



Riverside Central, Reading

Air Quality Assessment

On behalf of **Lipman Properties**

LIPMAN
P R O P E R T I E S

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1 Introduction

1.1 Proposed Development

- 1.1.1 Lipman Properties has commissioned Stantec to undertake an air quality assessment to support a planning application for the proposed residential development at Dukesbridge House, within the administrative boundary of Reading Borough Council (RBC).
- 1.1.2 Historically, the building comprised of retail accommodation, a basement nightclub and a waterside self-contained office arranged over a basement, ground and four upper floors. Nineteen car parking spaces were provided within the site. In June 2019, the site was subject to a General Permitted Development (GPD) application which sought the change of use of part lower ground floor, part ground floor, first, second, third and loft floors from Class B1(a)(offices) to Class C3 (dwelling houses) to comprise 77 dwellings. The application was granted planning permission by RBC in June 2019.
- 1.1.3 The current development proposals seek permission for a roof and side extensions to the existing building to provide a residential-led scheme with associated landscaping, public realm improvements, alterations to the existing vehicular access and car parking and provision of cycle parking and waste storage

1.2 Scope of Assessment

- 1.2.1 This report describes existing air quality within the study area, considers the suitability of the site for residential development, and assesses the impact of construction activities and operation of the development on air quality in the surrounding area. The main air pollutants of concern related to construction are dust and fine particulate matter (PM₁₀), and for road traffic are nitrogen dioxide (NO₂) and PM₁₀.
- 1.2.2 The assessment has been prepared taking into account relevant local and national guidance, policy and legislation.

2 Legislation, Policy and Guidance

2.1 National Air Quality Objectives

- 2.1.1 The National Air Quality Objectives (NAQOs) are defined by the Air Quality Standards (Amendment) Regulations 2016, which implement the European Union's Directive on ambient air quality and cleaner air for Europe (2008/50/EC).
- 2.1.2 Directive 2008/50/EC consolidated the previous framework directive on ambient air quality assessment and management and its first three daughter directives. The limit values remained unchanged, but it now allows Member States a time extension for compliance, subject to European Commission (EC) approval.
- 2.1.3 The NAQOs for NO₂ and PM₁₀ are shown in **Table 2-1**.

Table 2-1 NO₂ and PM₁₀ Objectives

Pollutant	Time Period	Objective
Nitrogen Dioxide (NO ₂)	1-hour mean	200 µg/m ³ not to be exceeded more than 18 times a year
	Annual mean	40 µg/m ³
Particulate Matter (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

- 2.1.4 The NAQO's for NO₂ and PM₁₀ were to have been achieved by 2005 and 2004, respectively, but also continue to apply in all future years thereafter.
- 2.1.5 In relation to PM_{2.5}, the EU Directive (2008/50/EC) includes a national exposure reduction target, a target value and a limit value for PM_{2.5}, shown in **Table 2-2**. The UK Government transposed this new directive into national legislation in June 2010.
- 2.1.6 The Air Quality Strategy 2007 (Defra, 2007) includes limits for PM_{2.5} comprising an annual mean target of 25 µg/m³ by 2020 and an average urban background exposure reduction target of 15% between 2010 and 2020. The Air Quality Strategy is discussed further in **Section 2.2**.

Table 2-2 PM_{2.5} Objectives

	Time Period	Objective	To be Achieved by
UK Objectives	Annual mean	25 µg/m ³	2020
	3 year running annual mean	15% reduction in concentrations measured at urban background sites	Between 2010 and 2020
European Obligations	Annual mean	Target value of 25 µg/m ³	2010
	Annual mean	Limit value of 25 µg/m ³	2015
	Annual mean	Stage 2 indicative Limit value of 20 µg/m ³	2020
	3 year Average Exposure Indicator (AEI) (a)	Exposure reduction target relative to the AEI depending on the 2010 value of the 3 year AEI (ranging	2020

	Time Period	Objective	To be Achieved by
		from a 0% to a 20% reduction)	
	3 year Average Exposure Indicator (AEI)	Exposure concentration obligation of 20 µg/m ³	2015

(a) The 3 year annual or AEI is calculated from the PM_{2.5} concentration averaged across all urban background monitoring locations in the UK e.g. the AEI for 2010 is the mean concentration measured over 2008, 2009 and 2010.

