REPORT

7ABC Bayham Street - Air Quality Assessment

Air Quality Assessment

Client: Camden Lifestyle (UK) Limited

Reference: PB7760I&BRP1806071049

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1 Introduction

This air quality report is submitted as part of a detailed planning application for a proposed mixed use co-working office and hotel development, located at 7ABC Bayham Street, Camden. Consideration of air quality impacts was requested as part of the pre-application development advice provided by London Borough of Camden Council (LBCC).

This report provides a review of existing air quality in proximity to the proposed development and considers the suitability of the development site for intended use. Baseline conditions and potential impacts associated with proposed energy and heating plant, changes in traffic levels and dust generated during the construction and operational phases were all considered and screened out where impacts are likely to be insignificant.

1.1 Site Description and Surrounding Area

The site is located on Bayham Street, Camden, north of the Bayham Place intersection. The site is in an urban area with existing commercial, retail and residential uses. The site is bounded to the north by office and residential uses, to the west by commercial properties fronting Camden High Street, to the south by office uses and to the west by Bayham Street and high rise residential blocks.

The development will fully replace the existing one and two storey office structures forming 7ABC, Bayham Street.

The development is located within the Camden Air Quality Management Area (AQMA) which is a borough wide statutory designation in relation to annual mean NO_2 and short term PM_{10} concentrations.

The site plan and location is detailed in **Figure 1**.

Figure 1 Site Plan

1.2 Development Proposals

The development proposal is as follows:

"Full Planning Application for the demolition of existing buildings (B1a Use Class) and erection of a 5 storey building, comprising co-working office floorspace (B1a Use Class), hotel accommodation (C1 Use Class) and an ancillary café/bar and gym/fitness facilities; works to the existing access and associated works".

The development proposal is a new build structure and will involve the removal of the existing structures. No car parking provision for tenants or customers is provided as part of the proposed development.

2 Legislative Framework and Planning Policy

2.1 National Legislation

2.1.1 The Air Quality Strategy

Air pollution can have adverse effects on the health of humans and ecosystems. European Union (EU) legislation forms the basis for UK air quality policy. The EU Air Quality Framework Directive 96/62/EC on Ambient Air Quality Assessment and Management entered into force in September 1996[1]. This was a framework for tackling air quality through setting European-wide air quality limit values in a series of Daughter Directives, prescribing how air quality should be assessed and managed by the Member States. Directive 96/62/EC and the first three Daughter Directives were combined to form the new EU Directive 2008/50/EC[2] on Ambient Air Quality and Cleaner Air for Europe, which came into force June 2008.

The 1995 Environment Act[3] required the preparation of a national Air Quality Strategy (AQS) which set air quality standards and Objectives for specified pollutants. The Act also outlined measures to be taken by local planning authorities in relation to meeting these standards and Objectives (the Local Air Quality Management (LAQM) system).

The UK AQS was originally adopted in 1997[4] and has been reviewed and updated in order to take account of the evolving EU Legislation, technical and policy developments and the latest information on health effects of air pollution. The strategy was revised and reissued in 2000 as the AQS for England, Scotland, Wales and Northern Ireland[5]. This was subsequently amended in 2003[6] and was last updated in July 2007[7].

The standards and Objectives relevant to the LAQM framework have been prescribed through the Air Quality (England) Regulations (2000)[8], and the Air Quality (England) (Amendment) Regulations 2002[9]; the Air Quality Standards Regulations 2010 set out the combined Daughter Directive limit values and interim targets for Member State compliance[10].

The current air quality standards and Objectives (for the purpose of LAQM) of relevance to this assessment are outlined in **Table 1**. Pollutant standards relate to ambient pollutant concentrations in air, set on the basis of medical and scientific evidence of how each pollutant affects human health. Pollutant Objectives however incorporate future dates by which each standard is to be achieved, taking into account economic considerations, practicability and technical feasibility.

Where an air quality Objective is unlikely to be met by the relevant deadline, local authorities must designate those areas as Air Quality Management Areas (AQMAs) and take action, along with others, to work towards meeting the Objectives. Following the designation of an AQMA, local authorities are required to develop an Air Quality Action Plan (AQAP) to work towards meeting the Objectives and improve air quality locally.

[1] European Parliament (1996) Council Directive 96/62/EC on Ambient Air Quality Assessment and Management.
[2] European Parliament (2008) Council Directive 2008/50/EC on Ambient Air Quality and Cleaner Air for Europe.
[3] HMSO (1995) 'The Environment Act 1995 (c.25)', London:TSO.
[4] Department of the Environment (DoE) (1997) 'The UK National Air Quality Strategy', London: HMSO.
[5] Department of the Environment, Transport & the Regions (DETR) (2000) 'UK Air Quality Strategy'. London:HMSO.
[6] DETR (2003) 'UK Air Quality Strategy- Addendum'. London:HMSO.
[7] Department for Environment, Food and Rural Affairs (Defra) (2007) 'The Air Quality Strategy for England, Scotland, Wales and Northern Ireland', London:HMSO.
[8] HMSO (2000) 'Statutory Instrument 2000 No. 928, The Air Quality (England) Regulations 2000', London:HMSO.
[9] HMSO (2002) 'Statutory Instrument 2002 No. 3043, The Air Quality (England) (Amendment) Regulations 2002', London:HMSO.
[10] HMSO (2010) 'Statutory Instrument 2010 No. 1001, Air Quality Standards (England) Regulations, 2010'. London:HMSO.

Possible exceedances of air quality Objectives are usually assessed in relation to those locations where members of the public are likely to be regularly present and are likely to be exposed for a period of time appropriate to the averaging period of the Objective.

