that annual mean concentrations of NO_2 and 24-hour mean concentrations of PM_{10} are above the relevant AQOs within the borough. One AQMA has therefore been declared. This is described as follows:

> "The entire area south of the North Circular Road and all housing, schools and hospitals along the North Circular Road, Harrow Road, Bridgewater Road, Ealing Road, Watford Road, Kenton Road, Kingsbury Road, Edgware Road, Blackbird Hill, Forty Lane, Forty Avenue and East Lane."

4.2.2 The development is located within the AQMA. As such, there is the potential for the exposure of future residents to poor air quality, as well as vehicles travelling to and from the site to increase pollution levels in this sensitive area. This has been considered throughout the assessment.

4.2.3 LBoB has concluded that concentrations of all other pollutants considered within the AQS are currently below the relevant AQOs. As such, no further AQMAs have been designated.

4.3 Air Quality Monitoring

4.3.1 Monitoring of pollutant concentrations is undertaken by LBoB throughout their area of jurisdiction. Recent NO_2 results recorded in the vicinity of the development are shown in Table 12. Exceedences of the relevant AQO are shown in **bold**.

Table 12 Monitoring Results

Monitoring Site		Monitored NO_2 Concentration (µg/m^3)		
		2017	2018	2019
BRT58	51 High Road, Willesden	**52.8**	-(a)	**41.7**
74	Junction Salisbury Road/Chevening Road	-(a)	-(a)	31.4

Note: (a) Data unavailable

4.3.2 As shown in Table 12, annual mean NO_2 concentrations were above the relevant AQO at the BRT58 - 51 High Road, Willesden monitor in recent years. As the site is positioned at a roadside location within an AQMA, exceedences are to be expected. The 74 - Junction Salisbury Road/Chevening Road monitor recorded concentrations below the AQO in 2019. Reference should be made to Figure 2 for a map of the survey positions.

4.3.3 LBoB do not undertake monitoring of PM_{10} concentrations within the vicinity of the site.

4.4 Background Pollutant Concentrations

4.4.1 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 in grid square NGR: 524500, 184000. Data for this location was downloaded from the DEFRA website[18] for the purpose of this assessment and is summarised in Table 13.

Table 13 Background Pollutant Concentrations

Pollutant	Predicted Background Pollutant Concentration (µg/m^3)		
	2019	2021	2024
NO_2	25.76	23.37	21.42
PM_{10}	18.73	18.01	17.38

4.4.2 As shown in Table 13, predicted background concentrations are below the relevant AQOs at the development site.

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

4.5 Sensitive Receptors

4.5.1 A sensitive receptor is defined as any location which may be affected by changes in air quality as a result of a development. Receptors sensitive to potential dust impacts during demolition, earthworks and construction were identified from a desk-top study of the area up to 350m from the development boundary. These are summarised in Table 14.

Table 14 Demolition, Earthworks and Construction Dust Sensitive Receptors

Distance from Site Boundary (m)	Approximate Number of Human Receptors	Approximate Number of Ecological Receptors
Up to 20	10 - 100	0
Up to 50	10 - 100	0
Up to 100	More than 100	-
Up to 350	More than 100	-

4.5.2 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. These are summarised in Table 15.

Table 15 Trackout Dust Sensitive Receptors

Distance from Site Access Route (m)	Approximate Number of Human Receptors	Approximate Number of Ecological Receptors
Up to 20	More than 100	0
Up to 50	More than 100	0

4.5.3 There are no ecological receptors within 50m of the development boundary or the access route within 500m of the site entrance. As such, ecological impacts have not been assessed further within this report.

4.5.4 A number of additional factors have been considered when determining the sensitivity of the surrounding area. These are summarised in Table 16.

Table 16 Additional Area Sensitivity Factors to Potential Dust Impacts

Guidance	Comment
Whether there is any history of dust generating activities in the area	The baseline study indicated construction works have recently been undertaken for a residential development approximately 45m south of the site. As such, it is likely there has been a history of dust generation in the area
The likelihood of concurrent dust generating activity on nearby sites	There are a number of developments that have been granted planning consent in the vicinity of the site. It is therefore possible that there will be concurrent dust generation in the area should the construction phases of these schemes and the proposals overlap
Pre-existing screening between the source and the receptors	Trees and shrubs are located sporadically along the site boundary. These may act as a barrier between emission sources and receptors should they be retained during construction
Conclusions drawn from analysing local meteorological data which accurately represent the area: and if relevant the season during which works will take place	As shown in Figure 3, the predominant wind bearing at the site is from the south-west. As such, receptors to the north-east of the boundary are most likely to be affected by dust releases
Conclusions drawn from local topography	There are no significant topographical constraints to dust dispersion
Duration of the potential impact, as a receptor may become more sensitive over time	Currently it is unclear as to the duration of the construction phase. However, it is possible that it will extend over one year
Any known specific receptor sensitivities which go beyond the classifications given in the document	No specific receptor sensitivities identified during the baseline assessment

4.5.5 Based on the criteria shown in Table 4, the sensitivity of the receiving environment to potential dust impacts was determined as **high**. This was because the identified receptors included residential properties.

4.5.6 The sensitivity of the receiving environment to specific potential dust impacts, based on the criteria shown in Section 3.2, is shown in Table 17.

Table 17 Sensitivity of the Surrounding Area to Potential Dust Impacts

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

5.0 ASSESSMENT

5.1 Introduction

5.1.1 There is the potential for air quality impacts as a result of the construction and operation of the proposed development, as well as exposure of future residents to poor air quality. These issues are assessed in the following Sections.

5.2 Construction Phase Assessment

Step 1

5.2.1 The undertaking of activities such as demolition, excavation, ground works, cutting, construction, concrete batching and storage of materials has the potential to result in fugitive dust emissions throughout the construction phase. Vehicle movements both on-site and on the local road network also have the potential to result in the re-suspension of dust from haul roads and highway surfaces.

5.2.2 The potential for impacts at sensitive locations depends significantly on local meteorology during the undertaking of dust generating activities, with the most significant effects likely to occur during dry and windy conditions.

5.2.3 The desk-study undertaken to inform the baseline identified a number of sensitive receptors within 350m of the site boundary. As such, a detailed assessment of potential dust impacts was required.

Step 2

Demolition

5.2.4 Demolition will be undertaken at the start of the construction phase and will involve clearance of all existing buildings on site.

5.2.5 It is estimated that the total building volume to be demolished is less than 20,000m^3. In accordance with the criteria outlined in Table 3, the magnitude of potential dust emissions from demolition is therefore **small**.

5.2.6 Table 17 indicates the sensitivity of the area to dust soiling effects on people and property is **high**. In accordance with the criteria outlined in Table 8, the development is considered to be a **medium** risk site for dust soiling as a result of demolition activities.

5.2.7 Table 17 indicates the sensitivity of the area to human health impacts is **low**. In accordance with the criteria outlined in Table 8, the development is considered to be a **negligible** risk site for human health impacts as a result of demolition activities.

Earthworks

5.2.8 Earthworks will primarily involve excavating material, haulage, tipping and stockpiling, as well as site levelling and landscaping. The proposed development site covers an area of less than 2,500m^2. In accordance with the criteria outlined in Table 3, the magnitude of potential dust emissions from earthworks is therefore **small**.

