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51 CALTHORPE STREET, LONDON
Air Quality Assessment – Revision C

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51 CALTHORPE STREET, LONDON
Air Quality Assessment

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Contents

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Registration of Amendments

Revision and Date	Amendment Details	Revision Prepared By	Revision Approved By
Rev A 05.05.2020	Update to address Client comments	PZ	CB
Rev B 06.05.2020	Minor change to building spec	PZ	CB
Rev C 28.10.2020	Amendment to address comments from London Borough of Camden and introducing ASHP	GB	PZ

1.0 INTRODUCTION

1.1 Create Consulting Engineers Ltd have been commissioned by Mr Simon Firth to provide an Air Quality Assessment (AQA) in support of the planning application for the proposed development at 51 Calthorpe Street, London, WC1X 0HH (the Site) in the London Borough of Camden.

1.2 This AQA has been undertaken in accordance with guidance set out by the Institute of Air Quality Management (IAQM) and Environmental Protection UK (EPUK) to assess any likely air quality impacts associated with the proposed development upon the surrounding area and whether the site location can be considered as suitable for the proposed use.

1.3 In the event that potential impacts are identified, specific mitigation measures will be recommended in order to help safeguard the health and well-being of existing and future occupiers of the site and surrounding area.

1.4 The development site is located within the London Borough of Camden (LBC). Figure 1.1 shows the site location.

Figure 1.1: Site Location

1.5 The Site comprises an existing three storey Victorian-era building that is currently used as offices and storage. The building's eastern side is located adjacent to the Holiday Inn Hotel and the western side abuts other residential buildings on Calthorpe Street. The front of the existing development faces southeast over Calthorpe Street and is opposite the Mount Pleasant Royal Mail sorting centre. The rear northwest elevation of the development faces the Cubitt Street play centre. The Site is accessed solely via Calthorpe Street.

1.6 The development proposal comprises the refurbishment and extension of the existing building to enable a partial change of its use from offices to a mix of offices and residential accommodation. The scheme will lead to the creation of 8 flats over three upper floors plus part of the ground floor, with offices on the remainder of the ground floor and at lower ground floor and basement level. The scheme involves the addition of a basement level below the existing lower ground floor.

2.0 LEGISLATION AND POLICY CONTEXT

2.1 The Environment Act 1995 placed a responsibility on the UK Government to prepare an Air Quality Strategy (AQS) for England, Scotland, Wales and Northern Ireland. The most recent version of the strategy (2007) sets out the current UK framework for air quality management and includes a number of AQOs for specific pollutants.

2.2 The 1995 Act also requires that Local Authorities "review and assess" air quality in their areas, following a prescribed timetable. The Review and Assessment process is intended to locate and spatially define areas where the UK AQOs are not being met. In such instances, the Local Authority is required to declare an AQMA, carry out a Further Assessment of air quality, and develop an Air Quality Action Plan (AQAP), which should include measures to improve air quality so that the objectives may be achieved in the future. The timetables and methodologies for carrying out Review and Assessment studies are prescribed in Defra Technical Guidance – Local Air Quality Management Technical Guidance (LAQM.TG, 2016) and London specific LAQM.TG (16).

2.3 Table 2.1 lists the objectives relevant to this assessment that are included in the Air Quality Regulations 2000 and (Amendment) Regulations 2002 for the purposes of LAQM.

Pollutant	Air Quality Objective	
	Concentration	**Measured as**
Nitrogen Dioxide (NO_2)	200 µg/m^3	1-hour mean not to be exceeded more than 18 times per year
	40 µg/m^3	Annual mean
Particulate Matter (PM_{10})	50 µg/m^3	24-hour mean not to be exceeded more than 35 times per year
	40 µg/m^3	Annual mean

Table 2.1: Air Quality Objectives (England)

2.4 The National Planning Policy Framework (NPPF) (Feb 2019) paragraph 181 notes 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.

2.5 The National Planning Practise Guidance (NPPG) (Reference ID: 32-008-20140306), states that air quality assessments and resulting mitigation measures must be location specific and

proportionate to the nature/scale of development proposed and the level of concern about air quality.

Dust

2.6 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."*

2.7 Enforcement of the Act, in regard to nuisance, is currently under the administration 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). Enforcement can insist that there be no dust beyond the boundary of the works. 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 practice measures.

Regional Planning Policy

<u>The London Plan (2016)</u>

2.8 Policy 7.14 of The London Plan (2016) updated in 2017 (improving Air Quality), contains additional guidance for air quality in relation to planning decisions:

Development proposals should:

- *a- minimize increased exposure to existing poor air quality and make provision to address local problems of air quality (particularly within Air Quality Management Areas (AQMAs) and where development is likely to be used by large numbers of those particularly vulnerable to poor air quality, such as children or older people) such as by design solutions, buffer zones or steps to promote greater use of sustainable transport modes through travel plans (see Policy 6.3)*
- *b- promote sustainable design and construction to reduce emissions from the demolition and construction of buildings following the best practice guidance in the GLA and London Councils' 'The control of dust and emissions from construction and demolition'*
- *c- be at least 'air quality neutral' and not lead to further deterioration of existing poor air quality (such as areas designated as Air Quality Management Areas (AQMAs)).*
- *d- ensure that where provision needs to be made to reduce emissions from a development, this is usually made on-site. Where it can be demonstrated that on-site*

provision is impractical or inappropriate, and that it is possible to put in place measures having clearly demonstrated equivalent air quality benefits, planning obligations or planning conditions should be used as appropriate to ensure this, whether on a scheme by scheme basis or through joint area-based approaches

e- *where the development requires a detailed air quality assessment and biomass boilers are included, the assessment should forecast pollutant concentrations. Permission should only be granted if no adverse air quality impacts from the biomass boiler are identified*

London Environment Strategy

2.9 The most recent London Environment Strategy which replaced Mayor's Air Quality Strategy (MAQS) for London was published in August 2017. The overarching aim of the Strategy is to reduce pollution concentrations and tackle the most urgent environmental challenges facing our city, as well as safeguard London's environment over the longer term. We need to ensure that London is greener, cleaner and ready for the future. The Strategy commits to the continuation of measures identified in the 2010 MAQS and sets out a series of additional measures.

Policy 4.1.1 *Make sure that London and its communities, particularly the most disadvantaged and those in priority locations, are empowered to reduce their exposure to poor air quality*

Policy 4.1.2 *Improve the understanding of air quality health impacts to better target policies and action*

Policy 4.2.3 *Reduce emissions from non-transport sources, including by phasing out fossil fuels*

Policy 4.2.4 *The Mayor will work with the government, the London boroughs and other partners to accelerate the achievement of legal limits in Greater London and improve air quality*

Policy 4.2.5 *The Mayor will work with other cities (here and internationally), global city and industry networks to share best practice, lead action and support evidence-based steps to improve air quality*

Policy 4.3.2 *The Mayor will encourage the take up of ultra-low and zero emission technologies to make sure London's entire transport system is zero emission by 2050 to further reduce levels of pollution and achieve WHO air quality guidelines*

Policy 4.3.3 *Phase out the use of fossil fuels to heat, cool and maintain London's buildings, homes and urban spaces, and reduce the impact of building emissions on air quality*

Local Planning Policy

Camden Core Strategy 2010-2025

2.10 Camden's Core Strategy sets out the key elements of the Council's planning vision and strategy for the borough. It is the central part of our Local Development Framework (LDF), a group of documents setting out our planning strategy and policies. All other Local Development Framework documents must be consistent with the Core Strategy.

> ***CS9- Achieving a successful Central London***
> *[…]*
> *"continue to designate Central London as a Clear Zone Region to reduce congestion, promote walking and cycling and improve air quality"*
> *[…]*
>
> ***CS16 – Improving Camden's health and well-being***
> *[….]*
> *"recognise the impact of poor air quality on health and implement Camden's Air Quality Action Plan which aims to reduce air pollution levels"*
> […]

2.11 The assessment has been completed to address the key points raised by the adopted policies and follows the guidance provided by the GLA and LBC and reference has been made with reference to above policies within this report.

3.0 ASSESSMENT METHODOLOGY

3.1 This section outlines the assessment methodology and the criteria that have been used to assess the significance of risk associated with the proposed development.

Scope of Air Quality Assessment

3.2 The following document assesses the suitability of the site for the proposed development and whether any significant air quality impacts are expected as a result of the construction and operation of the proposed development.

3.3 A staged assessment approach has been adopted. This ensures that the approach taken for the assessment of risk is proportional to the risk of an unacceptable impact being caused. Where a simple review of the impacts associated with the proposed development shows that the risk of a health/annoyance impact is negligible, this will be sufficient and no further assessment will be undertaken.

3.4 In cases where the risk involved cannot be regarded as insignificant, a more detailed and quantitative assessment will be undertaken.

3.5 The methodology used in this assessment is presented in the following sections.

Dust Assessment

3.6 Potential dust impacts associated with construction activities have been assessed in accordance with guidance from the Institute of Air Quality Management (IAQM)[1] and the Greater London Authority (GLA)[2] best practice documents. The IAQM provides guidance on a five step process to assess the potential impacts of construction dust pre-mitigation, provide mitigation measures specific to the risk and assess the post-mitigation impacts.

3.7 The assessment procedure follows the following framework:

- Screen the requirement for a more detailed assessment;
- Assess the risk of dust impacts of the four phases of construction (demolition, earthworks, construction and trackout), taking into account:
  - the scale and nature of the works, which determines the potential Dust Emission Magnitude; and
  - the sensitivity of the area.
- Determine the site-specific mitigation for the potential activities;
- Examine the residual effects and determine whether or not these are significant; and
- Prepare the Construction Dust Assessment.

[1] Institute of Air Quality Management (2014). Guidance on the assessment of dust from demolition and construction. IAQM, London.
[2] Greater London Authority and London Councils (2006). The Control of dust and emissions from construction and demolition: Best Guidance Practice. GLA, London.

3.8 In the process for defining the sensitivity of an area/receptor, the following guidance has been used as below is Table 3.1.

Sensitivity of Area	Human Receptors	Ecological Receptors
High	Very densely populated area, 10-100 dwellings within 20m of site. Annual mean concentrations of PM_{10} close to/in exceedence of the national objective (40 µg m^{-3}). Very sensitive receptors (e.g. residential properties, hospitals, schools, care homes).	Internationally or nationally designated site, the designated features may be affected by dust soiling. A location where there is dust sensitive species present.
Medium	Densely populated area, 1-10 dwellings within 20m of site. Annual mean concentrations of PM_{10} below the national objective (> 28 µg m^{-3}). Medium sensitivity receptors (e.g. office and shop workers).	Nationally designated site where the features may be affected by dust deposition. A location with a particularly important plant species where its dust sensitivity is unknown.
Low	Sparsely populated area, 1 dwelling within 20m of site. Annual mean concentrations well below the national objectives (< 28 µg m^{-3}). Low sensitivity receptors (e.g. public footpaths, playing fields, shopping streets).	Locally designated site where the features may be affected by dust deposition.

