Oriel

Air Quality Assessment

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Oriel
Creating the centre for advancing eye health

Moorfields Eye Hospital NHS Foundation Trust

NHS

Moorfields Eye Charity

UCL INSTITUTE OF OPHTHALMOLOGY

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Oriel
Air Quality Assessment

Prepared for:
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UCL Institute of Ophthalmology
Moorfields Eye Charity

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1 Introduction

1.1 Overview

1.1.1 Moorfields Eye Hospital NHS Foundation Trust, on behalf of Oriel[1], have commissioned AECOM to undertake an Air Quality Impact Assessment to accompany a planning application for a new facility that would allow the existing Moorfields Eye Hospital at City Road (Moorfields at City Road) and University College London (UCL) Institute of Ophthalmology (IoO) services at Bath Street to relocate into a single building at the existing St. Pancras Hospital site (hereafter referred to as the 'Proposed Development').

1.1.2 The Proposed Development will be located at part of the existing St. Pancras Hospital site within the London Borough of Camden (LBC) (hereafter referred to as the 'Site').

1.1.3 This report presents the findings of the assessment of the likely effects on air quality as a result of the construction and operation of the Proposed Development.

1.2 Site Location and Description

1.2.1 The Site is bounded by Granary Street to the north, and St Pancras Way to the west. The remainder of St. Pancras Hospital lies to the east and south of the Site. St Pancras Gardens, a Site of Borough Importance for Nature Conservation (SINC) is located 45 m to the south of the Site. The Site is situated within St. Pancras Hospital and is centred on national grid reference (NGR) TQ 29689 83612.

1.2.2 The Site located approximately 95m west of Regent's Canal and Camden High Street is approximately 800m to the west.

1.3 The Proposed Development

1.3.1 The Proposed Development comprises a single building, between seven and ten storeys in height (including Ground Level and Lower Ground Level, as well as plant at Roof Level), as well as provision of public realm at ground level, blue badge parking, and a vehicular drop off point along St Pancras Way. The building is arranged around a central atrium and connection space. There is also a roof terrace on the Sixth Floor Level on the south-western corners of the building.

1.3.2 The Proposed Development will be up to 69.15 metres (m) Above Ordnance Datum (AOD) and will have a gross external area of approximately 48,851 square metres (sq m) and a gross internal area of approximately 46,468 sq m.

1.3.3 The Proposed Development will comprise a mix of uses including clinical, research and education purposes, including accident and emergency (A&E) department, outpatients, operating theatres, research areas, education

[1] Oriel is a joint venture between Moorfields Eye Hospital NHS Foundation Trust, University College London Institute of Ophthalmology and Moorfields Eye Charity

space, café and retail areas, facilities management, office space and plant space.

1.3.4 Further details are provided in the Design and Access Statement that is submitted with the planning application.

2 Planning Policy and Legislation

2.1 European Air Quality Directives

2.1.1 The Clean Air for Europe (CAFE) (Ref. 1) programme revisited the management of air quality within the EU and replaced much of the existing air quality legislation with a single legal act, Directive 2008/50/EC on Ambient Air Quality and Cleaner Air for Europe (Ref. 2). This Directive repealed and replaced the EU Framework Directive 96/62/EC on Ambient Air Quality Assessment and Management (Ref. 3) and its associated Daughter Directives 1999/30/EC (Ref. 4), 2000/69/EC (Ref. 5), 2002/3/EC (Ref. 6), (relating to limit values for ambient air pollutants) and the Council Decision 97/101/EC (Ref. 7) which established a reciprocal exchange of information and data within Member States.

2.2 National Air Quality Legislation

UK National Air Quality Strategy

2.2.1 The UK National Air Quality Strategy (Ref. 8) (AQS) was initially published in 2000, under the requirements of the Environment Act 1995 (Ref. 9). The most recent revision of the strategy (2007) (Ref. 10) sets objective values for key pollutants as a tool to help local authorities manage local air quality improvements in accordance with the EU Air Quality Framework Directive. Some of these objective values have subsequently been laid out within the Air Quality (England) Regulations 2000 (Ref. 11) and later amendments (2015) (Ref. 12).

2.2.2 The AQS objective values, referred to below, have been outlined in legislation solely for the purposes of local air quality management. Under the local air quality management regime, the local authority has a duty to carry out regular assessments of air quality against the air quality objectives and if it is unlikely that the objectives will be met in the given timescale, they must designate an Air Quality Management Area (AQMA) and prepare an Air Quality Action Plan (AQAP) with the aim of achieving the air quality objectives. The boundary of an AQMA is set by the governing local authority to define the geographical area that is to be subject to the management measures set out in a subsequent action plan. Consequently, it is not unusual for the boundary of an AQMA to include relevant locations where air quality is not at risk of exceeding an AQS objective.

2.2.3 The UK's national AQS objectives for the pollutants of relevance to this assessment are displayed in Table 2-1 as stated in the Air Quality Standards Regulations 2010 (Ref. 13).

Table 2-1 UK AQS Objectives

Pollutant	Averaging Period	Value	Maximum Permitted Exceedances
Nitrogen Dioxide (NO_2)	Annual Mean	40 µg/m^3	None
	Hourly Mean	200 µg/m^3	18 times per year
Particulate Matter (PM_{10})	Annual Mean	40 µg/m^3	None
	24 Hour Mean	50 µg/m^3	35 times per year
Fine Particulate Matter ($PM_{2.5}$)	Annual Mean	25 µg/m^3	None

National Clean Air Strategy

2.2.4 In 2019, the UK government released its much-anticipated Clean Air Strategy (Ref. 14) (referred to as 'the Strategy'), part of its 25 Year Environment Plan. The Strategy places greater emphasis on improving air quality in the UK than has been seen before and outlines how this is to be achieved (including the development of new enabling legislation).

2.2.5 The focus of air quality management in recent years has primarily related to one pollutant, NO_2, and its principal source in the UK, road traffic. However, the Strategy broadens the focus to other areas, including domestic emissions from wood burning stoves and from agriculture. This shift in emphasis is part of a goal to reduce the levels of fine particulate matter ($PM_{2.5}$) in the air to below the World Health Organisation guideline level, which is far lower than the current EU limit value.

2.2.6 The Strategy includes clear guidance on how AQMAs, Clean Air Zones (CAZ) and Smoke Control Areas interrelate and how they can be used by local government to tackle pollution.

2.2.7 In relation to NO_x, the Strategy sets the following reduction target:

- Nitrogen oxides (NO_X) – reduce emissions against the 2005 baseline by 55% by 2020, and by 73% by 2030;

2.2.8 It is noted within the Strategy that the "*current legislative framework has not driven sufficient action at a local level".* New legislation will seek to shift the focus towards the prevention of exceedances rather than tackling pollution when limits have been surpassed. This shift of focus encourages more of a proactive rather than reactive policy framework for air quality at regional and local levels.

Air Quality Standards Regulations (2010)

2.2.9 Directive 2008/50/EC is transcribed into UK legislation by the Air Quality Standards Regulations 2010 (Ref. 13), and amended by the Air Quality Standards (Amendment) Regulations 2016, which came into force on 11th

June 2010. This sets binding limit values or objectives on pollutants with the aim of avoiding, preventing or reducing harmful effects on human health and on the environment as a whole.

2.3 National Planning Policy

National Planning Policy Framework (2019)

2.3.1 The revised National Planning Policy Framework (NPPF) (Ref. 15) was published in February 2019 and sets out the Government's planning policies for England and how these are expected to be applied. The NPPF supersedes the previous NPPF published in March 2012.

2.3.2 Paragraph 103 of the NPPF states that:

"The planning system should actively manage patterns of growth in support of these objectives. Significant development should be focused on locations which are or can be made sustainable, through limiting the need to travel and offering a genuine choice of transport modes. This can help to reduce congestion and emissions and improve air quality and public health."

2.3.3 Air quality is considered an important element of the natural environment. On conserving and enhancing the natural environment, paragraph 170 states that:

"Planning policies and decisions should contribute to and enhance the natural and local environment by: …

e) preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability. Development should, wherever possible, help to improve local environmental conditions such as air and water quality …"

2.3.4 Air quality in the UK is managed through the Local Air Quality Management (LAQM) regime using national objectives. The effect of a development on the achievement of such policies and plans may be a material consideration by planning authorities when making decisions for individual planning applications. Paragraph 181 of the NPPF states that:

"Planning policies and decisions should sustain and contribute towards compliance with relevant limit values or national objectives for pollutants, taking into account the presence of Air Quality Management Areas and Clean Air Zones, and the cumulative impacts from individual sites in local areas. Opportunities to improve air quality or mitigate impacts should be identified, such as through traffic and travel management, and green infrastructure provision and enhancement. So far as possible these opportunities should be considered at the plan-making stage, to ensure a strategic approach and limit the need for issues to be reconsidered when determining individual applications. Planning decisions should ensure that any new development in Air Quality Management Areas and Clean Air Zones is consistent with the local air quality action plan."

2.3.5 The differing roles of a planning authority and a pollution control authority are addressed by the NPPF in paragraph 183:

"The focus of planning policies and decisions should be on whether Proposed Scheme is an acceptable use of land, rather than the control of processes or emissions (where these are subject to separate pollution control regimes). Planning decisions should assume that these regimes will operate effectively. Equally, where a planning decision has been made on a particular development, the planning issues should not be revisited through the permitting regimes operated by pollution control authorities."

Planning Practice Guidance

2.3.6 The Planning Practice Guidance (PPG) (Ref. 16) supports the NPPF and was first published online in 2014, with the air quality PPG last updated on 1st November 2019. The PPG states that the planning system should consider the potential effect of new developments on air quality where relevant limits have been exceeded or are near the limit. Concerns also arise where the development is likely to adversely affect the implementation of air quality strategies and action plans and/or, in particular, lead to a breach of EU legislation (including that applicable to wildlife). In addition, air quality may also be considered to be material if the proposed development would be particularly sensitive to poor air quality in its vicinity.

2.3.7 When deciding whether air quality is relevant to a planning application the PPG states that the following criteria may be required to be taken into consideration:

- the 'baseline' local air quality, including what would happen to air quality in the absence of the development;
- whether the Proposed Scheme could significantly change air quality during the construction and operational phases (and the consequences of this for public health and biodiversity); and
- whether occupiers or users of the development could experience poor living conditions or health due to poor air quality.

2.3.8 On how detailed an air quality assessment needs to be, the PPG:

"Assessments should be proportionate to the nature and scale of the development proposed and the level of concern about air quality... Mitigation options where necessary will be locationally specific, will depend on the Proposed Scheme and should be proportionate to the likely impact. It is important therefore that local planning authorities work with applicants to consider appropriate mitigation so as to ensure the new development is appropriate for its location and unacceptable risks are prevented."

A Green Future: Our 25 Year Plan to Improve the Environment

2.3.9 The 25 Year Environment Plan (Ref. 17), published in January 2018 and updated in 2019, sets out the actions the UK Government will take to help the natural world regain and retain good health (Ref 16). This references several actions that are being taken to improve air quality, most notably the

publication of the Clean Air Strategy (referenced earlier) and tighter controls on Medium Combustion Plants (capacity more than or equal to 1 megawatt thermal (MWth) and less than 50MWth burning any fuel). Emphasis is also placed on the 'Future of Mobility', in the establishment of a flexible regulatory framework to encourage new modes of transport and encouraging opportunities to move toward zero emission transport.

2.3.10 The 25 Year Environment Plan reinforces the demand for high environmental standards for all new build development. Resilient buildings and infrastructure will more readily adapt to a changing climate, and by extension have a lesser impact on local air quality.

2.4 Regional Planning Policy

The Mayor's London Plan, Spatial Development Strategy for London

2.4.1 The Mayor's London Plan represents a spatial development strategy for Greater London (Ref. 18) and is the overall strategic plan for London. It sets out a fully integrated economic, environmental, transport and social framework for the development of the capital to 2031. It forms part of the development plan for Greater London. 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.

2.4.2 Policy 7.14 Improving Air Quality states:

"Development proposals should:

a) 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 (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".

2.4.3 Policy 5.7 Renewable Energy states that:

"all renewable energy systems should be located and designed to […] avoid any adverse impacts on air quality".

2.4.4 Policy 6.13 Parking states that:

"in locations with high public transport accessibility, car-free developments should be promoted (while still providing for disabled people)."

The New Draft London Plan – Intend to Publish

2.4.5 The 'Draft London Plan – Intend to Publish Version December 2019' (Ref. 19) considers air quality in the following policies:

2.4.6 Policy Sustainable Infrastructure 1 (SI1) 'Improving Air Quality' states:

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 retrofitted mitigation measures*
   c. *Major development proposals must be submitted with an Air Quality Assessment. Air quality assessments should show how the development will meet the requirements of B1*
   d. *Development proposals in Air Quality Focus Areas or that are likely to be used by large numbers of people particularly vulnerable to poor air quality, such as children or older people, should demonstrate that design measures have been used to minimise exposure.*

C. *Masterplans and development briefs for large-scale development proposals subject to an Environmental Impact Assessment should consider how local air quality can be improved across the area of the proposal as*

part of an air quality positive approach. To achieve this, a statement should be submitted demonstrating:

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

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

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

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

2.4.7 Policy D3 ‘Optimising site capacity through the design-led approach’ states that:

“Development proposals should:

9) help prevent or mitigate the impacts of noise and poor air quality.”

2.4.8 One of the amendments to the latest draft London Plan refers to the Mayor’s commitment to making London’s air quality the best of any major world city; supported by achieving compliance with legal limits for NO_2 as soon as possible and achieving air quality standards published by the World Health Organisation for other pollutants such as PM. The new draft London Plan is expected to be adopted in 2020 (Ref. 20).

London Environment Strategy

2.4.9 The London Environment Strategy (Ref. 21) was published by the Mayor of London in May 2018 and sets out the Mayor’s vision of London’s environment to 2050. The London Environment Strategy includes a number of policies and aspirations, with an accompanying implementation plan, which sets out actions the Mayor is prioritising for the next five years to implement the aims of this strategy.

2.4.10 Chapter 4 of the London Environment Strategy relates to air quality and supersedes the 2010 Mayor’s Air Quality Strategy (Ref. 22). It sets the ambitious target for London to have the best air quality of any major world city by 2050 and goes further than the previous strategy by requiring developments to be ‘air quality positive’. To date, however, the underpinning guidance outlining the method of assessment and the effective approaches to be taken to ensure that larger developments are ‘air quality positive’, has not been published. Therefore, the minimum requirement must remain for a

development to be air quality neutral, until such time as this guidance is available.

