Report

Land East of Oxhey Lane, Carpenders Park

Air Quality Assessment

For Burlington Developments Ltd

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Executive Summary

The air quality impacts associated with the proposed mixed-use development of land east of Oxhey Lane in Carpenders Park have been assessed. The development will consist of up to 260 homes and a care home together with associated parking, open space, landscaping and vehicular access.

During the construction works, a range of best practice mitigation measures will be implemented to reduce dust emissions, and the overall effect will be 'not significant'; appropriate measures have been set out in this report, to be included in the Construction Environment Management Plan for the works.

The assessment has demonstrated that future residents of the proposed development will experience acceptable air quality, with pollutant concentrations below the air quality objectives (and future targets for $PM_{2.5}$).

The proposed development will generate additional traffic on the local road network, but the assessment has shown that there will be no significant effects at any existing, sensitive receptor.

Overall, the construction and operational air quality effects of the proposed development are judged to be 'not significant'.

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1 Introduction

1.1 This report describes the potential air quality impacts associated with the proposed mixed-use development of land east of Oxhey Lane, Carpenders Park. The proposed development is described as:

"Mixed-use development of up to 260 homes, a care home together with associated parking, open space, landscaping and vehicular access".

1.2 The proposed development will generate additional traffic on local roads, which may impact on air quality at existing residential properties along the affected road network, thus an assessment is required. The assessment is also required determine the air quality conditions that future residents will experience. The main air pollutants of concern related to road traffic emissions are nitrogen dioxide (NO_2) and fine particulate matter (PM_{10} and $PM_{2.5}$).

1.3 The location and setting of the proposed development are shown in Figure 1-1.

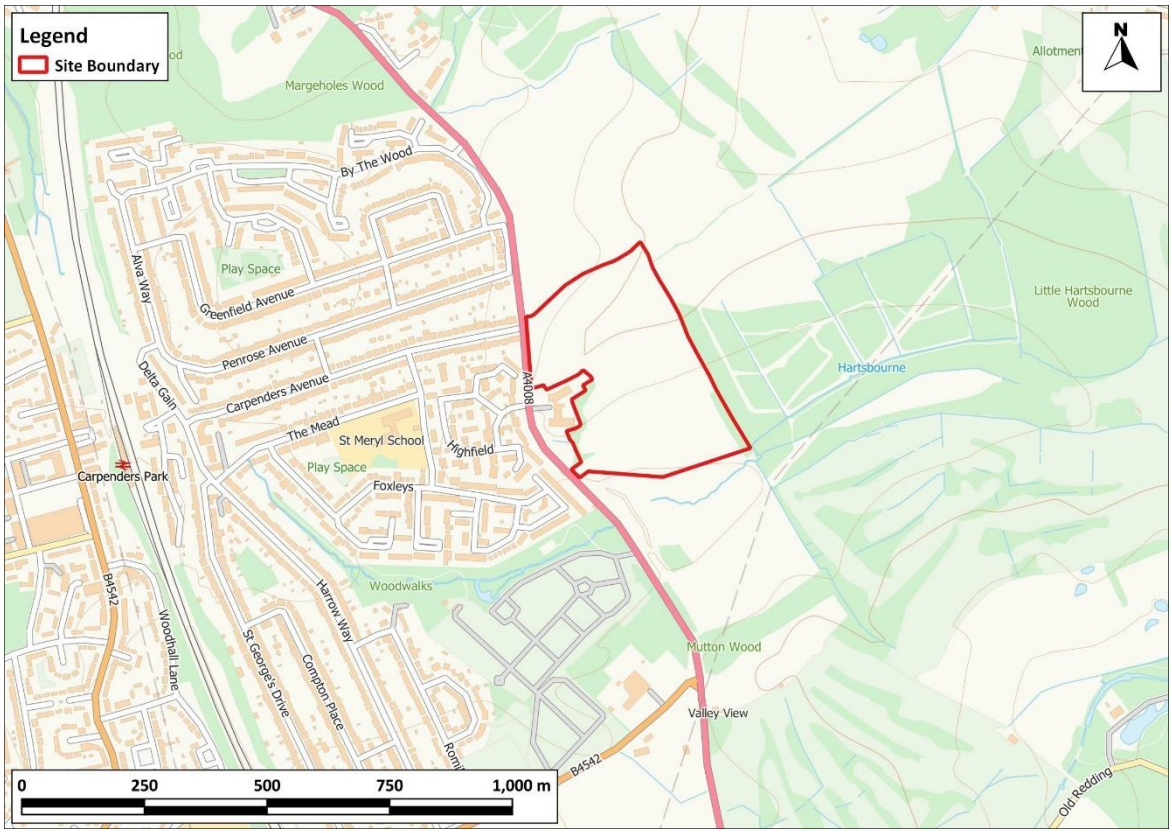

Figure 1-1: Proposed Development Setting

Additional data sourced from third parties, including public sector information licensed under the Open Government Licence v3.0.

1.4 The new homes within the proposed development will be provided with heat and hot water via heat pumps; there will be no centralised combustion plant and thus no significant point sources of emissions within the proposed development.

1.5 There is also the potential for the construction activities to impact upon existing properties. The main pollutants of concern related to construction activities are dust and PM_{10}.

1.6 This report describes existing local air quality conditions (base year 2023), and considers air quality in 2030, which is the anticipated year of first occupation of any of the new homes. The assessment of construction dust impacts focuses on the anticipated duration of the works.

1.7 This report has been prepared taking into account all relevant local and national guidance and regulations.

2 Policy Context

2.1 All European legislation referred to in this report is written into UK law and remains in place.

Air Quality Strategy 2007

2.2 The Air Quality Strategy (Defra, 2007) published by the Department for Environment, Food, and Rural Affairs (Defra) and Devolved Administrations, provides the policy framework for air quality management and assessment in the UK. It provides air quality standards and objectives for key air pollutants, which are designed to protect human health and the environment. It also sets out how the different sectors: industry, transport and local government, can contribute to achieving the air quality objectives. Local authorities are seen to play a particularly important role. The strategy describes the Local Air Quality Management (LAQM) regime that has been established, whereby every authority has to carry out regular reviews and assessments of air quality in its area to identify whether the objectives have been, or will be, achieved at relevant locations, by the applicable date. If this is not the case, the authority must declare an Air Quality Management Area (AQMA), and prepare an action plan which identifies appropriate measures that will be introduced in pursuit of the objectives.

Air Quality Strategy 2023

2.3 The Air Quality Strategy: Framework for Local Authority Delivery 2023 (Defra, 2023a) sets out the strategic air quality framework for local authorities and other Air Quality Partners in England. It sets out their powers and responsibilities, and actions the government expects them to take. It does not replace other air quality guidance documents relevant to local authorities.

Clean Air Strategy 2019

2.4 The Clean Air Strategy (Defra, 2019) sets out a wide range of actions by which the UK Government will seek to reduce pollutant emissions and improve air quality. Actions are targeted at four main sources of emissions: Transport, Domestic, Farming and Industry. At this stage, there is no straightforward way to take account of the expected future benefits to air quality within this assessment.

Reducing Emissions from Road Transport: Road to Zero Strategy

2.5 The Office for Low Emission Vehicles (OLEV) and Department for Transport (DfT) published a Policy Paper (DfT, 2018) in July 2018 outlining how the government will support the transition to zero tailpipe emission road transport and reduce tailpipe emissions from conventional vehicles during the transition. This paper affirms the Government's pledge to end the sale of new conventional petrol and diesel cars and vans by 2040. It states that the Government expects the majority of new cars and vans sold to be 100% zero tailpipe emission and all new cars and vans to have significant zero tailpipe emission capability by this year, and that by 2050 almost every car and van should have zero tailpipe emissions. It also states that the Government wants to see at least 50%, and as many as 70%, of new car sales, and up to 40% of new van sales, being ultra-low emission by 2030.

2.6 The paper sets out a number of measures by which Government will support this transition, but is clear that Government expects this transition to be industry and consumer led. The Government's 'Zero Emission Vehicle' (ZEV) mandate requires that 80% of new cars and 70% of new vans sold in Great Britain must be zero exhaust emission by 2030, increasing to 100% by 2035. If these ambitions are realised then road traffic-related NOx emissions can be expected to reduce significantly over the

coming decades, likely beyond the scale of reductions forecast in the tools utilised in carrying out this air quality assessment.

Environment Act 2021

2.7 The UK's new legal framework for protection of the natural environment, the Environment Act (2021) passed into UK law in November 2021. The Act gives the Government the power to set long-term, legally binding environmental targets. It also establishes an Office for Environmental Protection (OEP), responsible for holding the Government to account and ensuring compliance with these targets.

2.8 The Environmental Targets (Fine Particulate Matter) (England) Regulations 2023 (SI 2023 No. 96) sets two new targets for future concentrations of $PM_{2.5}$. These targets are described in Paragraph 3.4.

Environmental Improvement Plan 2023

2.9 Defra published its 25 Year Environment Plan in 2018 (Defra, 2018a). The Environment Act (2021) requires Defra to review this Plan at least every five years. The Environmental Improvement Plan 2023 (Defra, 2023b) is the first revision. This outlines the progress made since 2018 and adds detail to the goals defined in the 2018 Plan, including that of achieving clean air.

2.10 The Environmental Improvement Plan 2023 sets out the new air quality targets which have been set for concentrations of $PM_{2.5}$. These targets, which are described in more detail in Paragraph 3.4, include the long-term targets in the Statutory Instrument described in Paragraph 2.8, and interim targets to be achieved by 2028.

2.11 The 2023 Plan outlines the role of local authorities in helping it meet both its targets and existing commitments. It also outlines the respective roles of industry, agricultural sectors, and the DfT in providing the coordinated action required to meet both its new, and pre-existing targets and commitments.

Planning Policy

National Policies

2.12 The National Planning Policy Framework (NPPF) (2024) sets out planning policy for England. It states that the purpose of the planning system is to contribute to the achievement of sustainable development, and that the planning system has three overarching objectives, one of which (Paragraph 8c) is an environmental objective:

"to protect and enhance our natural, built and historic environment; including making effective use of land, improving biodiversity, using natural resources prudently, minimising waste and pollution, and mitigating and adapting to climate change, including moving to a low carbon economy".

2.13 To prevent unacceptable risks from air pollution, Paragraph 187 of the NPPF states that:

"Planning policies and decisions should contribute to and enhance the natural and local environment by… preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by unacceptable levels of soil, air, water or noise pollution or land instability. Development should, wherever possible, help to improve local environmental conditions such as air and water quality, taking into account relevant information such as river basin management plans".

2.14 Paragraph 198 states:

"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".

2.15 More specifically on air quality, Paragraph 199 makes clear that:

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

2.16 The NPPF is supported by Planning Practice Guidance (PPG) (Ministry of Housing, Communities & Local Government, 2019), which includes guiding principles on how planning can take account of the impacts of new development on air quality. The PPG states that:

"Defra carries out an annual national assessment of air quality using modelling and monitoring to determine compliance with Limit Values. It is important that the potential impact of new development on air quality is taken into account 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".

2.17 Regarding plan-making, the PPG states:

"It is important to take into account air quality management areas, Clean Air Zones and other areas including sensitive habitats or designated sites of importance for biodiversity where there could be specific requirements or limitations on new development because of air quality".