5.2.9 Table 17 indicates the sensitivity of the area to dust soiling effects on people and property is **high**. In accordance with the criteria outlined in Table 9, the development is considered to be a **low** risk site for dust soiling as a result of earthworks.

5.2.10 Table 17 indicates the sensitivity of the area to human health impacts is **low**. In accordance with the criteria outlined in Table 9, the development is considered to be a **negligible** risk site for human health impacts as a result of earthworks.

Construction

5.2.11 The total proposed building volume is estimated to be less than 25,000m^3. In accordance with the criteria outlined in Table 3, the magnitude of potential dust emissions from construction is therefore **small**.

5.2.12 Table 17 indicates the sensitivity of the area to dust soiling effects on people and property is **high**. In accordance with the criteria outlined in Table 9, the development is considered to be a **low** risk site for dust soiling as a result of construction activities.

5.2.13 Table 17 indicates the sensitivity of the area to human health impacts is **low**. In accordance with the criteria outlined in Table 9, the development is considered to be a **negligible** risk site for human health impacts as a result of construction activities.

Trackout

5.2.14 Based on the total site area, it is anticipated that the unpaved road length will be less than 50m. In accordance with the criteria outlined in Table 3, the magnitude of potential dust emissions from trackout is therefore **small**.

5.2.15 Table 17 indicates the sensitivity of the area to dust soiling effects to people and property is **high**. In accordance with the criteria outlined in Table 10, the development is considered to be a **low** risk site for dust soiling as a result of trackout activities.

5.2.16 Table 17 indicates the sensitivity of the area to human health impacts is **medium**. In accordance with the criteria outlined in Table 10, the development is considered to be a **negligible** risk site for human health impacts as a result of trackout activities.

Summary of the Risk of Dust Effects

5.2.17 A summary of the risk from each dust generating activity is provided in Table 18.

Table 18 Summary of Potential Unmitigated Dust Risks

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

5.2.18 As indicated in Table 18, the potential risk of dust soiling is **medium** from demolition and **low** from earthworks, construction and trackout. The potential risk of human health impacts is **negligible** from demolition, earthworks, construction and trackout.

5.2.19 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.

Step 3

5.2.20 The Mayor of London's guidance[19] provides potential mitigation measures to reduce impacts as a result of fugitive dust emissions during the construction phase. These have been adapted for the development site as summarised in Table 19.

Table 19 Fugitive Dust Emission Mitigation Measures

Issue	Control Measure
Site management	• Display the name and contact details of person(s) accountable for air quality 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 the complaints log available to the LA when asked • Carry out regular site inspections, record inspection results, and make an inspection log available to the LA upon request • 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 are being carried out, and during prolonged dry or windy conditions • Record any exceptional incidents, either on or off the site, and the action taken to resolve the situation is recorded in the log book
Preparing and maintaining the site	• Plan site layout: machinery and dust causing activities should be located away from receptors • Erect solid screens or barriers around dusty activities or the site • 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
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 comply with the relevant standards • Ensure all vehicles switch off engines when stationary - no idling vehicles • Avoid the use of diesel or petrol powered generators and use mains electricity or battery powered equipment where practicable • Implement a Travel Plan that supports and encourages sustainable travel (public transport, cycling, walking, and car-sharing).

19 The Control of Dust and Emissions During Construction and Demolition Supplementary Planning Guidance, The Mayor of London, 2014.

Issue	Control Measure
Operations	• Only use cutting, grinding or sawing equipment fitted or in conjunction with suitable dust suppression techniques • Ensure an adequate water supply on the site for effective dust/particulate matter mitigation (using recycled water where possible) • Use enclosed chutes and conveyors and covered skips • Minimise drop heights and use fine water sprays wherever appropriate
Waste management	• Reuse and recycle waste to reduce dust from waste materials • Avoid bonfires and burning of waste materials
Demolition	• Ensure water suppression is used during demolition operations • Avoid explosive blasting, using appropriate manual or mechanical alternatives • Bag and remove any biological debris or damp down such material before demolition
Construction	• Ensure sand and other aggregates are stored in bunded areas and are not allowed to dry out • Avoid scabbling (roughening of concrete surfaces) if possible
Trackout	• Regularly use a water-assisted dust sweeper on access and local roads, as necessary • Avoid dry sweeping of large areas • Ensure vehicles entering and leaving site are covered to prevent escape of materials

Step 4

5.2.21 Assuming the relevant mitigation measures outlined in Table 19 are implemented, the residual impacts from all dust generating activities are predicted to be **not significant**, in accordance with the Mayor of London's guidance[20].

5.3 Operational Phase Assessment

Potential Development Impacts

5.3.1 Any vehicle movements associated with the proposals will generate exhaust emissions on the local and regional road networks. Information provided by Paul Mew Associates, the

20 The Control of Dust and Emissions During Construction and Demolition Supplementary Planning Guidance, The Mayor of London, 2014.

Transport Consultants for the scheme, indicated that the development is predicted to generate six trips per day.

5.3.2 Based on the provided information, the proposals are not predicted to result in an increase of LDV flows of more than 100 AADT on any individual road link, include significant highway realignment or the introduction of a junction and there will not be a requirement for more than 25 HDV deliveries per day. As such, potential air quality impacts associated with operational phase road vehicle exhaust emissions are predicted to be **not significant**, in accordance with the IAQM screening criteria shown in Section 3.3

Potential Future Exposure Assessment

5.3.3 The proposed development has the potential to expose future residents to elevated pollution levels. Dispersion modelling was therefore undertaken with the inputs described in Appendix 1 to quantify air quality conditions at the site. Reference should be made to Figures 5 and 6 for graphical representations of annual mean NO_2 and PM_{10} concentrations, respectively.

5.3.4 As shown in Figure 5, annual mean NO_2 concentrations were predicted to be below the AQO of 40μg/m^3 across the development. The maximum concentration at the site boundary was 29.73μg/m^3, which is classified as APEC - A in accordance London Councils Air Quality and Planning Guidance[21].

5.3.5 As shown in Figure 6, annual mean PM_{10} concentrations were predicted to be below the AQO of 40μg/m^3 across the development. The maximum concentration at the site boundary was 16.25μg/m^3, which is classified as APEC - A in accordance with the London Councils Air Quality and Planning Guidance[22].

5.3.6 The number of days with PM_{10} concentrations greater than 50μg/m^3 was predicted to be below the permitted number of 35 at all locations across the development. The maximum number of days with concentrations above 50μg/m^3 at the building façade was 1. This is

[21] London Councils Air Quality and Planning Guidance, London Councils, 2007.

[22] London Councils Air Quality and Planning Guidance, London Councils, 2007.

classified as APEC - A in accordance with the London Councils Air Quality and Planning Guidance[23].

5.3.7 Based on the assessment results, the site has been classified as APEC - A. It is therefore considered suitable for the proposed end-use from an air quality perspective without the inclusion of mitigation.

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

6.0 AIR QUALITY NEUTRAL ASSESSMENT

6.1 Introduction

6.1.1 The London Plan[24] requires that all developments are 'air quality neutral' to ensure proposals do not lead to further deterioration of existing poor air quality. In order to support the policy, guidance[25] has been produced on behalf of the GLA. The document provides a methodology for determining potential emissions from a development and benchmark values for comparison purposes. Where the benchmark is exceeded then action is required, either locally or by way of off-setting.

