HOARE LEA

Clarendon Centre.
Oxford.
Clarendon LP GP Limited.

AIR QUALITY

AIR QUALITY ASSESSMENT – PLANNING SUBMISSION

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Audit sheet.

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Contents.

Executive Summary.

Hoare Lea have been commissioned by Clarendon LP GP Ltd to undertake an Air Quality Assessment to support the planning application for the redevelopment of the Clarendon Centre, Oxford (the 'Application Site').

The proposals comprise of the redevelopment of the existing Clarendon Centre, Oxford to form a mixed-use development to include laboratory use, student residential rooms, retail units and office space. The proposals will be completed in three phases.

The baseline assessment shows that the Application Site is located within the Oxford city-wide Air Quality Management Area (AQMA), declared by Oxford City Council (OCC) for exceedances of the annual mean NO_2 air quality objective (AQO). Pollutant concentrations at monitoring locations representative of the Application Site, showed compliance with the annual mean NO_2 AQO in recent years. The annual mean NO_2 AQO has however been exceeded at the nearest automatic monitoring location. Monitoring locations within the vicinity of the Application Site show that annual mean PM_{10} and $PM_{2.5}$ concentrations and the 24-hour mean PM_{10} concentrations complied with the AQO's in recent years.

The impacts of demolition and construction work on dust soiling and ambient fine particulate matter concentrations have been assessed and the risk of dust causing a loss of local amenity and increased exposure to PM_{10} concentrations has been used to identify appropriate mitigation measures. Provided these measures are implemented and included within a dust management plan, the residual impacts are considered to be not significant.

Operational phase road traffic generated by the Proposed Development has been provided by Mott MacDonald, the project transport consultants. Current vehicle trips are associated with the existing retail use of the Application Site. There are no parking spaces associated with the scheme however, there are some vehicle trips associated with staff, students and servicing and deliveries. These will result in a slight overall increase in vehicle trips when compared to the existing use. The change in traffic will be below the criteria set out in the Environmental Protection United Kingdom (EPUK) and Institute of Air Quality Management (IAQM) planning guidance and consequently the impact of additional traffic on local air quality is considered insignificant and a detailed assessment is not required.

The energy strategy for the Proposed Development will be all electric with no combustion systems. Consequently, there will be no on-site emissions associated with the proposed energy systems. A detailed assessment of the impacts from the energy plant has therefore been screened out in line with the EPUK and IAQM guidance.

As part of the Proposed Development, there will be fully fitted out laboratory spaces, which will include fume cupboards. Recirculating fume hoods will be included for the fume cupboards with no emissions discharged to the atmosphere.

The Site Suitability Assessment indicates no likely exceedances of the relevant AQOs for NO_2, PM_{10} and $PM_{2.5}$ at the Application Site. Therefore, the Application Site is considered suitable for the proposed uses, including student residential use, without the need for additional mitigation measures.

Based on the assessment results, the Application Site is considered suitable for the Proposed Development without the inclusion of mitigation and air quality should not be considered as a constraint to the planning consent. The Proposed Development conforms to the principles of the National Planning Policy Framework and the Oxford Local Plan.

1. Introduction.

Hoare Lea have been commissioned by Clarendon LP GP Ltd to undertake an Air Quality Assessment to support the planning application for the proposed redevelopment of the Clarendon Centre, Oxford (hereafter referred to as the 'Application Site' or 'Proposed Development').

1.1 Proposed Development.

The Proposed Development is for the redevelopment of the Clarendon Centre, an indoor shopping centre in the centre of Oxford. The Proposed Development is to be constructed in three phases and includes:

- Phase 1 comprises of laboratory buildings and new retail space
- Phase 2 comprises of student accommodation, retail space and offices
- Phase 3 comprises of new office and retail space

Access to the Proposed Development is via Cornmarket Street to the east, Queen Street to the south and Shoe Lane to the north.

The Clarendon Centre is currently car free with no on-site parking provision. Existing trips relate to servicing and deliveries for the retail uses. There are no new parking spaces associated with the Proposed Development and as such there will be no parking provision associated with the scheme. Based on the change in land uses, there is predicted to be a slight increase in trips associated with the staff, students, servicing and deliveries.

The energy strategy for the Proposed Development is to be an all-electric approach with no combustion systems. Consequently, there will be no on-site emissions associated with the proposed energy systems.

As part of the proposals for phase 1, there will be fully fitted out laboratory spaces. There will be recirculating fume hoods that will serve the fume cupboards. There will be no emissions from the fume cupboards discharged to the atmosphere.

1.2 Application Site Description and Location.

The Application Site is located within the administrative area of Oxford City Council (OCC) at the approximate National Grid Reference (NGR): X 451273 Y 206234.

The Application Site is currently occupied by the Clarendon Centre, an indoor shopping centre in Oxford. The Application Site is bound by pedestrianised high streets to the south and east. To the north and west are retail and office buildings with residential dwellings and St Peters College beyond.

A visual representation of the Application Site location is shown in Figure 1.

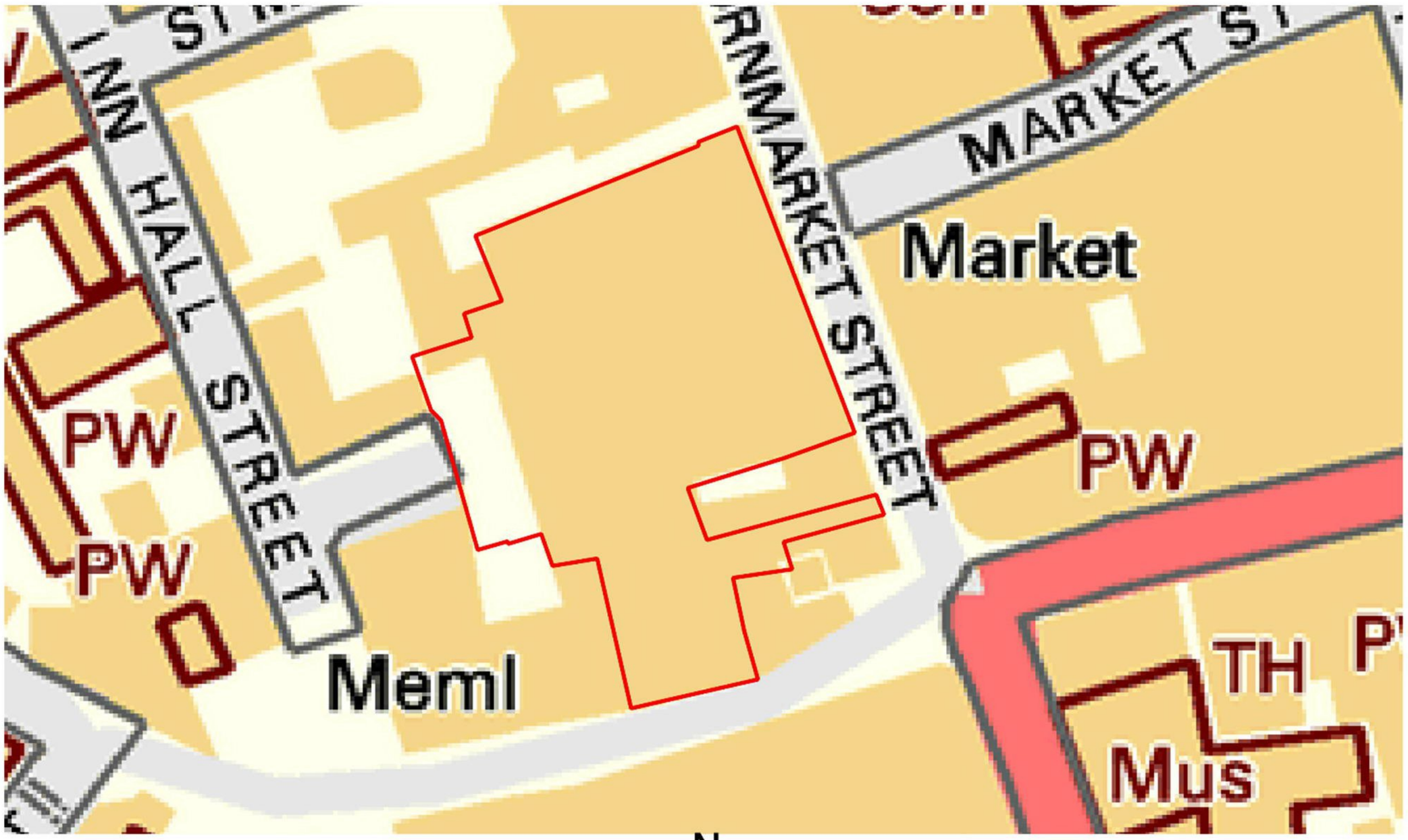

Figure 1 Location of Application Site. Contains OS Data © Crown Copyright and Database rights 2021

1.3 Scope of Assessment.

An email detailing the proposed methodology for the Air Quality Assessment was provided to OCC on 23rd September 2020. A response was received by Hoare Lea on 25th September 2020 stating that pre-application advice falls into the charging scheme. A copy of the correspondence with OCC has been included in Appendix 1.

A summary of the scope of the assessment includes:

- Determination of baseline scenario, using OCC's existing monitoring data;
- Assessment of potential air quality impacts during the construction phase;
- Assessment of potential air quality impacts during the operational phase;
- Assessment of the suitability of the Application Site for the Proposed Development; and
- Identification of mitigation measures, if required.

Hoare Lea received pre-app advice from the Air Quality Officer at OCC on 29th October 2020. OCC's comments were that the proposed air quality assessment methodology seems in general appropriate to the scale and nature of the Proposed Development, assuming that the assumptions listed in the proposed methodology remain valid. The assessment should follow the structure and recommendations presented in the pre-app advice document which also align with the OCC Air Quality Planning Application Guidance[17].

2. Legislation, Policy and Guidance Documents.

2.1 Air Quality Strategy and Local Air Quality Management.

The Environment Act 1995 (Part IV)[1] requires the Secretary of State to publish an air quality strategy and local authorities to review and assess the quality of air within their boundaries. The latter has become known as Local Air Quality Management (LAQM).

