
Air Quality Assessment

New Henry Street
Premiere Business Park, Sussex Street, Bristol

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1 Introduction

1.1 Overview

1.1.1 Savills UK Limited (Savills) was retained by Ridge on behalf of Dominus Bristol Limited to complete an air quality assessment in relation to a planning application for mixed-use development (i.e., commercial and purpose-built student accommodation) at Premier Business Park, Bristol, BS2 0QX (hereafter referred to as the 'Site') located within the administrative area of the Bristol City Council (BCC). This air quality assessment has been completed to review existing air quality, assess the potential effects on local air quality and consider appropriate measures to mitigate these effects.

1.1.2 The latest planning guidance from Environmental Protection UK (EPUK) in partnership with the Institute of Air Quality Management (IAQM) (EPUK and IAQM, 2017), the Department for Environment Food and Rural Affairs (DEFRA, 2021), and the IAQM Guidance on the assessment of dust from demolition and construction (Version 2.1) (IAQM, 2023) were utilised to assess the potential local air quality effects of the proposed development.

1.2 Project Details

1.2.1 The Site is located within an Air Quality Management Area (AQMA) covering Bristol city centre and parts of the main radial roads including the M32. The AQMA in Bristol has been declared due to exceedances of Nitrogen Dioxide (NO₂) annual and hourly objectives and as a precautionary measure, exceedances of objectives for particulate matter (PM₁₀).

1.2.2 There are no nationally designated ecological sites in proximity to the Site. Figure 1.1 presents the current site location, whereas Figure 1.2 illustrates the proposed site location in comparison to the AQMA.

Figure 1.1: Proposed Site location

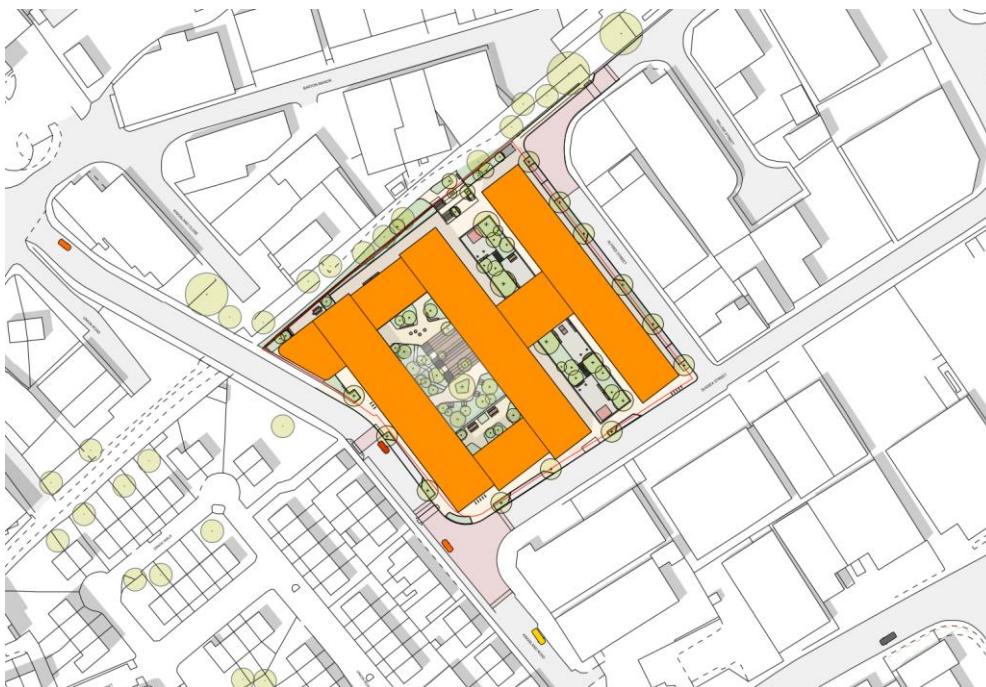
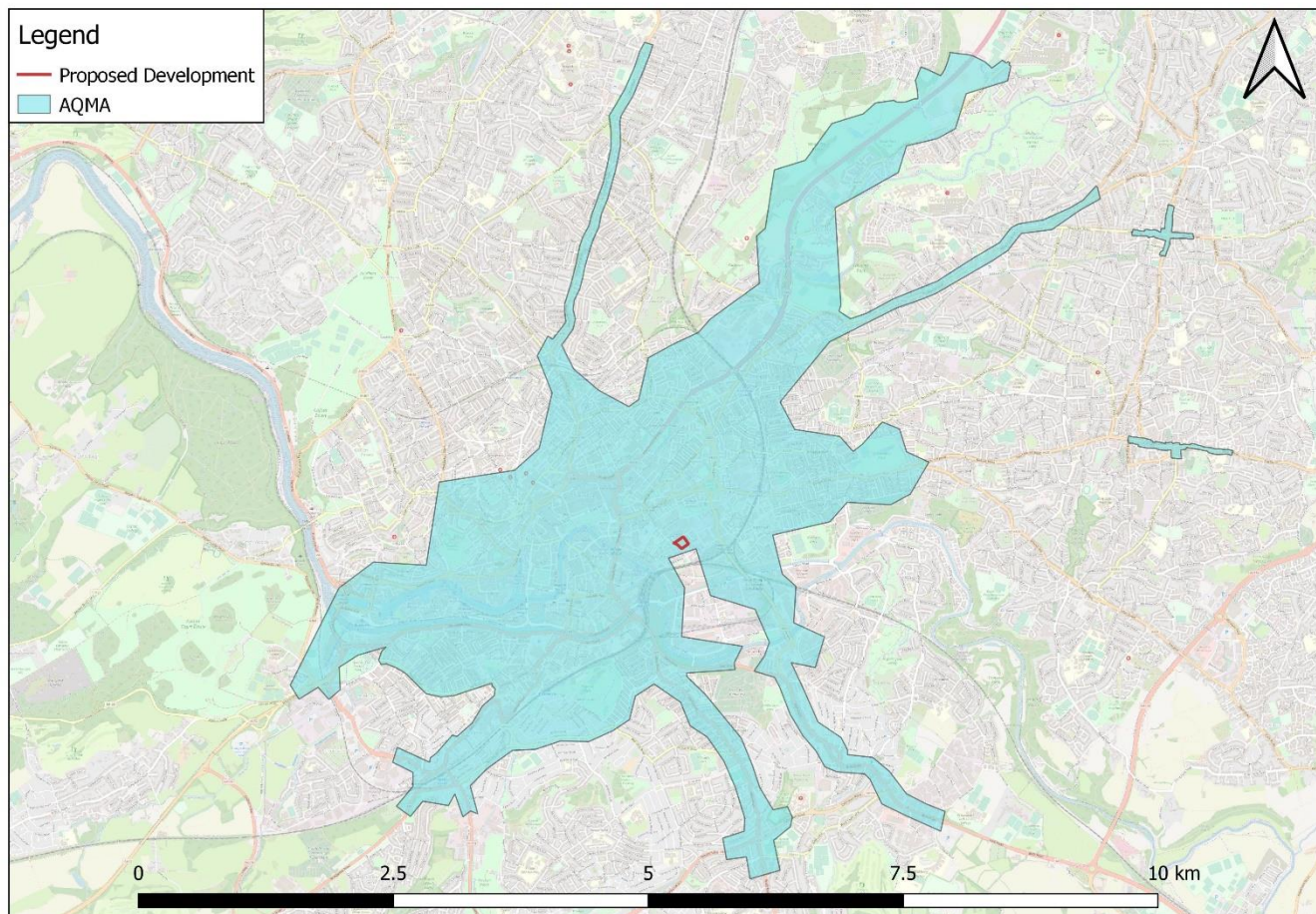