6.1.2 The Air Quality Neutral Assessment for the proposed development is outlined below.

6.2 Building Emissions

6.2.1 Heating and hot water for the development will be provided by Air Source Heat Pumps (ASHPs). These do not produce NO_x or PM_{10} emissions to atmosphere. As such, the proposals are considered air quality neutral from a building emissions perspective.

6.3 Transport Emissions

6.3.1 Transport Emission Benchmarks (TEBs) have been calculated based on the proposed number of residential units. The NO_x TEB is shown in Table 20.

Table 20 Transport Emission Benchmark - NO_x

Land Use	Number of Units	Emission Benchmark (g/unit/annum)	Emission (g/NO_x/annum)
Residential	21	1,553	32,613

6.3.2 As shown in Table 20, the NO_x TEB for the development is 32,613g/annum.

6.3.3 The PM_{10} TEB is shown in Table 21.

24 The London Plan - The Spatial Development Strategy for Greater London, GLA, 2021.

25 Air Quality Neutral Planning Support Update: GLA 80371, Air Quality Consultants and Environ, 2014.

Table 21 Transport Emission Benchmark - PM_{10}

Land Use	Number of Units	Emission Benchmark (g/unit/annum)	Emission (g/PM_{10}/annum)
Residential	21	267	5,607

6.3.4 As shown in Table 21, the PM_{10} TEB for the development is 5,607g/annum.

6.3.5 The anticipated NO_x emissions from the development were calculated based on the trip generation rates provided by Paul Mew Associates. These are shown in Table 22.

Table 22 Transport Emission - NO_x

Land use	Daily Trip Generation	Trip Length	Emission Rate (g/km)	Emission (g/NO_x/annum)
Residential	6	11.4	0.353	1,469

6.3.6 As shown in, the annual NO_x transport emissions from the development was calculated as 1,469 g/annum. This is lower than the TEB of 32,613g/annum. As such, further reduction techniques are not required.

6.3.7 The anticipated PM_{10} emissions are shown in Table 23.

Table 23 Transport Emission - PM_{10}

Land Use	Daily Trip Generation	Trip Length	Emission Rate (g/km)	Emission (g/PM_{10}/annum)
Residential	6	11.4	0.0606	252

6.3.8 As shown in Table 23, the annual PM_{10} transport emission from the development was calculated as 252g/annum. This is lower than the TEB of 5,607g/annum. As such, further reduction techniques are not required.

6.4 <u>Summary</u>

6.4.1 Potential emissions from the development were assessed in order to determine compliance with the air quality neutral requirements of the London Plan. The building energy strategy includes the use of ASHPs which do not produce emissions to atmosphere. In addition, transport emissions from the development were considered to be an acceptable level. As such, the proposals are considered air quality neutral.

7.0 CONCLUSION

7.1.1 Redmore Environmental Ltd was commissioned by ANX Developments Ltd to undertake an Air Quality Assessment in support of a residential development on land off 66 Cavendish Road, London.

7.1.2 The proposed development has the potential to cause air quality impacts at sensitive locations during construction and operation, as well as expose future occupants to any existing air quality issues. As such, an Air Quality Assessment was undertaken in order to determine baseline conditions at the site, consider its suitability for the proposed end-use and assess potential impacts associated with the scheme.

7.1.3 During the construction phase of the 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 Mayor of London's methodology. Assuming good practice dust control measures are implemented, the residual significance of potential air quality impacts from dust generated by demolition, earthworks, construction and trackout activities was predicted to be **not significant**.

7.1.4 Potential impacts during the operational phase of the proposed development may occur due to road traffic exhaust emissions associated with vehicles travelling to and from the site. These were assessed against the screening criteria provided within the IAQM guidance. Due to the low number of trips associated with the scheme, impacts were predicted to be **not significant.**

7.1.5 The proposal has the potential to expose future residents to elevated pollution levels. Dispersion modelling was therefore undertaken using ADMS-Roads in order to predict concentrations as a result of emissions from the local highway network. Results were subsequently verified using local monitoring data.

7.1.6 The results of the dispersion modelling assessment indicated that predicted concentrations of NO_2 and PM_{10} were below the relevant AQOs across the development. Pollutant levels were categorised as APEC - A in accordance with the London Councils Air Quality and Planning Guidance. As such, the site is considered suitable for the proposed use from an air quality perspective.

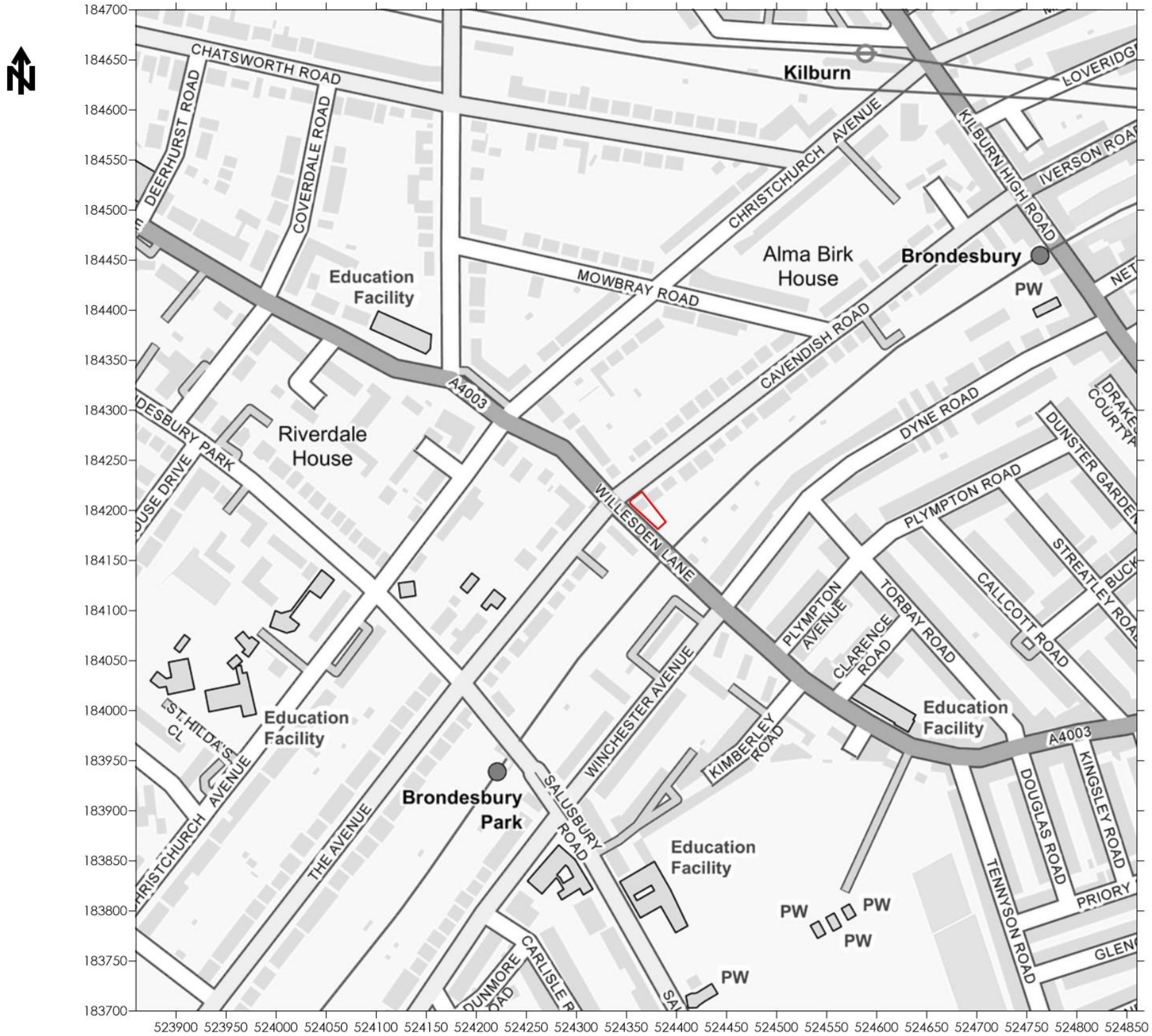
7.1.7 Potential emissions from the development were assessed in order to determine compliance with the air quality neutral requirements of the London Plan. The building energy strategy includes the use of ASHPs which do not produce emissions to atmosphere. In addition, transport emissions from the development were considered to be an acceptable level. As such, the development was considered to be air quality neutral.

