Hawkins environmental

Air Quality Assessment:

57-59 Neal Street, Covent Garden

Shaftesbury Covent Garden Limited

29th July 2020

Report Details:

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1. INTRODUCTION

1.1. Overview

Hawkins Environmental Limited has been instructed by Shaftesbury Covent Garden Limited to undertake an air quality assessment for the proposed redevelopment of 57-59 Neal Street, situated in the Seven Dials area of the London Borough of Camden.

During the planning process, it has been identified that the site may require an air quality assessment to determine whether the site is suitable for residential use and to determine whether the proposed development would have an adverse impact on the surrounding environment. Consequently, this assessment has been completed in order to determine whether the proposed development achieves compliance with the National Air Quality Objectives, as well as national, regional and local planning policy.

This assessment has been undertaken in accordance with the Department of Environment, Food and Rural Affairs' (Defra) current *Technical Guidance on Local Air Quality Management (LAQM) (TG16)* and the Institute for Air Quality Management and Environmental Protection UK's *Land-Use Planning & Development Control: Planning for Air Quality* (January 2017).

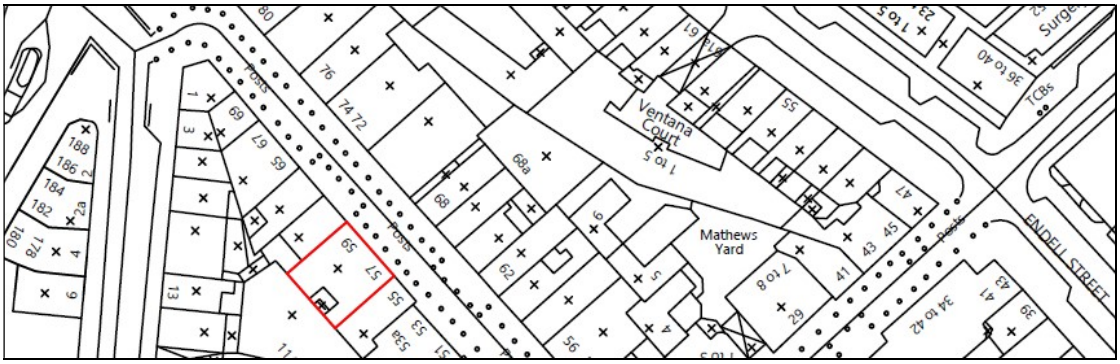
The assessment addresses the effects of air pollutant emissions from traffic using the adjacent roads and emissions associated with the development of the site. In addition, a risk-based assessment of the likely impact of construction on the air quality of the local environment has been conducted in accordance with the Institute of Air Quality Management's 2014 edition of the *Guidance on the assessment of dust from demolition and construction.*

This report assesses the overall levels of nitrogen dioxide (NO_2) and particulates (PM_{10} and $PM_{2.5}$) in the vicinity of the site. A glossary of terms is detailed in **Appendix 1.** The constraints which existing air quality may have on the proposed development have been considered and forms part of this assessment. However, the impacts of the development on the air quality of surrounding properties have also been considered.

1.2. Site Description

The proposed development site is situated on Neal Street, east of Seven Dials Junction, connecting Earlham Street to Monmouth Street and transecting Shorts Gardens. The site is currently commercial premises on the ground floor with associated storage and office space on the upper floors. The proposed development will see the conversion of the 4th floor into two residential apartments. A location plan of the proposed site can be seen in **Figure 1.1**.

Figure 1.1: Site Location Plan



2. LEGISLATION, PLANNING POLICY & GUIDANCE

2.1. National Legislation

Part IV of the Environment Act (1995), requires the UK government to produce a national Air Quality Strategy which contains standards, objectives and measures for improving ambient air quality. The National Air Quality Strategy sets out National Air Quality Objectives (NAQOs) that are maximum ambient pollutant concentrations that are not to be exceeded either without exception or with a permitted number of exceedances over a specified timescale.

The Clean Air for Europe (CA FE) programme revisited the management of Air Quality within the EU and replaced the EU Framework Directive 96/62/EC, its associated Daughter Directives 1999/30/EC, 2000/69/EC, 2002/3/EC, and the Council Decision 97/101/EC, with a single legal act, the Ambient Air Quality and Cleaner Air for Europe Directive 2008/50/EC.

Directive 2008/50/EC is currently transcribed into UK legislation by the Air Quality Standards Regulations 2010, which came into force on 11th June 2010. These limit values are binding on the UK and have been set with the aim of avoiding, preventing or reducing harmful effects on human health and on the environment as a whole. These limit values are the basis of the NAQOs.

The National Air Quality Objectives (NAQOs) and their Limit Values will form the basis of this air quality assessment of the proposed development. The NAQOs are based on an assessment of the effects of each pollutant on public health. Therefore, they are a good indicator in assessing whether, under normal circumstances, the air quality in the vicinity of a development is likely to be detrimental to human health. In determining whether air pollutant levels may constrain development, the results of studies are compared against the acceptability criteria. The Air Quality Standards are displayed in **Table 2.1**.

Table 2.1: Air Quality Standards

Pollutant	Average Period	NAQO Limit Value
Sulphur Dioxide	One Hour	350 µg/m^3 Not to be exceeded more than 24 times per calendar year
	One Day	150 µg/m^3 Not to be exceeded more than 3 times per calendar year
Nitrogen Dioxide	One Hour	200 µg/m^3 Not to be exceeded more than 18 times per calendar year
	Calendar Year	40 µg/m^3
Benzene	Calendar Year	5 µg/m^3
Lead	Calendar Year	0.5 µg/m^3

Pollutant	Average Period	NAQO Limit Value
PM_{10}	One Day	50 µg/m^3 Not to be exceeded more than 35 times per calendar year
	Calendar Year	40 µg/m^3
$PM_{2.5}$	Calendar Year	25 µg/m^3
Carbon Monoxide	Maximum daily running 8-hour mean	10 mg/m^3

2.2. Clean Air Strategy (2019)

The Government's Clean Air Strategy was launched on the 14th January 2019 and sets out a range of initiatives that will help reduce air pollution, providing healthier air to breathe, enhancing the economy and protecting nature. The Clean Air Strategy highlights action to be taken to reduce emissions across all sectors, including transport, the home, farming, and industrial sources. This includes actions to reduce particulate matter from domestic emissions, by introducing new legislation to prohibit the sales of the most polluting fuels and ensuring only the cleanest stoves are available for sale by 2022. In addition, the Clean Air Strategy sets out proposals to halve the population living in areas with concentrations of fine particulate matter ($PM_{2.5}$) above the World Health Organisation (WHO) guideline levels of 10 µg/m^3 by 2025.

2.3. National Planning Policy Framework (2019)

The National Planning Policy Framework (NPPF) was first published on the 27th March 2012 and revised July 2018 and again on the 20th February 2019. The NPPF outlines the Government's environmental, economic and social policies for England. The NPPF sets out a presumption in favour of sustainable development which should be delivered with three main dimensions: economic; social and environmental (Paragraphs 7, 8 10 and 11). The NPPF aims to enable local people and their councils to produce their own distinctive local and neighbourhood plans, which should be interpreted and applied in order to meet the needs and priorities of their communities.

The NPPF states that in the planning system *"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, taking into account relevant information such as river basin management plans"* (Paragraph 170).

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

should be considered at the plan-making stage, to ensure a strategic approach and limit the need for issues to be reconsidered when determining individual applications. Planning decisions should ensure that any new development in Air Quality Management Areas and Clean Air Zones is consistent with the local air quality action plan" (Paragraph 181).

2.4. Planning Practice Guidance (2015)

The Planning Practice Guidance (PPG) was launched on 6th March 2014 and last updated in November 2019 and provides additional guidance and interpretation to the Government's strategic policies, outlined within the NPPF, in a web-based resource. This is updated regularly.

Matters of relevance to the air quality assessment include:

- The provision of *"guidance on how planning can take account of the impact of new development on air quality".* The PPG provides signposts as to how to address air quality in planning applications and highlights the importance of local plans.
- The statement that *"The Department for Environment, Food and Rural Affairs carries out an annual national assessment of air quality using modelling and monitoring to determine compliance with relevant Limit Values"* and *"It is important that the potential impact of new development on air quality is taken into account where the national assessment indicates that relevant limits have been exceeded or are near the limit"* (Reference ID: 32-001-20191101). The PPG goes on to say that *"Whether air quality is relevant to a planning decision will depend on the proposed development and its location. Concerns could arise if the development is likely to have an adverse effect on air quality in areas where it is already known to be poor, particularly if it could affect the implementation of air quality strategies and action plans and/or breach legal obligations (including those relating to the conservation of habitats and species)"* (Reference ID: 32-005-20191101).
- The identification of the content of an air quality assessment, stating clearly that *"Assessments need to be proportionate to the nature and scale of development proposed and the potential impacts (taking into account existing air quality conditions), and because of this are likely to be locationally specific"* (Reference ID: 32-007-20191101).

2.5. The London Plan (2016)

The London Plan – Spatial Development Strategy for London Consolidated with Alterations since 2011 (2016) provides an overall strategic plan for London, and it sets out a fully integrated economic, environmental, transport and social framework for the development of the capital to 2031. The London Plan brings together the Mayor's strategies, including policy on a range of environmental issues, such as climate change, air quality, noise and waste. London Boroughs' local plans need to be in general conformity with the London Plan, and its policies guide decisions on planning applications by councils and the Mayor.

Policy 7.14: Improving Air Quality specifically relates to air quality and states:

"Development proposals should:

- *minimise 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...;

- *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';*
- *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);*
- *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;*
- *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."*

Regarding the appropriateness of new developments in areas of poor air quality, the London Plan states that *"increased exposure to existing poor air quality should be minimised by avoiding introduction of potentially new sensitive receptors in locations where they will be affected by existing sources of air pollution (such as road traffic and industrial processes). Particular attention should be paid to development proposals such as housing, homes for elderly people, schools and nurseries." The guidance goes on to state that "where it can be clearly shown that onsite mitigation measures are impractical or inappropriate, and where measures having clearly demonstrated equivalent air quality benefits could be taken elsewhere, local planning authorities should use their planning powers to ensure this."*

2.6. The New London Plan (2019 – Draft)

The New London Plan takes an even tougher approach to air quality and when adopted, will replace the existing London Plan. The Examination in Public (EiP) on the London Plan was held between 15th January and 22nd May 2019. The Panel of Inspectors appointed by the Secretary of State issued their report and recommendations to the Mayor on 8th October 2019. The Mayor has considered the Inspectors' recommendations and, on the 9th December 2019, issued to the Secretary of State his intention to publish the London Plan along with a clean and tracked version of the Intend to Publish London Plan, a statement of reasons for any of the Inspectors' recommendations that the Mayor does not wish to accept and a note that sets out a range of interventions that will help achieve the housing delivery set out in the Plan. The SoS published a response to the Intend to Publish version on 13th March 2020, which outlined that the draft London Plan requires amendments to be carried out. Nevertheless, given the very advanced stage that the draft London Plan has reached, the draft policies carry significant weight.