Table 1: Air Quality Strategy Objectives (England) for the Purpose of Local Air Quality Management

Pollutant	Air Quality Objective		To be Achieved by
	Concentration	Measured as*	
Nitrogen dioxide (NO_2)	200µg.m^{-3}	1 hour mean not to be exceeded more than 18 times per year	31/12/2005
	40µg.m^{-3}	Annual mean	31/12/2005
Particles (PM_{10})	50µg.m^{-3}	24-hour mean not to be exceeded more than 35 times per year	31/12/2004
	40µg.m^{-3}	Annual mean	31/12/2004
Particles ($PM_{2.5}$)	25µg.m^{-3}	Annual mean (target)	2020
	15% cut in annual mean (urban background exposure)		2010 - 2020

Note: * how the Objectives are to be measured is set out in the UK Air Quality (England) Regulations (2000)

2.2 National Policy Guidance

2.2.1 National Planning Policy Framework

The National Planning Policy Framework[11] (NPPF) was adopted in March 2012 and refers to the Local Air Quality Management process by recognising that:

> *'Planning policies should sustain compliance with and contribute towards EU limit values or national Objectives for pollutants, taking into account the presence of Air Quality Management Areas and the cumulative impacts on air quality from individual sites in local areas.'*

The NPPF[12] identifies that local planning authorities should maintain consistency within the Local Air Quality Management process and states that:

> *'Planning decisions should ensure that any new development within Air Quality Management Areas is consistent with the local Air Quality Action Plan.'*

2.2.2 Planning Practice Guidance

The government's Planning Practice Guidance provides guidance on how the planning process can take account of the impact new development may have on air quality.

The guidance states that air quality may be relevant to a planning application where:

- Traffic in the vicinity of the development may be affected by increasing volume or congestion or altering the fleet composition on local roads;
- New point sources of air pollution are to be introduced;
- People may be exposed to existing sources of pollution;
- Potentially unacceptable impacts (such as dust) may arise during construction; and
- Biodiversity may be affected.

[11] Department for Communities and Local Government (DCLG) (2012) National Planning Policy Framework

2.3 Regional Planning Guidance

2.3.1 London Plan 2015

In 2015, the Mayor of London adopted the Further Alterations to the London Plan[12] (FALP) document. The FALP policies are operative from March 2015 and form part of the development plan for Greater London.

Policy 7.14 '*Improving Air Quality*' of the FALP document states:

"*Development proposals should:*

a) *minimise increased exposure to existing poor air quality and make provision to address local problems of air quality (particularly within Air Quality Management Areas (AQMAs) and where development is likely to be used by large numbers of those particularly vulnerable to poor air quality, such as children or older people) such as by design solutions, buffer zones or steps to promote greater use of sustainable transport modes through travel plans;*
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; and*
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 requirements of this policy were considered in the air quality assessment.

2.4 Local Planning Policy Guidance

LBCC published its Local Plan[13] in 2017. A review of the Local Plan document identified the following policies relevant to air quality:

"Policy CC 4 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.

[12] Further Alterations to the London Plan, 2015, available at URL: http://www.london.gov.uk/priorities/planning/london-plan/further-alterations-to-the-london-plan
[13] *London Borough of Camden Council (2017) Camden Local Plan, Adopted 2017*

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."

The local plan clearly identifies that air pollution is a material planning consideration, and has an increased importance when considering developments, which have the potential to affect, the designated AQMA.

The requirements of this policy were considered in the air quality assessment.

3 Methodology and Assessment Criteria

3.1 Data Sources

The assessment was undertaken with reference to information from a number of sources, as detailed in **Table 2.**

Table 2: Key Information Sources

Data Source	Reference
London Borough of Camden Council (LBCC)	2016 Air Quality Annual Status Report (ASR) for 2016. Submitted 4th May 2017
Department for Environment Food and Rural Affairs (Defra)	Defra (2016): *Local Air Quality Management Technical Guidance TG(16)*
Defra's LAQM Support Tools	Defra (2017): *Local Air Quality Management 1km x 1 km grid background pollutant maps*
Institute of Air Quality Management (IAQM)	IAQM (2014): *Guidance on the Assessment of Dust from Demolition and Construction*[14]
IAQM and Environmental Protection UK (EPUK)	IAQM & EPUK (2017): *Land-use Planning & Development Control: Planning for Air Quality*[15]

3.2 Consultation

The proposed development lies within the administrative area of LBCC. Consultation was undertaken with the LBCC Environmental Health Officer (EHO) by telephone in April 2018. The EHO stated that advice for specific applications could not be provided, however an explanation of the LAQM obligations and policies adopted in Camden was discussed.

The methodology of this report was therefore designed to satisfy the planning requirements of the pre-application advice in line with local and regional air quality policy guidance.

3.2.1 Scope of Assessment

The following scope of assessment was considered appropriate based on development design aspects and practitioner guidance.

Impacts Associated with Construction Dust

An assessment of potential impacts associated with the construction phase was undertaken in accordance with Greater London Authority (GLA) and London Council's guidance [16]. The construction works associated with the proposed development have the potential to impact on local air quality conditions as described below:

- Dust emissions generated by construction and earthwork activities associated with the demolition of existing buildings and construction of the proposed building;
- Emissions of exhaust pollutants, especially NO_2 and PM_{10} from construction traffic on the local

[14] *Institute of Air Quality Management – 2014 IAQM Guidance on the assessment of dust from demolition and construction, Institute of Air Quality Management, London*
[15] Environmental Protection UK and Institute of Air Quality Management, 2017, Land-use Planning & Development Control: Planning for Air Quality. v1.2. Institute of Air Quality Management
[16] Greater London Authority (GLA) and London Councils (2014); The Control of Dust and Emissions During Construction and Demolition

road network, have the potential to impact upon local air quality at sensitive receptors situated adjacent to the routes utilised by construction vehicles; and,

- Emissions of PM_{10} from non-road mobile machinery (NRMM) operating within the proposed development site have the potential to impact local air quality at sensitive receptors in close proximity to the works.

Impacts Associated with Changes in Road Vehicle Movements

There is potential for air quality impacts where a development generates additional vehicle movements on the local road network. Impacts associated with development-generated road movements were therefore compared to IAQM and EPUK[15] screening criteria to determine whether detailed consideration would be required.

As the project does not provide any parking provision for the hotel/office tenants or retail customers, the operational phase of the development is unlikely to have a significant impact upon local receptors, including within the statutory designated Camden AQMA. It has also been confirmed that HDV movements are unlikely to exceed the most stringent IAQM and EPUK[15] criteria, of 25 movements per day, during the construction phase.

Therefore, a detailed assessment of operational or construction phase road traffic emissions **is not required**.

