# New College of the Humanities

# Boston House, Fitzroy Square, W1T 6EY

# Air Quality Assessment

# May 2020

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## Executive Summary

WYG have undertaken an Air Quality Assessment for the proposed refurbishment and change of use of Boston House, Fitzroy Square, W1T 6EY. The application shall be for the change of use of Boston House, 36-38 Fitzroy Square, London, W1T 6EY from office (Class B1a) to a non-residential education institution (Class D1) including internal alterations.

**Construction Phase**

The potential effects during the demolition and construction phases include fugitive dust emissions from site activities, such as earthworks, construction and trackout.

During the construction phase, site specific mitigation measures detailed within this assessment will be implemented. With these mitigation measures in place, the effects from the construction phase are not predicted to be significant.

Operational Phase

All proposed receptor locations are predicted to be below 60µg/$m^3$ as an annual average. Paragraph 7.91 of TG(16) states *"Previous research carried out on behalf of Defra and the Devolved Administrations identified that exceedances of the NO2 1-hour mean are unlikely to occur where the annual mean is below 60µg/$m^3$"*. The short-term objective, which is considered appropriate to assess office use, is therefore not considered to be exceeded and no further mitigation is required.

**Air Quality Neutral**

The Air Quality Neutral assessment has determined that the Building Emissions and Transport Emissions associated with the proposed development are below the defined benchmarks. Therefore, the proposed development is determined to be Air Quality Neutral and no additional mitigation measures are required.

# 1. Introduction

WYG have undertaken an Air Quality Assessment for the proposed refurbishment and change of use of Boston House, Fitzroy Square, W1T 6EY. The application shall be for the change of use of Boston House, 36-38 Fitzroy Square, London, W1T 6EY from office (Class B1a) to a non-residential education institution (Class D1) including internal alterations.

## 1.1 Site Location and Context

The approximate United Kingdom National Grid Reference (NGR) is approximately 529178, 182043. Reference should be made to Figure 2 for a map of the proposed development site and surrounding area.

The following assessment stages have been conducted as part of this assessment:

- Baseline monitoring and evaluation;
- Assessment of potential air quality impacts during the construction phase;
- Assessment of potential air quality impacts during the operational phase;
- Air Quality Neutral Assessment; and,
- Identification of mitigation measures (as required).

The results of the assessment are detailed in the following sections of this report.

The construction phase assessment considers the potential effects of dust and particulate emissions from site activities and materials movement based on a qualitative risk assessment method based on the Institute of Air Quality Management's (IAQM) 'Guidance on the Assessment of Dust from Demolition and Construction' document, published in 2014.

The assessment of the potential air quality impacts that are associated with the operational phase has focused on the predicted impact of changes in ambient nitrogen dioxide ($NO_2$), particulate matter with an aerodynamic diameter of less than 10µm ($PM_{10}$) and particulate matter with an aerodynamic diameter of less than 2.5µm ($PM_{2.5}$) as a result of the development at key local receptor locations. The changes have been referenced to EU air quality limits and UK air quality objectives and the magnitude and impact description of the changes have been referenced to non-statutory guidance issued by IAQM and Environmental Protection UK (EPUK).

# 2. Policy and Legislative Context

## 2.1 Documents Consulted

The following documents were consulted during the undertaking of this assessment:

Legislation and Best Practice Guidance

- National Planning Policy Framework, Ministry for Housing, Communities and Local Government, Revised February 2019;
- Planning Practice Guidance: Air Quality, Ministry for Housing, Communities and Local Government, November 2019;
- The Air Quality Standards Regulations (Amendments), 2016;
- The Air Quality Strategy for England, Scotland, Wales and Northern Ireland, 2007;
- The Environment Act, 1995;
- Local Air Quality Management Technical Guidance LAQM.TG16, Defra, 2018;
- London Local Air Quality Management Technical Guidance LLAQM.TG19, Mayor of London, 2019;
- Design Manual for Roads and Bridges, Volume 11, Section 3, Part 1, LA 105 Air quality, November 2019;
- Land-Use Planning & Development Control: Planning for Air Quality, EPUK & IAQM, 2017;
- Guidance on the Assessment of Dust from Demolition and Construction, IAQM, 2014; and,
- A Guide to the Assessment of Air Quality Impacts on Designated Nature Conservation Sites (Version 1.0), IAQM, June 2019.
- London Plan Supplementary Planning Guidance (SPG) 'The Control of Dust and Emissions during Construction and Demolition', July 2014
- Greater London Assembly (GLA) The London Plan, March 2016;
- Greater London Assembly (GLA) The London Plan Intend to Publish, December 2019;
- Greater London Authority, Sustainable Design & Construction Supplementary Planning Guidance, April 2014;
- Local Air Quality Management Note on Projecting $NO_2$ concentrations, Defra, April 2012; and,
- Air Quality Neutral Planning Support Guidance, Greater London Authority, 2014.

Websites Consulted

- Google maps (maps.google.co.uk);

- The UK National Air Quality Archive (www.airquality.co.uk);
- Department for Transport Matrix (www.dft.go.uk/matrix);
- emapsite.com;
- Multi-Agency Geographic Information for the Countryside (http://magic.defra.gov.uk/);
- Planning Practice Guidance (http://planningguidance.planningportal.gov.uk/); and,
- London Borough of Camden (https://www.camden.gov.uk/).

Site Specific Reference Documents

- London Borough of Camden Air Quality Annual Status Report for 2018 (Published July 2019); and,
- London Borough of Camden Local Plan, Adopted 2017.

## 2.2 Air Quality Legislative Framework

### European Legislation

European air quality legislation is consolidated under Directive 2008/50/EC, which came into force on 11th June 2008. This Directive consolidates previous legislation which was designed to deal with specific pollutants in a consistent manner and provides new air quality objectives for fine particulates. The consolidated Directives include:

- **Directive 1999/30/EC** – the First Air Quality "Daughter" Directive – sets ambient air limit values for $NO_2$ and oxides of nitrogen, sulphur dioxide, lead and $PM_{10}$;
- **Directive 2000/69/EC** – the Second Air Quality "Daughter" Directive – sets ambient air limit values for benzene and carbon monoxide; and,
- **Directive 2002/3/EC** – the Third Air Quality "Daughter" Directive – seeks to establish long-term objectives, target values, an alert threshold and an information threshold for concentrations of ozone in ambient air.

The Fourth Daughter Directive was not included within the consolidation and is described as:

- **Directive 2004/107/EC** – sets health-based limits on polycyclic aromatic hydrocarbons, cadmium, arsenic, nickel and mercury, for which there is a requirement to reduce exposure to as low as reasonably achievable.

### UK Legislation

The Air Quality Standards Regulations (Amendments 2016) seek to simplify air quality regulation and provide a new transposition of the Air Quality Framework Directive, First, Second and Third Daughter Directives and also transpose the Fourth Daughter Directive within the UK. The Air Quality Limit Values are transposed into

the updated Regulations as Air Quality Standards, with attainment dates in line with the European Directives. SI 2007 No. 64 Regulation 14 extends powers, under Section 85(5) of the Environment Act (1995), for the Secretary of State to give directions to Local Authorities (LAs) for the implementation of these Directives.

The UK Air Quality Strategy is the method for implementation of the air quality limit values in England, Scotland, Wales and Northern Ireland and provides a framework for improving air quality and protecting human health from the effects of pollution.

For each nominated pollutant, the Air Quality Strategy sets clear, measurable, outdoor air quality standards and target dates by which these must be achieved; the combined standard and target date is referred to as the Air Quality Objective (AQO) for that pollutant. Adopted national standards are based on the recommendations of the Expert Panel on Air Quality Standards (EPAQS) and have been translated into a set of Statutory Objectives within the Air Quality (England) Regulations (2000) SI 928, and subsequent amendments.

The AQOs for pollutants included within the Air Quality Strategy and assessed as part of the scope of this report are presented in Table 2.1 along with European Commission (EC) Directive Limits and World Health Organisation (WHO) Guidelines.

**Table 2.1 Air Quality Standards, Objectives, Limit and Target Values**

| Pollutant | Applies | Objective | Concentration Measured as | Date to be achieved and maintained thereafter | European Obligations | Date to be achieved and maintained thereafter | New or existing |
|---|---|---|---|---|---|---|---|
| $PM_{10}$ | UK | 50µg/m³ by end of 2004 (max 35 exceedances a year) | 24-hour mean | 1st January 2005 | 50µg/m³ by end of 2004 (max 35 exceedances a year) | 1st January 2005 | Retain Existing |
| | UK | 40µg/m³ by end of 2004 | Annual mean | 1st January 2005 | 40µg/m³ | 1st January 2005 | |
| $PM_{2.5}$ | UK | 25µg/m³ | Annual Mean | 31st December 2010 | 25µg/m³ | 1st January 2010 | Retain Existing |
| $NO_2$ | UK | 200µg/m³ not to be exceeded more than 18 times a year | 1-Hour Mean | 31st December 2005 | 200µg/m³ not to be exceeded more than 18 times a year | 1st January 2010 | Retain Existing |
| | UK | 40µg/m³ | Annual Mean | 31st December 2005 | 40µg/m³ | 1st January 2010 | |

Within the context of this assessment, the annual mean objectives are those against which facades of residential receptors will be assessed and the short-term objectives apply to all other receptor locations, where people may be exposed over a short duration, both residential and non-residential such as using gardens, balconies, walking along streets, using playgrounds, footpaths or external areas of employment uses.

### Local Air Quality Management

Under Section 82 of the Environment Act (1995) (Part IV) Local Authorities (LAs) are required to periodically review and assess air quality within their area of jurisdiction under the system of Local Air Quality Management (LAQM). This review and assessment of air quality involves assessing present and likely future air quality against the AQOs. If it is predicted that levels at the façade of buildings where members of the public are regularly present (normally residential properties) are likely to be exceeded, the LA is required to declare an Air Quality Management Area (AQMA). For each AQMA, the LA is required to produce an Air Quality Action Plan (AQAP), the objective of which is to reduce pollutant concentrations in pursuit of the AQOs.

### National Policy

The National Planning Policy Framework (NPPF), revised February 2019, principally brings together and summarises the suite of Planning Policy Statements (PPS) and Planning Policy Guidance (PPG) which previously guided planning policy making. 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 or 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 or 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'.*

The Planning Practice Guidance (PPG) web-based resource was launched by the Ministry for Housing, Communities and Local Government (DCLG) on 6 March 2014 to support the National Planning Policy Framework and make it more accessible. A review of PPG: Air Quality (November 2019) identified the following guidance:

*"Whether air quality is relevant to a planning decision will depend on the proposed development and its location. Concerns could arise if the development is likely to have an adverse effect on air quality in areas where it is already known to be poor, particularly if it could affect the implementation of air quality strategies and action plans and/or breach legal obligations (including those relating to the conservation of habitats and species). Air quality may also be a material consideration if the proposed development would be particularly sensitive to poor air quality in its vicinity.*

*Where air quality is a relevant consideration the local planning authority may need to establish:*

- *the 'baseline' local air quality, including what would happen to air quality in the absence of the development;*
- *whether the proposed development 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."*

**Regional Policy**

The London Borough of Camden lies within the Greater London Authority (GLA) Area. The London Plan addresses the improvement of air quality. Policy 7.14 within the London Plan specifically relates to air quality improvement:

*'Policy 7.14 Improving Air Quality*

*A. The Mayor recognises the importance of tackling air pollution and improving air quality to London's development and the health and well-being of its people. He will work with strategic partners to ensure that the spatial, climate change, transport and design policies of this plan support implementation of his Air Quality and Transport strategies to achieve reductions in pollutant emissions and minimise public exposure to pollution.*

***Planning Decisions***

*A. Development proposals should: minimise increased exposure to existing poor air quality and make provision to address local problems of air quality (particularly within Air Quality Management Areas (AQMAs) and where development is likely to be used by large numbers of those particularly vulnerable to poor air quality, such as children or older people) such as by design solutions, buffer zones or steps to promote greater use of sustainable transport modes through travel plans (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.*

**The London Plan (Intend to Publish)**

The London Plan (Intend to Publish) has also been reviewed for any policies relevant to Air Quality. Policy SI1, Improving Air Quality, was identified as relevant and has been outlined below;

*"**SI1: Improving Air Quality;***

**Local Policy**

*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:*

*i. lead to further deterioration of existing poor air quality*

*ii. 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*

*iii. 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.*

**Local Policy**

The London Borough of Camden Local Plan was adopted in 2017, which outlines the broad planning strategy. Following a review of policies within the Local Plan, the following policies were identified as being relevant to the proposed development from an air quality perspective:

"***Policy CC4 Air quality****;*

*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*."