The Air Quality Strategy[2] provides the policy framework for local air quality management and assessment in the UK. It sets out air quality standards and objectives for key air pollutants. These standards and objectives are designed to protect human health and the environment. The Strategy also sets out how the different sectors of industry, transport and local government, can contribute to achieving these air quality objectives.

Local authorities are required to identify whether the objectives have been, or will be, achieved at relevant locations, by the applicable date. If the objectives are not achieved, the authority must declare an Air Quality Management Area (AQMA) and should prepare an Air Quality Action Plan (AQAP) within 12 months. The action plan must identify appropriate measures and policies that can be introduced to help achieve the objective(s).

The air quality objectives set out the extent to which the Government expects the standards to be achieved by a certain date. They take account of economic efficiency, practicability, technical feasibility and timescale. The objectives for use by local authorities are prescribed within the Air Quality (England) Regulations 2000[3], and the Air Quality (England) (Amendment) Regulations 2002[4].

The objectives for nitrogen dioxide (NO_2) and fine particulate matter (PM_{10} and $PM_{2.5}$) are given in Table 1. The target dates for meeting the NO_2 and PM_{10} objectives were 2005 and 2004, respectively. It should be noted that local authorities in England have a flexible role in working towards reducing emissions and concentrations of $PM_{2.5}$.

Table 1: Air Quality Objectives for NO_2, PM_{10} and $PM_{2.5}$

Pollutant	Time Period	Objective
Nitrogen Dioxide (NO_2)	1-hour Mean	200 µg/m^3 Not to be exceeded more than 18 times a year
	Annual Mean	40 µg/m^3
Fine Particulate Matters (PM_{10})†	24-hour Mean	50 µg/m^3 Not to be exceeded more than 35 times a year
	Annual Mean	40 µg/m^3
Fine Particulate Matter ($PM_{2.5}$) †*	Annual Mean	25 µg/m^3
Notes: †Measured gravimetrically.		

The objectives apply at locations where members of the public are likely to be regularly present and exposed over the averaging period of the objective. Examples of where the annual mean objectives should apply are provided in LAQM.TG16[5] and include building facades of residential properties, schools, hospitals. The annual mean objectives are not relevant for the building facades of offices or other places of work where members of the public do not have regular access, nor kerbsides nor gardens.

The 24-hour objective for PM_{10} is considered to apply at the same locations as the annual mean objective, as well as in gardens of residential properties and at hotels.

The 1-hour objective for NO_2 also applies wherever members of the public might regularly spend 1-hour or more, including places of work, outdoor eating locations, pavements of busy shopping streets, carparks and bus stations which are not fully enclosed. The 1-hour objective does not apply at kerbside sites where the public do not have regular access.

2.2 EU Limit Values.

The European Union has also set limit values for NO_2, PM_{10} and $PM_{2.5}$; these are legally binding and have been implemented into English legislation by The Air Quality Standards Regulations 2010[6] and The Air Quality Standards (Amendment) Regulations 2016[7].

The limit values for NO_2, PM_{10} and $PM_{2.5}$ are the same as the English objectives (given in Table 1), but applied from 2010 for NO_2, 2005 for PM_{10} and 2015 for $PM_{2.5}$. The limit values apply at all locations (apart from where the public does not have access, where health and safety at work provisions apply and on the road carriageway).

2.3 Statutory Nuisance Legislation.

Part III of the Environmental Protection Act (EPA) 1990 (as amended) contains the main legislation on Statutory Nuisance and allows local authorities and individuals to take action to prevent a statutory nuisance. Section 79 of the EPA defines, amongst other things, smoke, fumes, dust and smells emitted from industrial, trade or business premises so as to be prejudicial to health or a nuisance, as a potential Statutory Nuisance.

Fractions of dust greater than 10µm in diameter (i.e. greater than PM_{10}) typically relate to nuisance effects as opposed to potential health effects and therefore are not covered within the AQS. In legislation there are currently no numerical limits in terms of what level of dust deposition constitutes a nuisance.

2.4 UK Plan for Tackling Roadside Nitrogen Dioxide Concentrations.

The UK Plan for Tackling Roadside Nitrogen Dioxide Concentrations[8] was published in 2017. This sets out roles and responsibilities and measures for bringing NO_2 levels within the mandatory limit values in the shortest possible time. Under the UK Plan, local authorities with roadside concentrations of NO_2 forecast by the Defra as exceeding legal limits are identified.

2.5 Clean Air Strategy.

The Clean Air Strategy (CAS)[9], published in 2019, sets out the Government's proposals aimed at delivering cleaner air in England, and also indicates how devolved administrations intend to make emissions reductions. It sets out the comprehensive action that is required from across all parts of government and society to deliver clean air to help meet EU limit values for the five most damaging air pollutants: NO_x (including NO_2), $PM_{2.5}$, NH_3, sulphur dioxide (SO_2), non-methane volatile organic compounds (NMVHC).

The immediate challenge is to reduce NO_x emissions due to non-compliance with the limit value for annual mean NO_2 (as given in Table 1). Targets for action include road traffic to reduce ambient NO_2 concentrations, and domestic coal and wood burning to improve ambient $PM_{2.5}$ concentrations.

2.6 Planning Policy.

2.6.1 National Planning Policy Framework

The National Planning Policy Framework (NPPF) 2019[10] sets out planning policy for England. It includes advice on when air quality should be a material consideration in development control decisions. Relevant sections are set out below:

> Paragraph 54: "Local planning authorities should consider whether otherwise unacceptable development could be made acceptable through the use of conditions or planning obligations. Planning obligations should only be used where it is not possible to address unacceptable impacts through a planning condition."
>
> Paragraph 102: "…c) opportunities to promote walking, cycling and public transport use are identified and pursued; d) the environmental impacts of traffic and transport infrastructure can be identified, assessed and taken into account - including appropriate opportunities for avoiding and mitigating any adverse effects, and for net environmental gains… ."
>
> Paragraph 103: "Significant development should be focused on locations which are or can be made sustainable, through limiting the need to travel and offering a genuine choice of transport modes. This can help to reduce congestion and emissions and improve air quality and public health."

Paragraph 170: "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."

Paragraph 180: "Planning policies and decisions should also ensure that new development is appropriate for its location taking into account the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, as well as the potential sensitivity of the site or the wider area to impacts that could arise from the development."

Paragraph 181: "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."

Paragraph 183: "The focus of planning policies and decisions should be on whether proposed development is an acceptable use of land, rather than the control of processes or emissions (where these are subject to separate pollution control regimes). Planning decisions should assume that these regimes will operate effectively. Equally, where a planning decision has been made on a particular development, the planning issues should not be revisited through the permitting regimes operated by pollution control authorities."

The NPPF is supported by Planning Practice Guidance (PPG)[11].

The 2018 PPG states that:

> Paragraph 001 (Reference ID: 32-001-20191101): "Defra carries out an annual national assessment of air quality using modelling and monitoring to determine compliance relevant Limit Values. It is important that the potential impact of new development on air quality is taken into account in planning where the national assessment indicates that relevant limits have been exceeded or are near the limit or where the need for emissions reductions has been identified."
>
> Paragraph 002 (Reference ID: 32-002-20191101): Plans may need to consider ways in which the development could be made appropriate in locations where air quality is or is likely to be a concern, and not give rise to unacceptable risks from pollution. This could, for example entail identifying measures for offsetting the impact on air quality arising from new development including supporting measures in an air quality action plan or low emissions strategy where applicable".
>
> Paragraph 005 (Reference ID: 32-005-20191101): "Whether air quality is relevant to a planning decision will depend on the proposed development and its location. 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 conversation 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.

The PPG also sets out the information that may be required in an air quality assessment, stating that:

> Paragraph 007 (Reference ID: 32-007-20191101): "Assessments need to be proportional to the nature and scale of development proposed and the potential impacts (taking into account existing air quality conditions), and because of this are likely to be locationally specific. The scope and content of supporting information is best discussed and agreed between the local planning authority and applicant before it is commissioned".

It also provides guidance on options for mitigating air quality impacts, and makes clear that:

> Paragraph 008 (Reference ID: 32-008-20191101): "Mitigation options will need to be locationally specific, will depend on the proposed development and need to be proportionate to the likely impact."

2.7 Local Policy.

2.7.1 Oxford City Council Local Plan

The Oxford Local Plan 2016-2036[12] was adopted on 8th June 2020. The Local Plan contains detailed polices which planning applications are judged against. The following policies relating to air quality is contained within the Local Plan:

> Policy RE6: *Air Quality*
>
> *"Planning permission will only be granted where the impact of new development on air quality is mitigated and where exposure to poor air quality is minimised or reduced.*
>
> *The exposure of both current and new occupants to air pollution during the development's operational and construction phases, and the overall negative impact that proposals may cause to the city's air quality, will be considered in determining planning applications. Where additional negative air quality impacts from a new development are identified, mitigation measures will be required to ameliorate these impacts.*
>
> *Sensitive uses including residential development, schools and nurseries should be located away from areas of poor air quality, with site layout designed to reduce impact and with any residual impact mitigated through air quality measures.*
>
> *Planning applications for major proposals (10 or more dwellings or 1000 square metres) which would carry a risk of exposing individuals to unacceptable levels of air pollution must be accompanied by an Air Quality Assessment (AQA).*
>
> *Where the Air Quality Assessment indicates that a development would cause harm to air quality, planning permission will not be granted unless specific measures are proposed and secured to mitigate those impacts.*
>
> *Planning applications for proposals that involve significant demolition, construction or earthworks will also be required to submit a dust assessment as part of the AQA, to assess the potential impacts and health risks of dust emissions from those activities. Any appropriate site-specific dust mitigation measures will be secured as part of the Construction Management Plan (CMP).*
>
> *Further guidance on meeting the requirements of the policy is set out in the Oxford City Council's Air Quality Planning Application Guidance Note and the up to date IAQM guidelines which applicants are expected to follow."*

2.8 Local Air Quality Management in Oxford.

The City of Oxford was declared an AQMA in 2010 for exceedances of the annual mean NO_2 objective. Consequently, an Air Quality Action Plan[13] (AQAP) was published in 2013. The AQAP highlights measures to improve air quality in order to meet the air quality objectives within the Oxford. These measures are:

- Support for development of sustainable transport measures
- Support the uptake of low and zero emission vehicles
- Reducing freight emissions
- Planning for sustainable transport
- Managing the councils transport emissions
- Developing partnerships and public education

Furthermore, in January 2019, OCC and Oxfordshire County Council published updated proposals for a Zero Emission Zone (ZEZ) in Oxford city centre from 2020[14]. This ZEZ aims to expediate the reduction in air pollution to achieve zero transport emissions in Oxford by 2035. The ZEZ will ban all non-zero emission vehicles from

parking and loading on public highways in the inner-city centre during daytime hours. A larger Low Emission Zone (LEZ) will also exist that will require local buses to must meet Euro 6 standards.