Combustion Sources Associated with Heat and Power Requirements

A centralised water heating system is proposed in order to increase efficiencies in fuel use and building emissions compared to individual units. The choice of on-site combustion sources also reduces the contribution to CO_2 emissions compared to electrical heating systems.

The development is expected to include a natural gas-fuelled condensing boiler unit, meeting all current emission limits, of less than 100kW in capacity. This includes compliance with the most recent EU Ecodesign of the Energy-related Products (ErP) Directive which stipulates manufacturer enforced NO_X emission limits. The unit is classified as small-scale and will not require either an environmental permit to operate or be considered within the 2018 Medium Combustion Plant or Generator Controls legislation. The flue will be elevated above ground level as to aid pollutant dispersion.

Therefore, a detailed assessment of on-site combustion source emissions **is not required**.

Site Suitability Assessment

The suitability of the site for hotel and office use was determined by evaluation of local monitoring data collected by LBCC as part of its Local Air Quality management (LAQM) obligations. NO_2 diffusion tube monitoring data from the area was collated and compared to the relevant air quality Objectives.

Air Quality Neutral Assessment

Policy 7.14 of the London Plan[17] states that “development proposals should 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)).

[17] *Greater London Authority (2015) The London Plan*

An air quality neutral assessment was therefore undertaken in relation to energy use at the proposed development.

3.3 Baseline Air Quality Conditions

Baseline air quality conditions were determined using monitoring data collected by LBCC and from the background pollution maps provided by Defra.

3.4 Construction Phase Assessment

An assessment of potential impacts associated with the construction phase was undertaken in accordance with Greater London Authority (GLA) and London Council's guidance[18]. A summary of the assessment process is provided below:

Construction phase assessment steps:

1) Screen the need for a more detailed assessment;
2) Assess the dust risks separately for demolition, earthworks, construction and trackout:
   A. determine potential dust emission magnitude;
   B. determine sensitivity of the area; and
   C. establish the risk of dust impacts.

Site specific mitigation measures to control dust and PM_{10} emissions are recommended from the dust risk impacts established in Step 2.

It should be noted that trackout is defined as the transport of dust and dirt from the construction site onto the public road network. Full details of the construction phase assessment methodology are provided in **Appendix A**.

3.5 Air Quality Neutral Assessment

Methodologies for the air quality neutral assessment are detailed in the Greater London Authority's (GLA's) Sustainable Design and Construction Supplementary Planning Guidance (SPG)[19] and the Air Quality Neutral Planning Support Update 2014[20] guidance document. The guidance documents detail benchmarks for both building emissions and transport emissions associated with the development, and are dependent on the planning use class. As there is no parking provision for this development, it is not appropriate to compare the development to the calculate road base benchmark.

The building emission benchmarks, relevant for this development are detailed in **Table 3**.

Table 3: Building Emission Benchmarks

Planning Use Class	Building Emission Benchmark	
	NOx (g/m^2)	PM_{10} (g/m^2)
C1 (Hotel)	70.9	4.07

[18] Greater London Authority (GLA) and London Councils (2014); The Control of Dust and Emissions During Construction and Demolition
[19] *Greater London Authority (2014) Sustainable Design and Construction Supplementary Planning Guidance*
[20] *Air Quality Consultants (2014) Air Quality Neutral Planning Support Update*

Planning Use Class	Building Emission Benchmark	
	NOx (g/m^2)	PM_{10} (g/m^2)
B1 (Office)	30.8	1.77

*Figures for Inner London were utilised

If the relevant benchmarks are exceeded, the guidance states that on-site mitigation measures should be implemented, in addition to off-site measures if required.

3.6 Assessment Significance Criteria

3.6.1 Construction Phase Assessment

In assessing the significance of construction dust impacts using the IAQM guidance[15], the dust emission magnitude is combined with the sensitivity of the area to determine the risk of impacts prior to mitigation. Full details are provided in **Appendix A**. Once appropriate mitigation measures were identified, the significance of construction phase impacts was determined.

The IAQM[14] guidance states that a Detailed Assessment is required where there are human receptors within 350m of the site boundary and/or within 50m of the route(s) used by construction vehicles on the public highway, up to 500m from the site entrance(s). Ecological receptors within 50m of the site boundary or within 50m of the route(s) used by construction vehicles on the public highway, up to 500m from the site entrance(s), are also identified at this stage.

Receptor locations were identified within the study area as follows:

- There are human receptors within 350m of the site boundary and within 50m of the planned construction vehicle route; and
- There are no designated ecological receptors within 50m of the site boundary or within 50m of the planned construction vehicle route, up to 500m from the site entrance.

A Detailed Assessment was therefore required to assess the impact of dust during the construction phase at human receptors.

A plan showing the construction dust assessment distances is provided as **Figure 2**.

4 Baseline Air Quality Conditions

4.1 Air Quality Monitoring

LBCC has published a series of documents in accordance with the LAQM process. The 2016 Air Quality Annual Status Report was obtained to establish the existing conditions at, and in proximity to, the site. This is the most recent LAQM report and monitoring data published by LBCC.

LBCC undertake ambient air quality monitoring using four automatic monitoring sites and a network of NO_2 diffusion tubes. The monitoring stations are primarily located adjacent to main roads within the AQMA however urban background locations are also represented.

Consideration of air quality monitoring data has been undertaken by presenting data which is likely to be representative of the development site. The development site is located on a single lane, one way side street and is located in excess of 50m from the nearest major A-road, the A400. On this basis, the development location is likely to be considered as an urban background location site.

Details of monitoring at urban background sites within the borough are presented in **Table 4**. Exceedances of the annual mean Objective for NO_2 are shown in bold text.