2.2 The Air Quality Strategy

- 2.2.1 The Air Quality Strategy (2007) establishes the policy framework for ambient air quality management and assessment in the UK (Defra, 2007). The primary objective of the Air Quality Strategy is to ensure that everyone can enjoy a level of ambient air quality which poses no significant risk to health or quality of life. The Air Quality Strategy sets out the NAQOs and Government policy on achieving these.
- 2.2.2 Part IV of the Environment Act 1995 (Environment Act, 1995) introduced a system of Local Air Quality Management (LAQM) which requires local authorities to regularly and systematically review and assess air quality within their boundary, and appraise development and transport plans against these assessments.
- 2.2.3 Where a NAQO is unlikely to be met, the local authority must designate an Air Quality Management Area (AQMA) and draw up an Air Quality Action Plan (AQAP) setting out the measures it intends to introduce in pursuit of the NAQO's within its AQMA.
- 2.2.4 The Local Air Quality Management Technical Guidance 2016 (LAQM.TG(16); Defra, 2016), issued by the Department for Environment, Food and Rural Affairs (Defra) for Local Authorities provides advice as to where the NAQOs apply. These include outdoor locations where members of the public are likely to be regularly present for the averaging period of the objective (which vary from 15 minutes to a year), as summarised in **Table 2-3**.

Table 2-3 Relevant Public Exposure

Averaging Period	Relevant Locations	NAQO's should apply at:	NAQO's don't apply at:
Annual mean	Where individuals are exposed for a cumulative period of 6 months in a year.	Building facades of residential properties, schools, hospitals etc.	Facades of offices Hotels Gardens of residences Kerbside sites
1-hour mean	Where individuals might reasonably expected to spend one hour or longer.	As above together with locations of regular access, car parks, bus stations etc.	Locations not publicly accessible or where occupation is not regular.
15-minute mean	All locations where members of the public might reasonably be regularly exposed for a period of 15-minutes or longer.		

Clean Air Strategy 2019

- 2.2.5 The Clean Air Strategy (2019) aims to lower national emissions of pollutants, thereby reducing background pollution and minimising human exposure to harmful concentrations of pollution. The Strategy also states that it will create a stronger and more coherent framework for action to tackle air pollution (Defra, 2019a).

2.3 Planning Policy

National Policy

2.3.1 The National Planning Policy Framework (NPPF) sets out the Government's planning policies for England and how they are expected to be applied (Ministry of Housing, Communities & Local Government, 2019). The following paragraphs are considered relevant from an air quality perspective.

2.3.2 Paragraph 170 on conserving and enhancing the natural environment states:

"Planning policies and decisions should contribute to and enhance the natural and local environment by: ...

e) preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land stability. 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, and..."

2.3.3 Paragraph 180 within ground conditions and pollution 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."

2.3.4 Paragraph 181 states that:

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

2.3.5 Paragraph 182 states that:

"Planning policies and decisions should ensure that new development can be integrated effectively with existing businesses and community facilities (such as places of worship, pubs, music venues and sports clubs). Existing businesses and facilities should not have unreasonable restrictions placed on them as a result of development permitted after they were established. Where the operation of an existing business or community facility could have a significant adverse effect on new development (including changes of use) in its vicinity, the applicant (or 'agent of change') should be required to provide suitable mitigation before the development has been completed".

Planning Practice Guidance

2.3.6 Paragraph 005, Reference 32-005-20191101 (revision date 01.11.2019), of the PPG provides guidance on how considerations regarding air quality can be relevant to the development management process as follows:

“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.

