

**SONIC STAR
PROPERTIES
LIMITED**

**29-32 MARKET
PLACE AND 173-
175 FRIAR STREET,
READING**

**AIR QUALITY
ASSESSMENT**

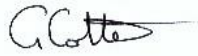
MARCH 2018

FINAL REPORT

2211W-SEC-00001-02

SONIC STAR PROPERTIES LIMITED
29-32 MARKET PLACE AND 173-175 FRIAR STREET, READING
AIR QUALITY ASSESSMENT
FINAL REPORT

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CONTENTS	PAGE NO.
1. INTRODUCTION	1
1.1 Background	1
1.2 Report Structure	1
2. SITE DETAILS	2
2.1 Site Description	2
2.2 Project Description	2
2.3 Sensitive Receptors	2
3. AIR QUALITY POLICY, GUIDANCE AND CRITERIA	3
3.1 Air Quality, Dust and Emissions	3
3.2 EU & National Air Quality Policy and Guidance	3
3.3 Local Air Quality Policy and Guidance	5
3.4 Non-Statutory Guidance	7
4. ASSESSMENT METHODOLOGY	8
4.1 Assessment Procedure	8
4.2 Screening Criteria	8
4.3 Construction Dust	9
5. BASELINE CONDITIONS	10
5.1 Local Air Quality	10
5.2 Monitoring	10
5.3 Defra Background Maps	11
5.4 Summary of Baseline Conditions	12
6. CONSTRUCTION IMPACTS	13
6.1 Methodology	13
6.2 EPUK Screening	13
6.3 Dust and Emissions Screening	13
7. OPERATIONAL IMPACTS	15
7.1 Methodology	15
7.2 EPUK Screening	15
8. MITIGATION	16
8.1 Construction	16
8.2 Operational	17
9. CONCLUSIONS	18
10. REFERENCES	19



APPENDIX A – FIGURES



1. INTRODUCTION

1.1 Background

- 1.1.1 Southdowns Environmental Consultants Ltd (Southdowns) was commissioned by Sonic Star Properties Limited (Sonic) in March 2018 to produce an air quality assessment for a proposed mixed-use development at 29-32 Market Place and 173-175 Friar Street, Reading.
- 1.1.2 This assessment has been prepared to validate the planning application by Sonic and to determine the air quality impacts of the construction and operation of the proposed development on existing and introduced receptors.
- 1.1.3 This document has been prepared in accordance with the principles and requirements of the Institute of Air Quality Management and Environmental Protection UK's guidance for '*Land-use Planning & Development Control: Planning for Air Quality*' [1].

1.2 Report Structure

- 1.2.1 Details of the site and the proposed scheme are described in the following section of this report. Relevant air quality policies and guidance are outlined in Section 3 and the assessment methodology is detailed in Section 4. The existing baseline conditions are presented in Section 5, with the dust risk effects from construction assessed in Section 6 and the operational effects in Section 7. Appropriate mitigation measures are discussed in Section 8 and the assessment conclusions summarised in Section 9.



2. SITE DETAILS

2.1 Site Description

2.1.1 The development site is located in Reading town centre. The site is bounded by commercial and retail buildings adjoined to the immediate south and west, Friar Street to the north and Market Place to the east.

2.1.2 The development site is located in an urban setting (commercial and retail) and is currently occupied by buildings providing approximately 3,000 m² of mixed office and retail space.

2.2 Project Description

2.2.1 The proposed development will involve the demolition of the existing building and construction of 43 residential units, 1,602 m² of retail space and 4,212 m² of office space.

2.2.2 The construction works are projected to commence in 2019. 2020 has also been assumed to be the earliest year of operation for the development for the purposes of this assessment.

2.3 Sensitive Receptors

2.3.1 Sensitive receptors are identified as locations where people or wildlife may be adversely affected by changes in air quality or dust soiling as a result of a development. High-sensitivity receptors can include residential receptors, medium-sensitivity receptors can include workplaces and low-sensitivity receptors can include amenity areas, such as parks.