7.1.8 Based on the assessment results, air quality issues are not considered a constraint to planning consent for the proposals.

8.0 ABBREVIATIONS

AADT	Annual Average Daily Traffic
ADM	Atmospheric Dispersion Modelling
APEC	Air Pollution Exposure Criteria
AQAP	Air Quality Action Plan
AQLV	Air Quality Limit Value
AQMA	Air Quality Management Area
AQO	Air Quality Objective
AQS	Air Quality Strategy
ASHP	Air Source Heat Pump
CERC	Cambridge Environmental Research Consultants
DEFRA	Department for Environment, Food and Rural Affairs
DfT	Department for Transport
DMP	Development Management Policies
EFT	Emissions Factor Toolkit
GLA	Greater London Authority
HDV	Heavy Duty Vehicle
HGV	Heavy Goods Vehicle
IAQM	Institute of Air Quality Management
LA	Local Authority
LAEI	London Atmospheric Emissions Inventory
LAQM	Local Air Quality Management
LBoB	London Borough of Brent
LDV	Light Duty Vehicle
LGV	Light Goods Vehicle
NGR	National Grid Reference
NO_2	Nitrogen dioxide
NO_x	Oxides of nitrogen
NPPF	National Planning Policy Framework
NPPG	National Planning Practice Guidance
PM_{10}	Particulate matter with an aerodynamic diameter of less than 10µm
SP	Slow Phase
SPG	Supplementary Planning Guidance
TEB	Transport Emission Benchmarks
z_0	Roughness length