Table 3.1: IAQM Factors for Defining the Sensitivity of an Area

Traffic Exhaust Emissions

3.9 The proposed development is proposed to be car free. Therefore, it has not been considered necessary to quantify traffic exhaust emissions as a result of the operation of the proposed development.

Operational Activities

3.10 A qualitative assessment of any likely impacts associated with any operational plant, will be completed based on the finding of the Energy Assessment produce for the same proposals. If necessary, mitigation measures will be recommended in order to minimise any detrimental impacts.

3.11 At this early stage, the use of air source heat pumps will be proposed at the development site.

Significance Criteria

3.12 In the event that the risk is assessed as significant, guidance is provided by the IAQM and EPUK on how to determine any likely changes in air pollutant concentrations and/or exposure as a result of a proposed development.

3.13 The methodology provided by the EPUK guidance document has been followed to determine the significance of the impacts. This process takes the following into account:

- the magnitude of the change (% change of annual mean concentration);
- the concentration relative to the AQS objective (above or below the objective); and
- the direction of change (adverse or beneficial).

3.14 The magnitude of an impact should be described by using the EPUK criteria set out in Table 3.2 below, the criteria are based on the change in concentration resulting by the proposed development as a percentage of the assessment level.

Magnitude of Change	Annual Mean NO_2/PM_{10}	Days PM_{10} > 50 µg m^{-3}
Large	Increase/decrease >10% (>4 µg m^{-3})	Increase/decrease >4 days
Medium	Increase/decrease 5-10% (2-4 µg m^{-3})	Increase/decrease 2-4 days
Small	Increase/decrease 1-5% (0.4-2 µg m^{-3})	Increase/decrease 1-2 days
Imperceptible	Increase/decrease <1% (<0.4 µg m^{-3})	Increase/decrease <1 day

Table 3.2: Impact Magnitude for Changes in Relation to Concentration of NO_2 and PM_{10}

3.15 The descriptors of impact significance for the annual mean concentration for both NO_2 and PM_{10} that take account of the magnitude of changes for the proposed development based on guidance from EPUK are shown in Table 3.3 below.

Total Concentration Related to Objective/Limit Value	Change in Concentration		
	Small	**Medium**	**Large**
Increase With Scheme			
Above Objective/Limit Value with Scheme (>40 µg m^{-3})	Minor Adverse	Moderate Adverse	Major Adverse
Just Below Objective/Limit Value with Scheme (36-40 µg m^{-3})	Minor Adverse	Moderate Adverse	Moderate Adverse
Below Objective/Limit Value with Scheme (30-36 µg m^{-3})	Negligible	Minor Adverse	Minor Adverse
Well Below Objective/Limit Value with Scheme (<30 µg m^{-3})	Negligible	Negligible	Minor Adverse
Decrease With Scheme			
Above Objective/Limit Value with Scheme (> 40 µg m^{-3})	Minor Beneficial	Moderate Beneficial	Major Beneficial

Total Concentration Related to Objective/Limit Value	Change in Concentration		
	Small	**Medium**	**Large**
Just Below Objective/Limit Value with Scheme (36-40 µg m^{-3})	Minor Beneficial	Moderate Beneficial	Moderate Beneficial
Below Objective/Limit Value with Scheme (30-36 µg m^{-3})	Negligible	Minor Beneficial	Minor Beneficial
Well Below Objective/Limit Value with Scheme (< 30 µg m^{-3})	Negligible	Negligible	Minor Beneficial

Table 3.3: Impact Descriptors for Changes to Annual Mean Concentration of NO_2 and PM_{10}

3.16 Once the magnitude of the change has been established, the impact at each relevant receptor needs to be described. The impact magnitude at each receptor location can be described using the changes stated above as Negligible, Minor, Moderate or Major, as either Adverse or Beneficial, and either Temporary or Permanent.

3.17 The overall significance should be described separately for both the impact of emissions related to the proposed development on existing receptors, and for the impacts of emissions from existing source(s) on new exposure being introduced from the proposed development.

3.18 Air quality is not well suited to the rigid application of generic significance matrix to determine the overall significance of a development. Professional judgement should be employed throughout, and the assessment should take into account site specific considerations.

4.0 BASELINE CONDITIONS

4.1 Baseline data were gathered from the following sources:

- 2019 Air Quality Annual Status Report for LBC;
- 2017 DEFRA's national air quality background maps; and
- LAEI 2016 Map Data.

Local Air Quality Management

4.2 As required by the Environment Act (1995), London Borough of Camden has undertaken a review and assessment of air quality within their administrative area. The recent Annual Status Report 2019 has indicated that areas of the jurisdiction exceed the air pollutant guidelines. This has led to an AQMA being enforced since 2002. This LAQMA was designated for both NO_2 annual mean objectives with PM_{10} 24-hr mean objective by London Borough of Camden.

Camden AQMA- *"Whole Borough of Camden".*

4.3 As a result the proposed development site is located within the AQMA.

Monitoring Locations

Automatic Monitoring Location

4.4 LBC operates continuous automatic monitoring at four locations across the Borough. But due to no site representation, none of them has been considered for this assessment.

4.5 A caution should therefore be employed when using this automatic monitoring location to predict pollutant concentrations on the proposed site as they will most likely result in overestimation.

Diffusion Tube Monitoring

4.6 LBC also undertakes passive monitoring for the pollutants. As the site falls to another boundary, i.e. London Borough of Islington, therefore, closest diffusion tube are listed below in Table 4.1.

Site ID	X (m)	Y (m)	Site Type	Annual Mean NO_2 Concentrations µg/m^3			
				2016	2017	2018	2019
BIS005/02 Roseberry	531336	182599	Roadside	62	54	51	44
IS005/03 Perry Circus	530901	182855	Roadside	37	31	30	32
BIS005/10 Highbury Fields	531755	185454	Background	34	28	28	26

Table 4.1 Diffusion Tube Monitoring Locations for NO_2

4.7 As indicated that nearest Diffusion tube BIS005/02 had exceedance during recent years. It may be due to higher background pollutant values and the general low level speed of road traffic.

Background Concentrations

4.8 The Defra website includes estimated background pollutant concentrations data forNO_2, PM_{10} and $PM_{2.5}$ for each 1km by 1km OS grid square. Background pollutant concentrations are modelled from the base year of 2017 based on ambient monitoring and meteorological data from 2017. Defra also include projections for future years on the website. Estimated pollutant concentrations for the current year (2019) in the OS grid square in which the proposed development site lies (NGR 530500, 182500) are shown in Table 4.2 below.

Pollutant	2019 Annual Mean (µg/m^3)
NOx	69.50
NO_2	39.25
PM_{10}	20.34
$PM_{2.5}$	12.94

Table 4.2: Annual Predicted Mean Background Concentrations for NO_2, and PM_{10}/ $PM_{2.5}$

4.9 Annual mean background concentration for NO_2, and PM_{10} doesn't exceeds the Air Quality Objective (AQO's) of 40µg/m^3 for both pollutants in 2019. Currently, there is no annual mean objective for $PM_{2.5}$ in England.

5.0 ASSESSMENT INPUTS

5.1 The built and occupied development has the potential to expose future site users to elevated pollutant levels. In order to assess NO_2 and PM_{10} concentrations across the site, detailed dispersion modelling was undertaken using the following inputs.

Dispersion Model

5.2 Dispersion modelling was undertaken using the ADMS-Roads dispersion model (version 4.1.1.0). 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.

Input Data

5.3 The model requires input data that details the following parameters:

- Emission Factors;
- Meteorological data;
- Roughness length; and
- Monin-Obukhov length.

Emission Factors

5.4 Emission factors for each link were calculated using the relevant traffic flows and the Emissions Factor Toolkit (version 9.0) released in May 2019, which incorporates updated COPERT5 vehicle emissions factors for NOx and vehicle fleet information.

5.5 There is current uncertainty over NO_2 concentrations within the UK, with roadside levels not reducing as previously expected due to the implementation of new vehicle emission standards. Therefore, 2019 emission factors have been utilised for the prediction of pollution levels for all scenarios in preference to the development opening year (2021) in order to provide a robust assessment.

Traffic Flow Data

5.6 Traffic data for this scheme including baseline and future years was provided by Create Transport Planners.

5.7 Traffic data for use in the assessment, including 24-hour Annual Average Daily Traffic (AADT) flows and fleet composition, was obtained from the Department for Transport (DfT) and LAEI.

5.8 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. It should be noted that the DfT matrix is referenced in DEFRA guidance LAQM (TG16) 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.

5.9 Growth factors provided by the Trip End Model Presentation Program (TEMPRO) software package were utilised to allow for conversion from the obtained 2019 traffic flow year to 2021, which was used to represent the development opening year.

5.10 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. Reference should be made to Figure 5.1 for a graphical representation of the road link locations used within the ADMS model.

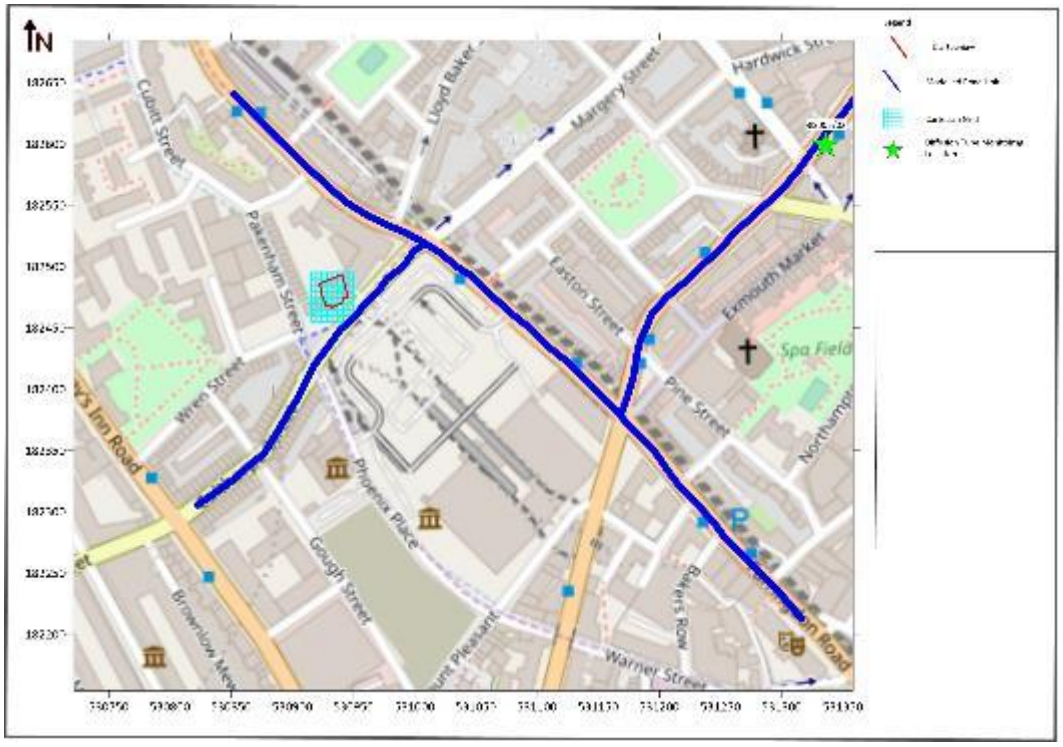

Figure 5.1 ADMS Input for the Model

5.11 A summary of the traffic data used in the verification scenarios is provided in Table 5.1.

Link ID	Road Links	Road Width (m)	24-hour AADT Flow	HDV Prop (%)	Mean Vehicle Speed (km/h)
L1	Farringdon Road	32.5	18317	4.54	40
L2	Farringdon Road/ Roseberry Avenue	35.2	18317	4.54	30
L3	Farringdon Road	32.0	18317	4.54	35