Where air quality is a relevant consideration the local planning authority may need to establish:

- *The 'baseline' local air quality, including what would happen to air quality in the absence of the development;*
- *Whether the proposed development could significantly change air quality during the construction and operational phases (and the consequences of this for public health and biodiversity); and*
- *Whether occupiers or users of the development could experience poor living conditions or health due to poor air quality.*

2.3.7 Paragraph 006, Reference 32-006-20191101 (revision date 01.11.2019), of the PPG identifies what specific air quality issues need to be considered in determining a planning application:

“Considerations that may be relevant to determining a planning application include whether the development would:

- *Lead to changes (including any potential reductions) in vehicle-related emissions in the immediate vicinity of the proposed development or further afield. This could be through the provision of electric vehicle charging infrastructure; altering the level of traffic congestion; significantly changing traffic volumes, vehicle speeds or both; and significantly altering the traffic composition on local roads. Other matters to consider include whether the proposal involves the development of a bus station, coach or lorry park; could add to turnover in a large car park; or involve construction sites that would generate large Heavy Goods Vehicle flows over a period of a year or more;*
- *Introduce new point sources of air pollution. This could include furnaces which require prior notification to local authorities; biomass boilers or biomass-fuelled Combined Heat and Power plant; centralised boilers or plant burning other fuels within or close to an air quality management area or introduce relevant combustion within a Smoke Control Area; or extraction systems (including chimneys) which require approval or permits under pollution control legislation;*
- *Expose people to harmful concentrations of air pollutants, including dust. This could be by building new homes, schools, workplaces or other development in places with poor air quality;*
- *Give rise to potentially unacceptable impacts (such as dust) during construction for nearby sensitive locations; and*
- *Have a potential adverse effect on biodiversity, especially where it would affect sites designated for their biodiversity value.”*

2.3.8 Paragraph 007, Reference 32-007-20191101 (revision date 01.11.2019), of the PPG provides guidance on how detailed an assessment needs to be;

“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.”

and

“The following could form part of assessments:

- *A description of baseline conditions and any air quality concerns affecting the area, and how these could change both with and without the proposed development;*
- *Sensitive habitats (including designated sites of importance for biodiversity);*
- *the assessment methods to be adopted and any requirements for the verification of modelling air quality;*
- *The basis for assessing impacts and determining the significance of an impact;*
- *Where relevant, the cumulative or in-combination effects arising from several developments;*
- *Construction phase impacts;*
- *Acceptable mitigation measures to reduce or remove adverse effects; and*
- *Measures that could deliver improved air quality even when legally binding limits for concentrations of major air pollutants are not being breached.”*

2.3.9 Paragraph 008, Reference 32-008-20140306 (revision date 01.11.2019), of the PPG provides guidance on how an impact on air quality can be mitigated;

“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. Planning conditions and obligations can be used to secure mitigation where the relevant tests are met.

Examples of mitigation include:

- *Maintaining adequate separation distances between sources of air pollution and receptors;*
- *Using green infrastructure, trees, where this can create a barrier or maintain separation between sources of pollution and receptors;*
- *Appropriate means of filtration and ventilation;*
- *Including infrastructure to promote modes of transport with a low impact on air quality (such as electric vehicle charging points);*
- *Controlling dust and emissions from construction, operation and demolition; and*
- *Contributing funding to measures, including those identified in air quality action plans and low emission strategies, designed to offset the impact on air quality arising from new development.”*

Local Policy

New Local Plan

- 2.3.10 The RBC Local Plan, adopted in November 2019, provides the planning policies to guide development in the borough up to 2036 (RBC, 2019a). The Local Plan contains policy EN15 on Air Quality which states:

“Development should have regard to the need to improve air quality and reduce the effects of poor air quality.

i. Development that would detrimentally affect air quality will not be permitted unless the effect is to be mitigated. The following criteria should be taken into account:

- *Whether the proposal, including when combined with the cumulative effect of other developments already permitted, would worsen air quality;*
- *Whether the development is within, or accessed via, an Air Quality Management Area; and*
- *Whether it can be demonstrated that a local worsening in air quality that would not detrimentally affect human health or the environment would be offset by an overall improvement in air quality, for instance through the reduction in need to travel.*

ii. Where a development would introduce sensitive uses (such as residential, schools and nurseries, hospitals, care facilities) into, or intensify such uses within, an Air Quality Management Area, detrimental effects on that use will be mitigated. Mitigation measures should be detailed in any planning application. If there are significant detrimental effects that cannot be mitigated, the application should be refused.

iii. Where required, planning obligations will be used to secure contributions to measures to tackle poor air quality or for air quality monitoring.”

