Air Quality Assessment

Commercial Development

20-24 Kirby Street, Farringdon

20th Jan 2022

ENVIRONMENTAL AND
SUSTAINABILITY CONSULTANTS

encon associates

Report Reference Number: A4944

Document Control

Date of first Issue	Revision	Date of Revision	Issued By	Checked by
20/01/2022	-	-	JK	GM
-	A	26/10/2022	JK	GM
-	B	31/10/2022	JK	GM

Executive Summary

Encon Associates were commissioned by Colgold Limited (the 'Client') to carry out an air quality assessment in connection with the proposed refurbishment and extension of the existing office building at 20-24 Kirby Street, London (the 'Site').

The Site falls within the administrative boundary of London Borough of Camden (LBC). The Council has declared the whole borough an Air Quality Management Area (AQMA) due to exceedances of both the annual mean Nitrogen Dioxide (NO_2) objective and the 24 -hour Particulate Matter (PM_{10}).

Based on the current design layout and criteria set out within the Camden Air Quality Planning Guidance[1], the development is classed as a 'major' scheme as the floorspace, which includes the proposed refurbishment and extension, is greater than 1000 m^2. The proposed development is in an area of poor air quality as the estimated NO_2 background concentrations based on the Defra background maps exceed 40 µg/m^3 (section 5.2), however the scheme will not introduce sensitive receptors as it is for office accommodation or generate significant air quality impacts as it is a car free development. A 'basic' Air Quality Assessment is therefore required, including an Air Quality Neutral Assessment and a Construction Impact Assessment.

It is inevitable that with any development, demolition and construction activities will cause some disturbance to those nearby. Dust arising from most construction activities tends to be of a coarse nature, which through dispersion by the wind can lead to soiling of property including windows, cars, external paintwork and laundry. However, as well as giving rise to annoyance due to soiling of surfaces from dust emissions, there is evidence of major construction activities causing increases in long term PM_{10} concentrations and in the number of days exceeding the short term PM_{10} objective of 50 μgm^{-3}.

The IAQM guidance on assessing impacts on air quality from construction activities and determining the likely significance has been used to determine the risk of impacts occurring during the

[1] LBC (2021) Camden Planning Guidance Air Quality, January 2021

construction of the development and to identify appropriate mitigation measures to be implemented on site to reduce dust emissions and associated impacts.

Due to the proximity of nearby residential receptors, the Site is considered to have a medium risk with regards to dust soiling during demolition and construction and a low risk with regard to earthworks and construction. The site is considered to have a low risk with regard to PM_{10} concentrations during trackout and a negligible risk with regard to demolition, earthworks and construction. However, following the implementation of appropriate mitigation measures impacts associated with the construction of the development will be negligible.

The baseline assessment has concluded that pollution levels at the Site are currently meeting the relevant air quality objective limits for NO_2, PM_{10} and $PM_{2.5}$.

Based on the results of this assessment air quality does not pose a constraint to development of the Site for commercial purposes.

Table of Contents

1 Introduction

1.1 General

Encon Associates were commissioned by Colgold Limited (the 'Client') to carry out an air quality assessment in connection with the proposed refurbishment and extension of the existing office building at 20-24 Kirby Street. London (the 'Site').

The Site falls within the administrative boundary of London Borough of Camden (LBC). The Council has declared the whole borough an Air Quality Management Area (AQMA) due to exceedances of both the annual mean Nitrogen Dioxide (NO_2) objective and the 24 -hour Particulate Matter (PM_{10}).

Based on the current design layout and criteria set out within the Camden Air Quality Planning Guidance[2], the development is classed as a 'major' scheme as the floorspace, which includes the proposed refurbishment and extension is greater than 1000 m^2. The proposed development is in an area of poor air quality as the estimated NO_2 background concentrations based on the Defra background maps exceed 40 µg/m^3 (section 5.2), however the scheme will not introduce sensitive receptors as it is for office accommodation where only the 1-hour objective applies or generate significant air quality impacts as it is a car free development. A 'basic' Air Quality Assessment is therefore required, including an Air Quality Neutral Assessment and a Construction Impact Assessment.

Senior Air Quality officer, Tom Parkes, at LBC was contacted to agree the scope of the assessment. Following email correspondence, the following response was received: '*Your scope of works looks OK but please do not take this as formal approval, as I do not have any background information about the site or nature of the development. We are not resourced to provide bespoke advice ahead of planning application stage, other than through the formal Pre-planning application service: https://www.camden.gov.uk/pre-planning-application-advice*.'

This report assesses air quality impacts associated with the proposed development.

[2] LBC (2021) Camden Planning Guidance Air Quality, January 2021

A glossary of common air quality terminology is provided in Appendix A.

1.2 Scope of Assessment

The development proposals are for the refurbishment of the existing office building and a two-storey extension to increase the overall office space. The proposals would not provide any on-site parking and is therefore classed as a car free development.

A baseline assessment of local air quality has been carried out to determine pollution levels at the Site and assess the sites suitability for commercial development.

The development has been considered against Air Quality Neutral policy set out in London Plan Policy SI-1 Improving Air Quality. The energy demand for the new building has been estimated as 30,657 kWh/annum in relation to heating and hot water. The proposals are for a fully electric energy supply which will be achieved via an electric Heat Pump VRF with heat Recovery heating and cooling system for the provision of all heating and hot water. The development will therefore be air quality neutral in respect of building emissions. As the proposals will also be Car free, with no more than 2-3 deliveries per week the development is also considered to be AQN in respect of transport emissions. No further assessment of the proposals in terms of the air quality neutral policy has therefore been carried out.

An assessment of air quality impacts associated with the construction of the proposed development has been undertaken following the methodology set out within the Institute of Air Quality Management (IAQM) guidance[3].

The report includes plans supplied by Hawkins Brown which have been reproduced from the Design and Access Statement submitted as part of the planning application.

[3] IAQM (January 2014) Guidance on the Assessment of Dust from Demolition and Construction. Version 1.1

2 Site Description

2.1 The Existing Site

The Site is located at 20-24 Kirby Street, in the Hatton Garden Conservation Area approximately 125 m west of Farringdon Station and 400 m northeast of Chancery Lane underground station. The Site is bounded by Kirby Street to the west, St Cross Street to the north and Saffron Hill to the east. The surrounding area comprises a mix of retail, office, and residential uses with a multi storey car park located to the northeast of the Site. The site extends to approximately 0.0514 ha (514 m).

The location of the Site is presented in red in Figure 2.1 and the surrounding land uses are presented Figure 2.2.

