London Borough of Camden

31 Daleham Gardens

Air Quality Assessment

Issue | 24 August 2020

Job number 238826-14

Ove Arup & Partners Ltd
13 Fitzroy Street
London
W1T 4BQ
United Kingdom
www.arup.com

ARUP

Document verification

ARUP

Job title		31 Daleham Gardens			**Job number** 238826-14
Document title		Air Quality Assessment			**File reference**
Document ref					
Revision	**Date**	**Filename**	Daleham Gardens Air Quality Report Draft 01 200818.docx		
Draft 1	18 Aug 2020	**Description**	First draft		
			Prepared by	Checked by	Approved by
		Name	Sofia Gkino	Emma Gibbons, Marilena Karyampa	Michael Bull
		Signature			
Issue	24 Aug 2020	**Filename**	Daleham Gardens Air Quality Report Final.docx		
		Description			
			Prepared by	Checked by	Approved by
		Name	Sofia Gkino	Emma Gibbons, Marilena Karyampa	Michael Bull
		Signature			
		Filename			
		Description			
			Prepared by	Checked by	Approved by
		Name			
		Signature			
				Issue Document verification with document	✓

Contents

1 Introduction

This air quality assessment has been prepared by Ove Arup and Partners Limited (Arup) to accompany the application being submitted for the proposed demolition of the existing fire damaged building at 31 Daleham Gardens, London (hereafter referred to as the 'site'). The site is located in the London Borough of Camden.

This report assesses the likely effects of the site on the environment in respect to air quality during demolition. The proposed re-development of the site will be prepared once the building has been demolished and will be the subject of a separate assessment.

Air quality studies are concerned with the presence of airborne pollutants in the atmosphere. The main pollutants of concern for local air quality are oxides of nitrogen (NOx), including nitrogen dioxide (NO_2), particulate matter (PM_{10} and $PM_{2.5}$) and dust.

This assessment outlines the relevant air quality legislation and policy and presents the methodology and significance criteria used in the assessment. It describes the existing air quality conditions at and in the vicinity of the site, the potential air quality effects associated with the demolition activities, and any mitigation required.

1.1 Description of the Development

The site consists of an existing building damaged by a fire in 2017 and is considered as unsafe. The site is located at 31 Daleham Gardens, in the London Borough of Camden, as shown in Figure 1. The existing building features a site area of 143m^2, and comprises four stories (including a basement). The site is located in a predominantly residential area, with Finchley Road Underground station approximately 500m to the south-west, and Belsize Park Underground station and the Royal Free Hospital approximately 500m to the east and north-east respectively.

Figure 1: Location of the site

2 Legislation, Policy and Guidance

2.1 European Air Quality Management

In 1996 the European Commission published the Air Quality Framework Directive on ambient air quality assessment and management (96/62/EC)[1]. This Directive defined the policy framework for 12 air pollutants known to have harmful effects on human health and the environment. Limit values (*pollutant concentrations not to be exceeded by a certain date*) for each specified pollutant were set through a series of Daughter Directives, including Directive 1999/30/EC (the 1st Daughter Directive)[2] which set limit values for NO_2 and PM_{10} amongst other pollutants.

In May 2008, the Directive 2008/50/EC[3] on ambient air quality and cleaner air for Europe came into force. This Directive consolidates the previous Directives (apart from the 4th Daughter Directive), provides a new regulatory framework for $PM_{2.5}$ and makes provision for extended compliance deadlines for NO_2 and PM_{10}.

The Directives were transposed into national legislation in England by the Air Quality Standards Regulations 2010[4] (amended in 2016)[5]. The Secretary of State for the Environment has the duty of ensuring compliance with the air quality limit values.

2.2 Environment Act 1995

Part IV of the Environment Act 1995[6] places a duty on the Secretary of State for the Environment to develop, implement and maintain an Air Quality Strategy with the aim of reducing atmospheric emissions and improving air quality. The Air Quality Strategy for England, Scotland, Wales and Northern Ireland[7] provides the framework for ensuring compliance with the air quality limit values based on a combination of international, national and local measures to reduce emissions and improve air quality. This includes the statutory duty, also under Part IV of the Environment Act 1995, for local authorities to undergo a process of local air quality management and declare Air Quality Management Areas (AQMA) where pollutant concentrations exceed the national air quality objectives. Where an AQMA is declared, the local authority needs to produce an Air Quality Action Plan (AQAP) which outlines the strategy for improving air quality in these areas.

[1] Directive 96/62/EC of 27 September 1996 on ambient air quality assessment and management
[2] Directive 1999/30/EC of 22 April 1999 relating to limit values for sulphur dioxide, nitrogen dioxide and oxides of nitrogen, particulate matter and lead in ambient air
[3] Directive 2008/50/EC of the European Parliament and of the Council of 21 May 2008 on ambient air quality and cleaner air for Europe
[4] The Air Quality Standards Regulations 2010, SI 2010/1001
[5] The Air Quality Standards (Amendment) Regulations 2016, SI 2016/1184
[6] Environment Act 1995, Chapter 25, Part IV Air Quality
[7] The Air Quality Strategy for England, Scotland, Wales and Northern Ireland, Volume 1, July 2007

2.3 Air Quality Standards

Air quality limit values and objectives are quality standards for clean air. Some pollutants have standards expressed as annual average concentrations due to the chronic way in which they affect health or the natural environment, i.e. effects occur after a prolonged period of exposure to elevated concentrations. Other pollutants have standards expressed as 24-hour, 1-hour or 15-minute average concentrations due to the acute way in which they affect health or the natural environment, i.e. after a relatively short period of exposure. Some pollutants have standards expressed in terms of both long and short-term concentrations.

In this assessment, the term 'air quality standard' has been used to refer to both the UK objectives and European limit values. Table 1 sets out the air quality standards for NO_2, PM_{10} and $PM_{2.5}$. Other pollutants have been screened out of this air quality assessment, since they are not likely to cause exceedances of their respective standards.

Table 1: Air quality standards

Pollutant	Averaging period	Air quality standard
Nitrogen dioxide (NO_2)	Annual mean	40µg/m^3
	1-hour mean	200µg/m^3 [1]
Fine particulate matter (PM_{10})	Annual mean	40µg/m^3
	24-hour mean	50µg/m^3 [2]
Very fine particulate matter ($PM_{2.5}$)	Annual mean	25µg/m^3
[1] not to be exceeded more than 18 times a year (99.79th percentile) *[2] not to be exceeded more than 35 times a year (90.41th percentile)*		

2.4 Dust Nuisance

Dust is the generic term used in the British Standard document BS 6069 (Part Two) to describe particulate matter in the size range 1–75µm in diameter. Dust nuisance is the result of the perception of the soiling of surfaces by excessive rates of dust deposition. Under provisions in the Environmental Protection Act 1990[8], dust nuisance is defined as a statutory nuisance.