# 3. Assessment Methodology

The potential environmental effects of the operational phase of the proposed development are identified so far as current knowledge of the site and development allows. The impact description of potential environmental effects is assessed according to the latest guidance produced by EPUK and IAQM in January 2017.

The methodology used to determine the potential air quality effects of the construction phase of the proposed development has been derived from the IAQM 'Guidance on the Assessment of the Impacts of Dust from Demolition and Construction' document and is summarised in Section 5.

## 3.1 Determining Impact Description of the Air Quality Effects

The impact description of the effects during the operational phase of the development is based on the latest guidance produced by EPUK and IAQM in January 2017. The guidance provides a basis for a consistent approach that could be used by all parties associated with the planning process to professionally judge the overall impact description of the air quality effects based on severity of air quality impacts.

The following rationale is used in determining the severity of the air quality effects at individual receptors:

1. The change in concentration of air pollutants, air quality effects, are quantified and evaluated in the context of AQOs. The effects are provided as a percentage of the Air Quality Assessment Level (AQO), which may be an AQO, EU limit or target value, or an Environment Agency 'Environmental Assessment Level (EAL)';
2. The absolute concentrations are also considered in terms of the AQO and are divided into categories for long term concentration. The categories are based on the sensitivity of the individual receptor in terms of harm potential. The degree of harm potential to change increases as absolute concentrations are close to or above the AQO;
3. Severity of the effect is described as qualitative descriptors; negligible, slight, moderate or substantial, by taking into account in combination the harm potential and air quality effect. This means that a small increase at a receptor which is already close to or above the AQO will have higher severity compared to a relatively large change at a receptor which is significantly below the AQO;
4. The effects can be adverse when pollutant concentrations increase or beneficial when concentration decrease as a result of development;
5. The judgement of overall impact description of the effects is then based on severity of effects on all the individual receptors considered; and,
6. Where a development is not resulting in any change in emissions itself, the impact description of effect is based on the effect of surrounding sources on new residents or users of the development, i.e., will they be exposed to levels above the AQO.

**Table 3.1 Impact Description of Effects Matrix**

| Long term average concentration at receptor in assessment year | % Change in concentration relative to AQO | | | |
|---|---|---|---|---|
| | 1 | 2-5 | 6-10 | >10 |
| ≤75% of AQO | Negligible | Negligible | Slight | Moderate |
| 76-94% of AQO | Negligible | Slight | Moderate | Moderate |
| 95-102% of AQO | Slight | Moderate | Moderate | Substantial |
| 103-109 of AQO | Moderate | Moderate | Substantial | Substantial |
| ≥110 of AQO | Moderate | Substantial | Substantial | Substantial |

In accordance with explanation note 2 of Table 6.3 of the EPUK & IAQM guidance. The Table is intended to be used by rounding the change in percentage pollutant concentration to whole numbers, which then makes it clearer which cell the impact falls within. The user is encouraged to treat the numbers with recognition of their likely accuracy and not assume a false level of precision. Changes of 0%, i.e. less than 0.5%, will be described as 'Negligible'.

# 4. Baseline Conditions

## 4.1 Air Quality Review

This section provides a review of the existing air quality in the vicinity of the proposed development site in order to provide a benchmark against which to assess potential air quality impacts of the proposed development. Baseline air quality in the vicinity of the proposed development site has been defined from a number of sources, as described in the following sections.

### Local Air Quality Management (LAQM)

As required under section 82 of the Environment Act 1995, the London Borough of Camden (LBC) has undertaken an ongoing exercise to review and assess air quality within its area of jurisdiction. The assessments have indicated that concentrations of $NO_2$ and $PM_{10}$ are above the relevant AQOs at a number of locations of relevant public exposure within the Council. LBC have one declared Air Quality Management Area (AQMA) as outlined below;

- Camden AQMA: The whole borough.

The proposed development is located within the Camden AQMA, and so receptors within the AQMA have been included within the modelling assessment.

### Air Quality Monitoring

Monitoring of air quality within LBC is undertaken by both continuous and non-continuous monitoring methods.

Continuous Monitoring

LBC have developed their own air pollution monitoring networks to review and assess air quality within their area of jurisdiction. These consist of three permanent monitoring stations recording continuous concentrations of $NO_2$ and $PM_{10}$. The most recently available monitoring data from 2018 is displayed below in Table 4.1.

**Table 4.1 Monitored Annual Mean $NO_2$ Concentrations**

| Site ID | Location | Site Type | Inlet Height (m) | Distance from Kerb of Nearest Road (m) | $NO_2$ Annual Mean Concentration ($\mu g/m^3$) |
|---|---|---|---|---|---|
| | | | | | 2018 |
| London Bloomsbury | Russel Square | Urban Background | - | 27 | 36.0 |
| Swiss Cottage | Belsize Park | Kerbside | - | 1.5 | 54.0 |
| Euston Road | Premier Inn London Euston | Roadside | - | 0.5 | 82.3 |

All automatic monitoring locations outlined in Table 4.1, with the exception of London Bloomsbury, monitored

annual average $NO_2$ concentrations above the AQO for $NO_2$ in 2018.

Non-Continuous Monitoring

LBC operates a network of 14 passive diffusion tubes which measure $NO_2$ concentrations across the borough. The nearest diffusion tube to the proposed development site is CA11, located approximately 387m south east of the site boundary. The most recently available monitoring data is for 2018 and is detailed below in Table 4.2.

**Table 4.2 Monitored Annual Mean $NO_2$ Concentrations**

| Site ID | Location | Site Type | Inlet Height (m) | Distance from Kerb of Nearest Road (m) | $NO_2$ Annual Mean Concentration 2018 (µg/m³) |
|---|---|---|---|---|---|
| CA11 | Tottenham Court Road | Kerbside | - | <1 | 65.7 |
| CA21 | Bloomsbury Street | Roadside | - | <1 | 59.4 |
| CA10 | Tavistock Garden | Urban Background | - | 25 | 35.4 |
| CA6 | Wakefield Gardens | Urban Background | - | 30 | 26.7 |
| CA4 | Euston Road | Roadside | - | 5 | 69.2 |

As shown in Table 4.2, all diffusion tube monitoring locations except CA10 and CA6 monitored annual mean concentrations of $NO_2$ which exceeded the AQO for NO2 in 2018.

Due to the location of the proposed development and its proximity to the boundary of the City of Westminster (CoW), the monitoring data has been reviewed.

Continuous Monitoring

CoW have developed their own air pollution monitoring networks to review and assess air quality within their area of jurisdiction. These consist of eight permanent monitoring stations recording continuous concentrations of $NO_2$ and $PM_{10}$. The most recently available monitoring data from 2018 is displayed below in Table 4.1.

**Table 4.3 Monitored Annual Mean $NO_2$ Concentrations**

| Site ID | Location | Site Type | Inlet Height (m) | Distance from Kerb of Nearest Road (m) | $NO_2$ Annual Mean Concentration (µg/m³) |
|---|---|---|---|---|---|
| | | | | | 2018 |
| Marylebone Road | Marylebone Road | Kerbside | 2.5 | 1.5 | 85.0 |
| Horseferry Road | Horseferry Road | Urban Background | 3 | 1 | 31.0 |
| Oxford Street (Selfridges) | Oxford Street (Selfridges) | Kerbside | 1.5 | 1 | 63.0 |
| Strand | Strand (A4) | Roadside | 1.8 | 2.5 | 88.0 |
| Covent Garden | Covent Garden | Urban Background | 2 | - | 39.0 |

| Site ID | Location | Site Type | Inlet Height (m) | Distance from Kerb of Nearest Road (m) | $NO_2$ Annual Mean Concentration ($\mu g/m^3$) |
|---|---|---|---|---|---|
| | | | | | 2018 |
| Cavendish Square | Cavendish Square | Roadside | 1.7 | 5 | 64.0 |
| Oxford Street East (94 Oxford Street) | Oxford Street East (94 Oxford Street) | Roadside | 1.7 | 1.2 | 76.0 |
| Buckingham Palace Road | Buckingham Palace Road | Roadside | 1.5 | 6 | 52.0 |

All automatic monitoring locations outlined in Table 4.3, with the exception of Horseferry Road and Covent Garden monitored annual average $NO_2$ concentrations above the AQO for NO2 in 2018.

## 4.2 Meteorology

Meteorological conditions have significant influence over air pollutant concentrations and dispersion. Pollutant levels can vary significantly from hour to hour as well as day to day, thus any air quality predictions need to be based on detailed meteorological data. The ADMS model calculates the dispersion of pollutants on an hourly basis using a year of local meteorological data. The 2018 meteorological data used in the assessment is derived from London City Meteorological Station. This is the nearest meteorological station, which is considered representative of the development site, with all the complete parameters necessary for the ADMS model. Reference should be made to Figure 2 for an illustration of the prevalent wind conditions at the London City Meteorological Station site.

## 4.3 Emission Sources

A desktop assessment has identified that traffic movements are likely to be the most significant local source of pollutants affecting the site and its surroundings. The principal traffic derived pollutants likely to impact local receptors are $NO_2$, $PM_{10}$ and $PM_{2.5}$.

The assessment has therefore modelled all roads within the immediate vicinity of the proposed development site which are considered likely to experience changes in traffic flow as a result of the proposed development. Reference should be made to Figure 1 for a graphical representation of the traffic data utilised within the ADMS Roads 4.1.1 model.

It should be noted that the pollutant contribution of minor roads and rail sources that are not included within the dispersion model is considered to be accounted for by using background air quality levels.

## 4.4 Sensitive Receptors

Receptors that are considered as part of the air quality assessment are primarily those existing receptors that are situated along routes predicted to experience changes in traffic flow as a result of the proposed development and the proposed receptors.

The existing receptor locations are summarised in Table 4.3 and the spatial locations of all modelled receptors are illustrated in Figure 2.

**Table 4.3 Modelled Existing Sensitive Receptor Locations**

| Discrete Sensitive Receptor | | Height of Receptors |
|---|---|---|
| R1 | 30 Fitzroy Street | 1.5 |
| R2 | 33 Grafton Way | 1.5 |
| R3 | 46 Maple Street | 4.0 |
| R4 | 29 High Street/ Howland Street | 4.0 |
| R5 | 94 Tottenham Court Road | 4.0 |
| R6 | 108 Tottenham Court Road | 4.0 |
| R7 | 5-7 Goodge Street | 4.0 |
| R8 | 84 Cleveland Street | 4.0 |
| R9 | 166 New Cavendish Street | 4.0 |
| R10 | 56 Maple Street | 4.0 |
| R11 | 64 Goodge Street | 4.0 |
| R12 | 5 Mortimer Street | 4.0 |
| PR1 | On Site Receptor | 1.5 |
| PR2 | On Site Receptor | 1.5 |
| PR3 | On Site Receptor | 1.5 |
| PR4 | On Site Receptor | 1.5 |
| PR5 | On Site Receptor | 1.5 |

The locations of these receptors are displayed in Figure 1.

## 4.5 Ecological Receptors

Air quality impacts associated with the proposed re-development have the potential to impact on receptors of ecological sensitivity within the vicinity of the site. The IAQM guidance on 'Air Quality Impacts on Designated Nature Conservation Sites' (2019) document outlines the types of designated nature sites within 2 km of the proposed development which require air quality assessment. These are inclusive of;

- Sites of Special Scientific Interest (SSSIs);
- Special Areas of Conservation (SACs);
- Special Protection Areas (SPAs);
- Ramsar Sites;
- Areas of Special Scientific Interest (ASSIs);
- National Nature Reserves (NNRs);
- Local Nature Reserves (LNRs);
- Local Wildlife Sites (LWSs); and,
- Areas of Ancient Woodland (AW).

The Conservation of Habitats and Species Regulations (2017) additionally requires competent authorities to review planning applications and consents that have the potential to impact on European designated sites (e.g. Special Protection Areas).

A study was undertaken to identify any statutory designated sites of ecological or nature conservation importance within the extents of the dispersion modelling assessment. This was completed using the Multi-Agency Geographic Information for the Countryside (MAGIC) web-based interactive mapping service, which draws together information on key environmental schemes and designations.