2.18 The role of the local authorities through the LAQM regime is covered, with the PPG stating that a local authority Air Quality Action Plan "*identifies measures that will be introduced in pursuit of the objectives and can have implications for planning*". In addition, the PPG makes clear that "*Odour and dust can also be a planning concern, for example, because of the effect on local amenity*".

2.19 Regarding the need for an air quality assessment, the PPG states that:

"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 conservation of habitats and species). Air quality may also be a material consideration if the proposed development would be particularly sensitive to poor air quality in its vicinity".

2.20 The PPG sets out the information that may be required in an air quality assessment, making clear that:

"Assessments need to be proportionate 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".

2.21 The PPG also provides guidance on options for mitigating air quality impacts, as well as examples of the types of measures to be considered. It makes clear that:

"Mitigation options will need to be locationally specific, will depend on the proposed development and need to be proportionate to the likely impact. It is important that local planning authorities work with applicants to consider appropriate mitigation so as to ensure new development is appropriate for its location and unacceptable risks are prevented".

Local Transport Plan

2.22 Hertfordshire County Council's Local Transport Plan 4 (LPT4) (Hertfordshire County Council, 2018) includes two policies particularly relevant to air quality:

Policy 19: Emissions reduction

"The county council will reduce levels of harmful emissions by:

a) Promoting a change in people's travel behaviour to encourage a modal shift in journeys from cars to walking, cycling and passenger transport.

b) Addressing any barriers to and supporting the uptake of [Ultra Low Emission Vehicles] *in the county, particularly where this can positively affect areas with identified poor air quality…".*

Policy 20: Air Quality

"The county council will seek to reduce the impact of poor Air Quality on human health, by:

a) Investigating the use of Clean Air Zones.

b) Working with district/borough councils to monitor and assess air pollution levels, and working in partnership with them to deliver any declared AQMA joint action plans.

c) Implementing, monitoring and reviewing the county council's Air Quality Strategic Plan."

Local Policies

2.23 The Three Rivers Core Strategy (Three Rivers District Council, 2011) makes reference to air quality in Core Policy CP1, 'Overarching Policy on Sustainable Development' which states:

"All development in Three Rivers will contribute to the sustainability of the District. This means taking into account the need to…

…o) Manage and reduce risk of and from pollution in relation to quality of land, air and water and dealing with land contamination."

2.24 Policy DM9, 'Contamination and Pollution Control', within the Development Management Policies (Three Rivers District Council, 2013) states:

"a) Amenity and Pollution

The Council will refuse planning permission for development, including changes of use, which would or could give rise to polluting emissions to land, air and/or water by reason of disturbance, noise, light, smell, fumes, vibration, liquids, solids or other (including smoke, soot, ash, dust and grid) unless appropriate mitigation measures can be put in place and be permanently maintained.

…c) Development will not be permitted where it would:

> *i) Have an adverse impact on pollution levels, particularly where it would adversely affect air quality in an Air Quality Management Area and/or*

ii) Be subject to unacceptable levels of air pollutants or disturbance from existing pollutant sources."

2.25 Three Rivers District Council (TRDC) is preparing a New Local Plan that will set out the policy framework for growth within the district up to 2041. The Council previously consulted on its preferred policy options in 2021 (Three Rivers District Council, 2021), which proposes to retain both Policy CP1 and Policy DM9 of the current Local Plan. The preferred policy options also include Strategic Objective 9, to:

"Continue to tackle climate change and reduce the impacts on the environment by encouraging reductions in carbon emissions, waste, pollution, energy and water consumption and promoting the use of renewable energy and sustainable building materials."

2.26 It adds:

"…air pollutants (including dust and odour) have been shown to have an adverse effect on both health and the environment and it will be important to consider emissions arising from development including indirect emissions, such as those attributable to associated traffic generation."

Building Standards

2.27 Part F(1) of Schedule 1 of the Building Regulations 2010 as amended June 2022 (Ministry of Housing, Communities & Local Government, 2022) places a duty on building owners, or those responsible for relevant building work[1], to ensure adequate ventilation is provided to building occupants.

2.28 Approved Document F (HM Government, 2021a), which accompanies the Building Regulations, explains that care should be taken to minimise entry of external air pollutants. Specific steps should be taken to manage ventilation intakes where the building is near to a significant source of emissions, or if local ambient concentrations exceed values set in the Air Quality Standards Regulations 2010 (see Paragraph 3.9, later). These steps include maximising the distance between emission source and air intake, considering likely dispersion patterns, and considering the timing of pollution releases when designing the ventilation system.

2.29 Part S(1) of Schedule 1, and Regulation 44D, of the Building Regulations 2010 (Ministry of Housing, Communities & Local Government, 2022) define a requirement for the provision of infrastructure for charging electric vehicles. Precise requirements are explained further within Approved Document S (HM Government, 2021b) and depend on the overall number of parking spaces provided and the average financial cost of installation.

2.30 Compliance with the Building Regulations is not required for planning approval, but it is assumed that the Regulations will be complied with in the completed development.

Air Quality Action Plans

National Air Quality Plan

2.31 Defra has produced an Air Quality Plan to tackle roadside nitrogen dioxide concentrations in the UK (Defra, 2017); a supplement to the 2017 Plan (Defra, 2018b) was published in October 2018 and sets out the steps Government is taking in relation to a further 33 local authorities where shorter-term exceedances of the limit value were identified. Alongside a package of national measures, the 2017 Plan and the 2018 Supplement require those identified English Local Authorities (or the GLA in the case

[1] Building work is a legal term for work covered by the Building Regulations. With limited exemptions, the Regulations apply to all significant building work, including erecting or extending a building.

of London Authorities) to produce local action plans and/or feasibility studies. These plans and feasibility studies must have regard to measures to achieve the statutory limit values within the shortest possible time, which may include the implementation of a Clean Air Zone (CAZ). There is currently no straightforward way to take account of the effects of the 2017 Plan or 2018 Supplement in this assessment; however, consideration has been given to whether there is currently, or is likely to be in the future, a limit value exceedance in the vicinity of the proposed development. This assessment has principally been carried out in relation to the air quality objectives, rather than the limit values that are the focus of the Air Quality Plan.

Local Air Quality Action Plan

2.32 TRDC's Air Quality Action Plan (AQAP) 2015-2020 (Three Rivers District Council, 2020) was reviewed in 2020. TRDC's 2024 Air Quality Annual Status Report (ASR) (Three Rivers District Council, 2024) states that Watford Borough Council, which undertakes the LAQM duties for TRDC, intends to draft a new AQAP, however this is not currently available. The 2015-2020 AQAP sets out seven measures to improve air quality. The measures include:

- Subscribing to AirTEXT;
- Carrying out $PM_{2.5}$ monitoring;
- Reviewing the Local Transport Plan walking, cycling and bus strategy;
- Improving the bus network;
- Promoting Low Emission Transport;
- Creating additional cycle routes; and
- Creating alternative routes via green ways.

2.33 These measures are general in nature, and are not especially relevant to the proposed development.

Local Air Quality Strategy

2.34 Hertfordshire County Council has prepared an air quality strategy. The Strategic Objectives are:

- To gain a stronger understanding of the air quality issues within Hertfordshire;
- To ensure that air quality is an integral part of everything that the Council does;
- To develop a productive relationship with partners, in particular the District and Borough Councils, to achieve positive air quality outcomes;
- To create clear leadership on air quality; and
- To establish a coherent workstream on air quality, including clarification on roles and responsibilities.

2.35 The objectives are general in nature, and are not especially relevant to the proposed development.

3 Assessment Criteria

3.1 The Government has established a set of air quality standards and objectives to protect human health. The 'standards' are based on assessment of the effects of each pollutant on human health, including the effects on sensitive sub-groups. The 'objectives' set out the extent to which the Government expects the standards to be achieved taking account of practical considerations. The objectives for use by local authorities are prescribed within the Air Quality (England) Regulations (2000) and the Air Quality (England) (Amendment) Regulations (2002).

3.2 The UK-wide objectives for nitrogen dioxide and PM_{10} were to have been achieved by 2005 and 2004 respectively, and continue to apply in all future years thereafter. Measurements across the UK have shown that the 1-hour mean nitrogen dioxide objective is unlikely to be exceeded at roadside locations where the annual mean concentration is below 60 µg/m^3 (Defra, 2022). Therefore, 1-hour nitrogen dioxide concentrations will only be considered if the annual mean concentration is above this level. Measurements have also shown that the 24-hour mean PM_{10} objective could be exceeded at roadside locations where the annual mean concentration is above 32 µg/m^3 (Defra, 2022).

3.3 The objectives apply at locations where members of the public are likely to be regularly present and are likely to be exposed over the averaging period of the objective. Defra explains where these objectives will apply in its Local Air Quality Management Technical Guidance (Defra, 2022). The annual mean objectives for nitrogen dioxide and PM_{10} are considered to apply at the façades of residential properties, schools, hospitals etc.; they do not apply at hotels. The 24-hour mean 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 mean objective for nitrogen dioxide applies wherever members of the public might regularly spend 1-hour or more, including outdoor eating locations and pavements of busy shopping streets.

3.4 For $PM_{2.5}$, the objective set by Defra for local authorities is to work toward reducing concentrations without setting any specific numerical value. In the absence of a numerical objective, it is convention to assess local air quality impacts against the limit value (see Paragraph 3.9), originally set at 25 µg/m^3 and currently set at 20 µg/m^3.

3.5 Defra has also set two new targets, and two new interim targets, for $PM_{2.5}$ concentrations in England. One set of targets focuses on absolute concentrations. The long-term target is to achieve an annual mean $PM_{2.5}$ concentration of 10 µg/m^3 by the end of 2040 (referred to as the annual mean concentration target or AMCT), with the interim target being a value of 12 µg/m^3 by the start of 2028[2]. The second set of targets relate to reducing overall population exposure to $PM_{2.5}$. By the end of 2040, overall population exposure to $PM_{2.5}$ should be reduced by 35% compared with 2018 levels (referred to as the population exposure reduction target or PERT), with the interim target being a reduction of 22% by the start of 2028 (Table 3-1).

[2] Meaning that it will be assessed using measurements from 2027. The 2040 target will be assessed using measurements from 2040. National targets are assessed against concentrations expressed to the nearest whole number, for example a concentration of 10.4 µg/m^3 would not exceed the 10 µg/m^3 target.

Table 3-1: Environment Act $PM_{2.5}$ Targets

Metric	Target	Target year
AMCT	Interim target: 12 µg/m^3	2028
	Legally binding target: 10 µg/m^3	2040
PERT	Interim target: 22% reduction in exposure compared to 2018	2028
	Legally binding target: 35% reduction in exposure compared to 2018	2040

3.6 In 2024 Defra published Interim Planning Guidance on the $PM_{2.5}$ targets (Defra, 2024). This states that:

"The purpose of the targets is to improve air quality by reducing levels of $PM_{2.5}$ across the country, therefore improving public health. While achievement of the targets will be assessed at relevant monitoring sites, the targets apply to ambient (outdoor) air throughout England. Applicants and Local Planning Authorities should therefore consider the impact of developments on air quality in all ambient air, whether a monitor is present or not."

