65 & 67 Maygrove Road, London, NW6 2EH

Air Quality Assessment

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Air Quality Assessment

Revision	Date	Notes	Author	Checked	Approved
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1 INTRODUCTION

1.1 Entran Ltd has been commissioned by REP Maygrove Road LLP to undertake an air quality assessment in relation to a proposed residential redevelopment at 65 & 67 Maygrove Road, London, NW6 2EH.

1.2 The Site falls within an Air Quality Management Area (AQMA) declared for the entire London Borough of Camden for nitrogen dioxide (NO_2) and particulate matter (PM_{10}). The Site is bounded to the south by Maygrove Road and to the north by Brassey Road.

1.3 65 Maygrove Road is a mid-20th Century building comprising three storeys (ground plus two upper storeys) located on the north side of the road. The existing building comprises 2,543sqm of office accommodation accessed principally from a central entrance from Maygrove Road. No.67 Maygrove Road is a late 20th Century four storey building which is in office use at ground to second floor and has three residential flats at third floor. The office use in this building will shortly cease when the occupiers move to new premises elsewhere.

1.4 To the rear of the site is a large open car park accessed from Brassey Road. Assessing the space using normal parking standards the car park has space for 37 cars.

1.5 The proposed development comprises of the following:

> *Demolition of Nos. 65 and 67 Maygrove Road and the erection of a building comprising basement, ground and four upper storeys to provide 91 residential (Class C3) units, with the provision of 10 car spaces for disabled persons, 2 car club spaces, 120 cycle spaces and ancillary refuse storage at basement level and hard and soft landscaping to the rear.*

1.6 This report presents the findings of an air quality impact assessment that examines both construction and operational phases of the proposed development. The type, source and significance of potential impacts are identified and the measures that should be employed to minimise these impacts are described.

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

Figure 1: Site Location Plan

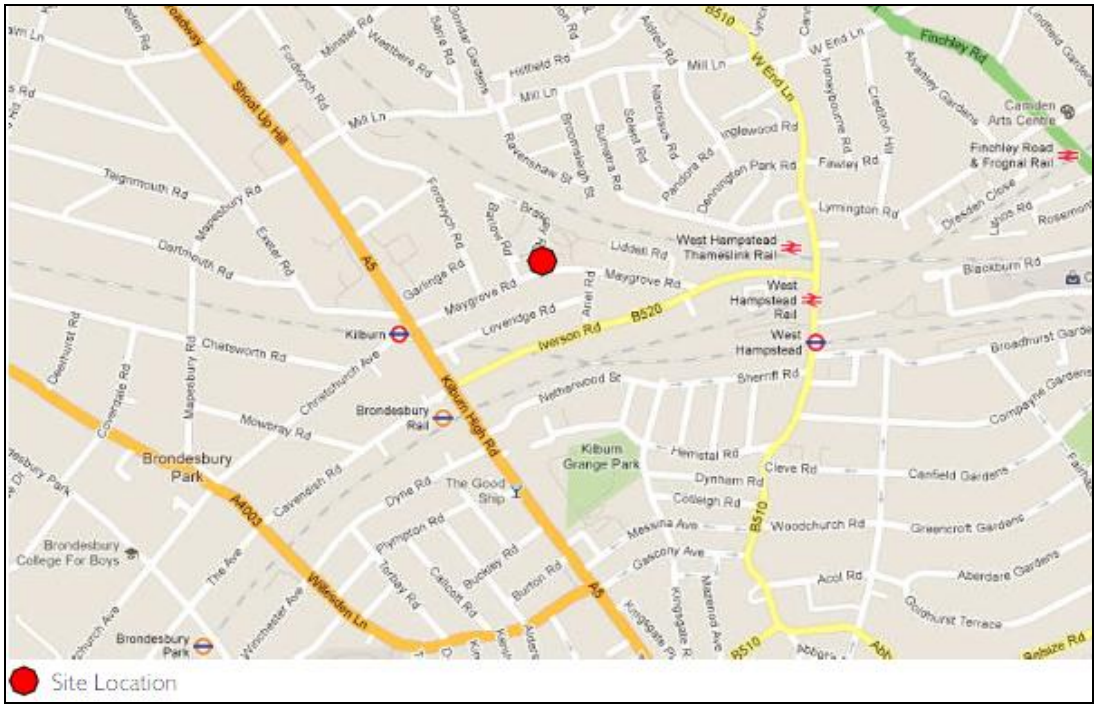
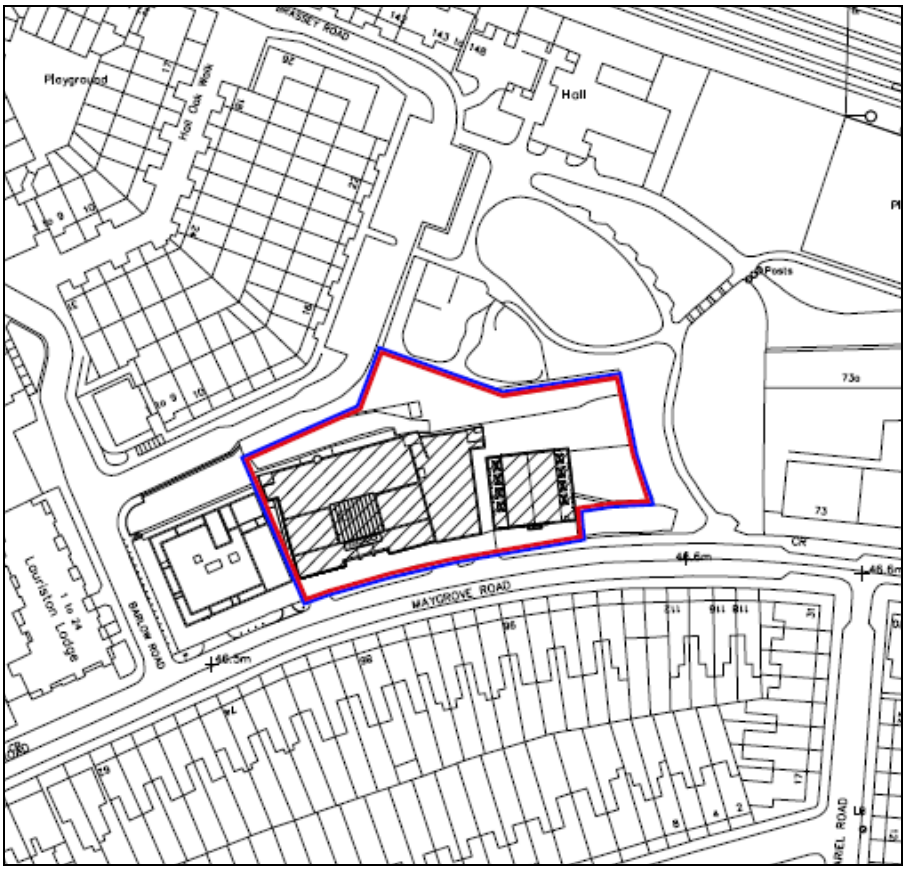