Following a search within a 2 km radius of the site boundary, no ecological receptor was identified.

# 5. Assessment of Air Quality Impacts - Construction Phase

## 5.1 Pollutant Sources

The main emissions during construction are likely to be dust and particulate matter generated during earth moving (particularly during dry months) or from construction materials. The main potential effects of dust and particulate matter are:

- Visual - dust plume, reduced visibility, coating and soiling of surfaces leading to annoyance, loss of amenity, the need to clean surfaces;
- Physical and/or chemical contamination and corrosion of artefacts;
- Coating of vegetation and soil contamination; and,
- Health effects due to inhalation e.g. asthma or irritation of the eyes.

A number of other factors such as the amount of precipitation and other meteorological conditions will also greatly influence the amount of particulate matter generated.

Construction activities can give rise to short-term elevated dust/$PM_{10}$ concentrations in neighbouring areas. This may arise from vehicle movements, soiling of the public highway or windblown stockpiles.

## 5.2 Particulate Matter ($PM_{10}$)

The UK Air Quality Standards seek to control the health implications of respirable $PM_{10}$. However, the majority of particles released from construction will be greater than this in size.

Construction works on site have the potential to elevate localised $PM_{10}$ concentrations in the area. On this basis, mitigation measures should still be taken to minimise these emissions as part of good site practice.

## 5.3 Dust

Particles greater than 10µm are likely to settle out relatively quickly and may cause annoyance due to their soiling capability. Although there is no formal standards or criteria for nuisance caused by deposited particles, the IAQM 'Guidance on Monitoring in the Vicinity of Demolition and Construction Sites' (October 2018) and the Environment Agency Technical Guidance Note (TGN) M17 states that dust is usually compared with a 'complaints likely' guideline of 200mg/$m^2$/day. Therefore, a deposition rate of 200mg/$m^2$/day is often presented as a threshold for serious nuisance though this is usually only applied to long term exposure as people are generally more tolerant of dust for a short or defined period. Significant nuisance is likely when the dust coverage of surfaces is visible in contrast with adjacent clean areas, especially when it happens regularly. Severe dust nuisance occurs when the dust is perceptible without a clean reference surface.

Construction activities have the potential to suspend dust, which could result in annoyance of residents surrounding the site. Measures will be taken to minimise the emissions of dust as part of good site practice.

Recommended mitigation measures proportionate to the risk associated with the development and based on best practice guidance are discussed in the following sections.

## 5.4 Methodology

The construction phase assessment utilises the IAQM Guidance on the Assessment of Dust from Demolition and Construction document published in February 2014.

Four construction processes are considered; these are demolition, earthworks, construction and trackout. For each of these phases, the impact description of the potential dust impacts is derived following the determination of a dust emission magnitude and the distance of activities to the nearest sensitive receptor, therefore assessing worst case impacts. A full explanation of the methodology is contained in Appendix A.

## 5.5 Assessment Results

Based on the methodology detailed in Appendix A, the scale of the anticipated works has determined the potential dust emission magnitude for each process, as presented in the Table 5.1 below.

**Table 5.1 Dust Emission Magnitude**

| Construction Process | Dust Emission Magnitude |
|---|---|
| Demolition | N/A |
| Earthworks | Small |
| Construction | Small |
| Trackout | Small |

The sensitivity of the surrounding area to each construction process has been determined following stage 2B of the IAQM guidance. The assessment has determined the area sensitivities as shown in the Table 5.2.

**Table 5.2 Sensitivity of the Area**

| Source | Area Sensitivity | | |
|---|---|---|---|
| | Dust Soiling | Health Effects of $PM_{10}$ | Ecological |
| Demolition | N/A | N/A | N/A |
| Earthworks | Medium | Low | N/A |
| Construction | Medium | Low | N/A |
| Trackout | Medium | Low | N/A |

The dust emission magnitude determined in Table 5.1 has been combined with the sensitivity of the area determined in Table 5.2, to determine the risk of impacts prior to the implementation of appropriate mitigation measures. The potential impact description of dust emissions associated with the construction phase, without mitigation, is presented overleaf in Table 5.3.

**Table 5.3 Impact Description of Construction Activities without Mitigation**

| Source | Summary Risk of Impacts Prior to Mitigation | | |
|---|---|---|---|
| | Dust Soiling | Health Effects of $PM_{10}$ | Ecological |
| Demolition | N/A | N/A | N/A |
| Earthworks | Low | Low | N/A |
| Construction | Low | Low | N/A |
| Trackout | Low | Low | N/A |

Appropriate mitigation measures are detailed and presented in Section 8. Following the adoption of these measures, the subsequent impact description of the construction phase is not predicted to be significant.

# 6. Traffic Modelling

The operational phase assessment consists of the quantified predictions of $NO_2$, $PM_{10}$ and $PM_{2.5}$ for the operational phase of the development. Predictions of air quality at the site have been undertaken for the operational phase of the development using ADMS Roads.

The operational phase assessment has been undertaken with an assumed development opening year of 2021. The assessment scenarios are therefore:

- 2018 Baseline = Existing baseline conditions;
- 2021 "Do Minimum" = Baseline conditions + committed development flows;
- 2022 "Do Something" = Baseline conditions + committed development flows + proposed development flows.

## 6.1 Existing and Predicted Traffic Flows

Baseline 2018 data and projected 2021 'do minimum' and 'do something' traffic data has been obtained for the operational phase assessment in the form of Annual Average Daily Traffic figures (AADT).

Baseline 2018 traffic data was downloaded from the Department for Transport and London Air Emissions Inventory websites.

The development opening year is assumed to be 2021. A TEMPro growth factor of 1.0416 has been applied to the Baseline 2018 data to derive the 2021 AADT flows for the 'do minimum' scenario.

The traffic flows associated with the proposed development are predicted to decrease.

Emission factors for the 2018 baseline and 2022 projected 'do minimum' and 'do something' scenarios have been calculated using the Emission Factor Toolkit (EFT) Version 9.0 (May 2019).

It is assumed the average vehicle speeds on the local road network in an opening year of 2021 will be broadly the same as the ones in 2018 as well. Where unavailable, traffic speeds have been estimated based on national speed limits.

A 50m slow down phase of 20km/hr is included on each link at every junction and roundabout within the assessment. All of the roads within the dispersion model are illustrated in Figure 2. Detailed traffic figures are provided in the Table 6.1.

**Table 6.1 Operational Traffic Data**

| Link | Speed (km/h) | 2018 | | 2022 Operational Flows | | | |
|---|---|---|---|---|---|---|---|
| | | AADT | HGV % | Do Minimum | | Do Something | |
| | | | | AADT | %HGV | AADT | %HGV |
| Tottenham Court Road (A400) | 48 | 12248 | 5.54 | 12758 | 5.54 | 12751 | 5.54 |
| Grafton Way | 32 | 5242 | 12.02 | 5628 | 12.02 | 5628 | 12.02 |
| Maple Street | 32 | 3828 | 3.80 | 4111 | 3.80 | 4098 | 3.81 |
| University Street | 32 | 778 | 1.32 | 836 | 1.32 | 836 | 1.32 |
| Cleveland Street | 48 | 2651 | 3.42 | 2847 | 3.42 | 2840 | 3.43 |
| Bloomsbury Street (A400) | 48 | 14191 | 1.87 | 14781 | 1.87 | 14781 | 1.87 |
| Fitzroy Street | 32 | 5242 | 12.02 | 5628 | 12.02 | 5628 | 12.02 |
| Howland Street | 32 | 4965 | 2.84 | 5172 | 2.84 | 5172 | 2.84 |
| Conway Street | 32 | 2621 | 12.02 | 2730 | 12.02 | 2730 | 12.02 |
| Goodge Street (A5204) | 48 | 6226 | 3.34 | 6485 | 3.34 | 6485 | 3.34 |
| A5204 (West of Cleveland Street) | 32 | 11858 | 2.03 | 12351 | 2.03 | 12348 | 2.03 |

## 6.2 Background Concentrations

The use of background concentrations within the modelling process ensures that pollutant sources other than traffic are represented appropriately. Background sources of pollutants include industrial, domestic and rail emissions within the vicinity of the study site. Several sources have been used to obtain representative background levels as discussed below.

The background concentrations used within the assessment have been determined with reference to the IAQM Guidance and TG (16).

The IAQM Guidance states:

> "*A matter of judgement should take into account the background and future background air quality and whether it is likely to approach or exceed the value of the AQO.*"

Additionally, TG (16) states:

> "*Typically, only the process contributions from local sources are represented within and output by the dispersion model. In these circumstances, it is necessary to add an appropriate background concentration(s) to the modelled source contributions to derive the total pollutant concentrations.*"

In accordance with this guidance, a review of all available background pollutant concentrations has been conducted on an individual receptor by receptor basis. This review compares sources from Defra, London Authorities Emissions Inventory (LAEI) and LA Monitoring data. The analysis and final utilised background concentrations for each modelled receptor are detailed in the sections below.

Defra Published Background mapped data/Concentrations

Background concentrations considered include the levels from the UK National Air Quality Information Archive database based on the National Grid Co-ordinates of 1 x 1 km grid squares nearest to the development site. In May 2019, Defra issued revised 2018 based background maps for nitrogen oxide ($NO_X$), $NO_2$, $PM_{10}$ and $PM_{2.5}$ which incorporate updates to Defra's input data.

The published 2018 background maps predicted pollutant concentrations for the existing and proposed receptors are listed in Table 6.3 below.

**Table 6.3 Published Background Air Quality Levels for Monitoring Sites (µg/m³)**

| Receptor Location | 2018 | | | |
|---|---|---|---|---|
| | $NO_2$ | $NO_x$ | $PM_{10}$ | $PM_{2.5}$ |
| **Monitoring Locations** | | | | |
| A6 | 40.29 | 75.50 | 20.08 | 13.49 |
| CA11 | 41.95 | 80.72 | 19.62 | 13.24 |
| CA21 | 41.95 | 80.72 | 19.62 | 13.24 |
| **Receptor Locations** | | | | |
| R1 | 40.87 | 76.98 | 19.50 | 12.99 |
| R2 | 40.87 | 76.98 | 19.50 | 12.99 |
| R3 | 41.95 | 80.72 | 19.62 | 13.24 |
| R4 | 41.95 | 80.72 | 19.62 | 13.24 |
| R5 | 41.95 | 80.72 | 19.62 | 13.24 |
| R6 | 40.87 | 76.98 | 19.50 | 12.99 |
| R7 | 41.95 | 80.72 | 19.62 | 13.24 |
| R8 | 41.95 | 80.72 | 19.62 | 13.24 |
| R9 | 41.95 | 80.72 | 19.62 | 13.24 |
| R10 | 41.95 | 80.72 | 19.62 | 13.24 |
| R11 | 41.95 | 80.72 | 19.62 | 13.24 |
| R12 | 41.95 | 80.72 | 19.62 | 13.24 |
| PR1 | 40.87 | 76.98 | 19.50 | 12.99 |
| PR2 | 40.87 | 76.98 | 19.50 | 12.99 |
| PR3 | 40.87 | 76.98 | 19.50 | 12.99 |
| PR4 | 40.87 | 76.98 | 19.50 | 12.99 |
| PR5 | 40.87 | 76.98 | 19.50 | 12.99 |

**Table 6.5 Background Concentrations Used in Modelling Assessment**

| Receptor location | Background Source | Background Concentration Utilised | |
|---|---|---|---|
| | | $NO_2$ | $NO_x$ |
| **Monitoring Locations** | | | |
| A6 | Defra | 40.29 | 75.50 |
| CA11 | | 41.95 | 80.72 |
| CA21 | | 41.95 | 80.72 |
| **Modelled Receptors** | | | |
| R1 | Defra | 40.87 | 76.98 |
| R2 | | 40.87 | 76.98 |
| R3 | | 41.95 | 80.72 |
| R4 | | 41.95 | 80.72 |
| R5 | | 41.95 | 80.72 |
| R6 | | 40.87 | 76.98 |
| R7 | | 41.95 | 80.72 |
| R8 | | 41.95 | 80.72 |
| R9 | | 41.95 | 80.72 |
| R10 | | 41.95 | 80.72 |
| R11 | | 41.95 | 80.72 |
| R12 | | 41.95 | 80.72 |
| PR1 | | 40.87 | 76.98 |
| PR2 | | 40.87 | 76.98 |
| PR3 | | 40.87 | 76.98 |
| PR4 | | 40.87 | 76.98 |
| PR5 | | 40.87 | 76.98 |

## 6.3 Model Verification

Model verification involves the comparison of modelled data to monitored data in order to gain the best possible representation of current pollutant concentrations for the assessment years. The verification process is in general accordance with that contained in Section 7 of the TG16 guidance note and uses the most recently available diffusion tube monitoring data to best represent this.