3.7 In order to address the new targets, it is not sufficient to assess solely whether a scheme is likely to lead to an exceedance of a legal limit. Instead, developments need to implement appropriate mitigation measures from the design stage, ensuring the minimum amount of pollution is emitted and that exposure is minimised.

3.8 Pending publication of the new guidance, Defra advises applicants to provide evidence that they have identified key sources of air pollution within the scheme and taken appropriate action to minimise emissions of $PM_{2.5}$ and its precursors as far as possible. More detailed assessment is expected for development closer to populations and/or having higher emissions. Defra has posed two questions to be used as prompts to support the interim assessment process:

"How has exposure to $PM_{2.5}$ been considered when selecting the development site?; and

What actions and/or mitigations have been considered to reduce $PM_{2.5}$ exposure for development users and nearby receptors (houses, hospitals, schools etc.) and to reduce emissions of $PM_{2.5}$ and its precursors?"

3.9 EU Directive 2008/50/EC (The European Parliament and the Council of the European Union, 2008) sets limit values for nitrogen dioxide, PM_{10} and $PM_{2.5}$, and is implemented in UK law through the Air Quality Standards Regulations (2010)[3]. The limit values for nitrogen dioxide and PM_{10} are the same numerical concentrations as the UK objectives, but achievement of the limit values is a national obligation rather than a local one and concentrations are reported to the nearest whole number. In the UK, only monitoring and modelling carried out by UK Central Government meets the specification required to assess compliance with the limit values. Central Government does not normally recognise local authority monitoring or local modelling studies when determining the likelihood of the limit values being exceeded, unless such studies have been audited and approved by Defra and DfT's Joint Air Quality Unit (JAQU).

3.10 The relevant air quality criteria for this assessment are provided in Table 3-2.

[3] As amended through The Air Quality Standards (Amendment) Regulations 2016 and The Environment (Miscellaneous Amendments) (EU Exit) Regulations 2020.

Table 3-2: Air Quality Criteria for Nitrogen Dioxide, PM_{10} and $PM_{2.5}$

Pollutant	Time Period	Value
Nitrogen Dioxide	1-hour Mean	200 µg/m^3 not to be exceeded more than 18 times a year
	Annual Mean	40 µg/m^3
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
$PM_{2.5}$	Annual Mean	20 µg/m^3 [a]

[a] There is no numerical $PM_{2.5}$ objective for local authorities (see Paragraph 3.4). Convention is to assess against the UK limit value which is currently 20 µg/m^3.

Construction Dust Criteria

3.11 There are no formal assessment criteria for dust. In the absence of formal criteria, the approach developed by the Institute of Air Quality Management (IAQM)[4] (2024) has been used. Full details of this approach are provided in Appendix A1.

Screening Criteria

3.12 Environmental Protection UK (EPUK) and the IAQM recommend a two-stage screening approach (Moorcroft and Barrowcliffe et al, 2017) to determine whether emissions from road traffic generated by a development have the potential for significant air quality impacts. The approach, as described in Appendix A2, first considers the size and parking provision of a development; if the development is residential and is for fewer than ten homes or covers less than 0.5 ha, or is non-residential and will provide less than 1,000 m^2 of floor space or cover a site area of less than 1 ha, and will provide ten or fewer parking spaces, then there is no need to progress to a detailed assessment.

3.13 The second stage then compares the changes in vehicle flows on local roads that a development will lead to against specified screening criteria. The screening thresholds (described in full in Appendix A2) inside an AQMA are a change in flows of more than 25 Heavy Duty Vehicles (HDVs) or 100 Light Duty Vehicles (LDVs) per day; outside of an AQMA the thresholds are 100 HDVs or 500 LDVs. Where these criteria are exceeded, a detailed assessment is likely to be 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*".

3.14 While these screening criteria are specifically intended to act as a trigger for a detailed assessment, they can also sometimes be used to identify the extent of the road network that requires assessment. Where the change in traffic on a given road link is less than the relevant screening threshold, it is unlikely that a significant impact would occur, and these links can be disregarded unless there are additional development-related emissions affecting receptors along the link.

[4] The IAQM is the professional body for air quality practitioners in the UK.

4 Assessment Approach

Existing Conditions

4.1 Existing sources of emissions and baseline air quality conditions within the study area have been defined using a number of approaches:

- industrial and waste management sources that may affect the area have been identified using Defra's Pollutant Release and Transfer Register (Defra, 2025a);
- local sources have been identified through examination of Air Quality Review and Assessment reports;
- information on existing air quality has been obtained by collating the results of monitoring carried out by the local authority and neighbouring authorities;
- background concentrations have been defined using Defra's 2021-based background maps (Defra, 2025b). These cover the whole of the UK on a 1x1 km grid. The background annual mean nitrogen dioxide maps have been calibrated against concurrent measurements (AQC, 2025). The calibration factor has also been applied to future year backgrounds. Mapped background concentrations of PM_{10} and $PM_{2.5}$ have not been adjusted; and
- whether or not there are any exceedances of the annual mean limit value for nitrogen dioxide in the study area has been identified using the maps of roadside concentrations published by Defra (2020; 2025c). These are the maps used by the UK Government, together with the results from national Automatic Urban and Rural Network (AURN) monitoring sites that operate to the required data quality standards, to identify and report exceedances of the limit value. The national maps of roadside PM_{10} and $PM_{2.5}$ concentrations (Defra, 2025c), which are available for the years up to 2023, show no exceedances of the limit values anywhere in the UK in 2023.

Construction Impacts

4.2 The construction dust assessment considers the potential for impacts within 250 m of the site boundary, or within 50 m of roads used by construction vehicles. The assessment methodology is that provided by the IAQM (2024). This follows a sequence of steps. Step 1 is a basic screening stage, to determine whether the more detailed assessment provided in Step 2 is required. Step 2a determines the potential for dust to be raised from on-site works and by vehicles leaving the site. Step 2b defines the sensitivity of the area to any dust that may be raised. Step 2c combines the information from Steps 2a and 2b to determine the risk of dust impacts without appropriate mitigation. Step 3 uses this information to determine the appropriate level of mitigation required to ensure that there should be no significant impacts. Appendix A1 explains the approach in more detail.

Road Traffic Impacts

4.3 The first step in considering the road traffic impacts of the proposed development has been to screen the development and its traffic generation against the criteria set out in the EPUK/IAQM guidance (Moorcroft and Barrowcliffe et al, 2017), as described in Paragraph 3.12 and detailed further in Appendix A2. Where impacts can be screened out there is no need to progress to a more detailed assessment.

Assessment of Significance

Construction Dust Significance

4.4 Guidance from the IAQM (2024) is that, with appropriate mitigation in place, the effects of construction dust will be 'not significant'. The assessment thus focuses on determining the appropriate level of mitigation so as to ensure that effects will normally be 'not significant'.

Operational Significance

4.5 There is no official guidance in the UK in relation to development control on how to assess the significance of air quality impacts. The approach developed jointly by EPUK and the IAQM (Moorcroft and Barrowcliffe et al, 2017) has therefore been used. The overall significance of the air quality impacts is determined using professional judgement; the experience of the consultants preparing the report is set out in Appendix A3. Full details of the EPUK/IAQM approach are provided in Appendix A2.

5 Baseline Conditions

Relevant Features

5.1 The proposed development is located in Carpenders Park, approximately 3 km to the southeast of Watford town centre. The application site is bounded by the A4008 Oxhey Road and Carpenders Park Care Home to the west, agricultural land to the north and south and Merry Hill Wood to the east. The Hartsbourne Gold Club is located to the southeast and there are existing residential properties on the other side of Oxhey Lane. The site currently consists of open fields. The site setting is shown in Figure 1-1.

5.2 TRDC has declared an Air Quality Management Area (AQMA) for exceedances of the annual mean nitrogen dioxide and 24-hour mean PM_{10} objectives in Chorleywood, although this is nearly 9 km from the application site. The neighbouring boroughs of Harrow and Watford have also declared AQMAs, which are located within 600 m (Harrow) and 1.4 km (the closest AQMA in Watford) of the site boundary, as highlighted in Figure 5-1.

Industrial Sources

5.3 No significant industrial or waste management sources have been identified that are likely to affect the proposed development, in terms of air quality and/or odour.

Local Air Quality Monitoring

5.4 TRDC does not operate any automatic monitoring stations within its area. Watford Borough Council (WBC) operates one automatic monitor, located at Watford Town Hall, however this is located approximately 3.7 km away from the proposed development, outside the study area. Hertsmere Borough Council (HBC) operates three automatic monitors, and London Borough of Harrow (LBH) operates two automatic monitors, all of which are also outside the study area, being at least 7.5 km and 4.5 km away from the proposed development, respectively.

5.5 The four councils operate a number of nitrogen dioxide monitoring sites using diffusion tubes prepared and analysed by Socotec using the 50% TEA in acetone method (TRDC, WBC and LBH) and Gradko using the 20% TEA in water method (HBC). These include several within approximately 2 km of the proposed development. Annual mean results for relevant sites for the years 2018 to 2023 are summarised in Table 5-1 and the monitoring locations are shown in Figure 5-1. The monitoring data have been taken from TRDC's 2024 ASR (Three Rivers District Council, 2024), WBC's 2023 and 2024 ASRs (Watford Borough Council, 2023; 2024), HBC's 2022 ASR (Hertsmere Borough Council, 2022) and LBH's 2023 ASR (London Borough of Harrow, 2023). These are the latest reports available from the respective councils.

Table 5-1: Summary of Annual Mean NO_2 Monitoring (2018-2023) (µg/m³) [a]

Site No.	Site Type	Location	2018	2019	2020	2021	2022	2023
Three Rivers District Council								
TR39	Kerbside	Hampermill Lane	-	-	-	-	24.5	23.3
Watford Borough Council								
WF29	Kerbside	Pinner Road	38.6	34.7	26.1	32.0	30.0	28.9
WF44	Kerbside	Chalk Hill	**53.2**	**49.0**	39.5	**45.6**	**44.6**	36.0
WF50	Kerbside	Eastbury Road (Oxhey Early Years)	32.2	31.1	23.3	24.4	23.0	21.4
WF51	Kerbside	Deacons Hill	-	-	-	-	33.0	28.3
WF52	Kerbside	Victoria Public House	-	-	-	-	40.0	35.8
WF53	Kerbside	Villiers Road	-	-	-	-	25.2 [c]	21.0
Herstmere Borough Council								
HM54	Kerbside	19 High Road, Bushey	24.1	28.7	19.6	19.3	-	-
HM99/ HM100/ HM101 [b]	Roadside	84 High Street, Bushey	38.3	**40.4**	30.6	28.6	-	-
HM117/ HM118/ HM119 [b]	Roadside	44 High Street, Bushey	37.3	37.8	27.5	26.6	-	-
London Borough of Harrow								
HA03	Background	Harrow Arts Centre	-	-	-	-	15.0 [c]	-
Objective			**40**					

[a] Exceedances of the objectives are shown in bold.

[b] Average of triplicate diffusion tubes.

[c] Low data capture (67%).

5.6 There are insufficient data at most of the monitoring sites with which to determine trends in the measured concentrations, especially considering that results for 2020 and 2021 are not representative of long-term trends due to the influence of the Covid-19 pandemic on activity. However, concentrations measures at WBC's monitoring sites WF29 and WF44 (in Watford centre) and WF50 show a downward trend between 2018 and 2023. Monitor WF53 is the most representative of the application site, being located approximately 1.4 km to the north of the proposed development and also adjacent to the A4008, however the monitor is in a more built-up area than the proposed development and is located closer to the kerb of the road than any of the properties within the application site. As such it is reasonable to expect that concentrations measured at this site (which are well below the objective) will be higher than those within the application site.