Air Quality Action Plan

- 2.3.11 RBC has declared an AQMA in the borough due to exceedances of the annual mean NO₂ objective. As a result, RBC has the responsibility to prepare an AQAP. The revised AQAP (RBC, 2016) contains measures aimed at improving air quality across Reading, centred around two themes: ‘intervention’ and ‘education/promotion’. In addition to a number of measures targeted at improving traffic congestion in the central area, and reducing the number of trips made by car, the AQAP contains a measure of particular relevance to new development in the borough:

“We will ensure through the planning process that future development does not result in further deterioration in air quality and where possible, results in an improvement in overall environmental quality”.

2.4 Assessment Guidance

- 2.4.1 The primary guidance documents used in undertaking this assessment are detailed below.

Defra ‘Local Air Quality Management Technical Guidance (LAQM.TG(16))’

- 2.4.2 Defra LAQM.TG(16) was published for use by local authorities in their LAQM review and assessment work (Defra, 2016). The document provides key guidance on aspects of air quality assessment, including screening, use of monitoring data, and use of background data that are applicable to all air quality assessments.

EPUK-IAQM 'Land-Use Planning & Development Control: Planning for Air Quality'

- 2.4.3 Environmental Protection UK (EPUK) and the Institute of Air Quality Management (IAQM) have together published guidance to help ensure that air quality is properly accounted for in the development control process (EPUK IAQM 2017). It clarifies when an air quality assessment should be undertaken, what it should contain, and how impacts should be described and assessed including guidelines for assessing the significance of impacts.

IAQM 'Guidance on the Assessment of Dust from Demolition and Construction'

- 2.4.4 Guidance on the assessment of dust from demolition and construction has been published by the IAQM (IAQM, 2014). The guidance provides a series of matrices to determine the risk magnitude of potential dust sources associated with construction activities in order to identify appropriate mitigation measures that are defined within further IAQM guidance.

3 Methodology

- 3.1.1 The assessment methodology detailed in the following sections has been applied to ascertain the suitability of the site for the proposed end-use so that compliance with policy and regulatory requirements (outlined in **Section 2** of this report) can be demonstrated, or whether additional mitigation is required.
- 3.1.2 This assessment first outlines the existing air quality within the study area, then considers the suitability of the site for the proposed end-use. It also assesses the impact of construction and operational activities on air quality and sensitive receptors in the study area.

3.2 Baseline Air Quality

- 3.2.1 Information on baseline air quality in the study area has been obtained by collating the results of monitoring carried out by RBC. Background concentrations for the study area have been defined using the national pollution maps published by Defra. These cover the whole country on a 1x1 km grid (Defra, 2019b).

3.3 Construction Dust Impacts

- 3.3.1 The Institute of Air Quality Management (IAQM) has issued guidance on the assessment of dust from demolition and construction (IAQM, 2014). Within the IAQM guidance, an 'impact' is described as a change in pollutant concentrations or dust deposition and an 'effect' is described as the consequence of an impact.
- 3.3.2 During pre-construction demolition and construction the main potential effects are dust annoyance and locally elevated concentrations of PM₁₀. The suspension of particles in the air is dependent on surface characteristics, weather conditions and on-site activities. Impacts have the potential to occur when dust generating activities coincide with dry, windy conditions, and where sensitive receptors are located downwind of the dust source.
- 3.3.3 Separation distance is also an important factor. Large dust particles (greater than 30 µm), responsible for most dust annoyance, will largely deposit within 100 m of sources. Intermediate particles (10-30 µm) can travel 200-500 m. Consequently, significant dust annoyance is usually limited to within a few hundred metres of its source. Smaller particles (less than 10µm) are deposited slowly and may travel up to 1 km; however, the impact on the short-term concentrations of PM₁₀ occurs over a shorter distance. This is due to the rapid decrease in concentrations with distance from the source due to dispersion.
- 3.3.4 The IAQM guidance recommends that the risk of dust emission magnitude is combined with the sensitivity of the area surrounding the site to determine the risk of dust impacts from construction and demolition activities. Depending on the level of risk (high, medium, low or negligible) for each activity, appropriate mitigation is selected.
- 3.3.5 In accordance with the IAQM, the dust emission magnitude is defined as either large, medium or small (summarised in **Table 3-1**) taking into account the general activity descriptors on site and professional judgement.
- 3.3.6 The sensitivity of the study area to construction dust impacts is defined based on the examples provided within the IAQM 2014 guidance (summarised in **Table 3-2**), taking into account professional judgement.