The verification process consists of using the monitoring data and the published background air quality data in the UK National Air Quality Information Archive to calculate the road traffic contribution of $NO_X$ at the monitoring locations. Outputs from the ADMS Roads model are provided as predicted road traffic contribution $NO_X$ emissions. These are converted into predicted roadside contribution $NO_2$ exposure at the relevant receptor locations based on the updated approach to deriving $NO_2$ from $NO_X$ for road traffic sources published in Local Air Quality Management TG16. The calculation was derived using the $NO_X$ to $NO_2$ worksheet in the online LAQM tools website hosted by Defra. Table 6.6 summarises the final model/monitored data correlation following the application of the model correction factor.

**Table 6.6 Comparison of Roadside Modelling & Monitoring Results for $NO_2$**

| Monitoring Location | $NO_2$ µg/m³ | | |
|---|---|---|---|
| | Monitored $NO_2$ | Modelled $NO_2$ | Difference (%) |
| A6 | 64.00 | 62.09 | -2.99 |
| CA11 | 65.70 | 62.12 | -5.45 |
| CA21 | 59.40 | 64.46 | 8.52 |

The final model produced data at the monitoring locations to within 10% of the monitoring results, as the requirement by TG16 guidance.

The final verification model correlation coefficient (representing the model uncertainty) is 0.99[1]. This figure demonstrates that the model predictions were in line with the road traffic emissions at the monitoring locations.

## 6.4 Summary of Model Inputs

**Table 6.7 Summary of ADMS Roads Model Inputs**

| Parameter | Description | Input Value |
|---|---|---|
| **Chemistry** | A facility within ADMS-Roads to calculate the chemical reactions in the atmosphere between Nitric Oxide (NO), $NO_2$, Ozone ($O_3$) and Volatile organic compounds (VOCs). | No atmospheric chemistry parameters included |
| **Meteorology** | Representative meteorological data from a local source | **London City Meteorological Station**, hourly sequential data |
| **Surface Roughness** | A setting to define the surface roughness of the model area based upon its location. | **1.5m** representing a typical surface roughness for **Large Urban areas**. |
| **Latitude** | Allows the location of the model area to be set | United Kingdom = **51.4** |
| **Monin-Obukhov Length** | This allows a measure of the stability of the atmosphere within the model area to be specified depending upon its character. | Large Conurbations >1 million = **100m.** |
| **Elevation of Road** | Allows the height of the road link above ground level to be specified. | All road links were set at ground level = **0m**. |
| **Road Width** | Allows the width of the road link to be specified. | Road width used depended on data obtained from OS map data for the specific road link. |
| **Topography** | This enables complex terrain data to be included within the model in order to account for turbulence and plume spread effects of topography | No topographical information used |
| **Time Varied Emissions** | This enables daily, weekly or monthly variations in emissions to be applied to road sources | No time varied emissions used |
| **Road Type** | Allows the effect of different types of roads to be assessed. | **London (Inner)** settings were used for the relevant links |
| **Road Speeds** | Enables individual road speeds to be added for each road link | Based on national speed limits |
| **Canyon Height** | Allows the model to take account turbulent flow patterns occurring inside a street with relatively tall buildings on both sides, known as a "street canyon". | **10m** Canyons were included along the A400 and Goodge Street |
| **Road Source Emissions** | Road source emission rates are calculated from traffic flow data using the in-built EFT database of traffic emission factors. | The **EFT** Version **9.0 (2019)** dataset was used. |
| **Year** | Predicted EFT emissions rates depend on the year of emission. | **2018** data for verification and baseline operational phase assessment, **2021** data for the operational phase assessment. |

[1] This was achieved by applying a model correction factor of 3.67 to roadside predicted $NO_X$ concentrations before converting to $NO_2$

## 6.5 ADMS Modelling Results

### Traffic Assessment

The ADMS Model has predicted concentrations of $NO_2$, $PM_{10}$ and $PM_{2.5}$ at relevant receptor locations adjacent to roads likely to be affected by the development, as summarised in the following tables. Only receptors close to roads where there is predicted to be a change in emissions have been assessed.

### Assessment Scenario:

For the construction year of 2021 and development opening year of 2022, assessment of the effects of emissions from the proposed traffic associated with the scheme, has been undertaken using the EFT 2021 and 2022 emissions rates respectively which consider the rate of reduction in emissions from road vehicles into the future with the following factors:

- 2018 Baseline = Existing baseline conditions;
- 2021 "Do Minimum" = Baseline conditions + committed development flows;
- 2021 "Do Something" = Baseline conditions + committed development flows + proposed development flows.

Nitrogen Dioxide

Table 6.8 presents a summary of the predicted change in $NO_2$ concentrations at relevant receptor locations, due to changes in traffic flow associated with the development, based on modelled 'do minimum' and 'do something' scenarios.

**Table 6.8 Predicted Annual Average Concentrations of $NO_2$ at Receptor Locations**

| Receptor | | $NO_2$ (µg/m$^3$) | | | |
|---|---|---|---|---|---|
| | | Baseline 2018 | Do Minimum 2021 | Do Something 2021 | Development Contribution |
| R1 | 30 Fitzroy Street | 47.15 | 45.19 | 45.18 | -0.01 |
| R2 | 33 Grafton Way | 51.36 | 48.09 | 48.09 | <0.01 |
| R3 | 46 Maple Street | 46.31 | 45.01 | 45.00 | -0.01 |
| R4 | 29 High Street/ Howland Street | 45.92 | 44.92 | 44.91 | -0.01 |
| R5 | 94 Tottenham Court Road | 46.98 | 45.62 | 45.62 | <0.01 |
| R6 | 108 Tottenham Court Road | 46.57 | 44.99 | 44.98 | -0.01 |
| R7 | 5-7 Goodge Street | 47.28 | 45.84 | 45.84 | <0.01 |
| R8 | 84 Cleveland Street | 45.32 | 44.25 | 44.25 | <0.01 |
| R9 | 166 New Cavendish Street | 45.38 | 44.52 | 44.52 | <0.01 |
| R10 | 56 Maple Street | 45.59 | 44.60 | 44.59 | -0.01 |
| R11 | 64 Goodge Street | 47.91 | 46.39 | 46.39 | <0.01 |
| R12 | 5 Mortimer Street | 48.33 | 46.75 | 46.75 | <0.01 |
| PR1 | On Site Receptor | 44.26 | 43.12 | 43.12 | <0.01 |
| PR2 | On Site Receptor | 44.78 | 43.50 | 43.50 | <0.01 |

| Receptor | | $NO_2$ (µg/m³) | | | |
|---|---|---|---|---|---|
| | | Baseline 2018 | Do Minimum 2021 | Do Something 2021 | Development Contribution |
| PR3 | On Site Receptor | 44.52 | 43.33 | 43.33 | <0.01 |
| PR4 | On Site Receptor | 44.14 | 43.06 | 43.06 | <0.01 |
| PR5 | On Site Receptor | 43.78 | 42.81 | 42.81 | <0.01 |
| **Annual Average AQO** | | **40 µg/m³** | | | |

As indicated in Table 6.8, the maximum predicted change in the annual average $NO_2$ concentration at all modelled existing receptors is <0.01 µg/m³ at any modelled receptor.

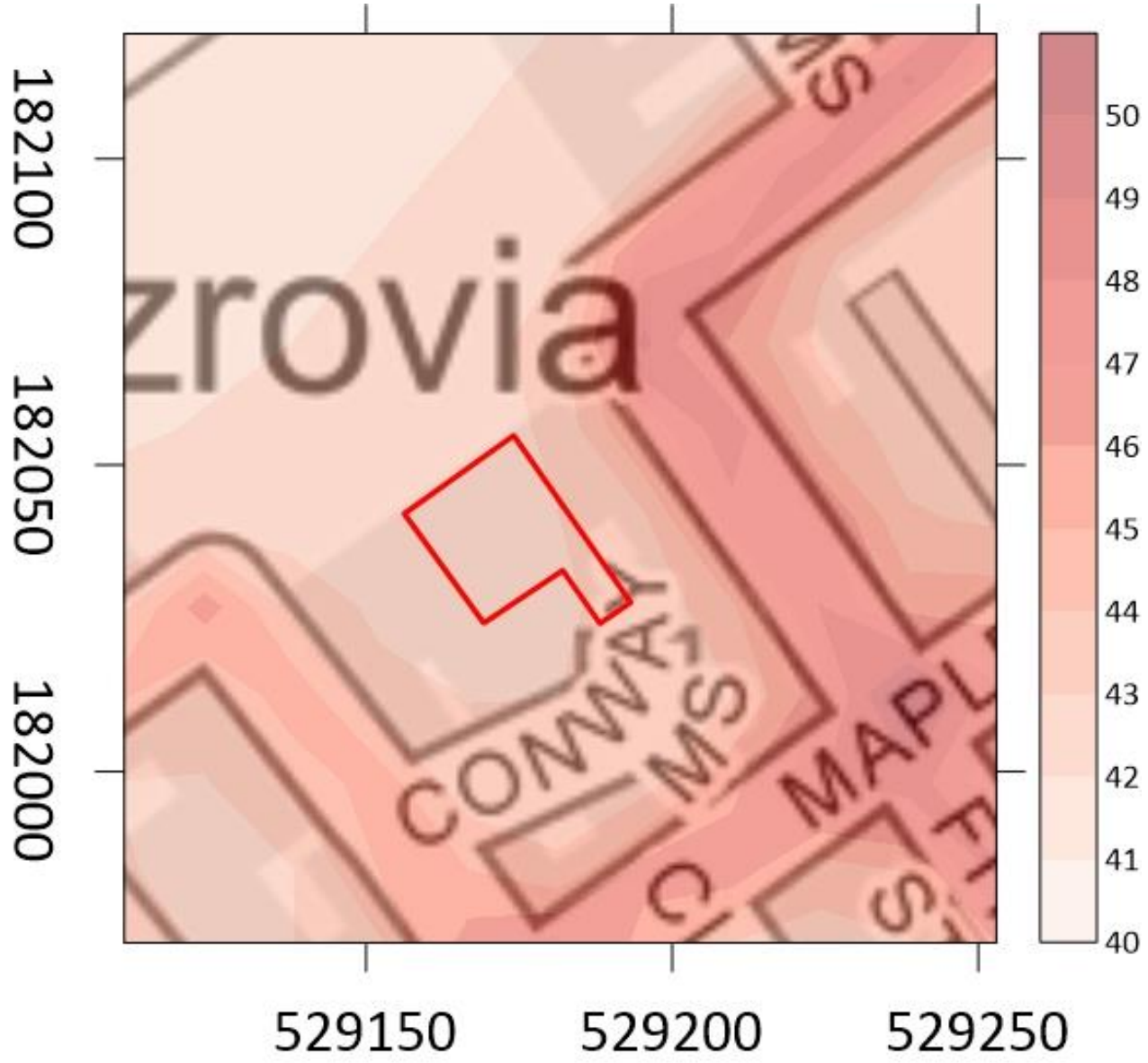
The impact description of changes in traffic flow associated with the development with respect to annual mean $NO_2$ exposure has been assessed with reference to the criteria in Section 3. The outcomes of the assessment are summarised in Table 6.9.