Figures



Legend

Site Boundary

Title

Figure 1 - Site Location Plan

Project

Air Quality Assessment
Cavendish Road, London

Project Reference

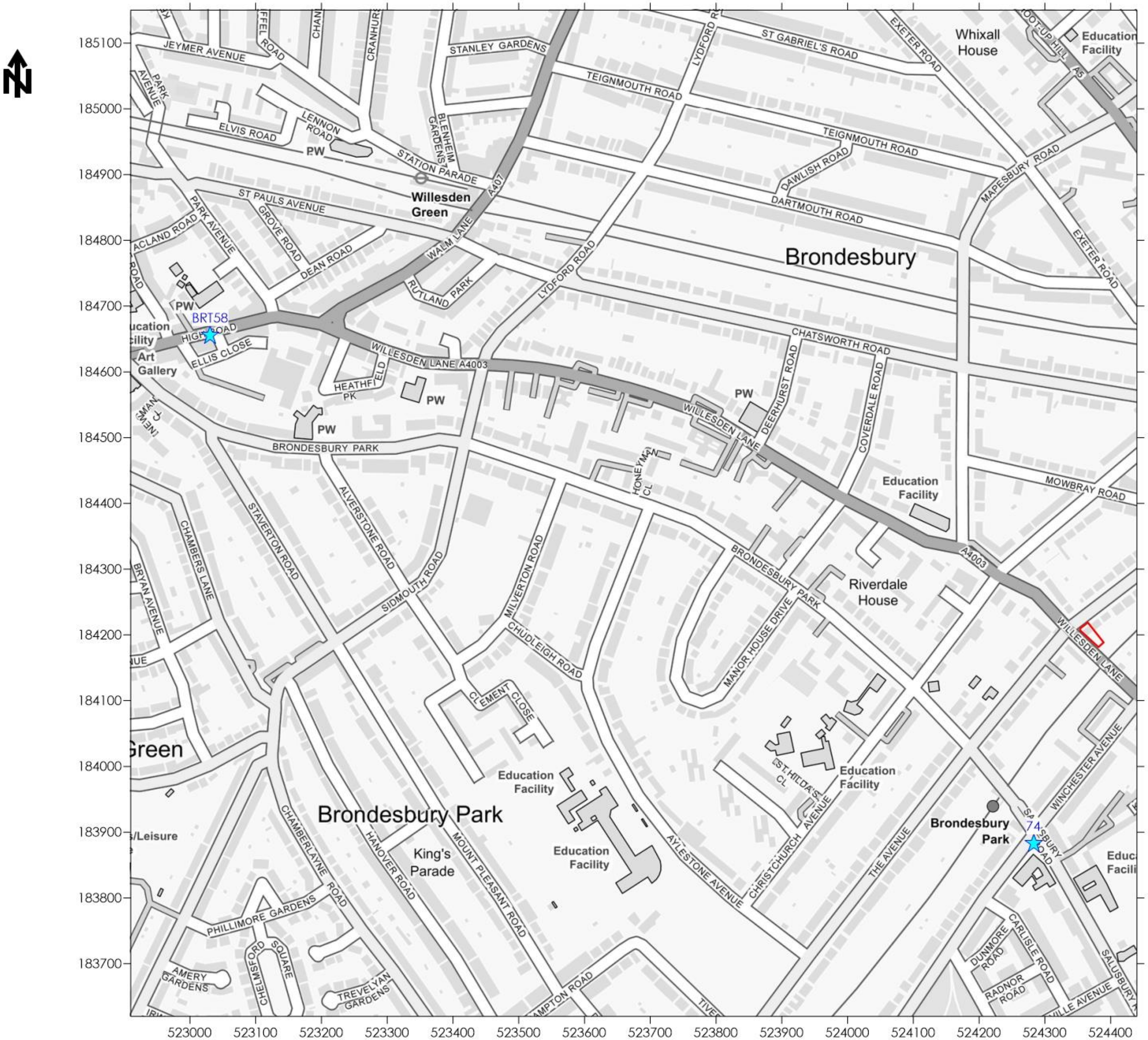
4396

Client

ANX Developments Ltd

Redmore environmental

www.red-env.co.uk | 0161 7060075



Legend

Site Boundary

Monitor

Title

Figure 2 - Monioring Locations

Project

Air Quality Assessment
Cavendish Road, London

Project Reference

4396

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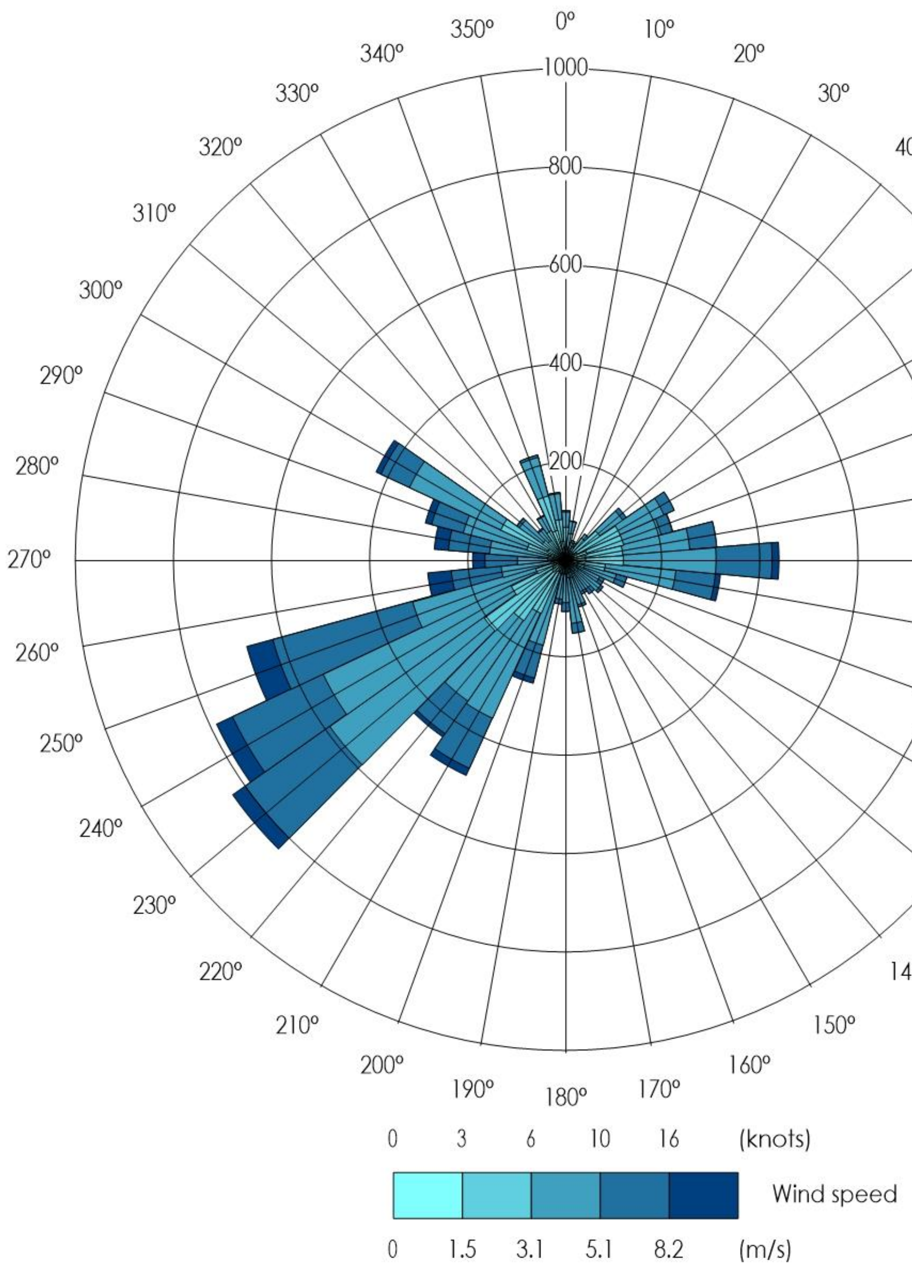

Legend

Title
Figure 3 - Wind Rose of 2019 London City Airport Meterological Data

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Air Quality Assessment
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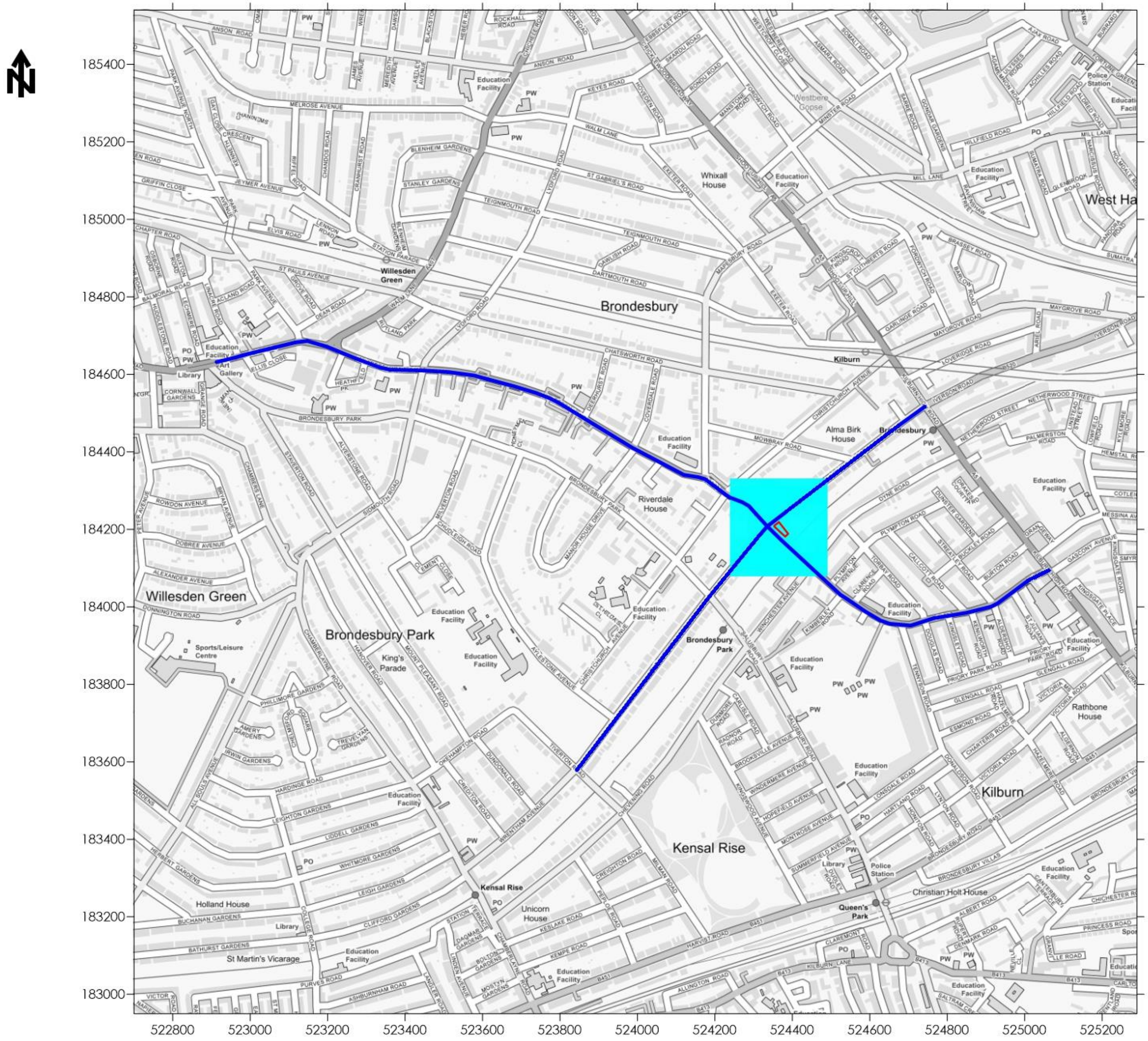