Figure 1.2: Proposed Site location in relation to the Bristol AQMA (DEFRA, n.d.)



1.2.3 The Site is approximately 0.75 hectares and currently comprises industrial uses with no public contribution. The outline planning application seeks to redevelop the land with mixed-use development comprising employment, commercial and student accommodation uses.

1.2.4 The project description of the proposed development is as follows:

“Demolition of existing structures and redevelopment of the site for two conjoined buildings comprising light industrial use (Class E(g)(iii)); flexible retail/light industrial use (Class E(a) / Class E(g)(iii)); flexible commercial use (Class E(b-g)); flexible industrial use (Class E(g)(iii) / Class B8 / Sui Generis); student accommodation use with ancillary community space (Sui Generis); public realm works and landscaping; cycle parking; ancillary plant and servicing; and other associated works”.

2 Legislation and Policy

2.1 European Union

- 2.1.1 The United Kingdom (UK), is required to report air quality data under European Directives, as transposed into UK legislation following Brexit. The current air quality directive is the Council Directive on ambient air quality and cleaner air for Europe (2008/50/EC) (European Union, 2008), which came into force in June 2008 and is also known as the Air Quality Directive. This Directive consolidates the first three Daughter Directives and maintains air quality objectives set out for nitrogen dioxide (NO₂) and oxides of Nitrogen (NO_x), lead (Pb), sulphur dioxide (SO₂), particulate matter (PM₁₀ and PM_{2.5}), carbon monoxide (CO), benzene (C₆H₆), and ozone (O₃). The Air Quality Directive was transposed into the Air Quality Standards Regulations in England, Scotland, Wales and Northern Ireland in June 2010 (SI 2010 No 1001) (The Air Quality Standards Regulations, 2010). The fourth Daughter Directive, which sets out air quality objectives for polycyclic aromatic hydrocarbons and heavy metals (i.e., arsenic, cadmium, nickel and mercury), remains in force based on the requirements set out in the first EU Ambient Air Quality Framework Directive (1996/62/EC) (European Union, 1996).
- 2.1.2 Following Brexit, Defra published The Air Quality (Amendment of Domestic Regulations) (EU Exit) Regulations 2019 (DEFRA, 2019), which retained law derived from the EU Air Quality Directive and transposed it into domestic law; ensuring the legislation was operable after EU Exit.

2.2 National Level

- 2.2.1 Under Part IV of the 1995 Environment Act (UK Public General Acts, 1995), the UK government was required to publish a National Air Quality Strategy (NAQS) to establish a Local Air Quality Management (LAQMs) system for the designation of Air Quality Management Areas (AQMAs). The technical guidance by Defra (2021) highlights that LAQM is a statutory process by which local authorities address air quality identify areas of non-compliance with the national air quality objectives and then declare AQMAs, if national air quality objectives are not likely to be achieved by the relevant deadlines. For areas designated as AQMAs, an Air Quality Action Plan (AQAP) is produced by the local authority that sets out actions designed to help achieve compliance with the objectives.
- 2.2.2 The National Planning Policy Framework (NPPF) (Department for Levelling Up, Housing and Communities, 2023) sets out the planning policies for England whereby conserving and enhancing the natural environment is a central theme.
- 2.2.3 Paragraph 174 section e of the NPPF states that:
- “Planning policies and decisions should contribute to and enhance the natural and local environment by preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability. Development should, wherever possible, help to improve local environmental conditions such as air and water quality, taking into account relevant information such as river basin management plans.”*
- 2.2.4 Paragraph 186 of the NPPF states that:
- “Planning policies and decisions should sustain and contribute towards compliance with relevant limit values or national objectives for pollutants, taking into account the presence of Air Quality Management Areas and Clean Air Zones, and*

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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.”

2.2.5 The National Planning Practice Guidance (NPPG) (Ministry of Housing, Communities & Local Government, 2019) supports the NPPF and guides a range of topic areas, including air quality. The NPPG states:

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

2.2.6 Additionally, it is recognised in the NPPG that the UK has legally binding limits for ambient air concentrations of major air pollutants (e.g., NO₂, PM₁₀ and PM_{2.5}). An annual national assessment of air quality, through modelling and monitoring, is conducted by Defra to determine compliance with relevant European Directive Limit Values.

2.2.7 The relevant European Directive Limit Values are summarised in Table 2.1 and the UK National Air Quality Objectives are summarised in

2.2.8 Table 2.2.

Table 2.1: European Directive Limit Values (DEFRA, 2022)

Pollutant	Limit Value (µg/m ³)	Averaging Period	Objective Limitation
Nitrogen Dioxide (NO ₂)	200	1-hour mean	Not to be exceeded more than 18 times a year
	40	annual mean	-
Particulate Matter (PM ₁₀)	50	24-hour mean	Not to be exceeded more than 35 times a year
	40	annual mean	-
Particulate Matter (PM _{2.5})	Stage 1 limit – 25 (by 2015)	annual mean	-
	Stage 2 limit – 20 (by 2020)		-
	Target a 20% reduction in concentrations at urban background	annual mean	-

Table 2.2: National Air Quality Objectives (DEFRA, 2022; DEFRA, n.d.)