2.3.2 A plan showing the location of the development site and the nearest sensitive receptors is presented in Figure A1 of Appendix A. The nearest existing receptors are commercial and retail businesses (workplaces), however there is potential for residential receptors to be located within 5 m of the site, on the higher floors of the adjacent buildings, which cannot be identified through interrogation of street mapping.

2.3.3 Future residential receptors introduced by the proposed development are also considered as part of this assessment.

2.3.4 No ecological receptors have been identified within 200 m of the proposed development site; therefore, ecological receptors have been scoped out of this assessment.



3. AIR QUALITY POLICY, GUIDANCE AND CRITERIA

3.1 Air Quality, Dust and Emissions

- 3.1.1 The pollutants of concern for the proposed development are nitrogen dioxide (NO₂) and particulate matter (PM).
- 3.1.2 NO₂ is produced through the combustion of fossil fuels, used for transport and energy requirements. Emissions of oxides of nitrogen (NO_x) from exhausts comprise nitric oxide (NO) and NO₂. NO undergoes oxidation in the atmosphere to form NO₂. High concentrations of NO₂ can cause lung inflammation, shortness of breath and coughing, and cause reduced immunity to lung infections like bronchitis.
- 3.1.3 PM can result directly from emissions from local sources (primary) or further afield, often having originated as other pollutants and reformed in the atmosphere (secondary). Primary sources are of most relevance to this assessment, and can include emissions from combustion processes, commonly in vehicles, and dust from construction activities. Exposure to high concentrations of PM₁₀ and PM_{2.5} can cause respiratory and cardiovascular illness and even death. PM₁₀ is defined as a mass fraction of airborne particulates with an aerodynamic diameter of 10 microns (µm) or less. PM_{2.5} is defined as a mass fraction of airborne particulates with an aerodynamic diameter of 2.5 microns or less. PM₁₀ and PM_{2.5} are respirable and can be drawn deep into the lungs and cause health problems. The fraction of dust that is larger than 10 µm is filtered by the nose and throat.

3.2 EU & National Air Quality Policy and Guidance

- 3.2.1 The EU Air Quality Directive (Directive 2008/50/EC) [2] came into force in June 2008 and was transposed into legislation in England, Wales, Scotland and Northern Ireland in the Air Quality Standards Regulations 2010 [3]. The Directive introduced legally-binding targets for national governments to reduce air pollution to levels at which no or minimal effects on human health are likely to occur. The obligation to meet the requirements of the Directive falls primarily upon the Secretary of State for the Environment in England, and appropriate Ministers in the Devolved Administrations, who are designated as the appropriate “competent authority”.
- 3.2.2 The Air Quality (England) Regulations 2000, as amended by the Air Quality (England) (Amendment) Regulations 2002, define air quality ‘objectives’ for a number of key pollutants. Air quality objectives are set at a range of different levels and averaging times for different pollutants.
- 3.2.3 The annual mean (long-term) objective applies at locations where individuals might be expected to spend a large majority of their time, for example residential properties. In the case of an hourly mean (short-term) objective, this applies at locations where people might reasonably be expected to spend at least an hour (such as outdoor spaces and leisure areas).



Pollutant	Air Quality Objective		Date to be Achieved By
NO ₂	40 µg/m ³	Annual mean	31 December 2005
	200 µg/m ³ not to be exceeded more than 18 hours in a year	Hourly mean	31 December 2005
PM ₁₀	50 µg/m ³ not to be exceeded more than 35 times a year	24-hour mean	31 December 2004
	40 µg/m ³	Annual mean	31 December 2004
PM _{2.5}	25 µg/m ³	Annual mean	2020 (but not in UKAQS)
	15% reduction urban background	Annual mean	2010-2020