**Table 6.9 Impact Description of Effects at Key Receptors ($NO_2$)**

| Impact Description of $NO_2$ Effects at Key Receptors | | | | | |
|---|---|---|---|---|---|
| Receptor | Change Due to Development (DS-DM) (µg/m³) | % Change of AQO | % Change in Concentration Relative to AQO | % Annual Mean Concentration in Assessment Year | Impact Description |
| R1 | -0.01 | -0.02 | 0% | ≥110 of AQO | Negligible |
| R2 | <0.01 | 0.00 | 0% | ≥110 of AQO | Negligible |
| R3 | -0.01 | -0.02 | 0% | ≥110 of AQO | Negligible |
| R4 | -0.01 | -0.02 | 0% | ≥110 of AQO | Negligible |
| R5 | <0.01 | 0.00 | 0% | ≥110 of AQO | Negligible |
| R6 | -0.01 | -0.02 | 0% | ≥110 of AQO | Negligible |
| R7 | <0.01 | 0.00 | 0% | ≥110 of AQO | Negligible |
| R8 | <0.01 | 0.00 | 0% | ≥110 of AQO | Negligible |
| R9 | <0.01 | 0.00 | 0% | ≥110 of AQO | Negligible |
| R10 | -0.01 | -0.02 | 0% | ≥110 of AQO | Negligible |
| R11 | <0.01 | 0.00 | 0% | ≥110 of AQO | Negligible |
| R12 | <0.01 | 0.00 | 0% | ≥110 of AQO | Negligible |
| PR1 | <0.01 | 0.00 | 0% | 103-109 of AQO | Negligible |
| PR2 | <0.01 | 0.00 | 0% | 103-109 of AQO | Negligible |
| PR3 | <0.01 | 0.00 | 0% | 103-109 of AQO | Negligible |
| PR4 | <0.01 | 0.00 | 0% | 103-109 of AQO | Negligible |
| PR5 | <0.01 | 0.00 | 0% | 103-109 of AQO | Negligible |
| *0% means a change of <0.5% as per explanatory note 2 of table 6.3 of the EPUK IAQM Guidance. | | | | | |

The impact description of any effects associated with the proposed development is determined to be 'negligible' at all modelled receptors, based on the methodology outlined in Section 3. Given the quantitative nature of the assessment and the verification of the air quality dispersion model, the confidence of the assessment is deemed to be 'high'.

**Figure 1 Annual Average Nitrogen Dioxide Concentration (µg/m³) at the Proposed Development Site**




**Particulate Matter ($PM_{10}$)**

Table 6.10 presents a summary of the predicted change in annual mean $PM_{10}$ concentrations at relevant receptor locations, due to changes in traffic flow associated with the development, based on modelled 'do minimum' and 'do something' scenarios.

**Table 6.10 Predicted Annual Average Concentrations of $PM_{10}$ at Receptor Locations**

| Receptor | | $PM_{10}$ (µg/m³) | | | |
|---|---|---|---|---|---|
| | | Baseline 2018 | Do Minimum 2021 | Do Something 2021 | Development Contribution |
| R1 | 30 Fitzroy Street | 20.58 | 20.55 | 20.55 | <0.01 |
| R2 | 33 Grafton Way | 21.40 | 21.33 | 21.33 | <0.01 |

| Receptor | | $PM_{10}$ (µg/m³) | | | |
|---|---|---|---|---|---|
| | | Baseline 2018 | Do Minimum 2021 | Do Something 2021 | Development Contribution |
| R3 | 46 Maple Street | 20.34 | 20.31 | 20.31 | <0.01 |
| R4 | 29 High Street/ Howland Street | 20.37 | 20.35 | 20.35 | <0.01 |
| R5 | 94 Tottenham Court Road | 20.59 | 20.55 | 20.55 | <0.01 |
| R6 | 108 Tottenham Court Road | 20.57 | 20.54 | 20.53 | <0.01 |
| R7 | 5-7 Goodge Street | 20.65 | 20.61 | 20.61 | <0.01 |
| R8 | 84 Cleveland Street | 20.19 | 20.17 | 20.17 | <0.01 |
| R9 | 166 New Cavendish Street | 20.27 | 20.25 | 20.25 | <0.01 |
| R10 | 56 Maple Street | 20.27 | 20.25 | 20.25 | <0.01 |
| R11 | 64 Goodge Street | 20.61 | 20.56 | 20.56 | <0.01 |
| R12 | 5 Mortimer Street | 20.69 | 20.63 | 20.63 | <0.01 |
| PR1 | On Site Receptor | 20.03 | 20.01 | 20.02 | <0.01 |
| PR2 | On Site Receptor | 20.13 | 20.11 | 20.11 | <0.01 |
| PR3 | On Site Receptor | 20.09 | 20.07 | 20.07 | <0.01 |
| PR4 | On Site Receptor | 20.02 | 20.00 | 20.00 | <0.01 |
| PR5 | On Site Receptor | 19.96 | 19.94 | 19.94 | <0.01 |
| **Annual Average AQO** | | **40 µg/m³** | | | |

As indicated in Table 6.10, the maximum predicted change in the annual average $PM_{10}$ concentrations at all modelled existing receptors is <0.01 µg/m³ at any modelled receptor.

All modelled existing and proposed receptor locations are predicted to be below the AQO for $PM_{10}$ in both the 'do minimum' and 'do something' scenarios.

The impact description of changes in traffic flow associated with the development with respect to annual mean $PM_{10}$ exposure has been assessed with reference to the criteria in Section 3. The outcomes of the assessment are summarised in Table 6.11.

**Table 6.11 Impact Description of Effects at Key Receptors (Particulate Matter)**

| Impact Description of $PM_{10}$ Effects at Key Receptors | | | | | |
|---|---|---|---|---|---|
| Receptor | Change Due to Development (DS-DM) (µg/m³) | % Change of AQO | % Change in Concentration Relative to AQO | % Annual Mean Concentration in Assessment Year | Impact Description |
| R1 | <0.01 | 0.00 | 0% | ≤75% of AQO | Negligible |
| R2 | <0.01 | 0.00 | 0% | ≤75% of AQO | Negligible |
| R3 | <0.01 | 0.00 | 0% | ≤75% of AQO | Negligible |
| R4 | <0.01 | 0.00 | 0% | ≤75% of AQO | Negligible |
| R5 | <0.01 | 0.00 | 0% | ≤75% of AQO | Negligible |
| R6 | <0.01 | 0.00 | 0% | ≤75% of AQO | Negligible |
| R7 | <0.01 | 0.00 | 0% | ≤75% of AQO | Negligible |
| R8 | <0.01 | 0.00 | 0% | ≤75% of AQO | Negligible |
| R9 | <0.01 | 0.00 | 0% | ≤75% of AQO | Negligible |
| R10 | <0.01 | 0.00 | 0% | ≤75% of AQO | Negligible |
| R11 | <0.01 | 0.00 | 0% | ≤75% of AQO | Negligible |

| Impact Description of $PM_{10}$ Effects at Key Receptors | | | | | |
|---|---|---|---|---|---|
| Receptor | Change Due to Development (DS-DM) (µg/m³) | % Change of AQO | % Change in Concentration Relative to AQO | % Annual Mean Concentration in Assessment Year | Impact Description |
| R12 | <0.01 | 0.00 | 0% | ≤75% of AQO | Negligible |
| PR1 | <0.01 | 0.00 | 0% | ≤75% of AQO | Negligible |
| PR2 | <0.01 | 0.00 | 0% | ≤75% of AQO | Negligible |
| PR3 | <0.01 | 0.00 | 0% | ≤75% of AQO | Negligible |
| PR4 | <0.01 | 0.00 | 0% | ≤75% of AQO | Negligible |
| PR5 | <0.01 | 0.00 | 0% | ≤75% of AQO | Negligible |
| *0% means a change of <0.5% as per explanatory note 2 of table 6.3 of the EPUK IAQM Guidance. | | | | | |

The impact description of any effects associated with the proposed development is determined to be 'negligible' at all modelled receptors, based on the methodology outlined in Section 3. Given the quantitative nature of the assessment and the verification of the air quality dispersion model, the confidence of the assessment is deemed to be 'high'.

## Particulate Matter ($PM_{2.5}$)

Table 6.12 presents a summary of the predicted change in annual mean $PM_{2.5}$ concentrations at relevant receptor locations, due to changes in traffic flow associated with the development, based on modelled 'do minimum' and 'do something' scenarios.

**Table 6.12 Predicted Annual Average Concentrations of $PM_{2.5}$ at Receptor Locations**

| Receptor | | $PM_{2.5}$ (µg/m³) | | | |
|---|---|---|---|---|---|
| | | Baseline 2018 | Do Minimum 2021 | Do Something 2021 | Development Contribution |
| R1 | 30 Fitzroy Street | 13.65 | 13.59 | 13.59 | <0.01 |
| R2 | 33 Grafton Way | 14.15 | 14.04 | 14.04 | <0.01 |
| R3 | 46 Maple Street | 13.69 | 13.65 | 13.65 | <0.01 |
| R4 | 29 High Street/ Howland Street | 13.71 | 13.66 | 13.66 | <0.01 |
| R5 | 94 Tottenham Court Road | 13.84 | 13.78 | 13.78 | <0.01 |
| R6 | 108 Tottenham Court Road | 13.65 | 13.59 | 13.58 | <0.01 |
| R7 | 5-7 Goodge Street | 13.88 | 13.81 | 13.81 | <0.01 |
| R8 | 84 Cleveland Street | 13.59 | 13.56 | 13.56 | <0.01 |
| R9 | 166 New Cavendish Street | 13.65 | 13.61 | 13.61 | <0.01 |
| R10 | 56 Maple Street | 13.64 | 13.61 | 13.61 | <0.01 |
| R11 | 64 Goodge Street | 13.87 | 13.80 | 13.80 | <0.01 |
| R12 | 5 Mortimer Street | 13.92 | 13.84 | 13.84 | <0.01 |
| PR1 | On Site Receptor | 13.32 | 13.29 | 13.29 | <0.01 |
| PR2 | On Site Receptor | 13.38 | 13.34 | 13.34 | <0.01 |
| PR3 | On Site Receptor | 13.35 | 13.32 | 13.32 | <0.01 |
| PR4 | On Site Receptor | 13.31 | 13.28 | 13.28 | <0.01 |
| PR5 | On Site Receptor | 13.27 | 13.24 | 13.24 | <0.01 |
| **Annual Average AQO** | | **25 µg/m³** | | | |

As indicated in Table 6.12, the maximum predicted change in the annual average $PM_{2.5}$ concentration at all modelled existing receptors is <0.01 µg/m$^3$ at any modelled receptor.

All modelled existing and proposed receptor locations are predicted to be below the AQO for $PM_{2.5}$ in both the 'do minimum' and 'do something' scenarios.

The impact description of changes in traffic flow associated with the development with respect to annual mean $PM_{2.5}$ exposure has been assessed with reference to the criteria in section 3. The outcomes of the assessment are summarised in Table 6.13.

**Table 6.13 Impact Description of Effects at Key Receptors (Particulate Matter)**

| Impact Description of $PM_{2.5}$ Effects at Key Receptors | | | | | |
|---|---|---|---|---|---|
| **Receptor** | **Change Due to Development (DS-DM) (µg/m³)** | **% Change of AQO** | **% Change in Concentration Relative to AQO** | **% Annual Mean Concentration in Assessment Year** | **Impact Description** |
| R1 | <0.01 | 0.00 | 0% | ≤75% of AQO | Negligible |
| R2 | <0.01 | 0.00 | 0% | ≤75% of AQO | Negligible |
| R3 | <0.01 | 0.00 | 0% | ≤75% of AQO | Negligible |
| R4 | <0.01 | 0.00 | 0% | ≤75% of AQO | Negligible |
| R5 | <0.01 | 0.00 | 0% | ≤75% of AQO | Negligible |
| R6 | <0.01 | 0.00 | 0% | ≤75% of AQO | Negligible |
| R7 | <0.01 | 0.00 | 0% | ≤75% of AQO | Negligible |
| R8 | <0.01 | 0.00 | 0% | ≤75% of AQO | Negligible |
| R9 | <0.01 | 0.00 | 0% | ≤75% of AQO | Negligible |
| R10 | <0.01 | 0.00 | 0% | ≤75% of AQO | Negligible |
| R11 | <0.01 | 0.00 | 0% | ≤75% of AQO | Negligible |
| R12 | <0.01 | 0.00 | 0% | ≤75% of AQO | Negligible |
| PR1 | <0.01 | 0.00 | 0% | ≤75% of AQO | Negligible |
| PR2 | <0.01 | 0.00 | 0% | ≤75% of AQO | Negligible |
| PR3 | <0.01 | 0.00 | 0% | ≤75% of AQO | Negligible |
| PR4 | <0.01 | 0.00 | 0% | ≤75% of AQO | Negligible |
| PR5 | <0.01 | 0.00 | 0% | ≤75% of AQO | Negligible |
| *0% means a change of <0.5% as per explanatory note 2 of table 6.3 of the EPUK IAQM Guidance. | | | | | |

The impact description of any effects associated with the proposed development is determined to be 'negligible' at all modelled receptors, based on the methodology outlined in Section 3. Given the quantitative nature of the assessment and the verification of the air quality dispersion model, the confidence of the assessment is deemed to be 'high'.