Table 4: LBCC Automatic Monitoring Data for the Study Area

Reference	Location	Monitored Pollutant Concentration ($\mu g.m^{-3}$)				
		2012	2013	2014	2015	2016
Nitrogen Dioxide (NO_2) – Annual Mean Objective of 40 $\mu g.m^{-3}$						
LB	London Bloomsbury – Urban Background	**55**	**44**	**45**	**48**	**42**
CA6	Wakefield Gardens	39.29	**40.32**	36.44	35.80	31.31
CA7	Frognal Way	28.89	31.95	28.55	27.78	27.91
CA10	Tavistock Gardens	**40.12**	**49.37**	**46.50**	**44.57**	39.68
Nitrogen Dioxide (NO_2) – Number of hourly Exceedances of 200 $\mu g.m^{-3}$ (18 permitted)						
LB	London Bloomsbury – Urban Background	1	0	0	0	0
Particulate Matter (PM_{10}) – Annual Mean Objective of 40 $\mu g.m^{-3}$						
LB	London Bloomsbury – Urban Background	19	18	20	22	20
Particulate Matter (PM_{10}) – Number of 24 hour Exceedances of 50 $\mu g.m^{-3}$ (35 permitted)						
LB	London Bloomsbury – Urban Background	10	4	11	6	9

*Not available due to low data capture and equipment faults

The LB, CA6, CA7 and CA10 are all urban background locations set back between 25 – 30m from any A-road or other busy road or junction. The urban background monitoring locations are considered to be the most appropriate representation of air quality conditions at the development site from the available LBCC monitoring data.

Monitoring data showed that annual mean NO_2 concentrations approached or exceeded the 40 $\mu g.m^{-3}$ Objective level. Concentrations at the four locations ranged from 27.78 $\mu g.m^{-3}$ to 55 $\mu g.m^{-3}$. Ten of the 20 results recorded values in excess of 40 $\mu g.m^{-3}$ and only one result was returned in excess of 50 $\mu g.m^{-3}$. There were no recorded breaches of the annual mean PM_{10} or short term NO_2/PM_{10} air quality Objectives.

The development is set further back from main or busy roads compared to LBCC urban background monitoring locations, in excess of 50m from the A400 Camden High Street. Given the increased distance between the pollution source and the development, it would be expected that pollutant concentrations would be less impacted by local sources and could be lower than results from LBCC urban background sites.

Roadside and kerbside monitoring in the area record higher concentrations, a significant number breaching the long and short term air quality Objectives for NO_2. This data has however not been presented in this assessment as they do not represent the urban background nature of the development site.

4.2 Defra Background Pollution Concentrations

Background air pollutant concentrations corresponding to the 1km x 1km grid squares covering the study area were obtained from the LAQM support tools provided by Defra for use in air quality assessments. Background concentrations for the base year (2018) were obtained to establish baseline air quality conditions at the receptor locations identified.

Background concentrations of NO_2, PM_{10} and $PM_{2.5}$ were obtained from the air pollutant concentration maps provided by Defra for the grid squares covering the study area. 2018 background concentrations of NO_x, NO_2 and PM_{10} were obtained from the air pollutant concentration maps provided by Defra for the grid squares containing the proposed development site.

Table 5: 2018 Background Pollutant Concentrations ($\mu g.m^{-3}$) Obtained for 1km x 1km Grid Squares Covering the Application Site and Receptor Locations

Location	Grid Reference	Pollutant	Concentration ($\mu g.m^{-3}$) 2018
Proposed Location of Development	529500,183500	NO_2	33.39
		PM_{10}	19.73
		$PM_{2.5}$	12.37

** All background concentrations obtained from the latest 2011 based background maps*

Background concentrations of NO_2, PM_{10} and $PM_{2.5}$ within the study area are below their respective mean air quality Objectives.

5 Impact Assessment

5.1 Construction Phase Assessment

A qualitative assessment of construction phase dust and PM_{10} emissions was carried out in accordance with the IAQM guidance[16]. Full details of the methodology and dust assessment undertaken are provided in **Appendix A**.

The construction works associated with the proposed development have the potential to impact on local air quality conditions. Dust emissions generated by demolition, excavation, construction and earthwork activities associated with the construction of the proposed development have the potential to cause nuisance to, and soiling of, sensitive receptors and to impact on human health.

The potential for sensitive receptors to be affected will depend on where within the application site the dust raising activity takes place, the nature of the activity and controls, and meteorological dispersion conditions.

5.1.1 Step 1: Screen the Need for a Detailed Assessment

The IAQM guidance[16] states that a Detailed Assessment is required if there are human receptors located within 350m and ecological sites within 50m of the site boundary. There are no designated ecological sites within 50m of the site boundary but human receptors are present within 350m. A Detailed Assessment was therefore undertaken.

A plan showing the construction dust assessment distances is provided as **Figure 2**.