Figure 2: Site boundary



2 LEGISLATION AND POLICY

Air Quality Strategy for England, Scotland, Wales & Northern Ireland

2.1 The Government's policy on air quality within the UK is set out in the Air Quality Strategy (AQS) for England, Scotland, Wales and Northern Ireland (AQS) published in July 2007[1], pursuant to the requirements of Part IV of the Environment Act 1995. The AQS sets out a framework for reducing hazards to health from air pollution and ensuring that international commitments are met in the UK. The AQS is designed to be an evolving process that is monitored and regularly reviewed.

2.2 The AQS sets standards and objectives for ten main air pollutants to protect health, vegetation and ecosystems. These are benzene (C_6H_6), 1,3-butadiene (C_4H_6), carbon monoxide (CO), lead (Pb), nitrogen dioxide (NO_2), particulate matter (PM_{10}, $PM_{2.5}$), sulphur dioxide (SO_2), ozone (O_3) and polycyclic aromatic hydrocarbons (PAHs).

2.3 The air quality standards are long-term benchmarks for ambient pollutant concentrations which represent negligible or zero risk to health, based on medical and scientific evidence reviewed by the Expert Panel on Air Quality Standards (EPAQS) and the World Health Organisation (WHO). These are general concentration limits, above which sensitive members of the public (e.g. children, the elderly and the unwell) might experience adverse health effects.

2.4 The air quality objectives are medium-term policy based targets set by the Government which take into account economic efficiency, practicability, technical feasibility and timescale. Some objectives are equal to the EPAQS recommended standards or WHO guideline limits, whereas others involve a margin of tolerance, i.e. a limited number of permitted exceedences of the standard over a given period.

2.5 For some pollutants there is both a long-term (annual mean) standard and a short-term standard. In the case of NO_2, the short-term standard is for a 1-hour averaging period, whereas for PM_{10} it is for a 24-hour averaging period. These periods reflect the varying impacts on health of differing exposures to pollutants (e.g. temporary exposure on the pavement adjacent to a busy road, compared with the exposure of residential properties adjacent to a road).

[1] The Air Quality Strategy for England, Scotland, Wales and Northern Ireland – July 2007.

2.6 Of the pollutants included in the AQS, NO_2 and PM_{10} will be particularly relevant to this project as these are the primary pollutants associated with road traffic.

Local Air Quality Management (LAQM)

2.7 Part IV of the Environment Act 1995 also requires local authorities to periodically Review and Assess the quality of air within their administrative area. The Reviews have to consider the present and future air quality and whether any air quality objectives prescribed in Regulations are being achieved or are likely to be achieved in the future.

2.8 Where any of the prescribed air quality objectives are not likely to be achieved the authority concerned must designate that part an Air Quality Management Area (AQMA).

2.9 For each AQMA, the local authority has a duty to draw up an Air Quality Action Plan (AQAP) setting out the measures the authority intends to introduce to deliver improvements in local air quality in pursuit of the air quality objectives. Local authorities are not statutorily obliged to meet the objectives, but they must show that they are working towards them.

2.10 The Department of Environment, Food and Rural Affairs (DEFRA) has published technical guidance for use by local authorities in their Review and Assessment work[2]. This guidance, referred to in this chapter as LAQM.TG(09), has been used where appropriate in the assessment.

National Planning Policy Framework

2.11 Published on 27th March 2012, the National Planning Policy Framework (NPPF)[3] sets out the Government's planning policies for England and how these are expected to be applied. It replaces Planning Policy Statement 23: Planning and Pollution Control[4], which provided planning guidance for local authorities with regards to air quality.

2.12 At the heart of the NPPF is a presumption in favour of sustainable development. It requires Local Plans to be consistent with the principles and policies set out in the Framework with the objective of contributing to the achievement of sustainable development.

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[2] Department for Environment, Food and Rural Affairs (DEFRA), (2009): Part IV The Environment Act 1995 Local Air Quality Management Review and Assessment Technical Guidance LAQM.TG(09).