# 7. Air Quality Neutral Assessment

## 7.1 Background

This Air Quality Neutral assessment considers the emissions of atmospheric pollutants from the development at source (i.e. from vehicles and building services plant) and compares the emissions with the benchmark levels that define neutrality.

The requirement for this Air Quality Neutral report is driven by:

- Policy 7.14 in the London Plan. The London Plan states: "development proposals should be at least 'air quality neutral' and not lead to further deterioration of existing poor air quality"; and
- The Mayor's Air Quality Strategy (MAQS). The MAQS includes a policy which states that "New developments in London shall as a minimum be 'air quality' neutral through the adoption of best practice in the management and mitigation of emissions."

The 'air quality neutral' policy is designed to address the problem of multiple new developments that individually add only a small increment to pollution at the point of human exposure (i.e. ambient concentrations), but cumulatively lead to baseline pollution levels creeping up. The policy requires Developers to design their schemes so that they are at least Air Quality Neutral in terms of emissions at source.

The Greater London Authority (GLA) Sustainable Design and Construction Supplementary Planning Guidance (SPG), published in April 2014, provides a formal definition for the term 'air quality neutral' and allows a transparent and consistent approach to demonstrating whether a development is 'air quality neutral'. This Air Quality Neutral assessment determines whether the proposed development is air quality neutral using the GLA SPG calculation method that separately quantifies building emissions (from heating and power plant) and transport emissions.

The GLA published a report titled "Air Quality Neutral Planning support update (GLA 80371)" in April 2014. This updated report provided a guidance note on the application of the air quality neutral policy.

## 7.2 Benchmark Emissions

### Buildings Emissions Benchmark

The GLA 80371 report has defined two Building Emission Benchmarks (BEB), one for $NO_x$ and one for $PM_{10}$, for a series of land-use classes. The benchmarks are expressed in terms of $g/m^2$/annum. The gross floor area (GFA) is used to define the area.

The derived BEBs for $NO_x$ and $PM_{10}$ Emissions are shown in Table 7.1.

**Table 7.1 Building Emissions Benchmarks**

| Land Use Class | $NO_x$ (g/m²) | $PM_{10}$ (g/m²) |
|---|---|---|
| Class A1 | 22.6 | 1.29 |
| Class A3- A5 | 75.2 | 4.32 |
| Class A2 and Class B1 | 30.8 | 1.77 |
| Class B2- B7 | 36.6 | 2.95 |
| Class B8 | 23.6 | 1.90 |
| Class C1 | 70.9 | 4.07 |
| Class C2 | 68.5 | 5.97 |
| Class C3 | 26.2 | 2.28 |
| D1 (a) | 43.0 | 2.47 |
| D1 (b) | 75.0 | 4.30 |
| Class D1(c -h) | 31.0 | 1.78 |
| Class D2(a-d) | 90.3 | 5.18 |
| Class D2(e) | 284 | 16.3 |

Note 1: These benchmarks have been calibrated for London.

### Transport Emissions Benchmarks

The derived Transport Emission Benchmarks (TEB) for $NO_x$ and $PM_{10}$ Emissions are shown in Table 7.2.

**Table 7.2 Transport Emissions Benchmarks**

| Land use | CAZ | Inner | Outer |
|---|---|---|---|
| **$NO_x$ (g/m²/annum)** | | | |
| Retail (A1) | 169 | 219 | 249 |
| Office (B1) | 1.27 | 11.4 | 68.5 |
| **$NO_x$ (g/m²/annum)** | | | |
| Residential (C3) | 234 | 558 | 1553 |
| **$PM_{10}$ (g/m²/annum)** | | | |
| Retail (A1) | 29.3 | 39.3 | 42.9 |
| Office (B1) | 0.22 | 2.05 | 11.8 |
| **$PM_{10}$ (g/dwelling/annum)** | | | |
| Residential (C3, C4) | 40.7 | 100 | 267 |

## 7.3 Air Quality Neutral Calculations

Change of use of the building from office (Class B1a use) to a non-residential education institution (Class D1 use). Due to the change of use, the traffic flows associated with the development are predicted to decrease, as outlined in the transport statement provided by Royal Haskoning DHV. As the development causes a decrease in traffic flows, the development can be determined to be air quality neutral.

# 8. Mitigation

## 8.1 Construction Phase

The dust risk categories have been determined in Section 5 for each of the four construction activities. The assessment has determined that the potential impact description of dust emissions associated with the construction phase of the proposed development is 'low risk' at the worst affected receptors. However, consideration should still be given to the following mitigation measures.

**Table 1 Highly Recommended Mitigation**

| **Communications** |
|---|
| Display the name and contact details of person(s) accountable for air quality and dust issues on the site boundary. This may be the environment manager/engineer or the site manager. |
| Display the head or regional office contact information. |
| **Dust Management** |
| Record all dust and air quality complaints, identify cause(s), 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 offsite, 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 an inspection log available to the local authority when asked. |
| Increase the frequency of site inspections 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 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 on site. |
| Avoid site runoff of water or mud. |
| 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. |
| 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 the 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. |
| Avoid bonfires and burning of waste materials. |
| **Earthworks** |
| No Action Required. |

| Construction |
|---|
| No Action Required. |
| **Trackout** |
| No Action Required. |

## Table 2 Desirable Mitigation

| Communications |
|---|
| No Action Required. |
| **Dust Management** |
| Develop and implement a Dust Management Plan (DMP), which may include measures to control other emissions, approved by the Local Authority. The level of detail will depend on the risk, and should include as a minimum the highly recommended measures in this document. The desirable measures should be included as appropriate for the site. In London additional measures may be required to ensure compliance with the Mayor of London's guidance. The DMP may include monitoring of dust deposition, dust flux, real time $PM_{10}$ continuous monitoring and/or visual inspections. |
| Undertake daily on-site and off-site inspection, where receptors (including roads) are nearby, to monitor dust, record inspection results, and make the log available to the local authority when asked. This should include regular dust soiling checks of surfaces such as street furniture, cars and window sills within 100m of site boundary, with cleaning to be provided if necessary. |
| Fully enclose site or specific operations where there is a high potential for dust production and the site is actives for an extensive period. |
| Keep site fencing, barriers and scaffolding clean using wet methods. |
| Remove materials that have a potential to produce dust from site as soon as possible, unless being re-used on site. If they are being re-used on-site cover as described below. |
| Cover, seed or fence stockpiles to prevent wind whipping. |
| Impose and signpost a maximum-speed-limit of 15 mph on surfaced and 10 mph on un-surfaced haul roads 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). |
| 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. |
| **Earthworks** |
| No Action Required. |
| **Construction** |
| Avoid scabbling (roughening of concrete surfaces) if possible. |
| 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. |
| **Trackout** |
| Use water-assisted dust sweeper(s) on the access and local roads, to remove, as necessary, any material tracked out of the site. This may require the sweeper being continuously in use. |
| Avoid dry sweeping of large areas. |

| |
|---|
| Ensure vehicles entering and leaving sites are covered to prevent escape of materials during transport. |
| Record all inspections of haul routes and any subsequent action in a site log book. |
| Implement a wheel washing system (with rumble grids to dislodge accumulated dust and mud prior to leaving the site where reasonably practicable). |

Following the implementation of the mitigation measures detailed in the tables above, the impact description of the construction phase is not considered to be significant.

# 9. Conclusions

WYG have undertaken an Air Quality Assessment for the proposed refurbishment and change of use of Boston House, Fitzroy Square, W1T 6EY. The application shall be for the change of use of Boston House, 36-38 Fitzroy Square, London, W1T 6EY from office (Class B1a) to a non-residential education institution (Class D1) including internal alterations.

**Construction**

Prior to the implementation of appropriate mitigation measures, the potential impact description of dust emissions associated with the construction phase of the proposed development has potential as 'medium' at some worst affected receptors without mitigation. However, appropriate site-specific mitigation measures have been recommended based on Section 8.2 of the IAQM Guidance on the Assessment of Dust from Earthworks, Construction and Trackout. It is anticipated that with these appropriate mitigation measures in place, the risk of adverse effects due to emissions from the construction phase will not be significant.

**Operational**

An assessment of construction traffic emissions has been undertaken for an assessment year of 2021.

The 2021 assessment of the effect of emissions from traffic associated with the scheme, has determined that the maximum predicted increase in the annual average exposure to $NO_2$ at any existing receptor is likely to be <0.01 µg/m$^3$ at any modelled receptor.

For $PM_{10}$, the maximum predicted increase in the annual average exposure is likely to be <0.01 µg/m$^3$ at any modelled receptor. For $PM_{2.5}$, the maximum predicted increase in the annual average exposure is likely to be <0.01 µg/m$^3$ at any modelled receptor.

The significance of the effects of changes in traffic flow as a result of the proposed development, with respect to $NO_2$, $PM_{10}$ and $PM_{2.5}$ exposures, significance is determined to be 'negligible' at all identified receptor locations.

**Air Quality Neutral**

The Air Quality Neutral assessment has determined that the Building Emissions and Transport Emissions associated with the proposed development are below the defined benchmarks. Therefore, the proposed development is determined to be Air Quality Neutral and no additional mitigation measures are required.