Figure 2.1: Location of proposed development site

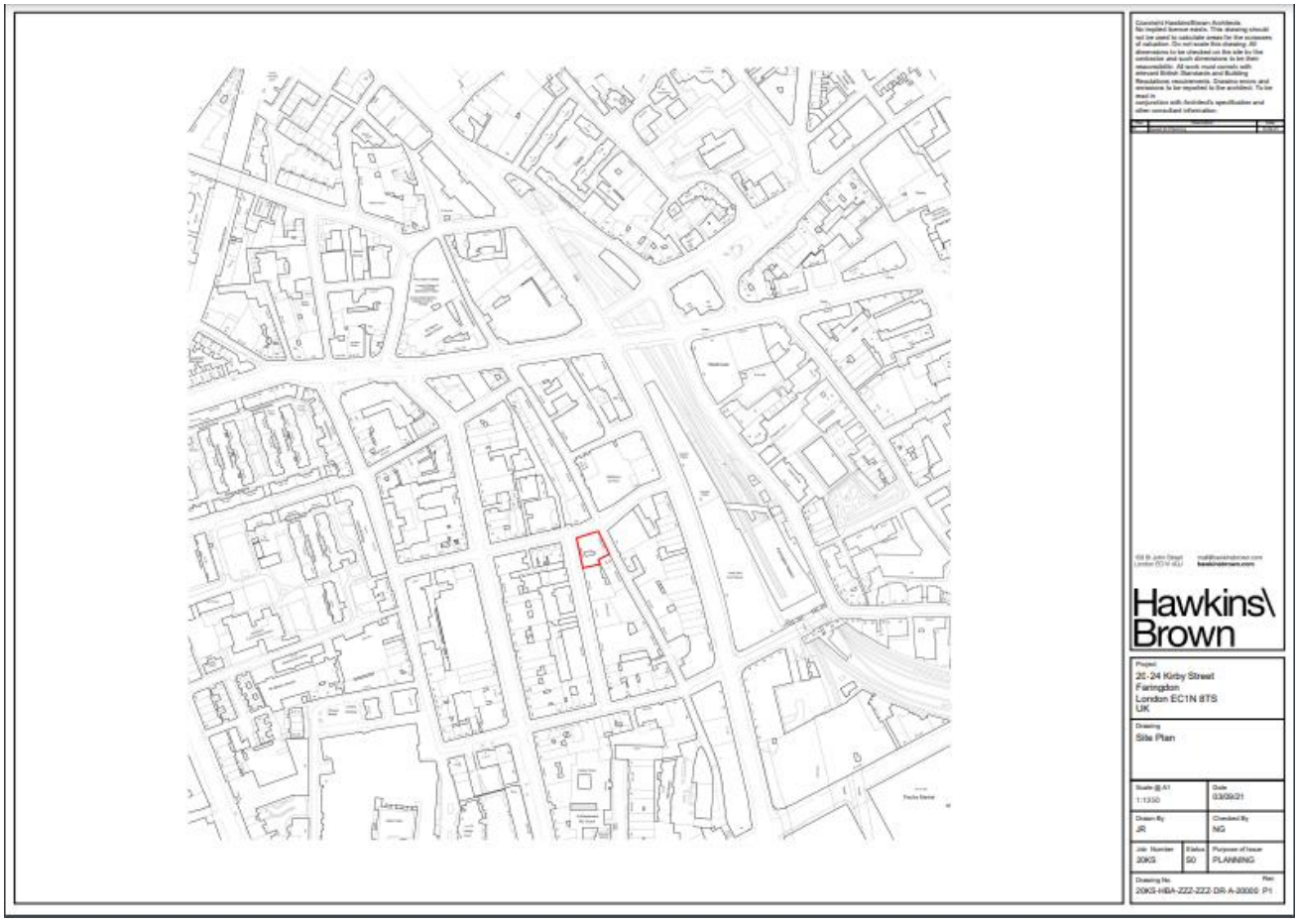


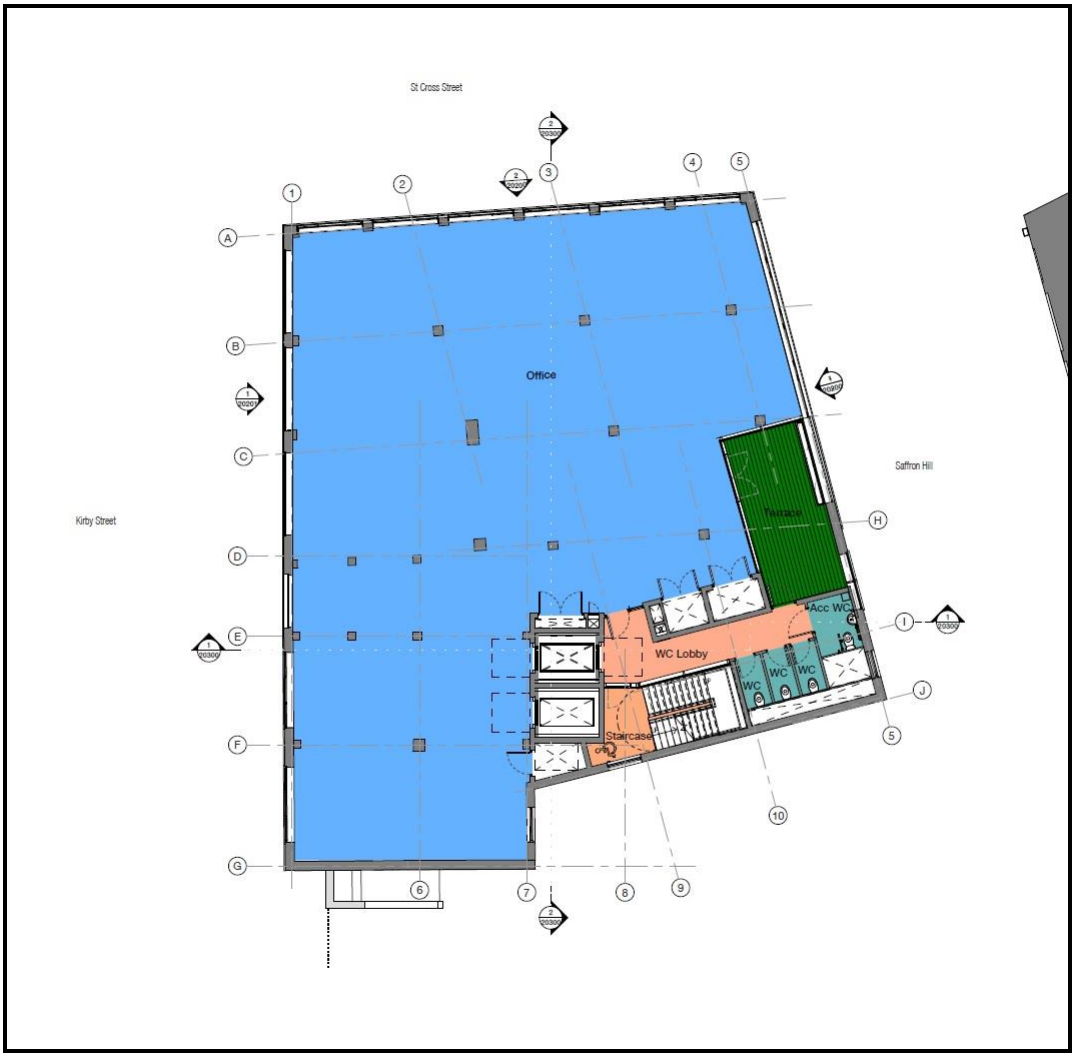
Figure 2.1: Surrounding Land Uses

2.2 Proposed Development

The proposed application is for the demolition of the existing fifth floor of the office building at 20-24 Kirby Street; erection of a new floor extending to the same extent as the fourth floor to create additional office floorspace; creation of affordable jewellery space at lower ground floor level; internal and external alterations; plant and other associated works. The application also includes the provision of 60 double stack cycle racks, lockers and shower cabins.

An indicative layout of the 5th Floor is shown in Figure 2.3.

Figure 2.3: Layout of Proposed New 5th Floor of Development



3 Policy Context

3.1 International Legislation and Policy

The EU Directive 2008/50/EC[4] on ambient air quality and cleaner air for Europe (the CAFE directive) sets out the ambient air quality standards for NO_2 and PM_{10}, to be achieved by 1st January 2010 and 2005 respectively. The Air Quality Standards Regulations 2010[5] implements the requirements of the Directive into UK legislation. The Directive contains a series of limit values for the protection of human health and critical levels for the protection of vegetation. These limit values are legally binding, and the UK may incur infringement action if it does not meet the required objective limits within the agreed time limits. The UK is currently exceeding the objective limits for NO_2 and PM_{10} within London and a number of other air quality zones within the UK.

3.2 National Legislation and Policy

3.2.1 Local Air Quality Management

Part IV of the Environment Act 1995[6], requires the UK Government to publish an Air Quality Strategy and local authorities to review, assess and manage air quality within their areas. This is known as Local Air Quality Management (LAQM). The 2007 Air Quality Strategy[7] establishes the policy for ambient air quality in the UK. It includes the National Air Quality Objectives (NAQOs) for the protection of human health and vegetation for 11 pollutants. Those NAQOs included as part of LAQM are prescribed in the Air Quality (England) Regulations 2000[8] and the Air Quality (Amendment) (England) Regulations 2002[9] . Table 3.1 presents the NAQOs for NO_2 and PM_{10}, the two key pollutants emitted from traffic.

The Defra Local Air Quality Management Policy Guidance (LAQM.PG(16))[10] sets out guidance on the role and responsibilities of local authorities and $PM_{2.5}$. There is no regulatory standard applied to

[4] Directive 2008/50/EC of the European Parliament and of the Council of 21 May 2008 on ambient air quality and cleaner air for Europe
[5] Air Quality Regulations 2010 – Statutory Instrument 2010 No. 1001
[6] Secretary of State The Environment Act 1995 part IV Air Quality HMSO
[7] Department for Environment, Food and Rural Affairs, July 2007, Air Quality Strategy for England, Scotland, Wales and Northern Ireland
[8] The Air Quality (England) Regulations 2000 (SI 2000 No. 928)
[9] The Air Quality (England) (Amendment) Regulations 2002 (SI 2002 No. 3043)
[10] DEFRA (2016) Local Air Quality Management Policy Guidance (PG16) LAQM.PG(16)

the $PM_{2.5}$ role for local authorities in England, however, local authorities are expected to work towards reducing emissions and concentrations of $PM_{2.5}$ in their area.

The 2019 Clean Air Strategy[11] includes a commitment to set a 'new, ambitious, long-term target to reduce people's exposure to $PM_{2.5}$' which the proposed Environment Bill 2019-2021 commits the Secretary of State to setting. Additionally, the Mayor of London has committed to meeting the World Health Organisation (WHO) guidelines of 10 µg/m^3 by 2030[12].

The objective limits for $PM_{2.5}$ is also provided in Table 3.1.

Table 3.1: Relevant Objectives set out in the Air Quality Strategy

Pollutant	Concentrations	Measured As	Date to be Achieved by
Nitrogen Dioxide (NO_2)	200 µg/m^3 not to be exceeded more than 18 times per year	1-hour mean	31 December 2005
	40 µg/m^3	Annual mean	31 December 2005
Particulate Matter (PM_{10})	50 µg/m^3 not to be exceeded more than 35 times per year	24-hour mean	31 December 2004
	40 µg/m^3	Annual mean	31 December 2004
Particulate Matter ($PM_{2.5}$)	25 µg/m^3	Annual Mean	Stage 1 limit value by 2015 – NAQO and EU Limit Value)
	20 µg/m^3	Annual mean	Stage 2 limit value by 2020 – EU Limit Value)

The NAQOs apply to external air where there is relevant exposure to the public over the associated averaging periods within each objective. Guidance is provided within Local Air Quality Management Technical Guidance 2022 (LAQM.TG(22))[13] issued by the Defra for Local Authorities, on where the NAQOs apply as detailed in Table 3.2. The objectives do not apply in workplace locations, to internal air or where people are unlikely to be regularly exposed (i.e. centre of roadways).

It should be noted that the EU Limit Values are numerically the same as the NAQO values but differ in terms of compliance dates, locations where they apply and legal responsibility. The compliance date for the NO_2 Limit Values is 1 January 2010, which is five years later than the date for the NAQO.

[11] Defra (2019) Clean Air Quality Strategy 2019
[12] Mayor of London (2018) London Environment Strategy. May 2018
[13] Defra (2022) Local Air Quality Management. Technical Guidance LAQM.TG(22)

The Limit Values are mandatory, whereas the NAQOs are policy objectives. Local authorities are not required to achieve them but have to work towards their achievement. In addition, the limit Values apply in all locations except where members of the public do not have access and there is no fixed habitation, on factory premises or at industrial installations, and on the carriageway/central reservation of roads except where there is normally pedestrian access.