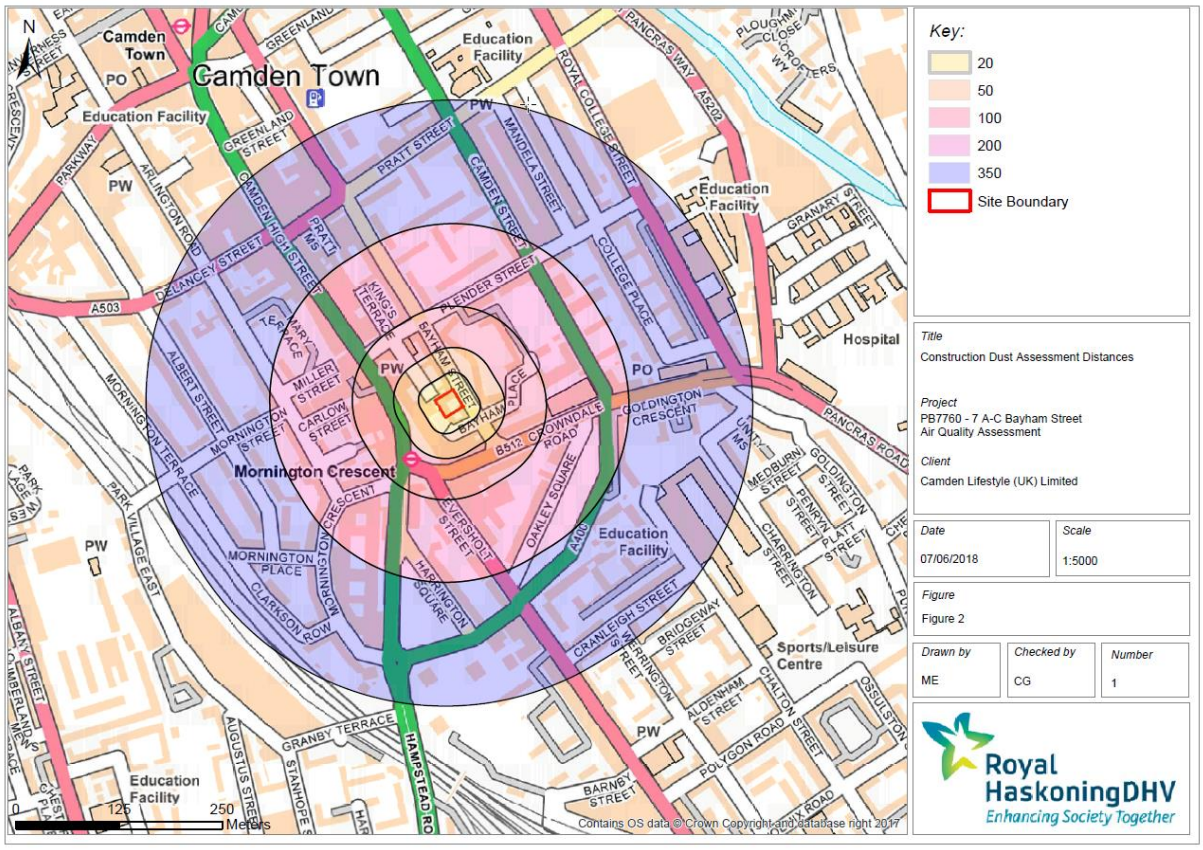

Figure 2 *– Construction Dust Assessment Distances*

5.1.2 Step 2A: Define the Potential Dust Emission Magnitude

The IAQM guidance recommends that the dust emission magnitude is determined for demolition, earthworks, construction and trackout. The dust magnitudes for demolition, earthworks, construction and trackout were determined from site plans and in accordance with the IAQM methodology (see **Appendix A**), and are summarised in **Table 6**.

Table 6: Dust Emission Magnitude for the Site

Activity	Dust Emission Magnitude	Note:
Demolition	**Small**	The volume of buildings to be demolished are estimated to be less than 20,000m^3, and demolition activities would be less than 10m above ground.
Earthworks	**Small**	The site area is less than 2,500m^2 and it is anticipated that there would be fewer than 5 heavy earth moving vehicles active at any one time
Construction	**Small**	Volume of building is anticipated to be less than 25,000m^3
Trackout	**Small**	It is anticipated that there would be fewer than 10 outward HDV movements in any one day.

The risk of potential impact of construction phase dust and PM_{10} emissions during demolition,

earthworks, construction and trackout is used to recommend appropriate mitigation measures. The dust magnitude for demolition, earthworks, construction and trackout was considered to be 'small'.

5.1.3 Step 2B: Define the Sensitivity of the Area

The sensitivity of human receptors to dust soiling and health effects of PM_{10} associated with demolition, earthworks, construction and trackout activities during construction of the proposed development were determined and are summarised in **Table 7**.

Sensitivity of People to Dust Soiling

- Demolition, construction and earthworks: there are 10-100 high sensitivity receptors within 20m of onsite demolition works. The sensitivity is therefore **High**.
- Trackout: there are over 100 high-sensitivity residential receptors within 20m of the access roads, up to 500m from the site. The sensitivity is therefore **High**.

Sensitivity of People to Health Effects of PM_{10}

- Demolition, construction and earthworks: the annual mean background PM_{10} concentration at the site is less than 24µg.m^{-3}, and there are 10-100 high-sensitivity residential receptors within 20m of the boundary. The sensitivity is therefore **Low**.
- Trackout: the annual mean background PM_{10} concentration at the site is less than 24µg.m^{-3}, and there are over 100 receptors within 20m of the routes that construction vehicles will use to access the site. The sensitivity is therefore **Medium**.

Table 7: Outcome of Defining the Sensitivity of the Area

Potential Impact	Sensitivity of the Surrounding Area			
	Demolition	Earthworks	Construction	Trackout
Dust Soiling	High	High	High	High
Human Health	Low	Low	Low	Medium

5.1.4 Step 2C: Define the Risk of Impacts

The dust emission magnitude detailed in **Table 6** is combined with the sensitivity of the area detailed in **Table 7** to determine the risk of impacts with no mitigation applied. The risks concluded for dust soiling and human health are provided in **Table 8.**

Table 8: Summary Dust Risk Table to Define Site-specific Mitigation.

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

Details of Step 3: Site Specific Mitigation and Step 4: Determining Significant Effects are provided in **Section 5** of this report.

5.2 Operational Phase Assessment

5.2.1 Impacts of the Proposed Development at Existing Receptors

As detailed in the project description, operational phase impacts at existing sensitive receptors are classified as insignificant on the basis of:

- A negligible level of development-generated traffic; and,
- No significant combustion sources are to be included as part of the development.

No further assessment is required to consider impacts of the development upon existing receptor locations, including those within the statutory designated LBCC AQMA.

5.2.2 Site Suitability

A review of annual mean NO_2 at representative monitoring locations in the vicinity of the development site was conducted to evaluate the suitability of the site for its intended uses.

The first consideration is to determine the magnitude and exposure duration of receptor exposure caused by adoption of the development proposals. The proposed development will introduce additional public exposure by provision of public use areas compared to the current employment land use. This will be in the form of members of the public using the hotel and/or the café/bar/gym areas.

In accordance with Defra guidance[21] objectives should not apply at areas where the exposure is not relevant to the assessment standard. This is clarified in the guidance with the following examples of long term exposure; residential, schools, hospitals and care homes. Other public areas should only be considered against short term exposure Objectives, with specific clarification in the Defra guidance that hotels fall into the short term category, unless intended for permanent habitation, i.e. annual, use.

Office provision is included in the proposed development, however the UK air quality Objectives do not apply to work places or employment areas where members of the public do not have regular access.

The potential for air quality impacts was considered by evaluation of pollutant concentrations at locations likely to be representative of the proposed development site.