Link ID	Road Links	Road Width (m)	24-hour AADT Flow	HDV Prop (%)	Mean Vehicle Speed (km/h)
L4	Farringdon Road/ Margery Street	35.5	18317	4.54	25
L5	Farringdon Road North	33.0	18317	4.54	35
L6	Calthorpe Street/ Peckham Street	25.5	18317	4.27	35
L7	Calthorpe Street	30.0	1900	4.27	30
L8	Rosebery Avenue	28.5	17851	9.30	25
L9	Rosebery Avenue	32.5	17851	9.30	30
L10	Rosebery Avenue/ Farringdon Road	35.0	17851	9.30	25

Table 5.1 2019 Traffic Data

5.12 The road width and mean vehicle speed shown in Table 5.1, remained the same for development opening year scenario (2021). A summary of the 2021 traffic data is shown in Table 5.2.

5.13 This should be noted that different links have been used for the traffic approaching at busy junctions and delays during peak/off peak as a general measure.

Site ID	Road Link	24-hours AADT Flow	HDV Prop: (%).
L1	Farringdon Road	18,518	4.54
L2	Farringdon Road/ Roseberry Avenue	18,518	4.54
L3	Farringdon Road	18,518	4.54
L4	Farringdon Road/ Margery Street	18,518	4.54
L5	Farringdon Road North	18,518	4.54
L6	Calthorpe Street/ Peckham Street	1,920	4.27
L7	Calthorpe Street	1,920	4.27
L8	Rosebery Avenue	18,046	9.30
L9	Rosebery Avenue	18,046	9.30
L10	Rosebery Avenue/ Farringdon Road	18,046	9.30

Table 5.2 2021 Traffic Data

Meteorological Data

5.14 Meteorological data used in this assessment was taken from London City Airport meteorological station over the period 1st January 2019 to 31st December 2019 (inclusive) as shown in Figure 5.1. London City Airport meteorological station is located approximately 14.5km south west of the proposed development.

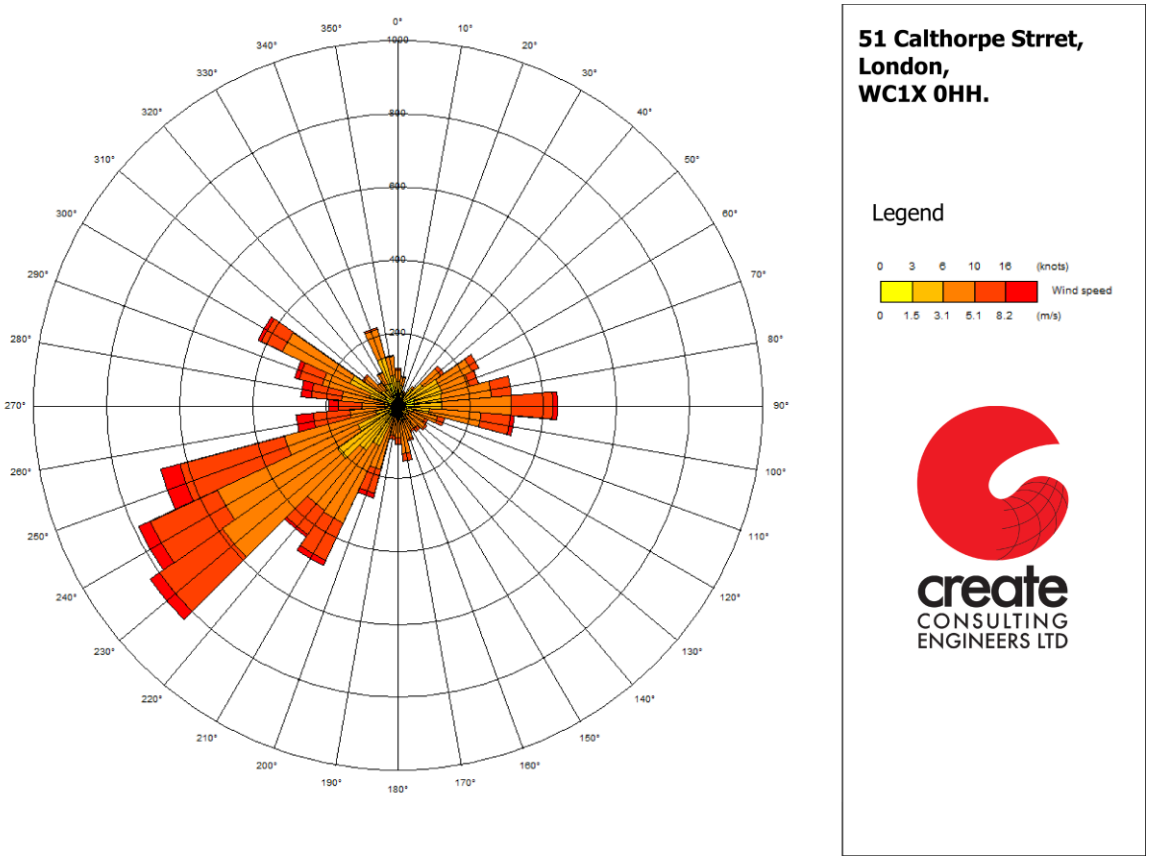

Figure 5.2 Wind Rose for London City Airport Meteorological Data 2019

5.15 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.

Roughness Length

5.16 A roughness length (z0) of 1m was used within the dispersion model and for morphology of meteorological station. This value of z0 is considered appropriate for the morphology of the assessment area and is suggested within ADMS-Roads as being suitable for 'Cities and Woodland'.

Monin-Obukhov Length

5.17 The Monin-Obukhov length provides a measure of the stability of the atmosphere. A minimum Monin-Obukhov length of 30m was used in the assessment area. This value is considered appropriate for the nature of the assessment area and the metrological station and is suggested within ADMS-Roads as being suitable for 'cities and large towns'.

Background Concentrations

5.18 NO_2 concentration (39.25µg/m^3) and PM_{10} concentration of 20.34µg/m^3 as predicted by DEFRA, was used in the dispersion modelling assessment to represent annual mean PM levels in the vicinity of the site.

5.19 Similar to emission factors, background concentrations for 2019 were utilised in preference to the development opening year. This provided a robust assessment and is likely to overestimate actual pollutant concentrations during the operational phase of the proposals.

NO_x to NO_2 Conversion

5.20 Predicted annual mean NOx concentrations from the dispersion model were converted to NO_2 concentrations using the spreadsheet provided by DEFRA, which is the method detailed within LAQM (TG16).

Verification

5.21 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.

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

5.23 The dispersion model was run with the traffic input data previously detailed for 2019 to predict the NOx concentration at the monitoring locations. The results are shown in Table 5.3.

Site ID Name	Monitored Road NO_x Concentration (µg/m^3)	Modelled Road NO_x Concentration (µg/m^3)
BIS005/02 Roseberry	44	40.90

Table 5.3 NO_2 Verification Results

5.24 The monitored and modelled NOx road contribution concentrations were graphed below and the equation of the trend line based on the linear progression through zero was calculated. This indicated that a verification factor of **1.0757** was required to be applied to all NOx modelling results, showing the model has a slight tendency to underestimate pollutant concentrations throughout the assessment extents.

5.25 Table 5.4 presents the monitored annual mean NO_2 concentrations and the adjusted modelled total NO_2 concentration based on the above verification factor.

Site ID Monitoring Location	Monitored NO_2 Concentration ($\mu g/m^3$)	Adjusted Modelled Total NO_2 Concentration ($\mu g/m^3$)	Difference (%)
BIS005/02 Roseberry	**44**	**43.98**	0.04 %

Table 5.4 2019 NO_2 Monitoring Results

5.26 As PM_{10} monitoring was not undertaken within the assessment extents, a factor of **1.0757** was utilised to adjust model predictions of particulate matter in accordance with the guidance provided within LAQM (TG16).

6.0 ASSESSMENT

Construction

6.1 During the demolition, site clearance and construction phases, there is the potential for emissions of dust to cause annoyance/nuisance for sensitive receptors, both human and ecological located close to the site.

6.2 The construction activities associated with the proposed development can be separated into four stages:

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

6.3 There are numerous sensitive receptors within close proximity to the site that could potentially be affected by construction dust emissions in relation to any of the above stages.

6.4 The site is located within the Bloomsbury Conservation Area. However, no sensitive ecological receptors have been identified in close proximity to the site. Therefore, the risk has been assessed as negligible.

Why is the Dust Assessment Required?

6.5 In line with IAQM (2014), the following screening criterion has been applied to the assessment: An assessment will normally be required where there is:

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

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

Step 1

6.6 The undertaking of activities such as 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 road and highway surfaces.

6.7 There are a number of human receptors within 50m to 350m of the site boundary but no ecological receptors within 50m of the site. However, a dust assessment is still required due to the proposed development location meeting the 'human receptor' portion of the above criteria as shown below in Figure 6.1.