Table 3.2: Locations Where Air Quality Objectives Apply

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

3.2.2 National Air Quality Plan for Nitrogen Dioxide (NO_2) in the UK

The National Air Quality Plan[14] was written as a joint venture between the Defra and the Department for Transport (DfT) and aims to tackle roadside concentrations of NO_2 in the UK. It

[14] Defra and DfT. (2017). UK plan for tackling roadside nitrogen dioxide concentrations. London: HMSO

includes a number of measures such as those aimed at investing in Ultra Low Emission Vehicles (ULEVs) charging infrastructure, public transport and grants to help local authorities in improving air quality.

The plan requires all local authorities (LAs) in England with areas expected not to meet the Limit Values by 2020 (known as 'air quality hotspots') to develop plans to bring concentrations within these values in "the shortest time possible". These plans are to be reviewed by the government and suggestions included in the plan include actions such as utilising retrofitting technologies, changing road layout and encouraging public transport and ULEV use. Where these approaches are not considered sufficient, the LA may need to consider implementation of a Clean Air Zone (CAZ) which places restrictions on vehicle access to an area and may include charging certain (or all) vehicles or restrictions on the type of vehicle allowed to access an area.

3.2.3 Road to Zero Strategy

The 'Road to Zero' strategy[15] sets out the government's plans to encourage zero emissions vehicles. These include the aim that by 2040 all new cars and vans will have zero tailpipe emissions and by 2050 almost every car will have zero emissions. Measures within the Strategy are aimed at encouraging the uptake of the cleanest vehicles and supporting electric charging infrastructure.

3.2.4 Clean Air Strategy

The Clean Air Strategy[16] sets out policies to lower national emissions of pollutants in order to reduce background pollution and human exposure. It aims to create a strong framework to tackle air pollution and to reduce the number of people living in locations with $PM_{2.5}$ concentrations exceeding 10 µg/m^3 by 50% by 2025.

3.2.5 Control of Dust and Particulates Associated with Construction

Section 79 of the Environmental Protection Act (1990)[17] states that where a statutory nuisance is shown to exist, the local authority must serve an abatement notice. Statutory nuisance is defined as:

[15] HM Government. (2018). Road to Zero Strategy. London: HMSO
[16] Defra. (2019). Clean Air Strategy. London: HMSO
[17] Secretary of State, The Environment Act 1990 HMSO

- *'any dust or other effluvia arising on industrial, trade or business premises and being prejudicial to health or a nuisance', and*
- *'any accumulation or deposit which is prejudicial to health or a nuisance'.*

Failure to comply with an abatement notice is an offence and if necessary, the local authority may abate the nuisance and recover expenses.

In the context of the proposed development, the main potential for nuisance of this nature would arise during the construction phase - potential sources being the clearance, earthworks, construction and landscaping processes.

There are no statutory limit values for dust deposition above which 'nuisance' is deemed to exist - 'nuisance' is a subjective concept and its perception is highly dependent upon the existing conditions and the change which has occurred. However, research has been undertaken by a number of parties to determine community responses to such impacts and correlate these to dust deposition rates. However, impacts remain subjective and statutory limits have yet to be derived.

3.3 Planning Policy

3.3.1 National Planning Policy

The National Planning Policy Framework (NPPF)[18] sets out the Government's planning policies for England and how these are expected to be applied. At the heart of the NPPF is a presumption in favour of sustainable development. It requires Local Plans to be consistent with the principles and policies set out in the NPPF with the objective of contributing to the achievement of sustainable development.

The NPPF states that the planning system has three overarching objectives in achieving sustainable development including a requirement to *'contribute to protecting and enhancing our natural, built and historic environment; including making effective use of land, helping to improve biodiversity, using natural resources prudently, minimising waste and pollution, and mitigating and adapting to climate change, including moving to a low carbon economy.*'

[18] Ministry of Housing, Communities and Local Government: National Planning Policy Framework (July 2021)

Under Section 15: Conserving and Enhancing the Natural Environment, the NPPF (paragraph 174) requires that *'planning policies and decisions should contribute to and enhance the natural local environment by …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.*'

In dealing specifically with air quality the NPPF (paragraph 186) states that *'planning policies and decisions should sustain and contribute towards compliance with relevant limit values or national objectives for pollutants, taking into account the presence of Air Quality Management Areas and Clean Air Zones, and the cumulative impacts from individual sites in local areas. Opportunities to improve air quality or mitigate impacts should be identified, such as through traffic and travel management, and green infrastructure provision and enhancement. So far as possible these opportunities should be considered at the plan-making stage, to ensure a strategic approach and limit the need for issues to be reconsidered when determining individual applications. Planning decisions should ensure that any new development in Air Quality Management Areas and Clean Air Zones is consistent with the local air quality action plan.*'

Paragraph 188 states that *'the focus of planning policies and decisions should be on whether proposed development 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'*.

3.4 Regional Legislation and Policy

3.4.1 The Mayor of London's Air Quality Strategy

The Mayor of London's AQS[19] sets out a series of policies and proposals for the implementation of the UK AQS and for the achievement of the air quality standards and objectives in Greater London. With regards new developments the following policies are of relevance:

[19] Mayor of London (2010) Clearing the Air, The Mayor's Air Quality Strategy, December 2010

Policy '1 - Encouraging smarter choices and sustainable travel': The Mayor will support a shift to public transport, by only supporting developments that generate high levels of trips in locations with good public transport accessibility, by supporting car free developments and encouraging the inclusion of infrastructure to support sustainable travel, such as cycling, electric vehicle recharging points and car clubs.

Policy '6 - Reducing emissions from construction and demolition sites': The London Council's Best Practice guidance will be reviewed and updated, and more vigorously implemented.

Policy '7 - Using the planning process to improve air quality - new developments in London as a minimum shall be 'air quality neutral': The Mayor will encourage boroughs to require emissions assessments to be carried out alongside conventional air quality assessments. Where air quality impacts are predicted to arise from developments these will have to be offset by developer contributions and mitigation measures secured through planning conditions, section 106 agreements or the Community Infrastructure Levy.

Policy '8 - Maximising the air quality benefits of low to zero carbon energy supply': The Mayor will apply emission limits for both PM and NO_x for new biomass boilers and NO_x emission limits for Combined Heat and Power Plant (CHPP). Air quality assessments will be required for all developments proposing biomass boilers or CHPPs and operators will be required to provide evidence yearly to demonstrate compliance with the emission limits.

Policy '9 - Energy efficient buildings': The Mayor will set CO_2 reduction targets for new developments which will be achieved using the Mayor's Energy Hierarchy. These measures will result in reductions of NO_x emissions; and

Policy '10 - Improved air quality in the public realm': The Mayor will encourage the improvement of air quality in the public realm by planting vegetation to trap particulate matter. Through the planning system the Mayor will increase the number of green roofs and living walls across London. Additionally, he will encourage the planting of trees in areas of poor air quality.

3.4.2 The London Plan

The London Plan 2021[20] was published in March 2021. The Plan is the overall Spatial Development Strategy (SDS) for London setting out an integrated economic, environmental, transport and social framework for the development of London over the next 20-25 years. It specifically addresses how development can help support the implementation of the Mayor's Air Quality Strategy and achieve a reduction in pollutant emissions and public exposure to pollution.

Policy SI 1 – Improving Air Quality sets out the following to reduce emissions and exposure across the city:

A Development Plans, through relevant strategic, site-specific and area-based polices, 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 of Part 1, as a minimum:

a) development proposals must be at least Air Quality Neutral

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

[20] Greater London Authority (2021) The London Plan 2021: The Spatial Development Strategy for Greater London, March 2021

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

d) development proposals in Air Quality Focus Areas or that are likely to be used by large numbers of people particularly vulnerable to poor air quality, such as children or older people should demonstrate that design measures have been used to minimise exposure.

C Masterplans and development briefs for large-scale development proposals subject to an Environmental Impact assessment should consider how local air quality can be improved across the area of the proposal as part of an air quality positive approach. To achieve this a statement should be submitted demonstrating:

1) how proposals have considered ways to maximise benefits to local air quality

2) what measures or design features will be put in place to reduce exposure to pollution, and how they 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.

3.4.3 London Environmental Strategy

The London Environmental Strategy considers policies aimed at improving the environment in London, across a number of different areas such as air quality, noise and climate change. There are a number of objectives but notable in relation to air quality is the objective: “for London to have the best air quality of any major world city by 2050, going beyond the legal requirements to protect human health and minimise inequalities.”

Chapter 4 of the Environmental Strategy relates specifically to air quality and identifies a number of key issues to be addressed:

- Achieving legal compliance as quickly as possible.
- Diesel vehicles, especially cars and vans.
- Tackling all sources of pollution.
- Government action.
- Maximising co-benefits between air quality and climate change policies; and
- Further reductions are needed in PM_{10} and $PM_{2.5}$, particularly from transboundary pollution, tyre and brake wear and wood burning.

3.5 Local Legislation and Policy

3.5.1 Camden Local Plan

The Camden Local Plan[21] was adopted in 2017 and sets out the Council’s planning policies for the long-term development of the Borough for the period 2016-2031.

In relation to air quality the guidance includes Policy CC4 Air Quality which states:

‘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

[21] LBC (2017) Camden Local Plan, 2017

development on air quality. Consideration must be taken to the actions identified in the Councils 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.'