Annual mean NO_2 concentrations are not directly relevant to this development, however they were used to indicate compliance with short term Objective compliance. Annual mean NO_2 concentrations at urban background monitoring locations were compared to the Defra guidance[21] criteria for short-term exposure. Concentrations were below the 60µg.m^{-3} NO_2 Defra screening level, a level where the short-term NO_2 air quality Objective is unlikely to be breached. This is confirmed by automatic monitoring at urban background sites where the short term NO_2 air quality Objective was not breached between 2012-2016.

Concentrations of short term particulate matter (PM_{10} and $PM_{2.5}$) were also below the air quality Objective levels.

Based on representative monitoring data provided by LBCC and background pollutant concentrations provided by Defra, it is considered unlikely that pollutant exposure at new receptors would exceed the

[21] Department for the Environment Food and Rural Affairs (2016) 'Local Air Quality Management Technical Guidance Document (TG16)', London: Defra.

relevant air quality Objectives. The site is therefore considered to be suitable for the proposed uses.

5.3 Air Quality Neutral Assessment

Building Emissions

The following data are required to undertake the calculation of annual building emissions:

- The gross floor area of the development (m^2);
- NOx emissions for each land use class (g/year); and
- Emission rate of NOx.

The gross floor area of the hotel and office use areas of the development was provided by the developer. The emission factor for NO_X was taken from the stated manufacturer performance for the plant to be installed at the development. Any installed plant will will meet the 2018 EU Ecodesign of the Energy-related Products (ErP) Directive which stipulate a maximum NO_X emission performance of 56mg/kWh for gas and LPG systems. The stated PM_{10} emisison factor from the Air Quality Neutral Planning Support[19] guidance document was used for the air quality neutral calculation. The data utilised in the Building Emission Benchmark assessment are detailed in **Section 3.4**.

Table 9: Input Data for Building Emission Benchmark Assessment

Proposed Use	Gross Floor Area (m^2)	Total Energy Consumption* (kWh/year)	NOx Emission Factor (kgNOx/kWh)	PM_{10} Emission Factor ($kgPM_{10}$/kWh
C1 (Hotel)	2,107	850,000	0.000056	0.00000314
B1 (Office)	1,571	417,000	0.000056	0.00000314

* from on-site combustion sources

The data detailed in **Table 9** were utilised to calculate building emissions for the development for comparison to the relevant benchmarks. The assessment steps are detailed below:

Table 10: Building Emission Benchmark Assessment Steps - Hotel

Parameter	Calculation	Result
Oxides of Nitrogen (NO_X)		
NOx emissions/year (kg/year)	850,000 x 0.000056	47.60 $kgNO_X$/year
NOx emissions (g/year)	47.60 x 1,000	47,600 gNO_X/year
NOx emissions/m^2	47,600 ÷ 2,107	22.59 gNO_X/m^2
Comparison to Building Emission Benchmark	22.59 – 70.9	**- 48.31** gNO_X/m^2
Particulate Matter (PM_{10})		
PM_{10} emissions/year	850,000 x 0.00000314	2.67 $kgPM_{10}$/year
PM_{10} emissions (g/year)	2.67 x 1,000	2,670 gPM_{10}/year

Parameter	Calculation	Result
PM_{10} emissions/m^2	2,670 ÷ 2,107	1.27 gPM_{10}/m^2
Comparison to Building Emission Benchmark	1.27 – 4.07	**- 2.80** gPM_{10}/m^2

Table 11: Building Emission Benchmark Assessment Steps - Office

Parameter	Calculation	Result
Oxides of Nitrogen (NO_X)		
NOx emissions/year	417,000 x 0.000056	23.35 kgNO_X/year
NOx emissions (g/year)	23.35 x 1,000	23,350 gNO_X/year
NOx emissions/m^2	23,350 ÷ 1,571	14.86 gNO_X/m^2
Comparison to Building Emission Benchmark	14.86 – 30.8	**- 15.94** gNO_X/m^2
Particulate Matter (PM_{10})		
PM_{10} emissions/year	417,000 x 0.00000314	1.30 kgPM_{10}/year
PM_{10} emissions (g/year)	1.30 x 1,000	1,300 gPM_{10}/year
PM_{10} emissions/m^2	1,300 ÷ 1,571	0.83 gPM_{10}/m^2
Comparison to Building Emission Benchmark	0.83 – 1.77	**- 0.94** gPM_{10}/m^2

As detailed in **Table 10** and **Table 11** the total NO_X and PM_{10} emissions for the proposed buildings are below the NO_X and PM_{10} Building Emission Benchmarks for Hotel and Office Use respectively.

6 Mitigation Measures

6.1 Construction Phase Assessment

6.1.1 Step 3: Site-Specific Mitigation

Step three of the IAQM[14] guidance identifies appropriate site-specific mitigation. These measures are related to the site risk for each activity.

The dust assessment determined that there was a risk of impacts resulting from construction activities without the implementation of mitigation measures. Additional guidance has been provided by the IAQM in relation to dust and air mitigation measures. It is recommended that the good practice measures outlined in the IAQM guidance are followed.

The recommendations below should be detailed in a Dust Management Plan (DMP) to prevent or minimise the release of dust entering the atmosphere and/or being deposited on nearby receptors. Particular attention should be paid to operations which must unavoidably take place close to the site boundary. The effective implementation of the DMP will ensure that any potential dust releases associated with the construction phase will be reduced.

Highly Recommended Mitigation Measures

A list of mitigation measures that are highly recommended for a **medium risk** site by the IAQM are provided below.

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

- Develop and implement a Dust Management Plan (DMP), which may include measures to control other emissions.
- 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.
- 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 practicable.
- Erect solid screens or barriers around dusty activities or the site boundary that are at least as high as any stockpiles on site.
- Consider enclosure of site or specific operations where there is a high potential for dust production and the site is active for an extensive period.
- Take measures to control site runoff of water or mud.
- Keep site fencing, barriers and scaffolding clean using wet methods.
- Remove materials that have a potential to produce dust from site as soon as possible.

- Cover, seed or fence stockpiles to prevent wind whipping.
- Ensure all vehicles switch off engines when stationary - no idling vehicles.
- Avoid the use of diesel or petrol powered generators and use mains electricity or battery powered equipment where practicable.
- Produce a Construction Logistics Plan to manage the sustainable delivery of goods and materials.
- Ensure an adequate water supply on the site for effective dust/particulate matter suppression/mitigation, using non-potable water where possible and appropriate.
- Bonfires and burning of waste materials should not be permitted.