Legend

Site Boundary

Road Link

Output Grid

Title

Figure 4 - ADMS-Road Inputs

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Legend

Site Boundary

Annual Mean NO_2 Concentrations ($\mu g/m^3$)

34
33
32
31
30
29
28

APEC - A

Title

Figure 5 - Predicted Annual Mean NO_2 Concentration ($\mu g/m^3$)

Project

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Cavendish Road, London

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Legend

Site Boundary

Annual Mean PM_{10} Concentrations (µg/m3)

17.5
17
16.5
16

APEC - A

Title

Figure 6 - Predicted Annual Mean PM_{10} Concentration (µg/m³)

Project

Air Quality Assessment
Cavendish Road, London

Project Reference

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Appendix 1 - Assessment Input Data

Introduction

The proposed development has the potential to expose future residents to poor air quality. In order to assess pollutant concentrations across the site, detailed dispersion modelling was undertaken in accordance with the following methodology.

Modelling was undertaken for 2019 to allow verification against recent monitoring results and 2024 to represent likely conditions in the opening year of the scheme.

Dispersion Model

Dispersion modelling was undertaken in order to predict NO_2 and PM_{10} concentrations across the site using the ADMS-Roads dispersion model (version 5.0.0.1). 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 (z_0); and,
- Monin-Obukhov length.

Additional options can also be selected with the ADMS-Roads interface to take account of the site specific characteristics that may affect model output, such as canyons.

The relevant inputs are detailed in the following Sections.

Assessment Area

Ambient concentrations were predicted over the area NGR: 524240, 184080 to 524490, 184330. One Cartesian grid was included within the model to produce data suitable for contour plotting using the Surfer software package.

It should be noted that although the grid only covered the proposed site, road links were extended in order to ensure the impact of all relevant vehicle emissions in the vicinity of the development were considered.

Reference should be made to Figure 4 for a graphical representation of the assessment grid extents.

Traffic Flow Data

Traffic data for use in the assessment, including 24-hour AADT flows and fleet composition, was obtained from the London Atmospheric Emissions Inventory (LAEI). The LAEI was produced by the GLA and provides traffic flows throughout London for a number of scenarios. It should be noted that the LAEI is referenced in GLA guidance[26] as being a suitable source of data for air quality assessments and is therefore considered to provide a reasonable estimate of traffic flows in the vicinity of the site.

The baseline traffic data was converted to the opening year of the development utilising a factor obtained from TEMPro (Version 7.2). This software package has been developed by the Department for Transport (DfT) to calculate future traffic growth throughout the UK.

Road widths and vehicle speeds were estimated from aerial photography and UK highway design standards. A summary of the traffic data is provided in Table A1.1.

[26] London Local Air Quality Management (LLAQM)), Technical Guidance 2019 (LLAQM.TG (19)), GLA, 2019.

Table A1.1 Traffic Data

Link		24-hour AADT Flow		Road Width (m)	Average Vehicle Speed (km/h)
		2019	2024		
L1	A4003 Willesden Lane, approach to A5 Kilburn High Road, Slow Phase (SP)	10,098	10,801	8.2	25
L2	A4003 Willesden Lane, south of Cavendish Road	10,098	10,801	9.6	45
L3	A4003 Willesden Lane, south of Cavendish Road SP	10,098	10,801	8.5	25
L4	A4003 Willesden Lane, north of Cavendish Road SP	10,098	10,801	8.3	25
L5	A4003 Willesden Lane, north of Cavendish Road	10,098	10,801	7.7	45
L6	A4003 Willesden Lane, approach to Lydford Road, SP	10,098	10,801	9.8	25
L7	A4003 Willesden Lane, approach to Lydford Road	10,098	10,801	10.9	45
L8	A4003 Willesden Lane, south of A407 Walm Lane, SP	10,098	10,801	9.8	25
L9	A407 High Road, SP, Canyon 1	15,745	16,841	9.8	25
L10	A407 High Road	15,745	16,841	10.4	35
L11	A407 High Road, Canyon 2	15,745	16,841	8.3	35
L12	A407 High Road, one-sided Canyon 3	15,745	16,841	8.6	35
L13	A407 High Road, Canyon 4	15,745	16,841	9.3	35
L14	A407 High Road, one-sided Canyon 5	15,745	16,841	9.7	35
L15	A407 High Road, one-sided Canyon 6	15,745	16,841	9.2	35
L16	A407 High Road, Canyon 7	15,745	16,841	8.6	35
L17	Cavendish Road, SP	3,344	3,576	8.9	25
L18	Cavendish Road	3,344	3,576	8.9	35
L19	Cavendish Road, approach to A5 Kilburn High Road, SP	3,344	3,576	9.1	25
L20	The Avenue, SP	3,344	3,576	8.0	25
L21	The Avenue	3,344	3,576	7.7	35

Fleet composition data as a proportion of total flows on each link for cars, taxis, Light Goods Vehicles (LGV), Heavy Goods Vehicles (HGV), buses and coaches and motorcycles are summarised in Table A1.2.

Table A1.2 Fleet Composition Data

Link	Proportion of Fleet (%)						
	Car	Taxi	LGV	Rigid HGV	Artic HGV	Bus and Coach	Motorcycle
L1	71.7	1.6	0.3	7.4	0.4	13.8	4.8
L2	71.7	1.6	0.3	7.4	0.4	13.8	4.8
L3	71.7	1.6	0.3	7.4	0.4	13.8	4.8
L4	71.7	1.6	0.3	7.4	0.4	13.8	4.8
L5	71.7	1.6	0.3	7.4	0.4	13.8	4.8
L6	71.7	1.6	0.3	7.4	0.4	13.8	4.8
L7	71.7	1.6	0.3	7.4	0.4	13.8	4.8
L8	71.7	1.6	0.3	7.4	0.4	13.8	4.8
L9	67.9	7.4	0.3	9.0	0.6	12.8	2.0
L10	67.9	7.4	0.3	9.0	0.6	12.8	2.0
L11	67.9	7.4	0.3	9.0	0.6	12.8	2.0
L12	67.9	7.4	0.3	9.0	0.6	12.8	2.0
L13	67.9	7.4	0.3	9.0	0.6	12.8	2.0
L14	67.9	7.4	0.3	9.0	0.6	12.8	2.0
L15	67.9	7.4	0.3	9.0	0.6	12.8	2.0
L16	67.9	7.4	0.3	9.0	0.6	12.8	2.0
L17	72.0	2.0	0.4	1.9	0.4	18.6	4.7
L18	72.0	2.0	0.4	1.9	0.4	18.6	4.7
L19	72.0	2.0	0.4	1.9	0.4	18.6	4.7
L20	72.0	2.0	0.4	1.9	0.4	18.6	4.7
L21	72.0	2.0	0.4	1.9	0.4	18.6	4.7

Reference should be made to Figure 4 for a graphical representation of the road link locations.