[3] Communities and Local Government: *National Planning Policy Framework* (March 2012)

[4] Office of the Deputy Prime Minister: *Planning Policy Statement 23: Planning and Pollution Control* (Oct 2004).

2.13 Current planning law requires that application for planning permissions must be determined in accordance with the relevant development plan (i.e. Local Plan or Neighbourhood Plan). The NPPF should be taken into account in the preparation of development plans and therefore the policies set out within the Framework are a material consideration in planning decisions.

2.14 The NPPF identifies 12 core planning principles that should underpin both plan-making and decision-taking, including a requirement for planning to '*contribute to conserving and enhancing the natural environment and reducing pollution'.*

2.15 Under Policy 11: Conserving and Enhancing the Natural Environment the Framework requires the planning system to *'prevent both new and existing developments from contributing to or being put at unacceptable risk or being adversely affected by unacceptable levels of air pollution'.*

2.16 In dealing specifically with air quality the Framework states 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. Planning decisions should ensure that any new development in Air Quality Management Areas is consistent with the local air quality action plan'.*

Control of dust and particulates associated with construction

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

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

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

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

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

3 METHODOLOGY

Scope of Assessment

3.1 The scope of the assessment has been determined in the following way:

- Consultation with the Environmental Health Department of London Borough of Camden (LBC);
- Review of air quality data for the area surrounding the Site and background pollutant maps; and
- Review of the traffic flow data, which has been used as an input to the air quality modelling assessment.

3.2 Details of the assessment methodology and the specific issues considered are provided below.

Construction Phase Methodology

3.3 To assess the potential impacts associated with dust and PM_{10} releases during the construction phase and to determine any necessary mitigation measures, an assessment based on the latest guidance from the Institute of Air Quality Management (IAQM)[5] has been undertaken.

3.4 This approach divides construction activities into the following four categories:

- demolition;
- earthworks;
- construction; and
- trackout (the transport of dust and dirt from the construction site onto the public road network).

3.5 The assessment methodology then considers three separate dust effects:

- annoyance due to dust soiling;
- harm to ecological receptors; and
- the risk of health effects due to a significant increase in exposure to PM_{10}.

3.6 The assessment of risk of dust effects is determined by:

[5] Institute of Air Quality Management, (January 2012), *Guidance on the Assessment of the Impacts of Construction on Air Quality and the Determination of their Significance.*

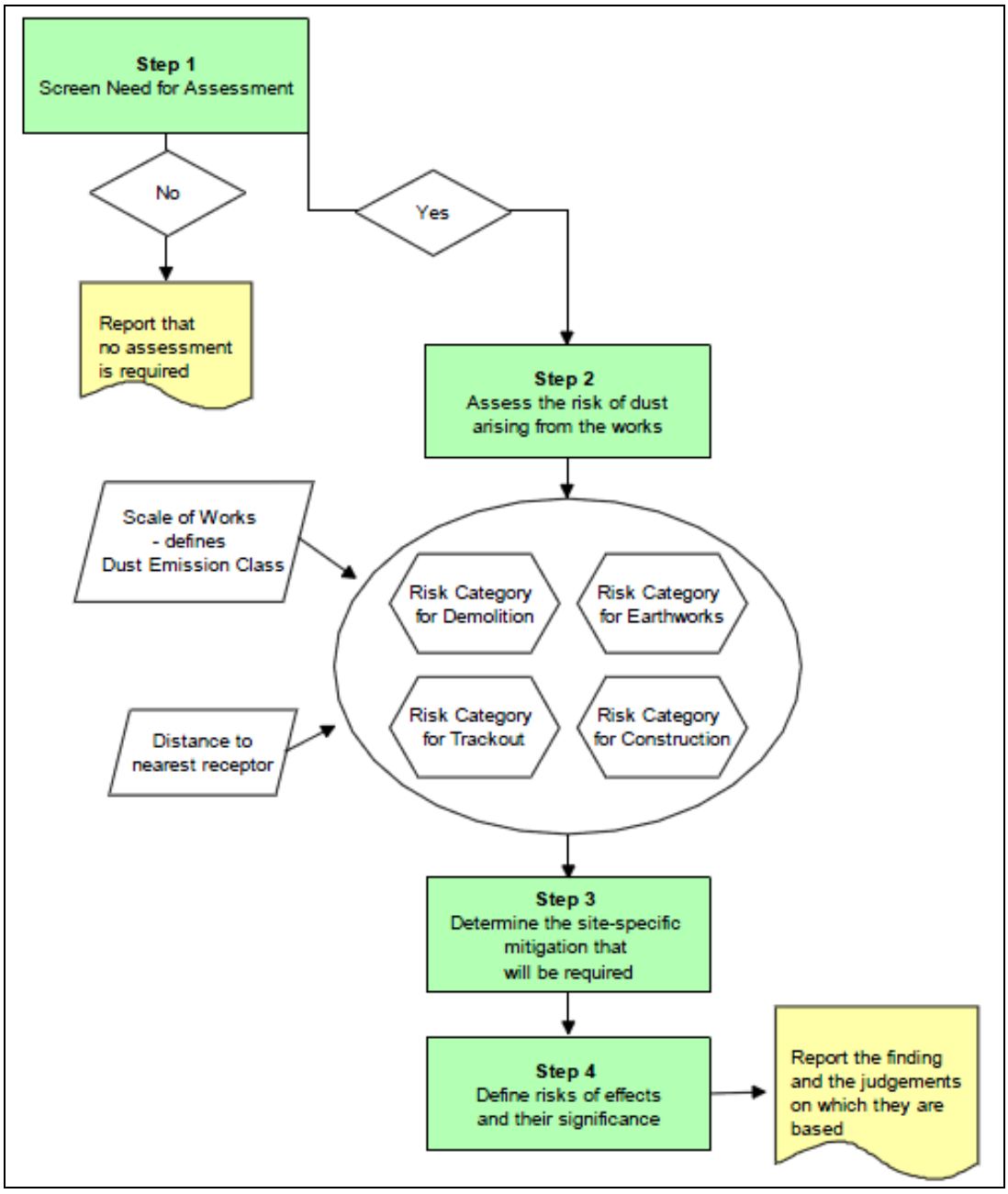
- the scale and nature of the works, which determine the risk of dust arising; and
- the proximity of sensitive receptors.