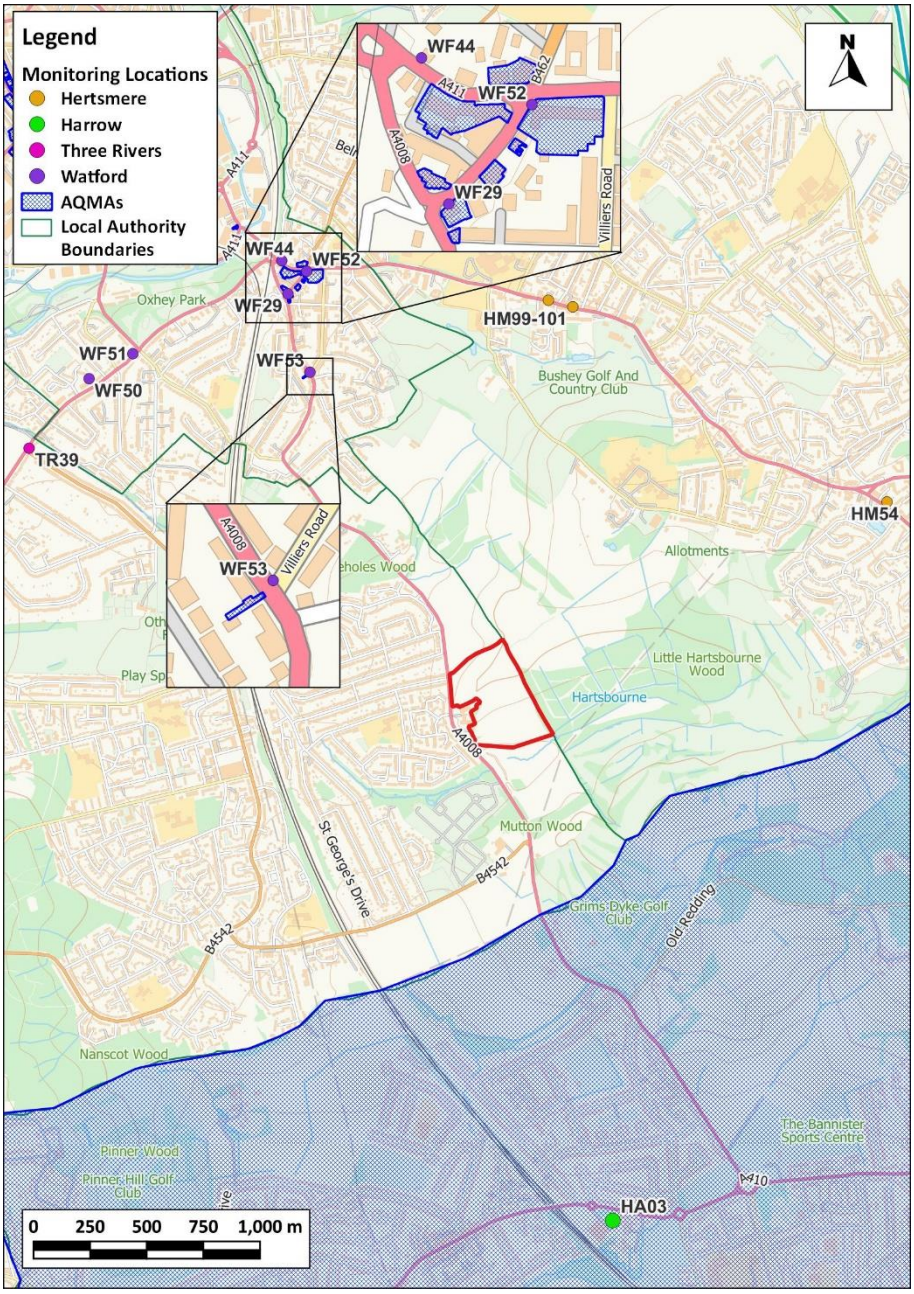

Figure 5-1: Air Quality Management Areas and Nearby Monitoring Locations

Additional data sourced from third parties, including public sector information licensed under the Open Government Licence v3.0.

5.7 While 2020 results have been presented in this Section for completeness, they are not relied upon in any way as they will not be representative of 'typical' air quality conditions due to the impact of the Covid-19 pandemic on traffic volumes and thus pollutant concentrations.

5.8 No monitoring of PM_{10} or $PM_{2.5}$ concentrations is undertaken in TRDC. The WF1 roadside automatic monitoring station, located at the Watford Town Hall, approximately 3.8 km to the northwest of the proposed development, is the closest station which measures PM_{10} concentrations. It also measures $PM_{2.5}$ concentrations. Annual mean results for the years 2018 to 2023 are summarised in Table 5-2, while results relating to the daily mean objective are summarised in Table 5-3. Results have been taken from WBC's 2023 and 2024 ASRs (Watford Borough Council, 2023; 2024).

5.9 The monitoring results show that the measured PM_{10} concentrations have been below the annual mean and 24-hour mean objectives in all years. Measured annual mean $PM_{2.5}$ concentrations have been below the objective and below the AMCT in all years. Concentrations have remained consistent between 2018 and 2023.

Table 5-2: Summary of Annual Mean PM_{10} and $PM_{2.5}$ Monitoring (2018-2023) (µg/m³)

Site No.	Site Type	Location	2018	2019	2020	2021	2022	2023
PM_{10}								
WF1	Roadside	Watford Town Hall	15	15	13	13	14	14
Objective			**40**					
$PM_{2.5}$								
WF1	Roadside	Watford Town Hall	9	9	8	8	8	8
Objective /AMCT [b]			**20/10 [a]**					

[a] The 20 µg/m³ $PM_{2.5}$ objective, which was to be met by 2020, is not in Regulations and there is no requirement for local authorities to meet it.

[b] To be met by 2040

Table 5-3: Number of Days with PM_{10} Concentrations Above 50 µg/m³

Site No.	Site Type	Location	2018	2019	2020	2021	2022	2023
WF1	Roadside	Watford Town Hall	1	4	0	0	3	1
Objective			**35 [a]**					

Exceedances of Limit Value

5.10 There are no AURN (Defra, 2025d) monitoring sites within the study area with which to identify exceedances of the annual mean nitrogen dioxide limit value. Defra's roadside annual mean nitrogen dioxide concentrations (Defra, 2025c), which are used to identify and report exceedances of the limit value, do not identify any exceedances within the study area in 2023. As such, there is considered to be no risk of a limit value exceedance in the vicinity of the proposed development by the time that it is operational.

Background Concentrations

5.11 Estimated background concentrations at the application site for 2023, 2025 (current year) and 2030 (anticipated year of first occupation) are set out in Table 5-4 and are all well below the objectives. A range of values is presented as the application site covers multiple 1x1 km grid squares.

Table 5-4: Estimated Annual Mean Background Pollutant Concentrations in 2023, 2025 and 2030 (µg/m³)

Year	NO_2	PM_{10}	$PM_{2.5}$
2023	12.6 – 13.5	13.0 – 13.1	7.8 – 8.2
2025	10.7 – 11.4	12.8	7.6 – 8.0
2030	8.8 – 9.3	12.4	7.2 – 7.6
Objective	**40**	**40**	**20** [a]
AMCT [b]	**-**	**-**	**10**

[a] The 20 µg/m³ $PM_{2.5}$ objective, which was to be met by 2020, is not in Regulations and there is no requirement for local authorities to meet it.

[b] To be met by 2040

6 Construction Phase Impact Assessment

Construction Traffic

6.1 The construction traffic generation of the proposed development is not currently known, however, based on the size of the site it is anticipated that the additional heavy vehicle movements on local roads will be well below the 100 AADT screening criterion recommended by EPUK/IAQM guidance (Moorcroft and Barrowcliffe et al, 2017) outside an AQMA, and is unlikely to exceed the 25 AADT screening criterion within the nearby AQMAs. It is, therefore, not considered necessary to assess the impacts of traffic emissions during the construction phase and it can be concluded that the proposed development will not have a significant impact on local roadside air quality as a result of construction traffic emissions.

On-Site Exhaust Emissions

6.2 The IAQM guidance (IAQM, 2024) states:

"Experience of assessing the exhaust emissions from on-site plant (also known as non-road mobile machinery or NRMM) and site traffic suggests that they are unlikely to make a significant impact on local air quality, and in the vast majority of cases they will not need to be quantitatively assessed. For site plant and on-site traffic, consideration should be given to the number of plant/vehicles and their operating hours and locations to assess whether a significant effect is likely to occur".

6.3 The site is reasonably large, and sensitive receptors are only located close to the western boundary of the site, thus NRMM emissions will mostly occur away from sensitive properties. The site layout will take account of the location of sensitive receptors, and the distance between NRMM and sensitive properties will be maximised, as far as possible, and all vehicles and plant will be switched off when not in use. It is judged that there is no risk of significant effects at existing receptors as a result of on-site machinery emissions.

Construction Dust and Particulate Matter Emissions

6.4 The construction period will last approximately five years, starting in early 2027. The construction works will give rise to a risk of dust impacts during earthworks and construction, as well as from trackout of dust and dirt by vehicles onto the public highway. Step 1 of the assessment procedure is to screen the need for a detailed assessment. There are receptors within the distances set out in the guidance (see Appendix A1), thus a detailed assessment is required. The following section sets out Step 2 of the assessment procedure.

Potential Dust Emission Magnitude

Demolition

6.5 There is no requirement for demolition on site.

Earthworks

6.6 The characteristics of the soil at the site have been defined using the British Geological Survey's UK Soil Observatory website (British Geological Survey, 2025), as set out in Table 6-1. Overall, it is considered that, when dry, this soil has the potential to be very dusty.

Table 6-1: Summary of Soil Characteristics

Category	Record
Soil Layer Thickness	Deep
Soil Parent Material Grain Size	Argillaceous [a]
European Soil Bureau Description	Prequaternary Marine/Estuarine Sand and Silt
Soil Group	Medium to Light (Silty) to Heavy
Soil Texture	Clayey Loam [b] to Silty Loam

[a] Grain size < 0.06 mm.

[b] A loam is composed mostly of sand and silt.

6.7 The site covers approximately 125,000 m^2 and a large amount of this will be subject to earthworks. Dust will arise mainly from vehicles travelling over unpaved ground and from the handling of dusty materials (such as dry soil). Based on the example definitions set out in Table A1-1 in Appendix A1, the dust emission class for earthworks is considered to be *large*.

Construction

6.8 The proposed development involves the construction of 260 new homes and a care home, with a total building volume of around 185,000 m^3. Dust will arise from vehicles travelling over unpaved ground, the handling and storage of dusty materials, and from the cutting of concrete. The construction will take place over a 5-year period. Based on the example definitions set out in Table A2-1 in Appendix A1, the dust emission class for construction is considered to be *large*.