The Plan notes that *"Poor air quality is a major issue for London which is failing to meet requirements under legislation. Poor air quality has direct impacts on the health, quality of life and life expectancy of Londoners. The*

impacts tend to be most heavily felt in some of London's most deprived neighbourhoods, and by people who are most vulnerable to the impacts such as children and older people. London's air quality should be significantly improved and exposure to poor air quality, especially for vulnerable people, should be reduced. The Mayor is committed to making air quality in London the best of any major world city, which means not only achieving compliance with legal limits for Nitrogen Dioxide as soon as possible and maintaining compliance where it is already achieved but also achieving World Health Organisation targets for other pollutants such as Particulate Matter".

Policy SI1 – Improving Air Quality states that:

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

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

1. Development proposals should not:

a) lead to further deterioration of existing poor air quality

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

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

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

a) Development proposals must be at least air quality neutral

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

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

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, which do not demonstrate that design measures have been used to minimise exposure should be refused.

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".

2.7. 'Clearing the Air' – The Mayor's Air Quality Strategy (2010)

In December 2010, the Mayor of London's Air Quality Strategy was published by the Greater London Authority (GLA). The strategy sets out a framework for delivering improvements to London's air quality and includes measures aimed at reducing emissions from all types of new development, as well as raising awareness of air quality issues and its impacts on health.

2.8. Housing Supplementary Planning Guidance (2016)

The Housing Supplementary Planning Guidance (SPG), published in March 2016 highlights the elements of the London Plan that are relevant to housing development, and where applicable, provides more detail. The SPG states:

"Air Quality - Standard 5.6.1 (and policy 7.14) – Minimise increased exposure to existing poor air quality and make provision to address local problems of air quality : 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).

LP Policy 7.14 seeks to minimise increased exposure to existing poor air quality and to prevent deterioration of existing poor air quality, including by seeking that new developments are 'air quality neutral'. Developers should focus on reducing nitrogen oxides (NO_x) and particulates (PM_{10}) from their schemes. During the demolition and construction phase emissions primarily come from the operation of construction vehicles and plant and the generation of dust. During the occupation of residential schemes emissions includes those from vehicles and boilers. Exposure to poor air quality can result from the materials used within the dwelling and poor ventilation as well as external sources such as busy roads and industrial uses. Further guidance will be provided in a revision to the Sustainable Design & Construction SPG.

Where schemes cannot have openable windows due to poor air quality, careful consideration needs to be given to the location of air intake units and any increased potential for overheating in the summer due to the reduced opportunities for natural ventilation."

2.9. Sustainable Design & Construction Supplementary Planning Guidance (2014)

Published in April 2014, Section 4.3 of the Sustainable Design and Construction SPG provides additional guidance on the application of Policy 7.14 of the London Plan. The SPG identifies that the Mayor's priorities regarding air quality are:

"*Developers are to design their schemes so that they are at least 'air quality neutral'.*

Developments should be designed to minimise the generation of air pollution.

Developments should be designed to minimise and mitigate against increased exposure to poor air quality.

Developers should select plant that meets the standards for emissions from combined heat and power and biomass plants set out in Appendix 7.

Developers and contractors should follow the guidance set out in the emerging Minimising dust and emissions from construction and demolition SPG when constructing their development."

The SPG suggests that the above areas should be addressed in an air quality assessment, which should be provided for all major developments.

Regarding exposure to poor air quality, the SPG states that *"the location and design of a development has a direct influence on exposure to elevated air pollution levels... an air tight building (as required by energy policy – see section 2.4) with any air intakes located away from the main source of air pollution will help minimise increased exposure to poor air quality. It is recommended that developers adhere to European standard EN 13779 to ensure that air filters are fitted and regularly maintained." The SPG goes on to state that "Developers should also consider the location of outside space including gardens, balconies and roof terraces proposed in areas of particular poor air quality. These should be screened where practical with exposure minimised through appropriate positioning and design. The latest evidence suggests that green infrastructure, especially mature trees can have a small but beneficial effect, absorbing air pollution to reduce local concentrations and/or acting as a protective screen. The location of equipment should not result in flues and exhaust vents being in close proximity to recreational areas."*

In order to assess air quality neutrality, emission benchmarks have been produced for both a buildings' operation and its associated transport impacts. Provided a development meets these benchmarks, it will be considered that the development avoids any increases in NO_x or PM emissions across London and, therefore, is considered to be air quality neutral.

The policy of air quality neutrality applies to all major new developments, which the London Plan defines as being 10 or more dwellings, or being greater than 1,000m^2 of floor space for developments other than dwellings. For major developments, developers will have to calculate the NO_x and/or PM_{10} emissions from the buildings and transport elements of their developments and compare them to adopted benchmarks. For smaller developments, combustion plant must adhere to emission standards set out in the SPG.

Where developments do not meet the air quality neutral benchmark after appropriate on-site mitigation measures have been incorporated, developers *"will be required to off-set any excess in emissions. The developer should investigate options for providing NO_x and PM abatement measures offsite in the vicinity of the development. This will involve working with the relevant planning authority or nearby property owners to identify suitable mitigation measures. Measures could include:*

- *green planting/walls and screens, with special consideration given to planting that absorbs or suppresses pollutants;*
- *upgrade or abatement work to combustion plant;*

- *retro-fitting abatement technology for vehicles and flues; and*
- *exposure reduction".*

2.10. Control of Dust and Emissions from Construction and Demolition Supplementary Planning Guidance (2014)

Published in July 2014, this SPG provides guidance on preparing an Air Quality Statement for construction and demolition activities, specifically in relation to dust risk assessments and helps identify the potential scale of dust emissions for each stage of work. The SPG also provides best practice methods for controlling dust on-site and preventing 'trackout', as well as recommendations for dust monitoring.

The SPG also tries to manage emissions of nitrogen oxides (NO_x) from construction and demolition machinery by means of a new non-road mobile machinery (NRMM) ultra-low emissions zone (ULEZ). For certain types of NRMM, the SPG sets emission standards which must be achieved.

2.11. Air Quality and Planning Guidance (2007)

Written by the London Air Pollution Planning and the Local Environment (APPLE) working group of the London Councils, an umbrella organisation comprising all 32 London Borough and the City of London, the Air Quality and Planning Guidance provides technical advice on how to conduct air quality assessments for planning applications. Whilst some of this guidance is now out of date, as it has not been updated in line with changes in other guidance documents or policy, the document does still provide useful guidance, especially in relation to detailed dispersion modelling. The guidance also offers advice in relation to determining the significance of exposure to air pollution and the levels of mitigation required.

2.12. Land-Use Planning & Development Control: Planning for Air Quality (2017)

Land-Use Planning & Development Control: Planning for Air Quality, jointly published by the Institute of Air Quality Management (IAQM) and Environmental Protection UK (EPUK) in May 2015 and updated in January 2017, provides general guidance on air quality and planning. Specifically, the guidance provides details on the scoping of effects, how to assess the impacts in relation to air quality, as well as details on how to assess the significance of impacts.

2.13. London Local Air Quality Management Technical Guidance TG16 - (2016)

Specifically designed to provide technical guidance to Local Planning Authorities (LPAs) in relation to their review and assessment of air quality, TG(16) provides useful guidance in relation to the appropriate methods of air quality modelling and monitoring, which can be as equally useful to the assessment of air quality impacts.

2.14. Guidance on the Assessment of Dust from Demolition and Construction (2014)

Published in 2014, the IAQM's Guidance on the Assessment of Dust from Demolition and Construction provides guidance on preparing an Air Quality Statement for construction and demolition activities, specifically in relation to dust risk assessments, as well as providing details on how best to mitigate the impacts of construction dust. Much of the detail within the IAQM's Guidance was adopted within the Control of Dust and Emissions from Construction and Demolition SPG.

2.15. Air Quality Neutral Planning Support Update: GLA 80371 (2014)

The Air Quality Neutral Planning Support Update document GLA 80371 provides a detailed methodology in support of Policy 7.14 of the London Plan in relation to how to assess air quality neutrality and what constitutes an air quality neutral development.

The document provides useful guidance in relation to the appropriate methods of air quality modelling and monitoring, which can be as equally useful to the environmental impact assessment of air quality.

2.16. London Atmospheric Emissions Inventory (2016)

The London Atmospheric Emissions Inventory (LAEI), published in 2013 and update in 2016, includes maps of the Air Quality Focus Areas in London. Air Quality Focus Areas were defined across London in locations where the EU annual mean limit value for NO_2 was exceeded, coupled with a high level of human exposure. These were not designed to be an exhaustive list of London's air pollution hotspots, but locations where the problem was the most acute. The Focus Areas were defined to address concerns raised by boroughs within the LAQM review process and forecasted air pollution trends. There are currently 187 Air Quality Focus Areas across London.

The Focus Areas have been used by GLA, TfL and the Boroughs to inform local air quality management, the development of air quality interventions and the planning process. Under London Local Air Quality Management guidelines, Boroughs are required to have regard to the focus areas in their Borough when devising their Air Quality Action Plans.

2.17. Local Policy – Camden Local Plan 2017 and Camden Planning Guidance (CPG) Air Quality (2019)

The London Borough of Camden has prepared a CPG (Camden Planning Guidance) Document on Air Quality to support the Camden Local Plan 2017. It provides information on key air quality issues within the borough and supports Local Plan Policy CC4 (Air Quality). It highlights that all of Camden is a designated AQMA due to high concentration of both NO_2 and PM_{10}, that all developments in areas of poor air quality are to protect future occupants from exposure to that poor air quality, and that all developments are to limit their impact on local air quality and be at least air quality neutral.

To this extent, the London Borough of Camden has adopted the WHO pollution objective for NO_2 of 38 µg/m^3 (as opposed to the EU limit value of 40 µg/m^3).

The document also contains guidance on air quality assessment, minimising emissions into the air, as well as conditions and legal agreements.

3. ASSESSMENT METHODOLOGY

3.1. Methodology Overview

The assessment of air quality considered several different areas, specifically:

1. The constraints that the existing air quality has on the Proposed Development;
2. The impact of the changes in road traffic flows on air pollutant concentrations, at nearby sensitive receptors;
3. The impact of emissions from the Proposed Development's plant (such as biomass boilers or combined heat and power (CHP) plants) on air pollutant concentrations at nearby sensitive receptors; and
4. The impact of construction and demolition dust at nearby sensitive receptors.