3.7 Risks are described in terms of there being a low, medium or high risk of dust effects for each of the four separate potential activities. This assessment is based on both IAQM criteria and professional judgement.

3.8 Mitigation measures are identified where necessary and significance of dust effects determined following such mitigation.

3.9 The overall approach to the assessment of construction related dust effects is outlined in Figure 3 below.

Figure 3: Approach to Dust Assessment



Operational Phase Methodology

3.10 The prediction of the effects of local traffic on NO_2 and PM_{10} concentrations has been undertaken using Breeze Roads (CAL3QHCR) dispersion model. This is a commercially available dispersion model and has been widely validated for this type of assessment.

3.11 This model uses detailed information regarding traffic flows on the local road network and local meteorological conditions to predict pollutant concentrations at specific locations selected by the user. Meteorological data from London Heathrow (2010) has been used for the assessment. It has not been possible to verify the modelled predictions as no monitoring data exists for the road links examined. In the absence of monitoring data, a cautious approach has been adopted by using very low traffic speeds. This will result in higher emission factors and will minimise the potential for the model to under-predict pollutant concentrations.

3.12 A summary of the traffic data used in the assessment can be found in **Appendix C**. The data includes details of annual average daily traffic flows (AADT), percentage HGV and speeds for the assessment years considered.

3.13 DEFRA Technical Guidance does not provide a method for the conversion of annual mean NO_2 concentrations to 1-hour mean NO_2 concentrations. However, research[6] has concluded that exceedences of the 1-hour mean objective are unlikely to occur where annual mean concentrations do not exceed 60 µg/m^3.

3.14 Quantitative assessment of the impacts on local air quality from road traffic emissions associated with the operation of the development have been completed against the current statutory standards and objectives set out in **Appendix B**.

Significance Criteria

3.15 Guidance issued by Environmental Protection UK relating to Air Quality considerations within the planning process was updated in April 2010[7]. In this guidance, criteria are detailed which identify the need for an Air Quality Assessment, the type of Air Quality assessment required, and the significance of any predicted impact.

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

[7] EPUK (April 2010), *Development Control: Planning for Air Quality (2010 Update)*.

3.16 The above guidance sets out criteria for assessing air quality impact magnitude. This updated guidance also places greater emphasis on judging overall impacts by means of professional judgement, whilst taking into account the impact magnitude descriptors.

3.17 The determination of impact significance within this assessment has considered both the impact descriptors and the professional judgement of the author. Tables 1 and 2 identify the assessment criteria from this guidance.

3.18 These criteria have been deemed suitable for use in this appraisal, as there are currently no standards or statutory significance criteria available for this purpose.

Table 1: Definition of Impact Magnitude for Changes in Ambient Annual Mean Nitrogen Dioxide and PM_{10}.

Magnitude of Change	Annual Mean
Large	Increase/ decrease >4 µg/m^3
Medium	Increase/ decrease 2 – 4 µg/m^3
Small	Increase/ decrease 0.4 – 2 µg/m^3
Imperceptible	Increase/ decrease <0.4 µg/m^3

3.19 Once the magnitude of the impact is defined from the criteria in Table 1, the next step is to describe the impact. The EPUK guidance therefore presents a set of descriptors as a means of describing impacts. These are identified in Table 2 below.

Table 2: Air Quality Impact Descriptors for Changes to Annual Mean Nitrogen Dioxide and PM_{10} Concentrations at a Receptor.

Absolute Concentration in Relation to Objective/ Limit Value	Change in Concentration		
	Small	Medium	Large
Increase with Development			
Above Objective/ Limit Value *With* Scheme (>40 µg/m^3)	Slight Adverse	Moderate Adverse	Substantial Adverse
Just Below Objective/ Limit Value *With* Scheme (36-40 µg/m^3)	Slight Adverse	Moderate Adverse	Moderate Adverse
Below Objective/ Limit Value *With* Scheme (30-36 µg/m^3)	Negligible	Slight Adverse	Slight Adverse
Well Below Objective/ Limit Value *With* Scheme (<30 µg/m^3)	Negligible	Negligible	Slight Adverse
Decrease with Development			
Above Objective/ Limit Value *Without* Scheme (>40 µg/m^3)	Slight Beneficial	Moderate Beneficial	Substantial Beneficial
Just Below Objective/ Limit Value *Without* Scheme (36-40 µg/m^3)	Slight Beneficial	Moderate Beneficial	Moderate Beneficial
Below Objective/ Limit Value *Without* Scheme (30-36 µg/m^3)	Negligible	Slight Beneficial	Slight Beneficial
Well Below Objective/ Limit Value *Without* Scheme (<30 µg/m^3)	Negligible	Negligible	Slight Beneficial

3.20 Other factors taken into account in determining the significance of the impacts predicted are summarised in Box 1 below.