Table 3-1 Indicative Criteria for Dust Emission Magnitude

Dust Emission Magnitude	Activity
Large	Demolition >50,000 m ³ building demolished, dusty material (e.g. concrete), on-site crushing/screening, demolition >20 m above ground level
	Earthworks >10,000 m ² site area, dusty soil type (e.g. clay) >10 earth moving vehicles active simultaneously >8 m high bunds formed, >100,000 tonnes material moved
	Construction >100,000 m ³ building volume, on site concrete batching, sandblasting
	Trackout >50 HDVs out / day, dusty soil type (e.g. clay), >100 m unpaved roads
Medium	Demolition 20,000 - 50,000 m ³ building demolished, dusty material (e.g. concrete) 10-20 m above ground level
	Earthworks 2,500 - 10,000 m ² site area, moderately dusty soil (e.g. silt), 5 - 10 earth moving vehicles active simultaneously, 4 m - 8 m high bunds, 20,000 - 100,000 tonnes material moved
	Construction 25,000 - 100,000 m ³ building volume, on site concrete batching
	Trackout 10 - 50 HDVs out / day, moderately dusty surface material, 50 -100 m unpaved roads
Small	Demolition <20,000 m ³ building demolished, non-dusty material, <10 m above ground level, work in winter
	Earthworks <2,500 m ² site area, non-dusty soil, <5 earth moving vehicles active simultaneously, <4 m high bunds, <20,000 tonnes material moved
	Construction <25,000 m ³ , non-dusty material
	Trackout <10 HDVs out / day, non-dusty soil, < 50 m unpaved roads

Table 3-2 Indicative Area Sensitivity Definitions

Area Sensitivity	People and Property Receptors	Ecological Receptors
High	>100 dwellings, hospitals, schools, care homes within 50 m 10 - 100 dwellings within 20 m Museums, car parks, car showrooms within 50 m PM ₁₀ concentrations approach or are above the daily mean objective.	National or Internationally designated site within 20 m with dust sensitive features / species present
Medium	>100 dwellings, hospitals, schools, care homes within 100 m 10 - 100 dwellings within 50 m < 10 dwellings within 20 m Offices/shops/parks within 20 m PM ₁₀ concentrations below the daily mean objective.	National or Internationally designated site within 50 m with dust sensitive features / species present Nationally designated site or particularly important plant species within 20 m
Low	>100 dwellings, hospitals, schools, care homes 100 - 350m away 10 - 100 dwellings within 50 – 350 m < 10 dwellings within 20 – 350 m Playing fields, parks, farmland, footpaths, short term car parks, roads, shopping streets PM ₁₀ concentrations well below the daily mean objective.	Nationally designated site or particularly important plant species 20 – 50 m Locally designated site with dust sensitive features within 50 m

- 3.3.7 Based on the dust emission magnitude and the area sensitivity, the risk of dust impacts is then determined (**Table 3-3**, **Table 3-4** and **Table 3-5**).

Table 3-3 Risk of Dust Impacts - Demolition

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

Table 3-4 Risk of Dust Impacts - Earthworks and Construction

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

Table 3-5 Risk of Dust Impacts - Trackout

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

- 3.3.8 Based on the risk of dust impacts, appropriate mitigation is selected from the IAQM guidance using professional judgement.

Significance Criteria

- 3.3.9 The construction impact significance criteria are based on the IAQM guidance. The guidance recommends that no assessment of the significance of effects is made without mitigation in place, as mitigation is assumed to be secured by planning conditions, legal requirements or required by regulations.
- 3.3.10 With appropriate mitigation in place, the residual effect of construction impacts on air quality is assessed as being not significant.

3.4 Road Traffic Impacts

- 3.4.1 EPUK and the IAQM have published the 'Land-Use Planning and Development Control: Planning for Air Quality' guidance to ensure air quality is adequately considered in land-use planning and development control (EPUK IAQM, 2017). The indicative criteria for requiring an air quality assessment include:
- A change in Light Duty Vehicles (LDVs) flows of more than 100 Annual Average Daily Traffic (AADT) within or adjacent to an AQMA or more than 500 AADT elsewhere.
 - A change in Heavy Duty Vehicles (HDVs) flow of more than 25 AADT within or adjacent to an AQMA or more than 100 AADT elsewhere.
- 3.4.2 The above criteria are for when an assessment may be required. If traffic from a development exceeds these levels, then it does not necessarily mean that a modelling assessment is necessary, only that air quality impacts of traffic require more detailed consideration. If development traffic is below the above thresholds, the impacts are considered to be insignificant and no further assessment is considered necessary.