Trackout

6.9 The number of heavy vehicles accessing the site, which may track out dust and dirt, is currently unknown, but based on the size of the site and construction programme, it is conservatively estimated that there will be a maximum of between 20-50 outward heavy vehicle movements per working day. Based on the example definitions set out in Table A2-1 in Appendix A1, the dust emission class for trackout is considered to be *medium*.

6.10 Table 6-2 summarises the dust emission magnitude for the proposed development.

Table 6-2: Summary of Dust Emission Magnitude

Source	Dust Emission Magnitude
Demolition	n/a
Earthworks	Large
Construction	Large
Trackout	Medium

Sensitivity of the Area

6.11 This assessment step combines the sensitivity of individual receptors to dust effects with the number of receptors in the area and their proximity to the site. It also considers additional site-specific factors

such as topography and screening, and in the case of sensitivity to human health effects, baseline PM_{10} concentrations.

6.12 The IAQM guidance explains that residential properties are 'high' sensitivity receptors to dust soiling (Table A2-2 in Appendix A1) and are also classified as being of 'high' sensitivity to human health effects. There are approximately two residential properties and approximately half of the Carpenders Park Care Home, which is understood to be newly constructed and not yet occupied, but which will house up to 76 residents (thus approximately 38 residential units), within 20 m of the site (see Figure 6-1).

Figure 6-1: 20 m Distance Band around Site Boundary

Imagery ©2025 Airbus, Maxar Technologies. Contains data from Pegasus Group drawing no. P24-2204_DE_003_A_01.

6.13 The IAQM guidance (IAQM, 2024) explains that there is a risk of material being tracked 250 m from the site exit. Since it is not known which roads construction vehicles will use or where the site exit(s) will be, it has been assumed that all possible routes could be affected. There are approximately 25 residential properties within 20 m of the roads along which material could be tracked (see Figure 6-2).

Figure 6-2: 20 m Distance Band around Potential Routes Used by Construction Traffic within 250 m of the Possible Site Exits

Imagery ©2025 Airbus, Maxar Technologies. Contains data from Pegasus Group drawing no. P24-2204_DE_003_A_01.

Sensitivity of the Area to Effects from Dust Soiling

6.14 Using the information set out in Paragraph 6.12 and Figure 6-1 alongside the matrix set out in Table A1-3 in Appendix A1, the area surrounding the onsite works is of 'high' sensitivity to dust soiling. Using the information set out in Paragraph 6.13 and Figure 6-2 alongside the same matrix, the area is also of 'high' sensitivity to dust soiling due to trackout.

Sensitivity of the Area to any Human Health Effects

6.15 The matrix in Table A1-4 in Appendix A1 requires information on the baseline annual mean PM_{10} concentration in the area. The existing annual mean PM_{10} concentration is best described by the background concentration in 2025 from Table 5-4 (12.8 µg/m^3). Using the information set out in Paragraphs 6.12 and Figure 6-1 alongside the matrix in Table A1-4 in Appendix A1, the area surrounding the onsite works is of 'low' sensitivity to human health effects. Using the information set out in Paragraph 6.13 and Figure 6-2 alongside the same matrix, the area surrounding roads along which material may be tracked from the site is also of 'low' sensitivity.

Sensitivity of the Area to any Ecological Effects

6.16 The guidance only considers designated ecological sites within 50 m to have the potential to be impacted by the construction works. There are no designated ecological sites identified within 50 m of the site boundary or those roads along which material may be tracked, thus ecological impacts will not be considered further.

Summary of the Area Sensitivity

6.17 Table 6-3 summarises the sensitivity of the area around the proposed construction works.

Table 6-3: Summary of the Area Sensitivity

Effects Associated With:	Sensitivity of the Surrounding Area	
	On-site Works	Trackout
Dust Soiling	High Sensitivity	High Sensitivity
Human Health	Low Sensitivity	Low Sensitivity
Ecological	n/a	n/a

Risk and Significance

6.18 The dust emission magnitudes in Table 6-2 have been combined with the sensitivities of the area in Table 6-3 using the matrix in Table A1-6 in Appendix A1, in order to assign a risk category to each activity. The resulting risk categories for the construction activities, without mitigation, are set out in Table 6-4. These risk categories have been used to determine the appropriate level of mitigation as set out in Section 8 (Step 3 of the assessment procedure).

Table 6-4: Summary of Risk of Impacts Without Mitigation

Source	Dust Soiling	Human Health	Ecology
Earthworks	High Risk	Low Risk	n/a
Construction	High Risk	Low Risk	n/a
Trackout	Medium Risk	Low Risk	n/a

6.19 The IAQM guidance does not provide a method for assessing the significance of effects before mitigation, and advises that pre-mitigation significance should not be determined. With appropriate mitigation in place, the IAQM guidance is clear that the residual effect will normally be 'not significant' (IAQM, 2024).

7 Operational Phase Impact Assessment

Impacts at Existing Receptors

7.1 The proposed development is expected to generate a total of 1,054 daily vehicle trips on average, of which 20 will be HDVs. The traffic will be split approximately 45%/55% north and south, with 462 LDVs using Oxhey Lane north of the site and 572 LDVs using Oxhey Lane south of the site. The daily trip rate is below the screening threshold of 500 LDVs recommended for use outside of an AQMA in the EPUK/IAQM guidance (Moorcroft and Barrowcliffe et al, 2017) (see Paragraph 3.13) to the north, but above the screening threshold to the south. However, to the south this traffic generation only marginally exceeds the criteria, and air quality monitoring undertaken adjacent to A4008 Pinner Road (at the WF53 kerbside diffusion tube north of the site) shows that concentrations of annual mean nitrogen dioxide have been well below the objective in 2022 and 2023 (25.2 µg/m^3 and 21.0 µg/m^3, respectively; see Table 5-1). Furthermore, the proposed development is not expected to be operational until 2030, and concentrations are expected to continue to reduce into the future. As such, it is considered very unlikely that the proposed development would lead to adverse impacts on air quality along the A4008 Oxhey Lane.

7.2 Further to the south of the site, the proposed development is expected to generate 414 LDV movements travelling into the LBH whole-borough AQMA. While this is above the screening threshold of 100 LDVs within an AQMA, the guidance states that "*the presence of an AQMA is taken to indicate the possibility of being close to the objective, but where whole authority AQMAs are present and it is known that the affected roads have concentrations below 90% of the objective, the less stringent criteria are likely to be more appropriate*". As discussed above, measured annual mean nitrogen dioxide concentrations adjacent to the A4008 are well below the objective. Once within the Harrow AQMA, the development traffic will further distribute along the A410 east and west. Measured annual mean nitrogen dioxide concentrations in the area have been well below the objective in recent years, with the highest measured concentration close to this road being 30.5 µg/m^3 at diffusion tube monitor HA02 in 2022 (London Borough of Harrow, 2023). Thus, it is the higher screening threshold of 500 light vehicles that is most relevant, and this will not be exceeded.

7.3 To the north of the site, there are several separate sections of the Chalk Hill and Pinner Road AQMA in Watford (see Figure 5-1); one is adjacent to Pinner Road and several are adjacent to the A4008 gyratory. The proposed development will generate 303 vehicle movements to the north of Watford Heath, but no further information on the distribution past this is available. As discussed above, monitoring at the WF53 kerbside diffusion tube site, which is located close to the AQMA (on the Villers Road / Pinners Road junction), has recently measured concentrations well below the objective at the kerbside.

7.4 There are two monitoring sites at the gyratory that have measured concentrations exceeding the objective in 2022, but 10% less than the objective in 2023 (kerbside monitors WF44 and WF52). Monitor WF44 is located 2 m from the kerb of Chalk Hill, while the nearest receptors sensitive to the objective are set further back from the road (approximately 4 m) and/or at first floor level. Monitor WF52 is located 1 m from the kerb, outside the Victoria pub. Again, the nearest relevant receptors are set further back from the road (approximately 3 m). As such, concentrations at relevant receptor locations nearby are expected to experience lower concentrations than those measured at monitors WF44 and WF52. Concentrations at monitor WF29, which is 2 m from the kerb, have been below 36 µg/m^3 in all recent years (see Table 5-1). Concentrations of PM_{10} and $PM_{2.5}$ measured at the nearest available monitoring site (in Watford, see Table 5-2 and Table 5-3) have also been well below the objectives in all recent years.

7.5 Based on the measured concentrations in Watford, the locations of relevant receptors being set further back from the road than the monitoring sites, and given that the proposed development is not expected to be operational until 2030, it is considered unlikely that an increase of 303 vehicle movements would lead to significant adverse impacts on air quality at relevant receptors along Pinner Road or adjacent to the gyratory.

7.6 As such, it is judged that there is no requirement for a detailed assessment of road traffic impacts at existing receptors; it can be concluded that the proposed development will not have a significant impact on local roadside air quality.

Impacts of Existing Sources on Future Occupants of the Development

7.7 The locations of relevant exposure within the proposed development site are located well away from Oxhey Lane (by at least 25 m), in an area where pollutant concentrations are expected to be close to background levels. Background nitrogen dioxide concentrations at the site are well below the objectives (see Table 5-4), thus it can be concluded that there is no risk of an exceedance of the nitrogen dioxide objective. Similarly, estimated background concentrations of PM_{10} and $PM_{2.5}$, and the nearest measured concentrations (in Watford), are well below the respective objectives. The annual mean $PM_{2.5}$ concentrations are also below the AMCT.

7.8 It can be therefore considered that future residents of the proposed development will experience acceptable air quality, and there is no need for more detailed assessment.

Significance of Operational Air Quality Effects

7.9 The operational air quality effects without mitigation are judged to be 'not significant'. This professional judgement is made in accordance with the methodology set out in Appendix A2, and takes account of the assessment that:

- pollutant concentrations within the proposed development will be below the objectives, thus future residents will experience acceptable air quality;
- while traffic generated by the proposed development will be above industry screening thresholds, it is expected that the proposed development will have a negligible impact on air quality conditions at existing receptors; and
- the proposed development will not have a meaningful effect on whether or not the interim and long-term $PM_{2.5}$ concentration targets are met within the study area.

8 Mitigation

Good Design and Best Practice

8.1 The EPUK/IAQM guidance advises that good design and best practice measures should be considered, whether or not more specific mitigation is required.

8.2 The proposed development incorporates the following good design and best practice measures, which have been accounted for in the assessment as far as is possible:

- adoption of a Construction Environmental Management Plan (CEMP) and Construction Transport Management Plan (CTMP) to minimise the environmental impacts of the construction works and construction traffic;
- provision of a residential travel plan to identify opportunities for the effective promotion and delivery of sustainable transport initiatives e.g., walking, cycling and public transport, to reduce the demand for travel by less sustainable mode. The Travel Plan would propose a series of measures to influence modal choice including a Resident's Welcome Pack;
- provision of dedicated and direct cycleway and footpath linkages throughout the development, creating a permeable network of streets for pedestrians and cyclists;
- provision of an orbital pedestrian route around the site, linking with the existing public right of way in the north of the site;
- provision of two dedicated pedestrian and cyclist accesses to the site (including one emergency vehicle access);
- provision of cycle parking in line with TRDC's requirements;
- provision of electric vehicle chargers in line with TRDC's requirements;
- use of air-source heating to avoid the need for on-site combustion; and
- setting back of the development buildings from roads by at least 25 m.

Recommended Mitigation

Construction Impacts

8.3 Measures to mitigate dust emissions will be required during the construction phase of the development in order to minimise effects upon nearby sensitive receptors.

