



Reading Borough Council

NORTH STREET, READING

Air Quality Appraisal



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1 INTRODUCTION

- 1.1.1. WSP has been commissioned by Reading Borough Council (RBC) to prepare an air quality assessment to support a planning application for a proposed development in North Street, Reading (hereafter referred to as the 'Proposed Development' or 'Application Site'). The development proposals are for the demolition of the existing building and the construction of two residential blocks, a 4.5 storey eastern block and a 3.5 reducing to 2.5 storey western block, providing a total of 41 residential units.
- 1.1.2. The Application Site lies within the administrative boundary of RBC and in an urban area. The main source of pollution in the area is road traffic and the relevant air pollutants for consideration are therefore nitrogen dioxide (NO₂) and particulate matter (PM₁₀ and PM_{2.5}).
- 1.1.3. This report presents the findings of an assessment of the potential air quality impacts of the Proposed Development during both the construction and operational phases.

2 RELEVANT LEGISLATION & LEGISLATION

2.1 UK AIR QUALITY STRATEGY

- 2.1.1. The Government's policy on air quality within the UK is set out in the Air Quality Strategy for England, Scotland, Wales and Northern Ireland (AQS)¹. The AQS provides a framework for reducing air pollution in the UK with the aim of meeting the requirements of European Union legislation.
- 2.1.2. The AQS also sets standards and objectives for nine key air pollutants to protect health, vegetation and ecosystems. The air quality standards are levels recommended by the Expert Panel on Air Quality Standards (EPAQS) and the World Health Organisation (WHO) with regards to current scientific knowledge about the effects of each pollutant on health and the environment. The air quality objectives are policy based targets set by the Government, which take into account economic efficiency, practicability, technical feasibility and timescale. Some objectives are equal to the EPAQS recommended standards or WHO guideline limits, whereas others involve a margin of tolerance, i.e. a limited number of permitted exceedances of the standard over a given period.
- 2.1.3. The objectives for the pollutants considered within this report are given in **Table 1**.

Table 1 – National Air Quality Objectives and European Limit Values Relevant to the Assessment

Pollutant	Objective	Measured as
Nitrogen dioxide (NO ₂)	200µg/m ³ not to be exceeded more than 18 times a year	1 hour mean
	40µg/m ³	Annual mean
Particulate Matter (PM ₁₀) (gravimetric)	40µg/m ³	Annual mean
	50µg/m ³ not to be exceeded more than 35 times a year	24 Hour mean
Particulate Matter (PM _{2.5})	25µg/m ³	Annual mean

- 2.1.4. For the pollutants shown in Table 1, there are both long-term (annual mean) and short-term standards. In the case of NO₂, the short-term standard is for a 1-hour averaging period, whereas for PM₁₀ it is for a 24-hour averaging period. These periods reflect the varying impacts on health of differing exposures to pollutants, for example temporary exposure on the pavement adjacent to a busy road, compared with the exposure of residential properties adjacent to a road.
- 2.1.5. The AQS contains a framework for considering the effects of a finer group of particles known as 'PM_{2.5}' as there is increasing evidence that this size of particles can be more closely associated with observed adverse health effects than PM₁₀. Local Authorities are required to work towards reducing emissions/concentrations of particulate matter within their administrative area. However, there is no statutory objective given in the AQS for PM_{2.5} at this time.

¹ Department for Environment, Food and Rural Affairs (Defra) and the Devolved Administrations (2007). The Air Quality Strategy for England, Scotland, Wales and Northern Ireland (Volumes 1 and 2)

2.2 AIR QUALITY REGULATIONS

- 2.2.1. Many of the objectives in the AQS have been made statutory in England with the Air Quality (England) Regulations 2000² and the Air Quality (England) (Amendment) Regulations 2002³ for the purpose of Local Air Quality Management (LAQM).
- 2.2.2. These Regulations require that likely exceedances of the AQS objectives are assessed in relation to: *'...the quality of air at locations which are situated outside of buildings or other natural or man-made structures, above or below ground, and where members of the public are regularly present...'*
- 2.2.3. The Air Quality Standards Regulations 2010⁴ transpose the European Union Ambient Air Quality Directive (2008/50/EC) into law in England. This Directive sets legally binding limit values for concentrations in outdoor air of major air pollutants that impact public health such as PM₁₀, PM_{2.5} and NO₂. The limit values for NO₂ and PM₁₀ are the same concentration levels as the relevant AQS objectives and the limit value for PM_{2.5} is a concentration of 25µg/m³.