There are currently no standards or guidelines for dust nuisance in the UK, nor are formal dust deposition standards specified. This reflects the uncertainties in dust monitoring technology and the highly subjective relationship between deposition events, surface soiling and the perception of such events as a nuisance. In law, complaints about excessive dust deposition would have to be investigated by the local authority and any complaint upheld for a statutory nuisance to occur. However, dust deposition is generally managed by suitable on-site practices and mitigation rather than by the determination of statutory nuisance and/or prosecution or enforcement notice(s).

[8] Environmental Protection Act 1990, Chapter 43, Part III Statutory Nuisances and Clean Air

3 Planning Policies and Guidance

The land-use planning process is a key means of improving air quality, particularly in the long term, through the strategic location and design of new developments. Any air quality consideration that relates to land-use and its development can be a material planning consideration in the determination of planning applications, dependent upon the details of the site.

3.1.1 National Planning Policy Framework

The National Planning Policy Framework (NPPF)[9] was updated in February 2019 with the purpose of planning to achieve sustainable development. Paragraph 181 of the NPPF on air quality states that:

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

In addition, paragraph 103 states that:

> *"The planning system should actively manage patterns of growth in support of these objectives. Significant development should be focused on locations which are or can be made sustainable, through limiting the need to travel and offering a genuine choice of transport modes. This can help to reduce congestion and emissions, and improve air quality and public health. However, opportunities to maximise sustainable transport solutions will vary between urban and rural areas, and this should be taken into account in both plan-making and decision-making."*

Paragraph 170 discusses how planning policies and decisions should contribute to and enhance the natural and local environment. In relation to air quality, NPPF notes that this can be achieved by:

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

[9] Ministry of Housing, Communities and Local Government (2019) National Planning Policy Framework

such as air and water quality, taking into account relevant information such as river basin management plans."

3.1.2 Planning Practice guidance

National Planning Practice guidance (PPG) on various topics, including air quality was developed in order to support the NPPF. The guidance provides a concise outline as to how air quality should be considered in order to comply with the NPPF and states when air quality is considered relevant to a planning application. This includes factors such as changes in traffic volumes, vehicle speeds, congestion or traffic composition, the introduction of new point sources of air pollution, exposure of people to existing sources of air pollutants, and the potential to give rise to air quality impacts at nearby sensitive receptors.

3.1.3 Clean Air Strategy

The Department for Environment, Food and Rural Affairs (Defra) Clean Air Strategy[10] was published in 2019 and sets targets for improving air quality across the country. It includes actions for reducing emissions from various sources, such as transport, domestic activities, farming and industry. There is also a long-term target for reducing population exposure to $PM_{2.5}$ concentrations to meet the World Health Organisation's (WHO) target of 10µg/m^3 as an annual mean. In particular, the Clean Air Strategy states:

"New legislation will create a stronger and a more coherent framework for action to tackle air pollution. This will be underpinned by new England-wide powers to control major sources of air pollution, in line with the risk they pose to public health and the environment, plus new local powers to take action in areas with an air pollution problem. These will support the creation of Clean Air Zones to lower emissions from all sources of air pollution, backed up with clear enforcement mechanism."

3.1.4 Local Air Quality Management Policy and Technical guidance

The policy guidance note, LAQM.PG(16)[11] provides additional guidance on the links between transport and air quality and the links between air quality and the land use planning system. It summarises the main ways in which the land-use planning system can help deliver compliance with the air quality objectives. This is relevant to any external organisations who may wish to engage with the local authority to assist in the delivery of their statutory duties on managing air quality.

The technical guidance, LAQM.TG(16)[12] is designed to support local authorities in carrying out their duties to review and assess air quality in their area. It provides detailed guidance on how to assess the impact of

[10] Defra (2019) Clean Air Strategy 2019
[11] Defra (2016) Local Air Quality Management Policy Guidance PG(16)
[12] Defra (2016) Local Air Quality Management Technical Guidance TG(16)

measures using existing air quality tools. Where relevant, this guidance has been taken into account in this assessment.

3.2 Regional Policy and Guidance

3.2.1 The London Plan

The London Plan, consolidated with alterations in 2016[13] (updated in December 2017[14]) forms part of the development strategy for the Greater London area until 2036 and integrates all economic, environmental, transport and social frameworks. This has been amended to be consistent with the NPPF. Specifically, for new development proposals, the London Plan looks at air quality by proposing the following measures:

- minimise increased exposure to existing poor air quality and make provision to address local problems of air quality such as by design solutions, buffer zones or steps to promote greater use of sustainable transport modes through travel plans;
- reduce emissions from the demolition and construction of buildings following the best practice guidance;
- ensure that where provision needs to be made to reduce emissions from a development, this is usually made on-site.

These policies have been considered throughout this air quality assessment.

3.2.2 London Local Air Quality Management Technical Guidance

The London Local Air Quality Management technical guidance (LLAQM.TG(16))[15] applies only to London's 32 boroughs (and the City of London), whilst LAQM.TG(16) applies to all other UK local authorities. Although the LLAQM.TG(16) technical guidance is largely based on the updated national guidance LAQM.TG(16), it does incorporate London-specific elements of the LAQM system.

This guidance is designed to support London authorities in carrying out their duties to review and assess air quality in their area. Where relevant this guidance has been taken into account.

3.2.3 The Control of Dust and Emissions during Construction and Demolition, Supplementary Planning guidance

The GLA published the Control of Dust and Emissions during Construction and Demolition SPG[4] in July 2014. This SPG seeks to reduce emissions of dust,

[13] Greater London Authority (2016) The London Plan: The Spatial Development Strategy for London Consolidated With Alterations Since 2011
[14] https://www.london.gov.uk/sites/default/files/new_london_plan_december_2017.pdf
[15] Greater London Authority (2016) London Local Air Quality Management Technical Guidance TG (16).

PM_{10} and $PM_{2.5}$ from construction and demolition activities in London. It also aims to manage emissions of nitrogen oxides (NOx) from construction and demolition machinery by means of a new non-road mobile machinery (NRMM) ultra-low emissions zone (ULEZ).

The method outlined for dust assessment in the GLA Control of Dust and Emissions during Construction and Demolition SPG[10] is the same as the the Institute of Air Quality Management (IAQM) guidance[16] and therefore the IAQM methodology has been considered in this assessment.