Land-Use Planning & Development Control: Planning for Air Quality states with respect to the identification of local receptors, they should include *"residential and other properties close to and within the proposed development, as well as alongside roads significantly affected by the development, even if well away from the development site, and especially if within AQMAs. These receptors will represent locations where people are likely to be exposed for the appropriate averaging time (dependent on the air quality objective being assessed against)"*. The last point is critical as this identifies that sensitivity in relation to air quality is directly related to the amount of time one spends in a location. For example, when considering annual mean objectives (such as that of NO_2), any area where one might spend large parts of the year might be considered a sensitive receptor. An example could be a dwelling, where one might expect to spend at least half of their time during one day. Health centres, hospitals, schools and nurseries could all expect to be considered sensitive receptors, partially due to the length of exposure spent in these locations, but also due to vulnerable members of society (e.g. the very young, the very old, or the ill) spending significant amounts of time at these locations. Offices would not normally be considered to be a highly sensitive receptor since most visitors would be healthy adults and would only spend around 8 hours per day, 5 days per week there (i.e. less than 25% of the year), whereas people could spend over 50% of their time within a dwelling. Hotels would not be considered sensitive receptors in terms of the annual mean since residents would only normally expect to spend a small number of nights in that location; however, hostels, sheltered accommodation and student accommodation would be considered as sensitive as dwellings, as residents could be expected to stay for several months.

The baseline scenario will consider two separate sets of site conditions, specifically the existing 2018 baseline conditions (the latest date for which data is available) and the future 2021 baseline site conditions, which represents the opening year of the proposed development. The consideration of a future baseline for air quality is important as it takes into account future changes in both traffic flow, but also pollutant concentrations, which could vary.

To determine the baseline conditions, the following was undertaken:

- A review of the most recent progress reports on air quality carried out by the local planning authority, as submitted to the Department for the Environment, Food and Rural Affairs (Defra);

- Determination of whether the site is situated within a designated Air Quality Management Area (AQMA);
- A review of local air quality monitoring within the area of the site;
- A review of the Environment Agency's register of industrial sites under the EC Integrated Pollution Prevention and Control Directive (IPPC) to determine whether industrial sources of air pollution could be affecting the site;
- Review of the list of registered Part A2 and Part B permitted premises under the PPC Regulations to determine whether any other sources of air pollution could be affecting the site;
- Using the methodology described in the ADMS-Roads Detailed Dispersion Model (details of which can be seen in **Appendix 2**, utilising data described in **Appendix 3**), predict concentrations of air pollutants on-site within the current baseline year and the future baseline year.

3.2. Methodology for Determining Demolition and Construction Effects

The determination of demolition and construction effects of the Proposed Development was based on the IAQM's Guidance on the Assessment of Dust from Demolition and Construction, which provides a risk-based assessment methodology to determine the significance of an air quality impact arising from the construction of a new development, based on the magnitude of change. The methodology provides a five-step approach to determining the significance:

*"**STEP 1** is to screen the requirement for a more detailed assessment. No further assessment is required if there are no receptors within a certain distance of the works.*

***STEP 2** is to assess the risk of dust impacts. This is done separately for each of the four activities (demolition; earthworks; construction; and trackout) and takes account of:*

the scale and nature of the works, which determines the potential dust emission magnitude (STEP 2A); and

the sensitivity of the area (STEP 2B).

These factors are combined in STEP 2C to give the risk of dust impacts.

Risks are described in terms of there being a low, medium or high risk of dust impacts for each of the four separate potential activities. Where there are low, medium or high risks of an impact, then site-specific mitigation will be required, proportionate to the level of risk.

Based on the threshold criteria and professional judgement one or more of the groups of activities may be assigned a 'negligible' risk. Such cases could arise, for example, because the scale is very small and there are no receptors near to the activity.

***STEP 3** is to determine the site-specific mitigation for each of the four potential activities in STEP 2. This will be based on the risk of dust impacts identified in STEP 2. Where a local authority has issued guidance on measures to be adopted at demolition/construction sites, these should also be taken into account.*

***STEP 4** is to examine the residual effects and to determine whether or not these are significant.*

***STEP 5** is to prepare the dust assessment report."*

3.3. Methodology for Determining Operational Effects

To determine the operational effects of the Proposed Development, the change in traffic flow at sensitive receptors in the future opening year of the proposed development, both with and without development related traffic, was modelled using the methodology described in the ADMS-Roads Detailed Dispersion Model (details of which can be seen in **Appendix 2**, utilising data described in **Appendix 3**).

To determine the impact of the proposed development on surrounding local sensitive receptors, the impact magnitude has been derived from Land-Use Planning & Development Control: Planning for Air Quality, jointly published by the IAQM and EPUK. **Table 3.1** identifies the advice given in the IAQM / EPUK Guidance regarding impact descriptors upon individual receptors.

Table 3.1: Impact Descriptors for Individual Receptors

Long-Term Average Concentration at Receptor in Assessment Year	% Change in Concentrations Relative to Air Quality Assessment Level (AQAL)			
	1	2-5	6-10	>10
75% or less of AQAL	Negligible	Negligible	Slight	Moderate
76-94% of AQAL	Negligible	Slight	Moderate	Moderate
95-102% of AQAL	Slight	Moderate	Moderate	Substantial
103-109% of AQAL	Moderate	Moderate	Substantial	Substantial
110% or more of AQAL	Moderate	Substantial	Substantial	Substantial

Source: Table 6.3 of the IAQM Guidance

The guidance goes on to offer the following explanation (taken from the footnotes of Table 6.3 of the IAQM Guidance):

"AQAL = Air Quality Assessment Level, which may be an air quality objective, EU limit or target value, or an Environment Agency 'Environmental Assessment Level (EAL)'.

The Table is intended to be used by rounding the change in percentage pollutant concentration to whole numbers, which then makes it clearer which cell the impact falls within. The user is encouraged to treat the numbers with recognition of their likely accuracy and not assume a false level of precision. Changes of 0%, i.e.. less than 0.5% will be described as Negligible.

The Table is only designed to be used with annual mean concentrations.

Descriptors for individual receptors only; the overall significance is determined using professional judgement (see Chapter 7). For example, a 'moderate' adverse impact at one receptor may not mean that the overall impact has a significant effect. Other factors need to be considered.

When defining the concentration as a percentage of the AQAL, use the 'without scheme' concentration where there is a decrease in pollutant concentration and the 'with scheme;' concentration for an increase.

The total concentration categories reflect the degree of potential harm by reference to the AQAL value. At exposure less than 75% of this value, i.e. well below, the degree of harm is likely to be small. As the exposure approaches and exceeds the AQAL, the degree of harm increases. This change naturally becomes more important when the result is an exposure that is approximately equal to, or greater than the AQAL.

It is unwise to ascribe too much accuracy to incremental changes or background concentrations, and this is especially important when total concentrations are close to the AQAL. For a given year in the future, it is impossible to define the new total concentration without recognising the inherent uncertainty, which is why there is a category that has a range around the AQAL, rather than being exactly equal to it."

To determine whether exposure to air pollution is an overriding consideration in new residential developments, it is common to use the Air Pollution Exposure Criteria (APEC) categories, as see in **Table 3.2**, which are derived from the London Councils' *Air Quality and Planning Guidance*.

Table 3.2: Air Pollution Exposure Categories

	Applicable Range Nitrogen Dioxide Annual Mean	Applicable Range PM_{10}	Recommendation
APEC A	> 5% below national objective	**Annual Mean:** > 5% below national objective **24 hr:** > 1-day less than national objective	No air quality grounds for refusal; however; mitigation of any emissions should be considered.
APEC B	Between 5% below or above national objective	**Annual Mean:** Between 5% above or below national objective **24 hr:** Between 1-day above or below national objective.	May not be sufficient air quality grounds for refusal, however appropriate mitigation must be considered e.g., Maximise distance from pollutant source, proven ventilation systems, parking considerations, winter gardens, internal layout considered and internal pollutant emissions minimised.
APEC C	> 5% above national objective	**Annual Mean:** > 5% above national objective **24 hr:** > 1-day more than national objective.	Refusal on air quality grounds should be anticipated, unless the Local Authority has a specific policy enabling such land use and ensure best endeavours to reduce exposure are incorporated.

3.4. Significance Criteria

Land-Use Planning & Development Control: Planning for Air Quality provides a framework to assess significance in air quality assessments. As described in the guidance, the *"assessment framework for describing impacts can be used as a starting point to make a judgement on significance of effect, but there will be other influences that might need to be accounted for. The impact descriptors set out in Table 6.3* [Replicated in **Table 3.1** of this chapter] *are not, of themselves, a clear and unambiguous guide to reaching a conclusion on significance. These impact descriptors are intended for application at a series of individual receptors. Whilst it may be that there are 'slight', 'moderate' or 'substantial' impacts at one or more receptors, the overall effect may not necessarily be judged as being significant in some circumstances (Paragraph 7.4)".*

The Land-Use Planning & Development Control guidance goes on to state that any significance needs to be assessed using a certain amount of professional judgement and should take into account *"the existing and future air quality in the absence of the development; the extent of current and future population exposure to the*

impacts; and the influence and validity of any assumptions adopted when undertaking the prediction of impacts" (Paragraph 7.7). For example, for a large development, a major adverse impact on a single dwelling might be considered insignificant; however, a minor impact to 100,000 dwellings might be considered to be highly significant. Furthermore, the absolute level of pollutant concentrations are also important in determining significance; for example, a moderate impact to a small group of dwellings might be considered highly significant if the concentrations of NO_2 were well in excess of the NAQO level, however, that same moderate impact might be considered insignificant if concentrations were well below the NAQO.

4. SCOPING

4.1. Overview

The National Planning Practice Guidance on Air Quality is explicit in stating that *"Assessments should be proportional to the nature and scale of development proposed and the level of concern about air quality".* This is reiterated in *Land-Use Planning & Development Control: Planning for Air Quality*, jointly published by the Institute of Air Quality Management (IAQM) and Environmental Protection UK (EPUK) in May 2015 and updated in January 2017, which provided guidance on screening as to whether an air quality assessment is required and what needs to be assessed.