# Figures

**Figure 2 Air Quality Assessment Area**

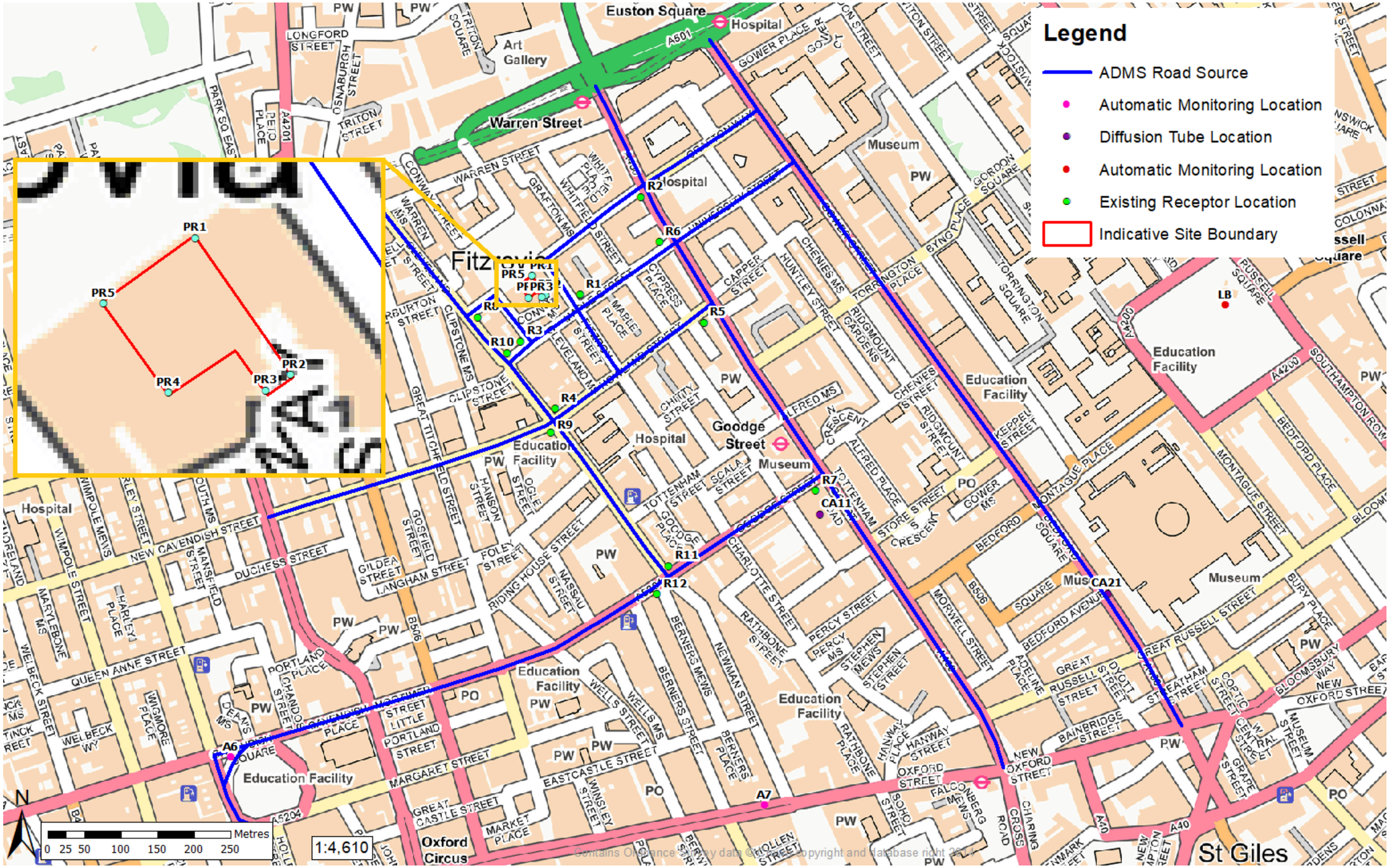
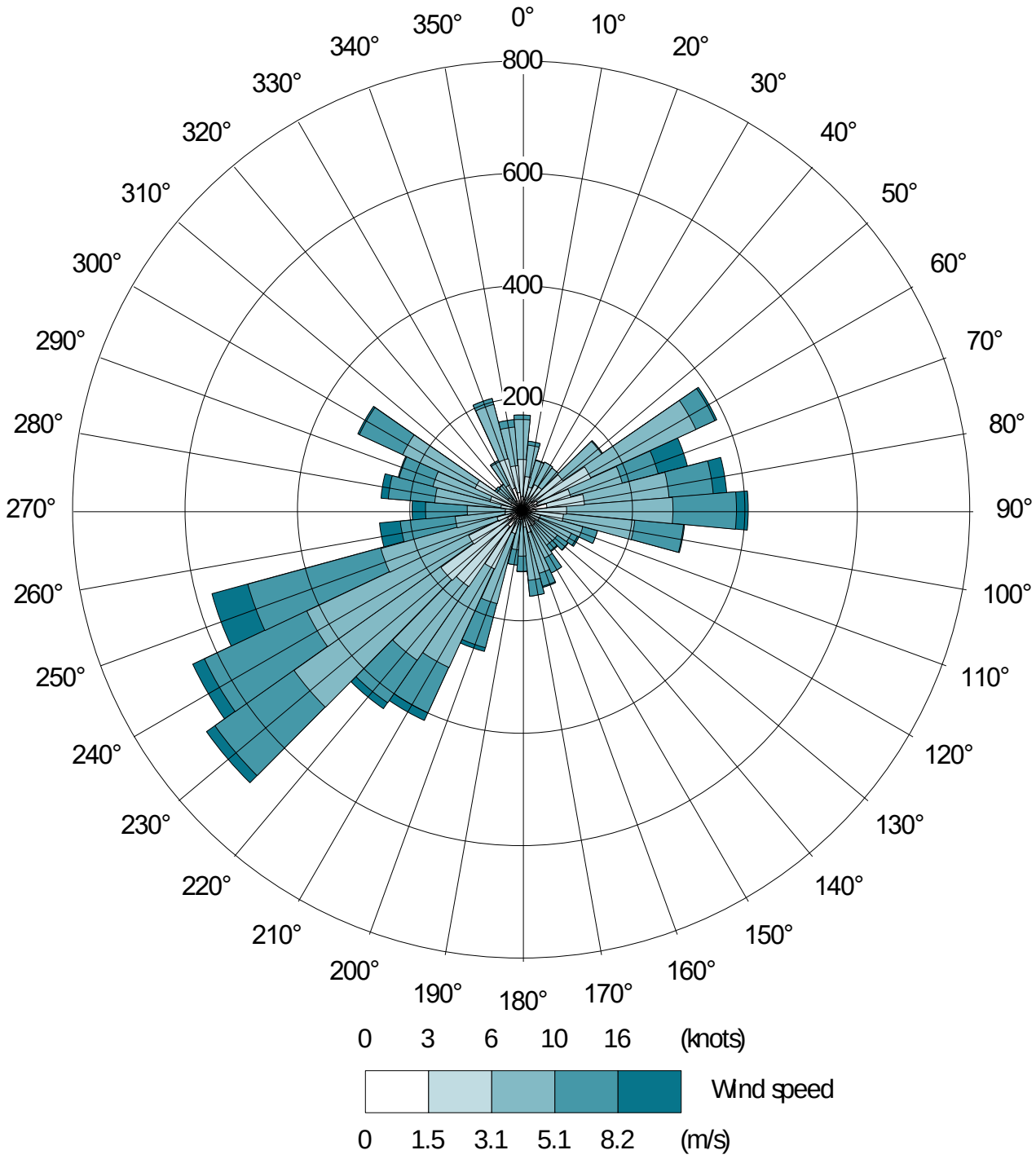


**Figure 2 London City 2018 Meteorological Station Wind Rose**



# Appendix A Construction Phase Assessment Methodology

The following information sets out the adopted approach to the construction phase impact assessment in accordance with the aforementioned IAQM guidance[2].

**Step 1 – Screen the Requirement for a more Detailed Assessment**

An assessment is required if there are sensitive receptors within 350m of the site boundary, within 50m of the route(s) used by construction vehicles on the surrounding road network, or within 500m from the site entrance. A detailed assessment is also required if there is an ecological receptor within 50m of the site boundary.

**Step 2A – Define the Potential Dust Emission Magnitude**

*Demolition*

The dust emission magnitude for the demolition phase has been determined based on the below criteria:

- *Large*: Total building volume >50 000m$^3$, potentially dusty construction (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 10-20m 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*

The dust emission magnitude for the planned earthworks has been determined based on the below criteria:

- *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 >8m in height, total material moved >100 000 tonnes;
- *Medium*: Total site area 2 500m$^2$ – 10 000m$^2$, moderately dusty soil type (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 <2 500 m$^2$, 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 <10 000 tonnes, earthworks during wetter months.

*Construction*

The dust emission magnitude for the construction phase has been determined based on the below criteria:

- *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 dust emission magnitude for trackout has been determined based on the below criteria:

- *Large:* >50 HGV (>3.5t) outward movements in any one day, potentially dusty surface material (e.g. high clay content), unpaved road length >100m;

[2] Institute of Air Quality Management 2014. *Guidance on the Assessment of dust from demolition and construction.*

- *Medium:* 10-50 HGV (>3.5t) outward movements in any one day, moderately dusty surface material (e.g. high clay content), unpaved road length 50m – 100m; and,
- *Small:* <10 HGV (>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**

*Sensitivities of People to Dust Soiling Effects*

- *High:*
  - Users can reasonably expect an enjoyment of a high level of amenity;
  - The appearance, aesthetics or value of their property would be diminished by soiling; and the people or property would reasonably expect to be present continuously, or at least regularly for extended periods, as part of the normal pattern of use of the land; and,
  - Indicative examples include dwellings, museums and other culturally important collections, medium and long term car parks and car showrooms.
- *Medium:*
  - Users can reasonably 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; and,
  - Indicative examples include parks and places of work.
- *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 land; and,
  - Indicative examples include playing fields, farmland (unless commercially-sensitive horticultural), footpaths, short term car parks and roads.

The sensitivity of the area should be derived for each of the four activities: demolition, construction, earthworks and trackout, using the following table:

**Table 19– Sensitivity of the Area to Dust Soiling Effects 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 |

*Note* - The likely routes the construction traffic will use should also be included to enable the presence of trackout receptors to be included in the assessment. As a general guidance, without site-specific mitigation, trackout may occur along the public highway up to 500 m from large sites (as defined in step 2A), 200 m from medium sites and 50 m from small sites, as measured from the site exit.

*Sensitivities of People to the Health Effects of* $PM_{10}$

- *High:*
  - Locations where members of the public are exposed over a time period relevant to the air quality objective for $PM_{10}$ (in the case of the 24-hour objectives, a relevant location would be one where individuals may be exposed for eight hours or more in a day);
  - Indicative examples include residential properties. Hospitals, schools and residential care homes should also be considered as having equal sensitivity to residential areas for the purposes of this assessment.
- *Medium:*
  - Locations where the people exposed are workers, and exposure is over a time period relevant to the air quality objective for $PM_{10}$ (in the case of the 24-hour objectives, a relevant location would be one where individuals may be exposed for eight hours or more in a day); and,
  - Indicative examples include office and shop workers, but will generally not include workers occupationally exposed to $PM_{10}$, as protection is covered by Health and Safety at Work legislation.
- *Low:*
  - Locations where human exposure is transient; and,
  - Indicative examples include public footpaths, playing fields, parks and shopping streets.

The sensitivity of the area should be derived for each of the four activities: demolition, construction, earthworks and trackout, using the following table:

**Table 20 - Sensitivity of the Area to Human Health Impacts**

| Receptor Sensitivity | Annual Mean $PM_{10}$ Concentration | Number of Receptors | Distance from the Source (m) | | | | |
|---|---|---|---|---|---|---|---|
| | | | <20 | <50 | <100 | <200 | <350 |
| High | >32 · g/m$^3$ | >100 | High | High | High | Medium | Low |
| | | 10-100 | High | High | Medium | Low | Low |
| | | 1-10 | High | Medium | Low | Low | Low |
| | 28 - 32 · g/m$^3$ | >100 | High | High | Medium | Low | Low |
| | | 10-100 | High | Medium | Low | Low | Low |
| | | 1-10 | High | Medium | Low | Low | Low |
| | 24 – 28 · g/m$^3$ | >100 | High | Medium | Low | Low | Low |
| | | 10-100 | High | Medium | Low | Low | Low |
| | | 1-10 | Medium | Low | Low | Low | Low |
| | <24 · g/m$^3$ | >100 | Medium | Low | Low | Low | Low |
| | | 10-100 | Low | Low | Low | Low | Low |
| | | 1-10 | Low | Low | Low | Low | Low |
| Medium | - | >10 | High | Medium | Low | Low | Low |
| | - | 1-10 | Medium | Low | Low | Low | Low |
| Low | - | >1 | Low | Low | Low | Low | Low |

*Note* - The likely routes the construction traffic will use should also be included to enable the presence of trackout receptors to be included in the assessment. As a general guidance, without site-specific mitigation, trackout may occur along the public highway up to 500 m from large sites (as defined in step 2A), 200 m from medium sites and 50 m from small sites, as measured from the site exit.

*Sensitivities of Receptors to Ecological Effects*

- *High:*
  - 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 Data List for Great Britain; and,
  - Indicative examples include a Special Area of Conservation (SAC) designated for acid heathlands or a local site designated for lichens adjacent to the demolition of a large site containing concrete (alkali) buildings.

- *Medium:*
  - 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; and,
  - Indicative example is a Site of Special Scientific Interest (SSSI) with dust sensitive features.
- *Low:*
  - Locations with a local designation where the features may be affected by dust deposition; and,
  - Indicative example is a local Nature Reserve with dust sensitive features.

The sensitivity of the area should be derived for each of the four activities: demolition, construction, earthworks and trackout, using the following table:

**Table 21 - Sensitivity of the Area to Ecological Impacts**

| Receptor Sensitivity | Distance from Source (m) | |
|---|---|---|
| | <20 | <50 |
| High | High | Medium |
| Medium | Medium | Low |
| Low | Low | Low |

*Note* - The likely routes the construction traffic will use should also be included to enable the presence of trackout receptors to be included in the assessment. As a general guidance, without site-specific mitigation, trackout may occur along the public highway up to 500 m from large sites (as defined in step 2A), 200 m from medium sites and 50 m from small sites, as measured from the site exit.

**Step 2C - Defining the Risk of Impacts**

The risk of impacts with no mitigation is determined by combining the dust emission magnitude determined in Step 2A and the sensitivity of the area determined in Step 2B.

The following tables provide a method of assigning the level of risk for each activity.