8.4 The site has been identified as a High Risk during earthworks and construction, and Medium Risk for trackout, as set out in Table 6-4. Comprehensive guidance has been published by the IAQM (2024) that describes measures that should be employed, as appropriate, to reduce the impacts, along with guidance on monitoring during demolition and construction (IAQM, 2018). This reflects best practice experience and has been used, together with the professional experience of the consultant who has undertaken the dust impact assessment and the findings of the assessment, to draw up a set of measures that should be incorporated into the specification for the works. These measures are described in Appendix A4.

8.5 The mitigation measures should be written into a Dust Management Plan (DMP). The DMP may be integrated into the Construction Environmental Management Plan, and may require monitoring.

8.6 Where mitigation measures rely on water, it is expected that only sufficient water will be applied to damp down the material. There should not be any excess to potentially contaminate local watercourses.

Road Traffic Impacts

8.7 The assessment has demonstrated that the overall air quality effect of the proposed development will be 'not significant'; it will not introduce any new exposure into areas of unacceptable air quality, nor will the development-generated traffic emissions have a significant impact on local air quality. It is, therefore, not considered appropriate to propose further mitigation measures for this development.

8.8 Measures to reduce pollutant emissions from road traffic are principally being delivered in the longer term by the introduction of more stringent emissions standards, largely via European legislation (which is written into UK law).

9 Achieving Compliance with the $PM_{2.5}$ Targets

9.1 Defra have set out in their Interim Planning Guidance (Defra, 2024) two questions designed to consider whether a development supports the AMCT and PERT $PM_{2.5}$ targets. The first question is "*How has exposure to $PM_{2.5}$ been considered when selecting the development site?*", whilst the second question is "*What actions and/or mitigations have been considered to reduce $PM_{2.5}$ exposure for development users and nearby receptors (houses, hospitals, schools etc.) and to reduce emissions of $PM_{2.5}$ and its precursors?*".

9.2 The annual mean $PM_{2.5}$ concentrations described in Section 5 are well below the AMCT target to be met by 2040; the monitoring data demonstrate that annual mean $PM_{2.5}$ concentrations are currently below the AMCT at the closest automatic monitoring site (in Watford centre adjacent to a much busier road than Oxhey Lane), and concentrations at the application site are expected to be lower than those measured at that monitoring site. Sensitive receptor locations within the site are set well back from the road, where concentrations can be expected to be approaching background levels, which are currently below the AMCT and are predicted to reduce into the future.

9.3 Exposure to $PM_{2.5}$ and ways to minimise $PM_{2.5}$ emissions have been considered through the mitigation measures set out in Section 8, including avoiding the need for onsite combustion, provision of cycle and pedestrian access to the site, and provision of a CEMP to minimise emissions during construction.

9.4 It is considered that the development complies with the requirements to deliver achievement of the AMCT and PERT by 2040 as appropriate action has been taken to minimise emissions of $PM_{2.5}$ and its precursors as far as is reasonably practicable.

10 Residual Impacts

Construction

10.1 The IAQM guidance is clear that, with appropriate mitigation in place, the residual effects will normally be 'not significant'. The mitigation measures set out in Section 8 and Appendix A4 are based on the IAQM guidance. With these measures in place and effectively implemented the residual effects are judged to be 'not significant'.

10.2 The IAQM guidance does, however, recognise that, even with a rigorous dust management plan in place, it is not possible to guarantee that the dust mitigation measures will be effective all of the time, for instance under adverse weather conditions. During these events, short-term dust annoyance may occur, however, the scale of this would not normally be considered sufficient to change the conclusion that overall, the effects will be 'not significant'.

Road Traffic Impacts

10.3 The residual impacts will be the same as those identified in Section 7. The overall effects of the proposed development will be 'not significant'.

11 Conclusions

11.1 The assessment has considered the impacts of the proposed development on local air quality in terms of dust and particulate matter emissions during construction and emissions from road traffic generated by the completed and occupied development. It has also identified the air quality conditions that future residents will experience. The assessment has been based on measurements made during 2023, and post-pandemic activity and emissions forecasts.

Construction Impacts

11.2 The construction works have the potential to create dust. During construction it will therefore be necessary to apply a package of mitigation measures to minimise dust emissions. Appropriate measures have been recommended and, with these measures in place, it is expected that any residual effects will be 'not significant'.

Operational Impacts

11.3 Air quality conditions for future residents of the proposed development have been shown to be acceptable, with concentrations well below the air quality objectives throughout the site.

11.4 The assessment has demonstrated that the emissions from the additional traffic generated by the proposed development will have a negligible impact on air quality conditions at all existing receptors along the local road network.

11.5 The overall operational air quality effects of the proposed development are judged to be 'not significant'.

Policy Implications

11.6 Taking into account these conclusions, it is judged that the proposed development is consistent with Paragraph 198 of the NPPF, being appropriate for its location both in terms of its effects on the local air quality environment and the air quality conditions for future residents. It is also consistent with Paragraph 199, as it will not affect compliance with relevant limit values or national objectives. The proposed development is also consistent with Core Policy CP1(o) of the TRDC Core Strategy in that it manages and reduces risk of and from air pollution, and Policy DM9 of the Development Management Policies, in that it will not have an adverse impact on pollution levels or be subject to unacceptable levels of air pollutants from existing pollutant sources. It is considered that the development complies with the requirements to deliver achievement of the AMCT and PERT by 2040 as appropriate action has been taken to minimise emissions of $PM_{2.5}$ and its precursors as far as is reasonably practicable.

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13 Glossary

AADT	Annual Average Daily Traffic
ADMS-Roads	Atmospheric Dispersion Modelling System model for Roads
AMCT	Annual Mean Concentration Target (for $PM_{2.5}$)
AQAL	Air Quality Assessment Level
AQC	Air Quality Consultants
AQMA	Air Quality Management Area
AURN	Automatic Urban and Rural Network
CAZ	Clean Air Zone
CEMP	Construction Environmental Management Plan
CHP	Combined Heat and Power
CTMP	Construction Transport Management Plan
Defra	Department for Environment, Food and Rural Affairs
DfT	Department for Transport
DMP	Dust Management Plan
EFT	Emissions Factors Toolkit
EPUK	Environmental Protection UK
EU	European Union
EV	Electric Vehicle
Exceedance	A period of time when the concentration of a pollutant is greater than the appropriate air quality objective. This applies to specified locations with relevant exposure
HBC	Herstmere Borough Council
HDV	Heavy Duty Vehicles (> 3.5 tonnes)
HGV	Heavy Goods Vehicle
HMSO	Her Majesty's Stationery Office
IAQM	Institute of Air Quality Management
JAQU	Joint Air Quality Unit
kph	Kilometres Per hour
kW	Kilowatt

LAQM	Local Air Quality Management
LBH	London Borough of Harrow
LDV	Light Duty Vehicles (<3.5 tonnes)
LGV	Light Goods Vehicle
µg/m^3	Microgrammes per cubic metre
NO	Nitric oxide
NO_2	Nitrogen dioxide
NOx	Nitrogen oxides (taken to be + NO)
NPPF	National Planning Policy Framework
NRMM	Non-road Mobile Machinery
OEP	Office for Environmental Protection
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
OLEV	Office for Low Emission Vehicles
PERT	Population Exposure Reduction Target (for $PM_{2.5}$)
PM_{10}	Small airborne particles, more specifically particulate matter less than 10 micrometres in aerodynamic diameter
$PM_{2.5}$	Small airborne particles less than 2.5 micrometres in aerodynamic diameter
PPG	Planning Practice Guidance
Standards	A nationally defined set of concentrations for nine pollutants *based on assessment of the effects of each pollutant on human health, including the effects on sensitive sub-groups.*
TEA	Triethanolamine – used to absorb nitrogen dioxide
TRDC	Three Rivers District Council
WBC	Watford Borough Council

14 Appendices

A1 Construction Dust Assessment Procedure

A1.1 The criteria developed by IAQM (2024) divide the activities on construction sites into four types to reflect their different potential impacts. These are:

- demolition;
- earthworks;
- construction; and
- trackout.

A1.2 The assessment procedure includes the four steps summarised below:

STEP 1: Screen the Need for a Detailed Assessment

A1.3 An assessment is required where there is a human receptor within 250 m of the boundary of the site and/or within 50 m of the route(s) used by construction vehicles on the public highway, up to 250 m from the site entrance(s), or where there is an ecological receptor within 50 m of the boundary of the site and/or within 50 m of the route(s) used by construction vehicles on the public highway, up to 250 m from the site entrance(s).

A1.4 Where the need for a more detailed assessment is screened out, it can be concluded that the level of risk is negligible and that any effects will be 'not significant'. No mitigation measures beyond those required by legislation will be required.

STEP 2: Assess the Risk of Dust Impacts

A1.5 A site is allocated to a risk category based on two factors:

- the scale and nature of the works, which determines the potential dust emission magnitude (Step 2A); and
- the sensitivity of the area to dust effects (Step 2B).

A1.6 These two factors are combined in Step 2C, which is to determine the risk of dust impacts with no mitigation applied. The risk categories assigned to the site may be different for each of the four potential sources of dust (demolition, earthworks, construction and trackout).

Step 2A – Define the Potential Dust Emission Magnitude

A1.7 Dust emission magnitude is defined as either 'Small', 'Medium', or 'Large'. The IAQM guidance explains that this classification should be based on professional judgement, but provides the examples in Table A1-1.

Table A1-1: Examples of How the Dust Emission Magnitude Class May be Defined

Class	Examples
Demolition	
Large	Total building volume >75,000 m^3, potentially dusty construction material (e.g. concrete), on site crushing and screening, demolition activities >12 m above ground level

Class	Examples
Medium	Total building volume 12,000 m^3 – 75,000 m^3, potentially dusty construction material, demolition activities 6-12 m above ground level
Small	Total building volume <12,000 m^3, construction material with low potential for dust release (e.g. metal cladding or timber), demolition activities <6 m above ground, demolition during wetter months
Earthworks	
Large	Total site area >110,000 m^2, potentially dusty soil type (e.g. clay, which will be prone to suspension when dry to due small particle size), >10 heavy earth moving vehicles active at any one time, formation of bunds >6 m in height.
Medium	Total site area 18,000 m^2 – 110,000 m^2, moderately dusty soil type (e.g. silt), 5-10 heavy earth moving vehicles active at any one time, formation of bunds 3 m – 6 m in height.
Small	Total site area <18,000 m^2, soil type with large grain size (e.g. sand), <5 heavy earth moving vehicles active at any one time, formation of bunds <3 m in height.
Construction	
Large	Total building volume >75,000 m^3, on site concrete batching; sandblasting
Medium	Total building volume 12,000 m^3 – 75,000 m^3, potentially dusty construction material (e.g. concrete), on site concrete batching
Small	Total building volume <12,000 m^3, construction material with low potential for dust release (e.g. metal cladding or timber)
Trackout [a]	
Large	>50 HDV (>3.5t) outward movements in any one day, potentially dusty surface material (e.g. high clay content), unpaved road length >100 m
Medium	20-50 HDV (>3.5t) outward movements in any one day, moderately dusty surface material (e.g. high clay content), unpaved road length 50 m – 100 m
Small	<20 HDV (>3.5t) outward movements in any one day, surface material with low potential for dust release, unpaved road length <50 m

[a] These numbers are for vehicles that leave the site after moving over unpaved ground.