TABLE 3.1: SUMMARY OF UK AIR QUALITY OBJECTIVES FOR NO₂, PM₁₀ AND PM_{2.5} FOR PROTECTION OF HUMAN HEALTH

- 3.2.4 The Environment Act 1995 [4] introduced the requirement for local authority management of air quality. Part IV of the Act details the duties of local authorities in carrying out their local air quality management (LAQM) responsibilities. The duties include the requirement for review and assessment of air quality and production of regular Updating and Screening Assessments (USA) and Progress Reports.
- 3.2.5 The Act also requires the preparation of a national air quality strategy, setting health-based air quality objectives for specified pollutants. These requirements led to the development of the UK Air Quality Strategy, which was adopted in 1997 and revised in 2000, 2003 and the current revision issued in 2007 [5].
- 3.2.6 The Air Quality Strategy for England, Scotland, Wales & Northern Ireland 2007 (AQS) updated previous versions of the strategy to set out new objectives for local authorities undertaking their local air quality management duties. It also introduced a national policy framework for reduction in exposure to fine particulates. The objectives in the current UK AQS are in some cases more onerous than those in the EU Directive and Air Quality Standards Regulations 2010 and the Strategy also contains further objectives for a wider range of pollutants.
- 3.2.7 The Environmental Protection Act 1990 (EPA) [6] deals with statutory nuisance. Nuisance caused by dust is regulated by the statutory nuisance provisions under Part III of the EPA 1990. s.79(1)(d) EPA 1990 defines this as: “*Any dust, steam, smell or other effluvia arising on industrial, trade or business premises and being prejudicial to health or a nuisance*”.
- 3.2.8 Statutory nuisance is not intended to secure a high level of amenity but rather to act as a basic safeguard that is intended to deal with excessive emissions. The perpetrator of the alleged nuisance has a defence of best practicable means (BPM). BPM provides a way of balancing the interests of the site and residents.
- 3.2.9 There are no UK standards or statutory guidance relating to deposited dust and nuisance. A deposition rate of 200 mg/m²/day is often used as a threshold for potentially significant nuisance effects.



- 3.2.10 The Clean Air Act 1993 (CAA) [7] updates previous versions of the CAA and details the legislative requirements for the heights of chimneys and flues where the burn rates exceed certain criteria. For appliances fuelled by gaseous matter this is 366.4kW.
- 3.2.11 The National Planning Policy Framework (NPPF) [8] was published in 2012 and paragraph 109 states: *"The planning system should contribute to and enhance the natural and local environment by: preventing both new and existing development from contributing to or being put at unacceptable risk from, or being adversely affected by unacceptable levels of soil, air, water or noise pollution..."*
- 3.2.12 Paragraph 124 states: *"Planning policies should sustain compliance with and contribute towards EU limit values or national objectives for pollutants, taking into account the presence of Air Quality Management Areas and the cumulative impacts on air quality from individual sites in local areas. Planning decisions should ensure that any new development in Air Quality Management Areas is consistent with the local air quality action plan."*
- 3.2.13 The roles of the planning authority and pollution control authorities are defined in paragraph 122: *"... local planning authorities should focus on whether the development itself is an acceptable use of the land, and the impact of the use, rather than the control of processes or emissions themselves where these are subject to approval under pollution control regimes. Local planning authorities should assume that these regimes will operate effectively. Equally, where a planning decision has been made on a particular development, the planning issues should not be revisited through the permitting regimes operated by pollution control authorities."*
- 3.2.14 The National Planning Practice Guidance (NPPG) [9] provides guiding principles on how planning can take into account of the impact of new development on air quality. The guidance states that air quality assessments should take into account the following:
- the existing baseline air quality in the study area;
 - relevant air quality concerns;
 - the future air quality without the development in place (future baseline);
 - the future air quality with the development in place (with mitigation); and
 - significance of changes in air quality or introduction of receptors into an area known to experience poor air quality.
- 3.2.15 The guidance provides a flow chart detailing the process that should be followed in determining an application. An application should proceed to decision with appropriate planning conditions or obligations if the proposed development, with mitigation in place, would not lead to an unacceptable risk from air pollution, prevent sustained compliance with EU limit values or fail to comply with the requirements of the Habitats Regulations [10].

