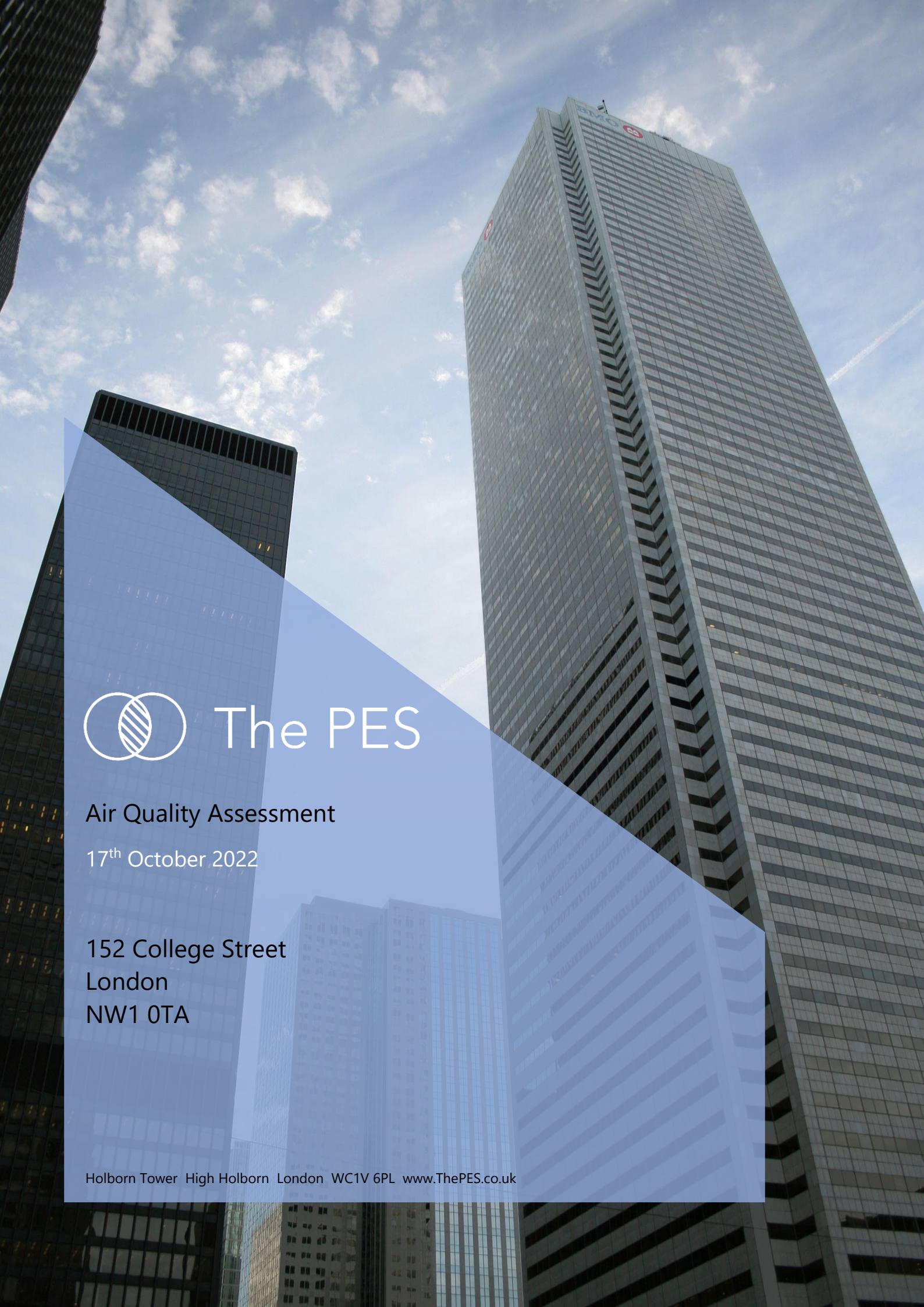

The PES

Air Quality Assessment

17th October 2022

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1.0 Executive Summary

The project clients have commissioned The PES Ltd to undertake a review of the air quality for occupants of the new commercial and residential accommodation at 152 Royal College Street

The proposed development project involves the development of 3 x townhouses and a small commercial/café unit at ground floor level.

During the construction phase, the site has the potential to generate dust nuisance beyond the application boundary. However, through the implementation of a Dust Management Plan, the impacts will be effectively minimised and are unlikely to be significant.

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Traffic generated by the proposed development is not expected to significantly affect local air quality as traffic movements generated are expected to very minimal given the proposed uses/occupiers and site location – occasional deliveries only

However, detailed dispersion modelling of traffic on the local network confirms that, at the time of project delivery, the project will not be subject any issues associated with poor air quality and the design team are able to utilise a natural ventilation strategy if desired.

Heat and hot water will be supplied to the whole development through zero emission electrically driven systems and is thereby, air quality neutral by default.

The site has been assessed as also being air quality neutral with respect to traffic-related emissions in line with the latest London Plan Guidance, as no on-site parking is to be provided.

2.0 Introduction

This report presents an assessment of the local air quality for occupants of the new commercial and residential development at .

The proposed development site is located to the corner of Royal College Street

The project involved the development of 3 x townhouses with a small commercial/café unit on ground floor.

The location of the proposed development site is presented in Figure 1.