Step 2B – Define the Sensitivity of the Area

A1.8 The sensitivity of the area is defined taking account of a number of 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 to reduce the risk of wind-blown dust.

A1.9 The first requirement is to determine the specific sensitivities of local receptors. The IAQM guidance recommends that this should be based on professional judgment, taking account of the principles in Table A1-2. These receptor sensitivities are then used in the matrices set out in Table A1-3, Table A1-4

and Table A1-5 to determine the sensitivity of the area. Finally, the sensitivity of the area is considered in relation to any other site-specific factors, such as the presence of natural shelters etc., and any required adjustments to the defined sensitivities are made.

Step 2C – Define the Risk of Impacts

A1.10 The dust emission magnitude determined at Step 2A is combined with the sensitivity of the area determined at Step 2B to determine the risk of impacts with no mitigation applied. The IAQM guidance provides the matrix in Table A1-6 as a method of assigning the level of risk for each activity.

STEP 3: Determine Site-specific Mitigation Requirements

A1.11 The IAQM guidance provides a suite of recommended and desirable mitigation measures which are organised according to whether the outcome of Step 2 indicates a low, medium, or high risk. The list provided in the IAQM guidance has been used as the basis for the requirements set out in Appendix A4.

STEP 4: Determine Significant Effects

A1.12 The IAQM guidance does not provide a method for assessing the significance of effects before mitigation, and advises that pre-mitigation significance should not be determined. With appropriate mitigation in place, the IAQM guidance is clear that the residual effect will normally be 'not significant'.

A1.13 The IAQM guidance recognises that, even with a rigorous dust management plan in place, it is not possible to guarantee that the dust mitigation measures will be effective all of the time, for instance under adverse weather conditions. The local community may therefore experience occasional, short-term dust annoyance. The scale of this would not normally be considered sufficient to change the conclusion that the effects will be 'not significant'.

Table A1-2: Principles to be Used When Defining Receptor Sensitivities

Class	Principles	Examples
Sensitivities of People to Dust Soiling Effects		
High	users can reasonably expect enjoyment of a high level of amenity; or the appearance, aesthetics or value of their property would be diminished by soiling; and the people or property would reasonably be expected to be present continuously, or at least regularly for extended periods, as part of the normal pattern of use of the land	dwellings, museum and other culturally important collections, medium and long term car parks and car showrooms
Medium	users would expect to enjoy a reasonable level of amenity, but would not reasonably expect to enjoy the same level of amenity as in their home; or the appearance, aesthetics or value of their property could be diminished by soiling; or the people or property wouldn't reasonably be expected to be present here continuously or regularly for extended periods as part of the normal pattern of use of the land	parks and places of work
Low	the enjoyment of amenity would not reasonably be expected; or	playing fields, farmland (unless commercially-sensitive

Class	Principles	Examples
	there is property that would not reasonably be expected to be diminished in appearance, aesthetics or value by soiling; or there is transient exposure, where the people or property would reasonably be expected to be present only for limited periods of time as part of the normal pattern of use of the land	horticulture), footpaths, short term car parks and roads
Sensitivities of People to the Health Effects of PM_{10}		
High	locations where members of the public may be exposed for eight hours or more in a day	residential properties, hospitals, schools and residential care homes
Medium	locations where the people exposed are workers, and where individuals may be exposed for eight hours or more in a day.	may include office and shop workers, but will generally not include workers occupationally exposed to PM_{10}
Low	locations where human exposure is transient	public footpaths, playing fields, parks and shopping streets
Sensitivities of Receptors to Ecological Effects		
High	locations with an international or national designation and the designated features may be affected by dust soiling; or locations where there is a community of a particularly dust sensitive species	Special Areas of Conservation with dust sensitive features
Medium	locations where there is a particularly important plant species, where its dust sensitivity is uncertain or unknown; or locations with a national designation where the features may be affected by dust deposition	Sites of Special Scientific Interest with dust sensitive features
Low	locations with a local designation where the features may be affected by dust deposition	Local Nature Reserves with dust sensitive features

Table A1-3: Sensitivity of the Area to Dust Soiling Effects on People and Property [5]

Receptor Sensitivity	Number of Receptors	Distance from the Source (m)			
		<20	<50	<100	<250
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 A1-4: Sensitivity of the Area to Human Health Effects [5]

Receptor Sensitivity	Annual Mean PM_{10}	Number of Receptors	Distance from the Source (m)			
			<20	<50	<100	<250
High	>32 µg/m^3	>100	High	High	High	Medium
		10-100	High	High	Medium	Low
		1-10	High	Medium	Low	Low
	28-32 µg/m^3	>100	High	High	Medium	Low
		10-100	High	Medium	Low	Low
		1-10	High	Medium	Low	Low
	24-28 µg/m^3	>100	High	Medium	Low	Low
		10-100	High	Medium	Low	Low
		1-10	Medium	Low	Low	Low
	<24 µg/m^3	>100	Medium	Low	Low	Low
		10-100	Low	Low	Low	Low
		1-10	Low	Low	Low	Low
Medium	>32 µg/m^3	>10	High	Medium	Low	Low
		1-10	Medium	Low	Low	Low
	28-32 µg/m^3	>10	Medium	Low	Low	Low
		1-10	Low	Low	Low	Low
	24-28 µg/m^3	>10	Low	Low	Low	Low
		1-10	Low	Low	Low	Low

[5] For demolition, earthworks and construction, distances are taken either from the dust source or from the boundary of the site. For trackout, distances are measured from the sides of roads used by construction traffic. Without mitigation, trackout may occur from roads up to 250 m, as measured from the site exit. The impact declines with distance from the site, and it is only necessary to consider trackout impacts up to 50 m from the edge of the road.

Receptor Sensitivity	Annual Mean PM_{10}	Number of Receptors	Distance from the Source (m)			
			<20	<50	<100	<250
	<24 µg/m^3	>10	Low	Low	Low	Low
		1-10	Low	Low	Low	Low
Low	-	>1	Low	Low	Low	Low

Table A1-5: Sensitivity of the Area to Ecological Effects [5]

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

Table A1-6: Defining the Risk of Dust Impacts

Sensitivity of the Area	Dust Emission Magnitude		
	Large	Medium	Small
Demolition			
High	High Risk	Medium Risk	Medium Risk
Medium	High Risk	Medium Risk	Low Risk
Low	Medium Risk	Low Risk	Negligible
Earthworks			
High	High Risk	Medium Risk	Low Risk
Medium	Medium Risk	Medium Risk	Low Risk
Low	Low Risk	Low Risk	Negligible
Construction			
High	High Risk	Medium Risk	Low Risk
Medium	Medium Risk	Medium Risk	Low Risk
Low	Low Risk	Low Risk	Negligible
Trackout			
High	High Risk	Medium Risk	Low Risk
Medium	Medium Risk	Medium Risk	Low Risk
Low	Low Risk	Low Risk	Negligible

A2 EPUK & IAQM Planning for Air Quality Guidance

A2.1 The guidance issued by EPUK and IAQM (Moorcroft and Barrowcliffe et al, 2017) is comprehensive in its explanation of the place of air quality in the planning regime. Key sections of the guidance not already mentioned above are set out below.

Air Quality as a Material Consideration

"Any air quality issue that relates to land use and its development is capable of being a material planning consideration. The weight, however, given to air quality in making a planning application decision, in addition to the policies in the local plan, will depend on such factors as:

- *the severity of the impacts on air quality;*
- *the air quality in the area surrounding the proposed development;*
- *the likely use of the development, i.e. the length of time people are likely to be exposed at that location; and*
- *the positive benefits provided through other material considerations".*

Recommended Best Practice

A2.2 The guidance goes into detail on how all development proposals can and should adopt good design principles that reduce emissions and contribute to better air quality management. It states:

"The basic concept is that good practice to reduce emissions and exposure is incorporated into all developments at the outset, at a scale commensurate with the emissions".

A2.3 The guidance sets out a number of good practice principles that should be applied to all developments that:

- include 10 or more dwellings;
- where the number of dwellings is not known, residential development is carried out on a site of more than 0.5 ha;
- provide more than 1,000 m^2 of commercial floorspace;
- are carried out on land of 1 ha or more.

A2.4 The good practice principles are that:

- New developments should not contravene the Council's Air Quality Action Plan, or render any of the measures unworkable;
- Wherever possible, new developments should not create a new "street canyon", as this inhibits pollution dispersion;
- Delivering sustainable development should be the key theme of any application;
- New development should be designed to minimise public exposure to pollution sources, e.g. by locating habitable rooms away from busy roads;

- The provision of at least 1 Electric Vehicle (EV) "rapid charge" point per 10 residential dwellings and/or 1000 m^2 of commercial floorspace. Where on-site parking is provided for residential dwellings, EV charging points for each parking space should be made available;
- Where development generates significant additional traffic, provision of a detailed travel plan (with provision to measure its implementation and effect) which sets out measures to encourage sustainable means of transport (public, cycling and walking) via subsidised or free-ticketing, improved links to bus stops, improved infrastructure and layouts to improve accessibility and safety;
- All gas-fired boilers to meet a minimum standard of <40 mgNOx/kWh;
- Where emissions are likely to impact on an AQMA, all gas-fired CHP plant to meet a minimum emissions standard of:
  - Spark ignition engine: 250 mgNOx/Nm^3;
  - Compression ignition engine: 400 mgNOx/Nm^3;
  - Gas turbine: 50 mgNOx/Nm^3.
- A presumption should be to use natural gas-fired installations. Where biomass is proposed within an urban area it is to meet minimum emissions standards of 275 mgNOx/Nm^3 and 25 mgPM/Nm^3.

A2.5 The guidance also outlines that offsetting emissions might be used as a mitigation measure for a proposed development. However, it states that:

"It is important that obligations to include offsetting are proportional to the nature and scale of development proposed and the level of concern about air quality; such offsetting can be based on a quantification of the emissions associated with the development. These emissions can be assigned a value, based on the "damage cost approach" used by Defra, and then applied as an indicator of the level of offsetting required, or as a financial obligation on the developer. Unless some form of benchmarking is applied, it is impractical to include building emissions in this approach, but if the boiler and CHP emissions are consistent with the standards as described above then this is not essential".

A2.6 The guidance offers a widely used approach for quantifying costs associated with pollutant emissions from transport. It also outlines the following typical measures that may be considered to offset emissions, stating that measures to offset emissions may also be applied as post assessment mitigation:

- Support and promotion of car clubs;
- Contributions to low emission vehicle refuelling infrastructure;
- Provision of incentives for the uptake of low emission vehicles;
- Financial support to low emission public transport options; and
- Improvements to cycling and walking infrastructures.

Screening

Impacts of the Local Area on the Development

"There may be a requirement to carry out an air quality assessment for the impacts of the local area's emissions on the proposed development itself, to assess the exposure that residents or users might experience. This will need to be a matter of judgement and should take into account:

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

Impacts of the Development on the Local Area

A2.7 The guidance sets out two stages of screening criteria that can be used to identify whether a detailed air quality assessment is required, in terms of the impact of the development on the local area. The first stage is that you should proceed to the second stage if any of the following apply:

- 10 or more residential units or a site area of more than 0.5 ha residential use; and/or
- more than 1,000 m^2 of floor space for all other uses or a site area greater than 1 ha.