Sustainable Design and Construction SPG

2.4.11 In April 2014, the Mayor of London published a revised Sustainable Design and Construction – Supplementary Planning Guidance (SPG) (Ref. 23). This document provides guidance to developers and local authorities on what measures can be included in their designs and operations in order to achieve sustainable development and the objectives set out in the London Plan.

2.4.12 Section 4.3 of the SPG concerns air quality, and sets out the Mayor's priorities, as follows:

- *"Developers are to design their scheme 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; and*
- *Developers and contractors should follow the guidance set out in the Control of Dust and Emissions during Construction and Demolition SPG when constructing their development."*

The Control of Dust and Emissions during Construction and Demolition SPG

2.4.13 During the construction phase of the Proposed Development, there is the potential for earthworks and construction activities to generate fugitive emissions of particulate matter (dust and PM_{10}).

2.4.14 The Control of Dust and Emissions during Construction and Demolition SPG provides the methodology for assessing construction phase impacts and recommends mitigation measures appropriate to the risk associated with development sites (Ref. 24). This methodology has been applied in this air quality assessment.

2.4.15 Non-Road Mobile Machinery (NRMM) is identified as a significant emissions source in the SPG. NRMM to be used on any construction sites in Greater London need to comply with the European emission standards, as set out in the SPG. As of 1st September 2020, the following standards apply:

- NRMM used on any site within Greater London will be required to meet Stage IIIB of the Directive as a minimum.
- NRMM used on any site within the Central Activity Zone or Canary Wharf will be required to meet Stage IV of the Directive as a minimum.

2.4.16 This policy is enforced through the planning process and compliance with the NRMM standards should be secured by local authorities as a planning condition or a Section 106 agreement. If emissions of NRMM are unknown, developers will be required to provide a written statement of their commitment and ability to meet these standards as part of an Air Quality Statement. An inventory of all NRMM should be kept, stating the emission limits for all equipment, and made available to local authority officers.

2.5 Local Planning Policy

Camden Local Plan

2.5.1 The Camden Local Plan (Ref. 25) was adopted in July 2017 replacing the Core Strategy and Camden Development Policies. It sets the overarching vision, strategic objectives and policies for development in the London Borough of Camden from 2016-2031. The Plan identifies a number of spatial development issues across the Borough including accommodating population growth, achieving economic prosperity, tackling climate change, infrastructure provision, community cohesion, and creating and maintaining attractive and distinctive places.

2.5.2 Policy CC4: Air Quality states that:

"The Council will ensure that the impact of development on air quality is mitigated and ensure that exposure to poor air quality is reduced in the borough.

The Council will take into account the impact of air quality when assessing development proposals, through the consideration of both the exposure of occupants to air pollution and the effect of the development on air quality. Consideration must be taken to the actions identified in the Council's Air Quality Action Plan.

Air Quality Assessments (AQAs) are required where development is likely to expose residents to high levels of air pollution. Where the AQA shows that a development would cause harm to air quality, the Council will not grant planning permission unless measures are adopted to mitigate the impact. Similarly, developments that introduce sensitive receptors (i.e. housing, schools) in locations of poor air quality will not be acceptable unless designed to mitigate the impact.

Development that involves significant demolition, construction or earthworks will also be required to assess the risk of dust and emissions impacts in an AQA and include appropriate mitigation measures to be secured in a Construction Management Plan."

2.5.3 Policy A1: Managing the impact of development states that:

"The Council will seek to protect the quality of life of occupiers and neighbours. We will grant permission for development unless this causes unacceptable harm to amenity….The factors we will consider include….odour, fumes and dust."

2.5.4 Policy T2: Parking and car free development states that:

"To promote sustainable transport for all and to make Camden a better place to cycle and walk around, to reduce air pollution, reliance on private cars and congestion and to support and promote new and improved transport links."

Our Camden Plan

2.5.5 Our Camden Plan (Ref. 26) is LBC's plan for how they will implement their Camden 2025 vision. It states that LBC will use all the resources at their disposal to play a part in improving air quality. The Our Camden Plan key objectives are to focus on building communities, strong growth and access to jobs, recognise the needs of the full range of employees and businesses, create safe and open communities, and build clean and sustainable places.

Camden Clean Air Action Plan 2019-2022

2.5.6 The Camden Clean Air Quality Action Plan (AQAP) (Ref. 27) was published in 2019. The plan has seven main themes for monitoring air quality, reducing emissions from buildings and new development, reducing emissions from transport, awareness raising and lobbying and partnership working. LBC's commitments include:

1. *Working to reduce emissions from our own estate and operations;*
2. *Helping residents and visitors to reduce emissions and exposure;*
3. *Using planning policy and regulation to reduce air pollution;*
4. *Implementing innovative projects across the borough to improve air quality;*
5. *Using our influence to lobby for increased financial and regulatory support for the mitigation of air pollution;*
6. *Maintaining a monitoring network and ensuring the data is freely accessible;*
7. *Raising awareness on how to reduce emissions and exposure*

Camden Planning Guidance – Air Quality

2.5.7 The Camden Planning Guidance – Air Quality, 2019 (Ref. 28) provides information on key air quality issues within the borough and supports Local Plan Policy CC4 Air Quality.

2.5.8 Key messages from the guidance which are relevant to the Proposed Development, are that:

- All of Camden is a designated Air Quality Management Area due to the high concentrations of nitrogen dioxide (NO_2) and particulate matter (PM_{10}).
- All developments in areas of poor air quality are to protect future occupants from exposure to poor air quality.

- All developments are to limit their impact on local air quality and be at least air quality neutral.
- Air quality neutral assessments are required for all major developments. Major developments are schemes of 10 or more dwellings or buildings where the floorspace created is 1,000 square metres or more.
- All proposals involving demolition and construction should adopt best practice measures to reduce and mitigate emissions.
- On-site monitoring may be required dependant on the scale of demolition and construction.
- Certain developments using Non-Road Mobile Machinery (within the KW range) need to meet standards in the Mayor's Dust and emissions SPD.
- The impact of outdoor air pollution on indoor air quality in new developments needs to be taken into account at the earliest stages of building design.
- Development should take into consideration the location of amenity space and opportunities for appropriate planting 'greening'.
- Development should reduce emissions by being energy efficient (reducing emissions associated with the operation of the building).
- Development should prioritise more sustainable modes of transport and where applicable improve the walking and cycling environment.

Camden's Minimum Requirements

2.5.9 LBC has outlined a series of measures to minimise air pollution and nuisance during demolition and construction activities to those nearby within the Camden's Minimum Requirements document (Ref. 29). These include:

1. *All dusty operations should be identified (and Reported in any CMP / DMP) and establish the best available techniques are required to control dust emissions…*
2. *Consideration should be given to the siting of aggregate stockpiles, based upon such factor as the prevailing winds, proximity of site boundary and proximity of neighbours….*
3. *Areas where there is vehicular movement should have a consolidated surface which should be kept in good repair.*
4. *The main principles for preventing dust emissions are containment of dusty processes and suppression of dust using water or proprietary suppressants. Suppression techniques need to be properly designed, used and maintained, in order to be effective.*
5. *Where there is evidence of airborne dust from the building construction/demolition activities the site, the contractor should make their own inspection and assessment, and where necessary undertake ambient monitoring with the aim of identifying those process operations giving rise*

to the dust. Once the source of the emission is known, corrective action should be taken without delay.

6. *Effective preventative maintenance should be employed on all aspects of the construction/demolition works including all plant, vehicles, buildings and the equipment concerned with the control of emissions to air.*
7. *It is useful to have an audited list of essential items.*

2.6 Other Relevant Policy, Standard and Guidance

Local Air Quality Management Technical Guidance

2.6.1 The Department for Environment, Food and Rural Affairs (Defra) provides and maintains guidance and tools to support local authorities in carrying out their duties under the Environment Act 1995 and subsequent regulations. In order to provide consistency with the Council's own work on air quality, the guiding principles for air quality assessments, as set out in the latest guidance and tools provided by the technical guidance - LAQM.TG(16) (Ref. 30), have been followed in this assessment.

Environmental Protection UK (EPUK) and Institute of Air Quality Management (IAQM) Planning Guidance

2.6.2 When determining the significance of effects, this assessment follows best practice guidance relating to air quality and development control published by Environmental Protection UK (EPUK) and Institute of Air Quality Management (IAQM) (Ref. 31). The guidance seeks to ensure that air quality is adequately considered during land-use planning and development control process and is applicable to assessing the effect of changes in exposure of members of the public consequential to residential and mixed-use developments. This is of particular importance in urban areas where air quality is of a poorer standard. The guidance states that:

"Land-use planning can play a critical role in improving local air quality. At the strategic level, spatial planning can provide for more sustainable transport links between the home, workplace, educational, retail and leisure facilities, and identify appropriate areas for potentially polluting industrial development. For an individual development proposal, there may be associated emissions from transport or combustion processes providing heat and power."

Local Air Quality Management

2.6.3 The whole of the Borough of Camden was declared an AQMA in 2002 due to concern over the achievement of long-term NO_2 air quality objectives and for the short term PM_{10} air quality objective.

2.6.4 The Greater London Authority (GLA) has also declared 187 Air Quality Focus Areas (AQFAs) in London (Ref. 32). These areas have been identified as locations of high levels of human exposure to concentrations of NO_2 above the national air quality objective(s) for NO_2. The Focus Area designation was designed to address concerns relating to forecasted air pollution trends, or

those raised during the LAQM review process. It is noted however, that this does not represent an exhaustive list of London's air pollution hotspot locations but indicates where the GLA believes air quality problems to be more acute.

2.6.5 LBC has five AQFAs, listed below:

- Camden High Street from Mornington Crescent to Chalk Farm and Camden Road (AQFA 28);
- Holborn and Southampton Row Junction (AQFA 29);
- Kilburn Town Centre (AQFA 30);
- Euston Road (AQFA 31); and
- Swiss Cottage from South Hampstead to Finchley Road Station (AQFA 32).

2.6.6 The Site is not located within an AQFA. The nearest AQFAs (Kilburn Town Centre and Swiss Cottage from South Hampstead) are 500m and 600m north-west of the Site boundary, respectively.

3 Assessment Methodology

3.1 Overview

3.1.1 There is currently no statutory guidance on the methodology for air quality impact assessments. Several bodies have published their own guidance relating to air quality and development control which have been used in the preparation of this report, such as that by Defra (Ref. 30), the GLA's Control of Dust and Emissions during Construction and Demolition SPG (Ref. 24), the IAQM's Guidance on the assessment of dust from demolition and construction (Ref. 33)), the EPUK, and IAQM's Land-use Planning and Development Control: Planning for Air Quality (Ref. 31).

3.1.2 Receptors close to the Site which are potentially sensitive to air quality have been identified through review of mapping and aerial photography of the area surrounding the Proposed Development.

3.1.3 This section presents the methodology used to assess the potential effects on air quality during the construction phase and the operational phase of the Proposed Development.

3.1.4 The air quality assessment considers the construction phase of the Proposed Development, and the impact on local air quality of emissions from road traffic associated with the Proposed Development. The pollutants of primary concern within the LBC administrative area are nitrogen dioxide (NO_2) and particulate matter (PM_{10} and $PM_{2.5}$). This assessment focuses on NO_2, PM_{10} and $PM_{2.5}$, as road traffic generated by the Proposed Development has the potential to emit these pollutants.

3.1.5 This section explains the methods used to assess the potential effect of:

- Fugitive emissions of particulate matter from the construction activities; and
- Emissions from trip generation during the operational phase of the Proposed Development.

3.1.6 The scenarios for the assessment of the emissions for the construction and operational phases are described in the following sections.

3.1.7 The methods used to determine the significance of effects associated with air quality impacts are described in the 'Significance Criteria' sub-section of this report.

3.2 Construction Phase

Road Traffic Emissions

3.1.8 The number of HGV (Average Annual Daily Traffic (AADT)) is 29 vehicle movements during the demolition and construction of the Proposed Development (estimated from the construction traffic flows set out in the Transport Assessment submitted with the planning application). Whilst this is just above the IAQM screening criteria of 25 vehicles AADT within an AQMA (Ref. 31), the presence of the HS2 construction traffic actually decreases HGV volumes in the study area during HS2 construction which will be constructed in parallel to the Proposed Development (Ref. 34). This is likely to be due to temporary roadworks/closures near the main site at Euston station. As such construction traffic volumes within the area would be reduced.

3.1.9 Construction traffic will be managed by measures set out in the Outline Construction Management Plan (CMP), which is submitted with the planning application, and emissions will be kept to a minimum. The Outline CMP will be updated by the Principal Contractor, once appointed, which is anticipated to be secured through an appropriately worded planning condition or Section 106 Obligation.

3.1.10 On this basis, road traffic emissions from the construction phase have not been considered in this assessment.

Fugitive Emissions of Particulate Matter

3.1.11 Fugitive emissions (i.e. emissions which are not associated with a single fixed release point) of airborne particulate matter are readily produced through the action of abrasive forces on materials. A qualitative construction dust risk assessment has been undertaken for the Site in accordance with the GLA guidance on the Assessment of Dust from Construction and Demolition (Ref. 24).

3.1.12 Activities on construction sites with the potential to generate dust and emissions can be categorised into four types of activities, which are:

- Demolition – any activities associated with the removal of existing structures on site;
- Earthworks – includes the processes of soil-stripping, ground-levelling, excavation and landscaping;
- Construction – any activities relating to the provision of new structures on site; and
- Trackout – the transport of dust and dirt from the construction site onto the public road network where it may be deposited and re-suspended by traffic using the network.

3.1.13 The potential for dust emissions has been assessed for each activity that is likely to take place. The guidance has been used to assess the risk and significance of any impacts associated with the construction phase and to identify appropriate mitigation measures to be adopted to reduce any potential impacts.

3.1.14 A detailed assessment is required where a sensitive human receptor is located within 350m from the site boundary and/or within 50m of the route(s) used by vehicles on the public highway, up to 500m from the site entrance(s) or if there is a relevant ecological receptor within 50m of the site boundary. Due to the central London location of the Site, there are a number of sensitive human receptors located within 350m of the Site boundary and hence the assessment is required.

3.1.15 The first step of the detailed assessment is to assess the risk of dust impacts. This is undertaken 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; and
- The sensitivity of the area.