3.5.2 Camden's Clean Air Action Plan 2019-2022

The Camden Clean Air Action Plan[22] outlines the action that the Council intends to take to improve air quality in Camden between 2019 and 2022. Measures relating to 'reducing construction emissions' of relevance to this assessment include:

1. Secure additional funding from developers through s.106 agreements to manage and enforce construction impacts.
2. Ensure all major developments sites have a demolition management plan (DMP) and/or a construction management plan (CMP) approved by the air quality officer.
3. Ensure all medium and high-risk sites have real-time particulate monitoring on site and that the information from this monitoring is easily accessible to the public.
5. Produce a construction code of practice for small developments to be used as an informative.
6. Create clean air zones (areas of exclusion for construction vehicles) around schools/hospitals.

7. Improve communications with local communities about the air pollution impact of large construction projects, how impacts will be minimised, and how residents can report concerns.
8. Support the development of community-led Neighbourhood Construction Site Watch groups to assist in monitoring construction sites in line with air quality CMP requirements.
9. Develop and implement a power generator hierarchy for construction sites with the aim of reducing the number of diesel generators.
10. Require cumulative impact assessments for development in order to identify the impact on local air quality and identify methods to reduce impact on local communities.
11. Control construction lorry delivery times through s.106 agreements and/or planning condition to reduce impact on local communities and air quality.
12. Reduce the impact of Council led infrastructure projects by requiring the control mechanisms noted in the Further Information column for all Community Investment Programme development.
13. Enforcement of Non Road Mobile Machinery (NRMM) air quality policies.
14. Monitor air quality for Council transport infrastructure projects to inform the scheme design, evaluate project impact, and enhance future schemes; the support construction industry led initiatives that demonstrate best practice and drive improvement across the sector.

3.6 Air Quality Guidance

3.6.1 DEFRA Technical Guidance

Local authorities are seen to play a particularly important role. Section 82 of the Environment Act 1995 requires every local authority to conduct a review of the air quality from time to time within the authority's area. The recently released DEFRA technical guidance, LAQM.TG(22), describes a new streamlined approach to the Local Air Quality Management (LAQM) regime, whereby every authority has to undertake and submit a single Annual Status Report/Annual Progress Report within

its area, to identify whether the objectives have been or will be achieved at relevant locations by the applicable date. If the objectives are not being met, the authority must declare an Air Quality Management Area (section 83 of the Act) and prepare an action plan (section 84) which identifies measures that will be introduced in pursuit of the objectives.

3.6.2 IAQM Land Use Planning and Development Control: Planning for Air Quality

Institute of Air Quality Management (IAQM) and Environmental Protection UK (EPUK) have published joint guidance on the assessment of air quality impacts for planning purpose. This includes information on when an air quality assessment is required, what should be included in an assessment and criteria for assessing the significance of any impacts. The scope of the operational impact and exposure assessment within this report are based on the guidance set out in this document.

3.6.3 Mayor of London the Control of Dust and Emissions during Construction and Demolition SPG

The Mayor of London has published guidance on assessing the risk of significant effects during construction[23] . The approach is based on guidance set out in the IAQM guidance on assessing impacts from construction and demolition activities [24]. Both guidance documents have therefore been used for this assessment. The methodology sets out an initial approach for identifying the risk magnitude of potential dust sources associated with demolition, construction, earthworks and trackout. This is then used to identify the level of mitigation necessary in order for the impacts to be not significant.

3.6.4 Camden Planning Guidance on Air Quality

The Camden Planning Guidance (CPG) on Air Quality[25] was adopted on 15th January 2021 and provides information on key air quality issues within the borough and supports Local Plan Policy CC4 Air Quality. The guidance sets out a simplified approach to assessing potential impacts on

[23] Mayor of London (2014) The Control of Dust and Emissions During Construction and Demolition SPG
[24] IAQM (June 2016) Guidance on the assessment of dust from demolition and construction Version 1.1
[25] LBC (2021) Camden Planning Guidance on Air Quality, January 2021

local air quality in relation to planning applications and has been used to determine the scope of this assessment.

4 Methodology

4.1 Baseline Assessment

A baseline assessment of air quality in the vicinity of the Site and the surrounding area has been carried out through a review of monitoring data available within the LBC air quality review and assessment reports, most notably the LBC 2021 Air Quality Annual Status Report (ASR)[26]. Additional data has been obtained from the UK Air Information Resource (UK-AIR) background pollution maps[27].

The results of the baseline assessment have been used to determine the suitability of the Site for commercial development and identify whether any mitigation measures are required to reduce exposure.

4.2 Construction Phase

4.2.1 Construction Traffic

During construction of the proposed development, lorries will require access to the Site to deliver and remove materials; earthmoving plant and other mobile machinery will work on site and generators and cranes will also be in operation. These machines produce exhaust emissions; of particular concern are emissions of NO_2 and PM_{10}.

It is anticipated that during the construction phase there would be 10-15 heavy duty vehicles (HDV) accessing the Site in any given day. Criteria set out in the Mayor of London's SPG/ EPUK/IAQM planning guidance indicate that significant impacts on air quality are unlikely to occur where a development results in less than 25 HDV movements per day within an AQMA and less than 100 per day elsewhere. It is therefore anticipated that construction traffic generated by the proposed development would result in a negligible impact on local NO_2 and PM_{10} concentrations and has not been considered any further in this assessment

[26] LBC (2020) Air Quality Annual Status Report for 2019 (ASR), July 2020
[27] https://uk-air.defra.gov.uk/data/laqm-background-home

4.2.2 Construction/Fugitive Dust

Construction phase activities associated with the Proposed Development may result in the generation of fugitive dust emissions (i.e. dust emissions generated by site-specific activities that disperse beyond the construction site boundaries).

If transported beyond the site boundary, dust can have an adverse impact on local air quality. The IAQM has published a guidance document for the assessment of demolition and construction phase impacts[28].The guidance considers the potential for dust nuisance and impacts to human health and ecosystems to occur due to activities carried out during the following stages of construction:

- Demolition (removal of existing structures).
- Earthworks (soil-stripping, ground-levelling, excavation and landscaping).
- Construction (activities involved in the provision of a new structure); and
- Trackout (the transport of dust and dirt from the construction site onto the public road network where it may be deposited and then re-suspended by vehicles using the network).

A qualitative assessment of air quality impacts due to the release of fugitive dust and particulates (PM_{10}) during the construction phase was undertaken in accordance with the methodology detailed in the IAQM guidance.

The assessment takes into account the nature and scale of the activities undertaken for each source and the sensitivity of the area to an increase in dust and PM_{10} levels, thus enabling a level of risk to be assigned. Risks are described in terms of there being a low, medium or high risk of dust impacts.

Once the level of risk has been ascertained, then site specific mitigation proportionate to the level of risk is identified, and the significance of residual effects determined.

A summary of the IAQM assessment methodology is provided in Appendix B.

[28] IAQM (June 2016) Guidance on the assessment of dust from demolition and construction Version 1.1

5 Baseline Assessment

5.1 LBC Air Quality Monitoring

5.1.1 NO_2 Concentrations

LBC currently operates four automatic monitoring stations within the borough recording concentrations of NO_2 and PM_{10}. The closest of these to the Site is an urban background automatic monitoring station in London Bloomsbury (LB) located approximately 1.3 km west northwest of the Site. Details of the monitoring station and NO_2 concentrations recorded since 2015 are provided in Tables 5.1 and 5.2 below[29]. The location of the monitoring site is shown in Figure 5.1.

Table 5.1: NO_2 Concentrations Measured at London Bloomsbury Automatic Site (μgm^{-3})

Site	Classification	Grid Reference	Year					
			2015	2016	2017	2018	2019	2020
LB0 London Bloomsbury	Urban Background	530123, 182014	**48**	**42**	38	36	32	28
Data taken from LBC 2020 Air Quality Annual Status Report (ASR)								

Table 5.2: Number of Exceedences of the Hourly NO_2 Objective Measured at London Bloomsbury

Site	Classification	Grid Reference	Year					
			2015	2016	2017	2018	2019	2020
LB0 London Bloomsbury	Urban Background	530123, 182014	0	0	0	0	0	0
Data taken from LBC 2020 Air Quality Annual Status Report (ASR)								

[29] As a result of the Covid-19 pandemic and associated behavioural changes and measures implemented by the governing authorities (e.g. lockdowns, travel restrictions etc.) measured concentrations during 2020 are not considered to be representative of 'normal' conditions. As such, measured 2020 concentrations are presented for information only, and have not been discussed or given weight in determining the conclusions of this assessment.

The monitoring data shows annual mean NO_2 concentrations to be below the objective limit of 40 µg/m³ at the London Bloomsbury site during all years with the exception of 2015 and 2016. The 1-hour mean objective has also not been exceeded at the site for the monitoring period.

Data recorded at this site shows an overall downward trend in concentrations since 2015.

LBC also operate an extensive network of passive diffusion tubes which monitor NO_2 concentrations across the borough. The closest sites to the proposed development are tubes CA4A adjacent to Euston Road approximately 1.6 km to the northwest; CA6 St Georges Gardens and CA28 St Georges Gardens East both approximately 1.1 km to the northwest of the Site boundary. These are presented in Table 5.3 along with concentrations recorded over the past five years.

In addition to the monitoring undertaken by LBC, diffusion tube monitoring is also undertaken for the Governments High Speed Two Project (HS2)[30]. There are two sites within 900 m of the development Site, and these are also presented in Table 5.3. The location of each site is shown in Figure 5.1.