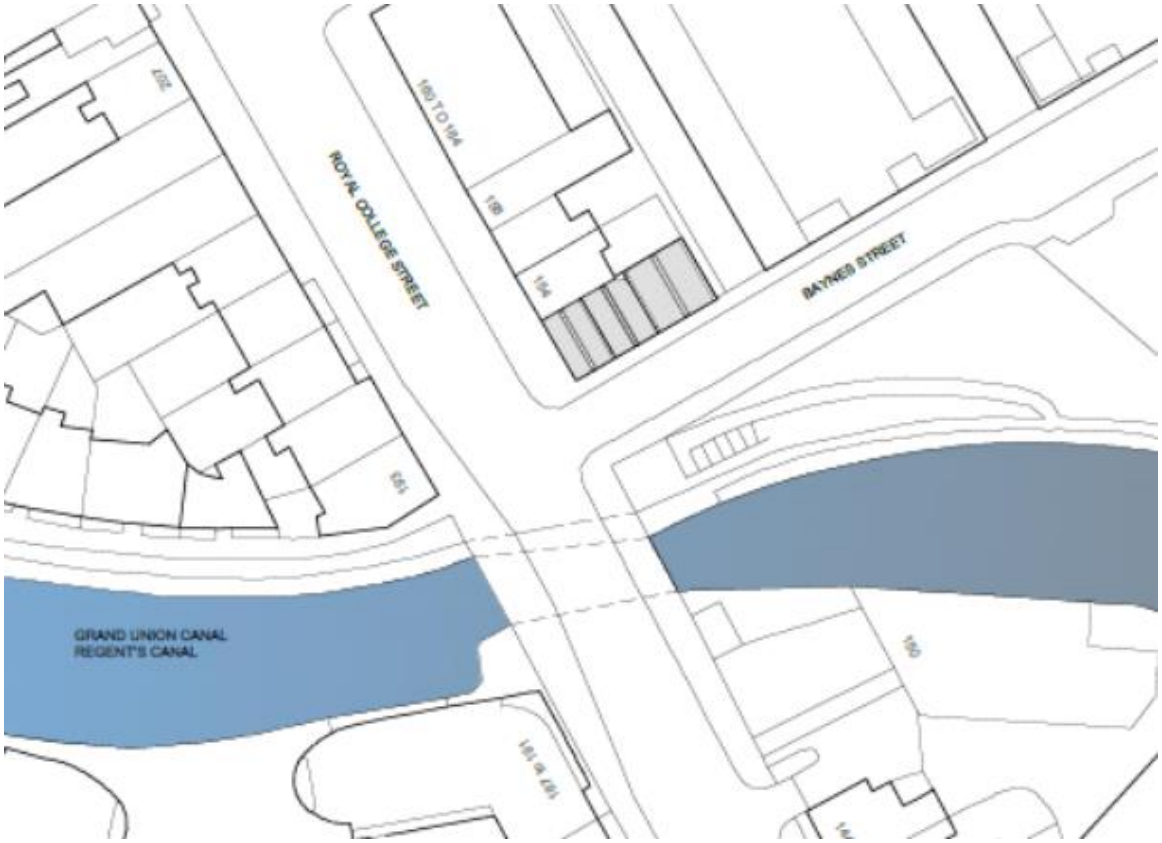

Fig 1. Site Location Plan

The project sits within the London Borough of Camden

Camden's draft Clean Air Strategy 2019-2034 & Clean Air Action Plan 2022-2026 is currently at consultation, This document provides the overarching vision for clean air in the borough.

Camden has committed to achieving the revised World Health Organization (WHO) air quality guidelines in response to the We Make Camden call to action and the scientific evidence about the impact of air pollution on health.

The Camden Clean Air Strategy 2019-2034 formalises this commitment and sets out the pathway to meeting these targets, including how we Camden will monitor progress.

This new Camden Clean Air Action Plan 2022-2026 continues the 'shared endeavour' principle of collective action through the Camden Clean Air Partnership.

The borough has carried the co-design approach into the development of this new Action Plan, but has also enhanced our engagement to better involve communities and groups which are typically most affected by air pollution.

3.0 Policy Context

An overview of the relevant policy drivers for the assessment is provided in the following section.

An overview of the relevant policy drivers for the assessment is provided in the following section.

3.1 European Legislation

Within the European Union, ambient air quality is currently regulated through the Ambient Air Quality Directive 2008/50/EC and the Fourth Daughter Directive 2004/107/EC. These directives set limit values and target values for ambient pollutant concentrations. The limit values are legally binding and must not be exceeded, whereas the target values are to be attained where it is cost effective to do so.

The Ambient Air Quality Directive provides limit values for sulphur dioxide (SO2), nitrogen dioxide (NO_2), benzene (C_6H_6), carbon monoxide (CO), lead (Pb) and particulate matter (PM_{10} and $PM_{2.5}$). The Fourth Daughter Directive provides target values for arsenic (As), cadmium (Cd), nickel (Ni), benzo(a)pyrene (B(a)P), mercury (Hg) and polycyclic aromatic hydrocarbons (PAH).

The EU limit values have been adopted into UK law via the Air Quality Standards Regulations 2010.

In the context of the proposed development, the primary pollutants of concern are NO_2, PM_{10} and $PM_{2.5}$ from traffic on roads close to the site. A summary of the European limit values for the protection of human health for these pollutants is presented in Table 1.

Table 1: European Limit Values for the Protection of Human Heath

Pollutant	Averaging Period	Limit Value ($\mu g/m^3$)	Comments
NO_2	1 Hour	200	Not to be exceeded more than 18 times per calendar year (equivalent to the 99.8th percentile of 1-hour means)
	Calendar Year	40	
PM_{10}	24 Hour	50	Not to be exceeded more than 35 times per year (equivalent to the 90.4th percentile of 24-hour means)
	Calendar Year	40	
$PM_{2.5}$	Calendar Year	25	Stage 1 LV (to be met by 01/01/15)
	Calendar Year	20	Stage 2 LV (to be met by 01/01/20)

It should be noted that the commercial/restaurant uses are not required to comply with the annual mean air quality objectives (see extract from the LAQM.TG(16)) below..

Box 1.4: Examples of where the air quality objectives should/should not apply		
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 and 8-hour mean	All locations where the annual mean objective would apply, together with hotels. Gardens of residential properties[7].	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 expected to spend one hour or longer.	Kerbside sites where the public would not be expected to have regular access.
15-min mean	All locations where members of the public might reasonably be exposed for a period of 15 minutes or longer.	

Fig 2 – LAQM Box 1.4

3.2 National Legislation

The Air Quality Strategy for England, Scotland, Wales and Northern Ireland

The Air Quality Strategy for England, Wales and Northern Ireland was published in 2007 and sets out policy targets (objectives) for SO2, NO2, C6H6, CO, Pb, PM10, PM2.5, 1,3-butadiene (C4H6) and PAH. These objectives are generally in line with those set by the European Directives, although more stringent particulate and benzene objectives apply in Scotland (and in Northern Ireland for benzene).

The Air Quality Objectives (AQO) for NO2, PM10 and PM2.5 in England do not differ from those presented in Table 1.

Local Air Quality Management

The framework for Local Air Quality Management (LAQM) in the UK was introduced by the Environment Act 1995. Local Authorities are required to regularly review and assess air quality to establish whether there are any locations where pollutant concentrations exceed the relevant air quality objectives or EU limit values.

Where an exceedance is identified the local authority is obliged to declare an Air Quality Management Area (AQMA) and prepare an Action Plan setting out measures to improve air quality and achieve compliance with the objective(s).

The National Planning Policy Framework

The National Planning Policy Framework (NPPF 2021) sets out the Government's policies for planning and how these should be applied. With regard to air quality, the NPPF states that:-

para. 186.

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.

3.3 Regional Policy

The London Plan (March 2021)

Chapter 9 deals with Sustainable Infrastructure:-

Policy SI1 Improving air quality

London's air quality should be significantly improved and exposure to poor air quality, especially for vulnerable people, should be reduced:

1) Development proposals should not:

a) lead to further deterioration of existing poor air quality
b) create any new areas that exceed air quality limits, or delay the date at which compliance will be achieved in areas that are currently in exceedance of legal limits
c) reduce air quality benefits that result from the Mayor's or boroughs' activities to improve air quality
d) create unacceptable risk of high levels of exposure to poor air quality.

5) Air Quality Assessments (AQAs) should be submitted with all major developments, unless they can demonstrate that transport and building emissions will be less than the previous or existing use.

The Mayor of London's Air Quality Strategy (2010)

The Mayor of London's Air Quality Strategy outlines the Mayor's commitment to improving air quality in London. The objective of the plan is to significantly reduce NO2 and PM10 concentrations through a number of measures including:

- Ensuring all buses meet Euro IV emission standards;
- Introducing age limits for taxis and Private Hire Vehicles to remove older, more polluting vehicles from the roads;
- Including large vans and minibuses in the Low Emission Zone (LEZ); Introducing a new NOx standard in the LEZ; and
- Working with Borough to implement traffic management strategies to reduce congestion.