3.1.16 These factors are combined following criteria set out in the GLA Guidance (Ref. 24) to give an estimate of the risk of dust impacts occurring.

3.1.17 The emphasis of the regulation and control of construction dust should be the adoption of good working practices as standard. Good practice is a process that is informed by the assessment, which seeks to avoid the potential for adverse effects. This approach assumes that the environmental management measures and controls, beyond those mitigation measures inherent in the proposed design, will be implemented during works to ensure potential significant adverse effects do not occur.

3.1.18 Site-specific mitigation for each of the four potential activities is then determined based on the risk of dust impacts identified. These measures are either ‘highly recommended’, ‘desirable’ or ‘not required’, depending on the level of risk identified. For general mitigation measures, the highest risk category identified should be applied. For example, if the site is medium risk for earthworks and construction, but a high risk for demolition and track-out, the general measures applicable to a high-risk site should be applied.

3.1.19 Where a local authority has issued guidance on measures to be adopted at demolition / construction sites, these should also be taken into account. LBC has published its “Camden’s Minimum Requirements” (Ref. 29) which have been reviewed during the air quality assessment. Professional judgment has been employed to examine the residual dust effects assuming mitigation is undertaken to determine significance. It is expected that best practice mitigation measures will be documented within a CMP (or equivalent). An Outline CMP has been produced and is submitted with the planning application. The CMP will be secured by an appropriately worded planning condition or Section 106 Obligation, and will be updated by the Principal Contractor, once appointed, and agreed with LBC prior to the commencement of construction works. With effective mitigation and management controls in place, commensurate with the level of risk identified in the construction dust assessment, the residual dust effects during demolition and construction works are generally considered to be ‘not significant’.

Construction Phase Sensitive Receptors

3.1.20 For the assessment of construction dust emissions, a construction dust receptor is defined as a location that may be affected by dust emissions. Human receptors include locations where people spend time and where property may be impacted by dust. Ecological receptors are habitats that might be sensitive to dust.

3.1.21 When assessing the impact of dust emissions generated during construction works, the methodology requires that only the quantities of the nearest, highest sensitivity receptors to the boundary of the Site in each direction be considered. These receptors have the potential to experience impacts of greater magnitude, when compared with other more distant or less sensitive receptors. Moreover, receptors located within 50m of routes to be used by construction vehicles might be impacted by dust originating from the track-out of material onto the road, and as such have been considered in this assessment.

3.1.22 There are a number of existing sensitive human receptors within 200m of the Site boundary, including properties along A5202, Pancras Road, Royal College Street and Crowndale Road.

3.1.23 There is one Local Nature Reserve (LNR) within 1 km of the Site. Camley Street Nature Park LNR is situated 200m south-east of the Site. The LNR is an urban wild space containing a range of habitat examples (scrub, pond, broadleaved woodland, semi-neutral grassland) created on former vacant land and is managed by London Wildlife Trust. The wildlife interest is of high local educational and social value owing to the severe deficiency of wildlife sites in Greater London.

3.1.24 There are 11 non-statutory designated sites - Sites of Importance to Nature Conservation (SINCs) within 1 km of the Site. SINCs are recognised by the Greater London Authority and London borough councils as important wildlife sites. SINCs are classified into three categories: Sites of Metropolitan Importance (SMINC), Sites of Borough Importance (SBINC) (borough I and borough II) and Sites of Local Importance (SLINC). These are set out in the Preliminary Ecological Appraisal prepared by AECOM.

3.1.25 While the DRA does not specifically consider these sites, the level of mitigation that has been recommended is such that the highest level of protection is provided to these sites.

Non-Road Mobile Machinery (NRMM)

3.1.26 Emissions from construction Non-Road Mobile Machinery (NRMM) have the potential to increase NO_2 and PM_{10} concentrations locally when in use on the construction site associated with the Proposed Development. This source is considered temporary, and localised.

3.1.27 The Mayor of London, through "The Control of Dust and Emissions during Construction and Demolition – SPG" (Ref. 24), has put in place a strategy to address emissions from NRMM in the London area. In order to reduce emissions from NRMM, this equipment will need to meet set emission standards. Since 1 September 2015, NRMM of net power between 37 kW and 560 kW used in London has been required to meet emission standards, based upon engine emissions standards set in EU Directive 97/68/EC (Ref. 35) and its subsequent amendments (Ref. 36). From 1 September 2020, NRMM used on any site within Greater London are required to meet Stage IIIB of the Directive as a minimum. NRMM used on any site within the Central Activity Zone or Canary Wharf are required to meet Stage IV of the Directive as a minimum, however, the site is located outside of these areas.

3.1.28 Local Planning Authorities (LPAs) are responsible for the application and enforcement of this policy through the planning process, and the developers, as part of their Air Quality Dust Risk Assessment, will be required to provide a written statement of their commitment and ability to meet the NRMM standards.

3.1.29 Emissions from NRMM will be temporary and localised and will be controlled via the application of the NRMM standards and through best practice mitigation measures. For that reason, the construction phase NRMM emissions should not be significant. These emissions have not been modelled and are not considered any further in this assessment.

3.3 Operational Phase

Building Emissions

3.1.30 No energy centre is proposed as part of the Proposed Development, as the energy requirements of the building will be met through a combination of Photo Voltaics, Ground Source Heat Pumps and Air Source Heat Pumps, thus dispersion modelling of the building emissions is not required.

3.1.31 Two oil-fired emergency generators will provide a back-up energy supply to the building in the event of a failure of the incoming network supply. It is not proposed to run the building on the generators at any other time, other than for a monthly load test, which will be undertaken at a planned time each month. As such it is not necessary to model the emissions from the emergency generators as they will not normally be operational.

Road Traffic Emissions

3.1.32 The incomplete combustion of fuel in vehicle engines results in the presence of hydrocarbons (HC) such as benzene and 1,3-butadiene, and sulphur dioxide (SO_2), carbon monoxide (CO), PM_{10} and $PM_{2.5}$ in exhaust emissions. Better emission control technology and fuel specifications are expected to reduce emissions per vehicle in the long term.

3.1.33 Although SO_2, CO, benzene and 1,3-butadiene are present in motor vehicle exhaust emissions, detailed consideration of the associated effects on local air quality is not considered relevant in the context of this assessment. This is because road traffic emissions of these substances have been reviewed by the LBC as part of their local air quality management obligations since the introduction of Part IV of the Environment Act (1995), and nowhere within the administrative area is at risk of exceeding these objectives. Emissions of SO_2, CO, benzene and 1,3-butadiene from road traffic are therefore not considered further within this assessment.

3.1.34 At high temperatures and pressures found within vehicle engines, some of the nitrogen in air and fuel is oxidised to form oxides of nitrogen (NO_x) mainly in the form of nitric oxide (NO), which is then converted to NO_2 in the atmosphere. The presence of NO_2 in the atmosphere is associated with adverse effects on human health. Vehicle emissions can also result in the exposure at sensitive receptors to concentrations of PM_{10} and $PM_{2.5}$.

3.1.35 The Proposed Development is considered to be car free due to the absence of an on-site car park (with the exception of the provision of three blue badge parking bays). The transport consultant for the Proposed Development has confirmed that the additional trip generation from the Proposed Development is anticipated to be 14 vehicle trips per day, and is thus below the IAQM threshold of 100 AADT, above which a potential for adverse impacts of air quality exists. Therefore, the potential for significant adverse impacts to occur on nearby sensitive receptors as a result of changes in road traffic movements is considered to be negligible. However, as the Site is located within the LBC AQMA, detailed modelling has been undertaken to consider site suitability and as part of this, modelling of off-site receptors close to the Site has also been included to demonstrate that the impact of the Proposed Development is anticipated to be negligible.

Traffic Data

3.1.36 Traffic data has been considered for the following scenarios:

- 2019 Base – existing situation;
- 2026 Base – opening year without the Proposed Development traffic (2026); and
- 2026 With – opening year with the Proposed Development traffic (2026).

3.1.37 Traffic data for the base year (2019) and opening year (2026 with and without the Proposed Development), as shown in Table 3-1, were provided for the following roads (as set out in the Transport Assessment submitted with the planning application):

- St Pancras Way – North and South of Granary Street;
- Granary Street East and West Bound – East and West of Service Bay; and
- Pancras Road East and West Bound – East of St Pancras Way.

Table 3-1 Traffic Data for Base and Opening Year With and Without the Proposed Development

Road Name	Direction (south, east and west bound)	2019 All Vehicles Base	2019 HGV% Base	2026 All Vehicles Base	2026 HGV% Base	2026 All Vehicles With the Proposed Development	2026 HGV% With the Proposed Development
St Pancras Way - north of Granary Street	s/b	6,382	13.3%	6,942	13.3%	7,145	13.1%
St Pancras Way - south of Granary Street	s/b	6,887	13.2%	7,491	13.2%	7,731	12.9%
Granary Street - west of service bay	e/b	1,041	16.8%	1,132	16.8%	1,181	16.9%
	w/b	1,546	15.0%	1,681	15.0%	1,767	14.8%
Granary Street - east of service bay	e/b	1,041	16.8%	1,132	16.8%	1,144	16.8%
	w/b	1,546	15.0%	1,681	15.0%	1,730	14.7%
St Pancras Road - east of St Pancras Way	e/b	7,496	12.8%	8,153	12.8%	8,284	12.7%
	w/b	6,198	11.6%	6,742	11.6%	6,742	11.6%

3.1.38 For other roads, Department for Transport road statistics for 2018 (Ref. 37) were used for the 2019 and 2026 traffic data for all scenarios as the growth factor for each year was ~1. This method was applied to the following roads in Table 3-2.

Table 3-2 Department for Transport traffic counts 2018

Road Name	DfT Code	All Vehicles	HGVs	HGV%
Camden Street - South	48352	13219	456	3.0
Camden Road East of St Pancras Way	47249	26216	654	5.0
Camden Road east of Royal College Street	27241	29842	713	2.7
Camden Road	28498	11254	739	2.5
Camden Road East of Camden Street	47081	17656	356	3.2
Royal College Street	7237	6880	142	2.1
Camden Street - North	7214	36705	824	2.2

3.1.39 London Atmospheric Emission Inventory (LAEI) 2016 (Ref. 32) road statistics were also used for all 2019 and 2026 scenarios due to the growth factor also being ~1. This method was applied to the following roads in Table 3-3.

Table 3-3 LAEI traffic counts 2016

Road Name	All Vehicles	HGV's	HGV%
Goods Way	13115	281	2.1
Midland Road	5915	24	0.4
Crowndale Road	15219	456	3.0

3.1.40 Road speeds were reduced at junctions to represent queuing traffic in accordance with guidance set out in LAQM.TG(16) (Ref. 30).

Road Modelling and Vehicle Emissions Factors

3.1.41 This assessment has used the latest version of the dispersion modelling software 'Atmospheric Dispersion Modelling System (ADMS)-Roads'. ADMS-Roads is a modern dispersion model that has an extensive published track record of use in the UK for the assessment of local air quality impacts, including model validation and verification studies (Ref. 38).

3.1.42 Details of the general model conditions set up in ADMS-Roads are provided in Table 3-4.

Table 3-4 General ADMS-Roads Model Conditions

Variables	ADMS-Roads Model Input: Road Traffic Model
Surface roughness at source	1.5m
Surface roughness at Metrological Site	1.0m
Minimum Monin-Obukhov length	100m
Terrain types	Flat
Receptor location	x, y coordinates determined by GIS, z = various.
Emissions	NO_x, PM_{10}, $PM_{2.5}$
Emission factors	Defra's Emission Factor Toolkit (EFT) version 10.0 (Ref. 39), using the "London" vehicle fleet composition and the "Basic Split" traffic format.
Meteorological data	1 year (2019) hourly sequential data from London City Airport meteorological station.
Receptors	Facades of selected sensitive receptors.
Model output	Annual mean NO_x, PM_{10} and $PM_{2.5}$ concentrations.

NO_x to NO_2 Conversion

3.1.43 The proportion of NO_2 in NOx varies greatly with location and time according to a number of factors including the amount of ozone available and the distance from the emission source.

3.1.44 Defra have produced a NO_x to NO_2 Calculator (Ref. 40) spreadsheet tool which provides a methodology for converting modelled road NO_x concentrations to NO_2 concentrations for any given year up to 2030. This conversion methodology has been used for the purpose of this assessment for all scenarios as the best representation of the NO_2 /NO_x relationship for the study area. The NO_x to NO_2 Calculator used is v7.1 and is designed to be used in combination with Defra's 2017 reference year background maps and Emission Factors Toolkit version 10.0. The traffic mix option used was the 'All London traffic' option. The local authority area used was selected based on the location of the modelled receptors and diffusion tube locations.

NO_2 Hourly Mean AQS Objective

3.1.45 The London Local Air Quality Management Technical Guidance, LLAQM.TG(16) (Ref. 41), states that the hourly mean NO_2 objective is unlikely to be exceeded if annual mean concentrations are less than 60 µg/m^3. The assessment, therefore, evaluates the likelihood of exceeding the hourly mean NO_2 objective by comparing predicted annual mean NO_2 concentrations at all receptors to an annual mean equivalent threshold of 60µg/m^3 NO_2. Where predicted concentrations are below this value, it can be concluded that the hourly mean NO_2 objective (200 µg/m^3 NO_2 not more than 18 times per year) is likely to be achieved.

Air Quality Predicting the Number of Days in which the PM_{10} 24-hour Mean Objective is Exceeded

3.3.1 The guidance document LLAQM.TG(16) (Ref. 41) sets out the method by which the number of days on which the PM_{10} 24-hour objective is likely to be exceeded can be obtained based on a relationship with the predicted PM_{10} annual mean concentration. The formula is:

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

3.3.2 Where C is the annual mean concentration of PM_{10}.

3.3.3 Based on this formula an annual mean PM_{10} concentration of 32 µg/m^3 is broadly equivalent to 35 days of exceedance and, as such, if the predicted annual mean is less than 32 µg/m^3 the short-term (daily) PM_{10} AQS objective can be considered to have been achieved.

Meteorological Data

3.3.4 One year (2019) of hourly sequential observation data from London City Airport meteorological station has been used in the dispersion modelling. London City Airport is located approximately 13km east of the Proposed Development and is considered to be representative of the meteorological conditions around the Site. Figure A-1 in Appendix A in shows that the dominant direction of wind is from the south-west, as is typical for the UK. The wind speed ranges from 0-18 knots (0 - ~9.3 m/s).