4 Baseline Environment

4.1 Site Context and Study Area

- 4.1.1 Dukesbridge House fronts onto the River Kennet, with Duke Street/London Street to the west. The site is located within the centre of Reading to the east of The Oracle shopping mall.
- 4.1.2 For the construction phase assessment, the study area (based on IAQM, 2014 guidance) is defined as up to 350 m from the development or 50 m from the route of construction vehicles (up to 500 m from the site entrance).
- 4.1.3 For the operational phase assessment, the study area (based on EPUK IAQM, 2017 guidance) is defined as all roads within 250 m of the development and any other roads predicted to experience a significant increase in road traffic as a result of the development ([Section 3.4](#)).

4.2 Ambient Air Quality

LAQM

- 4.2.1 RBC has investigated air quality within its area as part of its responsibilities under the LAQM regime and has declared an AQMA due to exceedances of the annual mean NO₂ objective. The AQMA encompasses the central area and the main arterial routes in and out of Reading. The site is located within the Reading AQMA.

Local Monitoring Data

Nitrogen Dioxide (NO₂)

- 4.2.2 RBC carries out automatic monitoring at three roadside sites in the borough. In addition, Defra carries out monitoring at one automatic urban background monitoring site in the borough as part of the Automatic Urban and Rural Network (AURN). RBC also operates a network of diffusion tubes to monitor NO₂ concentrations. The closest monitoring location, DT01 on Queens Road, is located approximately 250 m southeast of the site. The closest monitoring locations are described in [Table 4-2](#) below and their locations are shown in [Figure 1, Appendix B](#).

Table 4-1 Measured NO₂ Concentrations

Site ID	Site Type	Within AQMA	Annual Mean (µg/m3)				
			2014	2015	2016	2017	2018
Diffusion Tubes							
DT01	Roadside	Yes	38	33	33	31	32
DT39	Roadside	Yes	53	47	52	50	42
Objective		40					

Exceedances of the objective highlighted in bold.

2014 – 2018 data obtained from the Reading Borough Council 2019 Air Quality Annual Status Report (ASR) (RBC, 2019).

- 4.2.3 Measured annual NO₂ mean concentrations at the closest monitoring location to the development site, Site DT01 on Queens Road, have been below the relevant objective between 2014 – 2018. Measured concentrations at DT39 have been above the objective, however the diffusion tube is in a city centre location and therefore not representative of conditions at the proposed development site. There is no clear trend year on year, however concentrations are lower in 2018 than in 2014 at both monitoring sites which is typical in the UK over recent years (AQC 2019).

Particulates (PM₁₀ and PM_{2.5})

4.2.4 There is no PM₁₀ or PM_{2.5} monitoring undertaken in close proximity to the site.

4.3 Predicted Background Concentrations

4.3.1 In addition to these measured concentrations, estimated background concentrations for the site have been obtained from the national maps provided by Defra (Defra, 2019b). The Defra background concentrations for the site are provided in **Table 4 2**.

4.3.2 The background concentrations are all well below the relevant objectives.

Table 4-2 Annual Mean Background Concentrations

Year	Location	Annual Mean (µg/m3)		
		NO2	PM ₁₀	PM _{2.5}
2020	471_173	25.4	15.6	10.8
Objectives		40	40	25