A2.8 Coupled with any of the following:

- the development has more than 10 parking spaces; and/or
- the development will have a centralised energy facility or other centralised combustion process.

A2.9 If the above do not apply then the development can be screened out as not requiring a detailed air quality assessment of the impact of the development on the local area. If they do apply then you proceed to stage 2, which sets out indicative criteria for requiring an air quality assessment. The stage 2 criteria relating to vehicle emissions are set out below:

- the development will lead to a change in LDV flows of more than 100 AADT within or adjacent to an AQMA or more than 500 AADT elsewhere;
- the development will lead to a change in HDV flows of more than 25 AADT within or adjacent to an AQMA or more than 100 AADT elsewhere;
- the development will lead to a realigning of roads (i.e. changing the proximity of receptors to traffic lanes) where the change is 5m or more and the road is within an AQMA;
- the development will introduce a new junction or remove an existing junction near to relevant receptors, and the junction will cause traffic to significantly change vehicle acceleration/deceleration, e.g. traffic lights or roundabouts;

- the development will introduce or change a bus station where bus flows will change by more than 25 AADT within or adjacent to an AQMA or more than 100 AADT elsewhere; and
- the development will have an underground car park with more than 100 movements per day (total in and out) with an extraction system that exhausts within 20 m of a relevant receptor.

A2.10 The criteria are more stringent where the traffic impacts may arise on roads where concentrations are close to the objective. The presence of an AQMA is taken to indicate the possibility of being close to the objective, but where whole authority AQMAs are present and it is known that the affected roads have concentrations below 90% of the objective, the less stringent criteria are likely to be more appropriate.

A2.11 On combustion processes (including standby emergency generators and shipping) where there is a risk of impacts at relevant receptors, the guidance states that:

"Typically, any combustion plant where the single or combined NOx emission rate is less than 5 mg/sec is unlikely to give rise to impacts, provided that the emissions are released from a vent or stack in a location and at a height that provides adequate dispersion. As a guide, the 5 mg/s criterion equates to a 450 kW ultra-low NOx gas boiler or a 30kW CHP unit operating at <95mg/Nm^3.

In situations where the emissions are released close to buildings with relevant receptors, or where the dispersion of the plume may be adversely affected by the size and/or height of adjacent buildings (including situations where the stack height is lower than the receptor) then consideration will need to be given to potential impacts at much lower emission rates.

Conversely, where existing nitrogen dioxide concentrations are low, and where the dispersion conditions are favourable, a much higher emission rate may be acceptable".

A2.12 Should none of the above apply then the development can be screened out as not requiring a detailed air quality assessment of the impact of the development on the local area, provided that professional judgement is applied; the guidance importantly states the following:

"The criteria provided are precautionary and should be treated as indicative. They are intended to function as a sensitive 'trigger' for initiating an assessment in cases where there is a possibility of significant effects arising on local air quality. This possibility will, self-evidently, not be realised in many cases. The criteria should not be applied rigidly; in some instances, it may be appropriate to amend them on the basis of professional judgement, bearing in mind that the objective is to identify situations where there is a possibility of a significant effect on local air quality".

A2.13 Even if a development cannot be screened out, the guidance is clear that a detailed assessment is not necessarily required:

"The use of a Simple Assessment may be appropriate, where it will clearly suffice for the purposes of reaching a conclusion on the significance of effects on local air quality. The principle underlying this guidance is that any assessment should provide enough evidence that will lead to a sound conclusion on the presence, or otherwise, of a significant effect on local air quality. A Simple Assessment will be appropriate, if it can provide this evidence. Similarly, it may be possible to conduct a quantitative assessment that does not require the use of a dispersion model run on a computer".

A2.14 The guidance also outlines what the content of the air quality assessment should include, and this has been adhered to in the production of this report.

Assessment of Significance

A2.15 There is no official guidance in the UK in relation to development control on how to describe the nature of air quality impacts, nor how to assess their significance. The approach within the EPUK/IAQM guidance has, therefore, been used in this assessment. This approach involves a two stage process:

- a qualitative or quantitative description of the impacts on local air quality arising from the development; and
- a judgement on the overall significance of the effects of any impacts.

A2.16 The guidance recommends that the assessment of significance should be based on professional judgement, with the overall air quality impact of the development described as either 'significant' or 'not significant'. In drawing this conclusion, the following factors should be taken into account:

- the existing and future air quality in the absence of the development;
- the extent of current and future population exposure to the impacts;
- the influence and validity of any assumptions adopted when undertaking the prediction of impacts;
- the potential for cumulative impacts and, in such circumstances, several impacts that are described as 'slight' individually could, taken together, be regarded as having a significant effect for the purposes of air quality management in an area, especially where it is proving difficult to reduce concentrations of a pollutant. Conversely, a 'moderate' or 'substantial' impact may not have a significant effect if it is confined to a very small area and where it is not obviously the cause of harm to human health; and
- the judgement on significance relates to the consequences of the impacts; will they have an effect on human health that could be considered as significant? In the majority of cases, the impacts from an individual development will be insufficiently large to result in measurable changes in health outcomes that could be regarded as significant by health care professionals.

A2.17 The guidance is clear that other factors may be relevant in individual cases. It also states that the effect on the residents of any new development where the air quality is such that an air quality objective is not met will be judged as significant. For people working at new developments in this situation, the same will not be true as occupational exposure standards are different, although any assessment may wish to draw attention to the undesirability of the exposure.

A2.18 A judgement of the significance should be made by a competent professional who is suitably qualified. A summary of the professional experience of the staff contributing to this assessment is provided in Appendix A3.

A3 Professional Experience

Martin Peirce, BSc (Hons), MSc, MIEncSci, MIAQM

Mr Peirce is an Associate Director with AQC and has some thirty years' experience in environmental modelling and assessment, most relating to air quality and carbon and greenhouse gases (GHGs). He has extensive experience in the calculation of emissions to air and compiling emission inventories, for both local air quality assessments and carbon footprinting. For air quality, he also has extensive expertise in modelling the atmospheric dispersion of pollutants for comparison against regulatory limits and for assessment of health and environmental impacts. He has prepared assessments in support of Environmental Impact Assessments (EIA), permit applications and planning applications (under both Town and Country Planning Act (TCPA) and Development Consent Order (DCO) regimes), and has acted as expert witness. He has particular experience in modelling aviation and transport sources, non-road mobile machinery, construction and industrial sources.

Dr Kate Wilkins, BSc (Hons) MSc PhD CSci MIEnvSc MIAQM

Dr Wilkins is a Principal Consultant with AQC with seven years' experience in the field of air quality. Since joining AQC in January 2018, she has undertaken numerous air quality impact assessments for road traffic, combustion plant and construction dust throughout the UK for both standalone assessments and for EIAs, and has also prepared local authority reports and literature reviews. She has contributed her technical skills in programming, specialist software and data analysis to a range of large-scale projects, including the third runway at Heathrow airport. Previously, Kate completed a PhD at the University of Bristol, researching atmospheric dispersion modelling and satellite remote sensing of volcanic ash. She is a Chartered Scientist and a Member of both the Institute of Air Quality Management and the Institution of Environmental Sciences.

A4 Construction Mitigation

A4.1 Table A4-1 sets out a list of best-practice measures from the IAQM guidance (IAQM, 2024) that should be incorporated into the specification for the works. These measures should ideally be written into a Dust Management Plan (DMP). Some of the measures may only be necessary during specific phases of work, or during activities with a high potential to produce dust, and the list should be refined and expanded upon in liaison with the construction contractor when producing the DMP.

Table A4-1: Best-Practice Mitigation Measures Recommended for the Works

Measure	Desirable	Highly Recommended
Communications		
Develop and implement a stakeholder communications plan that includes community engagement before and during work 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 environmental manager/engineer or the site manager		✓
Display the head or regional office contact information		✓
Dust Management Plan		
Develop and implement a DMP approved by the Local Authority which documents the mitigation measures to be applied, and the procedures for their implementation and management		✓
Site Management		
Record all dust and air quality complaints, identify cause(s), take appropriate measures to reduce emissions in a timely manner, and record the measures taken		✓
Make the complaints log available to the local authority when asked		✓
Record any exceptional incidents that cause dust and/or air emissions, either on- or off- site, and the action taken to resolve the situation in the log book		✓
Hold regular liaison meetings with other high risk construction sites within 250 m of the site boundary, to ensure plans are co-ordinated and dust and particulate matter emissions are minimised. It is important to understand the interactions of the off-site transport/deliveries which might be using the same strategic road network routes		✓
Monitoring		
Undertake daily on-site and off-site inspections 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		✓

Measure	Desirable	Highly Recommended
regular dust soiling checks of surfaces such as street furniture, cars and window sills 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 or, if it is a large site, before work on a phase commences. Further guidance is provided by IAQM on monitoring during demolition, earthworks and construction (IAQM, 2018)		✓
Preparing and Maintaining the Site		
Plan the 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 that are at least as high as any stockpiles on site		✓
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 on-site cover as described below		✓
Cover, seed, or fence stockpiles to prevent wind whipping		✓
Operating Vehicle/Machinery and Sustainable Travel		
Ensure all vehicles switch off their 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		✓

Measure	Desirable	Highly Recommended
Impose and signpost a maximum-speed-limit of 15 mph on surfaced and 10 mph on un-surfaced haul roads and work areas (if long haul routes are required these speeds may be increased with suitable additional control measures provided, subject to the approval of the nominated undertaker and with the agreement of the local authority, where appropriate)		✓
Produce a Construction Logistics Plan to manage the sustainable delivery of goods and materials		✓
Implement a Travel Plan that supports and encourages sustainable staff 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, 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		✓
Measures Specific to Earthworks		
Re-vegetate earthworks and exposed areas/soil stockpiles to stabilise surfaces as soon as practicable		✓
Use Hessian, mulches or trackifiers where it is not possible to re-vegetate or cover with topsoil, as soon as practicable		✓
Only remove the cover from small areas during work, not all at once		✓
Measures Specific to Construction		
Avoid scabbling (roughening of concrete surfaces), if possible		✓

Measure	Desirable	Highly Recommended
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		✓
For smaller supplies of fine powder materials ensure bags are sealed after use and stored appropriately to prevent dust	✓	
Measures Specific to Trackout		
Use water-assisted dust sweeper(s) on the access and local roads, to remove, as necessary, any material tracked out of the site. This may require the sweeper being continuously in use		✓
Avoid dry sweeping of large areas		✓
Ensure vehicles entering and leaving sites are covered to prevent escape of materials during transport		✓
Inspect on-site haul routes for integrity and instigate necessary repairs to the surface as soon as reasonably practicable		✓
Record all inspections of haul routes and any subsequent action in a site log book		✓
Install hard surfaced haul routes, which are regularly damped down with fixed or mobile sprinkler systems or mobile water bowsers, and regularly cleaned		✓
Implement a wheel washing system (with rumble grids to dislodge accumulated dust and mud prior to leaving the site where reasonably practicable)		✓
Ensure there is an adequate area of hard surfaced road between the wheel wash facility and the site exit, wherever site size and layout permits		✓
Access gates should be located at least 10 m from receptors, where possible		✓

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