4.2. Impacts of the Local Area on the Development

The IAQM/EPUK Guidance suggests that whether an assessment of the impacts of the local area on the proposed development is required is a matter of judgement, but should take into account:

- *"the background and future baseline air quality and whether this will be likely to approach or exceed the values set by air quality objectives;*
- *the presence and location of Air Quality Management Areas as an indicator of local hotspots where the air quality objectives may be exceeded;*
- *the presence of a heavily trafficked road, with emissions that could give rise to sufficiently high concentrations of pollutants (in particular NO_2), that would cause unacceptably high exposure for users of the new development; and*
- *the presence of a source of odour and/or dust that may affect amenity for future occupants of the development."*

4.3. Impacts of the Development on the Local Area

To determine whether an assessment of the impacts of the development on the local environment is required, the IAQM/EPUK Guidance suggests a two-stage approach. The guidance states that *"The **first stage** is intended to screen out smaller development and/or developments where impacts can be considered to have insignificant effects. The **second stage** relates to specific details regarding the proposed development and the likelihood of air quality impacts."*

Figure 4.1 reproduces Stage 1 of the IAQM/EPUK Guidance' two-stage approach. In order to proceed to Stage 2, development needs to meet both one of the criteria in "A", and one of the criteria in "B". If the development fails to meet these criteria, then an air quality assessment looking at the impacts of the development on the local area will not be required.

Figure 4.2 reproduces Stage 2 of the IAQM/EPUK Guidance' two-stage approach. If the development meets the criteria contained within Stage 1, *"more specific guidance as to when an air quality assessment is likely to be required to assess the impacts of the proposed development on the local area."* If the development then meets any of the eight criteria in Stage 2, an assessment of the impacts of the proposed development on the surrounding environment will be required.

Figure 4.1: IAQM/EPUK Guidance – Stage 1 Criteria

Criteria to Proceed to Stage 2

A. If any of the following apply:

- 10 or more residential units or a site area of more than 0.5ha
- more than 1,000 m^2 of floor space for all other uses or a site area greater than 1ha

B. Coupled with any of the following:

- the development has more than 10 parking spaces
- the development will have a centralised energy facility or other centralised combustion process

Note: Consideration should still be given to the potential impacts of neighbouring sources on the site, even if an assessment of impacts of the development on the surrounding area is screened out.

Figure 4.2: IAQM/EPUK Guidance – Stage 2 Criteria

The development will:	Indicative Criteria to Proceed to an Air Quality Assessment [a]
1. Cause a significant change in Light Duty Vehicle (LDV) traffic flows on local roads with relevant receptors. (LDV = cars and small vans <3.5t gross vehicle weight).	A change of LDV flows of: - more than 100 AADT within or adjacent to an AQMA - more than 500 AADT elsewhere.
2. Cause a significant change in Heavy Duty Vehicle (HDV) flows on local roads with relevant receptors. (HDV = goods vehicles + buses >3.5t gross vehicle weight).	A change of HDV flows of: - more than 25 AADT within or adjacent to an AQMA - more than 100 AADT elsewhere.
3. Realign roads, i.e. changing the proximity of receptors to traffic lanes.	Where the change is 5m or more and the road is within an AQMA.
4. Introduce a new junction or remove an existing junction near to relevant receptors.	Applies to junctions that cause traffic to significantly change vehicle accelerate/decelerate, e.g. traffic lights, or roundabouts.
5. Introduce or change a bus station.	Where bus flows will change by: - more than 25 AADT within or adjacent to an AQMA - more than 100 AADT elsewhere.
6. Have an underground car park with extraction system.	The ventilation extract for the car park will be within 20 m of a relevant receptor. Coupled with the car park having more than 100 movements per day (total in and out).
7. Have one or more substantial combustion processes, where there is a risk of impacts at relevant receptors. NB. this includes combustion plant associated with standby emergency generators (typically associated with centralised energy centres) and shipping.	Typically, any combustion plant where the single or combined NO_x emission rate is less than 5 mg/sec[a] is unlikely to give rise to impacts, provided that the emissions are released from a vent or stack in a location and at a height that provides adequate dispersion. In situations where the emissions are released close to buildings with relevant receptors, or where the dispersion of the plume may be adversely affected by the size and/or height of adjacent buildings (including situations where the stack height is lower than the receptor) then consideration will need to be given to potential impacts at much lower emission rates. Conversely, where existing nitrogen dioxide concentrations are low, and where the dispersion conditions are favourable, a much higher emission rate may be acceptable.

[a] As a guide, the 5 mg/s criterion equates to a 450 kW ultra low NO_x gas boiler **or** a 30kW CHP unit operating at <95mg/Nm^3. Users of this guidance should quantify the NO_x mass emission rate from the proposed plant, based on manufacturers' specifications and operational conditions.

4.4. Site Specific Scoping Assessment

The proposed development is located in an Air Quality Management Area and is in a highly trafficked area of London, where exceedances of the National Air Quality Objective for NO_2 often occur; therefore, **an assessment of the impacts of the local area on the development is required**.

The proposed development consists of less than 10 new dwellings but no parking spaces or energy processes; therefore Stage 1 "B" criteria are not met. Therefore, **an assessment of the impacts of the development on the local area is not required**.

5. BASELINE CONDITIONS

5.1. Air Quality Review and Assessment

Local Authorities have been required to carry out a review of local air quality within their boundaries to assess areas that may fail to achieve the NAQO's. Where these objectives are unlikely to be achieved, local authorities must designate these areas as Air Quality Management Areas (AQMA's) and prepare a written action plan to achieve the NAQO's.

The review of air quality takes on several prescribed stages, of which each stage is reported. The review of historic Air Quality Assessment reports for the London Borough of Camden indicates that exceedances of the annual mean objective for NO_2 have been experienced across the Borough, primarily centred on the main roads, and these exceedances are predicted to continue. It is understood that exceedances of the annual mean objectives for both PM_{10} and $PM_{2.5}$ are not expected within the Borough in future years.

As a consequence of the exceedances of the NAQOs, the London Borough of Camden have declared an Air Quality Management Area (AQMA) encompassing the entire Borough.

The London Atmospheric Emissions Inventory (LAEI) notes that the site is not located within any of the London Borough of Camden's Air Quality Focus Areas, although it is only a short distance from Air Quality Focus Area 184 within the neighbouring City of Westminster, encompassing Oxford Street from Marble Arch to Bloomsbury.

Concentrations of SO_2, Benzene, Lead and CO are not considered to be significant within the Borough. Consequently, no further consideration is given to these pollutants as it is highly unlikely that they would be of concern on the proposed development site.

5.2. Local Air Quality Monitoring

The London Borough of Camden has conducted air quality monitoring, including at two sites in the vicinity of the proposed development site. Both sites are designated to be roadside monitoring locations and therefore are suitable for verification. **Table 5.1** summarises the air quality monitoring data.

Table 5.1: Air Quality Monitoring

Location	Annual Mean Concentrations of NO_2 (µg/m^3)				
	2014	2015	2016	2017	2018
CA11 Tottenham Court Road	86.75	85.61	83.57	N/A	65.7
CA21 Bloomsbury Street	80.82	71.43	72.20	80.67	59.4

5.3. Industrial Emissions

Both the Environment Agency's register of industrial sites under the EC Integrated Pollution Prevention and Control Directive (IPPC) and the Local Authority's list of registered Part A2 and Part B permitted premises under the Pollution, Prevention and Control Act 1999 and the Environmental Permitting (England and Wales)

Regulations 2010 have shown that there are no sites within close proximity of the development site that could be affecting air pollutant levels.

5.4. Baseline Onsite Pollution Concentrations

To characterise the air quality at the development site at present, predictions of air pollutant concentrations at the development site have been made using the air quality model for the baseline year (2018). **Appendix 2** provides a description of the methodology used in the assessment, including the method to calculate NO_2 from NO_x. **Appendix 3** outlines the input data, including traffic data, background concentrations and receptor locations. In addition, details of the verification factor applied to the predicted concentrations of NO_x can also be found in **Appendix 3**.

Concentrations have been calculated for two representative points across the development site, one on each of the facades fronting Earlham Street and Neal Street. The locations of these receptor locations can be seen on the site plan in **Appendix 3**. For each location, concentrations have been calculated at first floor level, i.e. where residential receptors are proposed. The results of these predictions can be seen in **Table 5.2**.

Table 5.2: Baseline Air Quality Concentrations 2018 – Development Site

Receptor	NO_2 (µg/m^3)	PM_{10} (µg/m^3)		$PM_{2.5}$ (µg/m^3)
	Annual Mean	Annual Mean	Days >50 µg/m^3	Annual Mean
Earlham Street façade	41.86	17.89	1.32	10.56
Neal Street façade	41.86	17.89	1.32	10.56
NAQO/WHO Objective	**40/38**	**40**	**35**	**25**

If pollutant concentrations in **Table 5.2** are compared to the National Air Quality Objectives, it can be seen that on the development site at present, concentrations of NO_2 are in excess of the WHO and National Air Quality Objectives for NO_2.

6. IMPACTS OF THE LOCAL AREA ON THE DEVELOPMENT

6.1. Annual Mean Concentrations

To characterise the air quality at the development site when constructed, predictions of air pollutant concentrations at the development site have been made using the air quality model for the proposed year of occupation (2021). **Appendix 2** provides a description of the methodology used in the assessment, including the method to calculate NO_2 from NO_x. **Appendix 3** outlines the input data, including traffic data, background concentrations and receptor locations. In addition, details of the verification factor applied to the predicted concentrations of NO_x can also be found in **Appendix 3**.

Concentrations have been calculated for two representative points across the development site, one on each of the facades fronting Earlham Street and Neal Street. The locations of these receptor locations can be seen on the site plan in **Appendix 3**. For each location, concentrations have been calculated at first floor level, i.e. where residential receptors are proposed. The results of these predictions can be seen in **Table 6.1**.

Table 6.1: Predicted Future Air Quality Concentrations 2021 – Development Site

Receptor	NO_2 (µg/m³)	PM_{10} (µg/m³)		$PM_{2.5}$ (µg/m³)
	Annual Mean	Annual Mean	Days >50 µg/m³	Annual Mean
Earlham Street façade	39.34	17.81	1.26	10.47
Neal Street façade	39.34	17.82	1.26	10.47
NAQO/WHO Objective	**40/38**	**40**	**35**	**25**

If pollutant concentrations in **Table 6.1** are compared to the National Air Quality Objectives, it can be seen that on the development site during the opening year, concentrations of NO_2 are below the National Air Quality Objectives, although not below the WHO objective for NO_2 of 38 µg/m³.

It is known that NO_X and NO_2 concentrations are not declining as predicted, especially in Greater London. Consequently, it is now commonplace to consider future concentrations of air pollutants without future reductions in emissions rates, as was predicted, alongside future concentrations of air pollutants with future reductions in emissions rates, with the likely onsite future pollutant concentrations considered to be somewhere between the two.