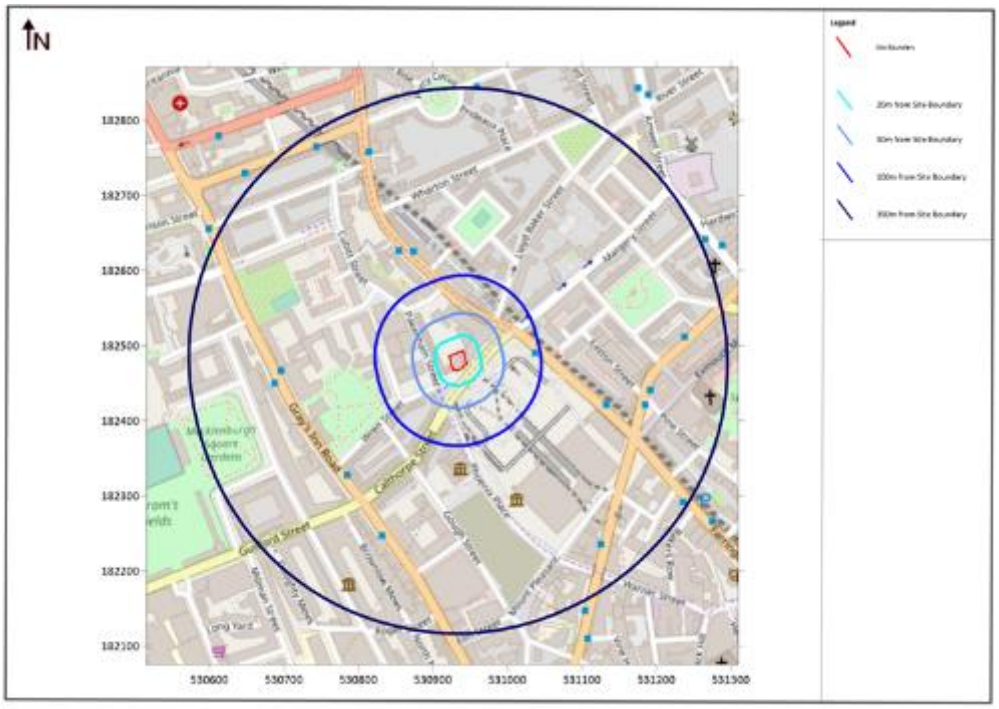

Figure 6.1 Dust, Demolition and Construction Buffer

6.8 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.

Step 2

<u>Demolition</u>

6.9 The proposed development site is estimated to cover a total building volume under 20,000m^3. In accordance with the criteria outlined in Table 3.2, the magnitude of potential dust emissions from earthworks is therefore **medium**.

6.10 The sensitivity of the area to dust soiling effects on people and property is **high**. In accordance with the criteria outlined in Table 3.2, the development is considered to be a **medium** risk site for dust soiling as a result of earthworks activities.

6.11 The sensitivity of the area to human health impacts is **low**. In accordance with the criteria outlined in Table 3.2, the development is considered to be a **negligible** risk site for human health impacts as a result of earthwork activities.

Earthworks

6.12 Earthworks will primarily involve excavating material, haulage, tipping and stockpiling, as well as site levelling and landscaping. Information on soil type was not available for the purpose of this assessment. As such, the soil type was considered to be potentially dusty in order to provide a worst-case scenario.

6.13 The proposed development site is estimated to cover a total area is less than 2,500m^2. In accordance with the criteria outlined in Table 3.2 the magnitude of potential dust emissions from earthworks is therefore **small**.

Construction

6.14 Due to the size of the development site the total building volume is likely to be less than 25,000m^3. In accordance with the criteria outlined in Table 3.2, the magnitude of potential dust emissions from construction is therefore **small**.

Trackout

6.15 Information on the number of HDV trips to be generated during the construction phase of the development was not available at the time of assessment. However details of the assumed track out details are provided below in Figure 6.2.

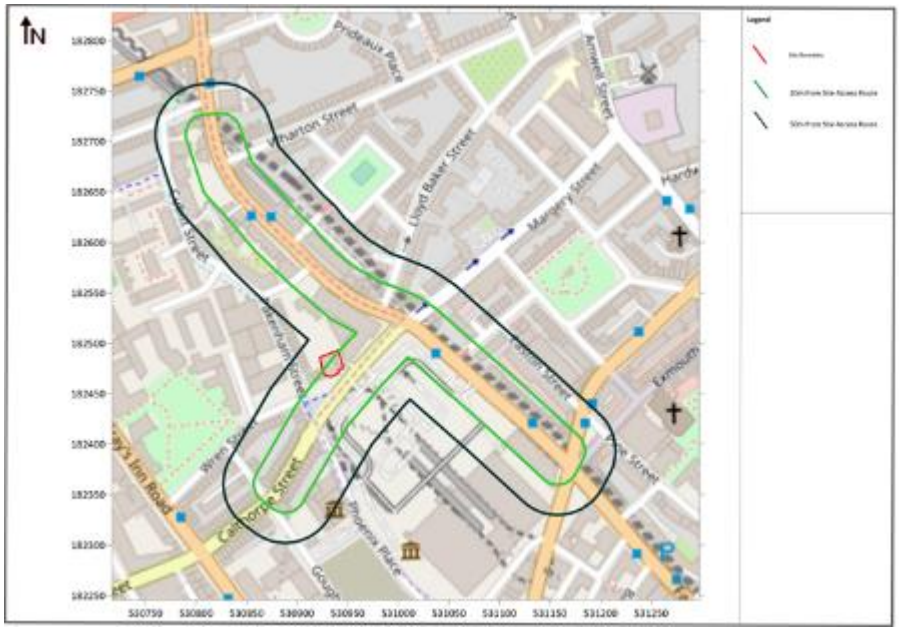

Figure 6.2 Trackout from Proposed Development Site

6.16 Based on the site area, it is anticipated that the unpaved road length is likely to be less than 50m. In accordance with the criteria outlined in Table 3.2, the magnitude of potential dust emissions from trackout is therefore **small**.

Summary of the Risk of Dust Effects

6.17 The DEM determined in Step 2A should be combined with the sensitivity of area determined in Step 2B to determine the risk of impacts, with no mitigation applied.

6.18 The matrices shown in IAQM (2014) section 7.4 provide a method of assigning a level of risk for each activity. This should be used to determine the level of mitigation that should be applied. For the categories where risk is negligible, no mitigation beyond those required by legislation is required. This has been illustrated in Table 6.2.

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

Table 6.2 Summary of Potential Unmitigated Dust Risks

6.19 As indicated, the potential risk of dust soiling is **medium** for demolition phase and **low** for all other construction activities. The potential risk of human health impacts is **Negligible** for demolition, earthworks, construction and trackout phase activities.

6.20 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

6.21 The IAQM guidance provides a number of potential mitigation measures to reduce impacts during the construction phase. These measures have been adapted for the development site as summarised in Table 6.3. The mitigation measures outlined in section 7 can be reviewed prior to the commencement of construction works incorporated into the existing the strategies as applicable.

Issue	Control Measure
Communications	• Display the name and contact details of person(s) accountable for air quality and dust issues on the site boundary • Develop and implement a stakeholder communications plan that includes community engagement • Display the head or regional office contact information • Develop and implement a Dust Management Plan (DMP), which may include measures to control other emissions, approved by the LA
Site Management	• Record all dusty and air quality complaints and make the complaints log available to the LA when asked • Record any exceptional incidents that cause dust/or air emissions, and the action taken to resolve the situation • Make complaints log available to LA when asked
Monitoring	• Carry out regular site inspections to monitor compliance with the DMP • Increase frequency of site inspections when activities with a high potential to produce dust are being carried out • Agree dust deposition, dust flux, or real-time PM_{10} continuous monitoring locations with the Local Authority
Preparing and Maintaining the Site	• Plan site layout so that machinery and dust causing activities are located away from receptors • Fully enclose site or specific operations where there is a high potential for dust production and the site as actives for an extensive period • Avoid site runoff of water or mud • Use water as dust suppressant where applicable • Keep site fencing, barriers and scaffolding clean using wet methods • Remove materials that have a potential to produce dust from site as soon as possible • Cover, seed or fence stockpiles to prevent wind whipping
Operating Vehicle/ Machinery and Sustainable Travel	• All vehicles to switch off engines - no idling vehicles • Avoid the use of diesel- or petrol-powered generators where practicable • Implement a Travel Plan that supports and encourages sustainable travel • Produce a Construction Logistics Plan to manage sustainable deliveries

Issue	Control Measure
Operations	• Cutting equipment to use water as dust suppressant or suitable local extract ventilation • Ensure adequate water supply on the site for effective dust/particulate matter suppression/mitigation • Use enclosed chutes and covered skips • Minimise drop heights • Ensure equipment is readily available on site to clean any spillages
Waste Management	• No bonfires
Earthworks and Construction	• Avoid scabbling • Ensure sand and other aggregates are stored and not able to dry out, unless it is required for a specific process
Trackout	• Use water-assisted dust sweeper on the access and local roads • Avoid dry sweeping of large areas • Ensure vehicles entering and leaving sites are covered to prevent escape of materials • Inspect on-site haul routes for integrity, instigate necessary repairs and record in site log book • Install hard surfaced haul routes which are regularly damped down • Implement a wheel washing system at a suitable location near site exit • Ensure there is an adequate area of hard surfaced road between the wheel wash facility and the site exit, wherever site size and layout permits • Access gates to be located at least 10m from receptors, where possible

Table 6.3 Fugitive Dust Mitigation Measures

Step 4

6.22 Assuming the relevant mitigation measures outlined in Table 6.3 are implemented, the residual effect from all dust generating activities is predicted to be not significant, in accordance with the IAQM guidance.

6.23 The above summary demonstrates that the proposed development, pre-mitigation, has the potential to result in a medium effect upon sensitive receptors from dust soiling and low impact on human health.

6.24 The mitigation measures, detailed above in Table 6.3, have been recommended to ensure that the residual effect of construction dust on the receptors and surrounding area will be temporary and, where possible, **negligible.**

Operational Phase

Traffic Emissions

6.25 The EPUK & IAQM (2017) Land-Use Planning and Development Control: Planning for Air Quality guidance provides indicative criteria for the requirement of an Air Quality Impact Assessment. The following criteria has been considered for this assessment:

Step 1

- If any of the following apply to the development:
  - *Contains 10 or more residential units or a site area of more than 0.5ha; or*
  - *Contains more than 1,000 m^2 of floor space for all other uses or a site area greater than 1ha*
- Coupled with any of the following:
  - *The development has more than 10 parking spaces; or*
  - *The development will have a centralised energy facility or centralised combustion process*

Step 2

- A change of LGV (light goods vehicle) flow of:
  - *More than 100 AADT within or adjacent to an AQMA; or*
  - *More than 500 AADT elsewhere.*

- A change of HGV (HGV goods vehicle) flow of:
  - *More than 25 AADT within or adjacent to an AQMA; or*
  - *More than 100 AADT elsewhere.*

6.26 The development is proposed to be car free and no contribution to local pollution levels is expected as a result of development traffic. Therefore, traffic impact from the development is considered to be negligible and no further assessment is required.

Energy Emissions

6.27 4 roof mounted air source heap pumps (ASHP), model number ECODAN PUHZ-W85BHA2 are proposed for the dwellings. As a result, the provision of ASHP have been modelled within the development scenario. No CHP or individual boilers are proposed on the site.

Future Exposure

6.28 During the operational phase of the proposed development there is the potential for future residents to be exposed to elevated pollutant concentrations.