3.3 Local Air Quality Policy and Guidance

- 3.3.1 Reading's Core Strategy was adopted by Reading Borough Council (RBC) in 2008 as the overarching development plan for the town [11]. Policy CS34 Pollution and Water Resources, states:

"Development will only be permitted where it would not be damaging to the environment through air...pollution..."



“...Proposals for development that are sensitive to the effects of air...pollution will only be permitted in areas where they will not be subject to high levels of such pollution, unless adequate mitigation measures are provided to minimise the impact of such pollution.”

- 3.3.2 The Sites and Detailed Policies Document, adopted by RBC in 2012, [12] provides further detail on the planning policies in the Core Strategy under “development management” policies. Development management policies relating to air quality include:

“DM19: 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 significantly reduce air quality;*
- *“Whether the development is within, or accessed via, an Air Quality Management Area; and*
- *“Whether it can be demonstrated that a local reduction in air quality would be offset by an overall improvement in air quality, for instance through reduction in the need to travel.*

“ii. Where a development would introduce sensitive uses (such as residential, schools and nurseries...) into, or intensify such uses within, an... [AQMA]..., detrimental effects on that use will be mitigated. Mitigation measures should be detailed in any planning application.

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

- 3.3.3 The Reading Central Area Action Plan [13] was adopted in 2009 to provide a planning framework for the centre of Reading. Policies relating to air quality within the Area Action Plan include:

“RC9: Living in the Centre:

“...ii. Proposals for residential development within the central area will be assessed against the following criteria:

“Proposals for new residential development within the central area will be required to demonstrate how the ...air quality implications of residential development, have been considered and if necessary, mitigated...”

- 3.3.4 The Sustainable Design and Construction Supplementary Planning Document (SPD) [14] was published by RBC in 2011, to provide guidance on the application of planning policies within the Core Strategy and Detailed Policies Document. This document provides checklists to promote compliance with the requirement for sustainable development, including provision for the minimisation of air pollution, specifically oxides of nitrogen, and the introduction of mitigation to reduce emissions.

- 3.3.5 An updated RBC Air Quality Action Plan [15] was published by the Council in 2016. The Plan outlines measures which will be employed to reduce airborne pollutant concentrations in the Reading AQMA. Measures include:



- cycle route infrastructure improvements;
- ensuring that future development does not result in any further deterioration of air quality and where possible, results in an improvement in overall environmental quality;
- increasing business participation in reducing emissions through measures such as; cycle to work schemes, reducing building energy use, low emission delivery vehicles; and
- reducing emissions from idling vehicles at hotspot locations within the AQMA.

3.4 Non-Statutory Guidance

- 3.4.1 Environmental Protection UK (EPUK) and the Institute of Air Quality Management (IAQM) have produced non-statutory guidance, 'Land Use Planning & Development Control: Planning for Air Quality (v1.2)' to ensure that air quality is properly accounted for in the development control process. This guidance gives advice on describing air quality impacts and assessing their significance.
- 3.4.2 This document advises that in *'...arriving at a decision about a specific proposed development the local planning authority is required to achieve a balance between economic, social and environmental considerations'*.
- 3.4.3 This document provides descriptors for magnitude of change, receptor sensitivity and the process for assessment of significance. This guidance is for developers, in the production of air quality assessments, and for reviewers.
- 3.4.4 IAQM's Guidance on the Assessment of Dust from Demolition and Construction [16] provides guidance on the production of Air Quality Dust Risk Assessments (AQDRA) for construction site activities. This enables a summary of the likely risk of soiling, health effects and effects on the natural environment from dust produced during demolition, earthworks, construction and trackout activities. Recommended measures for controlling dust and emissions through site-specific mitigation and monitoring procedures are supplied in the guidance, including those relating to non-road mobile machinery (NRMM).