Policy SI 1 of the London Plan includes requirements for new development to be Air Quality Neutral. In support of this policy, the Mayor's office published the London Plan Guidance Air Quality Neutral Consultation Draft (Nov 2021) which sets out the methodology for assessing the neutrality of projects as required.

The Mayor's office has also published the Control of Dust and Emissions SPG; the aim of this supplementary planning guidance is to reduce emissions of dust, PM10 and PM2.5 from construction and demolition activities in London.

It also aims to control nitrogen oxides (NOx) from these same activities by introducing an Ultra Low Emissions Zone (ULEZ) for non-road mobile machinery.

3.4 Local Policy

Camden Local Plan – adopted 2017

Policy CC4 Air quality

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

Air Quality Assessments (AQAs) are required where development is likely to expose residents to high levels of air pollution. Where the AQA shows that a development would cause harm to air quality, the Council will not grant planning permission unless measures are adopted to mitigate the impact. Similarly, developments that introduce sensitive receptors (i.e. housing, schools) in locations of poor air quality will not be acceptable unless designed to mitigate the impact.

Development that involves significant demolition, construction or earthworks will also be required to assess the risk of dust and emissions impacts in an AQA and include appropriate mitigation measures to be secured in a Construction Management Plan.

4.0 Methodology

This section outlines the assessment methodology, taking into account all relevant national and local policies and technical guidance relating to air quality.

4.1 Construction Dust

The potential impact of dust generated during site enabling, earthworks and construction works at the proposed development has been undertaken in accordance with the Mayor of London's SPG for the control of dust and emissions during construction and demolition, which is closely aligned with the Institute of Air Quality Management (IAQM) construction dust guidance . A full description of the construction dust methodology is provided in **Appendix A** – IAQM Construction Dust Methodology.

A detailed assessment of dust impacts is required where there are human or ecological receptors within:

- 50m of the site boundary; or
- 50m of the route(s) used by construction vehicles on public roads, up to 500m from the site entrance(s).

The IAQM/ SPG methodology allows the potential risk of dust soiling and human health effects to be determined, based primarily on the sensitivity of nearby receptors (human and ecological) and the anticipated magnitude of the dust emission due to:

- Demolition;
- Earthworks;
- Construction; and
- Track-out (re-suspended dust from vehicle movements).

The assessment of dust risk is also based on professional judgement taking into account factors such as the prevailing wind direction, the proposed construction phasing, the likely duration of dust raising activities, local topography and existing air quality.

A range of best practice mitigation measures are provided within the guidance, which are dependent on the level of dust risk attributed to the site. It is recommended that these measures are incorporated into a Dust Management Plan (DMP) for the proposed development.

The significance of the residual impacts following appropriate mitigation is determined by professional judgement.

Best Practice Guidance for dust control will be implemented, as appropriate, during the construction phase through the Dust Management Plan (DMP) for the proposed development.

The risk of dust soiling and human health impacts from the site has been assessed as medium:-

- Development of between 1,000 and 15,000 square metres of land and;
- Development of between ten to 150 properties and;
- Potential for emissions and dust to have an intermittent or likely impact on sensitive receptors

Prior to mitigation, therefore in accordance with the IAQM guidance it is recommended that the measures detailed in the table below are incorporated into the DMP. The significance of dust impacts on nearby receptors following the implementation of appropriate and best practice mitigation is considered to be negligible.

4.2 Construction Traffic

Construction traffic will contribute to existing traffic levels on the surrounding road network. However, the temporary increase in traffic is considered unlikely to be significant in terms of total flow or construction duration.

All non-road mobile machinery (NRMM) should use fuel equivalent to ultra-low sulphur diesel (ULSD), especially where a bunkered fuel supply is available.

The impact of vehicular emissions of NO_2 and PM10 from construction traffic and on-site machinery on local air quality is considered to be negligible, as a low volume temporary source of local pollution.

Construction traffic is not included within the screening requirements of Table 4.1 – Screening Assessment of Road Traffic Sources within the Technical Guidance 2016 (LLAQM.TG (16)).

Potential dust emission associated with construction traffic are considered further, in line with the IAQM guidance and section 6.0 below.

4.3 Operational Traffic

The Environmental Protection UK (EPUK)/ IAQM planning guidance states that for developments within or near an AQMA, a detailed assessment of traffic-related impacts is required where:

- There is a change in the annual average daily traffic (AADT) flow of light goods vehicles (LGV) of more than 100 vehicles; and/or
- There is a change in the AADT flow of heavy goods vehicles (HGV) of more than 25 vehicles; and/or There is a change in the road re-alignment by more than 5m; and/or
- A new junction is introduced, which will significantly alter vehicle speeds.

The project at Royal College Street does not trigger any of the above requirements.

It is also noted that the project is car free and close to the public transport infrastructure of Camden town centre, as such, impact on the local highways network is expected to be minimal.

However, dispersion modelling of baseline traffic on the surrounding major road network has been undertaken to predict pollutant concentrations at the proposed development site to determine whether the site is suitable for the office use, as proposed.

The input parameters for the modelling are detailed in **Appendix B** – ADMS-Roads Input Parameters.

4.4 Emission Factors

Concentrations of NOx, PM_{10} and $PM_{2.5}$ have been predicted using vehicle emission factors from version 10.1 of the Emissions Factor Toolkit. The emission factors predict a gradual decline in pollution levels over time due to improvements in emissions abatement technologies and the gradual renewal of the vehicle fleet.

However, monitoring carried out in urban areas throughout the UK have found that NO_2 concentrations are not declining as rapidly as predicted and in some locations, roadside concentrations have increased.

The predicted NOx concentrations have been converted to NO_2 using version 8.1 of the NOx to NO_2 calculator, available from the Defra air quality website. It should be noted that version 8.1 should only be used with the 2018 reference year background maps and the Emissions Factors Toolkit v10.1 onwards.

It should be noted that the Emission Factors Toolkit V11.0 was released in November 2021, but the corresponding NOx to NO_2 calculator is not yet available to enable assessments to be undertaken.

The baseline dispersion modelling has been based on the year **2019**, with background emissions, traffic data selected accordingly.

4.5 Meteorological Data

The assessment has used hourly sequential meteorological data from Heathrow Airport, which is approximately 23km south west of the proposed development.

4.6 Sensitive Receptors

Pollutant concentrations have been predicted across the development site using a Cartesian receptor grid of 5m resolution.

4.7 Verification

There is an inherent level of uncertainty associated with any assessment process; however, the methodology presented has been developed to minimise errors where possible.

Potential errors in predicted concentrations due to uncertainties in the assessment source activity data (e.g. traffic flows and emission factors) and the estimated background concentration are minimised by the verification of modelled concentrations using local monitoring data.

The 2016 Local Air Quality Management Technical Guidance (LAQM.TG16) recommends that modelled concentrations should be within 25% of monitored concentrations, ideally within 10%. Where there is a large discrepancy between modelled and measured concentrations, it is considered necessary to adjust the model results to more accurately reflect local air quality.

The modelled NO_2 concentrations have been verified using 2019 data from the Camden Road automated monitoring station (529173-184129) – only 100m to the north west of the proposed development site. Full details of the model verification process are presented in **Appendix B** – Model Verification.

4.8 Building-related Emissions

The development heating and DHW systems are 100% electrically driven, and as such, will emit zero local emissions; having no impact on occupants of the subject building or neighbouring sensitive receptors.