5 Predicated Impacts

5.1 Construction Dust Impacts

- 5.1.1 The main potential effects during construction are dust deposition and elevated PM₁₀ concentrations. The following activities have the potential to cause emissions of dust:
- Site preparation including delivery of construction material, erection of fences and barriers;
 - Earthworks including digging foundations and landscaping;
 - Materials handling such as storage of material in stockpiles and spillage;
 - Construction and fabrication of units; and
 - Disposal of waste materials off-site.
- 5.1.2 Typically, the main cause of unmitigated dust generation on construction sites is from demolition and vehicles using unpaved haul roads, and off-site from the suspension of dust from mud deposited on local roads by construction traffic. There is, however, no demolition associated with the development. The main determinants of unmitigated dust annoyance are the weather and the distance to the nearest receptor.
- 5.1.3 Based on the IAQM guidance criteria (**Table 3-1**), the potential dust emission magnitude for the phases of construction are as follows:
- for earthworks, the emissions magnitude is classified as 'small' as limited earthwork is required;
 - for construction activities, the dust emission magnitude is considered to be 'small' as the total building volume to be constructed will be less than 25,000 m²; and
 - For trackout, the dust emission magnitude is considered to be 'small' as there are anticipated to be less than 50 m of unpaved road.
- 5.1.4 The study area is considered to be of 'medium' sensitivity to potential dust soiling impacts (**Table 3-2**), due to the number of residential receptors in close proximity to the site.
- 5.1.5 The study area is considered to be of 'low' sensitivity to potential PM₁₀ impacts (**Table 3-2**), due to the baseline PM₁₀ concentrations.
- 5.1.6 There are no sensitive ecological receptors within 50 m of the site and therefore the study area is not considered to be sensitive to potential dust or PM₁₀ impacts on ecological receptors.
- 5.1.7 The risk of dust soiling impacts are classified as 'low' risk for construction and earthworks, and 'negligible' for trackout. The risk of PM₁₀ impacts are classified as 'negligible' risk for earthworks, trackout and construction. Appropriate mitigation measures corresponding to the level of risk identified for each activity are therefore required during the construction phase of the development (**see paragraph 6.1.1**).

5.2 Road Traffic Impacts

Construction

- 5.2.1 Vehicle movements associated with access and construction will vary through the construction programme, with short periods of peak HGV movements associated with the delivery of materials during the construction phase. However, when the HGV movements are averaged over a full year period (AADT), these are expected to be below the IAQM guidance criteria stated in **Paragraph 3.4.1**.
- 5.2.2 Together with the implementation of a CLP and CEMP, the construction vehicle movements impacts on human receptors in the area are considered to be temporary and not significant.

Operation

- 5.2.3 The Transport Statement prepared by Stantec (formerly Peter Brett Associates LLP), states that there will be a reduction in trips associated with the site with the proposed development in place, compared to the existing site use (Stantec, 2019). The potential impacts on air quality from road traffic associated with the development will therefore not be significant and no further assessment is required.

5.3 Site Suitability

- 5.3.1 The site is located within an AQMA, however measured concentrations at the closest monitoring location indicate that the NAQOs are unlikely to be exceeded within the site. Furthermore, the closest proposed residential properties to Duke Street, which is considered to be the main source of road traffic emissions in relation to the site, will be located on the 1st to 5th floors, with no residential proposed at ground floor. Residential properties are also proposed at the small side extension to the east of the site, however this will also be at 1st floor and above and approximately 50m from Duke Street. Given the separation distance between Duke Street and the proposed residential properties, it is considered that air quality for future residents within the site will be acceptable.

6 Mitigation

6.1 Construction

6.1.1 The following standard 'low' risk mitigation measures from the IAQM 2014 guidance are recommended.

Communication

- Display the name and contact details of persons accountable on the site boundary.
- Display the head or regional office information on the site boundary.

Management

- Develop and implement a dust management plan.
- Record all dust and air quality complaints, identify causes and take measures to reduce emissions.
- Record exceptional incidents and action taken to resolve the situation.
- Carry out regular site inspections to monitor compliance with the dust management plan and record results.
- Increase site inspection frequency during prolonged dry or windy conditions and when activities with high dust potential are being undertaken.
- Plan site layout so that machinery and dust causing activities are located away from receptors, as far as possible.
- Erect solid screens or barriers around dusty activities or the site boundary at least as high as any stockpile 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 run off of water or mud.
- Keep site fencing, barriers and scaffolding clean using wet methods.
- Remove potentially dusty materials from site as soon as possible.
- Cover, seed or fence stockpiles to prevent wind whipping.
- Ensure all vehicles comply with the London Low Emission Zone and the NRMM standards, where applicable.
- Ensure all vehicles switch off engines when stationary.
- Avoid the use of diesel or petrol powered generators where possible.
- Only use cutting, grinding and sawing equipment with dust suppression equipment.
- Ensure an adequate supply of water on site for dust suppressant.