6.29 This has been assessed through dispersion modelling, with the results presented in the following Sections.

Nitrogen Dioxide

6.30 The contour plots for the predicted annual mean NO_2 concentrations at ground (1.5m), 5m and 8.5m respectively; to represent exposure across the proposed development opening year (2021) are summarised in Figure 6.3 – 6.5, with the predicted annual mean NO_2 concentrations across the development site summarised in Table 6.4.

6.31 Predicted annual mean NO_2 concentrations are summarised in Table 6.4 Exceedances are shown in **bold**.

Floor	Predicted 2021 Annual Mean NO2 Concentration Range (µg/m3)
Ground Level 1 (1.5m)	**40.22**
Level 1 (4.5m)	39.78
Level 2 (7.5m)	39.49
Level 3 (10.5m)	39.41
Level 4 (13.5m)	39.37

Table 6.4: Predicted Annual Mean NO_2 Concentrations at the Development Site

6.32 As indicated in Table 6.4 predicted annual mean NO_2 concentrations exceeded the relevant AQO across the Ground floor of the proposed development. The remaining floor levels of the proposed development do not exceed the relevant AQO.

6.33 The proposed development will include sensitive residential receptors on the ground floor level, these receptors will be exposed to NO_2 concentrations above the AQO. Therefore, mitigation will be required to reduce the potential exposure to receptors and will be provided under suitability of the site for proposed use within section 8 of this report.

6.34 Predictions of 1-hour NO_2 concentrations were not produced as part of the dispersion modelling assessment. However, as stated in LAQM (TG16) if annual mean NO_2 concentrations are below 60µg/m^3 then it is unlikely that the 1-hour AQO will be exceeded.