Table 6.1 shows the future concentrations of air pollutants with future reductions in emissions rates, with **Table 5.2** effectively showing future concentrations of air pollutants without future reductions in emissions rates. At the Neal Street façade (the worst affected area of the proposed development), the annual mean concentration of NO_2 will be somewhere between 39.34 µg/m³ and 41.86 µg/m³.

To more accurately predict future baseline concentrations in light of the fact that NO_X and NO_2 concentrations are not declining as predicted, Air Quality Consultants Ltd have developed the CURED (Calculator Using

Realistic Emissions for Diesel) emissions factor dataset for predicting future NO_x and NO_2 concentrations. The model uses the same COPERT (V5.0) emissions factors and fleet compositions as Defra's Emissions Factors Toolkit (EFT) V9.0 as used in the modelled predictions above, however it takes a more pessimistic view than the EFT regarding the efficacy of forthcoming phases on the Euro 6 standard for diesel cars and vans. Modelling future baseline pollutant concentrations with the CURED emissions factor dataset should provide a more accurate representation of future concentrations of NO_2.

Concentrations have been calculated for the same two representative points at the same floor levels across the development site as per the above, this time using the CURED emissions factor dataset that take into account the models adjusted expectations for contributions from diesel vehicles. The results of these predictions can be seen in **Table 6.2**.

Table 6.2: Predicted Future Air Quality Concentrations 2021 – Using CURED Emissions Factors

Receptor	NO_2 (µg/m³)
	Annual Mean
30 Neal St Front Façade 1st Floor	39.37
32 Neal St Front Façade 1st Floor	39.37
NAQO/WHO Objective	**40/38**

Pollutant concentrations in **Table 6.2** are higher than their respective concentrations calculated without the CURED emissions factors, albeit still closer in absolute value to the 2021 concentrations than the 2018 concentrations, an indication of the low level of diesel HGVs that make up the fleet in Inner London. Regardless of whether expectations of diesel emissions are adjusted or not, it can be seen that on the development site during the opening year, concentrations of NO_2 are below the National Air Quality Objectives, although not below the WHO objective for NO_2 of 38 µg/m³.

In accordance with the London Councils' *Air Quality and Planning Guidance*, the predicted annual mean concentrations of both NO_2 and PM_{10} are within 5% of the National Air Quality Objective level; therefore the site is considered to be within Air Pollution Exposure Criteria (APEC) category APEC B, of which it is stated "*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.*"

6.2. NO_2 1-hour Exposure

In order to meet the hourly Air Quality Standard on NO_2, the average hourly concentration of NO_2 must not exceed the hourly objective level of 200 µg/m³ more than 18 times in one calendar year. If this standard is not met, there would be concern that even short duration exposure to pollutant concentrations could be prejudicial to health, which could be a concern for gardens, balconies and other outdoor amenity spaces associated with the development.

According to research conducted in 2003[1], there is only a risk that the NO_2 1-hour objective (200 µg/m^3) could be exceeded if the annual mean nitrogen dioxide concentration is greater than 60 µg/m^3. At the development site, the worst-case future annual mean is 39.37 µg/m^3, therefore hourly exceedances are not expected to occur. Consequently, local short duration pollutant concentrations would not be considered a cause for concern in gardens, balconies and other outdoor amenity spaces associated with the development.

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

7. IMPACTS OF THE DEVELOPMENT ON THE LOCAL AREA

The scoping assessment contained within **Section 4** of this report identifies that the impact of the proposed development on the local environment is likely to be insignificant and therefore no further assessment is required.

8. AIR QUALITY NEUTRALITY

As the proposed development is for only two new residential dwellings, it is not considered a *"major development*" under The London Plan's Sustainable Design and Construction SPG and therefore an Air Quality Neutral Assessment is not required.

9. CONSTRUCTION DUST IMPACT ASSESSMENT

9.1. Overview

The main air quality impacts that may arise during construction activities are:

- Dust deposition, resulting in the soiling of surfaces;
- Visible dust plumes; and
- An increase in concentrations of airborne particles (e.g. PM_{10}, $PM_{2.5}$) and nitrogen dioxide due to exhaust emissions from site plant and traffic that can impact adversely on human health.

The most common impacts are dust soiling and increased ambient PM_{10} concentrations due to dust arising from the site. Most of this PM_{10} is likely to be in the $PM_{2.5-10}$ fraction, known as coarse particles.

It is very difficult to quantify emissions of dust from construction activities. It is, therefore, common practice to provide a qualitative assessment of potential impacts. The Institute of Air Quality Management's *Guidance on the assessment of dust from demolition and construction (February 2014)* contains a complex methodology for determining the significance of construction impacts on air quality. The following sections outline the steps outlined in the IAQM methodology.

9.2. Step 1 – Screening the Need for a Detailed Assessment

The IAQM guidance states that:

"An assessment will normally be required where there is:

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

There are existing receptors within 350m of the boundary of the development site and within 50m of the route used by construction vehicles on the public highway. Therefore, a detailed assessment is required to determine potential dust impacts.

Step 1 Summary:

A detailed assessment is required to determine potential dust impacts.

9.3. Step 2 – Assess the Risks of Dust Impacts

The IAQM guidance states that:

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

A site is allocated to a risk category based on two factors:

- *the scale and nature of the works, which determines the potential dust emission magnitude as small, medium or large (STEP 2A); and*
- *the sensitivity of the area to dust impacts (STEP 2B), which is defined as low, medium or high sensitivity.*

These two factors are combined in STEP 2C to determine the risk of dust impacts with no mitigation applied. The risk category assigned to the site can be different for each of the four potential activities (demolition, earthworks, construction and trackout). More than one of these activities may occur on a site at any one time."

9.3.1. Step 2a – Dust Emission Magnitude

The first step (Step 2a) is therefore to assess the magnitude of the anticipated works. **Table 9.1** summarises the dust emission magnitude for each activity.

Table 9.1: Dust Emission Magnitude

Activity	Dust Emission Magnitude	Justification
Demolition	**N/A**	*No demolition required.*
Earthworks	**N/A**	*No earthworks required.*
Construction	**N/A**	*No external construction required.*
Trackout	**N/A**	*No demolition/construction vehicles.*

As the proposed development is the internal renovation of an already-constructed building, the dust emission magnitudes for each of the four activities are not applicable; i.e. there will be no external demolition/construction or earthworks, and therefore no trackout. Subsequently the need for further assessment is not required, as the impact will be deemed negligible regardless of the sensitivity of the surrounding area. The site can therefore be considered to be of negligible risk with no need for a Dust Management Plan or specific mitigation measures.

10. CONCLUSIONS & SUMMARY

An air quality assessment has been undertaken in accordance with the Department of Environment, Food and Rural Affairs' (Defra) current *Technical Guidance on Local Air Quality Management (LAQM) (TG16)* and addresses the effects of air pollutant emissions from traffic using the adjacent roads, and emissions associated with the development of the site. In addition, a risk-based assessment of the likely impact of construction on the air quality of the local environment has been conducted in accordance with the Institute of Air Quality Management's 2014 edition of the *Guidance on the assessment of dust from demolition and construction.*

Baseline pollutant concentrations on site have been investigated using both existing monitoring data and through predictions using the ADMS-Roads Detailed Dispersion Model methodology. At present, and in the opening year of the proposed development (2021), concentrations of all pollutants are below the Air Quality Objectives, with the exception of NO_2, which exceeds the WHO Objectives adopted by the London Borough of Camden across the development site, with the highest 2021 concentration predicted to be 39.36 µg/m^3.

In accordance with the London Councils' *Air Quality and Planning Guidance*, the predicted annual mean concentrations of both NO_2 and PM_{10} are within 5% of the National Air Quality Objective level; therefore the site is considered to be within Air Pollution Exposure Criteria (APEC) category APEC B, of which it is stated "*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."*

In order to assess the impact of the proposed development on local air quality, the IAQM/EPUK Guidance *Land-Use Planning & Development Control: Planning for Air Quality* has been utilised. The scoping stage has determined that due to the size of the development, a full assessment of the impacts of the proposed development on local air quality is not required. Similarly, an Air Quality Neutral assessment is not required owing to the small size of the proposed development.

With regards to the impacts of construction on air quality, dust and other pollutant emissions from the site can be considered to be negligible, owing to the fact that the development is essentially an internal reconfiguration of an existing building. A Dust Management Plan is therefore not necessary.

Since it has been shown that the proposed development meets the guidance contained within *Technical Guidance on Local Air Quality Management (LAQM) (TG16),* IAQM/EPUK's *Land-Use Planning & Development Control: Planning for Air Quality* and IAQM's *Guidance on the assessment of dust from demolition and construction*, it is considered that the proposed development adheres to the principles of the National Planning Policy Framework since the new development will not be *"put at risk from, or being adversely affected by unacceptable levels of soil, air, water or noise pollution"*. Since it has been shown that in terms of air quality, the proposals adhere to local and national planning policy, it is considered that the air pollution should not be a constraint on the proposed residential development.

Appendix 1
Glossary of Terms

Appendix 1: Glossary of Terms

Air Quality Standard/Air Quality Objective: The concentrations of pollutants in the atmosphere, which can broadly be taken to achieve a certain level of environmental quality. The standards are based on an assessment of the effects of each pollutant on human health including the effects on sensitive subgroups.

Annual mean: The average of the concentrations measured for each pollutant for one year. In the case of the Air Quality Objectives, this is for a calendar year.

Air Quality Management Area (AQMA): An area that a local authority has designated for action, based upon predicted exceedances of Air Quality Objectives.

Concentration: The amount of a (polluting) substance in a volume (of air), typically expressed as a mass of pollutant per unit volume of air (for example, microgrammes per cubic metre, µg/m^3) or a volume of gaseous pollutant per unit volume of air (parts per million, ppm).

Exceedance: A period of time where the concentration of a pollutant is greater than the appropriate Air Quality Objective.

Nitrogen Oxides: Nitric oxide (NO) is mainly derived from road transport emissions and other combustion processes such as the electricity supply industry. NO is not considered to be harmful to health. However, once released into the atmosphere, NO is usually very rapidly oxidised to nitrogen dioxide (NO_2), which is harmful to health. NO_2 and NO are both oxides of nitrogen and together are referred to as nitrogen oxides (NO_x).