The IAQM guidance provides a method for classifying the significance of effect from construction activities based on the 'dust magnitude' (high, medium or low) and proximity of the proposed development to the closest receptors. The guidance recommends that once the significance of effect from construction is identified, the appropriate mitigation measures are implemented. Experience has shown that once the appropriate mitigation measures are applied in most cases the resulting dust impacts can be reduced to negligible levels.

3.3 Local Policy and Guidance

3.3.1 London Borough of Camden

The London Borough of Camden's 2016 Local Plan[17], adopted in 2017 discusses air quality in several policies:

Policy A1 Managing the impact of development

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

Policy CC4 Air Quality

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

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

Air Quality Assessments (AQAs) are required where development is likely to expose residents to high levels of air pollution. Where the AQA shows that a development would cause harm to air quality, the Council will not grant planning permission unless measures are adopted to mitigate the impact. Similarly,

[16] IAQM (2016) Guidance on the Assessment of Dust from Demolition and Construction (Version 1.1)
[17] Camden Local Plan (2017) adopted 2017, https://www.camden.gov.uk/ccm/cms-service/stream/asset/?asset_id=3655163& [accessed March 2018]

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."

To support the Local Plan, the Council has prepared Camden Planning Guidance (CPG) on Air quality 2019 (updated in July 2020[18]). This guidance supports the Policy CC4 in the Local Plan taking further improvement of air quality in the borough.

Camden has adopted the World Health Organisation guideline for nitrogen dioxide (40µg/m^3), PM_{10} (20µg/m^3) and $PM_{2.5}$ (10µg/m^3) annual mean concentrations. For the determination of planning applications and appraisal of Construction Management Plans, consideration must be paid to uncertainty in NO_2 data, therefore 38µg/m^3 (the 40µg/m^3 WHO limit less 5%) shall be taken as the limit for this pollutant. Camden's overarching objective is to achieve WHO limits by 2030 and this will be steered by the Council's Clean Air Action Plan.

These policies have been considered throughout this air quality assessment.

[18] Camden Planning Guidance Air quality March 2019 (Draft July 2020) https://www.camden.gov.uk/documents/20142/231241308/Air+Quality+CPG.pdf/366daf09-8d40-d37c-0185-e475ac770dfa?t=1597064564347

4 Methodology of Assessment

4.1 Scope of Assessment

The overall approach to the air quality assessment comprises:

- a review of the existing air quality conditions at, and in the vicinity of, the site;
- an assessment of the potential changes in air quality arising from the demolition activities on the site; and
- formulation of mitigation measures, where appropriate, to ensure any adverse effects on air quality are minimised.

4.2 Methodology of Baseline Assessment

Existing or baseline ambient air quality refers to the concentration of relevant substances that are already present in the environment. These are present from various sources, such as industrial processes, commercial and domestic activities, traffic and natural sources.

A desk-based review of the following data sources has been undertaken to determine baseline conditions of air quality in this assessment:

- Local authority review and assessment reports and local air quality monitoring data[19],
- London Air website[20]
- The Defra Local Air Quality Management website[21];
- The UK Air Information Resource website[22]; and
- The Environment Agency website[23].

4.3 Methodology of Construction Phase Assessment

The site will include demolition of a building. The IAQM (and GLA dust guidance) methodology has been used to assess the impacts from dust on local sensitive receptors.

An ‘impact’ is described as a change in pollutant concentrations or dust deposition, while an ‘effect’ is described as the consequence of an impact. The main impacts that may arise during construction of the site are:

- Dust deposition, resulting in the soiling of surfaces;

[19] London Borough of Camden Air Quality Annual Status Report for 2018
[20] London Air website https://www.londonair.org.uk/LondonAir/Default.aspx
[21] Defra Local Air Quality Management website; http://laqm.defra.gov.uk/;
[22] Defra, http://uk-air.defra.gov.uk,
[23] Environment Agency website; https://environment.data.gov.uk/public-register/view/search-industrial-installations;

- Visible dust plumes;
- Elevated PM_{10} concentrations as a result of dust generating activities on site; and
- An increase in NO_2 and PM_{10} concentrations due to exhaust emissions from NRMM and vehicles accessing the site.

The IAQM guidance considers the potential for dust emissions from dust-generating activities, such as demolition of existing structures, earthworks, construction of new buildings and trackout. Earthworks refer to the processes of soil stripping, ground levelling, excavation and land capping, while trackout is the transport of dust and dirt from the site onto the public road network where it may be deposited and then re-suspended by vehicles using the network. This arises when vehicles leave the site with dusty materials, which may then spill onto the road, or when they travel over muddy ground on site and then transfer dust and dirt onto the road network.

For each of these dust-generating activities, the guidance considers three separate effects:

- Annoyance due to dust soiling;
- Harm to ecological receptors; and
- The risk of health effects due to a significant increase in PM_{10} exposure.

The receptors can be human or ecological and are selected based on their sensitivity to dust soiling and PM_{10} exposure. Sensitive receptors are defined as those properties/schools/hospitals that are likely to experience a change in pollutant concentrations and/or dust nuisance due to the construction of the site.

The methodology takes into account the scale to which the above effects are likely to be generated (classed as small, medium or large), along with the levels of background PM_{10} concentrations and the distance to the closest receptor, in order to determine the sensitivity of the area. This is then taken into consideration when deriving the overall risk for the site. Suitable mitigation measures are also proposed to reduce the risk of the site.

There are five steps in the assessment process described in the IAQM guidance. These are summarised in Figure 2: and a further description is provided in the following paragraphs.

Step 1: Need for Assessment

The first step is the initial screening for the need for a detailed assessment. According to the IAQM guidance, an assessment is required where there are sensitive receptors within 350m of the site boundary (*for ecological receptors that is 50m*) and/or within 50m of the route(s) used by the construction vehicles on the public highway and up to 500m from the site entrance(s).

Step 2: Assess the Risk of Dust Impacts

This step is split into three sections as follows:

- 2A. Define the potential dust emission magnitude;
- 2B. Define the sensitivity of the area; and
- 2C. Define the risk of impacts.

Each of the dust-generating activities is given a dust emission magnitude depending on the scale and nature of the works (step 2A) based on the criteria shown in Table 12 (Appendix A).

The sensitivity of the surrounding area is then determined (step 2B) for each dust effect from the above dust-generating activities, based on the proximity and number of receptors, their sensitivity to dust, the local PM_{10} background concentrations and any other site-specific factors. Table 13 to Table 15 (Appendix A) show the criteria for defining the sensitivity of the area to different dust effects.

The overall risk of the impacts for each activity is then determined (step 2C) prior to the application of any mitigation measures (Table 16, Appendix A) and an overall risk for the site derived.