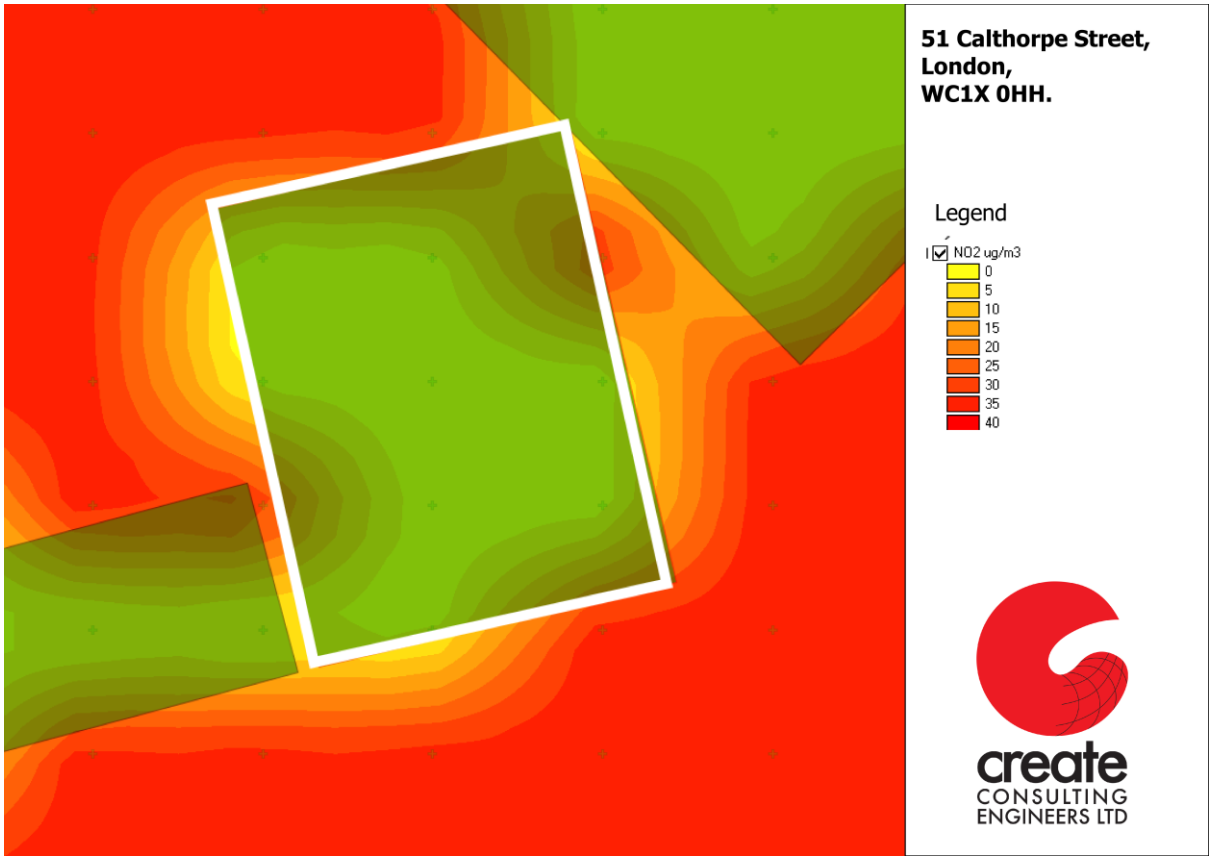

Figure 6.3 Predicted NO_2 Levels for Future Year 2021 at 1.5m

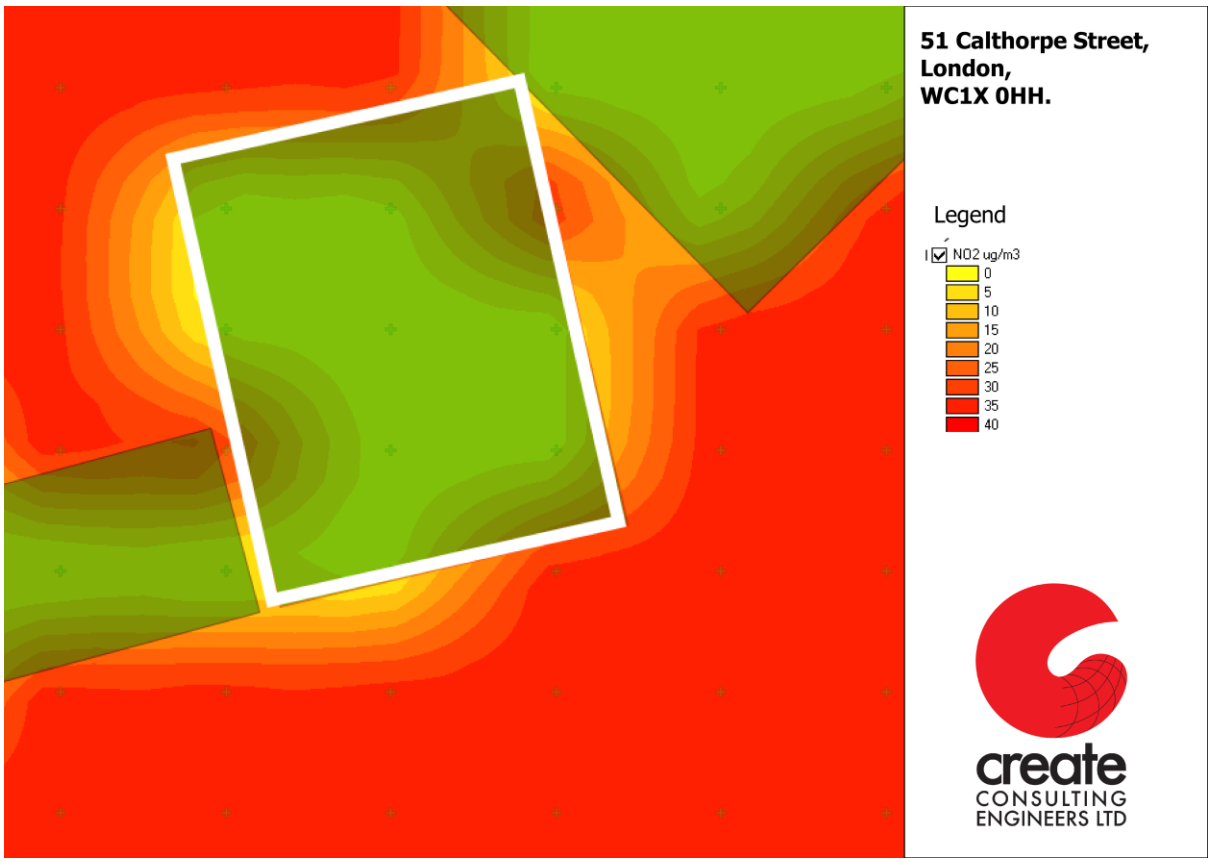

Figure 6.4 Predicted NO_2 Levels for Future Year 2021 at 4.5m

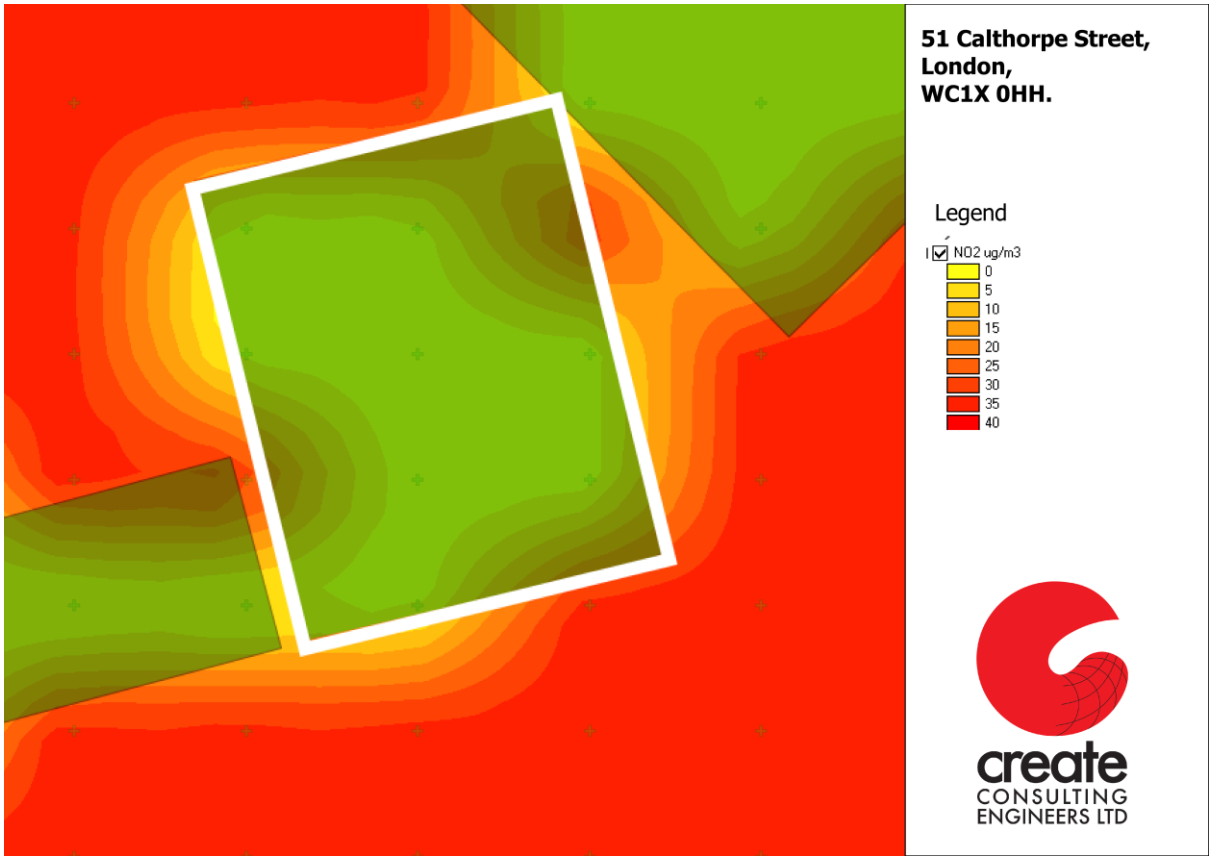

Figure 6.5 Predicted NO_2 Levels for Future Year 2021 at 7.5m

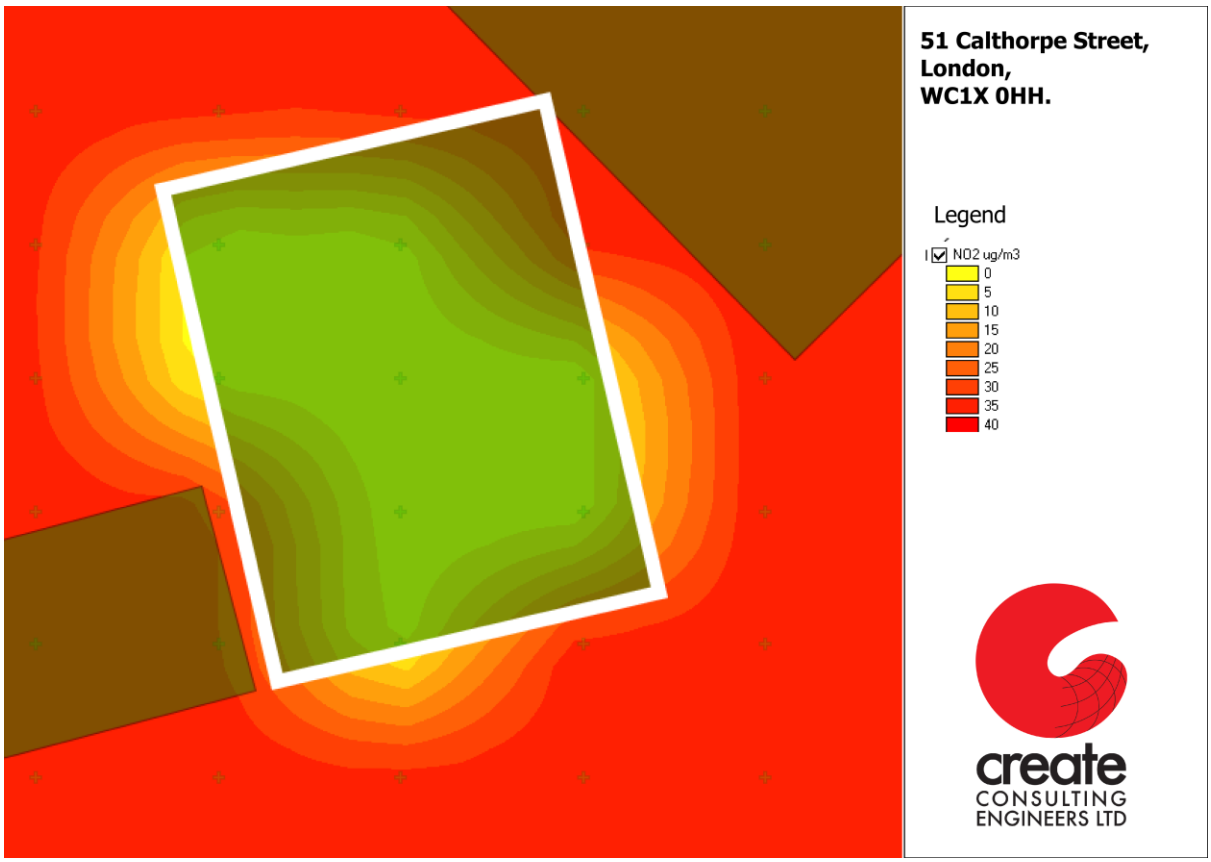

Figure 6.6 Predicted NO_2 Levels for Future Year 2021 at 10.5m

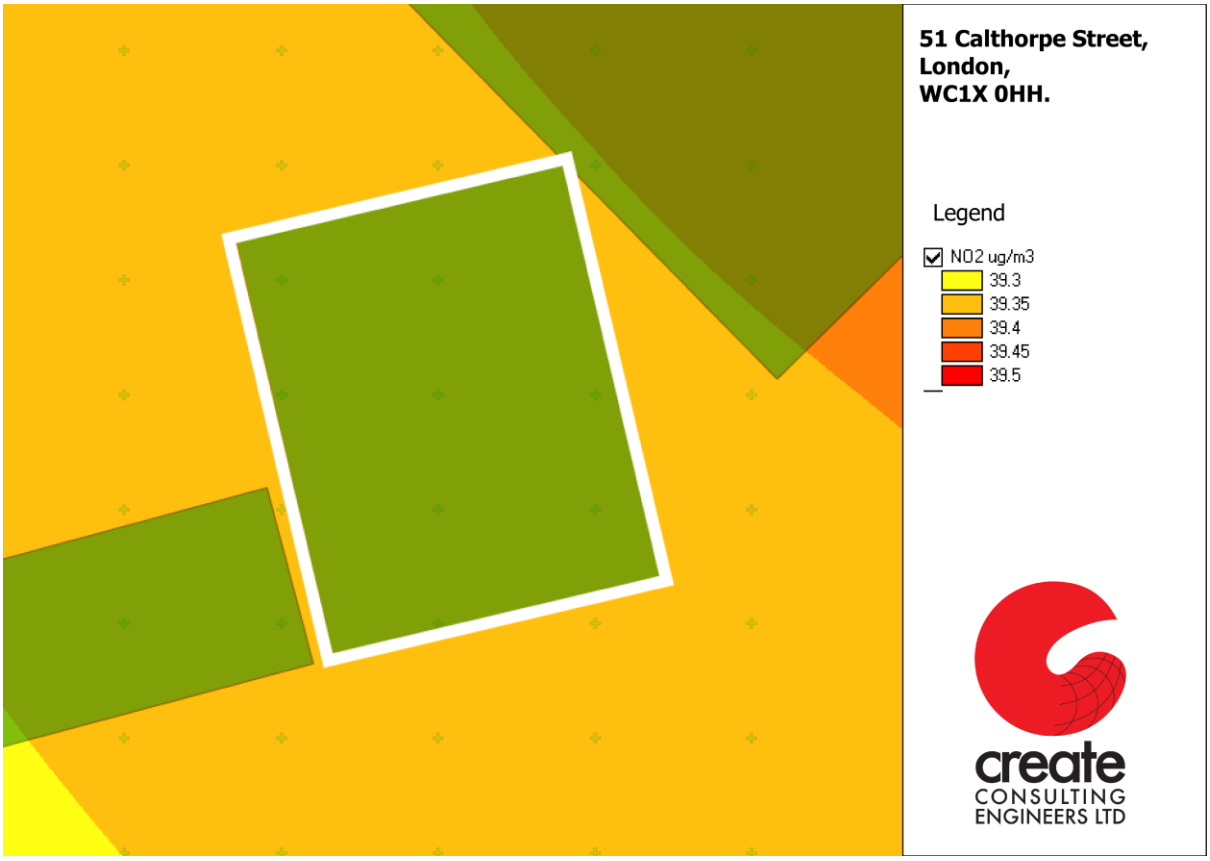

Figure 6.7 Predicted NO_2 Levels for Future Year 2021 at 13.5m

6.35 As indicated in Table 6.4 and discussed above, there are no predicted exceedances of the annual mean AQO for NO_2. As a result, the site is suitable for the proposed use without the implementation of mitigation techniques to protect future site users from elevated NO_2 concentrations.

Particulate Matter (PM_{10}) – Annual Mean

6.36 Figure 6.8 displays the contour plots for the predicted annual mean PM_{10} concentrations at Ground Level (1.5) to represent exposure across the proposed development opening year (2020). Predicted annual mean PM_{10} concentrations across the ground floor level are summarised in Table 6.5.

Floor	Predicted 2021 Annual Mean PM_{10} Concentration Range (µg/m3)
Ground Level (1.5m)	21.68

Table 6.5 Predicted Annual Mean PM_{10} Concentrations at the Development Site

6.37 As indicated in Table 6.5, there are no predicted exceedances of the annual mean AQO for PM_{10} across the proposed development. As a result, the site is considered to be suitable for the proposed use without the implementation of mitigation techniques to protect future site users from elevated PM_{10} concentrations.