*Demolition*

**Table 22 - Risk of Dust Impacts, Demolition**

| Sensitivity of Area | Dust Emission Magnitude | | |
|---|---|---|---|
| | Large | Medium | Small |
| High | High Risk | Medium Risk | Medium Risk |
| Medium | High Risk | Medium Risk | Low Risk |
| Low | Medium Risk | Low Risk | Negligible |

*Earthworks*

**Table 23 - Risk of Dust Impacts, Earthworks**

| Sensitivity of Area | Dust Emission Magnitude | | |
|---|---|---|---|
| | Large | Medium | Small |
| High | High Risk | Medium Risk | Low Risk |
| Medium | Medium Risk | Medium Risk | Low Risk |
| Low | Low Risk | Low Risk | Negligible |

*Construction*

**Table 24 - Risk of Dust Impacts, Construction**

| Sensitivity of Area | Dust Emission Magnitude | | |
|---|---|---|---|
| | Large | Medium | Small |
| High | High Risk | Medium Risk | Low Risk |
| Medium | Medium Risk | Medium Risk | Low Risk |
| Low | Low Risk | Low Risk | Negligible |

*Trackout*

**Table 25 - Risk of Dust Impacts, Trackout**

| Sensitivity of Area | Dust Emission Magnitude | | |
|---|---|---|---|
| | Large | Medium | Small |
| High | High Risk | Medium Risk | Low Risk |
| Medium | Medium Risk | Low Risk | Negligible |
| Low | Low Risk | Low Risk | Negligible |

**Step 3 – Site Specific Mitigation**

The dust risk categories for each of the four activities determined in Step 2C should be used to define the appropriate, site-specific mitigation measures to be adopted.

These mitigation measures are contained within section 8.2 of the IAQM Guidance on the Assessment of Dust from Demolition and Construction.

# Appendix B Theoretical Scenario Results

The results in this section represent a worst-case scenario assuming no improvement in future emissions.

Nitrogen Dioxide

Table B1 presents a summary of the predicted change in $NO_2$ concentrations at relevant receptor locations, due to changes in traffic flow associated with the development, based on modelled 'do minimum' and 'do something' scenarios.

**Table B1 Predicted Annual Average Concentrations of $NO_2$ at Receptor Locations**

| Receptor | | $NO_2$ (µg/m$^3$) | | | |
|---|---|---|---|---|---|
| | | Baseline 2018 | Do Minimum 2021 | Do Something 2021 | Development Contribution |
| R1 | 30 Fitzroy Street | 47.15 | 47.65 | 47.64 | -0.01 |
| R2 | 33 Grafton Way | 51.36 | 52.06 | 52.05 | -0.01 |
| R3 | 46 Maple Street | 46.31 | 46.62 | 46.62 | <0.01 |
| R4 | 29 High Street/ Howland Street | 45.92 | 46.17 | 46.17 | <0.01 |
| R5 | 94 Tottenham Court Road | 46.98 | 47.27 | 47.26 | -0.01 |
| R6 | 108 Tottenham Court Road | 46.57 | 46.95 | 46.94 | -0.01 |
| R7 | 5-7 Goodge Street | 47.28 | 47.57 | 47.57 | <0.01 |
| R8 | 84 Cleveland Street | 45.32 | 45.54 | 45.54 | <0.01 |
| R9 | 166 New Cavendish Street | 45.38 | 45.60 | 45.60 | <0.01 |
| R10 | 56 Maple Street | 45.59 | 45.86 | 45.86 | <0.01 |
| R11 | 64 Goodge Street | 47.91 | 48.27 | 48.26 | -0.01 |
| R12 | 5 Mortimer Street | 48.33 | 48.68 | 48.68 | <0.01 |
| PR1 | On Site Receptor | 44.26 | 44.51 | 44.51 | <0.01 |
| PR2 | On Site Receptor | 44.78 | 45.08 | 45.08 | <0.01 |
| PR3 | On Site Receptor | 44.52 | 44.79 | 44.79 | <0.01 |
| PR4 | On Site Receptor | 44.14 | 44.37 | 44.36 | -0.01 |
| PR5 | On Site Receptor | 43.78 | 43.98 | 43.98 | <0.01 |
| **Annual Average AQO** | | **40 µg/m$^3$** | | | |

As indicated in Table B1, the maximum predicted change in the annual average $NO_2$ concentration at all modelled existing receptors is <0.01 µg/m$^3$ at any modelled receptor.

All proposed receptors predict $NO_2$ concentrations of below 60 µg/m$^3$ in all scenarios. Therefore, it is unlikely for any exceedances of the short-term $NO_2$ AQO to occur as outlined in LAQM TG16 technical guidance.

The impact description of changes in traffic flow associated with the development with respect to annual mean $NO_2$ exposure has been assessed with reference to the criteria in Section 3. The outcomes of the assessment are summarised in Table B2.

**Table B2 Impact Description of Effects at Key Receptors ($NO_2$)**

| Impact Description of $NO_2$ Effects at Key Receptors | | | | | |
|---|---|---|---|---|---|
| Receptor | Change Due to Development (DS-DM) (µg/m³) | % Change of AQO | % Change in Concentration Relative to AQO | % Annual Mean Concentration in Assessment Year | Impact Description |
| R1 | -0.01 | -0.02 | 0% | ≥110 of AQO | Negligible |
| R2 | -0.01 | -0.02 | 0% | ≥110 of AQO | Negligible |
| R3 | <0.01 | 0.00 | 0% | ≥110 of AQO | Negligible |
| R4 | <0.01 | 0.00 | 0% | ≥110 of AQO | Negligible |
| R5 | -0.01 | -0.02 | 0% | ≥110 of AQO | Negligible |
| R6 | -0.01 | -0.02 | 0% | ≥110 of AQO | Negligible |
| R7 | <0.01 | 0.00 | 0% | ≥110 of AQO | Negligible |
| R8 | <0.01 | 0.00 | 0% | ≥110 of AQO | Negligible |
| R9 | <0.01 | 0.00 | 0% | ≥110 of AQO | Negligible |
| R10 | <0.01 | 0.00 | 0% | ≥110 of AQO | Negligible |
| R11 | -0.01 | -0.02 | 0% | ≥110 of AQO | Negligible |
| R12 | <0.01 | 0.00 | 0% | ≥110 of AQO | Negligible |
| PR1 | <0.01 | 0.00 | 0% | ≥110 of AQO | Negligible |
| PR2 | <0.01 | 0.00 | 0% | ≥110 of AQO | Negligible |
| PR3 | <0.01 | 0.00 | 0% | ≥110 of AQO | Negligible |
| PR4 | -0.01 | -0.02 | 0% | ≥110 of AQO | Negligible |
| PR5 | <0.01 | 0.00 | 0% | ≥110 of AQO | Negligible |
| *0% means a change of <0.5% as per explanatory note 2 of table 6.3 of the EPUK IAQM Guidance. | | | | | |

The impact description of any effects associated with the proposed development is determined to be 'negligible' at all modelled receptors, based on the methodology outlined in Section 3. Given the quantitative nature of the assessment and the verification of the air quality dispersion model, the confidence of the assessment is deemed to be 'high'.

Particulate Matter ($PM_{10}$)

Table B3 presents a summary of the predicted change in annual mean $PM_{10}$ concentrations at relevant receptor locations, due to changes in traffic flow associated with the development, based on modelled 'do minimum' and 'do something' scenarios.

**Table B3 Predicted Annual Average Concentrations of $PM_{10}$ at Receptor Locations**

| Receptor | | $PM_{10}$ (µg/m³) | | | |
|---|---|---|---|---|---|
| | | Baseline 2018 | Do Minimum 2021 | Do Something 2021 | Development Contribution |
| R1 | 30 Fitzroy Street | 20.58 | 20.65 | 20.65 | <0.01 |
| R2 | 33 Grafton Way | 21.40 | 21.50 | 21.50 | <0.01 |
| R3 | 46 Maple Street | 20.34 | 20.38 | 20.38 | <0.01 |
| R4 | 29 High Street/ Howland Street | 20.37 | 20.41 | 20.41 | <0.01 |
| R5 | 94 Tottenham Court Road | 20.59 | 20.63 | 20.63 | <0.01 |

| Receptor | | $PM_{10}$ (µg/m³) | | | |
|---|---|---|---|---|---|
| | | Baseline 2018 | Do Minimum 2021 | Do Something 2021 | Development Contribution |
| R6 | 108 Tottenham Court Road | 20.57 | 20.63 | 20.63 | <0.01 |
| R7 | 5-7 Goodge Street | 20.65 | 20.70 | 20.70 | <0.01 |
| R8 | 84 Cleveland Street | 20.19 | 20.22 | 20.22 | <0.01 |
| R9 | 166 New Cavendish Street | 20.27 | 20.31 | 20.31 | <0.01 |
| R10 | 56 Maple Street | 20.27 | 20.31 | 20.31 | <0.01 |
| R11 | 64 Goodge Street | 20.61 | 20.66 | 20.66 | <0.01 |
| R12 | 5 Mortimer Street | 20.69 | 20.74 | 20.74 | <0.01 |
| PR1 | On Site Receptor | 20.03 | 20.07 | 20.07 | <0.01 |
| PR2 | On Site Receptor | 20.13 | 20.17 | 20.17 | <0.01 |
| PR3 | On Site Receptor | 20.09 | 20.13 | 20.13 | <0.01 |
| PR4 | On Site Receptor | 20.02 | 20.05 | 20.05 | <0.01 |
| PR5 | On Site Receptor | 19.96 | 19.99 | 19.99 | <0.01 |
| **Annual Average AQO** | | **40 µg/m³** | | | |

As indicated in Table B3, the maximum predicted change in the annual average $PM_{10}$ concentrations at all modelled existing receptors is <0.01 µg/m³ at any modelled receptor.

All modelled existing and proposed receptor locations are predicted to be below the AQO for $PM_{10}$ in both the 'do minimum' and 'do something' scenarios.

Particulate Matter ($PM_{2.5}$)

Table B4 presents a summary of the predicted change in annual mean $PM_{2.5}$ concentrations at relevant receptor locations, due to changes in traffic flow associated with the development, based on modelled 'do minimum' and 'do something' scenarios.

**Table B4 Predicted Annual Average Concentrations of $PM_{2.5}$ at Receptor Locations**

| Receptor | | $PM_{2.5}$ (µg/m³) | | | |
|---|---|---|---|---|---|
| | | Baseline 2018 | Do Minimum 2021 | Do Something 2021 | Development Contribution |
| R1 | 30 Fitzroy Street | 13.65 | 13.70 | 13.70 | <0.01 |
| R2 | 33 Grafton Way | 14.15 | 14.21 | 14.21 | <0.01 |
| R3 | 46 Maple Street | 13.69 | 13.72 | 13.72 | <0.01 |
| R4 | 29 High Street/ Howland Street | 13.71 | 13.73 | 13.73 | <0.01 |
| R5 | 94 Tottenham Court Road | 13.84 | 13.86 | 13.86 | <0.01 |
| R6 | 108 Tottenham Court Road | 13.65 | 13.68 | 13.68 | <0.01 |
| R7 | 5-7 Goodge Street | 13.88 | 13.90 | 13.90 | <0.01 |
| R8 | 84 Cleveland Street | 13.59 | 13.61 | 13.61 | <0.01 |
| R9 | 166 New Cavendish Street | 13.65 | 13.67 | 13.67 | <0.01 |
| R10 | 56 Maple Street | 13.64 | 13.67 | 13.67 | <0.01 |
| R11 | 64 Goodge Street | 13.87 | 13.90 | 13.90 | <0.01 |
| R12 | 5 Mortimer Street | 13.92 | 13.95 | 13.95 | <0.01 |
| PR1 | On Site Receptor | 13.32 | 13.34 | 13.34 | <0.01 |

| Receptor | | $PM_{2.5}$ (µg/m³) | | | |
|---|---|---|---|---|---|
| | | Baseline 2018 | Do Minimum 2021 | Do Something 2021 | Development Contribution |
| PR2 | On Site Receptor | 13.38 | 13.40 | 13.40 | <0.01 |
| PR3 | On Site Receptor | 13.35 | 13.37 | 13.37 | <0.01 |
| PR4 | On Site Receptor | 13.31 | 13.33 | 13.33 | <0.01 |
| PR5 | On Site Receptor | 13.27 | 13.29 | 13.29 | <0.01 |
| **Annual Average AQO** | | **25 µg/m³** | | | |

As indicated in Table B4, the maximum predicted change in the annual average $PM_{2.5}$ concentration at all modelled existing receptors is <0.01 µg/m³ at any modelled receptor.

All modelled existing and proposed receptor locations are predicted to be below the AQO for $PM_{2.5}$ in both the 'do minimum' and 'do something' scenarios.

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