- Use enclosed chutes and conveyors and covered skips.
- Minimise drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment and use water sprays on such equipment where appropriate.
- Ensure equipment is readily available on site to clean up spillages of dry materials.
- No on-site bonfires and burning of waste materials on site.

Construction

- 6.1.2 Ensure sand and other aggregates are stored in bunded areas and are not allowed to dry out, unless required for a particular process.

Trackout

- 6.1.3 Use water assisted dust sweepers on the site access and local roads.
- 6.1.4 Avoid dry sweeping of large areas.
- 6.1.5 Ensure vehicles entering and leaving the site are covered to prevent escape of materials.
- 6.1.6 Record inspection of on-site haul routes and any subsequent action, repairing as soon as reasonably practicable.
- 6.1.7 Install hard surfaced haul routes which are regularly damped down.
- 6.1.8 Install a wheel wash with a hard-surfaced road to the site exit where site layout permits.

6.2 Operation

- 6.2.1 The assessment has demonstrated that there will be a reduction in vehicle trips generated by the site with the proposed development in place, and the pollutant concentrations at the site are expected to be below relevant NAQOs. The site is therefore considered suitable for the proposed development without the need for specific mitigation in relation to air quality.

7 Summary and Conclusions

- 7.1.1 The air quality impacts associated with the proposed residential development at Dukesbridge House, within the administrative boundary of Reading Borough Council (RBC) have been assessed.
- 7.1.2 RBC has investigated air quality within its area as part of its responsibilities under the Local Air Quality Management (LAQM) regime and has declared an Air Quality Management Area (AQMA) due to exceedances of the annual mean nitrogen dioxide (NO₂) National Air Quality Objective (NAQO). The AQMA encompasses the central area and the main arterial routes in and out of Reading. The site is located within the Reading AQMA.
- 7.1.3 The construction works have the potential to create dust. During construction it is recommended that, in accordance with the Institute of Air Quality Management's (IAQM's) guidance, a package of mitigation measures is put in place to minimise the risk of elevated PM₁₀ concentrations and dust deposition in the surrounding area. With mitigation in place the construction impacts are judged as being not significant.
- 7.1.4 Measured annual mean NO₂ concentrations at the closest, most representative monitoring locations in the study area have been below the objective between 2014-2018. Background concentrations are well below the objectives for NO₂ and particulates (PM₁₀ and PM_{2.5}). The site can be considered suitable for the proposed development without the need for specific mitigation in relation to air quality.
- 7.1.5 There will be a reduction in traffic generated by the site with the proposed development in place, compared to the existing site use. It is therefore considered that potential impacts on air quality from road traffic associated with the development will not be significant and no further assessment is required.
- 7.1.6 The proposed development is therefore considered to be in accordance with the requirements of relevant local and national guidance, policy and legislation in relation to Air Quality.

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Appendix A Glossary

Abbreviations	Meaning
AADT	Annual Average Daily Traffic
AQAP	Air Quality Action Plan
CEMP	Construction Environmental Management Plan
Defra	Department for Environment, Food and Rural Affairs
Diffusion Tube	A passive sampler used for collecting NO ₂ in the air
EHO	Environmental Health Officer
EPUK	Environmental Protection UK
HDV	Heavy Duty Vehicle; a vehicle with a gross vehicle weight greater than 3.5 tonnes. Includes Heavy Goods Vehicles and buses
IAQM	Institute of Air Quality Management
LAQM	Local Air Quality Management
NAQO	National Air Quality Objective as set out in the Air Quality Strategy and the Air Quality Regulations
NO ₂	Nitrogen Dioxide
NO _x	Nitrogen oxides, generally considered to be nitric oxide and NO ₂ . Its main source is from combustion of fossil fuels, including petrol and diesel used in road vehicles
NPPF	National Planning Policy Framework
PM ₁₀ /PM _{2.5}	Small airborne particles less than 10/2.5 µm in diameter
PPG	Planning Practice Guidance
RBC	Reading Borough Council

Appendix B Figures