Measures Specific to Demolition

- Ensure effective water suppression is used during demolition operations.
- Avoid explosive blasting, using appropriate manual or mechanical alternatives.
- Bad and remove any biological debris or damp down such material before demolition.

Measures Specific to Construction

- Ensure sand and other aggregates are stored in silos, bunded areas or in a controlled and well-managed manner.

Measures Specific to Trackout

- Use water-assisted dust sweeper(s) on the access and local roads, to remove, as necessary, any material tracked out of the site.
- Avoid dry sweeping of large areas.
- Ensure vehicles entering and leaving sites are covered to prevent escape of materials during transport.
- Inspect on-site haul routes for integrity and instigate necessary repairs to the surface as soon as reasonably practicable.
- Record all inspections of haul routes and any subsequent action in a site log book.
- Install hard surfaced haul routes, which are regularly damped down with fixed or mobile sprinkler systems, or mobile water bowsers and regularly cleaned.

Desirable Mitigation Measures

A list of mitigation measures that are desirable for a medium risk site by the IAQM are provided below.

Measures Specific to Demolition

- Soft strip inside buildings before demolition (retaining walls and windows in the rest of the building where possible to provide a screen against dust)

Measures Specific to Earthworks

- Re-vegetate earthworks and exposed areas/soil stockpiles to stabilise surfaces as soon as practicable.
- Use Hessian, mulches or trackifiers where it is not possible to re-vegetate or cover with topsoil, as soon as practicable.
- Only remove the cover in small areas during work and not all at once.

Measures Specific to Construction

- Avoid scabbling (roughening of concrete surfaces) if possible.
- Ensure bulk cement and other fine powder materials are delivered in enclosed tankers and stored in silos with suitable emission control systems to prevent escape of material and overfilling during delivery.

- For smaller supplies of fine power materials ensure bags are sealed after use and stored appropriately to prevent dust release.

Measures Specific to Non Road Mobile Machinery (NRMM)

Non Road Mobile Machinery[22] (NRMM) and plant would be well maintained. If any emissions of dark smoke occur then the relevant machinery should stop immediately and any problem rectified. In addition, the following controls should apply to NRMM:

- All NRMM should use fuel equivalent to ultralow sulphur diesel (fuel meeting the specification within EN590:2004).
- All NRMM will comply with regulation (EU) 2016/1628 of the European Parliament and of the European Council;
- All NRMM should be fitted with Diesel Particulate Filters (DPF) conforming to defined and demonstrated filtration efficiency (load/duty cycle permitting).
- The ongoing conformity of plant retrofitted with DPF, to a defined performance standard, should be ensured through a programme of onsite checks.
- Implementation of energy conservation measures including instructions to throttle down or switch off idle construction equipment; switch off the engines of trucks while they are waiting to access the site and while they are being loaded or unloaded, ensure equipment is properly maintained to ensure efficient energy consumption.

6.1.2 Step 4: Determine Significant Effects

With the implementation of the above highly recommended mitigation measures, the residual impacts from the construction phase of the proposed development are considered to be **not significant**, in accordance with IAQM guidance[15].

[22] Non-Road Mobile Machinery is defined as any mobile machinery, transportable industrial equipment or vehicle fitted with an internal combustion engine not intended for passenger or goods transport by road. Explanatory Memorandum to the UK Non Road Mobile Machinery (Emissions of Gaseous & Particulate Pollutants) (Amendment) Regulations (2006).

7 Conclusions

An air quality assessment was undertaken for a proposed mixed use hotel and office development on Bayham Street, Camden. The assessment considered the potential for construction and operational phase emissions associated with construction, traffic movements and the operation of on-site combustion plant. The suitability of the site with regards to air quality was also considered. A screening assessment was carried out to determine whether further detailed assessments for construction dust, traffic emissions and CHP emissions were required and the potential impacts on existing receptor locations.

Impacts of operational and construction phase traffic and emissions from CHP plant were screened from detailed assessment based on the likelihood that there will be a negligible impacts at existing receptor locations. The assessment considered the suitability of the site for its intended use, an air quality neutral assessment and impacts associated with construction phase dust emissions.

The impact of the construction of the proposed development was considered in accordance with the latest guidance available from the IAQM[14]. The assessment defined the sensitivity of the area and the risk of the site to cause dust impacts. Site-specific mitigation was recommended and with the implementation of this mitigation, the residual impacts from construction activities were predicted to be **not significant**.

Concentrations measured by LBCC at locations in the vicinity of the proposed development were compared to the air quality Objectives and the relationship presented in Defra guidance relating to short-term pollutant exposure. Monitored pollutant concentrations at locations representative of the development site were below the relevant air quality Objectives. It is therefore expected that pollutant concentrations at the proposed development would also be below all relevant Objectives without the requirement for mitigation measures. As such, the site was considered suitable for the proposed use.

An air quality neutral assessment demonstrated that the developments contribution to air quality emissions was below acceptable benchmarks adopted by the GLA.

The assessment concludes that:

- the development is unlikely have an impact upon air quality in the local area;
- with implementation of suggested mitigation measures, construction dust impacts are unlikely to be significant;
- the development does not introduce new receptors into an area of adverse air quality; and
- the proposal development can be considered to be ‘air quality neutral’.

The assessment considers that air quality should therefore not be a constraint to the proposed development.

Appendix A: Construction Phase Methodology and Assessment

The following section outlines criteria developed by the Institute of Air Quality Management (IAQM)[16] for the assessment of air quality impacts arising from construction activities. The assessment procedure is divided into five steps and is summarised below:

Step 1: Screening the Need for a Detailed Assessment

An assessment will normally be required where there are human receptors within 350m of the site boundary and/or within 50m of the route(s) used by construction vehicles on the public highway, up to 500m from the site entrance(s). Designated ecological sites within 50m of the site boundary or within 50m of the route(s) used by construction vehicles on the public highway, up to 500m from the site entrance(s), are also identified at this stage. A designated ecological site refers to any sensitive habitat affected by dust soiling. For locations with a statutory designation, such as a Site of Specific Scientific Interest (SSSI), Special Area of Conservation (SACs) and Special Protection Areas (SPAs), consideration should be given as to whether the particular site is sensitive to dust. Some non-statutory sites may also be considered if appropriate.