5.0 Baseline Air Quality

Through an analysis of local monitoring data, a description of existing air quality in the vicinity of the proposed development is provided.

5.1 Local Air Quality Monitoring

5.1.1 Automatic Data

Camden operate 5 automatic roadside monitoring sites; all of which are concentrated in central Camden. The most relevant sites relevant to the proposed development is provided in Table 1.

Table 2: Automatic Monitoring Sites

Site Name	Type	Easting	Northing	Pollutants Monitored	Location relative to development site
Camden High Street	Roadside	528832	518399	NO_2	400m to south west
London Bloomsbury	Urban Background	530123	182014	NO_2, PM_{10}, $PM_{2.5}$	2.2km to south east

Annual mean NO_2 and PM_{10} concentrations measured at the above automated stations between 2017 and 2021 have been obtained from Camden's Air Quality Annual Status Report for 2021 (Aug 2022), which are summarised in Tables 3a and 3b, together with the number of measured exceedances of the short-term AQO's.

Table 3a: Roadside NO_2, PM_{10} concentrations measured at the Camden High Street monitoring site

Criteria	2017	2018	2019	2020	2021
Annual Mean NO_2 (µg/m^3)	-	-	-	-	30
Number of Predicted Exceedances of the 1-Hour Mean AQO of 200 µg/m^3	-	-	-	-	0

Table 3b: Urban Background NO_2 concentrations measured at the London Bloomsbury monitoring site

Criteria	2017	2018	2019	2020	2021
Annual Mean NO_2 (µg/m^3)	38	36	32	28	227
Number of Predicted Exceedances of the 1-Hour Mean AQO of 200 µg/m^3	0	0	0	0	0
Annual Mean PM_{10} (µg/m^3)	19	17	18	16	16
Number of Predicted Exceedances of the 24-Hour Mean AQO of 50µg/m^3	6	1	9	4	0
Annual Mean $PM_{2.5}$ (µg/m^3)	13	10	11	9	9

5.1.2 Non-automatic Data

Camden operates a series of passive monitoring tubes as signified in the image below.

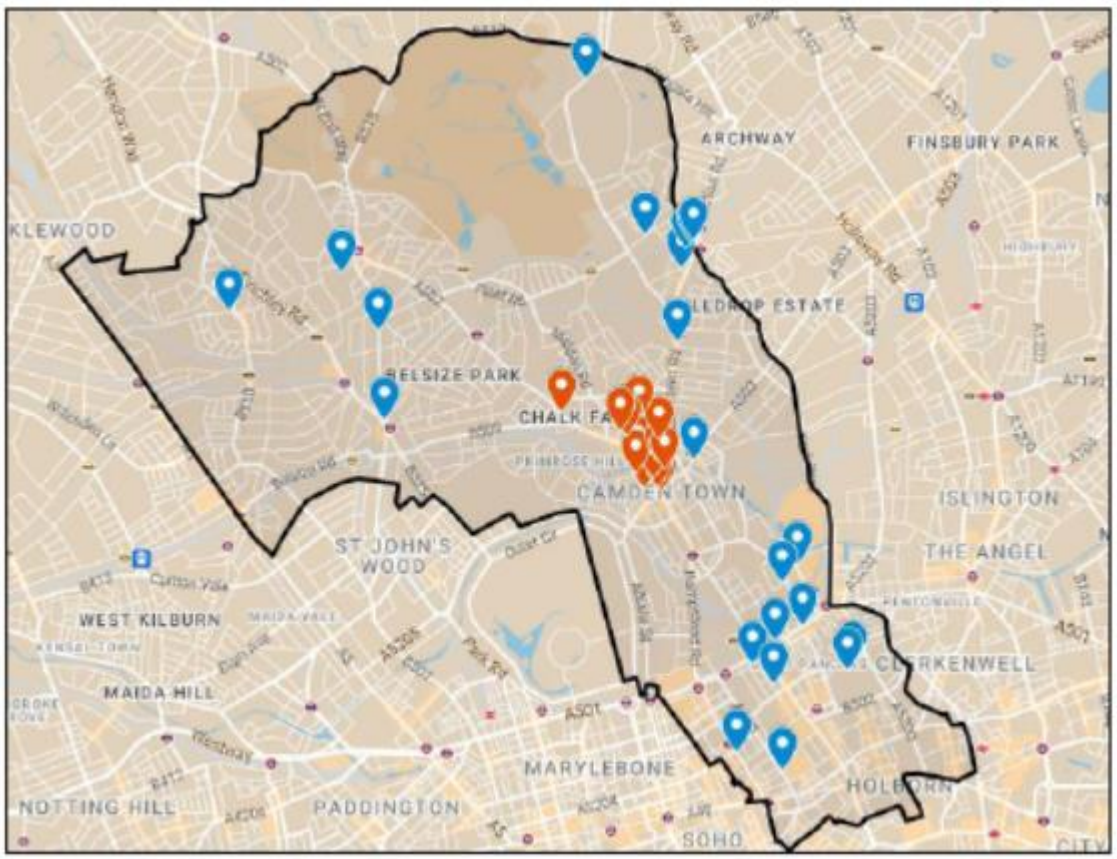

Fig2. - Camden's Passive Monitoring Network

Again the most relevant monitoring stations are the roadside facility on Camden Road (CA23), just 100m away from the proposed development site, and the background monitoring station at Tavistock Gardens (CA10).

The result from 2017 to 2021 are set out below:-

Table 4: NO_2 concentrations measured at the passive monitoring sites

Criteria	2017	2018	2019	2020	2021
Camden Road	**69.30**	**66.67**	**53.69**	**44.28**	37.3
Tavistock Gardens	**46.18**	35.35	33.90	26.78	22.32

The data indicates that NO_2 concentrations in the Borough have potential to exceed the relevant long standards, as could short term PM_{10} standards.

Measurements across the UK have shown that the 1-hour mean AQO for NO_2 may also be exceeded where the annual mean concentration is greater than 60µg/m3. The above noted data therefore indicates that an exceedance of the short-term objective could be less of concern.

5.1.2 DEFRA Mapped Background Concentrations

For comparison with the background monitoring data for NO_2 and in the absence of local PM_{10} and $PM_{2.5}$ data, concentrations have been obtained from the Defra UK Background Air Pollution maps.

These 1km grid resolution maps are derived from a complex modelling exercise that takes into account emissions inventories and measurements of ambient air pollution from both automated and non-automated sites.

At time of production of the this report, the DEFRA website was not providing any background data, and as such, this report has utilised background data from Camden monitoring sites as noted above.

A summary of the mapped and measured annual mean background concentrations for the proposed development site is presented in Table 5, together with the concentrations assumed for the purposes of the assessment.

Table 5: Defra Mapped, Measured and Assessment Background Pollutant Concentrations (µg/m3)

Pollutant	2019 Mapped	2019 Measured	Assessment	AQO/EAL
NO_2	n/a	33.90	33.90	40
PM_{10}	n/a	18.00	18.00	40
$PM_{2.5}$	n/a	11.00	11.00	25

6.0 Potential Impacts

The potential impacts and significance of these impacts on air quality during the construction phase of the development are identified in this section. Suggested mitigation measures are outlined in a subsequent section of the report.