Box 1: Factors Taken into Account in Determining Air Quality Significance

Factors
The number of properties affected by slight, moderate or major air quality impacts.
The number of people exposed to levels above the objective or limit value.
The magnitude of the changes and the description of the impacts at relevant receptors.
Whether or not an exceedence of an objective or limit value is predicted to arise in the study area where none existed before, or an exceedence area is substantially increased.
Whether or not the study area exceeds an objective or limit value and this exceedence is removed or the exceedence area is reduced.
Uncertainty, including the extent to which worst-case assumptions have been made.
The extent to which an objective or limit value is exceeded, e.g. an annual mean NO_2 of 41 µg/m^3 should attract less significance than an annual mean of 51 µg/m^3.

Sensitive Receptors

3.21 LAQM.TG(09) describes in detail typical locations where consideration should be given to pollutants defined in the Regulations. Generally, the guidance suggests that all locations '*where members of the public are regularly present'* should be considered. At such locations, members of the public will be exposed to pollution over the time that they are present, and the most suitable averaging period of the pollutant needs to be used for assessment purposes.

3.22 For instance, on a footpath, where exposure will be transient (for the duration of passage along that path) comparison with short-term standards (i.e. 15 minute mean or 1 hour mean) may be relevant. In a school, or adjacent to a private dwelling, however; where exposure may be for longer periods, comparison with long-term (such as 24 hour mean or annual mean) standards may be most appropriate. In general terms, concentrations associated with long-term standards are lower than short-term standards owing to the chronic health effects associated with exposure to low level pollution for longer periods of time. DEFRA LAQM TG(09) states that the annual mean objectives should not apply at '*Building façades of offices or other places of work where members of the public do not have regular access'.*

3.23 Receptor locations for this assessment have been selected at both the Site and at residential receptors adjacent to the local road network as identified in Figure 3.

Figure 3: Receptor Locations

3.24 For the purposes of assessing construction related impacts, receptor locations have been selected at sensitive locations (residential dwellings) adjacent to the Site.

4 BASELINE CONDITIONS

LBC Review and Assessment of air quality

4.1 As has been described earlier, in line with their statutory obligations, LBC have undertaken a comprehensive review of air quality in the area over recent years and this has resulted in the declaration of an AQMA covering the entire Borough. The AQMA is designated for NO_2 and PM_{10}.

Automatic Monitoring Data

4.2 Camden operate three automatic monitoring sites as identified in Table 3.

Table 3: Automatic Monitoring Sites

Site Name	Site Type	Grid References	Pollutants Monitored	Distance to Kerb of Nearest Road
London Bloomsbury	Urban background	530120, 182034	PM_{10}, $PM_{2.5}$, SO_2, CO, NO_2, O_3	27m
Shaftesbury Avenue	Roadside	530060, 181290	PM_{10}, NO_2	<1m
Swiss Cottage	Kerbside	526633, 184392	PM_{10}, $PM_{2.5}$, NO_2	3m
Euston Road	Roadside	529884, 182639	NO_2	0.5m

4.3 All of these sites exceeded the NO_2 annual mean objective during 2010 and the 1-hour objective was also exceeded at Swiss Cottage and Euston Road. PM_{10} is not monitored at Euston Road but the objectives for this pollutant were achieved at all of the other three sites identified in Table 3.

4.4 The above sites are all located more than 1.7km from the proposed development site and are therefore not considered representative for this specifc area.

Non-automatic Monitoring Data

4.5 LBC carry out monitoring for nitrogen dioxide by diffusion tube at 24 locations, although none of these are in the vicinity of the Site.

DEFRA Background Maps

4.6 Annual mean background concentrations for inclusion in the assessment have been obtained from the National Air Quality Information Archive (NAQIA). These figures are displayed in Table 4, which provide estimated annual mean background concentrations of NO_2, PM_{10} and $PM_{2.5}$.

Table 4: Estimated background concentrations (µg/m^3)

Pollutant	2012
NO_x	61.0
NO_2	34.2
PM_{10}	19.8
$PM_{2.5}$	14.0

4.7 Table 4 shows that for all years, estimated annual mean background concentrations of NO_2 are below the annual average objective of 40 µg/m^3. Estimated annual mean background concentrations of PM_{10} are also well below the annual average objective limit of 40 µg/m^3 and $PM_{2.5}$ concentrations are below the 25 µg/m^3 objective for this pollutant.

5 ASSESSMENT OF IMPACT, MITIGATION AND RESIDUAL EFFECTS

IMPACT - CONSTRUCTION PHASE

5.1 The Development Site covers an area of approximately 3239.5 m^2. There are a number of sensitive receptors in close proximity to the Site which are within 20 m of the Site boundary. It is therefore considered necessary to assess the risk of dust effects occurring.

5.2 The assessment of the Site's risk category is primarily based on the following factors:

- the scale and nature of the works;
- the proximity of receptors; and
- professional judgement.