Emission Factors

The emission factors were calculated using the relevant traffic flows and the Emissions Factor Toolkit (EFT) (version 10.1). This has been produced by DEFRA and incorporates COPERT 5.3 vehicle emission factors and fleet information.

There is current uncertainty over NO_2 concentrations within the UK, with the implementation of new vehicle emission standards not resulting in the previously expected reduction in roadside levels. Therefore, 2019 emission factors were utilised in preference to the development opening year in order to provide robust model outputs. As predictions for 2019 were verified, it is considered the results are a robust indication of worst case concentrations for the future year.

Canyons

Where buildings or walls surround roads, pollutant dispersion patterns are altered which can lead to high pollutant concentrations. These street canyons can significantly influence air quality along a road and therefore it is important to take consideration of their effects when undertaking dispersion modelling.

The release of ADMS-Roads version 4.0.1.0 in December 2015 incorporated a number of new features including an advanced street canyon module, which have been retained in version 5.0.0.1. Advanced street canyon modelling allows a number of parameters to be included in the dispersion model in order to predict pollutant dispersion patterns which better reflect air flow within complex urban geometries.

Canyons have five principal effects on dispersion which can influence pollutant concentrations. These are:

- Pollutants are channelled along street canyons;
- Pollutants are dispersed across street canyons by circulating flow at road height;
- Pollutants are trapped in recirculation regions;
- Pollutants leave the canyon through gaps between buildings - as if there was no canyon; and,
- Pollutants leave the canyon from the canyon top.

The combined modelling of these effects will result in concentration patterns unique to each canyon. The parameters used in the assessment are outlined in Table A1.3. It should be noted that where buildings are only present on one side of the road, parameters were purposely included at 0m.

Table A1.3 Canyons

Link	Parameters (m)					
	Canyon Width to Left	Average Height of Buildings to Left	Building Length Left	Canyon Width Right	Average Height of Buildings to Right	Building Length Right
L9	7.0	12.0	53.6	7.8	12.0	46.6
L11	8.0	11.0	69.3	5.8	13.0	69.3
L12	0.0	0.0	0.0	45.0	10.0	16.2
L13	9.5	12.0	42.2	6.2	14.0	40.2
L14	0.0	0.0	0.0	6.2	12.0	14.2
L15	9.2	12.0	16.2	0.0	0.0	0.0
L16	9.5	12.0	51.3	5.5	12.0	51.3

A choice of two modes is provided for use in the advanced canyon module. Standard mode assumes that each road is part of a continuous network of roads with similar canyon properties. Network mode analyses the road network to determine transport of pollutants between adjoining street canyons, allows for varying concentrations along the canyon and accounts for transport of pollutants out of the end of a canyon. Network mode is considered most accurate for detailed local analysis and as such was selected for use in the model.

<u>Meteorological Data</u>

Meteorological data used in the assessment was taken from London City Airport meteorological station over the period 1st January 2019 to 31st December 2019 (inclusive). London City Airport is located at NGR: 542739, 180487, which is approximately 18.7km south-east of the development. It is anticipated that conditions would be reasonably similar over a distance of this magnitude. The data was therefore considered suitable for an assessment of this nature.

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 3 for a wind rose of utilised meteorological data.

Roughness Length

The z_0 is a modelling parameter applied to allow consideration of surface height roughness elements. A z_0 of 1m was used to describe the modelling extents. This is considered appropriate for the morphology of the area and is suggested within ADMS-Roads as being suitable for 'cities, woodlands'.

A z_0 of 0.1m was used to describe the meteorological site. This is considered appropriate for the morphology of the area due to the large expanse of surrounding flat land use, such as runways, grassland and open water, and is suggested within ADMS-Roads as being suitable for 'root crops'.

Monin-Obukhov Length

The Monin-Obukhov length provides a measure of the stability of the atmosphere. A minimum Monin-Obukhov length of 100m was used to describe the modelling extents and meteorological site. This is considered appropriate for the nature of both areas and is suggested within ADMS-Roads as being suitable for 'large conurbations >1 million'.

Background Concentrations

Background NO_2 and PM_{10} concentrations for use in the assessment were obtained from the DEFRA mapping study for the grid square containing the development site, as shown in Table 13.

In order to avoid 'double-counting' of NO_2 and PM_{10} road vehicle emissions, the proportion of relevant background concentrations from primary A-roads and minor roads within the grid square were removed in accordance with the methodology outlined in the DEFRA guidance[27]. These sectors were considered to be most representative of those being modelled within ADMS-Roads. Background concentrations before and after adjustment are shown in Table A1.4.

27 Local Air Quality Management Technical Guidance (TG16), DEFRA, 2021.

Table A1.4 Predicted Background Concentrations - Modelling Extents

Pollutant	Total Predicted 2019 Background (µg/m^3)	Predicted 2019 Background with Sectors Removed (µg/m^3)
NO_2	25.76	23.96
PM_{10}	18.73	15.44

Similarly to emission factors, the background concentrations from 2019 were utilised in preference to the opening year. This provided a robust assessment and is likely to overestimate pollutant concentrations during the operation of the proposal.

It is noted that the GLA have released background concentration maps with a spatial resolution of 20m for 2013, 2020, 2025 and 2030. However, as the modelling area is considerably greater than 20m, and values were not available for the verification or opening year, this data was not considered appropriate for use in the assessment.

NO_x to NO_2 Conversion

Predicted annual mean NO_x concentrations were converted to NO_2 concentrations using the spreadsheet (version 8.1) provided by DEFRA, which is the method detailed within DEFRA guidance[28] and GLA guidance[29].

Prediction of 24-hour PM_{10} Concentrations

Predicted annual mean PM_{10} concentrations were converted to the number of days with PM_{10} concentrations above 50µg/m^3 using the equation outlined in the GLA guidance[30].

Verification

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

28 Local Air Quality Management Technical Guidance (TG16), DEFRA, 2021.

29 London Local Air Quality Management (LLAQM)), Technical Guidance 2019 (LLAQM.TG (19)), GLA, 2019.

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

- 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 the assessment, model verification was undertaken for 2019 using traffic data, meteorological data and monitoring results from this year.

Monitoring of NO_2 concentrations was undertaken at one location within the vicinity of roads included in the model during 2019. The result was obtained and the road contribution to total NO_x concentration calculated following the methodology contained within DEFRA guidance[31]. The monitored annual mean NO_2 concentration and calculated road NO_x concentration is summarised in Table A1.5.

Table A1.5 Verification - Monitoring Result

Monitoring Location		Monitored NO_2 Concentration ($\mu g/m^3$)	Calculated Road NO_x Concentration ($\mu g/m^3$)
BRT58	51 High Road, Willesden	41.70	40.26

The annual mean road NO_x concentration predicted from the dispersion model and the road NO_x concentration calculated from the monitoring result is summarised in Table A1.6.