6.1 Construction Dust

6.1.1 Sensitivity of the Area to Dust Impacts

The assessment of dust impacts is dependent on the proximity of the most sensitive receptors to the site boundary. The area is in a predominantly residential and the associated occupants, which would be considered as **HIGH** sensitivity receptors.

Accordingly, it can clearly be assumed that, with over 100 High Sensitivity Receptors that are within 50m of the site boundary, the sensitivity of the area to dust soiling effects on people and property could be considered **HIGH.**

Finally, for the potential range of sensitive receptors in the range of over 10 within 50m of the development site, and with the background PM levels at <24µg/m^3, sensitivity of the area to human health impacts would be considered **LOW.**

Figure 3 – Local sensitive receptors - Proposed development site – Sensitive Receptors

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

6.1.2 Dust Emission Magnitude

The risk of dust arising in sufficient quantities to cause annoyance and/or health and/or ecological impacts should be determined using four risk categories: negligible, low, medium and high risk.

A development is allocated to a risk category based on two factors:

- the scale and nature of the works, which determines the potential dust emission
- magnitude as small, medium or large (see Table 6);

and

- the sensitivity of the area to dust impacts, which is defined as low, medium or high sensitivity.

Table 6 – Dust emission risk categories

Activity	Dust Emission Class		
	Large	Medium	Small
Demolition	Total building volume >50,000 m^3, potentially dusty construction material (e.g. concrete), on-site crushing and screening, demolition activities >20 m above ground level	Total building volume 20,000 – 50 000m^3, potentially dusty construction material, demolition activities 10-20 m above ground level	Total building volume <20,000 m^3, construction material with low potential for dust release (e.g. metal cladding or timber), demolition activities <10m above ground, demolition during wetter months
Earthworks	Total site area >10,000 m^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 >8 m in height, total material moved >100,000 tonnes	Total site area 2,500 – 10,000 m^2, moderately dusty soil type (e.g. silt), 5-10 heavy earth moving vehicles active at any one time, formation of bunds 4 m - 8 m in height, total material moved 20,000 tonnes – 100,000 tonnes	Total site area <2,500 m^2, soil type with large grain size (e.g. sand), <5 heavy earth moving vehicles active at any one time, formation of bunds <4 m in height, total material moved <10,000 tonnes, earthworks during wetter months
Construction	Total building volume >100,000 m^3, piling, on site concrete batching; sandblasting	Total building volume 25,000 m3 – 100,000 m^3, potentially dusty construction material (e.g. concrete), piling, on site concrete batching	Total building volume <25,000 m^3, construction material with low potential for dust release (e.g. metal cladding or timber)
Track out	>50 HDV (>3.5t) trips in any one day, potentially dusty surface material (e.g. high clay content), unpaved road length >100 m	10 – 50 HDV (>3.5t) trips in any one day, moderately dusty surface material (e.g. high clay content), unpaved road length 50m – 100 m;	<10 HDV (>3.5t) trips in any one day, surface material with low potential for dust release, unpaved road length <50 m.

These factors are combined to determine the risk of dust impacts with no mitigation applied (see Table 6 below). The risk category assigned to the development can be different for each of the four potential activities (demolition, earthworks, construction and trackout).

Demolition - the development site is a cleared brown field site with no significant demolition works required.

Accordingly, the magnitude of the dust emission is considered to be 'small'.

Earthworks - the project will involve the development of the foundations with some limited piling.

Volume of material moved will not exceed 1,000t and the use of significant use of earth moving vehicles unlikely on such a restricted site.

With a site area at less just 100m^2, the magnitude of the dust emission during the earthworks phase is therefore also considered to be 'small'.

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

The proposed development will be of a brick clad structure up to 13m high

There is no potential for concrete batching on site.

The development is of a small scale - circa 1,250m^3 – the magnitude of the emission during construction is considered to be 'small'.

Trackout – the site is higher restricted and construction/delivery vehicles will operate from roadside - dust emissions will be "small".

Table 7: Risk of Dust Impacts Prior to Mitigation

Dust Source	Emissions Magnitude
Demolition	Small
Earthworks	Small
Construction	Small
Track Out	Small

6.1.3 Assessment of Dust Risk Prior to Mitigation

Referring to Chapter 7 of the IAQM "Assess the Risk of Dust Impacts" – tables 3 – 9; a summary of the potential risk of dust impacts prior to mitigation, based on the low sensitivity of the area to dust soiling and human health impacts is presented in Table 8.

Table 8: Risk of Dust Impacts Prior to Mitigation

Dust Source	Emissions Magnitude	Human Health Risk	Dust Soiling Risk
Demolition	Small	Negligible	Medium
Earthworks	Small	Negligible	Low
Construction	Small	Negligible	Low
Track Out	Small	Negligible	Low

6.1 Baseline Traffic - 2019

Predicted annual mean NO_2 concentrations have been considered for the proposed commercial and residential accommodation.

The levels have been assessed at the commercial ground floor and residential 1st floor level and are presented as a contour plots in Figures 4 & 5.

The modelled outputs strongly suggest that for the 2019 baseline, ground floor levels are at 39µg/m^3, noting that the commercial spaces are not required to comply with the long terms air quality objectives. At the rear of the ground floor level and first floor level (and by default- floors above), emission levels are at 37.2µg/m^3 of below

During pre-application consultation, the LPA confirmed that level at less than 38µg/m^3 were acceptable and no mitigation required and is reported as such in the Camden Air Quality Pro-forma (attached at **Appendix D**)

Predicted ground floor level annual mean PM_{10} and $PM_{2.5}$ concentrations are presented as contour plots Figure 6 and Figure 7 respectively; these concentrations are well within the relevant air quality standards across the site, with PM_{10} levels at less than 18.7 µg/m^3 and $PM_{2.5}$ at 11.5µg/m^3 or lower.

Short term concentrations of NO_2 and PM_{10} where modelled at the proposed development façade closest to Royal College Street at grid reference 529259-184094 at ground floor level.

Max short term NO_2 levels are predicted level to be 125.14µg/m^3 with no exceedances – well within acceptable limits, while PM_{10} levels do not exceed 19.59 µg/m^3, well within AQO.

These figures would of course reduce at high levels.
These low short term pollutant levels will enable the windows to openable for any natural or purge ventilation strategy.