Pollutant	Objective (µg/m ³)	Averaging Period	Objective Limitation	Applicable to:
Nitrogen Dioxide (NO ₂)	200	1-hour mean	Not to be exceeded more than 18 times a year	UK
	40	annual mean	-	

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Pollutant	Objective ($\mu\text{g}/\text{m}^3$)	Averaging Period	Objective Limitation	Applicable to:
Particulate Matter (PM ₁₀)	50	24-hour mean	Not to be exceeded more than 35 times a year	
	40	annual mean	-	
Particulate Matter (PM _{2.5})	20	annual mean	-	UK (except Scotland)
	(target a 15% reduction in concentrations at urban background)		-	UK urban areas

2.2.9 While the air quality Limit Values and Objectives are numerically the same, they apply in different locations and are assessed using different methods. This report provides an assessment based on the air quality objectives. Table 2.3 presents examples related to the averaging period of the specific objectives to identify where objectives should and should not apply, and are relevant only to the members of the public (DEFRA, 2021).

Table 2.3: Applying relevant National Air Quality Objectives (DEFRA, 2021)

Averaging Period	Objectives Should Apply At:	Objectives Should Generally Not Apply At:
Annual mean	All locations where members of the public might be regularly exposed. Building façades of residential properties, schools, hospitals, care homes etc.	Building façades of offices or other places of work where members of the public do not have regular access. Hotels, unless people live there as their permanent residence. Gardens of residential properties. Kerbside sites (as opposed to locations at the building façade), or any other location where public exposure is expected to be short term
24-hour mean	All locations where the annual mean objective would apply, together with hotels. Gardens of residential properties ^a .	Kerbside sites (as opposed to locations at the building façade), or any other location where public exposure is expected to be short term.
1-hour mean	All locations where the annual mean and: 24 and 8-hour mean objectives apply. Kerbside sites (for example, pavements of busy shopping streets). Those parts of car parks, bus stations and railway stations etc. which are not fully enclosed, where members of the public might reasonably be expected to spend one hour or more. Any outdoor locations where members of the public might reasonably expect to spend one hour or longer.	Kerbside sites where the public would not be expected to have regular access.

^a Such locations should represent parts of the garden where relevant public exposure to pollutants is likely, for example where there is seating or play areas. It is unlikely that relevant public exposure to pollutants would occur at the extremities of the garden boundary, or in front gardens, although local judgement should always be applied.

2.2.10 It should be noted, however, that the World Health Organisation (WHO) updated its air quality guidelines in 2021 (World Health Organisation, 2021). The UK is yet to determine whether to adopt these guidelines in the National Air Quality Objectives (AQO) and so

2.2.11 Table 2.2 remains the most up-to-date AQO, hence are the guidelines used throughout this report.

- 2.2.12 The Environment Act 2021 established a legally binding duty on the government which brings forward at least two new air quality targets in secondary legislation and this duty sits within the environmental targets framework outlined in the Environment Act (Part 1). Both of the targets under the Act concerns PM_{2.5}, where one states that for PM_{2.5} “Annual Mean Concentration Target ('concentration target') - a maximum concentration of 10µg/m³ to be met across England by 2040” (DEFRA, 2022). It is expected that pollution levels associated with traffic will decrease over time with the expected increased uptake of electric vehicles and other alternative fuel vehicles in line with national and local policy for transport.
- 2.2.13 NO₂ and PM₁₀ are not mentioned within the two new air quality targets; however, the Committee on the Medical Effects of Air Pollutants (COMEAP) anticipates that most measures implemented to achieve reductions in PM_{2.5} would also be likely to reduce concentrations of other pollutants (UK Health Security Agency, 2022).

2.3 Local Policy

- 2.3.1 The Bristol Development Framework Core Strategy was adopted in June 2011 (Bristol City Council, 2011). Policy BCS23 (Pollution) sets out a requirement for new development in the city to take into account the potential impact on pollution. Specifically, the policy states:

“Development should be sited and designed in a way as to avoid adversely impacting upon:

- Environmental amenity or biodiversity of the surrounding area by reason of fumes, dust, noise, vibration, smell, light or other forms of air, land, water pollution, or creating exposure to contaminated land.
- The quality of underground or surface water bodies.

In locating and designing development, account should also be taken of:

- *The impact of existing sources of noise or other pollution on the new development; and*
- *The impact of the new development on the viability of existing uses by reason of its sensitivity to noise or other pollution.*

Water quality and associated habitat of surface watercourses should be preserved or enhanced.”

3 Methodology

3.1 Screening

- 3.1.1 Due to the proposed plans of student accommodation (i.e., 10 or more residential units or a site area of more than 0.5ha), the development is classified as a 'Major Development' (EPUK and IAQM, 2017). Based on the Stage 1 criteria (Table 6.1 of the guidance), although the first screening criteria applies to the proposed development, the second screening criteria does not apply as the proposed development is highly sustainable with either ASHP or direct electric heating systems, along with only 4 disabled parking bays. Although an air quality assessment would not be required based on the criteria, due to the location of the proposed development being within an AQMA, a simple air quality Assessment was proposed.
- 3.1.2 This section outlines the methodology used in undertaking the second stage of screening and, where required, completing the air quality assessment for the construction and operational phases of the proposed project.

3.2 Construction Phase

- 3.2.1 The assessment has been carried out based on the assumption that the earliest possible year of construction is in the first quarter of 2024, with practical completion in 2026.
- 3.2.2 For this assessment, the IAQM's 2023 Construction Dust Guidance (IAQM, 2023) was utilised to assess the potential impacts of dust during the construction phase. The IAQM guidance provides an evaluation matrix to determine the potential risk of dust generation and the associated level of mitigation required.
- 3.2.3 As a component of the dust assessment, appropriate receptor sensitivities were identified and impacts due to annoyance from dust soiling and the risk of health effects from an increase in exposure to PM₁₀ were assessed.
- 3.2.4 Additionally, the EPUK and IAQM (2017) planning guidance was used to assess construction traffic generation. The EPUK and IAQM set out seven indicative criteria for requiring an AQA and as such, were considered in determining the need for an AQA, as shown in Table 3.1.

Table 3.1: Indicative criteria for requiring an air quality assessment (reproduced from Table 6.2 of EPUK and IAQM Guidance (2017))

The development will:	Indicative Criteria to Proceed to an Air Quality Assessment ^a
1. Cause a significant change in Light Duty Vehicle (LDV) traffic flows on local roads with relevant receptors. (LDV = cars and small vans)	A change of LDV flows of: - more than 100 AADT within or adjacent to an AQMA - more than 500 AADT elsewhere.
2. Cause a significant change in Heavy Duty Vehicle (HDV) flows on local roads with relevant receptors. (HDV = goods vehicles + buses >3.5t gross vehicle weight).	A change of HDV flows of: - more than 25 AADT within or adjacent to an AQMA - more than 100 AADT elsewhere.
3. Realign roads, i.e. changing the proximity of receptors to traffic lanes.	Where the change is 5m or more and the road is within an AQMA.
4. Introduce a new junction or remove an existing junction near to relevant receptors.	Applies to junctions that cause traffic to significantly change vehicle accelerate/decelerate, e.g. traffic lights, or roundabouts.