Step 3: Determine the Site-Specific Mitigation

Once each of the activities is assigned a risk rating, appropriate mitigation measures are identified. Where the risk is negligible, no mitigation measures beyond those required by legislation are necessary.

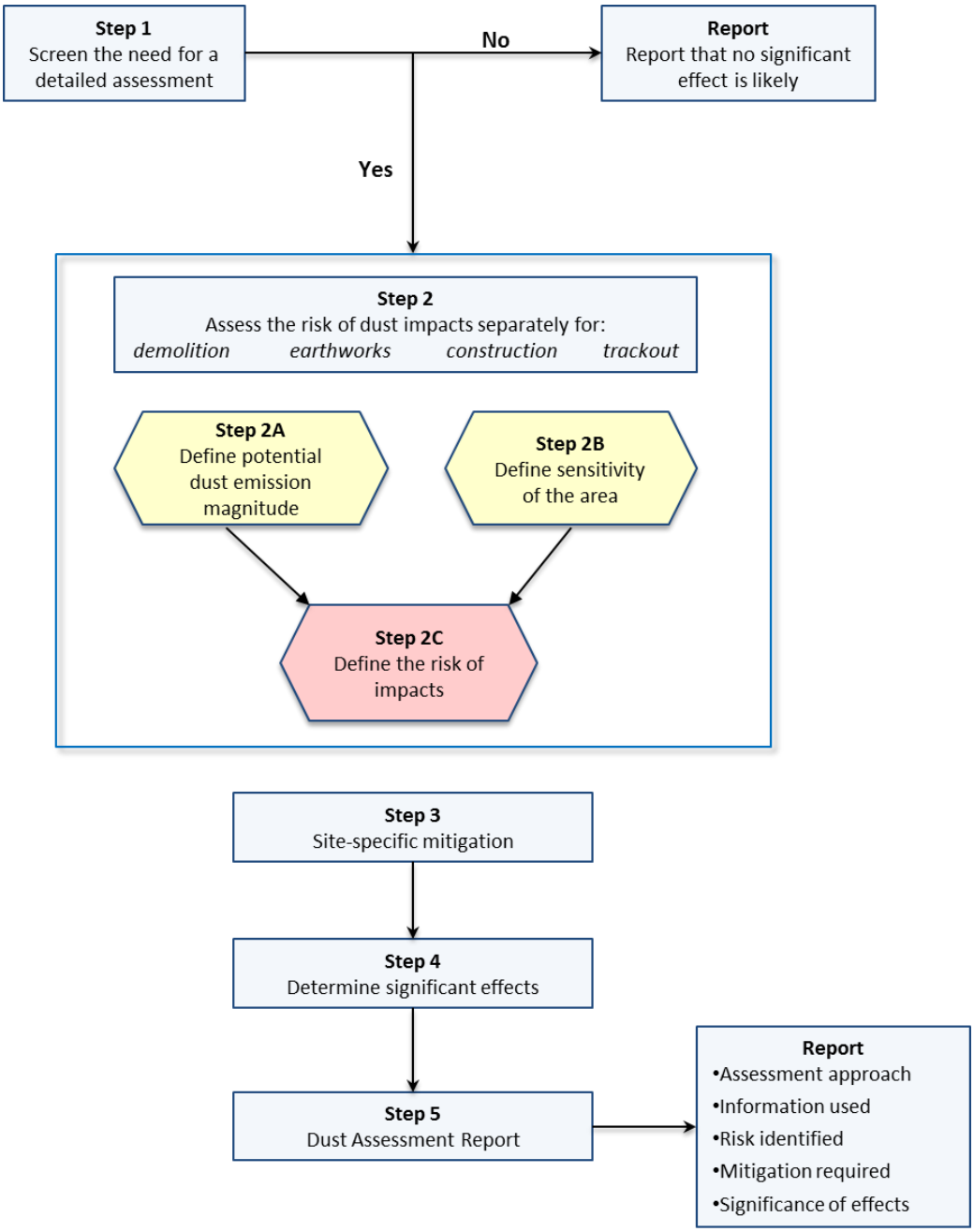
Step 4: Determine any Significant Residual Effects

Once the risk of dust impacts has been determined and the appropriate dust mitigation measures identified, the final step is to determine whether there are any residual significant effects. The IAQM guidance notes that it is anticipated that with the implementation of effective site-specific mitigation measures, the environmental effect will not be significant in most cases.

Step 5: Prepare a Dust Assessment Report

The last step of the assessment is the preparation of a dust assessment report. This forms part of this report (see Section 6).

Figure 2: IAQM dust assessment methodology



5 Baseline Assessment

5.1 Sources of Air Pollution

5.1.1 Industrial Processes

Industrial air pollution sources are regulated through a system of operating permits or authorisations, requiring stringent emission limits to be met, and ensuring that any releases to the environment are minimised or rendered harmless. Regulated (or prescribed) industrial processes are classified as Part A or Part B processes, and are regulated through the Pollution Prevention and Control (PPC) system[24,25]. The larger, more polluting processes are regulated by the Environment Agency (EA), and the smaller less polluting ones by the local authorities. Local authorities focus on regulation for emissions to air, whereas the EA regulates emissions to air, water and land.

There are no regulated Part A processes with releases to air relevant to this assessment within 1km of the site listed on the EA website. The impact of Part A and B processes further from the site are assumed to be included in the background concentrations used (Section 5.4).

5.2 Local Air Quality

The Environment Act 1995 requires local authorities to review and assess air quality with respect to the objectives for the pollutants specified in the National Air Quality Strategy. Where objectives are not predicted to be met, local authorities must declare the area as an AQMA. In addition, local authorities are required to produce an AQAP which includes measures to improve air quality within the AQMA.

As part of the review and assessment process, LBC declared the whole borough an AQMA in 2002 due to exceedances of the annual mean NO_2 and 24-hour mean PM_{10} objectives.

5.3 Local Monitoring

LBC undertake both automatic (continuous) and passive monitoring. There are four diffusion tubes sites measuring NO_2 within 2km of the site, and one continuous monitoring site. The locations of these monitoring sites are shown in Figure 3, with details and monitoring data for the past 5 years outlined in the following paragraphs.

[24] Directive 2010/75/EU of the European Parliament and of the Council of 24 November 2010 on industrial emissions (integrated pollution prevention and control)
[25] The Environmental Permitting (England and Wales) (Amendment) Regulations 2013, SI 2013/390

5.3.1 Automatic Monitoring

LBC operates one kerbside (CD1) automatic monitoring site within 2km of the site. Details of the monitoring site is presented in Table 2. The NO_2 annual mean standard has been exceeded between 2015 and 2019 at the CD1 site, with a maximum concentration of 66µg/m^3 recorded in 2016.