Diffusion tubes are a passive form of monitoring, which, due to their relative in-expense, allow for a much greater spatial coverage than with automatic monitoring sites. Diffusion tubes are acknowledged as a less accurate method of monitoring ambient air pollutants than automatic monitors, with diffusion tubes over or under estimating concentrations by as much as 30 %. To allow the results to be reliably compared with the AQ Objectives, the data should be bias corrected using factors calculated from a co-location site where both diffusion tubes and an automatic monitor are located in the same location. The data provided in Table 5.3 has been adjusted by LBC and DfT using appropriately derived adjustment factors.

[30] DfT (2019) HS2 Air Quality Annual Report 2019

Table 5.3: NO_2 Diffusion Tube Monitoring Results 2015-2019 (µg/m³)

Site	Grid Ref	Classification	Year					
			2015	2016	2017	2018	2019	2020
CA4A Euston Road (new)	530093, 182792	Kerbside	-	-	-	-	**69.1**	**52.4**
CA6 St George's Gardens	530430, 182430	Urban Background	35.8	31.3	34.8[a]	26.7	24.7	-
CA28 St George's Gardens East	530512, 182511	Urban Background	-	-	-	-	27.7	21.9
HS2 Diffusion Tube Results								
HS2 – 000020BP2 Junction of Gray's Inn Road and Holborn	530744, 181308	Roadside	-	**52.0**	**46.8**	**48.7**	**43.8**	**n/a**
HS2 – 000020BNN Lincoln's Inn Fields	531149, 181616	Background	-	38.6	36.9	35.6	31.3	n/a

Data in bold shows an exceedance of the annual mean objective

[a] data has been annualised by LBC as valid data capture < 75%

Data taken from LBC 2020 Air Quality Annual Status Report (ASR) & DfT HS2 Air Quality Report 2019

The monitoring data presented in Table 5.3 shows annual mean NO_2 concentrations above the objective limit of 40µg/m^3 at site CA4A Euston Road and the HS2 site at the junction of Gray's Inn Road and Holborn.

The three monitoring sites presented in Table 5.3 with long-term data show an overall downward trend in NO_2 concentrations since 2015.

Diffusion tubes cannot monitor short-term NO_2 concentrations, however, research[31] has concluded that exceedances of the 1-hour mean objective are generally unlikely to occur where annual mean concentrations do not exceed 60 µg/m^3. Based on monitoring data presented in Table 5.3, it is

[31] D Laxen and B Marner: Analysis of the relationship between 1-hour and annual mean nitrogen dioxide at UK roadside and kerbside monitoring sites (July 2003).

unlikely that the short-term objective is being exceeded at all locations except for tube CA4A adjacent to Euston Road.

There is also a NO_2 diffusion tube site within the neighbouring London Borough of Islington (LBI) located at Roseberry Avenue (BIS), which is approximately 0.7 km to the north of the development Site. The nearest City of London sites are at Citigen (Citigen), approximately 0.3 km to the southeast; West Poultry Avenue (T19), approximately 0.374 km to the southeast; The Fable (T20), approximately 0.376 to the south southeast and Goldman Sachs, Shoe Lane (Goldman) approximately 0.4 km to the south southwest.

Details of these diffusion tube sites along with data recorded since 2015 are presented in Table 5.4

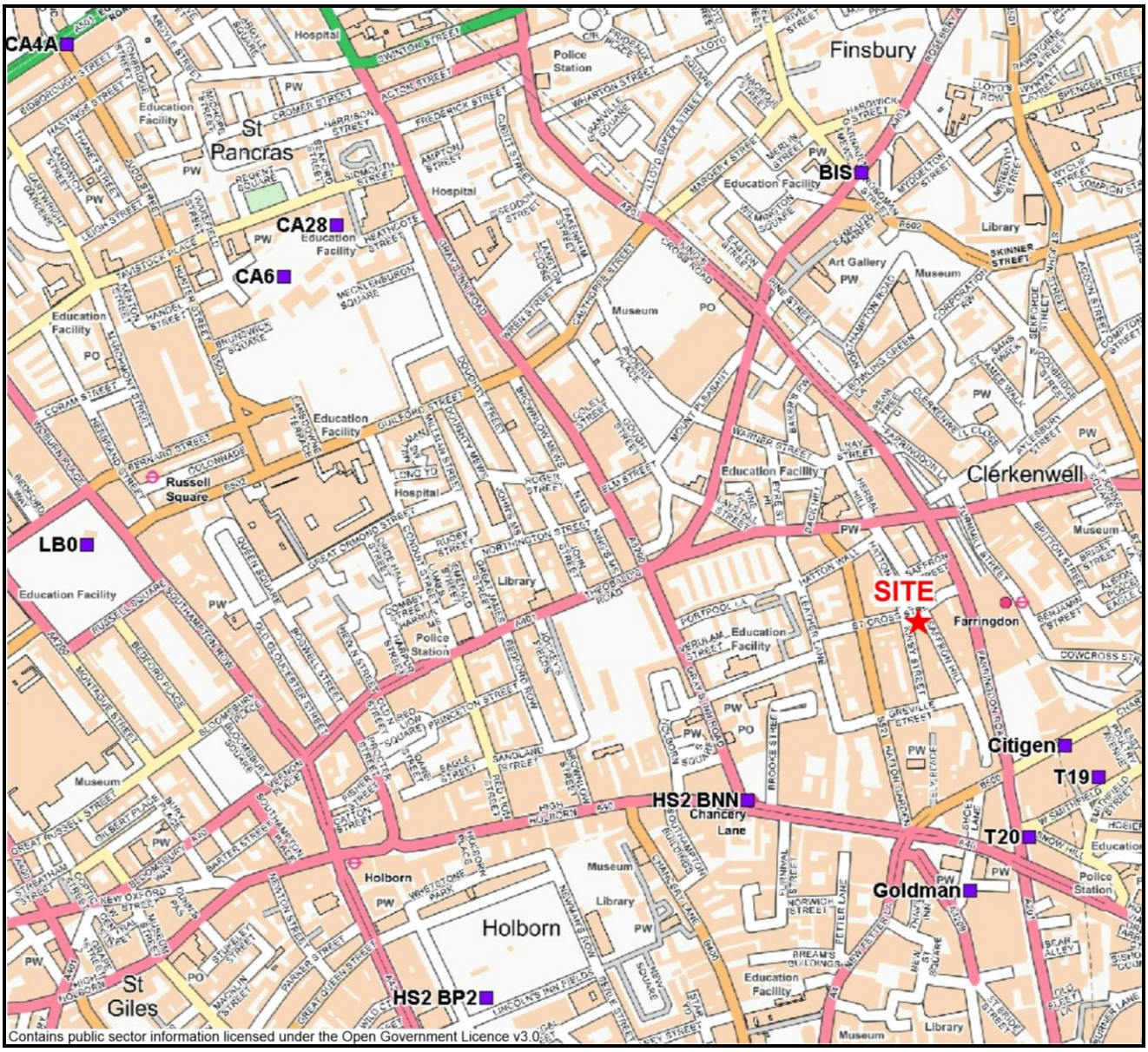
Table 5.4: NO_2 Diffusion Tube Monitoring Results 2015-2020 within Neighbouring Boroughs (µg/m³)

Site	Grid Ref	Classification	Year					
			2015	2016	2017	2018	2019	2020
London Borough of Islington								
BIS005/02 Roseberry Avenue	531327, 182592	Roadside	**62**	**62**	**54**	**51**	44	31
City of London								
Citigen	531642, 181701	Roadside	-	-	-	-	-	30
T19 West Poultry Avenue	531695, 181651	Kerbside	-	-	**67**	**51**	38	30
T20 The Fable	531586, 181558	Kerbside	-	-	**67**	**58**	**51**	38
Goldman Sachs Shoe Lane	531494, 181475	Roadside	-	-	-	-	-	24
Data in bold shows an exceedance of the annual mean objective Data taken from LBI ASR 2020 and City of London ASR July 2021								

The data presented in Table 5.4 shows annual mean NO_2 concentrations consistently exceeding the annual mean objective of 40 µg/m^3 at the LBI Roseberry, T19, West Poultry Avenue and T20 The

Fable monitoring sites. It is likely that that NO_2 short term objective limit was also exceeded at Roseberry Avenue during 2015 and 2016 and West Poultry Avenue and The Fable during 2017. However, due to COVID-19 pandemic traffic emissions were severely suppressed at all four City of London sites during 2020, resulting in significant reductions in NO_2 concentrations. Data for 2020 should therefore be treated with caution and has been provided for information only and not used to determine appropriate baseline air quality.

Figure 5.1: Location of Monitoring Sites



5.1.2 PM Concentrations

LBC monitor PM_{10} at four locations within the borough. Monitoring data at London Bloomsbury, which is the closest site, are set out in Tables 5.5 and 5.6.

$PM_{2.5}$ is also monitored at the London Bloomsbury site and is presented in Table 5.7.

Table 5.5: Annual Average PM_{10} Concentrations Measured at London Bloomsbury (μgm^{-3})

Site	Classification	Year					
		2015	2016	2017	2018	2019	2020
BL0 London Bloomsbury	Urban Background	22	20	19	17	18	16

The data set out in Table 5.5 shows annual mean PM_{10} concentrations below the annual mean objective of 40 $\mu g/m^3$ for all years since 2015 at the London Bloomsbury site. The data indicates no significant upward or downward trend during the monitoring period

Table 5.6: Number of Exceedances of the 24-hour PM_{10} Objective Measured at London Bloomsbury (μgm^{-3})

Site	Classification	Year					
		2015	2016	2017	2018	2019	2020
BL0 London Bloomsbury	Urban Background	**6**	9	6	1	9	4

Exceedances of the 24-hour objective has been recorded at the site, (Table 5.6) however, the objective allows for up to 35 exceedances of the limit in any given year, therefore the objective has been met during all monitoring years presented at the London Bloomsbury site.