The development will:	Indicative Criteria to Proceed to an Air Quality Assessment ^a
5. Introduce or change a bus station.	Where bus flows will change by: - more than 25 AADT within or adjacent to an AQMA - more than 100 AADT elsewhere.
6. Have an underground car park with extraction system.	The ventilation extract for the car park will be within 20 m of a relevant receptor. Coupled with the car park having more than 100 movements per day (total in and out).
7. Have one or more substantial combustion processes, where there is a risk of impacts at relevant receptors. NB. this includes combustion plant associated with standby emergency generators (typically associated with centralised energy centres) and shipping.	Typically, any combustion plant where the single or combined NO _x emission rate is less than 5 mg/s is unlikely to give rise to impacts, provided that the emissions are released from a vent or stack in a location and at a height that provides adequate dispersion. In situations where the emissions are released close to buildings with relevant receptors, or where the dispersion of the plume may be adversely affected by the size and/or height of adjacent buildings (including situations where the stack height is lower than the receptor) then consideration will need to be given to potential impacts at much lower emission rates. Conversely, where existing nitrogen dioxide concentrations are low, and where the dispersion conditions are favourable, a much higher emission rate may be acceptable.

a As a guide, the 5 mg/s criterion equates to a 450 kW ultra low NO_x gas boiler or a 30kW CHP unit operating at <95mg/Nm³. Users of this guidance should quantify the NO_x mass emission rate from the proposed plant, based on manufacturers' specifications and operational conditions.

3.3 Operational Phase

3.3.1 The assessment follows the planning guidance published by EPUK and IAQM (2017). The impact of existing sources in the local area and the impacts of the proposed development on the local area were considered in the assessment process. As part of the assessment, the following factors are to be taken into account as per the guidance (EPUK and IAQM, 2017):

- the background and future baseline air quality and whether this will be likely to approach or exceed the values set by air quality objectives;
- the presence and location of AQMA as an indicator of local hotspots where the air quality objectives may be exceeded;
- the presence of a heavily trafficked road, with emissions that could give rise to sufficiently high concentrations of pollutants (in particular NO₂), that would cause unacceptably high exposure for users of the new development; and
- the presence of a source of odour and/or dust that may affect amenity for future occupants of the development.

3.3.2 The indicative criteria presented in Table 3.1 were utilised for the assessment of the operational phase.

3.4 Assumptions

3.4.1 The assessment assumes the following:

- the earliest possible year of construction is in the first quarter of 2024, with practical completion in 2026;
- the construction phase assesses impacts for the worst-case scenario;

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- no quantitative emissions mitigation assessment was completed as there are no gas-fired boilers introduced in the proposed development; and
- all mitigation measures proposed in Section 6 will be implemented.

4 Baseline Conditions

4.1.1 The following section sets out the baseline conditions related to air quality for the proposed development. For this assessment, baseline data were obtained from the most recent BCC Air Quality Annual Status Report (ASR) (Bristol City Council, 2023) and the background mapping data for local authorities from Defra (DEFRA, n.d.).

4.1 Existing Baseline Conditions

4.1.1 Based on the 2023 ASR, BCC and Defra monitoring network in 2022 consisted of (Bristol City Council, 2023):

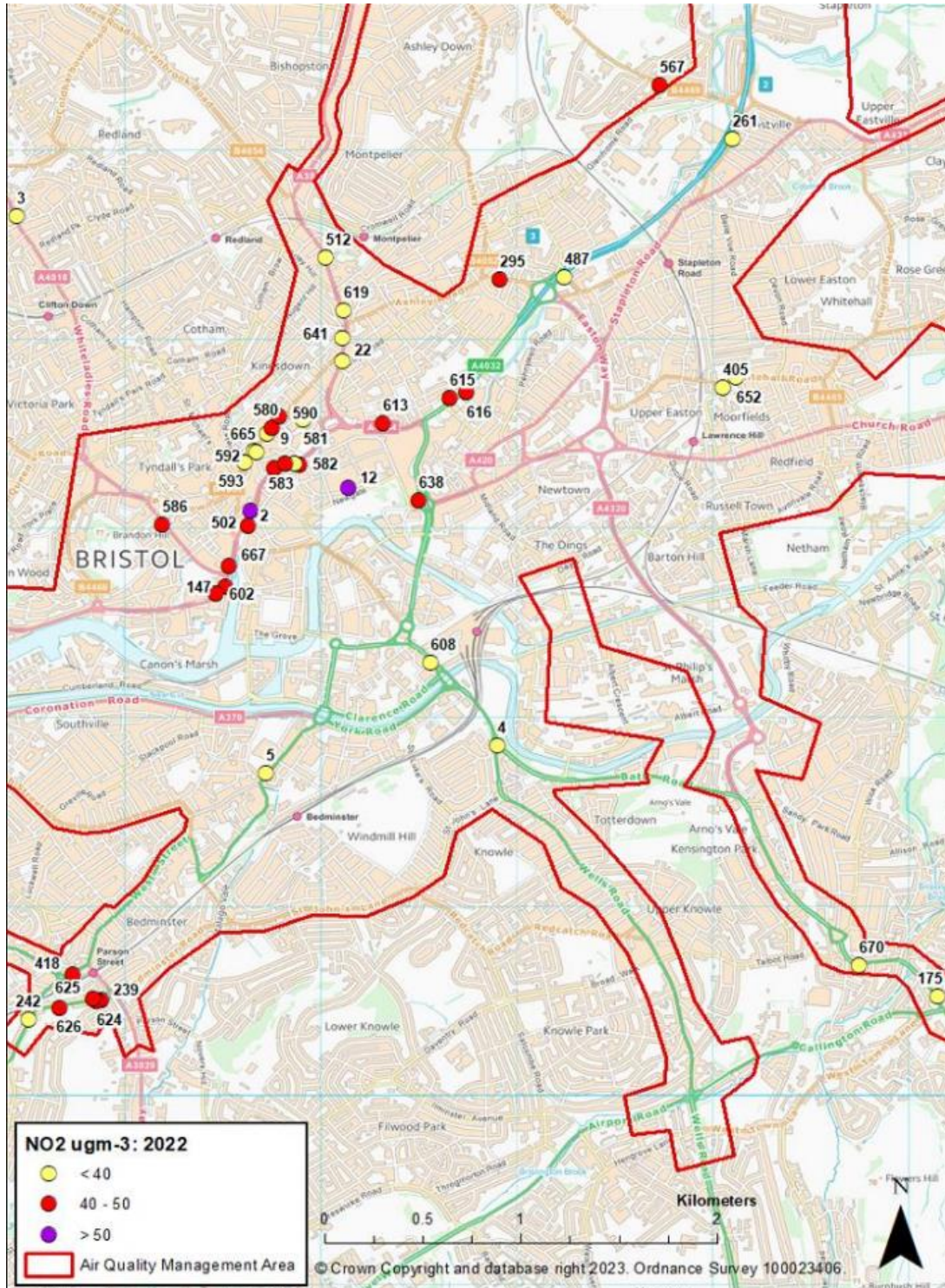
- 8 automatic (continuous) monitoring sites, of which 7 are BCC operated and one is part of the national Automatic Urban and Rural Network operated by Defra (site at St Paul's)
- 193 non-automatic (passive) monitoring sites
- 4 real time particulate monitors (2 x PM_{2.5} and 2 x PM₁₀)
- 1 real time Defra operated Ozone (O₃) monitor