Receptors

3.3.5 The concentration of road traffic emitted pollutants at the roadside or at sensitive receptors is influenced by a number of factors. These include background pollution levels and the amount of traffic emissions, which is dictated by traffic flow rates, composition and speed.

3.3.6 The AQS objectives for pollutants associated with road traffic were set by the Expert Panel of Air Quality Standards (and subsequently adopted as UK AQS objectives) at a level below the lowest concentration at which the more sensitive members of society have been observed to be adversely affected by exposure to each pollutant (Ref. 42). Therefore, all receptors that represent exposure of the public are of equal sensitivity as any member of the public could be present at those locations.

3.3.7 Commercial properties are not considered sensitive to changes in ambient pollutant concentrations or traffic noise levels and are legislated separately as part of occupational health and safety regulations. These properties are therefore not included in the assessment and the focus is on proposed and existing residential buildings and sensitive receptors, such as schools, hospitals and care homes, as these are considered most sensitive to changes in air quality.

3.3.8 Annual NO_2, PM_{10} and $PM_{2.5}$ concentrations have been predicted at a selection of receptors, representing the façades of buildings closest to St Pancras Way, Pancras Road, Royal College Street and Camden Street. Receptors R21-R23 are located close to the Site and are therefore also considered to represent the facades of the Proposed Development.

3.3.9 All receptors have been selected from aerial photography and publicly available mapping. The selected receptors are set out in Table 3-5 and their locations are shown in Figure A-2 (Appendix A).

Table 3-5 Summary of Receptors

ID	Receptor	Height (m)	Use (lowest floor)
R1	Mary Rankin Dialysis Unit	1.5	Hospital
R2	St Pancras Hospital	1.5	Hospital
R3	Richard Cobden Primary School	1.5	School
R4	1 St Pancras Way - Flats	5	Residential
R5	1 Goldington Crescent Gardens	1.5	Residential
R6	Goldington Building Flats 1-30	1.5	Residential
R7	5 Royal College Street	5	Residential
R8	10B Crowndale Road	5	Residential
R9	16 Royal College Street	1.5	Residential
R10	48C Camden Street	1.5	Residential
R11	4 Royal College Street	1.5	Residential
R12	Brayshaw House - 30 Camden Street	1.5	Residential
R13	101 Royal College Street	1.5	Residential
R14	19 Camden Street	1.5	Residential
R15	94B Camden Street	1.5	Residential
R16	125 Camden Street	1.5	Residential
R17	1 Canal Side Studios	5	Residential
R18	Margaret Toker Flats	1.5	Residential
R19	9 St Pancras Way	1.5	Residential
R20	Camelford House	1.5	Residential

ID	Receptor	Height (m)	Use (lowest floor)
R21a*	Potential future development Flats 1 (adjacent to site boundary)	1.5	Residential
R21b	Potential future development Flats 1 (adjacent to site boundary)	5	Residential
R21c	Potential future development Flats 1 (adjacent to site boundary)	8.5	Residential
R21d	Potential future development Flats 1 (adjacent to site boundary)	12	Residential
R21e	Potential future development Flats 1 (adjacent to site boundary)	15.5	Residential
R22a	Existing Residential Block within Hospital and Potential future development Flats 2 (adjacent to site boundary)	1.5	Residential
R22b	Existing Residential Block within Hospital and Potential future development Flats 2 (adjacent to site boundary)	5	Residential
R22c	Existing Residential Block within Hospital and Potential future development Flats 2 (adjacent to site boundary)	8.5	Residential
R22d	Potential future development Flats 2 (adjacent to site boundary)	12	Residential
R22e	Potential future development Flats 2 (adjacent to site boundary)	15.5	Residential
R23a	Potential future development Flats 3 (adjacent to site boundary)	1.5	Hospital / Residential
R23b	Potential future development Flats 3 (adjacent to site boundary)	5	Hospital / Residential
R23c	Potential future development Flats 3 (adjacent to site boundary)	8.5	Hospital / Residential
R23d	Potential future development Flats 3 (adjacent to site boundary)	12	Residential
R23e	Potential future development Flats 3 (adjacent to site boundary)	15.5	Residential

* at this time, details of future development adjacent to the site boundary are emerging. The assessment considers representative locations of potential future development for information.

Model Verification

3.3.10 Predicted results from an air quality dispersion model may differ from measured concentrations for a number of reasons, including uncertainties associated with traffic flows and emissions factors, meteorology and limitations inherent to the modelling software. In light of this, and in accordance with advice in LLAQM.TG(16), for roads-based air quality assessments it is best-practice to perform a comparison of modelled results with local monitoring data to minimise these modelling uncertainties. This provides a verification factor, by which the output of the ADMS-Roads model is adjusted, to gain greater confidence in the final results. The verification of the modelling output was carried out as prescribed in Chapter 7 of LLAQM.TG(16) (Ref. 41).

3.3.11 Site-specific air quality monitoring data were reviewed, and it was concluded that there were six diffusion tube sites suitable for verification; MEH 1, MEH 2, MEH 3, MEH 4, MEH 5 and MEH 6. MEH 7 was not used due to missing traffic data along Camley Street. These sites were located at roadside locations surrounding the Proposed Development as illustrated in Figure A-3 in Appendix A.

3.3.12 A model verification was undertaken using the traffic derived from the modelled, DfT and LAEI traffic counts to model predicted NO_2 concentrations at these monitoring sites based on monitoring data from 2019. The unadjusted model had a root mean squared error (RMSE) of 10.2 µg/m^3 and fractional bias of 0.2.

3.3.13 After applying an adjustment factor of 3.09, RMSE was reduced to 6.9, and the fractional bias was reduced to 0.1. All NO_2, PM_{10} and $PM_{2.5}$ results presented in Section 5 of this report were adjusted using this factor.

Significance Criteria and Effects

3.3.14 Air quality impacts are considered to be significant if a development leads to significant impacts at existing sensitive receptors or if air quality objectives are predicted to be exceeded at proposed sensitive receptor locations. Guidance on land-use planning and development control (Ref. 31) suggests that a two-stage approach should be adopted to determine whether or not a Proposed Development has a significant impact on local air quality:

- A qualitative or quantitative description of the impacts on local air quality arising from the development; and
- Professional judgement on the overall significance of the effects.

3.3.15 In order to assess the potential impacts of a development on local air quality, a description of the impact is given based on the magnitude of change as a percentage of a relevant Air Quality Assessment Level (AQAL). Account must also be taken of predicted pollutant concentrations and their relationship to the air quality objective for the pollutants of concern. Table 3-6 summarises the impact descriptors for annual mean NO_2 and PM_{10} concentrations and Table 3-7 provides the impact descriptors for annual $PM_{2.5}$ concentrations. The impact descriptors may be adverse or beneficial depending upon whether concentrations are predicted to increase or decrease.

Table 3-6 Effects Descriptors at Individual Receptors – Annual Mean NO_2 and PM_{10}

Annual Mean Concentration at Receptor in Assessment Year		Change in Concentration Relative to AQAL[a]				
		0%	1%	2% – 5%	6% – 10%	>10%
As % of AQAL	NO_2 / PM_{10} ($\mu g/m^3$)[b]	<0.2 $\mu g/m^3$	0.2 – <0.6 $\mu g/m^3$	0.6 – <2.2 $\mu g/m^3$	2.2 – ≤4.0 $\mu g/m^3$	>4.0 $\mu g/m^3$
≤75%	≤30.2	Negligible	Negligible	Negligible	Slight	Moderate
76% - 94%	30.2 – 37.8	Negligible	Negligible	Slight	Moderate	Moderate
95% - 102%	37.8 – 41.0	Negligible	Slight	Moderate	Moderate	Substantial
103% - 109%	41.0 – 43.8	Negligible	Moderate	Moderate	Substantial	Substantial
≥110%	≥43.8	Negligible	Moderate	Substantial	Substantial	Substantial

Notes:

[a] The percentage change in pollutant concentration is calculated and rounded to the nearest whole number to make it clearer which column the impacts fall within. Changes of less than 0.5% are rounded down to zero and therefore described as negligible.

[b] Concentrations quoted were obtained from EPUK/IAQM.

Table 3-7 Effects Descriptors at Individual Receptors – Annual Mean PM2.5

Annual Mean Concentration at Receptor in Assessment Year		Change in Concentration Relative to AQAL[a]				
		0%	1%	2% – 5%	6% – 10%	>10%
As % of AQAL	$PM_{2.5}$ ($\mu g/m^3$)[b]	<0.1 $\mu g/m^3$	0.1 – <0.4 $\mu g/m^3$	0.4 – <1.4 $\mu g/m^3$	1.4 – ≤2.5 $\mu g/m^3$	>2.5 $\mu g/m^3$
≤75%	≤18.9	Negligible	Negligible	Negligible	Slight	Moderate
76% - 94%	18.9 - 23.6	Negligible	Negligible	Slight	Moderate	Moderate
95% - 102%	23.6 - 25.6	Negligible	Slight	Moderate	Moderate	Substantial
103% - 109%	25.6 - 27.4	Negligible	Moderate	Moderate	Substantial	Substantial
≥110%	≥27.4	Negligible	Moderate	Substantial	Substantial	Substantial

Notes:

[a] The percentage change in pollutant concentration is calculated and rounded to the nearest whole number to make it clearer which column the impacts fall within. Changes of less than 0.5% are rounded down to zero and therefore described as negligible.

[b] Concentrations quoted were obtained from EPUK/IAQM.

3.3.16 For determining the air quality impacts of a development on short-term PM_{10} concentrations (i.e. the number of days where the daily mean PM_{10} concentration is greater than 50 $\mu g/m^3$) the significance criteria in Table 3-8

has been adapted to derive a value for the AQS objective equivalent to 35 days per year of PM_{10} concentrations greater than 50 µg/m^3. An annual mean PM_{10} concentration of 32µg/m^3 is broadly equivalent to 35 days of exceedance; and as such this value has been used as the AQS objective and has been used to calculate the changes in concentration thresholds for assessing the air quality impacts on short-term (daily) PM_{10} concentrations, as set out in Table 3-8.

Table 3-8 Local Air Quality Impact Descriptors for Daily PM_{10} Concentrations at Individual Receptors

Mean Concentration at Receptor in Assessment Year		Change in Annual Mean Concentration of PM_{10} (µg/m^3) and Percentage (%) as a Proportion of the AQS Objective				
		0%	**1%**	**2% – 5%**	**6% – 10%**	**>10%**
As % of AQAL	PM_{10} (µg/m^3)[b]	<0.2 µg/m^3	0.2 – <0.5 µg/m^3	0.5 – <1.8 µg/m^3	1.8 – ≤3.2 µg/m^3	>3.2 µg/m^3
≤75%	<24.2	Negligible	Negligible	Negligible	Slight	Moderate
76% - 94%	24.2 – <30.2	Negligible	Negligible	Slight	Moderate	Moderate
95% - 102%	30.2 – <32.8	Negligible	Slight	Moderate	Moderate	Substantial
103% - 109%	32.8 – <35.0	Negligible	Moderate	Moderate	Substantial	Substantial
≥110%	>=35.0	Negligible	Moderate	Substantial	Substantial	Substantial

Notes:

Adapted from the EPUK/IAQM Air Quality Guidance.

For the assessment of short-term PM_{10} impacts, a value of 32 µg/m^3 has been calculated as being equivalent to the AQS objective of 35 days per year not to exceed 50 µg/m^3.

3.3.17 The descriptors presented in Table 3-6 to Table 3-8 are ascribed to impacts at individual sensitive receptor locations; however they are not, of themselves, a clear and unambiguous guide to reaching a conclusion on overall significance. The IAQM/EPUK guidance on land-use planning and development control (Ref. 31) makes it clear that the assessment of significance of the overall effect should be based on professional judgement. Whilst it may be that there are 'slight', 'moderate' or 'substantial' impacts at one or more receptors, the overall effect may not necessarily therefore be judged as being significant in some circumstances. A 'moderate' or 'substantial' impact may not have a significant effect if it is confined to a very small area.

3.3.18 Where a single development can be judged in isolation, it is likely that a 'moderate' or 'substantial' impact will give rise to a significant effect and a 'negligible' or 'slight' impact will not have a significant effect, but such judgements are always more likely to be valid at the two extremes of impact severity. The IAQM/EPUK guidance also advises that for new occupants of a proposed development, the impacts are best described in relation to whether

or not an air quality objective will be met or is at risk of not being met. An exceedance of the objective is likely to be considered significant.

3.3.19 The EPUK/IAQM guidance notes that overall significance is determined using professional judgement and should consider:

- The existing and future air quality in the absence of development;
- The extent of current and future population exposure to any air quality impacts associated with a proposed development;
- The influence and validity of any assumptions made in the assessment approach;
- The cumulative effects arising from other committed developments in the study area; and
- The introduction of new occupants into the proposed development and the levels of air pollution to which they are likely to be exposed.

Assumptions, Constraints and Limitations

3.3.20 The following assumptions have been made in undertaking this assessment:

- Road traffic emissions modelling has used 2018 traffic data taken from the DfT traffic counts and used in the base and opening years (2019 and 2026) set out in the Transport Assessment submitted with the planning application.
- Road traffic emissions related impact predictions have been checked against baseline monitoring data to capture and adjust for variations in model performance. By carrying out model verification and adjusting the results in line with measured concentrations according to Defra's published guidance (Ref. 30), the uncertainty in the predictions for the current baseline is reduced.
- Worst case receptor locations have been assumed, which represent the location of maximum exposure to air pollutants within an area.
- The background NO_2 concentration from the Defra mapped background concentrations have been used in the absence of background monitoring.
- A greater level of uncertainty is associated with predictions for future years than for the base year, with uncertainty increasing the further into the future the predictions are made. The assumptions made in relation to traffic flows, vehicle emission rates and vehicle fleet composition are expected to be the most uncertain but have been made in accordance with best practice approaches and modelled using the official Defra v9 emission factors.

3.4 Air Quality Neutral Assessment

3.4.1 In accordance with the GLA's Sustainable Design and Construction SPG (Ref. 23), an Air Quality Neutral Assessment has been undertaken using the design information for the Proposed Development, as presented in the

Design and Access Statement and Technical Drawings submitted with the planning application.

3.4.2 The methodology and emission factors are taken from the Air Quality Neutral Planning Support document (Ref. 43).

3.4.3 The methodology assesses two sources of emissions: road traffic and energy production.

3.4.4 The Air Quality Neutral Assessment for the road traffic associated with the Proposed Development compares the road traffic related emissions against calculated benchmark values which are based upon use class, the number of anticipated trips per year, and the average distance travelled per trip, in accordance with the Air Quality Neutral Planning Support document (Ref. 43).