Particulate Matter: Fine Particles are composed of a wide range of materials arising from a variety of sources including combustion sources (mainly road traffic), and coarse particles, suspended soils and dust from construction work. Particles are measured in a number of different size fractions according to their mean aerodynamic diameter. Most monitoring is currently focused on PM_{10} (less than 10 microns in diameter), but the finer fractions such as $PM_{2.5}$ (less than 2.5 microns in diameter) is becoming of increasing interest in terms of health effects.

µg/m^3 micrograms per cubic metre of air: A measure of concentration in terms of mass per unit volume. A concentration of 1 µg/m^3 means that one cubic metre of air contains one microgram (millionth of a gram) of pollutant.

Appendix 2
Air Quality Model

Appendix 2: Air Quality Model

ADMS-Roads

In the UK, the Department for Environment, Food & Rural Affairs (Defra) provides guidance on the most appropriate methods to estimate pollutant concentrations for use in Local Air Quality Management (LAQM). Defra regularly updates its Technical Guidance, with the latest LAQM Technical Guidance TG16 published in 2016.

The methodology in TG16 directs air quality professionals to a number of tools published by Defra to predict and manage air quality. One of the main tools for modelling air pollutants is ADMS-Roads, which is a refined air dispersion model produced by Cambridge Environmental Research Consultants. ADMS-Roads has been specifically developed for use with UK roads and as such is considered to be one of the most appropriate tools for use in UK air quality modelling and therefore is widely used in the UK.

ADMS-Roads is an air dispersion modelling suite that predicts the air quality impacts of nitrogen dioxide, particulate matter and other inert pollutant concentrations from moving and idling motor vehicles at or alongside roads and junctions.

The methodology utilised by ADMS-Roads is significantly more advanced than that of most other air dispersion models, such as CALINE, which Breeze Roads is based upon, which is the other commonly used detailed air dispersion model in the UK. ADMS-Roads incorporates the latest understanding of the boundary layer structure and goes beyond the simplistic Pasquill-Gifford stability categories method used in other dispersion models and utilises the Monin-Obukhov length for greater accuracy. The model also uses advanced algorithms for the height-dependence of wind speed, turbulence and stability to produce improved predictions.

Unlike the 'DMRB Screening Method', ADMS-Roads can take into account annualised meteorological data; it can take into account source, receiver and terrain heights; canyon effects can be modelled, and the model can calculate hourly concentrations.

TG16 provides detailed guidance on the modelling of air pollutants and in particular highlights a procedure to validate models. The procedure discusses the comparison of modelled results against measured levels, either from diffusion tubes (for NO_2) or continuous monitors (for NO_2 or PM_{10}).

Model verification and subsequent adjustment for oxides of nitrogen is undertaken based upon NO_X as most models (including ADMS-Roads) predict NO_2 based upon its relationship to NO_x. Consequently, the verification process requires conversion to NO_x of any measurements of NO_2 in order to compare against modelled levels of NO_x.

Defra has published in 2009 a methodology to calculate NO_x from NO_2 and as part of its LAQM toolkit[2]. The calculation method allows local authorities and air quality consultants to derive NO_2 and NO_x wherever NO_x is predicted by modelling emissions from roads. The calculation method incorporates the impact of expected changes in the fraction of NO_x emitted as NO_2 (f – NO_2) and changes in regional concentrations of NO_x, NO_2 and O_3.

[2] http://laqm.defra.gov.uk/tools-monitoring-data/no-calculator.html

Background concentrations for various pollutants are published and updated regularly by Defra, so it is possible to calculate the contribution of NO_x from road traffic at a particular location. If the ratio of the monitored road traffic contribution to the modelled road traffic contribution of NO_x is calculated, this factor can be applied to the component derived from road traffic emissions for any predictions of NO_x in the area. Therefore, it is possible to validate the model such that predictions should be within 10% of air quality measurements.

Appendix 3
Modelling Procedure and Input Data

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The following Appendix summarises the input data and assumptions used in the modelling of air pollutants.

Model Input Data

Traffic flows in the vicinity of the site have been attained from the Department for Transport's traffic database for the year 2018 as well as the London Atmospheric Emissions Inventory for 2013. High traffic growth factors have been applied to this data to predict traffic flows for the baseline year (where the LAEI 2013 has been used) and the proposed opening year (2021).

Since lower traffic speeds increase emissions from vehicles, it is necessary to take into account the reduction in traffic speeds around junctions. TG16 suggests that *"there is no simple factor that can be applied to the average speed to calculate a speed applicable to congested periods"* and that one should exercise professional judgement when taking into account congestion and decreasing speeds around junctions. However, in the absence of any more detailed site-specific information, TG16 does suggest that that *"For a busy junction, assume that traffic approaching the junction slows to an average of 20kph …(for) approach distances of approximately 25m"*. This is the approach adopted at this site.

Input road links, traffic flows, the percentage of Heavy Goods Vehicles (HGVs) and traffic speeds are shown below.

Model Input Data

Road	AADT 2018	AADT 2021	% HGV	Speed km/h
Goodge St 1	11858	12400	2.4	20
Goodge St 2	11858	12400	2.4	48
Goodge St 3	11858	12400	2.4	20
Goodge St 4	11858	12400	2.4	32
Goodge St 5	11858	12400	2.4	20
Goodge St 6	11858	12400	2.4	32
Goodge St 7	11858	12400	2.4	20
Tottenham Ct Rd 1	13943	14580	11.2	32
Tottenham Ct Rd 2	13943	14580	11.2	20
Tottenham Ct Rd 3	13943	14580	11.2	20
Tottenham Ct Rd 4	13943	14580	11.2	32
Tottenham Ct Rd 5	13943	14580	11.2	20

Road	AADT 2018	AADT 2021	% HGV	Speed km/h
Tottenham Ct Rd 6	13943	14580	11.2	32
Tottenham Ct Rd 7	13943	14580	11.2	20
Tottenham Ct Rd 8	13943	14580	11.2	32
Tottenham Ct Rd 9	13943	14580	11.2	20
Tottenham Ct Rd 10	13943	14580	11.2	32
Tottenham Ct Rd 11	13943	14580	11.2	48
Tottenham Ct Rd 12	13943	14580	11.2	20
Bloomsbury St 1	14191	14839	10.6	20
Bloomsbury St 2	14191	14839	10.6	32
Bloomsbury St 3	14191	14839	10.6	20
Bloomsbury St 4	14191	14839	10.6	32
Bloomsbury St 5	14191	14839	10.6	20
Bloomsbury St 6	14191	14839	10.6	32
Bloomsbury St 7	14191	14839	10.6	20
Bloomsbury St 8	14191	14839	10.6	32
Bloomsbury St 9	14191	14839	10.6	20
Oxford St 1	11321	11838	17.8	48
Oxford St 2	11321	11838	17.8	20
St Giles High St 1	8561	8952	9.8	20
St Giles High St 2	8561	8952	9.8	32
Denmark St 1	8561	8952	9.8	32
Denmark St 2	8561	8952	9.8	20
Charing Cross Rd 1	7017	7338	26.0	20
Charing Cross Rd 2	7017	7338	26.0	48
Charing Cross Rd 3	7017	7338	26.0	20

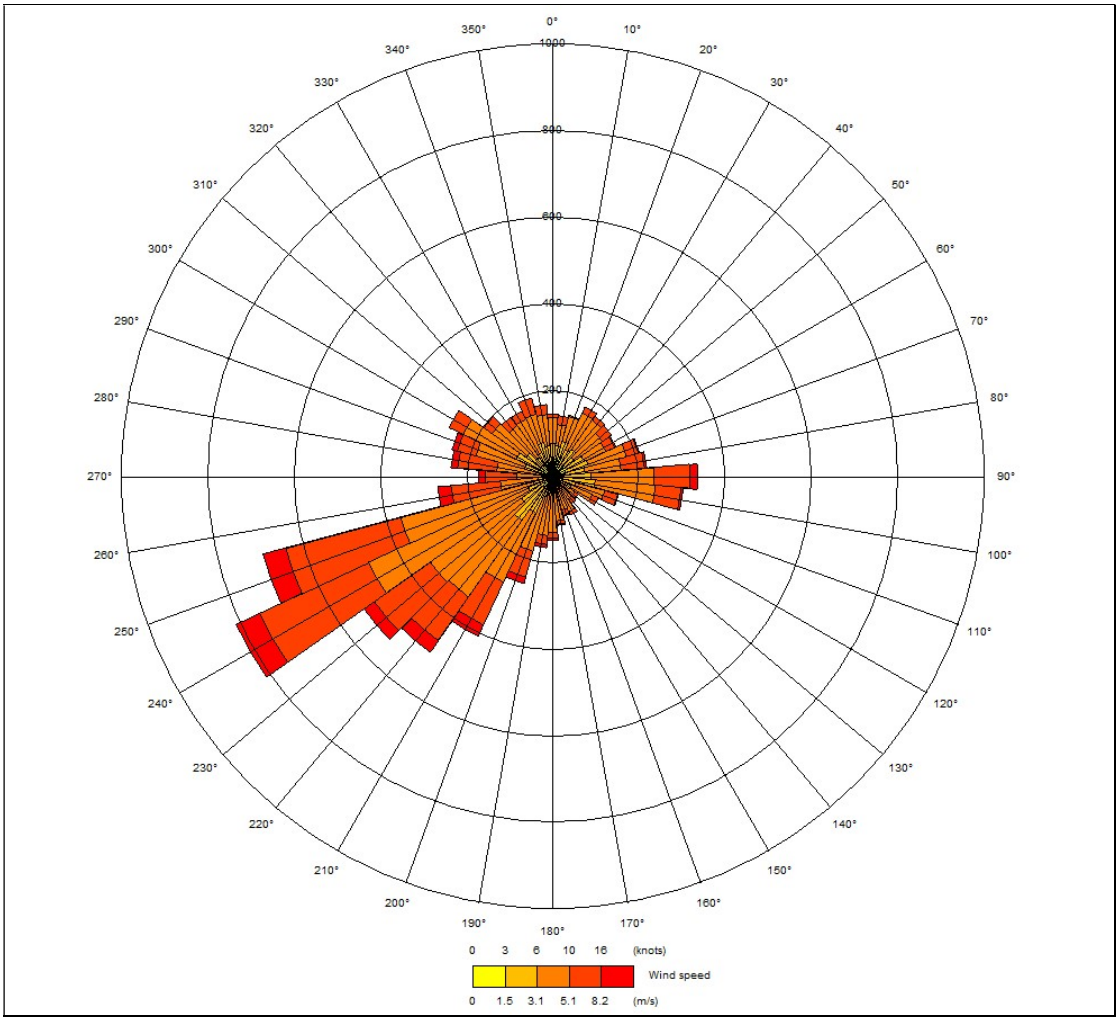
Road	AADT 2018	AADT 2021	% HGV	Speed km/h
New Oxford St 1	12677	13256	14.9	20
New Oxford St 2	12677	13256	14.9	32
New Oxford St 3	12677	13256	14.9	20
Charing Cross Rd 4	8839	9243	12.5	20
Charing Cross Rd 5	8839	9243	12.5	48
Shaftesbury Av 1	15172	15865	9.3	20
Shaftesbury Av 2	15172	15865	9.3	32
Shaftesbury Av 3	15172	15865	9.3	20
Shaftesbury Av 4	5339	5583	2.5	20
Shaftesbury Av 5	5339	5583	2.5	32
Shaftesbury Av 6	5339	5583	2.5	20
Shaftesbury Av 7	5339	5583	2.5	32
Shaftesbury Av 8	5339	5583	2.5	20
New Oxford St 4	12677	13256	14.9	20
New Oxford St 5	12677	13256	14.9	32
New Oxford St 6	12677	13256	14.9	20
New Oxford St 7	12677	13256	14.9	20
New Oxford St 8	12677	13256	14.9	32
New Oxford St 9	12677	13256	14.9	20
Charing Cross Rd 6	8839	9243	12.5	20
Charing Cross Rd 7	8839	9243	12.5	48
Charing Cross Rd 8	8839	9243	12.5	20
Bedford Av 1	1310	1370	7.1	20
Bedford Av 2	1310	1370	7.1	32
Bedford Av 3	1310	1370	7.1	20