4. ASSESSMENT METHODOLOGY

4.1 Assessment Procedure

4.1.1 This air quality assessment has been produced using the information available and procedures as follows:

- i. consultation with Sonic and RBC (Ross Jarvis – Environmental Health Officer) to agree the methodology and data to be used in this assessment;
- ii. review of RBC's 2017 Annual Status Report [17] and the predicted NO₂ concentrations provided in Defra's background maps [18];
- iii. consideration of the local environment to identify potentially sensitive receptors, both existing and proposed, that could be affected by changes in air quality as a result of the construction and operation of the proposed development;
- iv. comparison of the predicted NO₂ and PM₁₀ concentrations with the UK air quality objectives;
- v. qualitative assessment of the potential dust and air quality impacts of the demolition and construction activities and control measures considered necessary during these activities; and
- vi. review of the transport assessment, published by Motion, to determine the requirement for dispersion modelling of road emissions.

4.1.2 The assessment follows the procedure as defined in the EPUK guidance, using already-published information in the public domain.

4.2 Screening Criteria

4.2.1 The EPUK guidance provides criteria for establishing whether a development will require an air quality assessment. The criteria are set out in a two-stage approach, with initial simple screening criteria.

4.2.2 In order to meet the criteria in Stage 1, the development must have:

- 10 or more residential units or a site area of more than 0.5 ha; and
- more than 1,000 m² of floor space for all other uses or a site area greater than 1 ha.

Combined with any of the following:

- more than 10 parking spaces within the development; and
- a centralised energy facility or combustion process.

4.2.3 The floor area of the development is greater than 1,000 m², therefore the development falls into the 'major development' category and meets the initial criterion.

4.2.4 The proposed development has no proposed parking spaces but does have a proposed centralised boiler plant.

4.2.5 The introduction of new sensitive receptors into an area of potentially poor air quality has also been considered so that appropriate mitigation can be put in place to protect the future occupants if the NO₂ or PM₁₀ concentrations are likely to exceed the objectives.



4.3 Construction Dust

- 4.3.1 An assessment of the dust and air quality impacts from construction and demolition has been undertaken to establish the risk and appropriate mitigation to prevent effects at local receptors.



5. BASELINE CONDITIONS

5.1 Local Air Quality

- 5.1.1 The site is within the administrative boundary of RBC. A detailed assessment of air quality undertaken by RBC led to the designation of the Reading Air Quality Management Area (AQMA) in 2009, for exceedances of the annual mean NO₂ national objective.
- 5.1.2 RBC conducts air quality monitoring at various locations within and around the town as part of its local air quality management (LAQM) duties. The 2017 Annual Status Report details the most recent air quality information published by RBC. The report shows that the majority of monitoring locations within the borough have shown a gradual decline in NO₂ concentrations between 2012 and 2016. There are exceedances of the annual mean NO₂ objectives at some sites in the vicinity of the AQMA.
- 5.1.3 All other air quality objectives have been met in recent years.

5.2 Monitoring

- 5.2.1 The nearest NO₂ roadside continuous monitoring site is located on Caversham Road, to the north of the site, and the nearest urban continuous monitoring location is located to the east, at Reading Old Cemetery.
- 5.2.2 The monitoring data from these sites is included in Table 5.1. Annual mean NO₂ at the Caversham Road monitor exceeded the air quality objective (AQO) in all years between 2012 and 2014, decreasing to be within the AQO in 2015 and 2016. Air quality conditions at the Reading AURN were more favourable, with no exceedances of the AQO in all reported years. Concentrations at the urban background monitoring location were well within the AQO.

Description	X, Y	Distance from site	Type	2012	2013	2014	2015	2016	AQO
Caversham Road (RD1)	471153, 174429	1.0 km	Roadside	47	43	41	38	39	40
Reading AURN (Old Cemetery)	473441, 173198	1.8 km	Urban Background	25	27	27	22	34	40

TABLE 5.1 CONTINUOUS MONITORING SITE MEASURED NO₂ CONCENTRATIONS (µgm⁻³)

Note: Exceedances of the mean 1-hour NO₂ AQO are highlighted in **bold**.

- 5.2.3 PM₁₀ is also monitored at the Caversham Road and Old Cemetery continuous sites. Table 5.2 shows the annual mean PM₁₀ AQO was met at both monitoring locations between 2012 and 2016. The daily mean PM₁₀ AQO was only exceeded at the Caversham Road location in 2014.