The NO_2 hourly mean standard (exceeding 200µg/m^3 more than 18 times a year) was met in all years between 2015 and 2019, expect in 2016.

In 2019, the annual mean NO_2 concentration recorded at CD1 was 43µg/m^3, exceeding both the UK air quality objective (40µg/m^3) and the standard adopted by Camden (38µg/m^3, based on the 40µg/m^3 WHO limit less 5%). The NO_2 hourly mean objective was not exceeded in 2019.

It is considered that concentrations at the CD1 monitoring site would be greater than at the assessment site, as it is located at a kerbside location, on the A41 highway to the south of the site.

Table 2: Details of continuous monitoring site within 2km of the site

Site ID	Site location	OS grid reference		Site type	Distance to kerb of nearest road (m)	Distance to the site	Pollutants monitored
		X	Y				
CD1	Swiss Cottage	526629	184391	Kerbside	1.5	0.7	NO_2, PM_{10}, $PM_{2.5}$

Table 3: Automatic annual mean NO_2 monitoring results 2015-2019

Site ID	NO_2 annual mean concentration (µg/m^3)					NO_2 1-hour mean exceedances				
	2015	2016	2017	2018	2019	2015	2016	2017	2018	2019
CD1	**61**	**66**	**53**	**54**	**43**	11	**37**	1	2	1

Note: Exceedance are shown in bold.
NO_2 annual means in excess of 60µg/m^3, indicating a potential exceedance of the NO_2 hourly mean AQS objective are shown in bold and underlined.

Table 4 presents the recent PM_{10} monitoring results from 2015 to 2019. There were no exceedances of the PM_{10} annual mean or 24-hour standards at site CD1 between 2015 and 2019. However, in 2016 and 2018 the PM_{10} annual mean was just over the WHO standard (20µg/m^3).

Table 4: Automatic annual mean PM_{10} monitoring results 2015-2019

Site ID	PM_{10} annual mean concentration (µg/m^3)					PM_{10} 24-hour mean exceedances				
	2015	2016	2017	2018	2019	2015	2016	2017	2018	2019
CD1	20	21	20	21	19	8	7	8	4	8

Note: * if data capture is less than 90%, include the 90th percentile of 24-hour means in brackets

Table 5 presents the recent $PM_{2.5}$ monitoring results from 2015 to 2019. There were no exceedances of the $PM_{2.5}$ annual mean air quality standard at site CD1.

However, the $PM_{2.5}$ annual mean was higher than the WHO standard (10µg/m^3) for all years.

Table 5: Automatic annual mean $PM_{2.5}$ monitoring results 2015-2019

Site ID	Site location	$PM_{2.5}$ annual mean concentration (µg/m^3)				
		2015	2016	2017	2018	2019
CD1	Swiss Cottage	12	15	16	11	11

5.3.2 Diffusion Tube Monitoring

There are four passive monitoring sites within 2km of site. Details of the diffusion tubes are presented in Table 6. Exceedances of the NO_2 annual mean objective were recorded at three of these sites between 2014 and 2018 with the maximum concentration in 2016 recorded at CA15 on Swiss Cottage (73.9µg/m^3), a kerbside site.

The roadside site CA17 is the closest monitoring location to the site, 0.1km to the west, and the urban background site CA7 is located 0.6km to the north-west. It is considered that concentrations at the site would likely be somewhere in between those measured at these two locations, as the site is on a minor road. In 2018, the annual mean NO_2 concentration measured at CA17 was 48.1µg/m^3 which is above the annual mean air quality standard, and 22.1µg/m^3 at CA7, which is below the standard.

Measurements for 2019 at the diffusion tube sites were not available at the time of the assessment.

Table 6: Local air quality monitoring data NO_2 concentrations (µg/m^3)

ID	Site	OS coordinates	Location type	Distance to kerb (m)	Distance from the site (km)	Concentrations (µg/m^3)				
						2014	2015	2016	2017	2018
CA7	Frognal Way	526213, 185519	Urban background	30	0.6	28.6	27.8	27.9	32.6	22.1
CA15	Swiss Cottage	526633, 184392	Kerbside	<1	0.7	**74.3**	**69.3**	**73.9**	-	**62.3**
CA17	47 Fitzjohn's Road	526547, 185125	Roadside	1	0.1	**60.3**	**55.8**	**56.4**	-	**48.1**
CA25	Emmanuel Primary	525325, 185255	Roadside	1	1.4	**48.6**	**47.7**	**52.2**	**55.2**	39.8

Note: - : data not available this year

*: measurement above the air quality standard (40µg/m^3)

5.4 Background Concentrations

Background concentrations refer to the existing levels of pollution in the atmosphere, produced by a variety of stationary and non-stationary sources, such as roads and industrial processes. The Defra website includes estimated background pollutant concentrations for NOx, NO_2, PM_{10} and $PM_{2.5}$ for each 1km by 1km OS grid square. Background pollutant concentrations for the existing baseline year of 2020 have been obtained for the grid squares surrounding the site and shown in Table 7. It can be observed that the annual mean background concentrations are below the relevant air quality standards for all pollutants (NO_2, PM_{10} and $PM_{2.5}$).

A comparison against monitored background concentrations has also been undertaken, using monitoring site Frognal Way (CA7), for 2018 as the latest year of available monitoring data. Table 8 presents the comparison of the monitored NO_2 concentrations at Frognal Way (CA7) in 2018 against the Defra backgrounds for the same year. It can be observed that the monitored 2018 concentration is lower than the Defra background maps (5.4µg/m^3 difference).

Table 7: Defra background pollutant concentrations in 2020 around the site

OS Grid Square		Annual mean concentrations (µg/m^3)			
X	**Y**	**NOx**	**NO_2**	**PM_{10}**	**$PM_{2.5}$**
526500	185500	37.8	24.3	16.8	11.4

Table 8: Comparison of background NO_2 concentrations in 2018

Site	Monitored NO_2 (µg/m^3)	Defra background NO_2 (µg/m^3)	Defra OS grid square(s)
Frognal Way (CA7)	22.1	27.5	526500, 185500