2.3 ENVIRONMENTAL PROTECTION ACT 1990 - CONTROL OF DUST AND PARTICULATES ASSOCIATED WITH CONSTRUCTION

- 2.3.1. Section 79 of the Environmental Protection Act 1990 gives the following definitions of statutory nuisance relevant to dust and particles:

'Any dust, steam, smell or other effluvia arising from industrial, trade or business premises or smoke, fumes or gases emitted from premises so as to be prejudicial to health or a nuisance'; and

'Any accumulation or deposit which is prejudicial to health or a nuisance'.
- 2.3.2. Following this, Section 80 says that where a statutory nuisance is shown to exist, the local authority must serve an abatement notice. Failure to comply with an abatement notice is an offence and if necessary, the local authority may abate the nuisance and recover expenses.
- 2.3.3. There are no statutory limit values for dust deposition above which 'nuisance' is deemed to exist. Nuisance is a subjective concept and its perception is highly dependent upon the existing conditions and the change which has occurred.

2.4 ENVIRONMENT ACT 1995

- 2.4.1. Under Part IV of the Environment Act 1995, local authorities must review and document local air quality within their area by way of staged appraisals and respond accordingly, with the aim of meeting the air quality objectives defined in the Regulations. Where the objectives are not likely to be achieved, an authority is required to designate an Air Quality Management Area (AQMA). For each AQMA the local authority is required to draw up an Air Quality Action Plan (AQAP) to secure improvements in air quality and show how it intends to work towards achieving air quality standards in the future.

² The Air Quality (England) Regulations 2000 - Statutory Instrument 2000 No.928

³ The Air Quality (England) (Amendment) Regulations 2002- Statutory Instrument 2002 No.3043

⁴ The Air Quality Standards Regulations 2010 - Statutory Instrument 2010 No. 1001

3 SCOPE AND METHODOLOGY

3.1.1. After consultation with the Environmental Health Officer (EHO) at RBC⁵, the scope of the assessment was defined and includes the following tasks:

- **Task 1:** Undertake a simple two stage air quality assessment using the screening criteria provided in Tables 6.1 and 6.2 of the Institute of Air Quality Management/Environmental Protection UK (IAQM/EPUK) guidance⁶ to establish whether the proposals are likely to generate a potentially significant impact on air quality and whether further assessment is required. The two stages are as follows:
 - Stage 1: Review of the development proposals, including number of residential units, floor space, car park spaces and the presence of an energy centre or other combustion processes on site, against the screening criteria provided in Table 6.1 of the guidance. If the Stage 1 criteria are exceeded, proceed to Stage 2; and
 - Stage 2: Review of the changes in Light Duty Vehicles (LDVs) and Heavy Duty Vehicles (HDVs), road alignment, and the introduction of new junctions and bus stops (if applicable) due to the Proposed Development.
- **Task 2:** Undertake a qualitative assessment of potential impacts from dust and particulate matter generated during construction, with reference to the IAQM construction guidance⁷, including any applicable mitigation measures;
- **Task 3:** Establish air quality baseline conditions at the Application Site considering local sources of air pollution including emissions from the local road network and from the presence of any industrial facilities. A review of the latest air quality review and assessment report produced by RBC and information available on Defra's website regarding local background pollution concentrations; and,
- **Task 4:** A qualitative assessment of the potential exposure of future residents to air pollution using the information obtained from the tasks above and a review of the development plans.

⁵ Email correspondence with Ross Jarvis dated 12th September 2017

⁶ Environmental Protection UK and Institute of Air Quality Management (Version 1.2 Updated January 2017). Land Use Planning & Development Control: Planning for Air Quality

⁷ Institute of Air Quality Management (Version 1.1 Updated June 2016). Guidance on the Assessment of Dust from Demolition and Construction

4 RESULTS

4.1 TASK 1: SIMPLE AIR QUALITY ASSESSMENT

- 4.1.1. The development proposals have been reviewed against the Stage 1 EPUK/IAQM screening criteria and the results are summarised in **Table 2**.