2.9 Assessment Guidance.

The primary guidance documents consulted in undertaking this assessment are detailed below.

2.9.1 Defra Local Air Quality Management Technical Guidance

Defra Local Air Quality Management Technical Guidance (LAQM.TG(16))[5] was published for use by local authorities in their LAQM review and assessment work. The document provides key guidance in aspects of air quality assessment, including screening, use of monitoring data, and use of background data that are applicable to all air quality assessments.

2.9.2 EPUK-IAQM 'Air Quality Guidance for Planning'

Environmental Protection UK (EPUK) and the Institute of Air Quality Management (IAQM) have published guidance[15] to help ensure that air quality is properly accounted for in the development control process. It clarifies when an air quality assessment should be undertaken, what it should contain, and how impacts should be described and assessed including guidelines for assessing the significance of impacts.

2.9.3 IAQM 'Construction and Demolition Dust Guidance'

Guidance on the assessment of dust from demolition and construction has been published by the IAQM[16]. The guidance provides a methodology to determine the dust emission magnitude and provides a series of matrices to determine the risk magnitude of potential dust sources associated with construction activities. This allows for the identification of appropriate mitigation measures that are defined within further IAQM guidance.

2.9.4 Oxford City Council Planning Application Guidance for Air Quality

The OCC Air Quality Guidance[17] has been produced to help ensure that the air quality is adequately considered in the preparation of development proposals and planning applications for the city of Oxford. The guidance covers:

- Adoption of best practice good design principles to reduce emissions and the need for further mitigation in more advanced phases of the development
- Principles to be considered during the construction phase
- Principles to be considered during the operational phase
- The type of developments that require an air quality assessment
- The main considerations and structure of an air quality assessment
- How to assess the significance of the outcomes of an air quality assessment
- Mitigation, redesign and offset options

As the Proposed Development will introduce sensitive receptors into the Oxford AQMA, there is a requirement to submit an Air Quality Assessment, in line with the OCC Planning Application Guidance for Air Quality.

3. Assessment Methodology.

3.1 Consultation.

The approach to the assessment, as described in section 1.3, was provided to OCC for review. A response was received by Hoare Lea stating that pre-application advice falls into the charging scheme.

3.2 Existing Air Quality in the Study Area.

A baseline air quality review was undertaken to determine the existing air quality in the vicinity of the Application Site. This desk-top study was undertaken using the following sources:

- Air quality data for OCC, including a review of the OCC air quality reports[18] and local monitoring data;
- The UK Pollutant Release and Transfer Register[19];
- Background pollution maps taken from Defra's Local Air Quality Management (LAQM) website[20];
- Pollution Inventory from the Environment Agency[21]
- The UK Ambient Air Quality Interactive Map[22];
- Ordnance Survey data and aerial photography from Google Maps.

3.3 Construction Phase Impacts.

3.3.1 Construction Dust Assessment

The assessment of construction dust impacts has been undertaken in line with the OCC Planning Application Guidance for Air Quality and the IAQM methodology. Activities on the proposed construction site have been divided into four types to reflect their different potential impacts. These are:

- Demolition
- Earthworks;
- Construction; and
- Trackout

The risk of dust emissions was assessed for each activity with respect to:

- Potential loss of amenity due to dust soiling; and
- The risk of health effects due to a significant increase in exposure to PM_{10}.

The first stage of the assessment involves screening to determine whether there are any sensitive receptors within the threshold distances defined by the IAQM guidance. This includes identification of residential areas, schools and other dust-sensitive land uses A detailed assessment of the impact of dust from construction sites will be required where:

- A 'human receptor' is located within 350 m of the boundary of the Site or within 50 m of the route(s) used by construction vehicles on the public highway, up to 500 m from the Site entrance;
- An 'ecological receptor' is located within 50 m of the boundary of the Site or within 50 m of the route(s) used by construction vehicles on the public highway, up to 500 m from the Site entrance.

The magnitude of dust emission for each activity is determined on the basis of the guidance, indicative thresholds, information available relating to the project and expert judgement. The risk of dust effects arising is based upon the relationship between the dust emission magnitude and the sensitivity of the area. The risk of impact is then used to determine the mitigation requirements.

Descriptors for magnitude of impact and impact significance given in the guidance[16] and used in this assessment of construction phase dust have been reproduced in Appendix 3.

3.3.2 Construction Traffic

3.3.2.1 Construction Traffic Emissions Screening

A screening assessment has been undertaken with reference to the following EPUK and IAQM guidance indicative criteria:

- a change of Light Duty Vehicle (LDV) flows of more than 500 Annual Average Daily Traffic (AADT) (outside an AQMA);
- a change of Heavy Duty Vehicle (HDV) flows of more than 100 AADT (outside an AQMA);
- a change of LDV flows of more than 100 AADT (within an AQMA); and/or
- a change of HDV flows of more than 25 AADT (within an AQMA).

3.3.2.2 NRMM Emissions Screening

Non-Road Mobile Machinery (NRMM) refers to mobile machines, transportable industrial equipment or vehicles which are fitted with an internal combustion engine and not intended for transporting goods or passengers on roads. NRMM emissions have been screened following the guidance in Defra's LAQM.TG(16).

3.4 Operational Phase Impacts.

3.4.1 Road Traffic Impacts

The screening assessment has been undertaken with reference to the following documents:

- OCC Planning Application Guidance for Air Quality[17]
- Defra's LAQM.TG(16)[5]; and
- EPUK and IAQM guidance indicative criteria, i.e.:
  - a change of LDV flows of more than 500 AADT (outside an AQMA);
  - a change of HDV flows of more than 100 AADT (outside an AQMA);
  - a change of LDV flows of more than 100 AADT (within an AQMA); and/or
  - a change of HDV flows of more than 25 AADT (within an AQMA).

Where these criteria are exceeded, a detailed assessment is required, although the guidance advises that "the criteria provided are precautionary and should be treated as indicative", and "it may be appropriate to amend them on the basis of professional judgement".

Where impacts can be screened out there is no need to progress to a more detailed assessment.

3.4.2 Combustion Plant Screening of Impacts

The assessment has been undertaken with reference to the OCC Planning Application Guidance for Air Quality and the EPUK and IAQM Guidance indicative criteria, i.e.:

- All gas-fired boilers to meet a minimum standard of <40mgNO_x/kWh
- All gas-fired CHP plant to meet a minimum emissions standard of:
  - Spark ignition engine of 250mgNO_x/Nm^3 (at reference conditions of 273K, 101.3kPa, 5% O_2 and 0% H_2O)
  - Compression ignition engine of 400mgNO_x/Nm^3 (at reference conditions of 273K, 101.3kPa, 5% O_2 and 0% H_2O)
  - Gas turbine of 50mgNO_x/Nm^3 (at reference conditions of 273K, 101.3kPa, 15% O_2 and 0% H_2O)
- Have one or more substantial combustion processes, where there is a risk of impacts at relevant receptors.

Where the plant is compliant with the above thresholds, there is no need to progress to a more detailed air quality assessment.

This screening approach requires professional judgement, and the experience of the consultants preparing the assessment is set out in Appendix 4.

3.4.3 Site Suitability Assessment

A qualitative 'site suitability' assessment has been undertaken to consider the exposure of future occupants, introduced by the Proposed Development, to poor air quality based on current monitoring data. As the Proposed Development is to include student residential uses, the long-term and short-term NO_2, PM_{10} and $PM_{2.5}$ AQOs apply. The assessment will use nearby OCC monitoring data at the following sites:

- DT40 Queen Street (Roadside)
- DT41 Bonn Square (Roadside)
- DT49 Cornmarket Street (Urban Centre)
- CM1 Oxford Centre (AURN) (Roadside)
- CM2 Oxford High Street (Roadside)

3.5 Assessment of Significance.

3.5.1 Construction Phase Impacts

The IAQM guidance[16] on the assessment of dust from demolition and construction and construction vehicles states that the primary aim of the risk assessment is to identify site specific mitigation that, once implemented, should ensure that there will be no significant effect. Therefore, the assessment has been used to determine an appropriate level of mitigation for the construction phase.

The determination of which mitigation measures are recommended include elements of professional judgement and the professional experience of the consultants preparing this report is set out in Appendix 4.

3.5.2 Operational Phase Impacts

The EPUK and IAQM guidance[15] has been used to assess the potential for significant impacts as a result of vehicle emissions from traffic associated with the Proposed Development. The focus of the guidance is to assess traffic emission impacts and advises on how to describe the air quality impacts and their significance.

3.5.3 Significance of Effect – Site Suitability

To determine the significance of predicted air quality impacts based upon a site suitability assessment, the EPUK and IAQM guidance states:

"Where the air quality is such that an air quality objective at the building façade is not met, the effect on residents or occupants will be judged as significant, unless provision is made to reduce their exposure by some means."

The OCC Planning Application Guidance for Air Quality[17] references the EPUK and IAQM guidance[15] for assessing significance based on the predicted change in pollutant concentrations.

4. Baseline Environment.

This section sets out the available information on air quality in the vicinity of the Application Site.

4.1 Application Site Setting.

The Application Site is located within OCC's area of administration at approximate NGR: X 451273, Y 206234. The Application Site is bound by pedestrianised high streets to the south and east. To the north and west are retail and office buildings with residential dwellings and St Peters College beyond.

The Application Site is currently occupied by the Clarendon Centre, an indoor shopping centre in Oxford.

4.2 Local Air Quality Management Review and Assessment.

As required by the Environment Act (1995), OCC has undertaken Review and Assessment of air quality within their area of administration. This process has indicated that the annual mean concentrations of NO_2 are above the air quality objective (AQO) in the city. As such, one AQMA was declared in 2010, covering the whole city of Oxford[18].