4.1.2 Based on the report, the annual NO₂ concentrations in 2022 were similar to concentrations in 2021; however, there was some variation at some sites. The average change in measured annual NO₂ concentrations was 0.7% decrease between 2021 and 2022. When compared to 2019 figures, the last full year of data before Covid-19 impacted travel patterns, annual NO₂ concentrations at roadside locations were 14.2% lower in 2022.

4.1.3 The change between 2022 and 2021 roadside NO₂ concentrations is similar to the national decreasing trend. The report notes that a reduction in pollution and compliance with objectives in 2020 was a result of Covid-19 travel restrictions. Subsequently, with less severe travel restrictions in 2021, the pollution levels increased. In 2022, one of the central sites measured annual NO₂ concentrations which exceeded the objective and as such additional sites were added to the monitoring network. Figure 4.1 illustrates the locations in which 2022 monitoring sites exceed 36µg/m³ (Bristol City Council, 2022).

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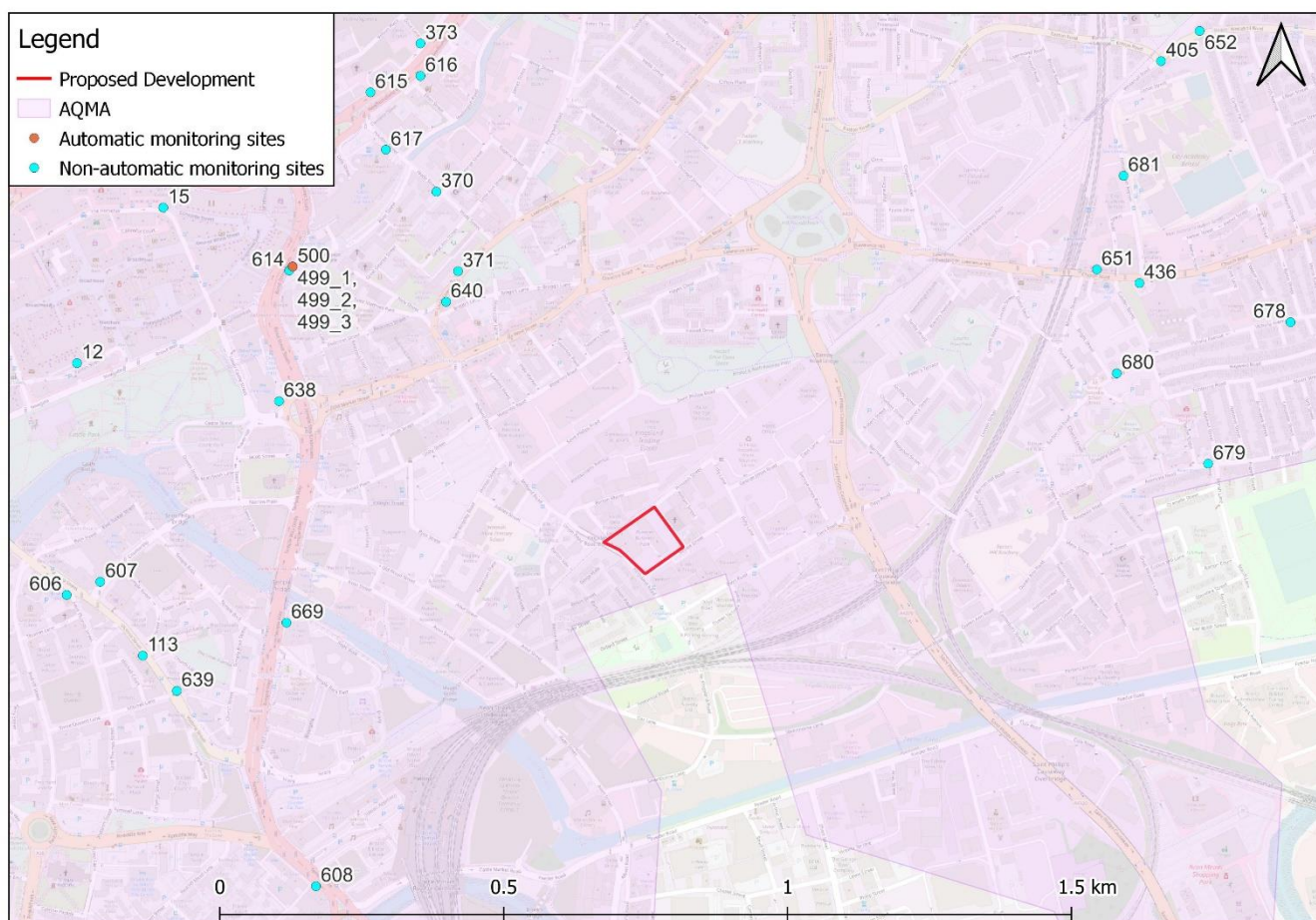
Figure 4.1: Locations in which 2021 monitoring sites exceed $36\mu\text{g}/\text{m}^3$ (Bristol City Council, 2023).