Table 2: EPUK/IAQM Stage 1 Screening Assessment

SCREENING CRITERIA	DEVELOPMENT PROPOSAL
A: if any of the following apply >10 residential units or a site area of > 10ha or	41 residential units and a site area <1 ha (approximately 0.20 ha)
> 1,000 m ² of floor space for all other uses or a site area > 1 ha	Not Applicable
B. Coupled with any of the following Development > 10 parking spaces	9 parking spaces
Central energy facility or centralised combustion process	No energy facility or centralised combustion process

- 4.1.2. **Table 2** indicates that the development proposals exceed the Stage 1 criteria and the assessment needs to proceed to Stage 2 (see **Table 3**).
- 4.1.3. The Stage 2 criteria are more detailed and use specific information about the development to determine the likelihood of significant effects and the need to proceed to a more detailed air quality assessment. It is important to note that the EPUK/IAQM guidance states that exceeding the Stage 2 criteria does not automatically lead to a requirement to undertake a detailed assessment using air dispersion modelling. However, if a qualitative assessment is required it will need to include a robust conclusion on whether the development is likely to significantly affect air quality.

Table 3: EPUK/IAQM Stage 2 Screening Assessment

SCREENING CRITERIA	DEVELOPMENT PROPOSAL
1. Change of LDVs flows > 100 AADT ¹	< 100AADT
2. Change of HDVs flows >25 AADT ¹	< 25 AADT
3. Change of 5m in road alignment	Not applicable
4. Introduce new junction or remove junction causing significant change in traffic speeds	Not applicable
5. Introduce /Change bus station causing bus flows to change by > 100 AADT	Not applicable
6. Underground car park with ventilation within 20m of receptor, with car park movements > 100 (in and out)	Not applicable
7. Substantial Combustion process	Not applicable
¹ Annual Average Daily Traffic	

- 4.1.4. **Table 3** shows that the Proposed Development does not exceed any of the Stage 2 criteria. Therefore, a detailed air quality assessment is not required; however, an assessment of the potential exposure of future residents to poor air quality is recommended and is provided in Tasks 3 and 4, which are described in Sections 3.3 and 3.4 of this report.

4.2 TASK 2: CONSTRUCTION DUST ASSESSMENT

- 4.2.1. The Application Site has a small area and it is therefore reasonable to assume that the construction period will be short and the amount of equipment used limited. Based on the IAQM guidance, the potential magnitude of dust emissions from the anticipated demolition, construction, earthworks and trackout (vehicles moving over unpaved roads) activities that will be undertaken is small.
- 4.2.2. The Application Site is within an urban area with a number of residential and commercial receptors in its vicinity that will be highly sensitive to increases in dust deposition. Based on the sensitivity of the area and the potential magnitude of construction dust emissions, the risk of dust impacts will be low. Following the application of good construction practices and mitigation measures on-site during the construction phase, the residual effects on local air quality will be negligible.

4.3 TASK 3: REVIEW OF BASELINE CONDITIONS

- 4.3.1. The main source of pollution in the area in which the Application Site is located is road traffic from vehicles using the A329 and the Inner Distribution Road. The Environment Agency's online pollution register indicates that there are no large scale/ Part A1 authorised industrial processes⁸ located within the vicinity of the Site that are likely to have a significant influence on local air quality. From a review of mapping data for the area in which the Application Site is located there are no smaller scale Part A2 or B processes⁹ within the immediate vicinity either.
- 4.3.2. RBC has declared an Air Quality Management Area (AQMA) encompassing all the main arterial routes in and out of Reading, due to exceedances of the UK Air Quality Strategy (AQS) objectives for annual mean concentrations of NO₂ and 24-hour mean concentrations of PM₁₀. The Application Site is located within the AQMA.
- 4.3.3. The most recent air quality report available from RBC is their 2019 Annual Air Quality Status Report. This report summarises the air quality monitoring data collected in the Borough up until the end of 2018. From this report, it has been identified that there are six NO₂ diffusion tube monitoring sites in the vicinity of the Application Site operated by RBC. The annual mean NO₂ concentrations measured at these monitoring sites, which are all positioned at roadside locations, over the last five years for which data are available are shown in the table overleaf.