Description	X, Y	Distance from site	Type	2012	2013	2014	2015	2016	AQO
Caversham Road (RD1)	471153, 174429	1.0 km	Roadside	32	34	33	28	20	40
Reading AURN (Old Cemetery)	473441, 173198	1.8 km	Urban Background	18	13	14	12	13	40

TABLE 5.2 CONTINUOUS MONITORING SITE MEASURED PM₁₀ CONCENTRATIONS (µgm⁻³)

Note: Exceedances of the mean 24-hour PM₁₀ AQO are highlighted in bold.

- 5.2.4 RBC also conducts NO₂ monitoring using passive diffusion tubes. The nearest roadside diffusion tube site is located on Friar Street, to the west of the development site. Monitoring data between 2012 and 2016 are shown in Table 5.3; the Friar Street site exceeded the AQO of 40 µgm⁻³ for mean annual NO₂ in all reported years.
- 5.2.5 Defra's local authority guidance TG(16) [19] states that when the annual mean NO₂ concentration at diffusion tube locations is less than 60 µgm⁻³, the short-term (one-hour) objective for NO₂ is unlikely to be exceeded. In recent years, the annual mean concentrations have been below 60 µgm⁻³.
- 5.2.6 The nearest urban background diffusion tube site is co-located with the Reading AURN automatic monitor, at the Old Cemetery; this monitoring location is likely to have lower concentrations of NO₂ than at the development site, due to the monitoring location being further from roads. As can be seen in Table 5.3, the annual mean AQO for NO₂ was met in all reported years.

Description	X, Y	Distance from site	Type	NO ₂ Annual Mean Concentration (µgm ⁻³)					
				2012	2013	2014	2015	2016	AQO
Friar Street (DT39)	471437, 173589	250 m	Roadside	52	52	53	47	52	40
Reading AURN (Old Cemetery) Co-located	473467, 173207	1.6 km	Urban Background	22	23	21	18	19	40

TABLE 5.3: DIFFUSION TUBE MONITORING ANNUAL MEAN NO₂ CONCENTRATIONS

5.3 Defra Background Maps

- 5.3.1 Predicted background pollutant concentrations are available from the Defra website for 1 km² grid squares across the UK. Concentrations of NO₂ and NO_x have been extracted for grid square centred on 471500, 173500, which overlays the site. Modelled predictions of mean annual background concentrations are within the AQOs for NO₂ and PM₁₀ in 2015 and decrease further in future years (as shown for the development year, 2020).



Pollutant	Predicted Annual Mean Concentrations at the Development Site	
	2015	2020
NO ₂	30.0	25.3
NO _x	48.8	39.0
PM ₁₀	16.1	14.9

**TABLE 5.4: PREDICTED BACKGROUND POLLUTANT CONCENTRATIONS
(μgm^{-3})**

5.4 Summary of Baseline Conditions

- 5.4.1 The development site is located in the centre of a busy town, near roads, and, as such, pollutant concentrations are likely to be elevated relative to background levels, especially nearest to the façade. The annual NO₂ concentrations recorded at the Friar Street passive monitoring locations indicate that concentrations will be likely to exceed the AQO in 2020, whereas the Caversham Road monitoring location is unlikely to exceed the AQO.
- 5.4.2 Market Place is located close (approximately 3 m away) to the development site; several bus stops are located on this road, and a parking bay for deliveries runs along the road parallel to the development façade. Although no monitoring information is available on Market Place, it has a smaller volume of traffic to Caversham Road and Friar Street.
- 5.4.3 The Friar Street monitor is closer to the kerb of the nearest road than the façade of the development to Market Place. It is likely, therefore, that the highest pollution levels at the development façade will be lower than measured concentrations at Friar Street.
- 5.4.4 The façade of the proposed development is a similar distance from the kerb of Market Place as the monitor at Caversham Road is from the nearest kerb. Compared to Market Place, Caversham Road has greater traffic volumes, a more open topography and is likely to have more free-flowing traffic. Concentrations at the proposed development nearest to Market Place are, therefore, considered likely to be similar to or have slightly higher concentrations than measured at Caversham Road. Ground-level concentrations closest to Market Place at the development site are expected to be close to or exceeding the NO₂ annual mean AQO in 2020.
- 5.4.5 Annual mean NO₂ concentrations at the development site are considered to be well below 60 μgm^{-3} and so the hourly mean NO₂ objective is unlikely to be exceeded and is not considered further in this assessment.
- 5.4.6 The annual and 24-hour mean PM₁₀ AQOs are expected to be met at the development site in all years.