3.4.5 It should be noted that on the 1st September 2020, The Town and Country Planning (Use Classes) Regulations 2020 (Ref. 44) were introduced and any new planning applications made on or after this date are to be used in the determination of the application. However, the guidance has not yet been updated to reflect the new Use Class Regulations. Therefore, using the information available and presented in the Design and Access Statement and Technical Drawings submitted, the Air Quality team has assigned the most appropriate use class and benchmark criteria for the floor areas within the Proposed Development. As such the floor area schedule by use class is not directly comparable to areas used in the air quality neutral assessment. Further details are provided in Appendix B.

3.4.6 For transport emissions, the benchmark trip rates by land-use category are used to compare against the predicted net trips per annum associated with the development. In this assessment, ‘Inner London’ trip rates will be used, due to the site being located within the Inner London Area.

3.4.7 For building emissions, Building Emissions Benchmarks (BEB) for NO_x and PM_{10} are calculated using information relating to energy supply and demand considerations for different use classes, as defined in the guidance (Ref. 43).

4 Baseline Conditions

4.1 Air Quality Management Areas

4.1.1 LBC has declared the entire borough an Air Quality Management Area (AQMA) for exceedances of the 24-hour mean AQS objective for PM_{10} and annual mean AQS objective for NO_2. As a central London borough, emissions within LBC are primarily influenced by road traffic emissions.

4.2 Local Monitoring Data

4.2.1 Under the requirements of Part IV of the Environment Act (1995) (Ref 9), LBC has carried out a review and assessment of local air quality. Currently, LBC monitors NO_2, PM_{10}, $PM_{2.5}$, and SO_2. Monitoring is conducted at automatic monitoring and non-automatic sites within LBC. LBC undertakes automatic monitoring at three continuous monitoring locations and non-automatic monitoring using NO_2 diffusion tubes at 14 monitoring sites.

4.2.2 Although there are six locations that are within 1km from the scheme boundary (Cavendish School, Britannia Junction, Camden High street, Kentish Town, Hawley Crescent and Brill Place) these sites could not be used. Hawley Crescent was not monitoring at the time the site-specific tubes were monitoring). The other 5 sites could not be used due to a lack of traffic data.

4.2.3 The review of the existing baseline and background air quality in the vicinity of the Site forms the basis for the prediction of baseline conditions following implementation of the Proposed Development. A three month NO_2 diffusion tube survey was undertaken at the Site between 26th July 2019 and 30th October 2019. Site specific monitoring locations were used to collect NO_2 concentrations along Pancras Road, St Pancras Way, Camley Street and on the Site. Diffusion tube monitoring was undertaken by AECOM for three months between July 2019 and October 2019. This produces a data capture of <75% of the annual mean concentrations and therefore the results were annualised to derive an overall annual mean concentration.

4.2.4 The methodology for this used three continuous monitors close to the Site. These monitors were Camden - Bloomsbury, Westminster - Covent Gardens and Islington – Arsenal.

4.2.5 The annual mean and period mean are calculated for each continuous monitoring site and are used to produce an annualisation ratio for each monitoring site.

4.2.6 Table 4-1 shows the annualisation methodology which calculated an average ratio of 1.25. The diffusion tube period means are multiplied by the average ratio to produce annual mean concentrations shown in Table 4-2.

Table 4-1 Annualisation Calculation

Background (continuous monitors)	Date On	Date Off	Annual Mean	Period Mean	Annual Mean/Period Mean Ratio
Camden - Bloomsbury	26-Jul-19	27-Aug-19	30.02	24.63	1.22
Westminster - Covent Garden	27-Aug-19	30-Sep-19	38.20	30.37	1.26
Islington - Arsenal	30-Sep-19	30-Oct-19	26.05	20.17	1.29
Average			**31.42**	**25.06**	**1.25**

Table 4-2 Site Specific Monitoring Concentrations

Location	Grid Reference	DT Code	Annual Mean – 2019-equivalent
East Wing	529689, 183593	MEH1	35.4
North Wing	529719, 183658	MEH2	36.7
Bloomsbury Day Centre	529630, 183616	MEH3	37.4
Brown Building	529595, 183704	MEH4	**45.0**
9 St Pancras Way	529603, 183594	MEH5	**51.5**
Pancras Road	529673, 183453	MEH6	**42.7**
Camley Street	529815, 183539	MEH7	**49.1**

Note: Bold denotes exceedance of the air quality objective

4.2.7 The 2019 annual mean equivalent NO_2 concentrations were above the air quality objective of 40 µg/m^3 at four of the seven monitoring locations within 1km of the Site. Measured concentrations at the East Wing, West Wing and Bloomsbury Day Centre monitoring site are just below the AQS objective NO_2.

Defra Mapped Background Pollutant Concentrations

4.2.8 A large number of small sources of air pollutants exist, which individually may not be significant, but collectively, over a large area, need to be considered in the modelling process. Pollutant emissions from these sources contribute to background air quality, which when added to modelled emissions allow estimates of total ambient pollutant concentrations to be made.

4.2.9 Defra has produced maps of background pollutant concentrations covering the whole of the UK for use by local authorities and consultants in the completion of LAQM reports and air quality assessments where local background monitoring is unavailable or inappropriate for use. The current Defra maps are based on projections from 2018 data and provide background pollutant concentrations for each 1km grid square within the UK for all years between 2018 and 2030 (Ref. 45).

4.2.10 Table 4-3 presents a comparison between the 2019 monitored urban background NO_2 concentrations reported by LBC at Bloomsbury automatic monitor and the Defra mapped background values for the corresponding grid square in 2019.

Table 4-3 LBC Urban Background Monitoring vs Defra Mapped Background Concentrations (µg/m³) in 2019

Monitoring Location	Defra Grid Square (x,y)	Monitored Annual Mean NO_2 (µg/m³)	Mapped Annual Mean NO_2 (µg/m³)
LBC London Bloomsbury	530500, 182500	32	35.99

4.2.11 Table 4-3 shows that the Defra Mapped background is greater than the monitored concentrations within the grid square. The reason for this difference is not clear and, therefore, to ensure that this assessment uses a conservative background, the modelling is based on the Defra mapped background concentrations.

4.2.12 Defra mapped background NO_2, PM_{10} and $PM_{2.5}$ concentrations which correspond to the location of each modelled receptor for both base and opening years are presented in Table 4-4. For those grid squares where all primary (A) roads are included in the model, their contribution has been taken out of the background to avoid double counting (Ref. 30). The table shows that the mapped background concentrations are below the relevant annual mean air quality objectives for all pollutants within the study area.

Table 4-4 2019 Defra Mapped Background Pollutant Concentrations (µg/m³)

Receptor	Grid Square (X, Y)	Annual Mean Concentrations (µg/m³)			
		NO_X	NO_2	PM_{10}	$PM_{2.5}$
All Receptors (Except R16)	529500, 183500	49.68	29.72	19.89	12.70
R16	529500, 184500	45.44	27.80	19.76	12.67

4.2.13 The background concentrations in 2019 were higher than those for 2026, therefore 2019 background concentrations were used for both base and opening years as these were the more conservative concentrations.

5 Results

5.1 Construction Phase

Predicted Effects during Demolition and Construction

5.1.1 An Air Quality dust risk assessment has been undertaken based on currently available information concerning construction phase activities, in accordance with the GLA's The Control of Dust and Emissions during Construction and Demolition SPG (Ref. 24). There are no relevant ecological receptors (nationally designated sites) within 50m of the Site boundary, 50m of the route used by construction traffic or within 500m of the Site entrance. Therefore, ecological receptors have been scoped out of the dust risk assessment.

5.1.2 It is estimated that the number of high-sensitivity receptors (i.e. residential properties, hospitals, schools and residential care homes) will be ~300 within 350m of the Site boundary, therefore the dust risk assessment will proceed focussing on human receptors.

5.1.3 The sensitivity of the receptors identified within the vicinity of the Site has been assessed as shown in Table 5-1 as per GLA's Control of Dust and Emissions during Construction and Demolition SPG (Ref. 24).

Table 5-1 Sensitivity of Receptors

Area Affected	Sensitivity	Justification
Dust Soiling	High	There are between 10 to 100 high sensitivity receptors, i.e. residential properties, within 20m of the site boundary. So, in accordance with the GLAs assessment criteria the area is high sensitivity in terms of dust soiling/nuisance.
Human Health	Low	There are between 10 to 100 high sensitivity receptors, i.e. residential properties, within 20m of the site boundary, however, annual mean PM_{10} concentrations are below 24 $\mu g/m^3$. So, in accordance with the GLA's assessment criteria the area is low sensitivity in terms of health impacts.

Demolition

5.1.4 Construction of the Proposed Development will require the demolition of the six existing buildings within the Site. Demolition activities will be occurring over 20m above ground level; the potential dust emission magnitude for demolition activities is therefore considered to be large. The Proposed Development is therefore defined as high risk for dust soiling and low risk in terms of human health.

Earthworks

5.1.5 The Site area is approximately 13,300m^2 and is therefore classified within the > 10,000m^2 bracket defined by the IAQM within which the potential dust emissions magnitude associated with earthworks is estimated to be large.

The Proposed Development is therefore defined as high risk for dust soiling and low risk in terms of human health.

Construction

5.1.6 The building volume of the Proposed Development is greater than 100,000m^3 and consequently the magnitude of construction dust emissions magnitude is anticipated to be large. The Proposed Development is therefore defined as high risk for dust soiling and low risk in terms of human health.

Trackout

5.1.7 The number of construction-related heavy-duty vehicle (HDV) movements generated by the Proposed Development is estimated to be between 10-50 HDV movements per day at its peak, with maximum predicted HGV movements not anticipated to exceed 29 vehicles per day during any one phase. Considering the size of the Site, the potential dust emissions class for trackout is assumed to be medium. The Proposed Development is therefore defined as medium risk for dust soiling and low risk in terms of human health.

5.1.8 The dust risk assessment discussed above is summarised in Table 5-2 and Table 5-3.

Table 5-2 Summary of Potential Dust Emission Magnitudes for Construction Phase Activities

Activity	Risk Magnitude	Justification
Demolition	Large	Demolition activities will be occurring over 20m above ground level.
Earthworks	Large	Earthworks site area is between > 10,000m^2 and therefore estimated to be large risk magnitude.
Construction	Large	The construction volume is approximately >100,000 m^3 which would put construction at a risk magnitude of large.
Trackout	Medium	The peak number of construction-related heavy-duty vehicle (HDV) movements generated by the Proposed Development is predicted to be between 10-50 so the risk magnitude is considered to be medium.

Table 5-3 Summary Dust Risk Table

Potential Impact	Risk of Dust Impacts			
	Demolition	Earthworks	Construction	Trackout
Dust Soiling	High Risk	High Risk	High Risk	Medium Risk
Human Health	Low Risk	Low Risk	Low Risk	Low Risk

5.1.9 Overall, the dust risk assessment conservatively identifies the Site as having a ‘high risk’ of causing impacts during demolition activities on the Site and mitigation measures consistent with a high-risk site should therefore be implemented. The proposed mitigation measures are presented in Table 7-1.

5.2 Operational Phase

5.2.1 The following sections present the results of the air quality assessment at selected receptors, providing the predicted levels in the base year, 2019, and in the opening year, 2026, both without and with the Proposed Development.

5.2.2 Predicted baseline pollutant concentrations, presented in Table 5-4, are below their respective AQS objectives at all modelled receptor locations for PM_{10} and $PM_{2.5}$, and all but one (R6) for NO_2. The highest concentration of NO_2, PM_{10} and $PM_{2.5}$ is predicted at R6 (43.3µg/m^3, 22.3µg/m^3, 14.1µg/m^3, respectively).

5.2.3 Predicted NO_2 concentrations at all modelled receptors are well below 60 µg/m^3 and, as such, it is unlikely that the hourly mean AQS objective for NO_2 will be exceeded at any receptors.

Table 5-4 Annual Mean Air Quality Results Baseline Results, 2019

Receptor	Locations	NO_2 (µg/m^3)	PM_{10} (µg/m^3)	$PM_{2.5}$ (µg/m^3)
R1	Mary Rankin Dialysis Unit	34.5	20.8	13.2
R2	St Pancras Hospital	32.7	20.4	13.0
R3	Richard Cobden Primary School	36.7	21.3	13.5
R4	1 St Pancras Way - Flats	35.9	21.1	13.4
R5	1 Goldington Crescent Gardens	39.5	21.4	13.6
R6	Goldington Building Flats 1-30	**43.3**	22.3	14.1
R7	5 Royal College Street	35.8	21.1	13.4
R8	10B Crowndale Road	37.3	21.4	13.6
R9	16 Royal College Street	35.4	21.1	13.4
R10	48C Camden Street	39.4	21.8	13.9
R11	4 Royal College Street	33.2	20.6	13.1
R12	Brayshaw House - 30 Camden Street	37.7	21.5	13.7
R13	101 Royal College Street	34.0	20.8	13.2
R14	19 Camden Street	37.0	21.3	13.6
R15	94B Camden Street	38.8	21.7	13.8
R16	125 Camden Street	38.5	21.9	14.0
R17	1 Canal Side Studios	34.0	20.8	13.2
R18	Margaret Toker Flats	39.7	22.0	14.0
R19	9 St Pancras Way	36.7	21.3	13.5
R20	Camelford House	32.9	20.5	13.1
R21a	Potential future development Flats 1 (adjacent to site boundary)	33.5	20.6	13.1

Receptor	Locations	NO_2 ($\mu g/m^3$)	PM_{10} ($\mu g/m^3$)	$PM_{2.5}$ ($\mu g/m^3$)
R21b	Potential future development Flats 1 (adjacent to site boundary)	33.3	20.5	13.1
R21c	Potential future development Flats 1 (adjacent to site boundary)	32.9	20.4	13.0
R21d	Potential future development Flats 1 (adjacent to site boundary)	32.3	20.3	13.0
R21e	Potential future development Flats 1 (adjacent to site boundary)	31.8	20.3	12.9
R22a	Existing Residential Block within Hospital and Potential future development Flats 2 (adjacent to site boundary)	32.7	20.4	13.0
R22b	Existing Residential Block within Hospital and Potential future development Flats 2 (adjacent to site boundary)	32.6	20.4	13.0
R22c	Existing Residential Block within Hospital and Potential future development Flats 2 (adjacent to site boundary)	32.3	20.3	13.0
R22d	Potential future development Flats 2 (adjacent to site boundary)	32.0	20.3	12.9
R22e	Potential future development Flats 2 (adjacent to site boundary)	31.6	20.2	12.9
R23a	Potential future development Flats 3 (adjacent to site boundary)	32.4	20.4	13.0
R23b	Potential future development Flats 3 (adjacent to site boundary)	32.3	20.3	13.0
R23c	Potential future development Flats 3 (adjacent to site boundary)	32.1	20.3	12.9
R23d	Potential future development Flats 3 (adjacent to site boundary)	31.8	20.3	12.9
R23e	Potential future development Flats 3 (adjacent to site boundary)	31.5	20.2	12.9

Note: **BOLD** numbers highlight concentrations exceeding their respective air quality objective.