⁸ Large scale industrial processes requiring authorisation from the Environment Agency.

⁹ Small scale industrial processes requiring authorisation from the Local Authority.

Table 4: RBC Diffusion Tube Annual Mean NO₂ concentrations (µg/m³)*

SITE	GRID REFERENCE (X,Y)	HEIGHT	2014	2015	2016	2017	2018
33 Caversham Road	471123, 173734	2.5	51	48	43	45	44
Vachel Street	471174, 173705	2.5	38	33	35	34	35
Sackville Street	471177, 173641	2.5	43	40	37	37	38
59a Caversham Road	471169, 173869	2.5	47	42	41	43	41
10 Trinity Place	470738, 173433	2.5	32	31	31	29	32
165 Oxford Street	470717, 173373	2.5	51	47	44	47	42

*Exceedances of the objective (40µg/m³) are highlighted in **bold**

- 4.3.4. The data in **Table 4** shows that annual mean NO₂ concentrations along Caversham Road and Oxford Street, two major roads in Reading, have been consistently above the annual mean objective of 40µg/m³ from 2013 to 2017.
- 4.3.5. The Application Site is located 100m from Oxford Street and 180m from Caversham Street and therefore concentrations recorded at the Caversham and Oxford Street sites are not considered representative for the location of the Application Site. The most relevant diffusion tubes are those in Vachel Street and Sackville Street, as these are located at positions set back from main roads, in a similar setting to the Application Site. Annual mean NO₂ concentrations at these two monitoring sites have been below the relevant objective in recent years.
- 4.3.6. As part of the review of available air quality data in the area, background pollutant concentrations were taken from the national maps provided on the Defra website¹⁰, where background concentrations of those pollutants included within the AQS have been mapped at a grid resolution of 1x1km for the whole of the UK. Estimated concentrations are available for all years between 2017 and 2030.
- 4.3.7. **Table 5** summarises the background pollutant concentrations of NO₂, PM₁₀ and PM_{2.5} for 2019 for the grid square in which the Application Site is located.

Table 5: Background Concentrations for 2019 (µg/m³)

GRID SQUARE (CENTRE ON O.S. GRID REFERENCE)	NO ₂	PM ₁₀	PM _{2.5}
470500, 173500	22.92	16.11	9.75

- 4.3.8. Background concentrations of PM₁₀ and PM_{2.5} in the vicinity of the Application Site are well below the relevant objectives. The background concentration of NO₂ is also below the objective, however concentrations measured at roadside locations, as indicated by the diffusion tube results in Table 4, are elevated from background levels. As the Application Site is set back from any main roads it is

¹⁰ <https://uk-air.defra.gov.uk/data/laqm-background-maps?year=2017>

therefore reasonable to assume that concentrations of all pollutants will be below the objectives within the Proposed Development.

4.4 TASK 4: REVIEW OF ASSESSMENT PROPOSALS

- 4.4.1. From Task 3 it can be concluded that whilst annual mean NO₂ concentrations on the Application Site are likely to be slightly elevated at ground level they will be below the AQS objective. Concentrations of PM₁₀ and PM_{2.5} will also be below their AQS objectives based on the low background concentrations and the distance of the Application Site away from the main roads.
- 4.4.2. Therefore, it is considered that no mitigation is required to protect future residents from exposure to air pollution.

5 CONCLUSIONS

- 5.1.1. The construction phase of the development will be limited in duration given the size and nature of the development proposals. Following the application of good construction practices and appropriate mitigation measures on site, any potential dust impacts will be mitigated so that the residual effects will be negligible.
- 5.1.2. Based on a review of local air quality data for the area in which the Application Site is located, the plans and elevations for the Proposed Development and the results of the screening assessment, it can be concluded that future residents will not be exposed to poor air quality, and that no operational phase mitigation measures are required specifically for air quality.



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