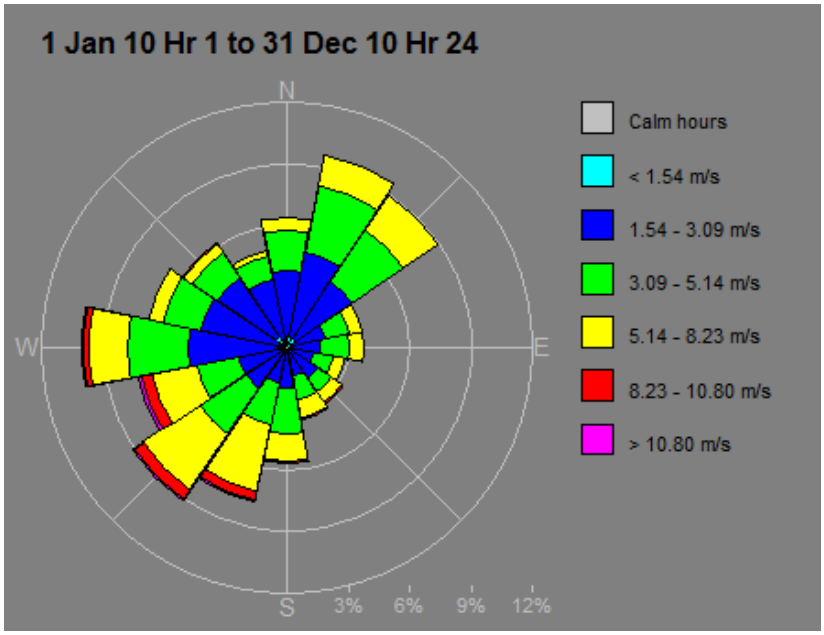
5.3 The Site currently comprises a 2/3 storey commercial building that will require demolition. There are residential properties located on all sides of the Development Site, some of which are within 20m of the Site boundary.

5.4 There are no ecologically sensitive sites in close proximity to the Site therefore the impact of dust emissions on ecologically sensitive receptors has not been considered any further in this assessment.

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

5.6 A windrose from Heathrow is provided below in Figure 4, which shows that the prevailing wind is from the south-west and north-east, with some strong winds also coming from the west. Properties to the south-west, north-east and west are therefore more likely to experience impacts than those to the north-west and south-east.

Figure 4: Windrose for Heathrow Meteorological Station (2010)



Demolition

5.7 As detailed above, the Development Site is currently occupied by commercial property. The existing building is classed as 'small' based on the IAQM guidance. However the construction material is mainly brick and concrete, which has a high potential for dust release, and part of the building is between 10-20 m in height, therefore based on professional judgement and using the IAQM guidance the Site is considered to have a dust emission class of small to medium.

5.8 Given that the closest sensitive receptors are <20 m away, the Site is considered to be a 'medium/high' risk site during demolition prior to mitigation.

Earthworks

5.9 Earthworks will primarily involve excavating material, haulage, tipping and stockpiling. This may also involve levelling of the Site and landscaping.

5.10 The Site is 3239.5 m^2 in size. Given the size of the Site there is unlikely to be more than 5 earth moving vehicles on site at any given time and it is unlikely that there will be room to store material at the Site for any significant period of time, therefore the Site is classed as being 'small' based on the IAQM guidance.

5.11 Due to the proximity of sensitive receptors the Site is considered to be a 'medium' risk site during earthwork activities prior to mitigation.

Construction

5.12 Dust emissions during construction will depend on the scale of the works, method of construction, construction materials and duration of build.

5.13 At the present time detailed information is unavailable regarding the method and duration of construction. However, it is anticipated that the duration of construction will be approximately 1 year. The construction materials for the proposed new building will include concrete, a potentially dusty material. The Site is classed as 'medium' based on the IAQM guidance.

5.14 Given the proximity of receptors to the Site boundary the proposed development is considered to be a 'high' risk site during the construction phase prior to mitigation.

Trackout

5.15 Factors influencing the degree of trackout and associated magnitude of effect include vehicle size, vehicle speed, vehicle numbers, geology and duration.

5.16 As a general guidance, significant trackout may occur up to 500 m from large sites, 200 m from medium sites and 50 m from small sites, as measured from the Site exit.

5.17 Due to the small size of the Site the number of heavy good movements is likely to be less than 25 in any given day and there will be no onsite roads. The Site is therefore classed as being 'small' with regards trackout.

5.18 All vehicles accessing the Site will do so via Maygrove Road, however as the Site is classed as 'small' significant impacts are only likely to occur up to 50 m from the Site. Given the close proximity of residential receptors, the Site is considered to have a 'medium' risk of impacts as a result of Trackout.

Summary of Dust Risk Effects

5.19 A summary of the potential dust risk effects prior to mitigation are presented in Table 7 below.

Table 7: Summary of Dust Risk Effects

Source	Dust Soiling Effects	PM_{10} Effects
Demolition	Medium/High Risk Site	Low/ Medium Risk Site
Earthworks	Medium Risk Site	Low Risk Site
Construction	High Risk Site	Medium Risk Site
Trackout	Medium Risk Site	Low Risk Site

5.20 The significance of potential dust impacts post mitigation are identified later in this report.

IMPACT - Operational Phase

Annual Mean NO_2 Concentrations

5.21 Predicted annual mean NO_2 concentrations are shown in Table 5. The receptor locations are illustrated in Figure 3 earlier in Section 3 of this report.

Table 5: Predicted annual mean nitrogen dioxide concentrations

Receptor ID	2012 Baseline Annual Mean (µg/m^3)	2012 With Development Annual Mean (µg/m^3)	Increase attributable to proposed development
1	39.7	39.7	0
2	36.5	36.5	0
3	39.8	39.9	0
4	35.5	35.5	0
5	35.0	35.0	0
6	35.6	35.6	0
7	35.1	35.1	0
8	40.6	40.6	0

5.22 The predicted concentrations displayed in Table 5 show that NO_2 concentrations are below the objective at the Site (35.0 µg/m^3) and that impacts from the proposed development are imperceptible. This is due to the very low traffic impacts associated with the proposed development.

1-hour Mean NO_2 Concentrations

5.23 Exceedence of the 1-hour objective for NO_2 is unlikely based on the predicted annual mean concentrations. Guidance earlier referred to indicates that exceedance of the 1-hour objective is unlikely where the annual mean concentration is below 60 µg/m^3.