Where the need for a more detailed assessment is screened out, it can be concluded that the level of risk is 'negligible'.

Step 2: Assess the Risk of Dust Impacts

A site is allocated to a risk category on the basis of the scale and nature of the works (Step 2A) and the sensitivity of the area to dust impacts (Step 2B). These two factors are combined in Step 2C to determine the risk of dust impacts before the implementation of mitigation measures. The assigned risk categories may be different for each of the construction activities outlined by the IAQM (demolition, construction, earthworks and trackout).

Step 2A: Define the Potential Dust Emission Magnitude

The IAQM guidance[14] recommends that the dust emission magnitude is determined for demolition, earthworks, construction and trackout. The dust emission magnitude is based on the scale of the anticipated works. **Table A1** describes the potential dust emission class criteria for each outlined construction activity.

Table A1: Criteria Used in the Determination of Dust Emission Class

Activity	Criteria used to Determine Dust Emission Class		
	Small	Medium	Large
Demolition	• Total building volume <20,000m^3; • Material with low potential for dust release	• Total building volume 20,000 – 50,000m^3; • Potentially dusty material.	• Total building volume >50,000m^3; • Potentially dusty material.
Earthworks	• Total site area <2,500m^2; • <5 heavy moving earth vehicles active at any one time.	• Total site area 2,500 – 10,000m^2; • 5 – 10 heavy moving earth moving vehicles active at any one time.	• Total site area >10,000m^2, • >10 heavy earth moving vehicles active at any one time.
Construction	• Total building volume <25,000m^3;	• Total building volume 25,000 – 100,000m^3;	• Total building volume >100,000m^3;

Activity	Criteria used to Determine Dust Emission Class		
	Small	Medium	Large
	• Construction material with low potential for dust release.	• Potentially dusty construction material (e.g. concrete).	• On site concrete batching.
Trackout	• <10 outward HGV trips in any one day; • Unpaved road length <50m.	• 10 – 50 outward HGV trips in any one day. • Unpaved road length 50 – 100m.	• >50 outward HGV trips in any one day; • Unpaved road length >100m.

Step 2B: Define the Sensitivity of the Area

The sensitivity of the area takes into account the following factors:

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

Table A3: Criteria for Determining Sensitivity of Receptors

Sensitivity of Receptor	Criteria for Determining Sensitivity	
	Dust Soiling Effects	Health Effects of PM_{10}
High	Dwellings, museums and other culturally important collections, medium and long-term car parks and car showrooms	Residential properties, hospitals, schools and residential care homes
Medium	Parks, places of work	Office and shop workers not occupationally exposed to PM_{10}
Low	Playing fields, farmland, footpaths, short-term car parks and roads	Public footpaths, playing fields, parks and shopping streets

The criteria detailed in **Tables A4 and A5** were used to determine the sensitivity of the area to dust soiling effects and human health impacts.

Table A4: Sensitivity of the Area to Dust Soiling Effects on People and Property.

Receptor Sensitivity	Number of Receptors	Distance from Source (m)			
		<20	<50	<100	<350
High	>100	High	High	Medium	Low
	10-100	High	Medium	Low	Low
	1-10	Medium	Low	Low	Low
Medium	>1	Medium	Low	Low	Low
Low	>1	Low	Low	Low	Low

Table A5: Sensitivity of the Area to Human Health Impacts

Receptor Sensitivity	Annual Mean PM_{10} Concentrations	Number of Receptors	Distance from the Source (m)				
			<20	<50	<100	<200	<350
High	>32µg.m^{-3}	>100	High	High	High	Medium	Low
		10-100	High	High	Medium	Low	Low
		1-10	High	Medium	Low	Low	Low
	>28-32µg.m^{-3}	>100	High	High	Medium	Low	Low
		10-100	High	Medium	Low	Low	Low
		1-10	High	Medium	Low	Low	Low
	>24-28µg.m^{-3}	>100	High	Medium	Low	Low	Low
		10-100	High	Medium	Low	Low	Low
		1-10	Medium	Low	Low	Low	Low
	<24µg.m^{-3}	>100	Medium	Low	Low	Low	Low
		10-100	Low	Low	Low	Low	Low
		1-10	Low	Low	Low	Low	Low
Medium	>32µg.m^{-3}	>10	High	Medium	Low	Low	Low
		1-10	Medium	Low	Low	Low	Low
	>28-32µg.m^{-3}	>10	Medium	Low	Low	Low	Low
		1-10	Low	Low	Low	Low	Low
	>24-28µg.m^{-3}	>10	Low	Low	Low	Low	Low
		1-10	Low	Low	Low	Low	Low
	<24µg.m^{-3}	>10	Low	Low	Low	Low	Low
		1-10	Low	Low	Low	Low	Low
Low	-	>1	Low	Low	Low	Low	Low

Step 2C: Define the Risk of Impacts

The dust emission magnitude and sensitivity of the area are combined and the risk of impacts from each activity (earthworks, construction and trackout) before mitigation is applied should be determined using the criteria detailed in **Tables A7 – A9**.

Table A7: Risk of Dust Impacts- Demolition

Potential Impact	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

Table A8: Risk of Dust Impacts- Earthworks and Construction

Potential Impact	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

Table A9: Risk of Dust Impacts- Trackout

Potential Impact	Dust Emission Magnitude		
	Large	Medium	Small
High	High Risk	Medium Risk	Low Risk
Medium	Medium Risk	Low Risk	Low Risk
Low	Low Risk	Low Risk	Negligible

Step 3: Site-Specific Mitigation

Step three of the IAQM guidance identifies appropriate site-specific mitigation. These measures are related to whether the site is a low, medium or high risk site. The highly recommended and desirable mitigation for the proposed scheme are detailed in **Section 6** of this report.

Step 4: Determine Significant Effects

With the implementation of the above mitigation measures, the residual impacts from the construction are considered to be **not significant**, in accordance with IAQM guidance.