Table 5.7: Annual Average $PM_{2.5}$ Concentrations Measured at London Bloomsbury (μgm^{-3})

Site	Classification	Year					
		2015	2016	2017	2018	2019	2020
BL0 London Bloomsbury	Urban Background	11	12	13	10	11	9

Data set out in Table 5.7 shows annual mean $PM_{2.5}$ concentrations below the NAQO objective limit of 25 µg/m^3 at the London Bloomsbury site. However, concentrations are exceeding the WHO guideline limit of 10 µg/m^3.

5.2 Defra Background Maps

Additional information on estimated background pollutant concentrations has been obtained from the Defra background maps provided on the UK-AIR, the Air Quality Information Resource (http://uk-air.defra.gov.uk/). Estimated air pollution concentrations for oxides of nitrogen (NO_x), NO_2, PM_{10} and $PM_{2.5}$ have been extracted from the 2018 background pollution maps for the UK, which were published in August 2020. These maps are available in 1 km x 1 km grid squares and provide an estimate of concentrations between 2018 and 2030. The average concentrations for the grid square representing the Site have been extracted for the 2019 base year. The data is provided in Table 5.2.

The NO_x and PM_{10} background maps are provided not only as total concentrations but are also broken down into sector contributions (i.e. motorways and rail). However, as this assessment is considering the impact of the proposed development on existing air quality, background concentrations from all sources should be considered. The data presented in Table 5.7 provides total background concentrations of both pollutants.

Table 5.7: Annual Mean Background Air Pollution Concentrations in 2019

Location (OS Grid Squares)	Annual mean concentrations (µgm^{-3})		
	Nitrogen dioxide	PM_{10}	$PM_{2.5}$
531500, 181500	43.4	19.6	12.8

The data indicates that existing background concentrations are currently exceeding the NO_2 annual mean objective limit of 40 µg/m³ but meeting the PM_{10} and $PM_{2.5}$ annual mean NAQO objectives in the vicinity of the Site. It is noted that $PM_{2.5}$ concentrations are exceeding the WHO 10 µg/m^3 guideline limit.

5.3 Air Quality at the Development Site

The proposed development would not provide any residential accommodation as the proposed refurbishment and extension would be for employment (office) use. Due to the transient nature of users of offices, the annual mean and 24-hour objective limits do not apply at places of work (Table 3.2). However, the shorter-term objective limits such as the 1-hour NO_2 objective are considered relevant to the Site. Exposure at the Site should therefore be considered in relation to the 1-hour NO_2 objective but not in relation to the PM objective limits.

Site T20 is the closest monitoring site to Kirby Street. It is located within a few meters of the A201 Farringdon Road. The Site is set back approximately 66 m to the west of the A201 Farringdon Road. NO_2 concentrations at the Site are therefore expected to be lower than concentrations recorded at monitoring site T20. Data recorded at the site exceeded 60 µg/m^3 in 2017, however concentrations have subsequently declined to an annual mean of 51 µg/m^3 recorded in 2019. This would indicate that short-term NO_2 concentrations are currently meeting the 1-hour objective adjacent to the A201. Given the separation distance between the Site and the A201 and the continuing downward trend in NO_2 concentrations it is concluded, based on professional judgement, that short-term NO_2 concentrations are below the 1-hour objective limit at the Site and the location is suitable for the proposed commercial use as office accommodation.

6 Construction Assessment

6.1 Assessing the Risk of Dust Effects

6.1.1 Site and Surroundings

A summary of the proposed development is provided in Section 2 of this report.

The Site covers an area of approximately 514 m^2. A review of surrounding land uses shows that the nearest residential properties are within 20 m to the east, west and northwest of the Site boundary. An assessment of construction related impacts in relation to human receptors is therefore considered necessary.

Significant impacts on ecologically sensitive receptors are unlikely to occur beyond 50 m from any construction activities. A review of data held on the Defra MAGIC website[32] shows no sites designated as important for wildlife within 50 m of the Site therefore impacts on ecological receptors has not been considered any further within this assessment.

A review of background data published by Defra within the 2019 background maps, indicates background concentrations at the Site in the region of 19-20 µg/m^3, at 50% of the annual mean objective. It is therefore expected, based on professional judgement, that concentrations at roadside locations are unlikely to be higher than 24 µg/m^3, making the surrounding area low in sensitivity to human health impacts.

The precise behaviour of the dust, its residence time in the atmosphere, and the distance it may travel before being deposited would depend upon a number of factors. These include wind direction and strength, local topography and the presence of intervening structures (buildings, etc.) that may intercept dust before it reaches sensitive locations. Furthermore, dust would be naturally suppressed by rainfall.

A windrose from the London City Airport Meteorological Station for 2020 is provided below in Figure 6.1, which shows that the prevailing wind is predominantly from the west southwest. Receptors located to the east northeast of the Site are therefore most at risk of experiencing impacts, which

[32] http://magic.defra.gov.uk/

includes the residential accommodation at De Vinci House 44 Saffron Hill which would be particularly sensitive to dust effects.

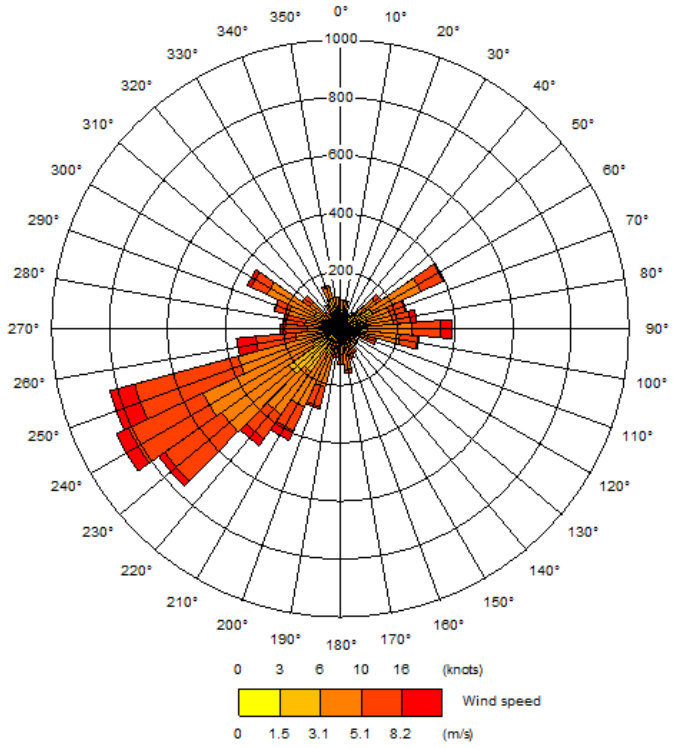


Figure 6.1: Windrose from London City Airport Meteorological Site (2020)

6.1.2 Risk Assessment of Dust Impacts

Defining the Dust Emission Magnitude

With reference to the criteria detailed in Appendix B, the dust emission magnitude for each of the categories demolition, earthworks, construction and trackout have been determined. These have been summarised in Table 6.1.

Table 6.1: Dust Emission Magnitude for each Activity

Activity	Criteria	Magnitude
Demolition	The fifth floor will be demolished <20,000 m^3	Small
Earthworks	Site area approx. 514 m^2, no earthwork activities as the lower floors would remain and be refurbished	n/a
Construction	Total build volume between <25,000 m^3, brick and stone	Small
Trackout	10 – 15 HDV per day	Medium

Sensitivity of Surrounding Area

Using the criteria set out in Tables B1 to B3, Appendix B, the sensitivity of the surrounding area to impacts from dust emissions has been determined and are set out in Table 6.2.

Dust Soiling

The nearest residential properties are located within 20 m to the east, west and northeast of the Site and there is an NCP car park with 15-65 m to the northeast, all of which would be of high sensitivity to dust effects. There are also a number of offices/retail premises to the north, south, east and northeast within 0 – 50 m. These would be of medium sensitivity to dust effects. The overall sensitivity of the surrounding area is classed as 'high' in relation to dust soiling.

It is expected that there will be between 10-15 HDV (>3.5t) movements per day during the construction phase which are expected to travel to and from the Site along St Cross Street and the surrounding road network. As a general guide, significant impacts from trackout may occur up to 500 m from large sites, 250 m from medium sites and 50 m from small sites, as measured from the site exit. There are more than 10 residential properties within 20 m of the roadside within 50 m of the Site along the adjacent road network. The sensitivity of the area to dust soiling effects from trackout is therefore considered to be high.

PM_{10} Effects

As previously discussed, annual mean PM_{10} concentrations in the vicinity of the Site are expected to be below 24 µg/m^3. Based on the proximity of sensitive receptors to the site boundary and the local concentrations of PM_{10} the sensitivity of the surrounding area is considered to be low with regards human health impacts.

Table 6.2: Sensitivity of Surrounding Area

Source	Dust Soiling	Human health
Demolition	High	Low
Earthworks	High	Low
Construction	High	Low
Trackout	High	Low

Defining the Risk of Impacts

The dust emission magnitude as set out in Table 6.1 is combined with the sensitivity of the area (Table 6.2) to determine the risk of both dust soiling and human health impacts, assuming no mitigation measures applied at site. The risk of impacts associated with each activity is provided in Table 6.3 below and has been used to identify site-specific mitigation measures, which are discussed in Section 6.2 and set out in Appendix C.