5.2.4 Table 5-5 provides the predicted annual mean concentrations for the future opening year of 2026 both without and with the Proposed Development. The results are presented for the lowest floor with relevant exposure.

5.2.5 Annual mean NO_2 concentrations are predicted to be below the AQS objective both without and with the Proposed Development at most locations. The highest NO_2 concentration is predicted to be 44.1 $\mu g/m^3$ at R6 without the Proposed Development and 44.2 $\mu g/m^3$ at R6 with the Proposed Development. Exceedances of the objective also occur at R5 (40.3 $\mu g/m^3$ without the Proposed Development and 40.4 $\mu g/m^3$ with the Proposed Development) and R18 (40.4 $\mu g/m^3$ without the Proposed Development and 40.6 $\mu g/m^3$ with the Proposed Development). The change in annual mean

NO_2 concentrations as a result of the Proposed Development is predicted to be 0.2 µg/m^3 or less and, as such, the change is considered negligible at all receptors.

5.2.6 Predicted NO_2 concentrations at all modelled receptors are well below 60 µg/m^3 and, as such, it is unlikely that the hourly mean AQS objective for NO_2 will be exceeded at any of the receptors.

5.2.7 Annual mean PM_{10} and $PM_{2.5}$ concentrations are predicted to be well below the relevant AQS objectives in 2026 both without and with the Proposed Development at all modelled receptors. The changes in annual mean PM_{10} and $PM_{2.5}$ concentrations as a result of the Proposed Development are less than 0.1 µg/m^3 and, as such, are considered to be negligible.

5.2.8 Predicted annual mean PM_{10} concentrations are predicted to be significantly below 32 µg/m^3 in both scenarios and, as such, the daily PM_{10} AQS objective of 50 µg/m^3, not to be exceeded more than 35 times per year, is likely to be achieved at all modelled receptor locations.

5.2.9 The modelling predicts that the annual mean AQS objectives for NO_2, PM_{10} and $PM_{2.5}$, and short-term AQS objectives for NO_2 and PM_{10} will be achieved at all modelled receptors representative of the Proposed Development, R21-R23. As such the Site is considered suitable for its proposed hospital use.

5.2.10 There are two key committed developments in the area which have not specifically been modelled as receptors. The Ugly Brown Building has been granted planning permission (planning reference 2017/5497/P, granted July 2018) and provides six new development blocks providing retail, office, residential and hotel development. The majority of new development will have commercial uses. In addition, the almost completed 101 Camley Street development is situated to the east of the remaining hospital buildings.

5.2.11 As locations R1 and R2 are closer to the Site, these developments are considered to not be located at worst-case locations for impacts from the Proposed Development, and results at the considered receptors show that there is no need for concern about impacts from the Proposed Development on these two locations.

5.2.12 Receptors R1, R2 and R21 - R23, also represent future receptors that may be brought forward as part of the emerging Kings Cross Corporation Limited Partnership (KCCLP). The modelling predicts that the annual mean AQS objectives for NO_2, PM_{10} and $PM_{2.5}$, and short-term AQS objectives for NO_2 and PM_{10} will be achieved at all modelled receptors.

5.2.13 KCCLP is the development partner of the Camden and Islington Foundation NHS Trust (‘the C&I Trust’) and they intend to submit a planning application for the remaining part of the St Pancras Hospital site in 2021 (Receptors R1, R2 and R21 – R23).

5.2.14 The design is at an early stage, however it is currently envisaged that the development will retain the existing Chapel, Gatehouse and Workhouse buildings. The buildings to the east of the Site (R1-R2) would be demolished and replaced by three new buildings (R21 – R23). It is currently anticipated that planning permission will be sought for a mix of uses including

employment, residential and retail/food and drink, as well as some healthcare and office facilities for the C&I Trust.

5.2.15 As this is an emerging scheme, details of the construction programme are not available, however it is unlikely to be constructed and operational prior to the commencement of construction or before the Proposed Development is complete.

Table 5-5 Annual Mean Concentrations With and Without the Proposed Development in 2026

Receptor ID	Locations	Height (m)	NO_2 (µg/m³)				PM_{10} (µg/m³)				$PM_{2.5}$ (µg/m³)			
			Without	With	Change	Effect Descriptor	Without	With	Change	Effect Descriptor	Without	With	Change	Effect Descriptor
R1	Mary Rankin Dialysis Unit	1.5	34.8	34.9	<0.1	Negligible	20.9	20.9	<0.1	Negligible	13.3	13.3	<0.1	Negligible
R2	St Pancras Hospital	1.5	32.9	32.9	<0.1	Negligible	20.5	20.5	<0.1	Negligible	13	13.1	<0.1	Negligible
R3	Richard Cobden Primary School	1.5	36.7	36.7	<0.1	Negligible	21.3	21.3	<0.1	Negligible	13.5	13.5	<0.1	Negligible
R4	1 St Pancras Way - Flats	5	36.3	36.4	<0.1	Negligible	21.1	21.1	<0.1	Negligible	13.4	13.5	<0.1	Negligible
R5	1 Goldington Crescent Gardens	1.5	**40.3**	**40.4**	<0.1	Negligible	21.5	21.5	<0.1	Negligible	13.7	13.7	<0.1	Negligible
R6	Goldington Building Flats 1-30	1.5	**44.1**	**44.2**	<0.1	Negligible	22.4	22.4	<0.1	Negligible	14.2	14.2	<0.1	Negligible
R7	5 Royal College Street	5	35.9	36	<0.1	Negligible	21.1	21.1	<0.1	Negligible	13.4	13.4	<0.1	Negligible
R8	10B Crowndale Road	5	37.4	37.4	<0.1	Negligible	21.4	21.4	<0.1	Negligible	13.6	13.6	<0.1	Negligible
R9	16 Royal College Street	1.5	35.4	35.4	<0.1	Negligible	21.1	21.1	<0.1	Negligible	13.4	13.4	<0.1	Negligible

Receptor ID	Locations	Height (m)	NO_2 (µg/m³)				PM_{10} (µg/m³)				$PM_{2.5}$ (µg/m³)			
			Without	With	Change	Effect Descriptor	Without	With	Change	Effect Descriptor	Without	With	Change	Effect Descriptor
R10	48C Camden Street	1.5	39.5	39.5	<0.1	Negligible	21.9	21.9	<0.1	Negligible	13.9	13.9	<0.1	Negligible
R11	4 Royal College Street	1.5	33.3	33.3	<0.1	Negligible	20.6	20.6	<0.1	Negligible	13.1	13.1	<0.1	Negligible
R12	Brayshaw House - 30 Camden Street	1.5	37.8	37.8	<0.1	Negligible	21.5	21.5	<0.1	Negligible	13.7	13.7	<0.1	Negligible
R13	101 Royal College Street	1.5	34	34	<0.1	Negligible	20.8	20.8	<0.1	Negligible	13.2	13.2	<0.1	Negligible
R14	19 Camden Street	1.5	37.1	37.1	<0.1	Negligible	21.3	21.4	<0.1	Negligible	13.6	13.6	<0.1	Negligible
R15	94B Camden Street	1.5	38.9	38.9	<0.1	Negligible	21.7	21.7	<0.1	Negligible	13.8	13.8	<0.1	Negligible
R16	125 Camden Street	1.5	38.5	38.5	<0.1	Negligible	21.9	21.9	<0.1	Negligible	14	14	<0.1	Negligible
R17	1 Canal Side Studios	5	34.3	34.4	0.1	Negligible	20.8	20.8	<0.1	Negligible	13.3	13.3	<0.1	Negligible
R18	Margaret Toker Flats	1.5	**40.4**	**40.6**	0.2	Negligible	22.2	22.2	<0.1	Negligible	14.1	14.1	<0.1	Negligible
R19	9 St Pancras Way	1.5	37.2	37.3	0.1	Negligible	21.4	21.4	<0.1	Negligible	13.6	13.6	<0.1	Negligible
R20	Camelford House	1.5	33	33	<0.1	Negligible	20.6	20.6	<0.1	Negligible	13.1	13.1	<0.1	Negligible

Receptor ID	Locations	Height (m)	NO_2 (µg/m^3)				PM_{10} (µg/m^3)				$PM_{2.5}$ (µg/m^3)			
			Without	With	Change	Effect Descriptor	Without	With	Change	Effect Descriptor	Without	With	Change	Effect Descriptor
R21a	Potential future development Flats 1 (adjacent to site boundary)	1.5	33.8	33.8	<0.1	Negligible	20.6	20.6	<0.1	Negligible	13.1	13.1	<0.1	Negligible
R21b	Potential future development Flats 1 (adjacent to site boundary)	5	33.5	33.6	<0.1	Negligible	20.6	20.6	<0.1	Negligible	13.1	13.1	<0.1	Negligible
R21c	Potential future development Flats 1 (adjacent to site boundary)	8.5	33.1	33.1	<0.1	Negligible	20.5	20.5	<0.1	Negligible	13.1	13.1	<0.1	Negligible
R21d	Potential future development Flats 1 (adjacent to site boundary)	12	32.5	32.5	<0.1	Negligible	20.4	20.4	<0.1	Negligible	13	13	<0.1	Negligible

Receptor ID	Locations	Height (m)	NO_2 (µg/m^3)				PM_{10} (µg/m^3)				$PM_{2.5}$ (µg/m^3)			
			Without	With	Change	Effect Descriptor	Without	With	Change	Effect Descriptor	Without	With	Change	Effect Descriptor
R21e	Potential future development Flats 1 (adjacent to site boundary)	15.5	32	32	<0.1	Negligible	20.3	20.3	<0.1	Negligible	12.9	12.9	<0.1	Negligible
R22a	Existing Residential Block within Hospital and Potential future development Flats 2 (adjacent to site boundary)	1.5	32.9	32.9	<0.1	Negligible	20.4	20.5	<0.1	Negligible	13	13	<0.1	Negligible
R22b	Existing Residential Block within Hospital and Potential future development Flats 2 (adjacent to site boundary)	5	32.8	32.8	<0.1	Negligible	20.4	20.4	<0.1	Negligible	13	13	<0.1	Negligible

Receptor ID	Locations	Height (m)	NO_2 (µg/m^3)				PM_{10} (µg/m^3)				$PM_{2.5}$ (µg/m^3)			
			Without	With	Change	Effect Descriptor	Without	With	Change	Effect Descriptor	Without	With	Change	Effect Descriptor
R22c	Existing Residential Block within Hospital and Potential future development Flats 2 (adjacent to site boundary)	8.5	32.5	32.5	<0.1	Negligible	20.4	20.4	<0.1	Negligible	13	13	<0.1	Negligible
R22d	Potential future development Flats 2 (adjacent to site boundary)	12	32.1	32.2	<0.1	Negligible	20.3	20.3	<0.1	Negligible	13	13	<0.1	Negligible
R22e	Potential future development Flats 2 (adjacent to site boundary)	15.5	31.8	31.8	<0.1	Negligible	20.2	20.3	<0.1	Negligible	12.9	12.9	<0.1	Negligible

Receptor ID	Locations	Height (m)	NO_2 (µg/m^3)				PM_{10} (µg/m^3)				$PM_{2.5}$ (µg/m^3)			
			Without	With	Change	Effect Descriptor	Without	With	Change	Effect Descriptor	Without	With	Change	Effect Descriptor
R23a	Potential future development Flats 3 (adjacent to site boundary)	1.5	32.6	32.6	<0.1	Negligible	20.4	20.4	<0.1	Negligible	13	13	<0.1	Negligible
R23b	Potential future development Flats 3 (adjacent to site boundary)	5	32.5	32.5	<0.1	Negligible	20.4	20.4	<0.1	Negligible	13	13	<0.1	Negligible
R23c	Potential future development Flats 3 (adjacent to site boundary)	8.5	32.2	32.3	<0.1	Negligible	20.3	20.3	<0.1	Negligible	13	13	<0.1	Negligible
R23d	Potential future development Flats 3 (adjacent to site boundary)	12	32	32	<0.1	Negligible	20.3	20.3	<0.1	Negligible	12.9	12.9	<0.1	Negligible

Receptor ID	Locations	Height (m)	NO_2 (µg/m^3)				PM_{10} (µg/m^3)				$PM_{2.5}$ (µg/m^3)			
			Without	With	Change	Effect Descriptor	Without	With	Change	Effect Descriptor	Without	With	Change	Effect Descriptor
R23e	Potential future development Flats 3 (adjacent to site boundary)	15.5	31.6	31.7	<0.1	Negligible	20.2	20.2	<0.1	Negligible	12.9	12.9	<0.1	Negligible

Note: **BOLD** numbers highlight concentrations exceeding their respective Air Quality Standards.

6 Air Quality Neutral Assessment Results

6.1 Introduction

6.1.1 In order to address the GLA's policy for new developments to be 'air quality neutral', and in-line with the relevant requirements of its Sustainable Design and Construction SPG (Ref. 23), air quality emissions for the Proposed Development were estimated, and used to evaluate its performance against site-specific benchmark values from the SPG. The methodology assesses two sources of emissions: road traffic and energy production.

6.1.2 It should be noted that on the 1st September 2020, The Town and Country Planning (Use Classes) Regulations 2020 (Ref. 44) were introduced and any new planning applications made on or after this date are to be used in the determination of the application. However, the guidance has not yet been updated to reflect the new Use Class Regulations. Therefore, using the information available and presented in the Design and Access Statement and Technical Drawings submitted, the Air Quality team has assigned the most appropriate use class and benchmark criteria for the floor areas within the Proposed Development. As such the floor area schedule by use class is not directly comparable to areas used in the air quality neutral assessment. Further details are provided in Appendix B.