Annual Mean PM_{10} Concentrations

5.24 The predicted annual mean PM_{10} concentrations are also below the 40 µg/m^3 objective for this pollutant, as identified in Table 6.

5.25 The predicted concentrations in Table 6 show that the maximum impact on PM_{10} is 0.1 µg/m^3 which is considered to be an imperceptible impact.

Table 6: Predicted Annual mean PM_{10} concentrations

Receptor ID	2012 Baseline Annual Mean (µg/m^3)	2012 With Development Annual Mean (µg/m^3)	Increase attributable to proposed development
1	20.3	20.3	0
2	20.0	20.0	0
3	20.3	20.3	0
4	19.9	19.9	0
5	19.9	19.9	0
6	20.0	20.0	0
7	19.9	19.9	0
8	20.4	20.4	0

24-hour mean PM_{10} concentrations

5.26 The number of exceedences of 50 µg/m^3 as a 24-hour mean PM_{10} concentration has been calculated from the annual mean, following the approach set out by DEFRA in LAQM TG(09):

$$A = -18.5 + 0.00145 \times \text{annual mean}^3 + (206/\text{annual mean})$$

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

5.27 Based on the above approach, the maximum number of PM_{10} days >50 µg/m^3 is less than 4-days with the proposed development in place. The objective for this pollutant permits up to 35-days per annum and therefore exceedence of this objective is highly unlikely.

Annual Mean $PM_{2.5}$ Concentrations

5.28 The predicted annual mean $PM_{2.5}$ concentrations are also below the 25 µg/m^3 objective for this pollutant, as identified in Table 7.

Table 7: Predicted Annual mean $PM_{2.5}$ concentrations

Receptor ID	2012 Baseline Annual Mean ($\mu g/m^3$)	2012 With Development Annual Mean ($\mu g/m^3$)	Increase attributable to proposed development
1	14.3	14.3	0
2	14.1	14.1	0
3	14.3	14.3	0
4	14.1	14.1	0
5	14.1	14.1	0
6	14.1	14.1	0
7	14.1	14.1	0
8	14.4	14.4	0

MITIGATION

Construction Phase

5.29 It is recommended that the following 'best practice' measures be implemented, as appropriate during the construction phase:

- ensure effective site planning locating layout machinery and dust causing activities away from sensitive receptors;
- erect solid screens or barriers around the Site boundary;
- vehicles carrying loose aggregate and workings should be sheeted at all times;
- all vehicles should switch of engines when not in use i.e. no idling vehicles should occur at the Site;
- no site runoff of water or mud should be allowed;
- stockpiles should be kept for the shortest time possible and if necessary, the use of sprinklers and hoses for dampening of exposed soil and materials should be employed;
- observation of wind speed and direction prior to conducting dust-generating activities to determine the potential for dust nuisance to occur, avoiding potentially dust-generating activities during periods when wind direction may carry dust into sensitive areas and avoiding dust-generating operations during periods of high or gusty winds;
- stockpiles of soils and materials should be located as far as possible from sensitive properties, taking account of prevailing wind directions and seasonal variations in the prevailing wind;
- completed earthworks should be covered or vegetated as soon as is practicable;
- regular inspection of local highways and site boundaries to check for dust deposits and, if necessary removal and cleaning of any deposits;
- visual inspection of site perimeter to check for dust deposition (evident as soiling and marking) on vegetation, cars and other objects and taking remedial measures if necessary;
- minimise surface areas of stockpiles (subject to health and safety and visual constraints regarding slope gradients and visual intrusion) to reduce area of surfaces exposed to wind pick-up;
- ensure concrete batcher, where used, has a permit to operate and is operated in accordance with Process Guidance Note 3/1 (04);
- use of dust-suppressed tools for all operations;
- ensuring that all construction plant and equipment is maintained in good working order; and
- no unauthorised burning of any material anywhere on site.

5.30 Construction vehicles should be kept clean and sheeted when on public highways. Timing of large-scale vehicle movements to avoid peak hours on the local road network will also be beneficial.

5.31 It is recommended that liaison with the Local Authority be maintained throughout the construction process, and any incidents which lead to excessive elevation of dust deposition and/or PM_{10} concentrations at neighbouring sensitive receptors are reported to the Environmental Health Department. If complaints are received from local residents, these will be documented in a diary or log held on site by the Site Manager. A nominated member of the construction team (e.g. Site Manager) will also act as a point of contact for residents who may be concerned about elevated deposition of dust.

Operational Phase

5.32 No mitigation is required as impacts are considered to be imperceptible.

RESIDUAL EFFECTS

Construction phase

5.33 A summary of the construction related residual following mitigation is provided in Table 8.

Table 8: Construction related impacts summary table with mitigation

Source	Dust soiling effects	Ecological effects	PM_{10} effects
Demolition	Negligible/ Slight adverse	None	Negligible
Earthworks	Negligible	None	Negligible
Construction	Slight adverse	None	Negligible
Trackout	Negligible	None	Negligible
Overall Significance		**Negligible/ Slight adverse**	

5.34 The greatest potential for dust nuisance problems to occur will be immediately next to the construction site perimeter. There may be limited incidences of increased dust deposited on property beyond this distance.

Operational Phase

5.35 The residual effects associated with the operational phase are considered to be imperceptible.

6 CONCLUSIONS

6.1 An air quality impact assessment has been carried out to assess both the construction and operational phases of the proposed development.