According to the OCC 2019 Annual Status Report (ASR), over a period of 10 years between 2009 and 2019, there has been a 29% reduction in concentrations of NO_2, 21% reduction in PM_{10} concentrations and 18% reduction in $PM_{2.5}$[18]. However, the ASR also states that the rate of improvement has slowed in recent years and, in some areas of the city, has plateaued.

4.3 Local Air Quality Monitoring.

The UK Automatic Urban and Rural Network (AURN) is a countrywide network of air quality monitoring stations operated on behalf of Defra. Monitoring data for AURN sites is available from the UK Air Information Resource website (UK-AIR).

There are two AURN sites in operation in Oxford. The nearest AURN site to the Application Site is the 'Oxford Centre Roadside' (CM1) located approximately 70m south. The second AURN site, Oxford St Ebbes, is an urban background site located approximately 820m south of the Application Site. This monitoring location has not been considered to be representative of air quality at the Application site due to distance and differences in site characteristics. Therefore, this monitoring location has not been considered further.

Additionally, OCC operate one further automatic monitoring station, Oxford High Street (Roadside) (CM2) located approximately 360m to the east of the Application Site, along the A420.

Recent monitoring data from the five year monitoring period for the automatic sites is detailed in Table 2. A visual representation of the locations of the automatic monitoring sites is shown in Figure 2.

Table 2: Automatic Monitoring Locations

Monitoring site and distance (m) from site boundary (approx.)	Objective	2015	2016	2017	2018	2019
NO_2						
CM1, Oxford Centre Roadside (AURN), 70m	Annual mean (µg/m^3)	49	49	40	39	42
	Number of hours with concentrations >200 µg/m^3	2	0	0	1	3

Monitoring site and distance (m) from site boundary (approx.)	Objective	2015	2016	2017	2018	2019
NO_2						
CM2, Oxford High Street, 360m	Annual mean (µg/m3)	44	47	39	38	40
	Number of hours with concentrations >200 µg/m3	0	0	0	0	2
PM_{10}						
CM2, Oxford High Street, 360m	Annual mean (µg/m^3)	21	20	18	18	19
	Number of days with concentrations > 50 µg/m^3	1	4	2	0	7
Notes: Data presented in **bold** represents exceedances of the annual mean NO_2 objective.						

The monitoring results indicate NO_2 concentrations at the CM1 exceeded the annual mean AQO in 2015, 2016 and 2019 but were below the annual mean AQO in 2017 and 2018. NO_2 concentrations at CM2 have been below the annual mean NO_2 AQO for the last three years of available monitoring data. Concentrations recorded at the monitoring locations have been in compliance with the 1-hour mean NO_2 AQO for all five years of available monitoring data.

CM2 monitoring location has shown compliance with the annual mean and 24-hour mean PM_{10} AQO in all years of available monitoring data.

OCC utilises passive diffusion tubes to monitor NO_2 concentrations. A review of the most recent monitoring data available indicated that there are eight passive diffusion tube monitoring locations within 300m of the Application Site boundary. Recent monitoring results are shown in Table 3. The passive diffusion tube locations are illustrated in Figure 2.

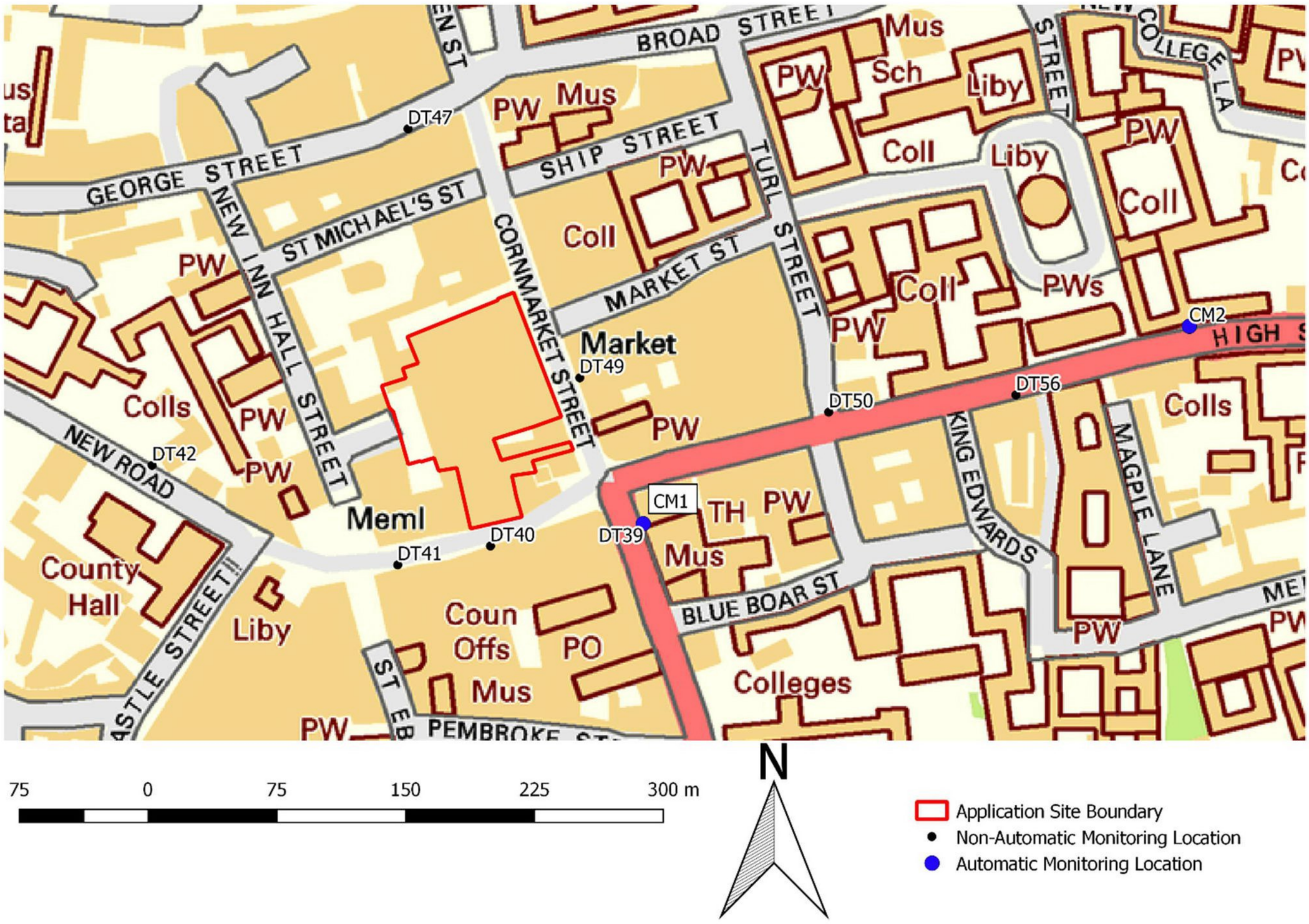

Figure 2 OCC automatic and non-automatic monitoring locations in the vicinity of the Application Site. Contains OS Data © Crown Copyright and Database rights 2021.

Table 3: Passive Diffusion Tube Monitoring Results

Site ID	Site Type	Site Name	Distance (m) from site (approx.)	Annual Mean NO_2 Concentration (µg/m^3)				
				2015	2016	2017	2018	2019
DT39	Roadside	St Aldate's	70	**49**	**49**	39	39	**43**
DT40	Roadside	Queen Street	10	38	36	28	26	28
DT41	Roadside	Bonn Square	50	39	37	25	23	26
DT42	Roadside	New Road	140	**44**	35	24	29	33
DT47	Kerbside	George Street/Magdalen Street	110	**52**	**49**	37	37	40
DT49	Urban Centre	Cornmarket Street	10	31	30	23	24	26
DT50	Roadside	High Street/Turl Street	150	35	36	27	28	32

Site ID	Site Type	Site Name	Distance (m) from site (approx.)	Annual Mean NO_2 Concentration (µg/m^3)				
				2015	2016	2017	2018	2019
DT56	Kerbside	High Street	260	54	53	42	44	50
Notes: Data presented in **bold** represents exceedances of the annual mean NO_2 objective.								

As shown in Table 3, annual mean NO_2 concentrations have been below the annual mean NO_2 AQO in recent years at four of the eight diffusion tube monitoring locations in the vicinity of the Application Site. Where exceedances have occurred, at four passive diffusion tube locations, two (DT47 and DT56) are kerbside locations along main roads where higher NO_2 concentrations are common. The passive diffusion tube locations nearest to the Application Site (DT40 and D49) have complied with the annual mean AQO in the last five years.

4.4 Industrial Pollution.

A desk-based review of potential industrial sources using the UK Pollutant Release and Transfer Register[19] and the Environment Agency's Pollution Inventory[21] did not identify any significant industrial or waste management sources of air pollution that are likely to affect the Proposed Development with regard to air quality.

4.5 Defra Predicted Concentrations.

The background concentrations have been obtained from the national maps published by Defra[20]. These estimated concentrations are produced on a 1 km by 1 km grid basis for the whole of the UK. The Application Site falls into grid square X 451500 Y 206500 and the predicted concentrations for this grid square for NO_x, NO_2, PM_{10} and $PM_{2.5}$ are provided in Table 4 for 2019, the most recent year with available monitoring data, 2020, the current year and for 2023 the earliest anticipated opening year for Phase 1 of the Proposed Development.

Table 4: Defra Predicted Background Concentrations

Year	Predicted Background Concentration (µg/m^3)			
	NO_x	NO_2	PM_{10}	$PM_{2.5}$
2019	26.1	18.2	15.3	10.2
2020	25.0	17.6	14.9	10.0
2023	23.0	16.3	14.4	9.6

As shown in Table 4, background concentrations are well below the relevant air quality objectives for all pollutants in the anticipated opening year of the Proposed Development.

4.6 Summary of Background Data.

The baseline assessment has shown compliance with the annual mean NO_2 AQO at the nearest passive diffusion tube locations to the Application Site. NO_2 concentrations recorded at the nearest automatic monitoring location showed compliance with the 1-hour mean NO_2 AQO in the most recent year of available monitoring data. Concentrations at the nearest automatic monitoring location (CM1) on the A420 have been in exceedance of the annual mean NO_2 AQO in 2019, the most recent year with available monitoring data.