Table 6.3: Summary of Risk Effects to Define Site Specific Mitigation

Source	Dust Soiling	Human health
Demolition	Medium Risk	Negligible Risk
Earthworks	n/a	Negligible Risk
Construction	Low Risk	Negligible Risk
Trackout	Medium Risk	Low Risk

6.2 Determining Appropriate Mitigation

The control of dust emissions from construction site activities relies upon management provisions and mitigation techniques to reduce emissions of dust and limit dispersion. Where dust emission controls have been used effectively, large-scale operations have been successfully undertaken without impacts to nearby properties.

An overall medium risk of impacts is predicted at adjacent receptors during construction of the proposed development. Appropriate mitigation measures for the Site have been identified following the IAQM guidance and based on the risk effects presented in Table 6.3. It is recommended that the measures set out in Appendix C are incorporated into a DMP and approved by prior to commencement of any work on site.

Based on the risk effects identified during each of the four types of activities and following implementation of the recommended mitigation measures, the significance of residual impacts during construction of the proposed development will be **negligible.**

7 Conclusion

Encon Associates were commissioned by Colgold Limited (the 'Client') to carry out an air quality assessment in connection with the proposed refurbishment and extension of the existing office building at 20-24 Kirby Street. London (the 'Site').

It is inevitable that with any development, demolition and construction activities will cause some disturbance to those nearby. Dust arising from most construction activities tends to be of a coarse nature, which through dispersion by the wind can lead to soiling of property including windows, cars, external paintwork and laundry. However, as well as giving rise to annoyance due to soiling of surfaces from dust emissions, there is evidence of major construction activities causing increases in long term PM_{10} concentrations and in the number of days exceeding the short term PM_{10} objective of 50 μgm^{-3}.

The IAQM guidance on assessing impacts on air quality from construction activities and determining the likely significance has been used to determine the risk of impacts occurring during the construction of the development and to identify appropriate mitigation measures to be implemented on site to reduce dust emissions and associated impacts.

Due to the proximity of nearby residential receptors the Site is considered to have a medium risk of impacts with regards to dust soiling during demolition and trackout and a low risk of impacts with regards to earthworks and construction. The site is considered to have a low risk with regards to PM_{10} concentrations. However, following the implementation of appropriate mitigation measures impacts associated with the construction of the development will be negligible.

The baseline assessment has concluded that pollution levels at the Site are currently meeting the relevant air quality objective limits for NO_2, PM_{10} and $PM_{2.5}$. The development proposals would not introduce new exposure into a location where pollutant concentrations are exceeding the relevant

air quality objectives. The impact of the proposals in terms of new exposure are therefore considered to be negligible.

Based on the results of this assessment air quality does not pose a constraint to development of the Site for the proposed use.

Appendix A
Glossary of Terminology

Term	Definition
Accuracy	A measure of how well a set of data fits the true value.
Air quality objective	Policy target generally expressed as a maximum ambient concentration to be achieved, either without exception or with a permitted number of exceedences within a specific timescale (see also air quality standard).
Air quality standard	The concentrations of pollutants in the atmosphere which can broadly be taken to achieve a certain level of environmental quality. The standards are based on the assessment of the effects of each pollutant on human health including the effects on sensitive sub groups (see also air quality objective).
Ambient air	Outdoor air in the troposphere, excluding workplace air.
Annual mean	The average (mean) of the concentrations measured for each pollutant for one year. Usually this is for a calendar year, but some species are reported for the period April to March, known as a pollution year. This period avoids splitting winter season between 2 years, which is useful for pollutants that have higher concentrations during the winter months.
AQMA	Air Quality Management Area.
DEFRA	Department for Environment, Food and Rural Affairs.
Exceedance	A period of time where the concentrations of a pollutant is greater than, or equal to, the appropriate air quality standard.
Fugitive emissions	Emissions arising from the passage of vehicles that do not arise from the exhaust system.
LAQM	Local Air Quality Management.
NO	Nitrogen monoxide, a.k.a. nitric oxide.
NO_2	Nitrogen dioxide.
NO_x	Nitrogen oxides.
O_3	Ozone.
Percentile	The percentage of results below a given value.
PM_{10}	Particulate matter with an aerodynamic diameter of less than 10 micrometres.
Ratification (Monitoring)	Involves a critical review of all information relating to a data set, in order to amend or reject the data. When the data have been ratified they represent the final data to be used (see also validation).
μgm^{-3} micrograms per cubic metre	A measure of concentration in terms of mass per unit volume. A concentration of $1ug/m^3$ means that one cubic metre of air contains one microgram (millionth of a gram) of pollutant.
UKAS	United Kingdom Accreditation Service.
Uncertainty	A measure, associated with the result of a measurement, which characterizes the range of values within which the true value is expected to lie. Uncertainty is usually expressed as the range within which the true value is expected to lie with a 95% probability, where standard statistical and other procedures have been used to evaluate this figure. Uncertainty is more clearly defined than the

	closely related parameter 'accuracy', and has replaced it on recent European legislation.
USA	Updating and Screening Assessment.
Validation (modelling)	Refers to the general comparison of modelled results against monitoring data carried out by model developers.
Validation (monitoring)	Screening monitoring data by visual examination to check for spurious and unusual measurements (see also ratification).
Verification (modelling)	Comparison of modelled results versus any local monitoring data at relevant locations.

Appendix B
IAQM Construction Impact Assessment Procedure

In order to assess the potential impacts, the activities on construction sites are divided into four categories. These are:

- demolition (removal of existing structures).
- earthworks (soil-stripping, ground-levelling, excavation and landscaping).
- construction (activities involved in the provision of a new structure); and
- trackout (the transport of dust and dirt from the construction site onto the public road network where it may be deposited and then re-suspended by vehicles using the network).

For each activity, the risk of dust annoyance, health and ecological impact is determined using three risk categories: low, medium and high risk. The risk category may be different for each of the four activities. The risk magnitude identified for each of the construction activities is then compared to the number of sensitive receptors in the near vicinity of the site in order to determine the risks posed by the construction activities to these receptors.

Step 1: Screen the Need for an Assessment

The first step is to screen the requirement for a more detailed assessment. An assessment is required where there is:

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

Step 2A: Define the Potential Dust Emission Magnitude

This is based on the scale of the anticipated works and the proximity of nearby receptors. The risk is classified as small, medium or large for each of the four categories.

Demolition: The potential dust emission classes for demolition are:

- Large: Total building volume >50,000m^3, potentially dusty construction material (e.g. Concrete), on site crushing and screening, demolition activities >20m above ground level.
- Medium: total building volume 20,000m^3 – 50,000m^3, potentially dusty construction material, demolition activities 10-20 m above ground level; and
- Small: total building volume <20,000m^3, construction material with low potential for dust release (e.g. metal cladding or timber), demolition activities <10m above ground, demolition during wetter months.

Earthworks: This involves excavating material, haulage, tipping and stockpiling. The potential dust emission classes for earthworks are:

- Large: Total site area >10,000m^2, potentially dusty soil type (e.g. clay, which will be prone to suspension when dry due to small particle size), >10 heavy earth moving vehicles active at any one time, formation of bunds >8 m in height, total material moved >100,000 tonnes.
- Medium: Total site area 2,500 m^2 – 10,000m^2, moderately dusty soil (e.g. silt), 5 – 10 heavy earth moving vehicles active at any one time, formation of bunds 4m – 8m in height, total material moved 20,000 tonnes- 100,000 tonnes; and
- Small: Total site area <2,500m^2, soil type with large grain size (e.g. sand), <5 heavy earth moving vehicles active at any one time, formation of bunds <4 m in height, total material moved <20,000 tonnes, earthworks during wetter months.

Construction: The important issues here when determining the potential dust emission magnitude include the size of the building(s)/infrastructure, method of construction, construction materials, and duration of build. The categories are:

- Large: Total building volume >100,000m^3, on site concrete batching, sandblasting.
- Medium: Total building volume 25,000m^3 – 100,000m^3, potentially dusty construction material (e.g. concrete), on site concrete batching; and
- Small: Total building volume <25,000m^3, construction material with low potential for dust release (e.g. metal cladding or timber).

Trackout: The risk of impacts occurring during trackout is predominantly dependent on the number of vehicles accessing the Site on a daily basis. However, vehicle size and speed, the duration of activities and local geology are also factors which are used to determine the emission class of the Site as a result of trackout. The categories are:

- Large: >50 HDV (>3.5t) outward movements in any one day, potentially dusty surface material (e.g. high clay content), unpaved road length > 100m.
- Medium: 10-50 HDV (>3.5t) outward movements in any one day, moderately dusty surface material (e.g. high clay content, unpaved road length 50-100m; and
- Small: <10 HDV (>3.5t) outward movements in any one day, surface material with low potential for dust release, unpaved road length >50m.

Step 2B: Defining the Sensitivity of the Area

The sensitivity of the area is defined for dust soiling, human health (PM_{10}) and ecological receptors. The sensitivity of the area takes into account the following factors:

- the specific sensitivities of receptors in the area.
- the proximity and number of receptors.
- in the case of PM_{10}, the local background concentration; and
- site specific factors, such as whether there are natural shelters, such as trees, to reduce the risk of wind-blown dust.

Table B1 is used to define the sensitivity of different types of receptors to dust soiling, health effects and ecological effects.

Based on the sensitivities assigned to the different receptors surrounding the site and numbers of receptors within certain distances of the site, a sensitivity classification can be defined for each. Tables B2 to B4 indicate the criteria used to determine the sensitivity of the area to dust soiling, human health and ecological impacts.