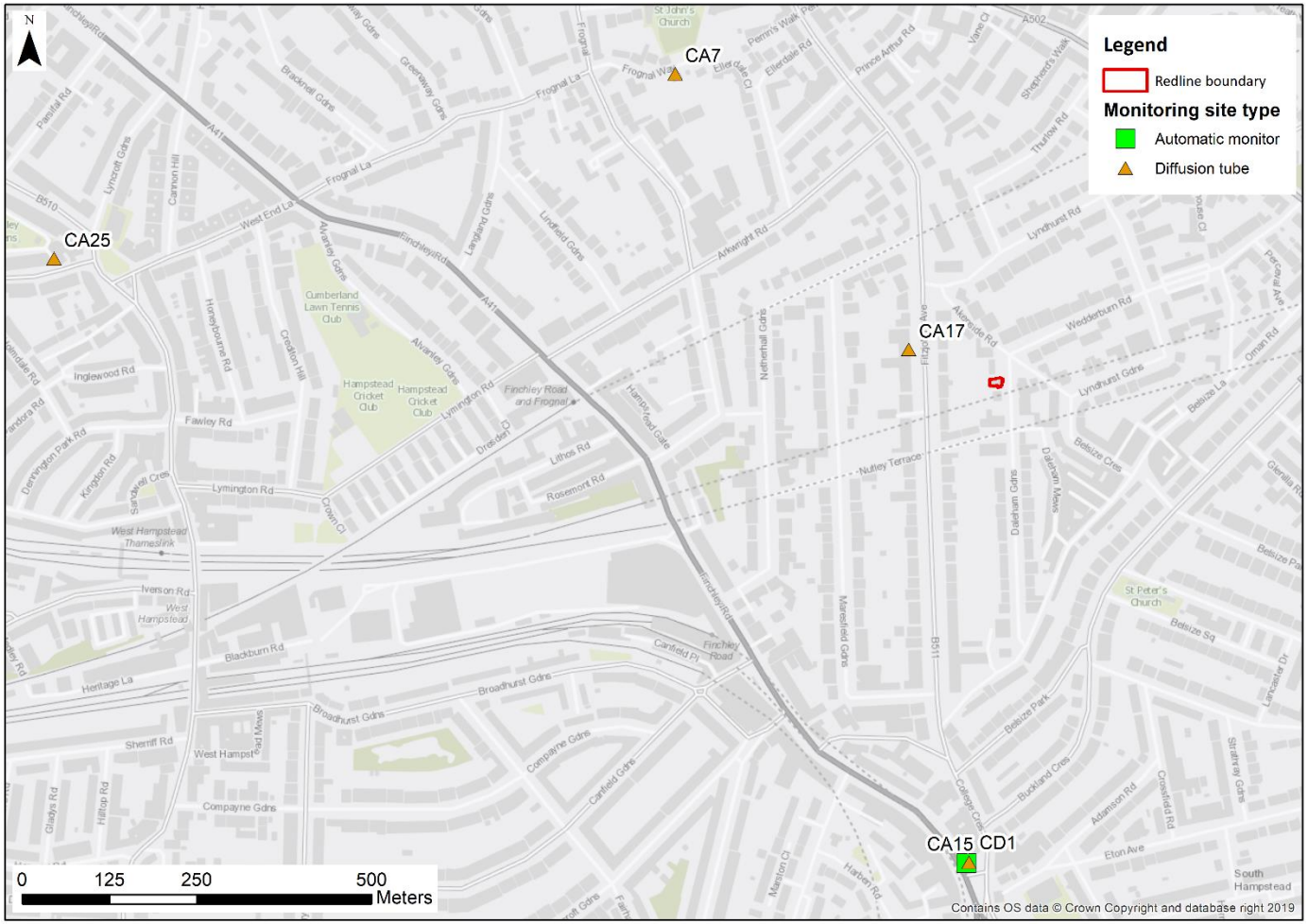
5.5 Baseline Summary

A review of monitoring data and estimated background pollutant concentrations, at and in the vicinity of the site, has been carried out. The results of the monitoring review indicate that concentrations of NO_2 are high at roadside and kerbside locations within the 2km of the site and below the standard at urban background locations. Annual mean NO_2 concentrations at the site would be expected to be somewhere in between those measured at the roadside and urban background locations, as the site is on a minor road, and would therefore likely meet the NO_2 annual mean standard.

It is considered that the estimated Defra background concentrations provide a likely assessment of the pollutant concentrations at the site, and therefore concentrations of NO_2, PM_{10}, and $PM_{2.5}$ would likely meet the relevant UK air quality objectives at the site.

Camden's overarching objective is to achieve the WHO air quality standards by 2030 (see Section 3.3.1). It is considered that the WHO standards are likely to be met at the site for NO_2 and PM_{10}, but may exceed the $PM_{2.5}$ standard.

Figure 3: Location of automatic monitoring and diffusion tube sites within 2km of the site



6 Construction Dust Assessment

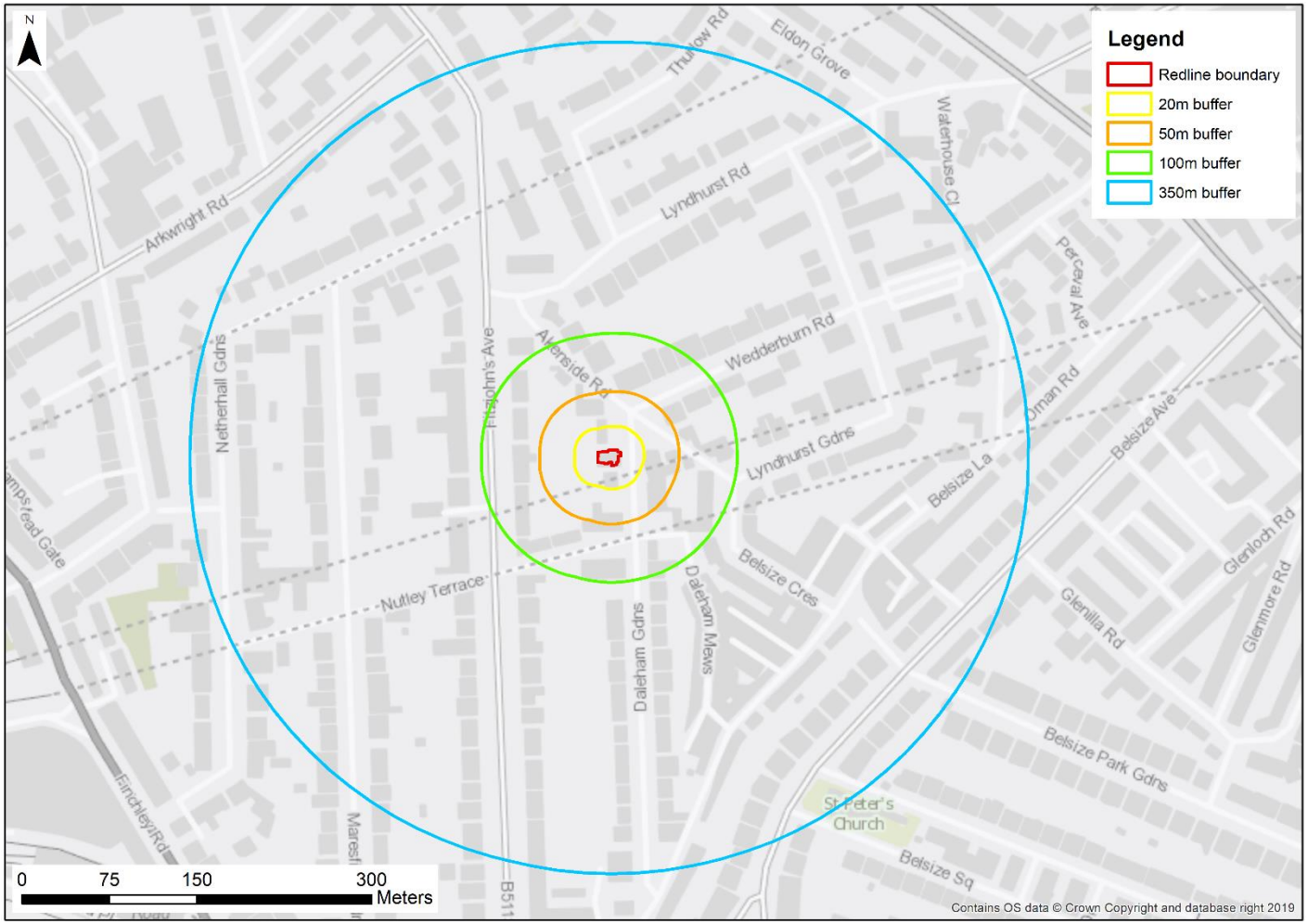
This section provides the results of the assessment for demolition and trackout activities on air quality. The site will not require construction or earthworks activities.