6.2 Transport Related Emissions

6.2.1 The Air Quality Neutral Assessment for the road traffic associated with the Proposed Development compares the road traffic related emissions against calculated benchmark values which are based upon use class, the number of anticipated trips per year, and the average distance travelled per trip, in accordance with the Air Quality Neutral Planning Support document (Ref. 43).

6.2.2 The Total Benchmarked Transport Emissions for the Proposed Development have been calculated using default NO_X and PM_{10} emission factors per square metre, which have been determined for the different use classes, and for each of the three areas within London, as defined in the guidance (Ref. 43).

6.2.3 The Transport Emissions Benchmarks (TEBs) are based on the number of light vehicle trips generated by different land-use classes, together with the associated trip lengths and vehicle emission rates. However, the guidance (Ref. 43) only provides trip lengths and emission rates for land-use classes A1, B1 and C3, and not land-use class D1, of which much of the Proposed Development is comprised. However, the guidance provides an alternative methodology, based on trip rates only.

6.2.4 Table 6-1 presents the area of the Proposed Development (comprised of use classes A3, B8 and C2) and the number of trips/m^2/year for inner London from the guidance (Ref. 43) for these land-use classes. These are multiplied to give the benchmark number of trips per year. Note that this does not include the trip rates for the retail (A1) or office (B1) floorspace. Further

information regarding the floorspace and allocated land-use category is provided in Appendix A.

Table 6-1 Calculation of Transport Benchmark Trips for the Proposed

Use Class	Area (m^2)	Trips/m^2/year	Trips / year
A3	435.5	137	59,664
B8	455	5.5	2,503
C2	454	3.8	1,725
D1	38,613.5	65.1	2,513,739
Total	**39,958**	**-**	**2,577,630**

6.2.5 The Transport Assessment for the Proposed Development, submitted with the planning application, provides the net change in traffic anticipated once the Proposed Development is complete and operational (Table 5.25 of the Transport Assessment). This is provided as net AADT change on each of the roads anticipated to be affected by the Proposed Development and has been reproduced in Table 6-2. This data can be used to compare against the calculated benchmark trip rate for the Proposed Development.

Table 6-2 Net Change in Traffic Flows

Location	Net AADT Change (All Vehicles)
St Pancras Way – north of Granary Street	203
St Pancras Way – south of Granary Street	240
Granary Street – west of service bay	135
Granary Street – east of service bay	61
Pancras Road – east of St Pancras Way	131
Total	**770**

6.2.6 The total net AADT is then multiplied by 365 to calculate the number of trips per annum for the Proposed Development: 770 * 365 = 281,050 trips/annum.

This is significantly less than the calculated number of trips for the Proposed Development (>2 million trips), taking into account floor areas for use classes A3, B8, C2 and D1 only. Therefore, the Proposed Development can be considered neutral for transport-related emissions.

Building Related Emissions

6.2.7 For building emissions, Building Emissions Benchmarks for NO_X and PM_{10} are calculated using information relating to energy supply and demand considerations for different use classes, as defined in the guidance.

6.2.8 The Proposed Development does not include any on-site centralised combustion plant (rather it utilises electricity and air source heat pumps for heating); however, it does incorporate two oil-fired emergency generators, which are provided to a back-up supply to the building in the event of a failure of the incoming network supply. It is not proposed to run the building on the generators at any other time, other than for a monthly load test, which will be undertaken at a planned time each month for approximately 20 minutes. As the plant will be fuelled by oil, emissions of oxides of nitrogen (NOx) and particulate matter (PM_{10}) are considered.

6.2.9 The air quality neutral assessment for the generators compares the energy related emissions against calculated benchmark values based upon floor space, use class and energy demand, in accordance with the Air Quality Neutral Planning Support. The Total Benchmarked Building Emissions for the Proposed Development are calculated using the floor area for each land-use class, multiplied by default emission factors for each land-use category, as shown in Table 6-3. Excluded from this calculation were areas within the development where the land-use is plant machinery, facilities management, loading bays and cycle racks as these are unlikely to be heated. Further information regarding the floorspace and allocated use class is provided in Appendix A.

Table 6-3 Calculation of Building Emissions Benchmarks (BEBs)

Use Class	Area (m^2)	Building Emission Benchmark (g/m^2/year)	Total Building Emissions Benchmark (kg NOx/year)
A1	2,774	22.6	63
A3 – A5	436	75.2	33
A2 and B1	3,255	30.8	100
C2	454	68.5	31
D1(a)	29,060	43	1,250
D1(c-h)	1,911	31	59
Total NO_X Building Emissions Benchmark			**1,536 kg NOx**

Use Class	Area (m^2)	Building Emission Benchmark (g/m^2/year)	Total Building Emissions Benchmark (kg PM_{10}/year)
A1	2,774	1.29	4
A3 – A5	436	4.32	2
A2 and B1	3,255	1.77	6
C2	454	5.97	3
D1(a)	29,060	2.47	72
D1(c-h)	1,911	1.78	3
Total PM_{10} Building Emissions Benchmark			**89 kg PM_{10}**

6.2.10 The specifics of the generators are still to be confirmed. However, professional judgement and experience indicates that it is highly unlikely that the two generators, to be tested for 20 minutes a month but otherwise only used in an emergency, will emit as much as the calculated Building Emissions Benchmark, over 1,000 kg of NOx or 80 kg PM_{10}. Therefore, it can be concluded that building emissions from the Proposed Development will be within the benchmark for both NOx and PM_{10}, and the Proposed Development is air quality neutral with regard to building emissions.

7 Mitigation Measures

7.1 Construction Phase Mitigation Measures

7.1.1 Based on the results of the dust risk assessment, the following mitigation measures are recommended by the GLA's The Control of Dust and Emissions during Construction and Demolition – Supplementary Planning Guidance (Ref. 24) for High Risk Sites in Table 7-1. It is recognised that not all of the recommended measures may be appropriate or feasible for all high-risk sites. It is provided to recommend the 'highly recommended' and 'desirable' mitigation from the SPG which is finally selected by the appointed demolition and construction contractor. The dust controls will be confirmed by the Principal Contractor and included in the CMP, that will be agreed with LBC prior to works commencing on-site. An Outline CMP has been submitted with the planning application.

Table 7-1 Construction Phase Mitigation Measures (Ref. 24)

Mitigation Measure	Highly Recommended (H) / Desirable (D)
Site Management	
Develop and implement a stakeholder communications plan that includes community engagement before work commences on site.	**H**
Develop a Dust Management Plan.	**H**
Display the name and contact details of person(s) accountable for air quality pollutant emissions and dust issues on the site boundary.	**H**
Display the head or regional office contact information.	**H**
Record and respond to all dust and air quality pollutant emissions complaints.	**H**
Make a complaint log available to the local authority when asked.	**H**
Carry out regular site inspections to monitor compliance with air quality and dust control procedures, record inspection results, and make an inspection log available to the local authority when asked.	**H**
Increase the frequency of site inspections by those accountable for dust and air quality pollutant emissions issues when activities with a high potential to produce dust and emissions and dust are being carried out, and during prolonged dry or windy conditions.	**H**
Record any exceptional incidents that cause dust and air quality pollutant emissions, either on or off the site, and the action taken to resolve the situation is recorded in the log book.	**H**
Hold regular liaison meetings with other high-risk construction sites within 500m of the site boundary, to ensure plans are co-ordinated and dust and particulate matter emissions are minimised.	**H**
Preparing and Maintaining the Site	
Plan site layout: machinery and dust causing activities should be located away from receptors.	**H**
Erect solid screens or barriers around dust activities or the site boundary that are, at least, as high as any stockpiles on site.	**H**
Fully enclosure site or specific operations where there is a high potential for dust production and the site is active for an extensive period.	**H**

Mitigation Measure	Highly Recommended (H) / Desirable (D)
Install green walls, screens or other green infrastructure to minimise the impact of dust and pollution.	**D**
Avoid site runoff of water or mud.	**H**
Keep site fencing, hoarding, barriers and scaffolding clean using wet methods.	**H**
Remove materials from site as soon as possible.	**H**
Cover, seed or fence stockpiles to prevent wind whipping.	**H**
Avoid double handling of material wherever reasonably practicable.	**H**
Carry out regular dust soiling checks of buildings within 100m of site boundary and cleaning to be provided if necessary.	**H**
Provide showers and ensure a change of shoes and clothes are required before going off-site to reduce transport of dust.	**D**
Agree monitoring locations with the Local Authority.	**H**
Where possible, commence baseline monitoring at least three months before phase begins.	**H**
Put in place real-time dust and air quality pollutant monitors across the site and ensure they are checked regularly.	**H**
Operating Vehicle/Machinery and Sustainable Travel	
Ensure all on-road vehicles comply with the requirements of the London Low Emission Zone.	**H**
Ensure all non-road mobile machinery (NRMM) comply with the standards set within this guidance.	**H**
Ensure all vehicles switch off engines when stationary – no idling vehicles.	**H**
Avoid the use of diesel- or petrol-powered generators and use mains electricity or battery powered equipment where possible.	**H**
Impose and signpost a maximum-speed-limit of 10mph on surfaced haul routes and work areas (if long haul routes are required these speeds may be increased with suitable additional control measures provided, subject to the approval of the nominated undertaker and with the agreement of the local authority, where appropriate).	**H**
Produce a Construction Logistics Plan to manage the sustainable delivery of goods and materials.	**H**
Implement a Travel Plan that supports and encourages sustainable travel (public transport, cycling, walking, and car-sharing).	**H**
Loading of material into lorries within designated bay.	**H**
Plant working on site to have exhausts positioned such that the risk of re-suspension of ground dust is minimised (exhausts should preferably point upwards), where reasonably practicable.	**H**
Ensure all vehicles carrying loose or potentially dusty material to or from the site are fully sheeted.	**H**
Use ultra-low sulphur fuels in plant and vehicles.	**H**
Operations	
Only use cutting, grinding or sawing equipment fitted or in conjunction with suitable dust suppression techniques such as water sprays or local extraction, e.g. suitable local exhaust ventilation systems.	**H**
Ensure an adequate water supply on the site for effective dust/particulate matter mitigation (using recycled water where possible).	**H**
Use enclosed chutes, conveyors and covered skips.	**H**

Mitigation Measure	Highly Recommended (H) / Desirable (D)
Minimise drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment and use fine water sprays on such equipment wherever appropriate.	**H**
Ensure equipment is readily available on site to clean any dry spillages and clean up spillages as soon as reasonably practicable after the event using wet cleaning methods.	**H**
Waste Management	
Reuse and recycle waste to reduce dust from waste materials	**H**
Avoid bonfires and burning of waste materials.	**H**
Measures Specific to 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)	**H**
Ensure water suppression is used during demolition operations.	**H**
Avoid explosive blasting, using appropriate manual or mechanical alternatives.	**H**
Bag and remove any biological debris or damp down such material before demolition.	**H**
Measures Specific to Earthworks	
No specific measures are recommended as the site is Low Risk, however, general good practice measures should be implemented.	**-**
Measures Specific to Construction	
Avoid scabbling (roughening of concrete surfaces) if possible	**H**
Ensure sand and other aggregates are stored in bunded areas and are not allowed to dry out, unless this is required for a particular process, in which case ensure that appropriate additional control measures are in place	**H**
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.	**H**
For smaller supplies of fine powder materials ensure bags are sealed after use and stored appropriately to prevent dust.	**D**
Measures Specific to Trackout	
Regularly use a water-assisted dust sweeper on the access and local roads, as necessary, to remove any material tracked out of the site.	**H**
Avoid dry sweeping of large areas.	**H**
Ensure vehicles entering and leaving sites are securely covered to prevent escape of materials during transport.	**H**
Record all inspections of haul routes and any subsequent action in a site log book.	**H**
Install hard surfaced haul routes, which are regularly damped down with fixed or mobile sprinkler systems and regularly cleaned.	**H**
Inspect haul routes for integrity and instigate necessary repairs to the surface as soon as reasonably practicable	**H**
Implement a wheel washing system (with rumble grids to dislodge accumulated dust and mud prior to leaving the site where reasonably practicable).	**H**

Mitigation Measure	Highly Recommended (H) / Desirable (D)
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.	**H**
Access gates to be located at least 10m from receptors where possible.	**H**
Apply dust suppressants to locations where a large volume of vehicles enter and exit the construction site	**H**

7.2 Operation Phase Mitigation Measures

7.2.1 There are no mitigation measures required for the operation phase. This is due to no air quality exceedances at on site location (Receptor 2). In addition there are no adverse impacts caused to off-site receptors.

7.2.2 There are no limitations on air intake locations for ventilation systems on the development site.

8 Summary and Conclusions

8.1.1 This air quality assessment has been undertaken in order to assess the potential air quality impacts associated with the Proposed Development.

8.1.2 LBC has declared the entire Borough an AQMA due to exceedances of the AQS objective for annual mean NO_2 and daily mean objective for PM_{10}. This assessment therefore has focused on the pollutants of primary concern within the LBC administrative area, namely NO_2, PM_{10} and $PM_{2.5}$.

8.1.3 The results of the assessment of impacts associated with the demolition and construction phase indicate that, in the absence of mitigation, impacts associated with the Proposed Development, such as removal / demolition of existing structures, earthworks, construction and track-out, can be described as medium to high risk with regard to dust soiling, and low risk in terms of human health impacts. A range of mitigation measures can be followed to reduce the nuisance and human-health impacts of the dust and PM_{10} which, if effectively implemented, would reduce impacts to an insignificant level. Appropriate mitigation measures are set out in Table 7-1 and should be implemented through a CMP.

8.1.4 The impacts of the complete and operational Proposed Development on local air quality have been assessed at receptor locations representing existing sensitive receptors. Concentrations of NO_2 are predicted to be below the annual mean air quality objective of 40 µg/m^3 at receptors except R6 (Goldington Building Flats 1-3), R5 (Goldington Crescent Gardens) and R18 (Margaret Toker Flats) both without and with the Proposed Development. Likewise, annual mean $PM_{2.5}$ and PM_{10} concentrations are predicted to be below the respective objectives of 25 and 40 µg/m^3 at all modelled receptors both without and with the Proposed Development. The impact of the Proposed Development at all existing receptor locations is therefore considered to be negligible, in accordance with the IAQM/EPUK significance criteria. Overall, the operational traffic impacts from the Proposed Development on local air quality are considered to be not significant.