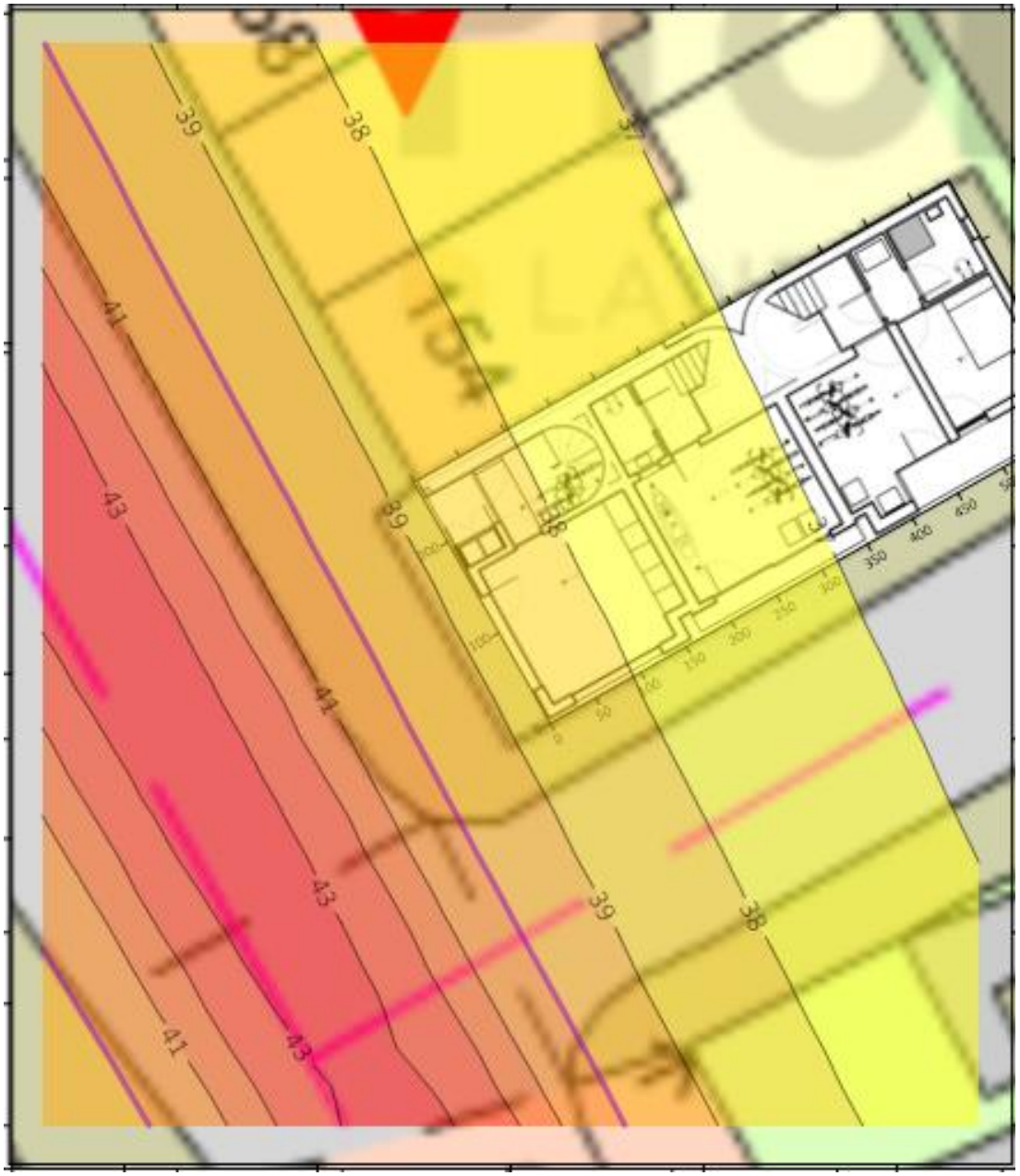

Figure 4 – NO_2 concentrations – ground floor

Figure 5 – NO_2 concentrations – 1st floor

Figure 6 - PM_{10} concentrations – ground floor

Figure 7 – PM2.5 Concentrations – ground floor

6.3 Year of Opening - 2023

Given the marginal long term air quality modelled for the 2019 baseline year, further dispersion modelling has been undertaken for the proposed/potential year of opening – 2023 – to further emphasis the acceptable air quality at the location.

The projected background NO_2 emissions can be downloaded in spreadsheet format from the UK Air website.

For Camden, grid ref 528500-184500, the background NO_2 levels are projected to be at 25.29µg/m^3.

The year of modelling is 2023 – the projected year of opening.

According to Tempro data Traffic volumes in 2023 are predicted to be 5% higher than the 2019 traffic data in the Borough of Camden.

The model at figure 8 shows the predicted maximum long-term concentrations of NO_2 to be at a maximum of 28.5µg/m^3 against the façade of the proposed development; well within the required air quality standards.

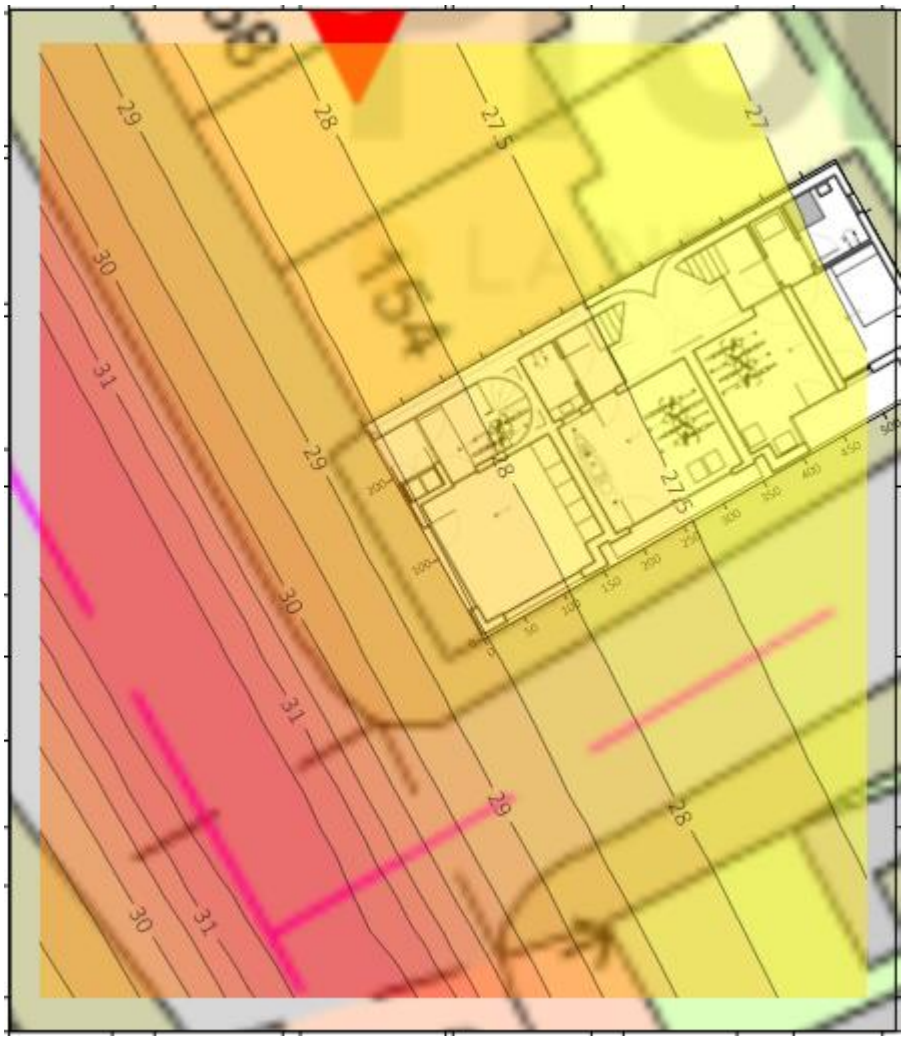

Figure 8 – NO_2 Concentrations – ground floor - 2023

7.0 Air Quality Neutral Assessment

Policy SI 1 of the London Plan includes requirements for new development to be Air Quality Neutral. This section presents an air quality neutral assessment in accordance with The London Plan Guidance Air Quality Neutral Consultation Draft (Nov 2021).