The annual mean and 24-hour mean PM_{10} AQO has not been exceeded at the automatic monitoring location in the last five years.

The Defra predicted background concentrations are below the NO_2, PM_{10} and $PM_{2.5}$ AQO's at the Application Site in the earliest anticipated opening year of the Proposed Development 2023.

5. Construction Phase Assessment.

The potential for air quality impacts during the construction of the Proposed Development are assessed in this section. The proposals are for the redevelopment of the existing Clarendon Centre and associated buildings, which will involve partial demolition of the existing buildings and the construction of new structures across all floors. The Proposed Development comprises of three phases. This assessment assumes all works will take place at once and represents a worst-case assessment. In reality this will not be the case and the potential for air quality impacts during the construction phase of the Proposed Development will be less than those assessed in this report.

5.1 Construction Phase Dust Assessment.

The risk of dust impacts is based on the potential dust emissions magnitude and the sensitivity of the area. These two factors are then combined to determine the risk of dust impacts with no mitigation applied. In the absence of any site-specific information, a higher risk category has been applied to represent a worst-case scenario.

5.1.1 Assessment Screening

There are 'human receptors' within 350 m of the Application Site but no designated habitat sites within 50 m of the Application Site boundary or within 50 m of the route(s) used by construction vehicles on the public highway, up to 500 m from the Application Site entrance.

Therefore, an assessment of construction dust on ecological receptors can be screened out from this assessment but an assessment of construction dust at human receptors is required.

5.1.2 Potential Dust Emission Magnitude

The potential magnitude of dust emissions from demolition, earthworks, construction and trackout have been assessed, as identified in Table 5.

Table 5. Predicted Magnitude of Dust Emissions

Activity	Magnitude	Justification
Demolition	Medium	Total building volume is between 20,000-50,000 m^3 and comprises of potentially dusty material i.e. brick and concrete. Due to the height of the existing Clarendon Centre, demolition activities are likely to occur at a height of 10-12m above ground level. The potential dust emission magnitude is therefore considered to be medium.
Earthworks	Small	As part of the proposals for Phase 3, there will be the formation of a basement. There will be elements of earthworks included in all other phases. Total area likely to be subject to earthworks is less than 2,500 m^2. Loamy soil type. The potential dust emission magnitude is therefore considered to be small.
Construction	Medium	The Proposed Development is for the redevelopment of the existing Clarendon Centre and associated buildings. Total building volume to be constructed is likely to be 25,000-100,000 m^3 of potentially dusty construction material (e.g. concrete, steel). The potential dust emission magnitude is therefore considered to be medium.
Trackout	Small	The Application Site is not expected to require more than 10 HDV movements in any one day. Due to the location of the Application Site, there will be no unpaved roads. However, there is potential for dusty material to be transferred from the Application Site. The potential dust emission magnitude is therefore considered to be small.

5.1.3 Sensitivity of the Study Area

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

- The specific sensitivities of receptors in the area;
- The proximity and number of those receptors;
- In the case of PM_{10}, the local background concentration; and
- Site-specific factors, such as whether there are natural shelters, such as trees or other vegetation, to reduce the risk of wind-blown dust.

The sensitivity of the area and the factors considered are detailed in Table 6. Figure 3 shows the location of the Application Site within the wider context of Oxford and a series of distance bands used to inform the assessment as outlined in the IAQM construction dust guidance[16].

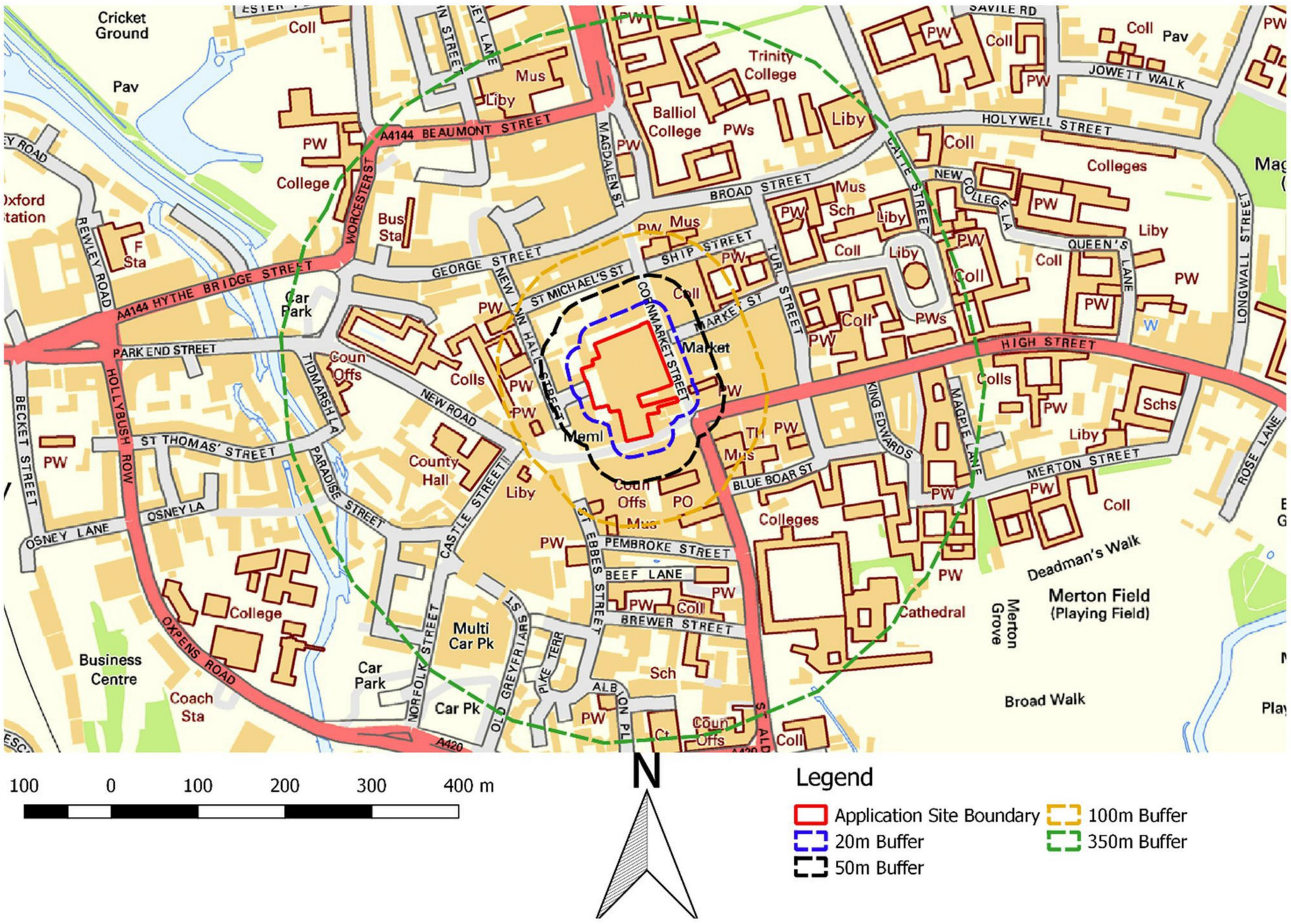

Figure 3 IAQM Demolition and Construction Distance Band Criteria from Application Site Boundary. Contains OS Data © Crown Copyright and Database rights 2021.

Table 6: Sensitivity of the Area

Sensitivity Type	Factors	Sensitivity of Area	
		On – Site Activity	Trackout
Dust Soiling	There are between 10-100 receptors, including residential dwellings, within 50m of the Application that would reasonably expect a high level of amenity.	Medium	Low

Sensitivity Type	Factors	Sensitivity of Area	
		On – Site Activity	Trackout
	Without site-specific mitigation, trackout may occur on roads used by construction traffic up to 50m from small sites, as measured from the site exit, and up to 50 m from the edge of the road. There are between 1 and 10 high sensitivity receptors within 50m of the route to be used by construction traffic.		
Human Health	The Defra predicted background PM_{10} concentrations at the Application Site in 2020, the current year, is 14.9 µg/m^3. PM_{10} concentrations at the nearest automatic monitoring location (CM2) recorded 19 µg/m^3 in 2019. There are between 10-100 high sensitivity receptors within 50m of the Application Site, where people could be exposed for an extended period of time. There are between 1 and 10 high sensitivity receptors including St Peters College, within 50m of the route to be used by construction traffic where people could be exposed to PM_{10} for extended periods of time.	Low	Low

5.1.4 Risk of Dust Impacts

The outcomes of the assessments of potential magnitude of dust emissions and the sensitivity of the area are combined to determine the risk of impact. This risk is then used to inform the selection of appropriate mitigation. Table 7 details the risk of dust impacts for demolition, construction , earthworks and trackout activities.

Table 7: Summary of Potential Unmitigated Dust Risks

Potential Impact	Sensitivity	Demolition	Earthworks	Construction	Trackout
		Magnitude			
		Medium	Small	Medium	Small
Dust Soiling Impacts	Medium	Medium Risk	Low Risk	Medium Risk	Negligible
Human Health Impacts	Low	Low Risk	Negligible Risk	Low Risk	Negligible

5.2 Construction Phase – Vehicular Pollutants.

The Application Site is located within the OCC AQMA and therefore the lower screening criterion (i.e. 100 LDV and 25 HDV) would apply.

Information on traffic movements anticipated during construction works was unavailable for the completion of the Air Quality Assessment. However, the development quantum is not anticipated to result in a significant increase in movements above the EPUK and IAQM criterion. The duration of movements will be short-term in nature and are not considered further within the context of this assessment. Therefore, in accordance with the criterion presented within EPUK and IAQM guidance, additional road vehicle trips during the construction phase of the Proposed Development "can be considered to have insignificant effects" on air quality.

5.3 Construction Phase – Non-Road Mobile Machinery.

Exhaust emissions of NO_x and fine particulate matter (PM_{10} and $PM_{2.5}$) from Non-Road Mobile Machinery (NRMM), associated with construction sites, may have a significant effect on local air quality. Typically, NRMM is

and associated with construction sites and, therefore there is a potential for NRMM emissions to adversely affect local air quality as a result of the Proposed Development.