8.1.5 Receptors R21-R23 (existing hospital buildings adjacent to the Site boundary) were modelled to represent the facades of the Proposed Development. NO_2, PM_{10} and $PM_{2.5}$ concentrations are predicted to be well below the annual mean AQS objective at these receptors. As such the Site is considered to be suitable, in terms of air quality, for the Proposed Development. The Air Quality Neutral Assessment calculated the total net trips associated with the Proposed Development per annum to be much less than the transport benchmark trips for the Proposed Development. Therefore the Proposed Development can be considered neutral for transport-related emissions.

8.1.6 The Proposed Development is to include two oil-fired generators for emergency use, which will be tested for 20 minutes each month. As such it is considered highly unlikely that the emissions per year will even approach the calculated building emissions benchmark, and the Proposed Development is concluded to be air quality neutral with regard to building emissions.

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Appendix A Figures

Figure A-1 Wind Rose from London City Meteorological Station, 2019

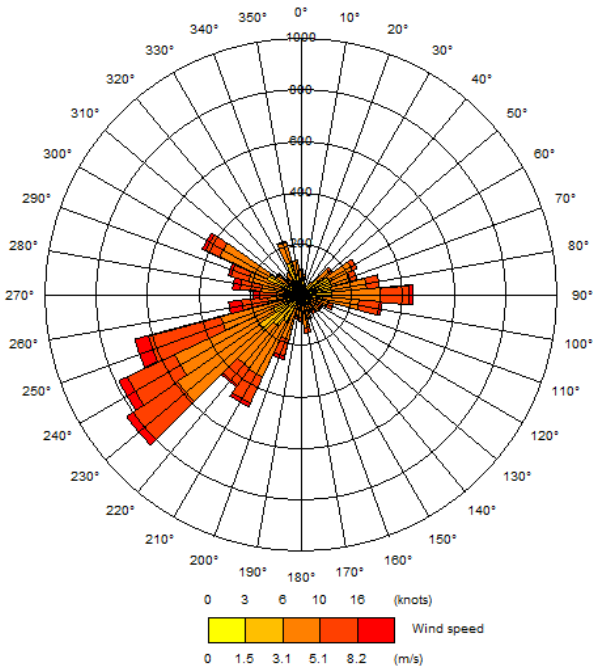


Figure A-2 Traffic Network, receptor locations and change in NO_2 concentration results

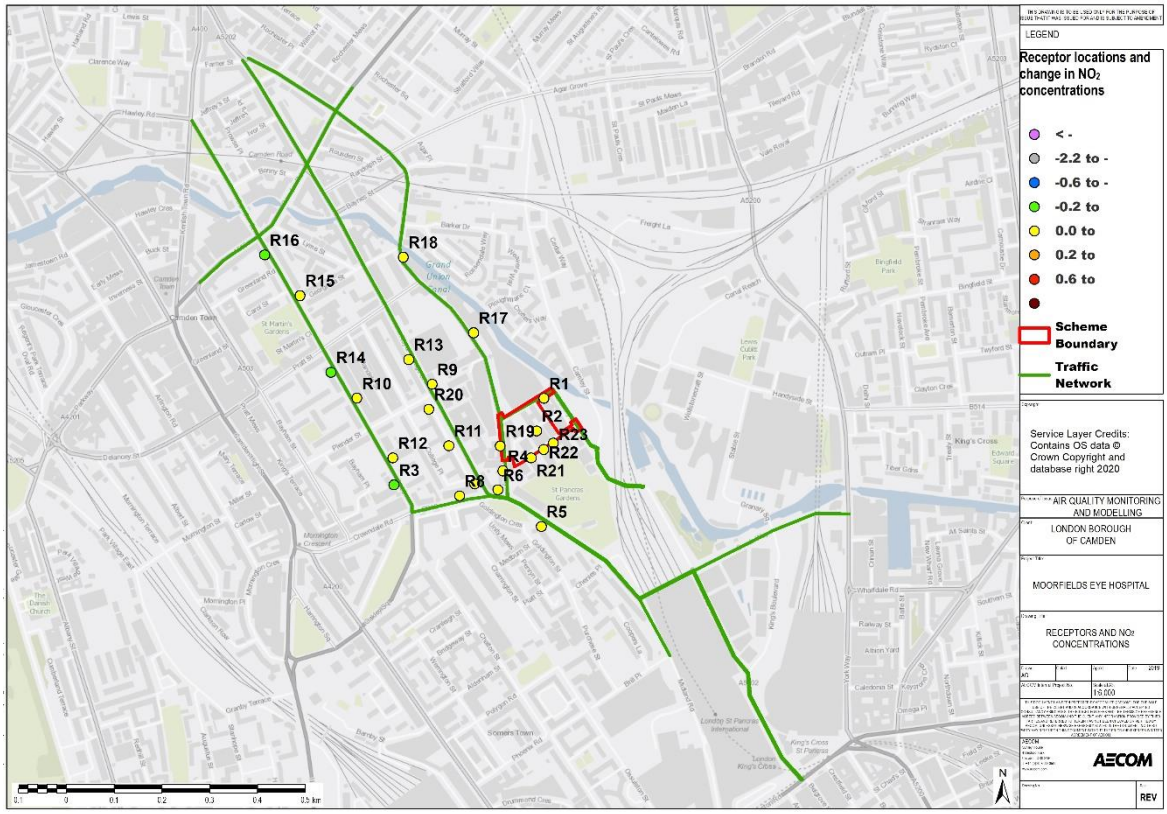
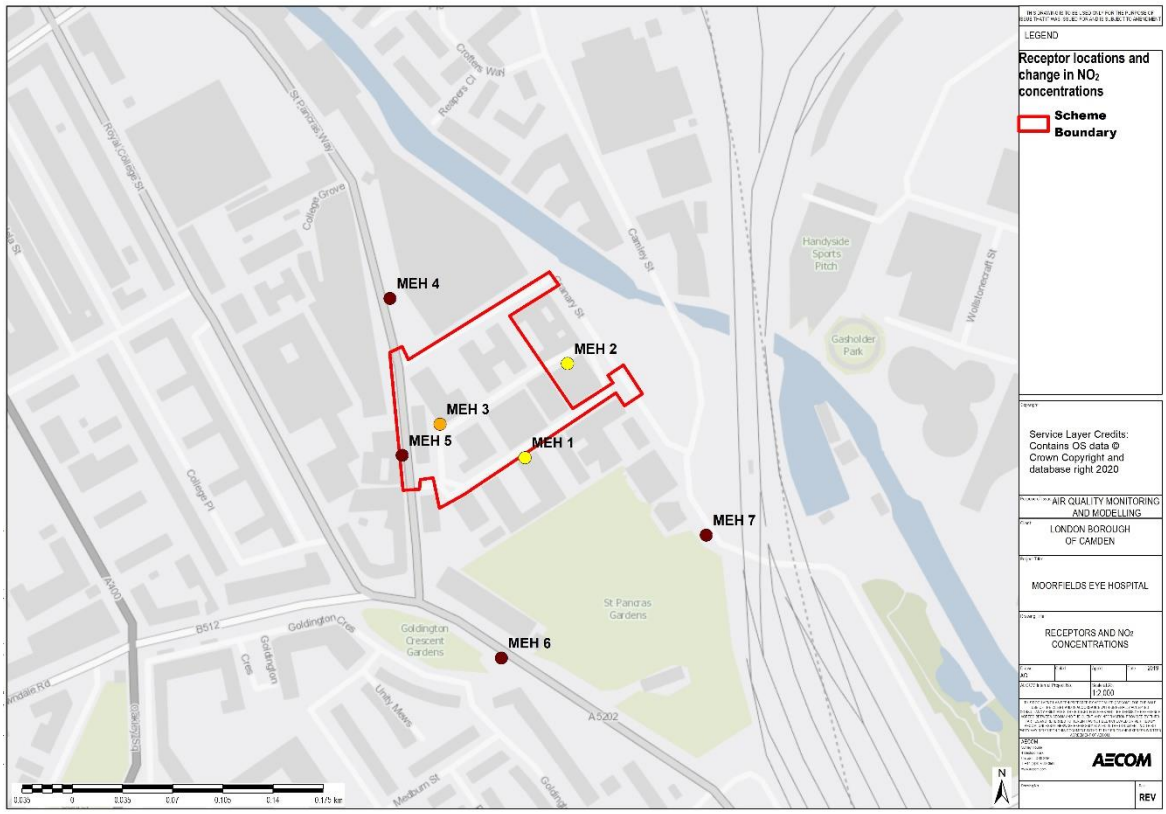


Figure A-3 Diffusion Tube Locations 2019



Appendix B Air Quality Neutral Benchmark Calculation

Table B-1 Air Quality Neutral Benchmark Calculation

Description	Total Area (m^2)	Building Emissions Benchmark					Benchmark Trip Rate**		
		Use Class for BEB	BEB (NO_X g/m^2)	BEB (PM_{10} g/m^2)	NO_X (g)	PM_{10} (g)	Use Class for TEB	Benchmark Trip Rate (trips/m^2/yr)	Trips/yr
Class E - Commercial, Business and Service (Medical)	14075.0	D1 (a)	43.0	2.5	605225.0	34765.3	D1	65.1	916282.5
Café	335.5	Class A3 - A5	75.2	4.3	25229.6	1449.4	A3	137	45963.5
Medical Records	38.5	Class A2 and Class B1	30.8	1.8	1185.8	68.1	-	-	-
IT	902.0	Class A2 and Class B1	30.8	1.8	27781.6	1596.5	-	-	-
Plant*	4823.5	-	-	-	-	-	D1	65.1	314009.9
Pharmacy	316.5	D1 (a)	43.0	2.5	13609.5	781.8	D1	65.1	20604.2
Radiology	425.0	D1 (a)	43.0	2.5	18275.0	1049.8	D1	65.1	27667.5
Bike storage*	308.0	-	-	-	-	-	D1	65.1	20050.8
Changing room	172.5	D1 (a)	43.0	2.5	7417.5	426.1	D1	65.1	11229.8
Foyer	1079.0	Class A2 and Class B1	30.8	1.8	33233.2	1909.8	-	-	-
Reception	53.0	Class A2 and Class B1	30.8	1.8	1632.4	93.8	-	-	-
Stairs*	243.5	-	-	-	-	-	D1	65.1	15851.9
Security	20.0	D1 (a)	43.0	2.5	860.0	49.4	D1	65.1	1302.0
Facilities Management	413.0	Class A2 and Class B1	30.8	1.8	12720.4	731.0	-	-	-
Retail	88.0	Class A1	22.6	1.3	1988.8	113.5	-	-	-

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Air Quality Assessment

Description	Total Area (m^2)	Building Emissions Benchmark					Benchmark Trip Rate**		
		Use Class for BEB	BEB (NO_X g/m^2)	BEB (PM_{10} g/m^2)	NO_X (g)	PM_{10} (g)	Use Class for TEB	Benchmark Trip Rate (trips/m^2/yr)	Trips/yr
Waiting area	117.5	Class A2 and Class B1	30.8	1.8	3619.0	208.0	-	-	-
Porters Office	29.0	Class A2 and Class B1	30.8	1.8	893.2	51.3	-	-	-
Bin Store*	119.5	-	-	-	-	-	D1	65.1	7779.5
Education	1910.5	Class D1 (c-h)	31.0	1.8	59225.5	3400.7	D1	65.1	124373.6
Housekeeping	44.5	D1 (a)	43.0	2.5	1913.5	109.9	D1	65.1	2897.0
Core	2547.0	D1 (a)	43.0	2.5	109521.0	6291.1	D1	65.1	165809.7
Lifts*	561.5	-	-	-	-	-	D1	65.1	36553.7
Riser	1000.5	D1 (a)	43.0	2.5	43021.5	2471.2	D1	65.1	65132.6
Labs	5972.0	D1 (a)	43.0	2.5	256796.0	14750.8	D1	65.1	388777.2
CRF	914.5	D1 (a)	43.0	2.5	39323.5	2258.8	D1	65.1	59534.0
Patient support	36.0	D1 (a)	43.0	2.5	1548.0	88.9	D1	65.1	2343.6
Medical Equipment Storage	88.0	D1 (a)	43.0	2.5	3784.0	217.4	D1	65.1	5728.8
Loading Bay*	455.0	-	-	-	-	-	B8	5.5	2502.5
Staff Welfare	100.0	Class A3 - A5	75.2	4.3	7520.0	432.0	A3	137	13700.0
Landing	1045.0	D1 (a)	43.0	2.5	44935.0	2581.2	D1	65.1	68029.5
Admin	622.5	Class A2 and Class B1	30.8	1.8	19173.0	1101.8	-	-	-
PPU	1673.0	D1 (a)	43.0	2.5	71939.0	4132.3	D1	65.1	108912.3
Overnight stay	454.0	Class C2 *	68.5	6.0	31099.0	2710.4	C2	3.8	1725.2
AHU Room	55.5	D1 (a)	43.0	2.5	2386.5	137.1	D1	65.1	3613.1
Commercial/Lettable	2685.5	Class A1	22.6	1.3	60692.3	3464.3	-	-	-
Toilets	145.0	D1 (a)	43.0	2.5	6235.0	358.2	D1	65.1	9439.5
Corridor	464.5	D1 (a)	43.0	2.5	19973.5	1147.3	D1	65.1	30239.0

Description	Total Area (m^2)	Building Emissions Benchmark					Benchmark Trip Rate**		
		Use Class for BEB	BEB (NO_X g/m^2)	BEB (PM_{10} g/m^2)	NO_X (g)	PM_{10} (g)	Use Class for TEB	Benchmark Trip Rate (trips/m^2/yr)	Trips/yr
Wheelchair storage	22.0	D1 (a)	43.0	2.5	946.0	54.3	D1	65.1	1432.2
Fire escape*	109.5	-	-	-	-	-	D1	65.1	7128.5
Patient transport	43.5	D1 (a)	43.0	2.5	1870.5	107.4	D1	65.1	2831.9
(Building envelope)*	1477.5	-	-	-	-	-	D1	65.1	96185.3
BENCHMARKS					**1535.6 kg/NO_X**	**89.1 kg/PM_{10}**			**2,577,630.1 trips/year**

Notes:

*Usage descriptions marked with an Asterix (*) have not been allocated a use class; the AQN assumed that these areas would not be heated and have therefore not been considered within the BEB for the Proposed Development. This allows for a more conservative assessment.

** Benchmark trip rates, excluding retail and office usage.

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