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- 4.1.4 The nearest automatic monitoring site to the proposed development Site is Temple Way (Site ID: 500) located approximately 765 m northwest to the site, as illustrated in Figure 4.2. The annual mean NO₂ concentration in 2021 was 31.2 µg/m³ which was higher than the 2020 concentration of 28.3 µg/m³ but lower than previous monitoring results from 2017.
- 4.1.5 The ASR reports no exceedances of the PM₁₀ objective and recorded a PM₁₀ concentration of 17.3 µg/m³ in 2022 which is an increase of 1.6µg/m³ when compared to 2021 at the Bristol St Pauls site. At the roadside Temple Way site, the 2002 annual concentration was 20.9µg/m³ which is an increase of 2.0µg/m³ when compared to 2021 levels.
- 4.1.6 When compared to 2020 data, the Temple Way site shows a reduction of 0.8 µg/m³ continuing the trend of decreasing the annual PM₁₀ since 2018 at this location. The report states “although no exceedances are reported from the monitoring data it is proposed that the AQMA declaration for PM₁₀ is retained as a precautionary measure” (Bristol City Council, 2023).
- 4.1.7 Figure 4.2 illustrates the locations of the nearest NO₂ diffusion tubes along with the nearest automatic monitoring site in relation to the proposed development (Bristol City Council, 2022).

Figure 4.2: Location of the nearest NO₂ diffusion tubes and automatic monitoring site in relation to the proposed development



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4.1.8 Table 4.1 presents the relevant monitored annual mean concentrations recorded at these nearest non-automatic monitoring sites between the years 2017 and 2022, if available (Bristol City Council, 2023).

Table 4.1: Annual mean NO₂ monitoring results for relevant non-automatic monitoring sites

Site name	Type	Distance from Site (m)	NO ₂ Annual Mean Concentration (µg/m ³)				
			2018	2019	2020	2021	2022
640	Roadside	510	-	-	-	28.1	27.1
371	Roadside	550	42.2	34.1	25.8	29.4	29.0
669	Roadside	600	-	-	-	28.6	33.2
638	Roadside	640	-	-	-	43.8	42.4
614	Roadside	740	-	-	-	28.4	29.4
499_1; 499_2; 499_3	Roadside	740	43.2	33.6	26	31.1	30.9

4.1.9 Based on the data presented in Table 4.1, the NO₂ annual mean concentrations are below the annual mean objective of 40 µg/m³ at the relevant monitoring sites for 2022, with the exception of site 638 which is located approximately 625m away from the site. Although there are limited data available at this site, there is a slight decrease in concentration when compared to the 2021 data. Additionally, a closer monitoring site (site 371) shows a steady downward trend since 2018.

4.1.10 Defra provides background concentration maps to assist local authorities in undertaking their air quality review and assessments. The most recent 2018 reference year background maps are based on the monitoring and meteorological data for 2018 and present projected concentrations for years 2018 to 2030 (DEFRA, n.d.). Defra notes that the projections for the 2018 background maps are based on assumptions before the pandemic; they do not reflect short or long term impacts on emissions in 2020 due to the pandemic.

4.1.11 Based on the 2018-based background maps for the year 2026, separate 1x1km grid files of concentrations for BCC were downloaded for NO₂, PM₁₀, and PM_{2.5}. Table 4.2 presents the predicted background concentration for the year 2026, the earliest year of practical completion, within the grid square that the proposed development would be situated in.

Table 4.2: Local authority-wide Defra projected background concentration

Pollutant	2026 Projected Concentration (µg/m ³)
NO ₂	15.19
PM ₁₀	13.79
PM _{2.5}	9.20

Data presented within the table are derived from the following Ordnance Survey grid squares: 360500, 172500.

4.1.12 The projections for 2026, based on the reference year 2018, for NO₂, PM₁₀, and PM_{2.5} are all significantly below the values set by air quality objectives.

4.2 Local Sensitive Receptors

- 4.2.1 The Site is known as Premier Business Park and is currently used for industrial purposes. To the north is the Old Market Conservation Area which comprise a mix of businesses and amenities. To the south is the emerging University of Bristol Innovation Campus and the Silverthorne Lane Conservation area. To the west, is the Dings residential neighbourhood. The surrounding area has high-sensitivity receptors as there are residential spaces and a well-used community park.
- 4.2.2 There are no nationally-designated ecological protection in close proximity to the Site. As there are no ecological designated sites within or in close proximity to the Site, ecological effects are not considered further.

5 Potential Impact

5.1 Construction Phase

5.1.1 As per the IAQM Dust Guidance (IAQM, 2023), there are four types of activities on construction sites:

- demolition;
- earthworks;
- constructions; and
- trackout.

5.1.2 Potential dust impacts from the proposed development can arise from:

- annoyance due to dust soiling;
- the risk of health effects due to an increase in exposure to PM₁₀; and
- harm to ecological receptors.

5.1.3 As indicated in Section 4.2, ecological receptors were not assessed as no designated areas were identified near the Site.

5.1.4 To assess the risk of dust impacts for the relevant activities, the potential impacts on dust soiling and human health were treated as being 'high risk' in order to determine mitigation measures for the worst-case scenario and apply those measures which constitute good or best practice. As such, the general measures applicable to a high risk site are applied and discussed in Appendix B, as outlined by IAQM (2023).

Table 5.1: Assigned risk for construction effects

Potential Impact	Risk *			
	Demolition	Earthworks	Construction	Trackout
Dust Soiling	High Risk	High Risk	High Risk	High Risk
Human Health	High Risk	High Risk	High Risk	High Risk

* Potential impact on dust soiling and human health were described as being 'high risk' in order to provide mitigation measures for the worst-case scenario.

5.1.5 Within the construction phase, construction-related vehicles may potentially present an additional source of air pollutants within the proposed development site. However, no more than 25 AADT for HDV are anticipated for the proposed development and any impacts from construction traffic should be minimised and addressed through the mitigation measured proposed in Appendix B, as per by IAQM (2023). As such, the indicative EPUK & IAQM guidance thresholds are not exceeded and a further AQA is not required.

5.2 Operational Phase

5.2.1 As identified in Section 4.1, the baseline information indicates that the NO₂ monitoring data for the most recent year (i.e., 2022) and the Defra predicted background concentration for the operational year of 2026 is below the appropriate AQO (i.e., 40 µg/m³) derived to be protective of human health, with the exception of site 638 which is located

approximately 625 m away from the site. For PM₁₀ and PM_{2.5}, the Defra predicted background concentration for the operational year of 2026 are below the appropriate AQO of 40 µg/m³ and 20 µg/m³, respectively. As such the site is considered to be suitable for development of this nature.