Road	AADT 2018	AADT 2021	% HGV	Speed km/h
Bedford Av 4	1310	1370	7.1	32
Bedford Av 5	1310	1370	7.1	20
Monmouth St 1	14067	14710	4.5	32
Monmouth St 2	14067	14710	4.5	20
Monmouth St 3	14067	14710	4.5	32
Long Acre 1	1525	1595	1.6	20
Long Acre 2	1525	1595	1.6	48
Long Acre 3	1525	1595	1.6	20
Endell St 1	9983	10439	4.9	20
Endell St 2	9983	10439	4.9	48
Endell St 3	9983	10439	4.9	20
Endell St 4	9983	10439	4.9	32
Endell St 5	9983	10439	4.9	20
Montague Place 1	9921	10374	4.3	20
Montague Place 2	9921	10374	4.3	32
Montague Place 3	9921	10374	4.3	20
Great Russell St 1	6023	6298	5.9	20
Great Russell St 2	6023	6298	5.9	32
Chenies St 1	4811	5031	3.3	20
Chenies St 2	4811	5031	3.3	32
Chenies St 3	4811	5031	3.3	20
Neal St	1525	1595	1.6	20

Meteorological Data

TG16 suggests that a single year's meteorological data will be sufficient to predict air pollution concentrations. Meteorological data was obtained for the nearest meteorological station to the proposed development site, which is situated at London City Airport (Surface Station Number 3763). The meteorological data consists of hourly sequential data of wind speed, wind direction, surface temperature, precipitation rate and cloud cover data. This data was used for both model verification and future year scenarios. The figure below shows the wind rose data used in the modelling.

Wind Rose – London City Airport



Advanced Modelling Parameters

The following modelling parameters have been used in the ADMS-Roads Model:

Parameter	Value	Justification
Latitude	51.51°	The default for southern England
Surface Roughness Note 1	1.5 m	Recommended for large urban areas
Minimum Monin-Obukhov Length	100 m	Recommended for cities population > 1 million
Surface Albedo	0.23	The default for non-snow-covered ground
Priestley-Taylor Parameter	1.0	Model default

Note 1: A surface roughness of 0.5 has been applied to the meteorological measurement site, as it is considered to be a less built up area than the proposed development site.

Background Concentration of Air Pollutants

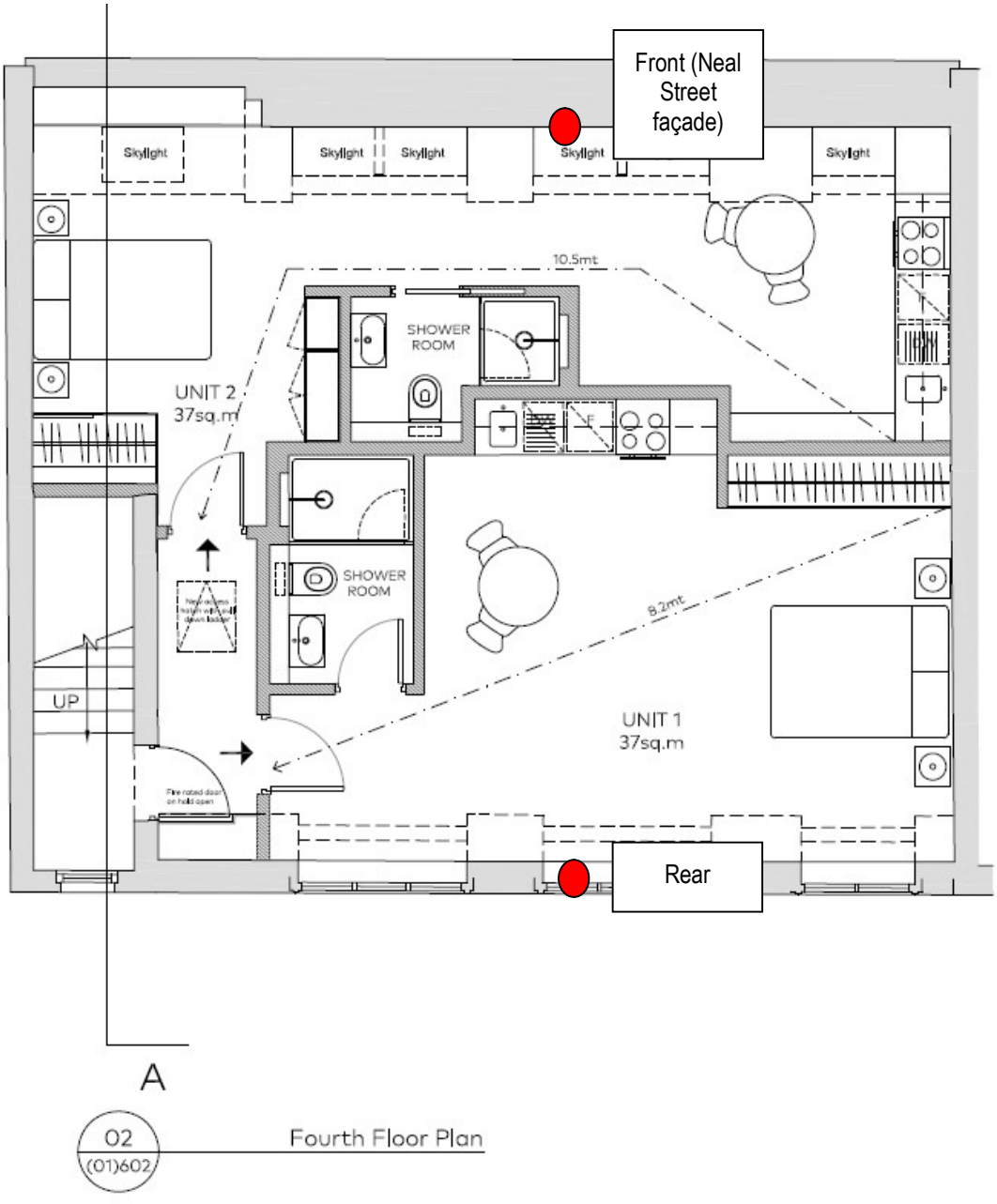
At this location (as is typical in large parts of London) the monitored background concentrations of NO_2 are higher than the background concentrations of NO_2 and PM_{10} contained within the background maps of the UK National Air Quality Information Archive, as recommended for use by the Local Air Quality Management Technical Guidance TG(16). Consequently, the background concentration of NO_2 from the nearby London Bloomsbury Automatic Monitoring Station (530123 182014) for 2018 has been utilised in all modelling, corresponding to an annual mean concentration of 36.0 $\mu g/m^3$ of NO_2.

Background concentrations of PM_{10} and $PM_{2.5}$ are also monitored at the Bloomsbury site, and in the year 2018 concentrations of PM_{10} and $PM_{2.5}$ were 17.0 $\mu g/m^3$ and 10.0 $\mu g/m^3$, respectively.

The above background concentrations have been used in all modelling scenarios (current and future) in order to show a worst-case scenario, i.e. future concentrations assuming that background levels stay constant and do not decrease as expected.

Receptor Locations

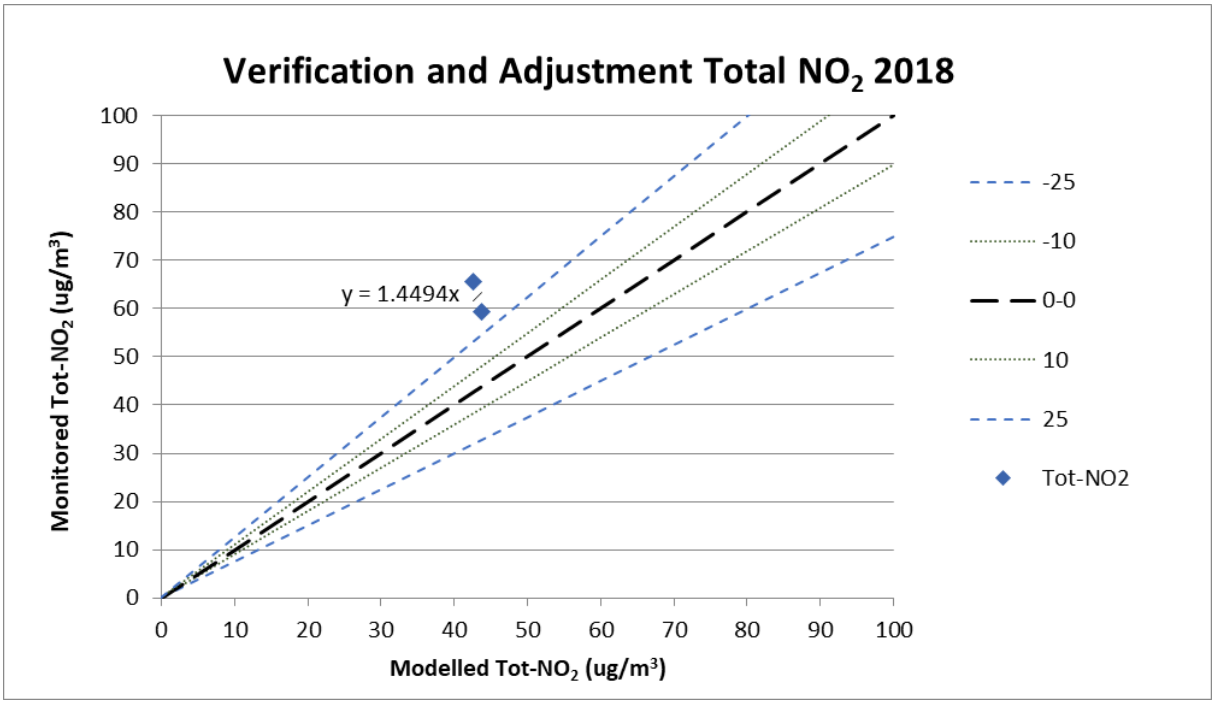
The site plan below shows the locations of the sample sensitive receptor locations used within the modelling:

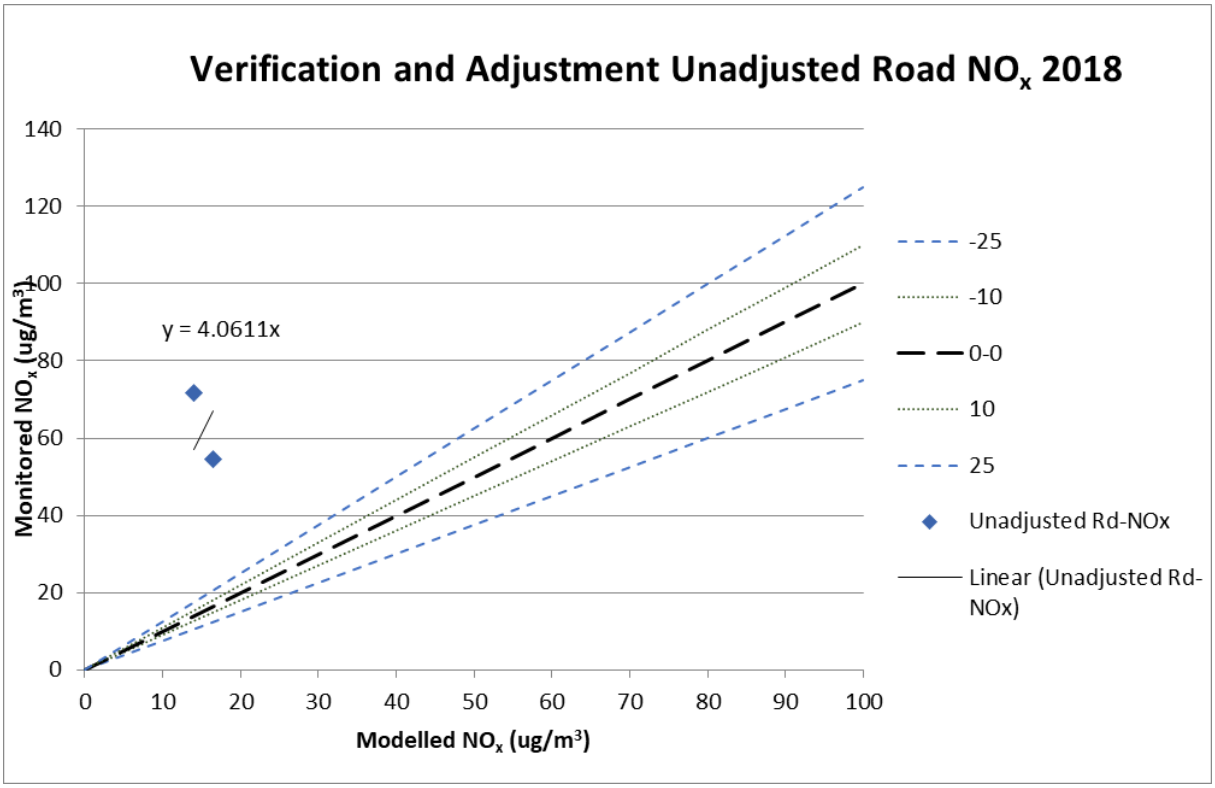


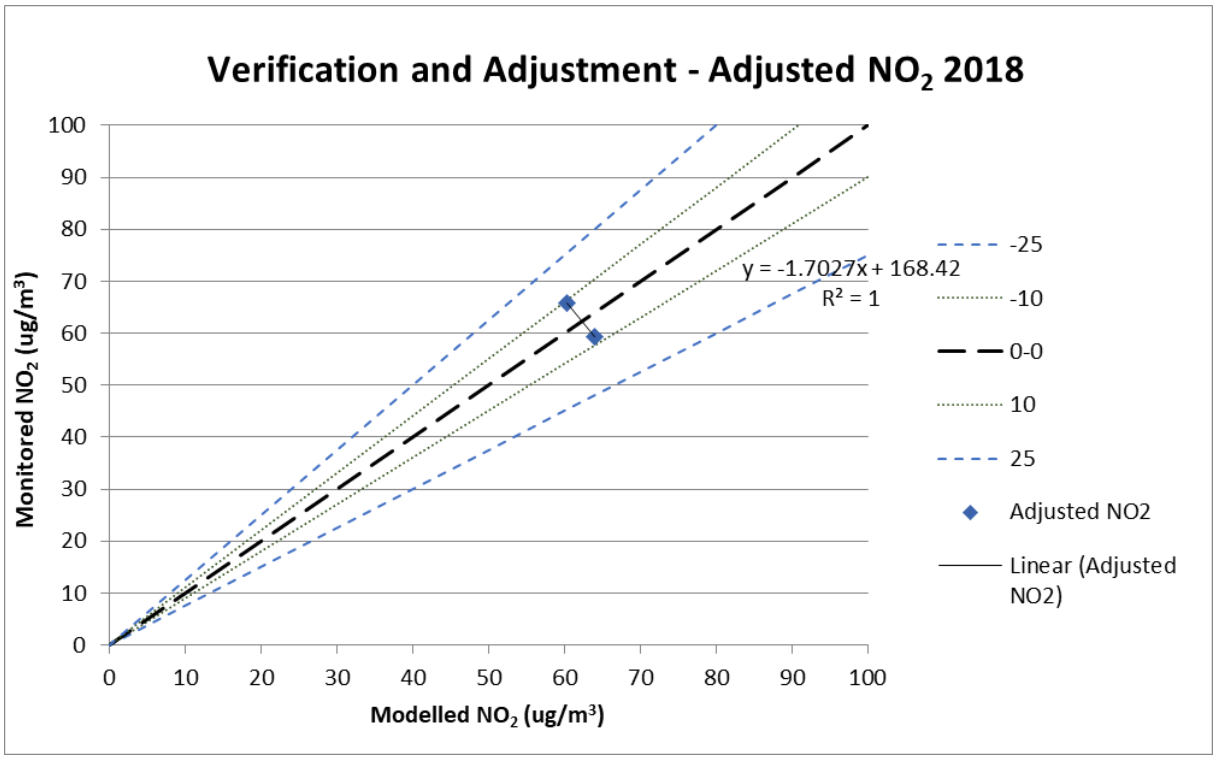
Verification and Adjustment

Verification of the air pollutant model was carried out in accordance with LAQM Technical Guidance TG16 using the data from the diffusion tube located in the vicinity of the site for 2018. The exercise required the modelling of the diffusion tube location for 2018 and comparing the modelled results with the monitoring results. The verification data is summarised below and shows that pollutant concentrations where under predicted using the model; therefore, an adjustment factor of 5.3327 was applied to the model contribution of NO_x.

	Modelled Rds NO_x	Modelled Tot-NO_2	Monitored Tot-NO_2	%Diff Mod/Mon Tot-NO_2	Modelled Rd-NO_x	Monitored Rd-NO_x	NO_x ADJ Corr1	Adj Mod Rd-NO_x	Adj Mod Tot-NO_2	Monitored Tot-NO_2	%Diff Mod/Mon Adj Tot-NO_2
CA11 - Tottenham Court Road	14.05	42.57	65.7	-35.21	14.05	71.58	5.09	57.08	60.33	65.70	-8.17
CA21 - Bloomsbury Street	16.49	43.67	59.4	-26.48	16.49	54.63	3.31	66.99	64.03	59.40	7.79


Verification and Adjustment Total NO2 2018
Monitored Tot-NO2 (ug/m3)
Modelled Tot-NO2 (ug/m3)
y = 1.4494x
0
10
20
30
40
50
60
70
80
90
100
-25
-10
0-0
10
25
Tot-NO2


Verification and Adjustment Unadjusted Road NOx 2018
Monitored NOx (ug/m3)
Modelled NOx (ug/m3)
y = 4.0611x
0
20
40
60
80
100
120
140
-25
-10
0-0
10
25
Unadjusted Rd-NOx
Linear (Unadjusted Rd-NOx)


Verification and Adjustment - Adjusted NO2 2018
Monitored NO2 (ug/m3)
Modelled NO2 (ug/m3)
y = -1.7027x + 168.42
R² = 1
-25
-10
0-0
10
25
Adjusted NO2
Linear (Adjusted NO2)

Model Uncertainty

TG16 recommends the use of statistical parameters to assess uncertainty in the verified model. The table below describes the three parameters it recommends and the corresponding value for the verified model at this site.

Parameter	Value	Description
Correlation Coefficient	N/A	Used to measure the linear relationship between predicted an observed data. The ideal value (an absolute relationship) is 1.
Root Mean Square Coefficient	5.4	RMSE defines the average error/uncertainty of the model verification and is in the same units as the model outputs (µg/m^3). Values should be <10µg/m^3 or ideally <4µg/m^3 where concentrations are near the AQO. The ideal value is 0µg/m^3.
Fractional Bias	0.085	Identifies if the model shows a systematic tendency to over/under predict concentrations. The ideal value is 0 and range between +/- 2. Negative values suggest an over prediction whilst positive values suggest under prediction.

TG16 notes that the Correlation Coefficient is a less reliable indicator when validating with a small dataset; therefore, for sites such as this validated with smaller datasets, the Root Mean Square Coefficient is the main parameter used. The table above notes that the Root Mean Square Coefficient is 5.4, therefore the model can be used with a high level of confidence. The Fractional Bias is just greater than 0, indicating that on average, the validated model is likely to underpredict *very* marginally, but overall should be highly accurate.

PM_{10} Exceedances

The number of exceedances of 50 µg/m^3 as a 24-hour mean PM_{10} concentration has been calculated from the modelled total annual mean concentration following the relationship advised by Defra:

$A = -18.5 + 0.00145 B^3 + 206/B$

where A is the number of exceedances of 50 µg/m^3 as a 24-hour mean PM_{10} concentration and B is the annual mean PM_{10} concentration.