Table B1: Examples of Factors Defining Sensitivity of an Area			
Sensitivity of Area	**Dust Soiling**	**Human Receptors**	**Ecological Receptors**
High	Users can reasonably expect enjoyment of a high level of amenity The appearance, aesthetics or value of their property would be diminished by soiling' The people or property would reasonably be expected to be present continuously, or at least regularly for extended periods, as part of the normal pattern of use of the land. E.g. dwellings, museums and other important collections, medium and long term car parks and car showrooms.	10 – 100 dwellings within 20 m of site. Local PM_{10} concentrations close to the objective (e.g. annual mean 36 -40 µg/m^3). E.g. residential properties, hospitals, schools and residential care homes.	Locations with an international or national designation and the designated features may be affected by dust soiling. Locations where there is a community of a particularly dust sensitive species such as vascular species included in the Red List for Great Britain. E.g. A Special Area of Conservation (SAC).
Medium	Users would expect to enjoy a reasonable level of amenity, but would not reasonably expect to enjoy the same level of amenity as in their home. The appearance, aesthetics or value of their property could be diminished by soiling The people or property wouldn't reasonably be expected to be present here continuously or regularly for extended periods as part of the normal pattern of use of the land. E.g. parks and places of work.	Less than 10 receptors within 20 m. Local PM_{10} concentrations below the objective (e.g. annual mean 30-36 µg/m^3). E.g. office and shop workers but will generally not include workers occupationally exposed to PM_{10} as protection is covered by the Health and Safety at Work legislation.	Locations where there is a particularly important plant species, where its dust sensitivity is uncertain or unknown. Locations with a national designation where the features may be affected by dust deposition E.g. A Site of Special Scientific Interest (SSSI) with dust sensitive features.
Low	The enjoyment of amenity would not reasonably be expected. Property would not reasonably be expected to be diminished in appearance, aesthetics or value by soiling. There is transient exposure, where the people or property would reasonably be expected to be present only for limited periods of time as part of the normal pattern of use of the	Locations where human exposure is transient. No receptors within 20 m. Local PM_{10} concentrations well below the objectives (less than 75%). E.g. public footpaths, playing fields, parks and shopping streets.	Locations with a local designation where the features may be affected by dust deposition. E.g. Local Nature Reserve with dust sensitive features.

Table B1: Examples of Factors Defining Sensitivity of an Area			
Sensitivity of Area	**Dust Soiling**	**Human Receptors**	**Ecological Receptors**
	land. E.g. playing fields, farmland unless commercially sensitive horticultural, footpaths, short lived car [parks and roads.		

Table B2: Sensitivity of the Area to Dust Soiling on People and Property					
Receptor Sensitivity	**Number of Receptors**	**Distance from the Source (m)**			
		<20	**<50**	**<100**	**<350**
High	>100	High	High	Medium	Low
	10-100	High	Medium	Low	Low
	1-10	Medium	Low	Low	Low
Medium	>1	Medium	Low	Low	Low
Low	>1	Low	Low	Low	Low

Table B3: Sensitivity of the Area to Human Health Impacts							
Receptor Sensitivity	**Annual Mean PM_{10} Concentration**	**Number of Receptors**	**Distance from Source (m)**				
			<20	**<50**	**<100**	**<200**	**<350**
High	>32 µg/m^3	>100	High	High	High	Medium	Low
		10-100	High	High	Medium	Low	Low
		1-10	High	Medium	Low	Low	Low
	28-32 µg/m^3	>100	High	High	Medium	Low	Low
		10-100	High	Medium	Low	Low	Low
		1-10	High	Medium	Low	Low	Low
	24-28 µg/m^3	>100	High	Medium	Low	Low	Low
		10-100	High	Medium	Low	Low	Low
		1-10	Medium	Low	Low	Low	Low
	<24 µg/m^3	>100	Medium	Low	Low	Low	Low
		10-100	Low	Low	Low	Low	Low
		1-10	Low	Low	Low	Low	Low
Medium	>32 µg/m^3	>10	High	Medium	Low	Low	Low

Table B3: Sensitivity of the Area to Human Health Impacts							
Receptor Sensitivity	**Annual Mean PM_{10} Concentration**	**Number of Receptors**	**Distance from Source (m)**				
			<20	**<50**	**<100**	**<200**	**<350**
		1-10	Medium	Low	Low	Low	Low
	28-32 µg/m^3	>10	Medium	Low	Low	Low	Low
		1-10	Low	Low	Low	Low	Low
	24-28 µg/m^3	>10	Low	Low	Low	Low	Low
		1-10	Low	Low	Low	Low	Low
	<24 µg/m^3	>10	Low	Low	Low	Low	Low
		1-10	Low	Low	Low	Low	Low
Low	-	>1	Low	Low	Low	Low	Low

Table B4: Sensitivity of the Area to Ecological Impacts		
Receptor Sensitivity	**Distance from the Source (m)**	
	<20	**<50**
High	High	Medium
Medium	Medium	Low
Low	Low	Low

Define the Risk of Impacts

The final step is to combine the dust emission magnitude determined in step 2A with the sensitivity of the area determined in step 2B to determine the risk of impacts with no mitigation applied. Tables B5 to B7 indicate the method used to assign the level of risk for each construction activity. The identified level of risk is then used to determine measures for inclusion within a site-specific Construction Management Plan (CMP) aimed at reducing dust emissions and hence reducing the impact of the construction phase on nearby receptors. The mitigation measures are drawn from detailed mitigation set out within the IAQM guidance document.

Table B5: Risk of Dust Impacts from Demolition			
Sensitivity of Area	**Large**	**Medium**	**Small**
High	High Risk	Medium Risk	Medium Risk
Medium	High Risk	Medium Risk	Low Risk
Low	Medium Risk	Low Risk	Negligible

Table B6: Risk of Dust Impacts from Earthworks/ Construction			
Sensitivity of Area	**Large**	**Medium**	**Small**
High	High Risk	Medium Risk	Low Risk
Medium	Medium Risk	Medium Risk	Low Risk
Low	Low Risk	Low Risk	Negligible

Table B7: Risk of Dust Impacts from Trackout			
Sensitivity of Area	**Large**	**Medium**	**Small**
High	High Risk	Medium Risk	Low Risk
Medium	Medium Risk	Low Risk	Negligible
Low	Low Risk	Low Risk	Negligible

Appendix C
Construction Mitigation Measures

It is recommended that the following measures are incorporated into a DMP and approved by LBC prior to commencement of any work on site. The measures set out below summaries the measures set out within the IAQM guidance

This guidance should be read in conjunction with this report to obtain full details of all the measures that should be applied on site.

- display the name and contact details of the person accountable for air quality and dust issues on the site boundary (i.e. the environment manager/engineer or site manager).
- display the head or regional office contact information on the site boundary.
- record all dust and air quality complaints, identify cause, take appropriate measures to reduce emissions in a timely manner and record the measures taken.
- make the complaints log available to the local authority when asked.
- record any exceptional incidents that cause dust and/or air emissions, either on- or off- site and the action taken to resolve the situation in the log book.
- carry out regular site inspections to monitor compliance with the DMP, record inspection results and make inspection log available to LBC when asked.
- increase frequency of site inspection by the person accountable for air quality and dust issues on site when activities with a high potential to produce dust are being carried out and during prolonged periods of dry or windy conditions.
- plan site layout so that machinery and dust causing activities are located away from receptors, as far as is possible.
- erect solid screens or barriers around dusty activities or the site boundary that are at least as high as any stockpiles.
- fully enclose site or specific operations where there is a high potential for dust production and the site is active for an extensive period.

- avoid site runoff of water or mud.
- keep site fencing, barriers and scaffolding clean using wet methods.
- remove materials that have a high potential to produce dust from site as soon as possible, unless being re-used on site. If they are being re-used cover as described below.
- cover, seed or fence stockpiles to prevent wind whipping.
- ensure all on-road vehicles comply with the requirements of the London Emission Zone.
- ensure all non-road machinery (NRMM) comply with the standards set within this guidance.
- ensure all vehicles switch off engines when stationary - no idling vehicles.
- avoid the use of diesel or petrol powered generators and use mains electricity or battery powered equipment where practicable.
- produce a Construction Logistics Plan to manage the sustainable delivery of goods and materials.
- implement a Travel Pan that supports and encourages sustainable travel (public transport, cycling, walking and car sharing).
- only use cutting, grinding or sawing equipment fitted or in conjunction with suitable dust suppression techniques such as water sprays or local extraction e.g. suitable local exhaust ventilation systems.
- ensure an adequate water supply on site for effective dust/particulate matter suppression/mitigation, using non-potable water where possible and appropriate.
- use enclosed chutes and conveyors and covered skips.
- minimise drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment and use fine water sprays on such equipment wherever appropriate.
- ensure equipment is readily available on site to clean any dry spillages, and clean up spillages as soon as reasonably practicable after the event using wet cleaning methods
- reuse and recycle waste to reduce dust from waste materials.

- avoid bonfires and burning of waste materials.
- Ensure effective water suppression is used during demolition operations. Handheld sprays are more effective than hoses attached to equipment as the water can be directed to where it is needed. In addition, high volume water suppression systems, manually controlled, can produce fine water droplets that effectively bring the dust particles to the ground.
- Avoid explosive blasting, using appropriate manual or mechanical alternatives.
- Bag and remove any biological debris or dampen down such material before demolition.
- avoid dry sweeping of large areas.
- ensure vehicles visiting and leaving the site that contain dusty materials are covered to prevent the escape of materials during transport.
- use water-assisted dust sweepers on the access and local roads, to remove, as necessary, any material tracked out of the site.
- re access gates to be located at least 10m from receptors where possible.

To provide additional protection and reduce the risk of dust effects further the following measures should also be considered:

- install green walls, screens or other green infrastructure to minimise the impact of dust and pollution.
- carry out regular dust soling checks of buildings within 100 m of site boundary and cleaning to be provided if necessary.