'Air Quality Neutral' (AQN) is a term for developments that do not contribute to air pollution beyond allowable benchmarks. The benchmarks, set out in this guidance, are based on research and evidence carried out by building and transport consultants.

7.1 Excluded Developments

Developments, including major developments which do not include additional emissions sources are assumed to be Air Quality Neutral and do not need an Air Quality Neutral assessment. This would include, for example, developments that have no additional motor vehicle parking, do not lead to an increase in motor vehicle movements , and do not include new combustion plant such as gas-fired boilers.

The project at Royal College Street does provide not provide on-site parking.

The development is proposed to use electrical HVAC systems only.

7. 2 Building Emissions

In accordance with the Air Quality Neutral Guidance document (AQNG), the project is air quality neutral by default, as it does not introduce any new fossil fuel combustion plant

7.3 Transport Emissions

Equally, the project is air quality neutral for transport emissions by default as there is no on-site parking.

8.0 Mitigation

The following mitigation measures will be required during the construction and operational phases in order to minimise the air quality impacts arising from the development.

8.1 Construction Phase

London Best Practice Guidance for dust control will be implemented, as appropriate, during the construction phase through the Dust Management Plan (DMP) for the proposed development.

The risk of dust soiling and human health impacts from the site has been assessed as **"Medium"** prior to mitigation, therefore in accordance with the IAQM guidance it is recommended that the measures detailed in Table 13 are incorporated into the DMP. The significance of dust impacts on nearby receptors following the implementation of appropriate and best practice mitigation is considered to be negligible.

Table 9 Recommended Mitigation Measures

Description	Mitigation Measure
General	• Develop and implement a stakeholder communications plan that includes community engagement before work commences on site. • 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.
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 offsite, and the action taken to resolve the situation in the log book.
Monitoring	• 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. • Agree dust deposition, dust flux, or real-time PM10 continuous monitoring locations with the Local Authority for 2 x monitors. 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
Preparing and maintaining the Site	• Plan site layout so that machinery and dust causing activities are located away from receptors, as far as is possible. • Erect solid screens or barriers around dusty activities or at the site boundary that is at least as high as any stockpiles on site. • Fully enclose the 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 to prevent wind whipping.
Operating vehicle & machinery and sustainable travel	• Ensure all vehicles switch off engines when stationary - no idling vehicles. • Avoid the use of diesel or petrol powered generators and use mains electricity or battery powered equipment where practicable. • Produce a Construction Logistics Plan to manage the sustainable delivery of goods and materials.
Operations	• Only use cutting, grinding or sawing equipment fitted or in conjunction with suitable dust suppression techniques such as water sprays or local extraction, e.g. suitable local exhaust ventilation systems. • Ensure an adequate water supply on the site for effective dust/particulate matter suppression/mitigation, using non-potable water where possible and appropriate. • Use enclosed chutes and conveyors and covered skips. • Minimise drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment and

	use fine water sprays on such equipment wherever appropriate. • 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.
Waste management	• Avoid bonfires and burning of waste materials
Demolition	• Ensure effective water suppression is used during demolition operations. Hand held sprays are more effective than hoses attached to equipment as the water can be directed to where it is needed. In addition, high volume water suppression systems, manually controlled, can produce fine water droplets that effectively bring the dust particles to the ground. • Avoid explosive blasting, using appropriate manual or mechanical alternatives. • Bag and remove any biological debris or damp down such material before demolition.
Construction	• Ensure sand and other aggregates are stored in bundled areas and are not allowed to dry out, unless this is required for a particular process, in which case ensure that appropriate additional control measures are in place.
Track out	• Use water-assisted dust sweeper(s) on the access and local roads, to remove, as necessary, any material tracked out of the site. • Avoid dry sweeping of large areas. • Ensure vehicles entering and leaving sites are covered to prevent escape of materials during transport. • Implement a wheel washing system (with rumble grids to dislodge accumulated dust and mud prior to leaving the site where reasonably practicable). • Access gates to be located at least 10m from receptors where possible.

8.1.1 Method Statement

A method statement should cover all phases of the development and take account of all contractors or sub-contractors. It should be submitted to the local planning authority (LPA) prior to any works being carried out and include a timetable of dust generating activities accompanied with proposed dust control measures.

The content of a Method Statement will be determined by a site specific evaluation but typical features to include are outlined below:-

- summary of work to be carried out
- description of site layout and access – including proposed haul routes, location of site equipment including supply of water for damping down, source of water (wherever possible from dewatering or extraction), drainage and enclosed areas
- inventory and timetable of all dust generating activities
- list of all dust and emission control methods to be used
- details of any fuel stored on site
- Identification of an authorised responsible person on-site for air quality. Ideally this person needs to have knowledge of pollution control and vehicle emissions;
- summary of monitoring protocols and agreed procedure of notification to the local authority nominated person(s)
- a site log book to record details and action taken in response to exceptional incidents or dust-causing episodes. It should also be used to record the results of routine site inspections.

8.2 Operational Phase

The proposed development will include secure cycle spaces to encourage sustainable transport, and this central location has excellent access to the public transport network with the Tube and bus network within a very short walking distance.

Detailed dispersion modelling of local traffic flows indicates that long term NO_2 levels are likely to within the relevant air quality standards and these will drop further in the coming years, accordingly it is considered that site is appropriate for the residential uses as proposed.

PM_{10} and $PM_{2.5}$ concentrations at the site are likely to be well within the relevant short and long-term air quality standards for the project.

9.0 Summary and Conclusions

The following summarise the outcomes of the assessment and provide details of any air quality constraints to the development of the site. Based on the results of the assessment, it is considered that redevelopment of the site would not cause a significant impact on local air quality.

An assessment has been undertaken to assess the potential impacts on local air quality associated with the construction and operation of the proposed development.

An assessment of the potential impacts during the construction phase has been carried out in accordance with the latest Institute of Air Quality Management guidance; this has shown that releases of dust and PM_{10} are likely to occur during site activities. The risk of dust soiling impacts at neighbouring properties has been assessed as medium, with the risk to human health assessed as potentially low. Through good site practice and the implementation of suitable mitigation measures, the impact of dust and PM_{10} releases may be effectively mitigated and the resultant impacts are considered to be negligible.

Traffic generated by the proposed development is expected to be very limited and would not significantly affect local air quality, however detailed dispersion modelling of the local road network has been undertaken to assess whether the site is suitable for the commercial/office uses, as proposed.

The modelling indicates that both long and short term air quality standards are within the targets for commercial spaces as set by the Air Quality Standards Regulations 2010.

It is also expected that long term air quality standards will be well within the required targets for the year of opening, given the constantly improving air quality within the London Boroughs

In addition, the site is air quality neutral with respect to building-related and transport related emissions by default.

Appendix A

IAQM CONSTRUCTION DUST METHODOLOGY

Factors defining the sensitivity of a receptor to dust impacts are presented in Table A1.