Table A1.6 Verification - Modelling Result

Monitoring Location		Calculated Road NO_x Concentration ($\mu g/m^3$)	Modelled Road NO_x Concentration ($\mu g/m^3$)
BRT58	51 High Road, Willesden	40.26	55.07

31 Local Air Quality Management Technical Guidance (TG16), DEFRA, 2021.

The monitored and modelled road NO_x concentrations were compared to calculate the associated ratio. This indicated a verification factor of 0.731 was required to be applied to all modelling results.

Monitoring of PM_{10} concentrations is not undertaken within the assessment extents. The NO_x verification factor was therefore used to adjust PM_{10} model predictions in lieu of more accurate data in accordance with GLA guidance[32].

32 London Local Air Quality Management (LLAQM)), Technical Guidance 2019 (LLAQM.TG (19)), GLA, 2019.

Appendix 2 - Curricula Vitae

EMILY PEARS-RYDING

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KEY EXPERIENCE:

Emily is a Principal Environmental Consultant with specialist experience in the air quality sector Her key capabilities include:

- Production of Air Quality Assessments in accordance with Department for Environment, Food and Rural Affairs (DEFRA) methodologies for a range of residential, commercial and industrial sectors.
- Detailed dispersion modelling of road vehicle and industrial emissions using ADMS-Roads and ADMS-5. Studies have included impact assessment of ground level pollutant and odour concentrations and assessment of suitability of development sites for proposed end-use.
- Project management and co-ordination of Environmental Impact Assessments and scoping reports for developments throughout the UK.
- Assessment of fugitive dust impacts from a range of mineral extraction developments.
- Assessment of petrol stations to address benzene concentrations and their impact on adjacent developments.
- Production of air quality mitigation strategies specifically tailored to address issues at individual sites.
- Assessment of potential effects associated with network realignment schemes and highway developments.

SELECT PROJECTS SUMMARY:

Broad Street, Birmingham

Air Quality Assessment in support of a residential-led development on land at Broad Street, Birmingham. The proposals were located adjacent to a section of the Midland Metro Westside which runs along Broad Street. Consideration was made to the potential for re-alignment of the local road network as a result of the Metro to effect pollution levels at the development. The assessment indicated NO_2 concentrations exceeded air quality criteria from ground to third floor level as a result of road vehicle exhaust emissions. Mitigation was therefore specified for the affected units.

Home Farm, Forest Road, Warfield

Ecological Air Quality Assessment in support of a residential development. Natural England held concerns regarding potential impacts at sensitive ecological designations as a result of traffic exhaust emissions associated with the development. The predicted change in NO_x and ammonia concentrations and nitrogen and acid deposition was below the relevant criteria at all locations within the ecological designations. Impacts were therefore not considered to be significant.

Saltcoats Road, Stevenston

Air Quality Assessment in support of an educational campus and associated energy centre. Impacts associated with emissions from the proposed gas and biomass boilers were assessed through detailed dispersion modelling. This indicated impacts on annual mean NO_2 and PM_{10} concentrations were predicted to be not significant.

Blackthorn & Piddington

Environmental Impact Assessment in support of a railway embankment scheme on land at the Network Railway Embankment between Piddington and Blackthorn. Due to the extensive stabilisation works a Fugitive Dust Emissions Assessment was undertaken in addition to consideration of road vehicle exhaust emissions. Due to the location of the site in relation to nearby sensitive receptors, potential impacts associated with construction works were not considered to be significant.

Blackmoorfoot Road, Huddersfield

Air Quality in support of a residential-led development in close proximity to an operational minerals facility. Due to the presence of the Johnsons Wellfield Quarry to the south of the site a Fugitive Dust Emissions Assessment was undertaken to determine potential impacts. Dispersion modelling of road vehicle exhaust emissions was also undertaken in support of the scheme. Results indicated the overall significance of fugitive dust emissions from the quarry and air quality impacts associated with operation of the development itself were not significant.

Lockwood Bar, Huddersfield

Air Quality Assessment for the proposed highway realignment scheme along Lockwood Road, Huddersfield. Changes in pollution levels were considered at sensitive receptors as a result of variations to road geometry and associated redistribution of vehicle trips across the local area. Results of the dispersion modelling study indicated air quality impacts as a result of the scheme were not significant.

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KEY EXPERIENCE:

Amelia is an Environmental Consultant with specialist experience in the air quality sector. Her key capabilities include:

- Production of Air Quality Assessments in accordance with Department for Environment, Food and Rural Affairs (DEFRA) methodologies for a range of residential, commercial and industrial sectors.
- Detailed dispersion modelling of road vehicle exhaust emissions using ADMS-Roads. Studies have included assessment of road traffic exhaust emissions on sensitive receptors and exposure of new residents to poor air quality.
- Advanced canyon modelling to evaluate the impact of altered urban topography on air quality in built up areas.
- Assessment of construction dust impacts from a range of development sizes.
- Definition of baseline air quality and identification of sensitive areas across the UK.
- Production of air quality mitigation strategies specifically tailored to address issues at individual sites.
- Air quality monitoring at industrial sites to quantify pollutant concentrations
- Odour surveys to assess amenity and suitability of sites for potential future development for residential use.

SELECT PROJECTS SUMMARY:

Eagle House, South Ruislip

Air Quality Assessment for the change of use from an office block to a hotel in an Air Quality Management Area (AQMA). Concerns were raised regarding the exposure of future occupants to poor air quality due to road traffic emissions. Detailed dispersion modelling was undertaken using ADMS-roads to assess PM_{10} and NO_2 concentrations across the site as well as an Air Quality Neutral Assessment in accordance with the London Plan requirements. Results revealed that pollution levels were below the air quality standards across the development.

Parr Bridge, Tyldesley

Air Quality Assessment to support a residential development of 154 units. Dispersion modelling was undertaken due to the proximity of the site to an AQMA. Using sensitive receptors located in areas where increased road traffic may affect NO_2 levels, a comparison was made between concentrations with and without the development in place. Results indicated the impacts were not significant.

St James's Street, Westminster

Air Quality Assessment in support of a mixed-use development in an AQMA. Dispersion modelling was undertaken at several different heights reflective of residential units within the development. Predicted concentrations of NO_2 were found to exceed air quality criteria from ground to third floor level. As such, mitigation was specified for the affected units to ensure future residents would not be exposed to poor air quality.

Rookery Avenue, Whiteley, Farnborough

Odour Impact Assessment in support of a hot food takeaway with a drive thru facility in Whiteley. The assessment considered a number of factors, including the scale and nature of potential emissions, the location of nearest receptors and the proposed cooking type in accordance with the relevant DEFRA guidance. An appropriate ventilation system was identified and described on the basis of the assessment results.

Hoole Way, Chester

Air Quality Assessment in support an eight-storey student accommodation block to provide circa 373 units on land off Hoole Way, Chester. Concerns had been raised in relation to the potential exposure of future occupants to elevated pollution concentrations. An assessment was therefore undertaken using dispersion modelling in order to quantify air quality conditions across the site. The results revealed that the use of good practice control measures would provide suitable mitigation for the development.

St James Place, Liverpool

Air Quality Assessment in support of a residential-led development located across three different sites in an AQMA on land off St James Place, Liverpool. Detailed dispersion modelling was undertaken with the inclusion of advanced canyon modelling to evaluate the impact of the urban topography within the locality on the dispersion of traffic related pollutants. The results revealed pollutant concentrations were below the relevant standards across the site.