LAQM.TG(16)[5] guidance states that, with the application of suitable control measures and site management, exhaust emissions from on-site NRMM are "unlikely to make a significant impact on local air quality. In the vast majority of cases they will not need to be quantitatively assessed".

6. Operational Phase Assessment.

6.1 Road Traffic Emissions Screening Assessment.

Initial road traffic data associated with the Proposed Development has been provided by Mott MacDonald, the appointed Transport Consultants for the project. Full details can be found in Chapter 5 and Section 7.3 of the Transport Assessment. There are no car parking spaces associated with the Proposed Development, therefore there are no on-site car movements associated with the Proposed Development. There will be a slight net increase of 4 AADT LDV vehicle trips associated with the Proposed Development when compared to existing uses. These trips are associated with staff, students and servicing and deliveries to the Proposed Development.

The change in traffic associated with the Proposed Development is below the indicative criteria in the EPUK and IAQM guidance of a change of more than 100 AADT LDV and 25 AADT HDV. As such, no further assessment is required. This is also in line with the requirements in the OCC Planning Guidance for Air Quality[17].

In accordance with the EPUK and IAQM guidance, the impacts on air quality from operational phase traffic generation are considered to be not significant.

6.2 Combustion Plant Screening Assessment.

It has been confirmed by Hoare Lea, the projects engineers, that the Proposed Development will meet its energy demand for space and water heating from an all-electric approach with no combustion systems. Consequently, there will be no on-site combustion emissions and a detailed assessment has been screened out, in line with the criteria set out in the and the EPUK and IAQM guidance[15] and the OCC Planning Guidance for Air Quality[17].

6.3 Laboratory Fume Cupboard Emissions

As part of phase 1 of the Proposed Development there will be fully fitted out laboratory spaces which will include fume cupboards for processes being undertaken within the laboratories. Recirculating fume hoods will be included which will serve the fume cupboards. Therefore, no emissions will be discharged to the atmosphere. As such, the impact of emissions from the laboratory fume cupboards has not been considered further.

6.4 Site Suitability.

This section presents a review of OCC monitoring data in the vicinity of the Application Site, for the purpose of identifying the suitability of the Application Site for student residential, retail and office use and identify any requirements for potential mitigation to be embedded into the Proposed Developments design.

As presented in section 2, in line with LAQM.TG(16), the annual and 1-hour mean for NO_2, the annual and 24-hour mean for PM_{10} and the annual mean for $PM_{2.5}$ AQOs apply to the Proposed Development due to its proposed use which includes student residential rooms, office use and retail. As such, this section considers the predicted annual mean, 24-hour mean, and the 1-hour mean pollutant concentrations at the Application Site.

6.4.1 NO_2 Concentrations

A review of the annual mean NO_2 concentrations monitored within 1 km of the Application Site has been completed as part of the baseline review with recent monitoring results, presented in Table 3.

There are three nearby diffusion tube locations within 50m of the Application Site boundary (DT40, DT41 and DT49). All three of these diffusion tubes are located on pedestrianised streets in the immediate vicinity of the Application Site (Cornmarket Street and Queen Street). An annual mean NO_2 concentrations at the three diffusion

tube locations ranged between 26 µg/m^3 and 28 µg/m^3 in 2019. The Application Site is set back further from the roads that these diffusion tubes are located on and therefore the annual mean concentrations are likely to be lower.

An annual mean concentration of 60 µg/m^3 or above is often used to indicate a possible exceedance of the hourly mean NO_2 objective. Monitored concentrations at CM1 recorded a maximum concentration of 49 µg/m^3 in 2015 and 2016. A maximum monitored concentration at DT40, the nearest diffusion tube location, was 28 µg/m^3 in 2019. Concentrations at these monitoring locations have not exceeded 60 µg/m^3 during the five-year monitoring period, indicating likely compliance with the 1-hour mean NO_2 AQO at the Application Site.

As presented in Table 4, the Defra predicted background concentrations are below the annual mean NO_2 AQO in the earliest anticipated opening year of the Proposed Development.

Therefore, NO_2 concentrations in the locale of the Proposed Development are considered to be below the annual mean and 1 hour mean AQOs and the Application Site is considered suitable for the proposed uses.

6.4.2 PM_{10} Concentrations

Concentrations recorded at CM2 automatic monitoring station located approximately 360m east of the Application Site along the A420 have been in compliance with both the annual mean and 24-hour mean PM_{10} objectives for all five years of available monitoring data. Furthermore, the predicted Defra background concentrations, as provided in Table 4, are below the relevant AQOs. Therefore, the Application Site is considered suitable for the proposed uses without the inclusion of mitigation measures against PM_{10} concentrations.

6.4.3 $PM_{2.5}$ Concentrations

Defra predicted $PM_{2.5}$ concentrations provided in Table 4 are below the annual mean $PM_{2.5}$ AQO. OCC do not currently monitor $PM_{2.5}$ concentrations in the centre of Oxford. The Application Site is considered suitable for the proposed uses without the inclusion of mitigation measures against $PM_{2.5}$ concentrations.

6.4.4 Significance of Air Quality Impacts

To determine the significance of predicted air quality impacts based upon a site-suitability assessment, such as that undertaken as part of this assessment, the EPUK and IAQM guidance states:

> "Where the air quality is such that an air quality objective at the building façade is not met, the effect on residents or occupants will be judged as significant, unless provision is made to reduce their exposure by some means."

With regards to the Proposed Development, the unmitigated impact significance associated with the Proposed Development has been predicted in accordance with the stated assessment methodology. The following factors have been considered when providing justification:

- The Proposed Development will not introduce any new receptor into an area of exceedance of the annual or 1-hour mean NO_2 AQO based upon a review of NO_2 monitoring data within the development locale;
- The Proposed Development will not introduce any new receptor into an area of exceedance of the annual mean PM_{10} AQO based upon a review of PM_{10} monitoring data within the development locale; and
- The Proposed Development will not introduce any new receptor into an area of exceedance of the annual mean $PM_{2.5}$ AQO based on a review of the $PM_{2.5}$ predicted background concentrations at the Application Site.

As no exceedances of the considered air quality objectives are predicted, mitigation measures are not required for the operational phase of the Proposed Development. As such, the overall effect is considered to be 'not significant'.

7. Mitigation.

7.1 Construction Phase.

To mitigate the potential impacts during the construction phase it is recommended that mitigation measures as detailed in the IAQM guidance are implemented. These mitigation measures have been carefully selected for the Proposed Development and are based upon the dust risk categories outlined in Section 5.1.4.

Table 8 below details the mitigation measures that should be included for the construction phase of the Proposed Development. For general mitigation measures, which excludes those specifically targeted towards demolition and construction (which are given towards the end of the table), 'medium risk' measures have been applied as these represent the highest risk category determined in Table 7. For trackout, the dust risk is 'negligible' and therefore no mitigation measures specific to this activity are required. This approach is consistent with the OCC and IAQM guidance.

Table 8: Mitigation Measures

Issue	Mitigation Measure
Communications	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
Dust Management Plan	Develop and implement a Dust Management Plan (DMP), which may include measures to control emissions, approved by the Local Authority. The DMP may include monitoring of dust deposition, dust flux, real-time PM_{10} continuous monitoring and/or visual inspections.
Site Management	Record all dust and air quality complaints, identify cause(s), take appropriate measures to reduce emissions in a timely manner, and record the measures taken
	Make the complaints log available to the Local Authority when asked
	Record any exceptional incidents that cause dust and/or air emissions, either on- or off- site, and the action taken to resolve the situation in the logbook
Monitoring	Undertake daily on-site and off-site inspection, where receptors (including roads) are nearby, to monitor dust, record inspection results, and make the log available to the Local Authority when asked. This should include regular dust soiling check of surfaces such as street furniture, cars, windowsills within 100 m of the site boundary, with cleaning to be provided if necessary
	Carry out regular site inspections to monitor compliance with the DMP, record inspection results, and make an inspection log available to the Local Authority when asked
	Increase the frequency of site inspections by the person accountable for air quality and dust issues on site when activities with a high potential to produce dust are being carried out and during prolonged dry or windy conditions
	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.
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 the site boundary

Issue	Mitigation Measure
	Fully enclose site or specific operations where there is a high potential for dust production and the site is active for an extensive period
	Avoid site runoff of water or mud
	Keep site fencing, barriers and scaffolding clean using wet methods
	Remove materials that have a potential to produce dust from site as soon as possible, unless being re-used on site. If they are being re-used cover as described below
	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
	Implement a Travel Plan that supports and encourages sustainable travel (public transport, cycling, walking and car-sharing)
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
	Minimize 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	Soft strip inside buildings before demolition (retaining walls and windows in the rest of the building where possible, to provide a screen against dust).
	Ensure effective water suppression is used during demolition operations.
	Bag and remove any biological debris before demolition
Construction	Ensure sand and other aggregates are stored in bunded 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
	Ensure bulk cement and other fine powder materials are delivered in enclosed tankers and stored in silos with suitable emission control systems to prevent escape of material and overfilling during delivery

Issue	Mitigation Measure
	For smaller supplies of fine powder material ensure bags are sealed after use and stored appropriately to prevent dust
	Avoid scabbling if possible

Potential dust effects during the construction phase are considered to be both temporary and short-term in nature. The impacts are determined to be 'temporary' as they will only potentially occur throughout the construction phase and 'short term' because these will only arise at particular times when certain activities and meteorological conditions combine to create the predicted level. Notwithstanding this, with the application of the above dust control and mitigation measures, it is considered that residual effect at all receptors will be 'not significant' in accordance with the IAQM guidance.

7.1.1 Construction Phase Road Traffic Emissions

The need for further assessment of the potential air quality impacts associated with construction phase road traffic emissions, principally HDV movements, have been screened out as they are considered to have an insignificant effect on air quality and mitigation measures are not required.

7.1.2 Construction Phase NRMM Emissions

In accordance with Part 4 of the IAQM guidance, all NRMM would need to adhere to the emissions standards for NO_2 and PM_{10} set out for NRMM. It is therefore considered the likely effects of construction plant on local air quality would be insignificant.