6.2 A qualitative assessment of the potential impacts during the construction phase has been carried out. This has showed that during this phase of the proposed development releases of dust and PM_{10} are likely to occur during site activities. Through good site practice and the implementation of suitable mitigation measures, the impact of dust and PM_{10} releases may be effectively mitigated.

6.3 Pollutant concentrations have been predicted using Breeze Roads dispersion model to assess both existing air quality constraints at the Site and impacts associated with the operational phase of the proposed development. This assessment has shown that existing air quality at the Site is below objectives for both nitrogen dioxide, PM_{10} and $PM_{2.5}$. Operational phase impacts are predicted to be imperceptible and therefore no mitigation is considered necessary.

6.4 Based on the above information, it is considered that air quality does not pose a constraint to redevelopment of the Site as proposed.

APPENDIX A - AIR QUALITY TERMINOLOGY

Term	Definition
Accuracy	A measure of how well a set of data fits the true value.
Air quality objective	Policy target generally expressed as a maximum ambient concentration to be achieved, either without exception or with a permitted number of exceedences within a specific timescale (see also air quality standard).
Air quality standard	The concentrations of pollutants in the atmosphere which can broadly be taken to achieve a certain level of environmental quality. The standards are based on the assessment of the effects of each pollutant on human health including the effects on sensitive sub groups (see also air quality objective).
Ambient air	Outdoor air in the troposphere, excluding workplace air.
Annual mean	The average (mean) of the concentrations measured for each pollutant for one year. Usually this is for a calendar year, but some species are reported for the period April to March, known as a pollution year. This period avoids splitting winter season between 2 years, which is useful for pollutants that have higher concentrations during the winter months.
AQMA	Air Quality Management Area.
DEFRA	Department for Environment, Food and Rural Affairs.
Exceedence	A period of time where the concentrations of a pollutant is greater than, or equal to, the appropriate air quality standard.
Fugitive emissions	Emissions arising from the passage of vehicles that do not arise from the exhaust system.
LAQM	Local Air Quality Management.
NO	Nitrogen monoxide, a.k.a. nitric oxide.
NO_2	Nitrogen dioxide.
NO_x	Nitrogen oxides.
O_3	Ozone.
Percentile	The percentage of results below a given value.
PM_{10}	Particulate matter with an aerodynamic diameter of less than 10 micrometres.
ppb parts per billion	The concentration of a pollutant in the air in terms of volume ratio. A concentration of 1 ppb means that for every billion (10^9) units of air, there is one unit of pollutant present.
ppm parts per million	The concentration of a pollutant in the air in terms of volume ratio. A concentration of 1 ppm means that for every billion (10^6) units of air, there is one unit of pollutant present.
Ratification (Monitoring)	Involves a critical review of all information relating to a data set, in order to amend or reject the data. When the data have been ratified they represent the final data to be used (see also validation).
µg/m^3 micrograms per cubic metre	A measure of concentration in terms of mass per unit volume. A concentration of 1ug/m3 means that one cubic metre of air contains one microgram (millionth of a gram) of pollutant.
UKAS	United Kingdom Accreditation Service.
Uncertainty	A measure, associated with the result of a measurement, which characterizes the range of values within which the true value is expected to lie. Uncertainty is usually expressed as the range within which the true value is expected to lie with a 95% probability, where standard statistical and other procedures have been used to evaluate this figure. Uncertainty is more clearly defined than the closely related parameter 'accuracy', and has replaced it on recent European legislation.
USA	Updating and Screening Assessment.
Validation (modelling)	Refers to the general comparison of modelled results against monitoring data carried out by model developers.
Validation (monitoring)	Screening monitoring data by visual examination to check for spurious and unusual measurements (see also ratification).
Verification (modelling)	Comparison of modelled results versus any local monitoring data at relevant locations.

APPENDIX B - AIR QUALITY STANDARDS AND OBJECTIVES

Air Quality Objectives currently included in the Air Quality Regulations 2000 and (Amendment) Regulations 2002 for the purpose of Local Air Quality Management (LAQM)						
Pollutant	**Applies to**	**Standard**		**Objective**		**EU AQ Daughter Directive**
		Concentration	***Measured as***	***Annual exceedences allowed***	**Target date**	
Nitrogen dioxide (NO_2)[1]	All UK	200 µg/m^3	1 hour mean	18	31.12.2005	As objective. target: 01.01.2010
Nitrogen dioxide (NO_2)	All UK	40 µg/m^3	annual mean		31.12.2005	As standard. target: 01.01.2010
Particulate Matter (PM_{10}) (gravimetric)	All UK	40 µg/m^3	annual mean		31.12.2004	As standard. target: 01.01.2005
	All UK	50 µg/m^3	24 hour mean	35	31.12.2004	As objective. target: 01.01.2005
	Scotland	50 µg/m^3	24 hour mean	7	31.12.2010	As objective. target: 01.01.2010
	Scotland	18 µg/m^3	annual mean		31.12.2010	
Particulate Matter ($PM_{2.5}$)	UK (Except Scotland)	25 µg/m^3	annual mean		2020	
	Scotland	12 µg/m^3	annual mean		2020	
	UK urban areas	Target of 15% reduction in concentrations at urban background	annual mean		Between 2010 and 2020	

APPENDIX C - SUMMARY OF TRAFFIC DATA

Traffic data utilised for the air quality assessment

Link Ref	2012 Base AADT	2012 Base + Dev AADT	HGV (%)	Speed (km/h)
Maygrove Road	3,015	3,084	4	10-20
Iverson Road	3,621	3,690	4	10-20
A5 – Shoot-Up Hill	13,707	13,776	15	15