6.1 Sensitive Receptors

Sensitive receptors (e.g. residential properties/schools/hospitals) that are likely to experience a change in pollutant concentrations and/or dust nuisance due to the dust generating activities on the site have been identified. There are more than 10 sensitive receptors within 50m of the site boundary (Figure 4); these are mainly residential dwellings and The Tavistock Children's Day Clinic. Their sensitivity to dust soiling and PM_{10} exposure has been classified as *high* according to the IAQM guidance.

There are no ecological receptors within 50m of the site boundary. Belsize Wood, a local nature reserve (LNR), is located 810m east from the site and so this element of the assessment is not considered further.

Figure 4: Buffers for construction dust assessment



6.2 Dust Emission Magnitude

Following the methodology outlined in Section 4.1, each dust-generating activity has been assigned a dust emission magnitude as shown in Table 9.

Table 9: Dust emission magnitude for construction activities

Activity	Dust emission magnitude	Reasoning
Demolition	Small	Total building volume <20,000m^3 (approximately 1700m^3). Demolition activities <20m above ground.
Trackout	Small	Number of daily HDV trips <10. It is expected that one HGV will visit the site each day.

6.2.1 Sensitivity of the Area

The sensitivity of the area to dust soiling has been assigned as *medium*, due to the presence of sensitive receptors within 50m of dust generating activities. The sensitivity of the area to human health impacts has been assigned as *low* due to the estimated background PM_{10} concentrations in the area (16.8µg/m^3 in 2020) and the presence of more than 10 high sensitivity receptors within 50m of any dust generating activity. The overall sensitivity has been summarised as shown in Table 10.

Table 10: Sensitivity of the surrounding area to impacts on dust soiling and human health

Potential Impact	Sensitivity of the surrounding area	
	Demolition	Trackout
Dust Soiling	Medium	Medium
Human Health	Low	Low

Using the criteria set out in the risk of dust impacts table, the impacts on the area without mitigation are defined.

6.2.2 Risk of Impacts

Taking into consideration the dust emission magnitude and the sensitivity of the area, the site has been classified as *low* risk to dust soiling and *negligible* risk to human health for all activities at worst (Table 11). The dust emitted by the activities discussed can be greatly reduced or eliminated by applying the site-specific mitigation measures for *low* risk sites according to the IAQM guidance.

With the appropriate best practice mitigation measures as outlined in Section 7.1 in place, there is likely to be a negligible effect from the dust-generating activities on site.

Table 11: Summary dust risk table prior to mitigation

Activity	Dust soiling	Human health
Demolition	Low Risk	Negligible
Trackout	Negligible	Negligible

7 Mitigation measures

7.1 Construction Dust Mitigation

The dust emitting activities assessed in section 5 can be greatly reduced or eliminated by applying the site specific mitigation measures for *low risk* sites according to the IAQM guidance. The following measures from the guidance are relevant and should be included in the Construction Management Plan for the site.

General

- 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.
- Develop and implement a Dust Management Plan (DMP), which may include measures to control other emissions, approved by the local authority.

Site management

- Record all dust and air quality complaints, identify cause(s), take appropriate measures to reduce emissions in a timely manner and record the measures taken.
- Make the complaints log available to the local authority when asked.
- Record any exceptional incidents that cause dust and/or air emissions, either on- or off-site and the action taken to resolve the situation in the log book.

Monitoring

- Undertake daily on-site and off-site inspection, where receptors (including roads) are nearby, to monitor dust, record inspection results, and make the log available to the local authority when asked. This should include regular dust soiling checks of surfaces such as street furniture, cars and window sills within 100m of the site boundary, with cleaning to be provided if necessary.
- Carry out regular site inspections to monitor compliance with the DMP, record inspection results, and make an inspection log available to the local authority when asked
- Increase the frequency of site inspections by the person accountable for air quality and dust issues on site when activities with a high potential to produce dust are being carried out and during prolonged dry or windy conditions.

Site maintenance

- Plan site layout so that machinery and dust causing activities are located away from receptors, as far as possible.
- Erect solid screens or barriers around dusty activities or the site boundary that are at least as high as any stockpiles on site (if applicable).

- Fully enclose site or specific operations where there is a high potential for dust production and the site is active for an extensive period.
- Avoid site runoff of water or mud.
- Keep site fencing, barriers and scaffolding clean using wet methods.
- Remove materials that have a potential to produce dust from site as soon as possible, unless being re-used on site.
- Cover, seed or fence stockpiles, if any, to prevent wind whipping.
- Make sure that sand and other aggregates, if any, are stored in bunded areas and are not allowed to dry out.

Operating vehicle/machinery and sustainable travel

- Make sure all on-road vehicles and machinery comply with the requirements of the London Low Emission Zone and the London NRMM standards.
- Make sure 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.
- Make sure vehicles entering and leaving the site, if applicable, are covered to prevent escape of materials during transport.