7.2 Operational Phase.

7.2.1 Road Traffic Emissions

Potential air quality impacts associated with operational phase development trips have been screened out from further assessment as 'the impacts [on air quality from operational phase movements] can be considered to have insignificant effects' in accordance with the OCC and EPUK and IAQM guidance. Therefore, no mitigation measures are required.

7.2.2 Combustion Plant Emissions

Potential air quality impacts associated with the Proposed Developments energy plant have been screened from further assessment as the proposed energy plant is for an all-electric approach with no combustion systems. Therefore, no mitigation measures are required.

7.2.3 Baseline Site Suitability Review

A review of OCC monitoring data in consideration of the Application Site, and mapped concentrations by Defra in the locale of the Application Site, indicates no likely exceedance of the annual and 1-hour mean NO_2, the annual and 24-hour mean PM_{10} or the annual mean $PM_{2.5}$ AQOs.

As no exceedances of any considered AQO is predicted, this follows the 1st hierarchy principle of the IAQM guidance to 'prevent and avoid' exposure[23]. Therefore, no embedded mitigation into the Proposed Development design (in the form of mechanical ventilation, for example) is required.

8. Summary and Conclusions.

This report details the potential air quality impacts associated with the construction and operation of a proposed mixed-use development at the Clarendon Centre, Oxford.

The findings of the assessment are as follows:

- A qualitative assessment of the potential dust impacts during the construction of the Proposed Development has been undertaken. Through good practice and implementation of appropriate mitigation measures, it is expected that the release of dust would be effectively controlled and mitigated, with resulting impacts considered to be 'not significant'. All dust impacts are considered to be temporary and short-term in nature;
- The results of the operational phase traffic screening assessment indicate that the traffic generated by the Proposed Development will result in a slight increase in trips when compared to the existing use. The change is below the indicative criteria in the EPUK and IAQM guidance and no further assessment is required. The impacts on air quality from operational phase traffic generation are therefore considered to be not significant;
- The Proposed Development will meet its energy demand for space and water heating from an all-electric approach with no combustion systems. Consequently, there will be no impacts from the Proposed Developments energy plant and no further assessment is required.
- As part of the proposals for phase 1, there will be fully fitted out laboratory spaces which will include fume cupboards. Recirculating fume hoods will serve these fume cupboards and no emissions will discharge to the atmosphere. As such, the impact of emissions from the laboratory fume cupboards has not been considered further.
- A baseline site suitability review has been undertaken to assess the suitability of the Application Site for the proposed laboratory, student residential, retail and office use. NO_2, PM_{10} and $PM_{2.5}$ concentrations at the Application Site are not expected to exceed the relevant AQO's. Therefore, the Application Site is considered suitable for the Proposed Development and mitigation measures are not required.
- There are no impacts relating to air quality from the Proposed Development and therefore it is considered to be compliant with the OCC Planning Application Guidance for Air Quality[17].

Based on the information above, which considers the most recent information available, it is considered that air quality should not be viewed as a constraint to planning and the Proposed Development conforms to the principles of National Planning Policy Framework and the Oxford Local Plan.

9. Glossary of Terms.

AADT	Annual Average Daily Traffic
AQMA	Air Quality Management Area
AQO	Air Quality Objective
Defra	Department for Environment, Food and Rural Affairs
DMP	Dust Management Plan
EPUK	Environmental Protection UK
HDV	Heavy Duty Vehicles (> 3.5 tonnes gross vehicle weight)
HGV	Heavy Goods Vehicle
IAQM	Institute of Air Quality Management
LAQM	Local Air Quality Management
LDV	Light Duty Vehicles (≤3.5 tonnes gross vehicle weight)
µg/m^3	Micrograms per cubic metre
NO_2	Nitrogen dioxide
NO_x	Nitrogen oxides (taken to be NO_2 + NO)
NPPF	National Planning Policy Framework
NRMM	Non-Road Mobile Machinery
Objectives	A nationally defined set of health-based concentrations for nine pollutants, seven of which are incorporated in Regulations, setting out the extent to which the standards should be achieved by a defined date. There are also vegetation-based objectives for sulphur dioxide and nitrogen oxides
OCC	Oxford City Council
PM_{10}	Particulate matter with an aerodynamic diameter less than 10 micrometres
$PM_{2.5}$	Particulate matter with an aerodynamic diameter less than 2.5 micrometres
PPG	Planning Practice Guidance
SPG	Supplementary Planning Guidance
Standards	A nationally defined set of concentrations for nine pollutants below which health effects do not occur or are minimal
Trackout	The process involving the transport of dust and dirt from the construction / demolition site onto the public road network, where it may be deposited and then re-suspended by vehicles using the network. This arises when heavy duty vehicles (HDVs) leave the construction / demolition site with dusty materials, which may then spill onto the road, and/or when HDVs transfer dust and dirt onto the road having travelled over muddy ground on site