Table A1: Receptor Sensitivity

Receptor Sensitivity	Human Health	Dust Soiling	Ecological
High	- Locations where members of the public are exposed over a time period relevant to the air quality objectives for PM_{10} (a) - Examples include residential dwellings, hospitals, schools and residential care homes.	- Regular exposure - High level of amenity expected. - Appearance, aesthetics or value of the property would be affected by dust soiling. - Examples include residential dwellings, museums, medium and long-term car parks and car showrooms.	- Nationally or Internationally designated site with dust sensitive features (b) - Locations with vascular species (c)
Medium	- Locations where workers are exposed over a time period relevant to the air quality objectives for PM_{10} (a) - Examples include office and shop workers (d)	- Short-term exposure - Moderate level of amenity expected - Possible diminished appearance or aesthetics of property due to dust soiling - Examples include parks and places of work	- Nationally designated site with dust sensitive features (b) - Nationally designated site with a particularly important plant species where dust sensitivity is unknown
Low	- Transient human exposure - Examples include public footpaths, playing fields, parks and shopping streets	- Transient exposure - Enjoyment of amenity not expected. - Appearance and aesthetics of property unaffected - Examples include playing fields, farmland (e), footpaths, short-term car parks and roads	- Locally designated site with dust sensitive features (b)

a) In the case of the 24-hour objective, a relevant location would be one where individuals may be exposed for eight hours or more in a day.
b) Ecosystems that are particularly sensitive to dust deposition include lichens and acid heathland (for alkaline dust, such as concrete).
c) Cheffing C. M. & Farrell L. (Editors) (2005), The Vascular Plant. Red Data List for Great Britain, Joint Nature Conservation Committee.
d) Does not include workers' exposure to PM_{10} as protection is covered by Health and Safety at Work legislation.
e) Except commercially sensitive horticulture.

The sensitivity of the area as a whole is dependent on the number of receptors within each sensitivity class and their distance from the source. Human health impacts are also dependent on the existing PM_{10} concentrations in the area.

Table A2 and Table A3 summarise the criteria for determining the overall sensitivity of the area to dust soiling and health impacts respectively. The sensitivity of the area to ecological impacts is presented in Table A4.

Table A2: Sensitivity of the Area to Dust Soiling Effects on People and Property

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

Table A3: Sensitivity of the Area to Health Impacts from Dust

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

Table A4: Sensitivity of the Area to Ecological Impacts from Dust

Receptor Sensitivity	Distance from the Source	
	<20m	<50m
High	High	Medium
Medium	Medium	Low
Low	Low	Low

The magnitude of the dust impacts for demolition, earthworks, construction and trackout is classified as small, medium or large depending on the scale of the proposed works as detailed in Table A5.

Table A5: Dust Emission Magnitude

Receptor Sensitivity	Large	Medium	Small
Demolition	- Total building volume >50,000m^3 - Potentially dusty material (e.g. concrete) - Onsite crushing and screening - Demolition activities >20m above ground level.	- Total building volume 20,000 - 50,000m^3 - Potentially dusty material - Demolition activities 10 - 20m above ground level.	- Total building volume <20,000m^3 - Construction material with low potential for dust release - Demolition activities <10m above ground level - Demolition during wetter months
Earthworks	- Total site area >10,000m^2 - Potentially dusty soil type (e.g. clay) - >10 heavy earth moving vehicles active at any one time - Formation of bunds >8m in height - Total material moved >100,000 tonnes	- Total site area 2,500 - 10,000m^2 - Moderately dusty soil type (e.g. silt) - 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 <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 <20,000 tonnes - Earthworks during wetter months
Construction	- Total building volume >100,000m^3 - On site concrete batching - Sandblasting	- Total building volume 25,000 - 100,000m^3 - Potentially dusty construction material (e.g. concrete) - On site concrete batching	- Total building volume <25,000m^3 - Material with low potential for dust release (e.g. metal cladding or timber
Trackout	- >50 HGV movements in any one day (a) - Potentially dusty surface material (e.g. high clay content) - Unpaved road length >100m	- 10 - 50 HGV movements in any one day (a) - Moderately dusty surface material (e.g. silt) - Unpaved road length 50 - 100m	- <10 HGV movements in any one day (a) - Surface material with low potential for dust release - Unpaved road length <50m

a) HGV movements refer to outward trips (leaving the site) by vehicles of over 3.5 tonnes

For each dust emission source, the worst-case area sensitivity is used in combination with the dust emission magnitude to determine the risk of dust impacts prior to mitigation as illustrated in Tables A6 and A7.

Table A6: Risk of Dust Impacts from Demolition, Earthworks and Construction

Area Sensitivity	Distance from the Source		
	Large	Medium	Small
High	High Risk	Medium Risk	Medium Risk
Medium	High Risk	Medium Risk	Low Risk
Low	Medium Risk	Low Risk	Negligible Risk

Table A7: Risk of Dust Impacts from Trackout

Area Sensitivity	Distance from the Source		
	Large	Medium	Small
High	High Risk	Medium Risk	Low Risk
Medium	Medium Risk	Low Risk	Negligible Risk
Low	Low Risk	Low Risk	Negligible Risk

Appendix B

ADMS-ROADS INPUT PARAMETERS

ADMS-Roads Input Parameters

Table A1: Summary of ADMS-Roads Input Parameters

Parameter	Value
ADMS-Roads Model Version	5.0.1.3
Vehicle Emission Factors	EFT v10.1
Meteorological Data	Hourly sequential data from London Heathrow Airport
Surface Roughness	1.0m
Monin-Obukhov Length	75m

Table A2: Summary of Traffic Data

Road Link	2019 AADT (hourly)	HGV/Buses – daily	Average Speed (kph)
Royal College Street	288	3.5%	10 – delays at zebra crossing

Figure 9 – modelled road network

Appendix C

MODEL VERIFICATION

Predicted annual mean NO_2 and PM_{10} concentrations have been verified using 2019 data from the nearby monitoring station on Camden Road just 100m north west from the development site.

Traffic is assumed to be congested and delayed by the traffic lit junctions to either side of the station, with an average speed at an average 10kph used in a modelled canyon.

Most nitrogen dioxide (NO_2) is produced in the atmosphere by the reaction of nitric oxide (NO) with ozone. It is therefore most appropriate to verify the model in terms of primary pollutant emissions. Verification of concentrations predicted by the ADMS-Roads model has followed the methodology presented in LAQM.TG16.

The modelled NO_x concentration has been converted into an equivalent Road-NO_2 (i.e. the component of total NO_2 coming from road traffic) concentrations using the Defra NOx to NO_2 calculator.

The ratio of the measured and modelled Road-NO_2 contributions provides an adjustment factor for the modelled Road-NO_2 concentrations. This factor is then applied to the modelled road NOx concentrations, before they are converted to Road-NO_2 using the Defra NOx to NO_2 calculator and added to the background NO_2 concentration for to produce a total adjusted modelled NO_2 concentration.

The model verification calculation is presented in Table B1; as can be seen, the outcomes are within the required tolerance levels and no adjustment to modelling outputs is required.

Table B1: Verification Calculations

Parameter	Value
Measured NO_2 Concentration (2019)	53.69 µg/m^3
Modelled NO_2 Concentration*	59.51 µg/m^3
Adjustment Factor	Zero adjustment

*Using the DEFRA NOx to NO_2 Converter

Figure 10 – Camden Road Monitoring Site

Appendix D

CAMDEN AIR QUALITY PROFORMA