- 5.2.2 As set out in the pre-application, the proposed development will be car-free with 4 disabled parking spaces provided, and even taking into account servicing and deliveries across the site, this site will generate a change of much less than 100 light duty vehicles (LDV) and/or 25 heavy duty vehicles (HDV) annual average daily traffic (AADT).
- 5.2.3 As such, in accordance with the EPUK and IAQM Planning Guidance (2017), the proposed development will not cause a significant change in vehicle traffic flows as the indicative criteria relevant to the proposed development is a change of more than 100 annual average daily traffic (AADT) for LDV and 25 for HDV.
- 5.2.4 The EPUK and IAQM guidance sets out seven indicative criteria for requiring an AQA. Of the seven indicative criteria, one is the proposed development having one or more substantial combustion processes. The proposed development will entail either air source heat pumps or direct electric heating systems, as such, no emissions from combustion processes are anticipated.
- 5.2.5 None of the indicative criteria proposed in the EPUK and IAQM Planning Guidance (2017) are triggered. As such, the development can be considered to have insignificant effects. The development effectively responds to the relevant guidance on mitigation with the embedded measures proposed, being a car-free development and having no gas-fired boilers.

6 Proposed Mitigation Measures

- 6.1.1 The relevant general mitigation measures for construction impacts appropriate for the 'High Risk' site (in order to capture best practice), as proposed by the IQAM Dust guidance (2023), will be applied for the proposed development and outlined in Appendix B.
- 6.1.2 Overall, the proposed development will incorporate principles of good practice and good design to reduce emissions and exposure of sensitive receptors. The proposed project will be car-free in operation and will include 4 disabled parking bays. Additionally, the development will include air source heat pumps or direct electric heating systems and no emissions from gas-fired boilers are expected.
- 6.1.3 Additional mitigation is therefore not considered to be necessary on this basis.

7 Conclusion

- 7.1.1 The concentration of NO₂ for the most recent monitoring year is below the AQO of 40 µg/m³ at the monitoring sites nearest to the proposed Site. The projected concentrations for 2026, based on Defra background maps, for NO₂, PM₁₀, and PM_{2.5} are all below their respective AQOs.
- 7.1.2 To address the risk of dust impacts for construction-related activities (i.e., demolition, earthworks, construction and trackout), relevant mitigation measures for construction impacts appropriate for 'High Risk' effects (to capture best practice), as set out in the IAQM's 2023 Construction Dust Guidance (2023) and summarised in Appendix B, will be applied.
- 7.1.3 The proposed development will not cause a significant change in vehicle traffic in flows during construction or operation. Based on the screening of the criteria presented by EPUK and IAQM Planning Guidance (2017), the impact of traffic generation is considered to have an insignificant effect as none of the criteria are exceeded.
- 7.1.4 Overall, at the outset, the proposed development will incorporate principles of good practice and good design to reduce emissions and exposure of receptors. The proposed project will be car-free in operation and will not include gas-fired boilers but rather air source heat pumps or direct electric heating systems.
- 7.1.5 Existing and predicted opening-year ambient pollutant concentrations in the local area are below air quality objective values set to be protective of health. As such the site is considered to be suitable for development of this nature.

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Appendix A: Key Pollutants

1. Nitrogen Dioxide (NO₂)

- 1.1.1. Nitrogen Dioxide (NO₂) is a gas that falls under a larger group of reactive gases referred to as nitrogen oxides, including nitric oxide (NO) (USEPA, n.d.). Combustion processes are the main source of anthropogenic emissions of NO₂. NO₂ forms from emissions from vehicles, off-road equipment and power plants (USEPA, n.d.)
- 1.1.2. The health impacts of short-term exposure to NO₂ are irritation to the respiratory system, and exacerbating symptoms of pre-existing lung and heart diseases (Defra, n.d.; Defra, 2021).
- 1.1.3. In the UK, NO₂ is considered a major air pollutant and as such, there is a legally binding limit for annual mean ambient air concentrations of NO₂ at 40 µg/m³.

2. Particulate Matter

- 2.1.1. Particulate matter consists of a variety of particles and compounds in the air and often particulate matter is discussed based on its size. Particles with a diameter of 10 microns or less are referred to as PM₁₀ (WHO, n.d.). Particles with a diameter of 2.5 microns or less are referred to as PM_{2.5} and are more concerning as they can be inhaled and carried deeper into the lungs.
- 2.1.2. The health impacts of exposure to fine particles include inflammation and irritation to the respiratory system, and exacerbating symptoms of pre-existing lung diseases (Defra, n.d.; Defra, 2021). Although no threshold below which no damage to health is observed for particulate matter, there is a relationship between high concentrations of PM₁₀ and PM_{2.5} and increased mortality or morbidity (WHO, n.d.).
- 2.1.3. In the UK, PM₁₀ and PM_{2.5} are considered major air pollutants and as such, there are legally binding limits for annual average ambient air concentrations of PM₁₀ at 40 µg/m³ and PM_{2.5} at 20 µg/m³ (with a target for a 15% reduction in concentrations of urban background PM_{2.5}).
- 2.1.4. It should be noted, however, that the World Health Organisation (WHO) updated its air quality guidelines in 2021 (World Health Organisation, 2021). The UK has yet to determine whether to adopt these guidelines in its National Air Quality Objectives, so the above information remains the most up-to-date.
- 2.1.5. The Environment Act 2021 established a legally binding duty on the government which brings forward at least two new air quality targets in secondary legislation and this duty sits within the environmental targets framework outlined in the Environment Act (Part 1). Both of the targets under the Act concerns PM_{2.5}, where one states that for PM_{2.5} "Annual Mean Concentration Target ('concentration target') - a maximum concentration of 10µg/m³ to be met across England by 2040" (DEFRA, 2022). It is expected that pollution levels associated with traffic will decrease over time with the expected increased uptake of electric vehicles and other alternative fuel vehicles in line with national and local policy for transport.
- 2.1.6. NO₂ and PM₁₀ are not mentioned within the two new air quality targets; however, the Committee on the Medical Effects of Air Pollutants (COMEAP) anticipates that most measures implemented to achieve reductions in PM_{2.5} would also be likely to reduce concentrations of other pollutants (UK Health Security Agency, 2022).