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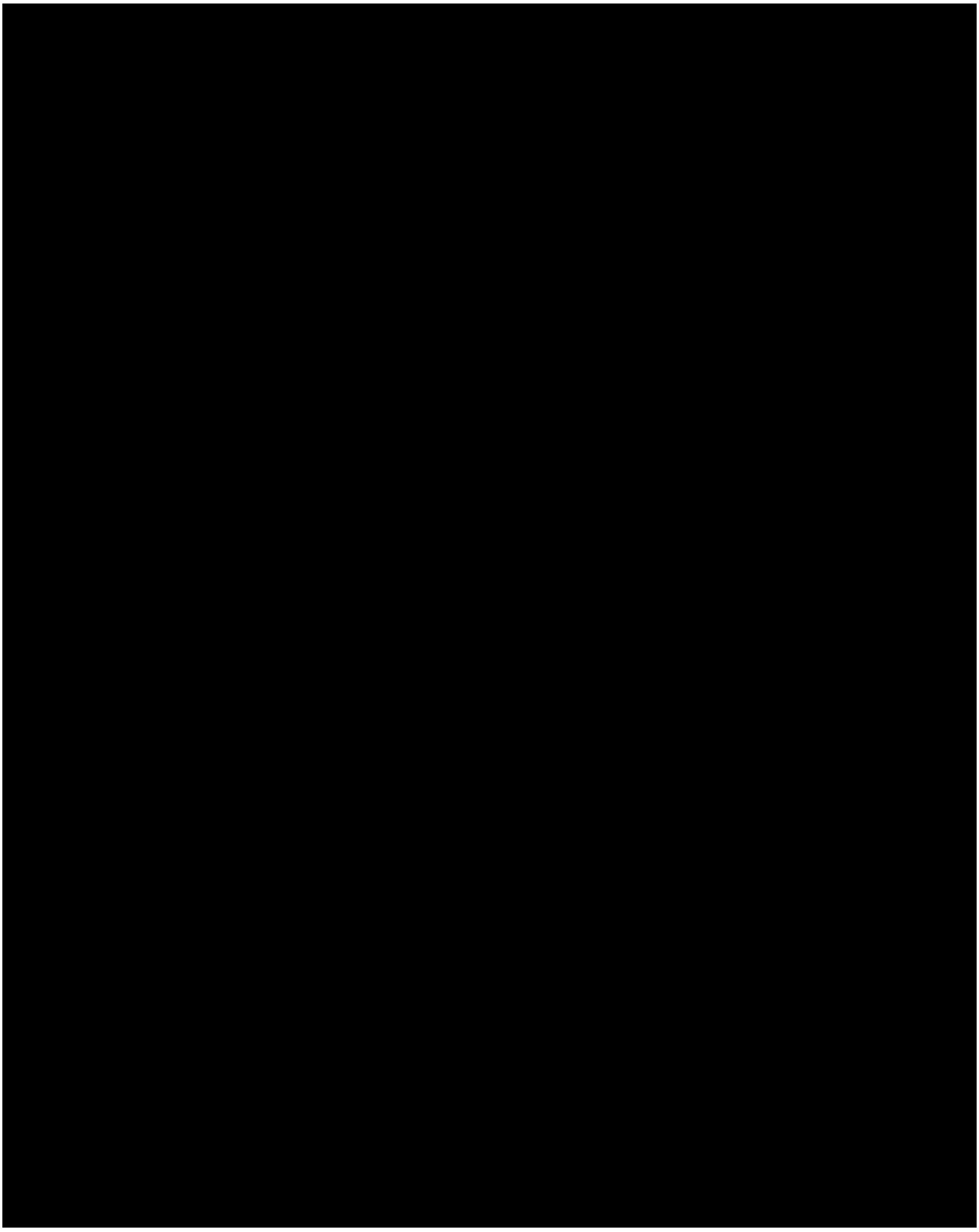
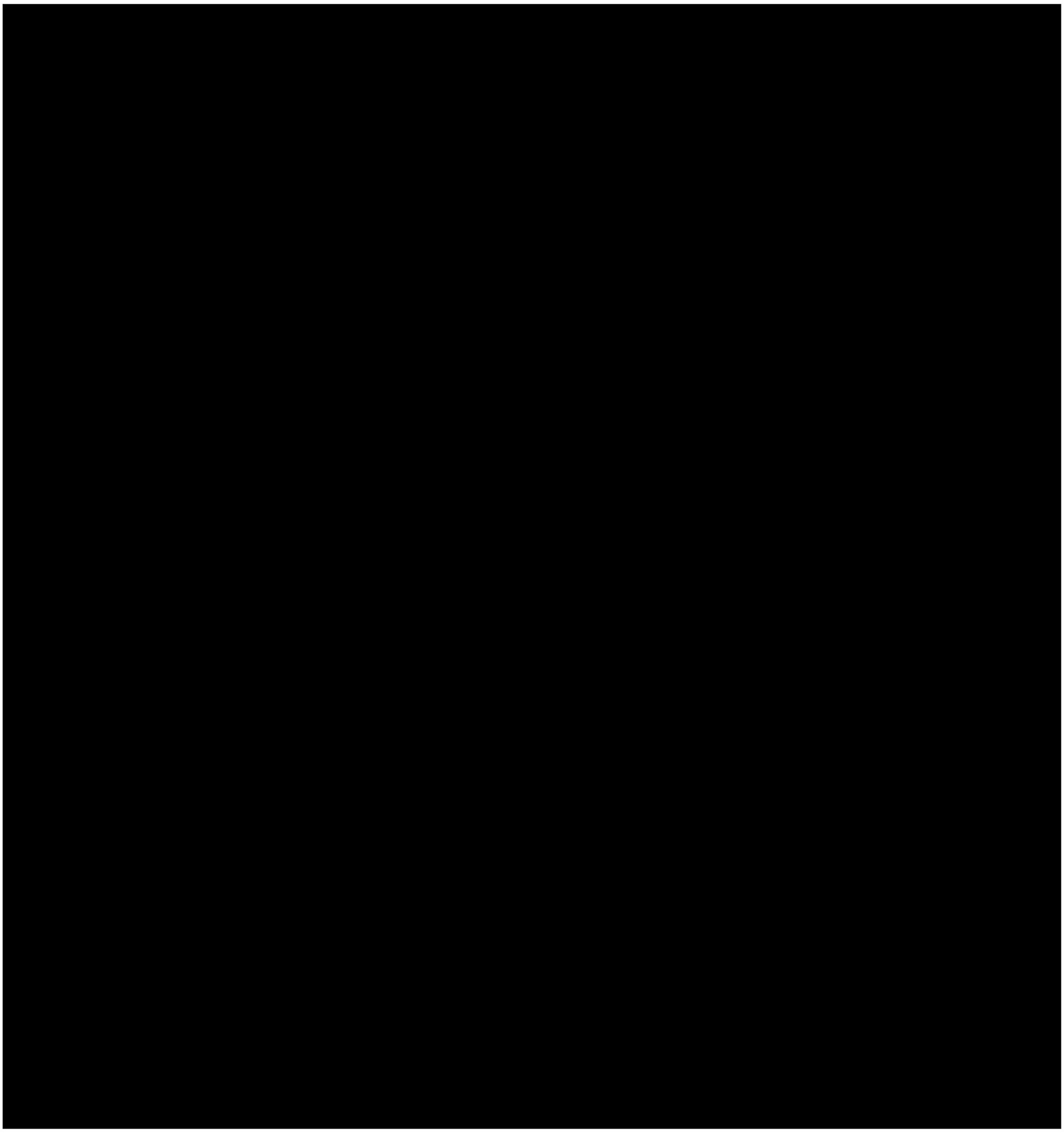
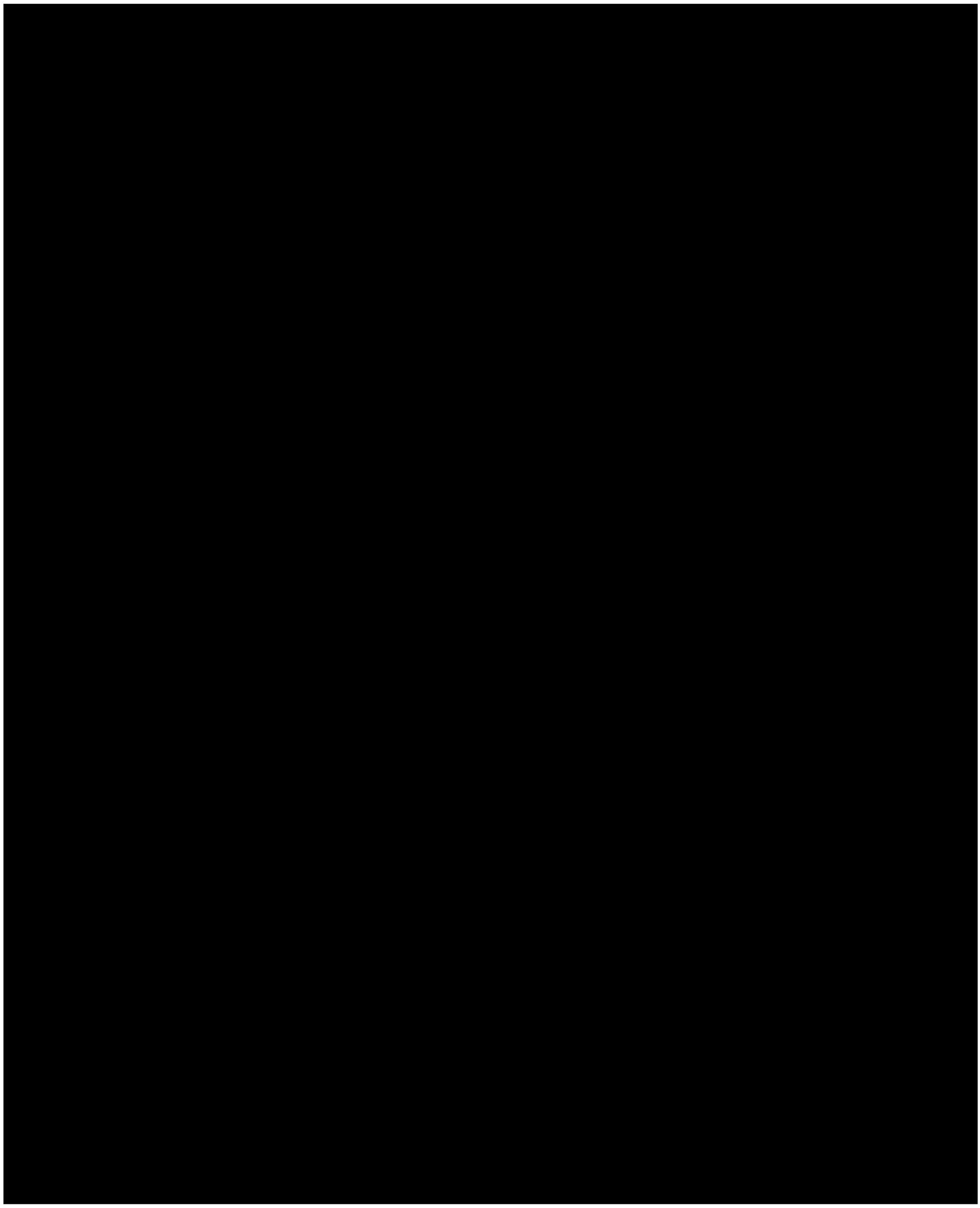
Appendix 1 – Proposed Development Plans.

Figure 4 Proposed Development Plans. Clarendon Centre Regeneration. Ground Floor. September 2020.







Appendix 3 – IAQM Construction Phase Methodology.

The following tables have been taken from the IAQM guidance document 'Guidance on the Assessment of Dust from Demolition and Construction'[16] and have been utilised to determine the sensitivity of the area and consider the risk of fugitive emissions as a result of construction activities.

A2-1 and A2-2 illustrate how the sensitivity of the area may be determined for dust soiling and human health, respectively. It should be noted that the highest level of sensitivity from each table should be considered, as recommended by the IAQM.

Table A2-1 Sensitivity of the Area to Dust Soiling Effects on People and Property

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

Table A2-2 Sensitivity of the Area to Human Health Effects

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

		1 – 10	Low	Low	Low	Low	Low
Medium	>32µg/m^3	>10	High	Medium	Low	Low	Low
		1 – 10	Medium	Low	Low	Low	Low
	28 – 32µg/m^3	>10	Medium	Low	Low	Low	Low
		1 – 10	Low	Low	Low	Low	Low
	24 – 28µg/m^3	>10	Low	Low	Low	Low	Low
		1 – 10	Low	Low	Low	Low	Low
	<24µg/m^3	>10	Low	Low	Low	Low	Low
		1 – 10	Low	Low	Low	Low	Low
Low	-	1	Low	Low	Low	Low	Low

Table A2-3 and Table A2-4 illustrate how the dust emission magnitude should be combined with the sensitivity of the area to determine the risk of impacts with no mitigation measures applied.

Table A2-3 Risk of Dust Impacts – Construction

Sensitivity of Area	Dust Emission Magnitude		
	Large	Medium	Small
High	High Risk	Medium Risk	Low Risk
Medium	Medium Risk	Medium Risk	Low Risk
Low	Low Risk	Low Risk	Negligible

Table A2-4 Risk of Dust Impacts – Trackout

Sensitivity of Area	Dust Emission Magnitude		
	Large	Medium	Small
High	High	High Risk	Low Risk
Medium	Medium	Low Risk	Negligible
Low	Low	Low Risk	Negligible

Appendix 4 - Professional Experience.

Kathryn Woolley (Hoare Lea), BSc (Hons), AMIEnvSc, MIAQM

Kathryn is a Principal Air Quality Consultant with Hoare Lea. She's is an associate Member of the Institution of Environmental Sciences and a Full Member of the Institute of Air Quality Management.

She has a diverse portfolio of experience and has worked on a range of projects from initial site feasibility, through planning and development to construction and operation. Kathryn's expertise covers planning, and air quality, specifically in relation to residential developments, industrial fixed installations such as district heating networks. Kathryn has completed over 30 EIA in the past 6 years throughout the UK and abroad including; St Johns Masterplan in Manchester (residential led), Leicester City Football club training facility north of Leister (sports use), 1-5 Grosvenor Place, Westminster (mixed use residential, retail and hotel site), and Chestnut Avenue in Eastleigh (residential and community use).

Charlotte Smith (Hoare Lea), BSc (Hons), AMIEnvSc, AMIAQM

Charlotte is a Senior Air Quality Consultant at Hoare Lea with over five years' experience in air quality consultancy. She has worked on a range of projects across a number of industries including residential, educational, commercial and industrial for site feasibility studies, planning applications and Environmental Impact Assessments. She also has experience in air quality monitoring at sites ranging from residential and educational schemes to large road network schemes. Charlotte's interests lie in the effects that pollution has on human health and wellbeing.

Benny Pygott (Hoare Lea), BSc (Hons), MSc (Hons), AMIEnvSc, AMIAQM

Benny is a Graduate Air Quality Consultant with Hoare Lea. He is a Physical Geography Graduate with an MSc in Pollution and Environmental Control from the University of Manchester. Benny has worked on a range of projects across a number of industries including residential, educational, commercial and industrial developments from initial site suitability, master planning and operational phase impacts of new developments. Benny has experience in atmospheric dispersion modelling including plant emission impacts and road traffic impacts. Benny has also undertaken a number of air quality monitoring surveys.

Benny has also worked as part of an EIA team looking at air quality impacts of HDV movements during the construction phases. His interests lie in pollution mitigation, air pollution control and sustainable travel.

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