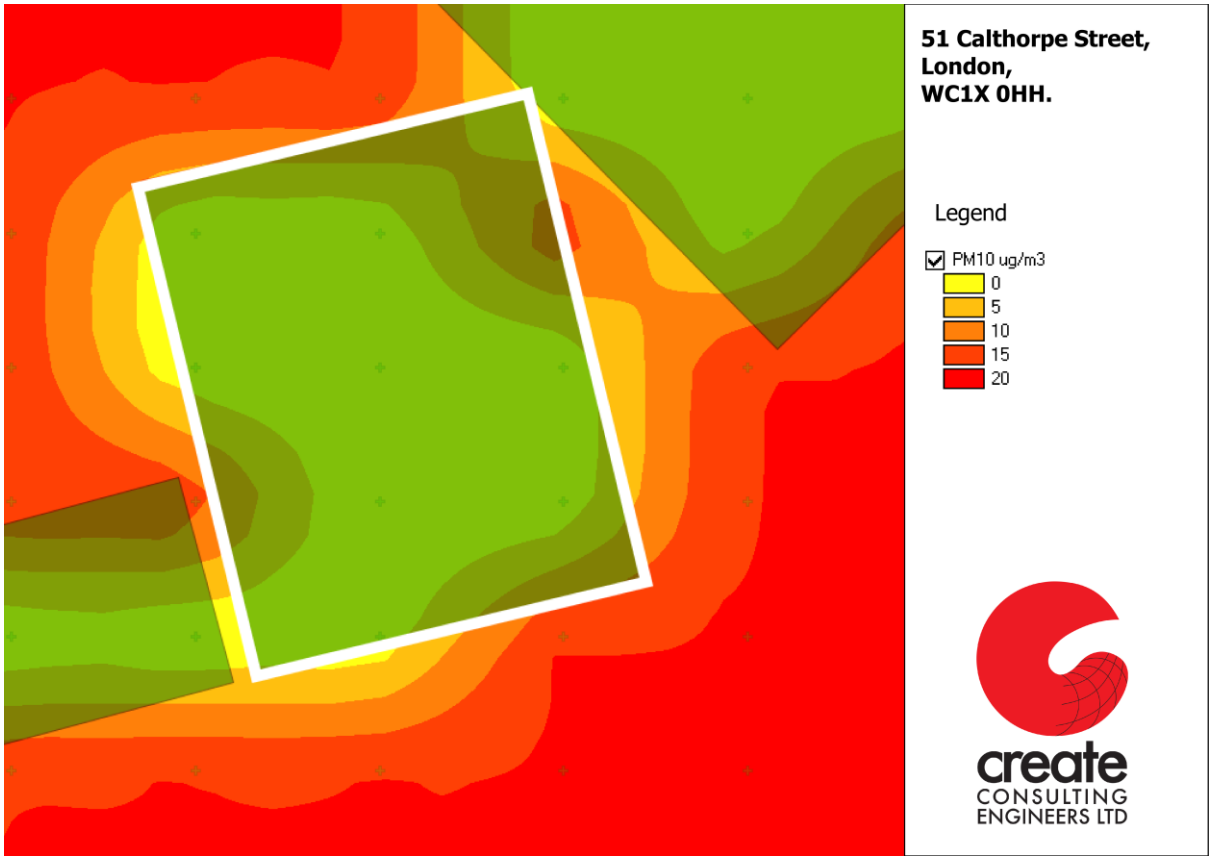

Figure 6.8 Predicted PM_{10} Levels for Future Year 2021 at 1.5m

6.38 It should be noted that background PM_{10} levels are likely to be lower at elevated heights due to increased distance from emission sources, such as the local road network. Therefore, predicted concentrations at heights above ground floor level are considered to be acceptable in regard to pollutant exposure and have not been assessed further.

6.39 Based on the dispersion modelling it is considered that PM_{10} concentrations at the development should not be viewed as a constraint to development.

Particulate Matter ($PM_{2.5}$) – Annual Mean

6.40 As described in the TG (16), if the concentration levels of PM_{10} is below 25ug/m^3, it is unlikely that it will give rise to $PM_{2.5}$. As such, no $PM_{2.5}$Assessment has been undertaken within this report.

Operational Activities

6.41 The Energy Efficiency Plan produced for the proposed site outlines how the proposed re-development of 51 Calthorpe Street, Camden will meet the energy requirements as specified by the London Plan and the London Borough of Camden's relevant policies.

6.42 The Energy Efficiency Plan has been prepared following the principles of the London Plan Energy Hierarchy: 'Be Lean', 'Be Clean' and 'Be Green'. The overriding objective in the formulation of the Energy Efficiency Plan has been to maximise the viable reductions in total carbon dioxide emissions from the development within the framework of the energy hierarchy.

7.0 AIR QUALITY NEUTRAL ASSESSMENT

7.1 London Plan Policy 6.14 requires development proposals within Greater London to be at least 'air quality neutral' and not lead to further deterioration of existing poor air quality (e.g. developments situated within an AQMA). A method for assessing this is outlined in the Sustainable Design and Construction SPG (April 2014).

Building Emissions Assessment

7.2 The Guidance sets out Building Emissions Benchmarks (BEB) based upon the Gross Internal Area (GIA m^2) and on-site emissions of NOx. Developments that do not exceed these benchmarks will be considered to avoid any increase in NOx emissions and be air quality neutral. BEB for NOx for all land use classes are presented in Table 7.1.

Land Use Class	NOx (g/m^2)
Class A1	22.6
Class A3 - A5	75.2
Class A2 and Class B1	30.8
Class B2 - B7	36.6
Class B8	23.6
Class C1	70.9
Class C2	68.5
Class C3	26.2
D1 (a)	43.0
D1 (b)	75.0
Class D1 (c -h)	31.0
Class D2 (a-d)	90.3
Class D2 (e)	284

Table 7.1 Building Emissions Benchmarks (BEBs) Emissions for Different Land Use Classes

*Source: Air Quality Neutral Planning Support Update: GLA 80371, April, 2014

7.3 The proposed development is wholly based on air source heat pumps. There are no gas systems, or systems with combustion process being involved. Therefore, development will not include any NO_x or PM_{10} emissions. Gas or combustion systems will not be considered any further in this assessment.

7.4 Table 7.2 sets out the benchmark mass emissions of NO_x against which the building emissions from the development have bene compared.

	GIA (m^2)	BEB (g/m^2/annum)	kg/annum
B1 Business	919	30.80	283.05
C3 Residential	800	26.2	209.6

Table 7.2 Building Emission Benchmarks (BEB) Calculations

7.5 Table 7.3 provides a comparison of the development building emissions with the Benchmark.

	Total Development Building Emissions	Total Benchmarked Building Emissions	Total Development – Benchmarked Building Emissions
NOx (kg/annum)	49.26	456.78	407.52

Table 7.3 Summary of Building Emission Results

7.6 For NO_x, the Total development Building Emissions are -407.52kg/annum below the Total Benchmarked Building Emissions.

7.7 As the Building is wholly based on air and heat source pumps. Therefore, no NO_x will be emitted and only building emissions are calculated.

Transport Emissions Assessment

7.8 The proposed development is a car free development that expects users to use local public transport services due to the location of the site. Therefore, the development isn't expected to lead to an increase in emissions from transport.

7.9 Based on above, there is no need for any mitigation or financial contribution towards future Borough wide mitigation measures for offset the potential air quality impacts.

Future Exposure

7.10 The results of the dispersion modelling assessment will be compared against the Air Pollution Exposure Criteria (APEC) contained within the London Councils Air Quality and Planning Guidance from the London Air Pollution Planning and the Local Environment (APPLE) working group. These are outlined in Table 7.4.

Category	Applicable Range	Recommendation
APEC - A	Below 5% of the annual mean 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	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	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.

Table 7.4 Air Pollution Exposure Criteria

7.11 It should be noted that a significant area of London would fall under APEC – "A and B".

7.12 This is due to high NO_2 concentrations throughout the city. However, to achieve the confidence level a robust approach has been made where possible and using the worst case traffic data.

7.13 The inclusion of suitable mitigation measures to protect future users is therefore considered a suitable way to progress sustainable schemes in locations at this site.

8.0 MITIGATION MEASURES

Construction

8.1 A construction dust assessment has been completed for the proposed development in accordance with IAQM guidance in Section 5.0 highlights, site specific mitigation measures which have been identified that ensure compliance with both the London Plan and the Mayor's Air Quality Strategy.

8.2 The mitigation measures have been recommended because, although the construction magnitude is considered small, the potential for dust soiling is considered to be medium.

8.3 The mitigation measures outlined below should make up part of a Construction Environment Management Plan (CEMP) that should be implemented to minimise the potential of adverse construction dust impacts throughout all the relevant construction stages.

Demolition:

- Soft strip inside buildings before demolition (retaining walls and windows in the rest of the building where possible, to provide a screen against dust);
- Wherever reasonably practicable, retain walls and windows while any internal demolition takes place to provide a screen against dust;
- Avoid explosive blasting, using appropriate manual or mechanical alternatives
- Bag and remove any biological debris or damp down such material before demolition; and
- Ensure effective water suppression is used during demolition operations. Hand held sprays are more effective than hoses attached to equipment as the water can be directed to where it is required.

Earthworks:

- Avoid scabbling (roughening of concrete surfaces) if possible;
- Avoid carrying out any earthworks during dry weather if reasonably practicable having regard to programme and contracting arrangements for the relevant works or provide and ensure appropriate use of water to control dust.
- Re-vegetate earthworks and exposed areas/soil stockpiles to stabilise surfaces as soon as practicable.

Construction:

- Ensure sand and other aggregates are stored in bunded areas and are not allowed to dry out unless required for a particular process;

- Mix large quantities of cement, grouts and other similar materials in enclosed areas remote from site boundaries and potential receptors;
- Ensure bulk cement and other fine powder materials are delivered in enclosed tankers and stored in silos with suitable emission control systems to prevent escape of material and overfilling during delivery; and
- For small supplies of fine powder ensure bags are sealed after use and are stored appropriately to prevent dust.

Trackout:

- Ensure any vehicles arriving and leaving site are securely covered to prevent escape of materials during transport;
- Ensure all vehicles switch off engines when stationary, so that there are no idling vehicles;
- Routinely clean public roads and any access routes using wet sweeping methods; and
- Avoid dry sweeping.

General Mitigation Measures:

- Ensure regular cleaning of hardstanding surfaces using wet sweeping methods;
- Display the head or regional office contact information, and the name and contact details of person(s) accountable for air quality on the site boundary;
- Develop and implement a stakeholder communications plan that includes community engagement before work commences on site;
- Log all air quality complaints, identify the cause(s), take appropriate measures to reduce emissions in a timely manner, and record all measures taken. Make the complaints log available to the Local Authority when requested;
- Carry out regular on-site and off-site inspections to monitor dust soiling effects, with cleaning to be provided if necessary. Increase the frequency of inspections when activities with a high potential to produce dust are being carried out;
- Erect barriers around the site, any dusty activities and stockpiles (the last of which should be covered);
- Screen areas of the building, where dust producing activities are taking place, with debris screens or sheeting;
- Fully enclose site or specific operations where there is a high potential for dust production and the site is active for an extensive period;
- Remove materials that have a potential to produce dust as soon as possible, unless they are being re-used. If they are to be re-used, on site covers should be used;
- Ensure all vehicles switch off engines when stationary, so that there are no idling vehicles;
- Minimise drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment and use fine sprays on such equipment wherever possible;

- Avoid bonfires and the burning of waste materials; and
- Special provisions will apply for any materials containing asbestos. The safety method statement should outline the control measures necessary to minimise the risks to an acceptable level and all statutory notices will be placed with the Health and Safety Executive (HSE).

8.4 It is important that attention is paid to any construction activity that takes place in close proximity to the site boundary, potentially at the closest location to sensitive receptors.

8.5 The implementation of the specific mitigation measures given above within a CEMP will ensure that the potential adverse impacts from construction dust during all construction stages are avoided. It is noted by the IAQM that, through the use of effective mitigation, the effects of dust from construction activity will normally not be considered significant.

Construction Traffic and Plant

8.6 As previously stated, there is potential for air pollutant impacts to arise from construction plant and vehicles associated with the scheme. Currently the number of construction vehicles is estimated to be between 4-5 per day. The construction plant has not been confirmed. However, the following BAT should still be implemented during the demolition and construction phases.