3. References

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Appendix B:
Mitigation Measures for Construction Impacts

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Table 1.1:	Dust and Air Emissions Mitigation Measures (as proposed in the IAQM Guidance (2023))	3
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1. Proposed Mitigation Measures

- 1.1.1. The IAQM's 2023 Construction Dust Guidance IAQM (2023) was utilised in the Air Quality Assessment (AQA) to assess the potential impacts of dust during the construction phase of the proposed development. The IAQM guidance provides an evaluation matrix to determine the potential risk of dust generation and the associated level of mitigation required.
- 1.1.2. To assess the risk of dust impacts for the construction activities, the potential impact on dust soiling and human health were treated as being 'high risk' in order to obtain mitigation measures for the worst-case scenario and apply those measures which constitute good or best practice. This Appendix highlights the proposed mitigation measure for a high risk site.
- 1.1.3. Based on the IAQM Guidance (2023), the mitigation measures are divided into general measures applicable to all site and measures applicable specifically to demolition, earthworks, construction and trackout. Based on the AQA, the highest risk category was applied to the site, and as such, the general mitigation measures applicable to the high-risk sites have been applied, where proportionate and within reason.
- 1.1.4. The following table identifies the general mitigation measures proposed to be applied to the development.

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Key to the table:

H Highly recommended

D Desirable

N Not required

Table 1.1: Dust and Air Emissions Mitigation Measures (as proposed in the IAQM Guidance (2023))

Mitigation measure	Low Risk	Medium Risk	High Risk	Adopted for the Proposed Development
Mitigation for All Sites – Communications				
1. Develop and implement a stakeholder communications plan that includes community engagement before work commences on site.	N	H	H	Yes
2. 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.	H	H	H	Yes
3. Display the head or regional office contact information	H	H	H	Yes
Mitigation for All Sites – Dust Management				
4. Develop and implement a Dust Management Plan (DMP), which may include measures to control other emissions, approved by the Local Authority. The level of detail will depend on the risk, and should include as a minimum the highly recommended measures in this document. The desirable measures should be included as appropriate for the site. In London additional measures may be required to ensure compliance with the Mayor of London's guidance. The DMP may include monitoring of dust deposition, dust flux, real- time PM10 continuous monitoring and/or visual inspections.	D	H	H	Yes, including visual inspections.

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Mitigation measure	Low Risk	Medium Risk	High Risk	Adopted for the Proposed Development
Site Management				
5. 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.	H	H	H	Yes
6. Make the complaints log available to the local authority when asked.	H	H	H	Yes
7. 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.	H	H	H	Yes
8. Hold regular liaison meetings with other high risk construction sites within 500 m of the site boundary, to ensure plans are co-ordinated and dust and particulate matter emissions are minimised. It is important to understand the interactions of the off-site transport/ deliveries which might be using the same strategic road network routes.	N	N	H	Yes
Monitoring				
9. 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 100 m of site boundary, with cleaning to be provided if necessary.	D	D	H	Yes, inspections are proposed to be conducted at an appropriate interval.
10. 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	H	H	H	Yes

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Mitigation measure	Low Risk	Medium Risk	High Risk	Adopted for the Proposed Development
11. 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.	H	H	H	Yes
12. Agree dust deposition, dust flux, or real-time PM ₁₀ continuous monitoring locations with the Local Authority. Where possible commence baseline monitoring at least three months before work commences on site or, if it a large site, before work on a phase commences. Further guidance is provided by IAQM on monitoring during demolition, earthworks and construction.	N	H	H	Yes, if required, monitoring details will be agreed upon with the Local Authority. Visual inspections will be carried out and recorded on a daily basis.
Preparing and maintaining the site				
13. Plan site layout so that machinery and dust causing activities are located away from receptors, as far as is possible.	H	H	H	Yes
14. Erect solid screens or barriers around dusty activities or the site boundary that are at least as high as any stockpiles on site.	H	H	H	Yes
15. Fully enclose site or specific operations where there is a high potential for dust production and the site is active for an extensive period.	D	H	H	Yes
16. Avoid site runoff of water or mud.	H	H	H	No, this is not proposed as it is not practical, although street sweeping will be utilised alongside wheel washing
17. Keep site fencing, barriers and scaffolding clean using wet methods.	D	H	H	No, this is not proposed as it is not practical and in the interests of water conservation
18. Remove materials that have a potential to produce dust from site as soon as possible,	D	H	H	Yes

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Mitigation measure	Low Risk	Medium Risk	High Risk	Adopted for the Proposed Development
unless being re-used on site. If they are being re-used on-site cover as described below.				
19. Cover, seed or fence stockpiles to prevent wind whipping.	D	H	H	Yes
Operating vehicle/machinery and sustainable travel				
20. Ensure all on-road vehicles comply with the requirements of the London Low Emission Zone and the London NRMM standards, where applicable	H	H	H	N/A
21. Ensure all vehicles switch off engines when stationary - no idling vehicles.	H	H	H	Yes
22. Avoid the use of diesel or petrol powered generators and use mains electricity or battery powered equipment where practicable.	H	H	H	Yes
23. Impose and signpost a maximum-speed-limit of 15 mph on surfaced and 10 mph on unsurfaced haul roads and work areas (if long haul routes are required these speeds may be increased with suitable additional control measures provided, subject to the approval of the nominated undertaker and with the agreement of the local authority, where appropriate)	D	D	H	Yes
24. Produce a Construction Logistics Plan to manage the sustainable delivery of goods and materials.	N	H	H	Yes
25. Implement a Travel Plan that supports and encourages sustainable travel (public transport, cycling, walking, and car-sharing)	N	D	H	No, this is not considered practical for this development

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Mitigation measure	Low Risk	Medium Risk	High Risk	Adopted for the Proposed Development
Operations				
26. Only use cutting, grinding or sawing equipment fitted or in conjunction with suitable dust suppression techniques such as water sprays or local extraction, e.g. suitable local exhaust ventilation systems.	H	H	H	Yes, where practical. The use of power cutting, grinding and sawing will be discouraged.
27. Ensure an adequate water supply on the site for effective dust/particulate matter suppression/mitigation, using non-potable water where possible and appropriate.	H	H	H	Yes
28. Use enclosed chutes and conveyors and covered skips.	H	H	H	Yes
29. Minimise drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment and use fine water sprays on such equipment wherever appropriate.	H	H	H	Yes
30. Ensure equipment is readily available on site to clean any dry spillages, and clean up spillages as soon as reasonably practicable after the event using wet cleaning methods.	D	H	H	Yes
Waste management				
31. Avoid bonfires and burning of waste materials.	H	H	H	Yes

Note. The AQA does not include emissions associated with contaminated soils.

2. References

IAQM. (2023, October 10). *Guidance on the assessment of dust from demolition and construction*. Retrieved from Institute of Air Quality Management: <https://iaqm.co.uk/wp-content/uploads/2013/02/Construction-dust-2023-BG-v6-amendments.pdf>