Operations

- Only use cutting, grinding or sawing equipment fitted or in conjunction with suitable dust suppression techniques, such as water sprays or local extraction.
- Make sure there is an adequate water supply on the site for effective dust/particulate matter suppression/mitigation, using non-potable water where possible and appropriate.
- Use enclosed chutes and conveyors and covered skips.
- Minimise drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment and use the fine water sprays on such equipment wherever appropriate.
- Avoid scabbling (roughening of concrete surfaces) if possible.
- Ensure equipment is readily available on site to clean and dry spillages, and clean up spillages as soon as reasonably practicable after the event using wet cleaning methods.

Waste management

- Avoid bonfires and burning of waste materials.

Demolition specific measures

- Soft strip inside buildings before demolition (retaining walls and windows in the rest of the building where possible, to provide a screen against dust).
- Make sure effective water suppression is used during demolition operations.

- Avoid explosive blasting, using appropriate manual or mechanical alternatives.
- Bag and remove any biological debris or damp down such material before demolition.

Trackout specific measures

- 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.

8 Summary

This report presents the air quality assessment for a fire damaged building to be demolished at 31 Daleham Gardens, in the London Borough of Camden. A review of current legislation and planning policy and a baseline assessment describing the current air quality conditions in the vicinity of the site have been undertaken. Local air quality impacts have been assessed during the demolition activities on the site.

The site is located in the London Borough of Camden AQMA. Monitoring data within 2km of the site show that four of the monitoring sites exceeded NO_2 air quality standards between 2014-2018. The current monitoring undertaken by the council indicates that concentrations at a nearby urban background location (CA7) are below the air quality standard for NO_2. It is considered that concentrations of NO_2, PM_{10}, and $PM_{2.5}$ would likely meet the relevant UK air quality objectives at the site, and that the WHO standards would likely be met at the site for NO_2 and PM_{10} but may exceed the $PM_{2.5}$ standard.

The construction dust effects have been assessed using the qualitative approach described in the latest IAQM (and GLA) guidance and it was concluded that with appropriate best practice mitigation measures for a *low* risk site in place, there is likely to be a negligible effect from the dust-generating activities on site.

Appendix A

Supporting Tables

Table 12: Dust emission magnitude

Dust emission magnitude		
Small	**Medium**	**Large**
Demolition		
• total building volume <20,000m^3 • construction material with low potential for dust release (e.g. metal cladding or timber) • demolition activities <10m above ground • demolition during wetter months	• total building volume 20,000 - 50,000m^3 • potentially dusty construction material • demolition activities 10 - 20m above ground level	• total building volume >50,000m^3 • potentially dusty construction material (e.g. concrete) • on-site crushing and screening • demolition activities >20m above ground level
Earthworks		
• total site area <2,500m^2 • soil type with large grain size (e.g. sand) • <5 heavy earth moving vehicles active at any one time • formation of bunds <4m in height • total material moved <10,000 tonnes • earthworks during wetter months	• total site area 2,500m^2 - 10,000m^2 • moderately dusty soil type (e.g. silt) • 5 – 10 heavy earth moving vehicles active at any one time • formation of bunds 4 - 8m in height • total material moved 20,000 - 100,000 tonnes	• total site area >10,000m^2 • potentially dusty soil type (e.g. clay, which will be prone to suspension when dry due to small particle size) • >10 heavy earth moving vehicles active at any one time • formation of bunds >8m in height • total material moved >100,000 tonnes
Construction		
• total building volume <25,000 m^3 • construction material with low potential for dust release (e.g. metal cladding or timber)	• total building volume 25,000 - 100,000m^3 • potentially dusty construction material (e.g. concrete) • on-site concrete batching	• total building volume >100,000m^3 • on-site concrete batching • sandblasting
Trackout		
• <10 HDV (>3.5t) outward movements in any one day • surface material with low potential for dust release • unpaved road length <50m	• 10 – 50 HDV (>3.5t) outward movements in any one day • moderately dusty surface material (e.g. high clay content) • unpaved road length 50 – 100m;	• >50 HDV (>3.5t) outward movements in any one day • potentially dusty surface material (e.g. high clay content) • unpaved road length >100m

Table 13: Sensitivity of the area to dust soiling effects

Receptor sensitivity	Number of receptors	Distance from the source (m)			
		< 20	< 50	< 100	< 350
High	> 100	High	High	Medium	Low
	10 – 100	High	Medium	Low	Low
	< 10	Medium	Low	Low	Low
Medium	> 1	Medium	Low	Low	Low
Low	> 1	Low	Low	Low	Low

Table 14: Sensitivity of the area to human health impacts

Background PM_{10} concentrations (annual mean)	Number of receptors	Distance from the source (m)				
		< 20	< 50	< 100	< 200	< 350
High receptor sensitivity						
> 32µg/m^3	> 100	High	High	High	Medium	Low
	10 – 100			Medium	Low	
	< 10		Medium	Low		
28 – 32µg/m^3	> 100	High	High	Medium	Low	Low
	10 – 100		Medium	Low		
	< 10					
24 – 28µg/m^3	> 100	High	Medium	Low	Low	Low
	10 – 100					
	< 10	Medium	Low			
< 24µg/m^3	> 100	Medium	Low	Low	Low	Low
	10 – 100	Low				
	< 10					
Medium receptor sensitivity						
> 32µg/m^3	> 10	High	Medium	Low	Low	Low
	< 10	Medium	Low			
28 – 32µg/m^3	>10	Medium	Low	Low	Low	Low
	1 -10	Low				
24 – 28µg/m^3	>10	Low	Low	Low	Low	Low
	1 -10					
< 24µg/m^3	>10	Low	Low	Low	Low	Low
	1 -10					
Low receptor sensitivity						
–	> 1	Low	Low	Low	Low	Low

Table 15: Sensitivity of the area to ecological impacts

Receptor sensitivity	Distance from the source (m)	
	< 20	< 50
High	High	Medium
Medium	Medium	Low
Low	Low	Low

Table 16: Risk of dust impacts

Sensitivity of area	Dust emission magnitude		
	Large	Medium	Small
Demolition			
High	High risk site	Medium risk site	Medium risk site
Medium	High risk site	Medium risk site	Low risk site
Low	Medium risk site	Low risk site	Negligible
Earthworks			
High	High risk site	Medium risk site	Low risk site
Medium	Medium risk site	Medium risk site	Low risk site
Low	Low risk site	Low risk site	Negligible
Construction			
High	High risk site	Medium risk site	Low risk site
Medium	Medium risk site	Medium risk site	Low risk site
Low	Low risk site	Low risk site	Negligible
Trackout			
High	High risk site	Medium risk site	Low risk site
Medium	Medium risk site	Low risk site	Negligible
Low	Low risk site	Low risk site	Negligible