8.7 The construction traffic and plant mitigation measures recommended are as follows:

- All vehicles should switch off engines when stationary, so that there are no idling vehicles;
- On-road vehicles should comply with the requirements of the Low Emission Zone and the London NRMM standards, where applicable;
- All non-road mobile machinery (NRMM) should use ultra low sulphur diesel (ULSD) where available;
- The movement of construction traffic around the site should be minimised;
- Efficiency should be maximised (this may include alternative modes of transport, maximising vehicle utilisation by ensuring full loading and efficient routing);
- All vehicles and machinery should be well maintained and kept in a high standard of working order;
- The use of diesel or petrol powered generators should be avoided by using mains electricity or battery powered equipment where possible; and
- Machinery should be located as far away as possible from boundaries close to residential properties.

Operational Phase

Operational Traffic

8.8 The assessment has demonstrated that air quality impacts associated with the proposed development traffic are unlikely. Therefore, it is not anticipated that mitigation measures will be required.

Operational Plant

8.9 The assessment has demonstrated that air quality impacts associated with the proposed operational plant as described in both the Energy Efficiency and Sustainability plans are unlikely. Therefore, it is not anticipated that no external mitigation measures will be required.

Suitability of the site for proposed use

8.10 The proposed development is located in an area where the prevailing air quality at ground level exceeds the AQO for annual average concentrations of nitrogen dioxide (NO_2) at ground level. Mitigation will be required to be implemented to reduce the potential exposure of sensitive receptors to poor air quality.

8.11 The proposed mitigation of ventilation system that would include scrubbers to reduce the concentration of NO_x's and NO_2 entering the building. The inlet of air would be situated on the roof of the building to allow air with lower NO_x concentration to enter the ventilation system. The use of scrubbers would reduce the potential exposure of air pollutants to future users of the proposed development internal to below the acceptable level.

8.12 The Defra estimated annual average background concentration of nitrogen dioxide (NO_2) in 2019 is 39.25µg m^3, reducing to 36.25µgm^3 by 2021.

8.13 Given that the location of the proposed development is where air quality background levels for NO_2 exceed the national objectives, there would be very little improvement to indoor air quality from the use of mechanical ventilation. Even if air were to be drawn in from the rear of the property, it would have very similar pollutant concentrations as air at the front of the building.

8.14 Where practical, the proposed development will include tree planting and a green wall, both of which have been shown to improve air quality.

8.15 The residents and occupants of the proposed development should be made aware of the air pollution monitoring services available in London, the free services providing text messages and information relating to air quality as shown in Table 8.1.

Name of Service	Website	Service Provided
airText	www.airtext.info	Free text message service providing air quality alerts for Greater London.
London Air	www.londonair.org.uk	Free downloadable air quality app providing real time air quality index across London, in addition LAQM data for London Boroughs is available.

Table 8.1: London Air Quality Services

9.0 CONCLUSIONS

9.1 Create Consulting Engineers Ltd have been commissioned by Mr Simon Firth to provide an Air Quality Assessment (AQA) in support of the planning application for the proposed development at 51 Calthorpe Street, London, WC1X 0HH (the Site) in the London Borough of Camden.

Baseline

9.2 This assessment demonstrates that the proposed development is situated within an AQMA designated by LBC in 2000 for the entire Borough made on the basis that levels of NO_2 and PM_{10} would not meet the AQS national objectives.

9.3 Automatic and non-automatic NO_2 monitoring is undertaken at several locations within the Borough and exceed the LAQs. However, as the proposed site is car park free so would not increase the poor air quality within the area.

9.4 The Defra estimated annual average background concentration for the nitrogen dioxide (NO_2) at the proposed site currently doesn't exceed the annual objectives, (39.25µg m^3 in 2019).

Construction Phase

9.5 A construction dust assessment has been undertaken for the demolition and construction phase associated with the proposed development in accordance with IAQM and GLA guidance on the assessment of dust from demolition and construction.

9.6 Mitigation measures have been proposed for construction traffic and stationary plant associated with the proposed development and illustrated within Section 8.

9.7 A Construction Management Plan (CMP) should be completed for the development. In addition a Dust Management Plan (DMP) is recommended. This should cover all stages of construction and incorporate appropriate mitigation measures for dust management and control of traffic and plant emissions as per section 6 / 8 of this report.

9.8 Following the successful implementation of the CMP and DMP, the residual effects of construction dust and emissions from construction plant/vehicles upon the local area and sensitive receptors although adverse, will be temporary and **not significant**.

Operational Phase (Built and Occupied)

9.9 Dispersion modelling was undertaken in order to quantify pollutant concentrations at the site and assess potential exposure of future users. Concentrations of NO_2 exceed the AQO at ground floor but not at 1st and 2nd floor. The concentration of PM_{10} was predicted to be below

the AQO across the ground floor to 2nd floor levels were subsequently verified using local monitoring results obtained from LBC.

9.10 Annual mean concentrations of NO_2 were predicted across the proposed development. As such the development site is within AQMA, potential mitigation measures to offset the potential air quality impacts are set out in Section 7.

9.11 As per the Energy Efficiency Plan, the London Heat Map tool indicates that there is no proposed decentralised heat network within proximity of the site. However, to facilitate future connection to an energy network in the future, the development proposes air and heat source pumps to serve the remaining individual dwellings.

9.12 In accordance with London Plan Policy 7.14 and The Mayor's Air Quality Strategy Policy 7, based on the above assessment, it is considered unlikely, that the proposed development will result in further deterioration of the existing air quality environment. On that basis it can be classed as 'air quality neutral'.

9.13 Based on the assessment results, the site is considered suitable for proposed end use with the implementation of suitable internal mitigation measures. The proposed mitigation of ventilation system that would include scrubbers to reduce the concentration of NO_x's and NO_2 entering the building. The inlet of air would be situated on the roof of the building to allow air with lower NO_x concentration to enter the ventilation system. The use of scrubbers would reduce the potential exposure of air pollutants to future users of the proposed development internal to below the acceptable level.

10.0 DISCLAIMER

10.1 Create Consulting disclaims any responsibility to the Client and others in respect of any matters outside the scope of this report.

10.2 The copyright of this report is vested in Create Consulting Engineers Ltd and Mr Simon Firth. The Client, or his appointed representatives, may copy the report for purposes in connection with the development described herein. It shall not be copied by any other party or used for any other purposes without the written consent of Create Consulting Engineers Ltd or Mr Simon Firth.

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APPENDICES

APPENDIX A

AIR QUALITY NEUTRAL

1.1 The London Plan includes a policy relating to 'air quality neutral development' and aims to bring forward developments that are air quality neutral or better and that do not degrade air quality in areas where EU limit values (or air quality objectives) are not currently achieved.

1.2 The Air Quality Neutral Planning Support document was published in March 2013 and updated in April 2014 to accompany the 2014 publication of the Greater London Authority's (GLA's) Sustainable Design and Construction Supplementary Planning Guidance (SPG)2. It provides specialist consultants with a methodology to undertake an 'air quality neutral' assessment, as well as emission benchmarks for buildings and transport, against which the predicted values for the proposed development can be compared.

1.3 With regards to emissions from road traffic and energy centres, the current assessment approach most widely adopted for developments in London is to calculate the change in concentrations of nitrogen dioxide (NO_2) and particulate matter (PM_{10} and $PM_{2.5}$). Through the application of physical mitigation (stacks, catalysts, particle traps or ventilation systems) the concentration of pollutants that receptors are exposed to can be controlled so that the impact is not significant. However, the emitted pollutants contribute to the background pollutant concentrations in London as a whole and in combination are helping to maintain pollutant concentrations in excess of legal standards. To address this, the air quality neutral approach compares the amount of pollutant(s) emitted against a benchmark value, with the aim of minimising the mass of pollutant emitted instead of targeting the ambient concentration of the pollutant.

1.4 Using the GLA's Sustainable Design and Construction SPG, an air quality neutral assessment has been undertaken using the latest information about the Proposed Development. The methodology and emission factors are taken from the Air Quality Neutral Planning Support document

Building, Transport and Energy Emissions Assessment

1.5 The Guidance sets out Building Emissions Benchmarks (BEB) based upon the Gross Internal Area (GIA m^2) and on-site emissions of NOx. Developments that do not exceed these benchmarks will be considered to avoid any increase in NOx emissions and be air quality neutral. BEB for NOx for all land use classes are presented in Table 2.1.

Land Use Class	NOx (g/m^2)
Class A1	22.6
Class A3 - A5	75.2
Class A2 and Class B1	30.8
Class B2 - B7	36.6
Class B8	23.6

Land Use Class	NOx (g/m^2)
Class C1	70.9
Class C2	68.5
Class C3	26.2
D1 (a)	43.0
D1 (b)	75.0
Class D1 (c -h)	31.0
Class D2 (a-d)	90.3
Class D2 (e)	284

Table 2.1: Building Emissions Benchmarks (BEBs) Emissions for Different Land Use Classes

*Source: Air Quality Neutral Planning Support Update: GLA 80371, April 2014

1.6 An assessment was undertaken to compare benchmark emissions with the application site use emissions in accordance with the methodology outlined within the GLA 'Air Quality Neutral Planning Support GLA 80371. The methodology is summarised below.

1.7 The following potential scenarios have been considered within the assessment:

- Benchmark; and
- Development.

1.8 The benchmark scenario is representative of annual NO_x and PM_{10} benchmark emissions, which are target emissions as defined by the GLA Guidance. The development scenario is representative of the annual NO_x and PM_{10} emissions from the operation of the proposed development only.

1.9 The following emission source was considered during the assessment:

- Road vehicles travelling to and from the application site.
- On-site energy generation.

Energy Emissions

1.10 The proposed development has the potential to change NOx emissions as a result of boiler technology used in the provision of heating and hot water. This was assessed by calculating annual emissions based on the anticipated energy usage of the site and standard release rates provided by the Air Quality Neutral Planning Support GLA 80371.

Energy Emissions

1.11 Similarly, to the TEB, the Building Emissions Benchmark (BEB) has been calculated using the GLA Air Quality Neutral Planning Support guidance document based on the land-use class of the proposed development.

1.12 The BEBs are those provided in the GLA Air Quality Neutral Planning Support document. This is detailed in Table 2.2.

Land Use	Quantity (m2)	NOx	
		BEB ((NOx (g/m2/year) /(g/dwelling/ year))	NOx per Land Use (kg/year)
B1 Office	919	30.80	49.26
C3 Residential	800	26.20	

Table 2.2 Development Road Vehicle Exhaust Emissions

1.13 As indicated above in Table 2.2, the total NO_x emissions BEB 492.65kg/year.

1.14 For NOx, the Total Development Building Emissions are 492.65kg/annum below the Total Benchmarked Building Emissions and is therefore **air quality neutral**.