6. CONSTRUCTION IMPACTS

6.1 Methodology

- 6.1.1 This assessment of potential demolition and construction-stage impacts follows the assessment procedure in the EPUK guidance and the IAQM guidance on the control of dust and emissions during construction and demolition.

6.2 EPUK Screening

- 6.2.1 The light-duty vehicle (LDV) movements during the construction period will be less than 100 per day and the heavy-duty vehicles (HDV) movements less than 25 per day, which is below the EPUK screening criteria and therefore does not require further assessment.

6.3 Dust and Emissions Screening

- 6.3.1 An assessment of construction dust and emissions is required, as there are human receptors within 50 m of the site and 50 m of the likely construction vehicle routes to and from site. There are human receptors within 50 m of the site and so the assessment considers human health impacts and dust soiling. There are no ecological receptors within 50 m of the site and so ecological impacts are not considered further in this assessment.

Magnitude of Dust Emissions

Demolition

- 6.3.2 The existing four-storey properties will be demolished to clear the site for the development, representing a total building volume of less than 20,000 m³. The properties are fabricated from brick and concrete and therefore have a medium potential for dust release. The site is considered to have a 'Medium' dust emission magnitude for demolition.

Earthworks

- 6.3.3 The total area of the site is approximately 2,500 m² with a soil type formed of Taplow Gravel (sand and gravel) [20] with a low potential for dust release. The site is considered to have a 'Small' dust emission magnitude for earthworks.

Construction

- 6.3.4 The total building volume to be constructed is estimated to be between 25,000-100,000 m³, with the construction involving potentially-dusty construction materials, including bricks and concrete. The site is considered to have a 'Medium' dust emission magnitude for construction.

Trackout

- 6.3.5 The number of HDVs outward is predicted to be between 10 and 50 per day. In light of this, the site is considered to have a 'Medium' dust emission magnitude for trackout.

Sensitivity of the Area

- 6.3.6 Residential receptors, which have a high sensitivity to dust soiling and health effects, may potentially be located within 20 m of the proposed development, at the adjacent properties at 164-171 Friar Street, 23-26 Market Place and 33-34 Market Place. There are estimated



to be fewer than 10 residential receptors within 20 m of the site, and between 10 and 100 within 50 m of the site, as a conservative estimate.

- 6.3.7 The sensitivity of the area to dust soiling effects is defined as 'Medium', due to the number and proximity of sensitive receptors.
- 6.3.8 The sensitivity of the area to human health impacts is defined as 'Low', due to the number and proximity of sensitive receptors to the site boundary and a predicted background annual mean PM₁₀ concentration of less than 24 µgm⁻³ in the vicinity of the site.
- 6.3.9 The sensitivity of the area to dust soiling from trackout is 'High' and human health effects from trackout are defined as 'Low', due to the first 200 m of the trackout route being within 20 m of between 10 and 100 sensitive receptors. The sensitivity of the surrounding area to dust soiling and human health effects are summarised in Table 6.1.

Sensitivity of the Area	Demolition	Earthworks	Construction	Trackout
Dust Soiling	Medium	Medium	Medium	High
Human Health	Low	Low	Low	Low

TABLE 6.1: SENSITIVITY OF THE AREA ASSESSMENT

Dust Risk

- 6.3.10 The risk of dust emissions is summarised in Table 6.2 and shows that there is a 'Medium Risk' of demolition, construction and trackout activities causing dust soiling effects at local receptors, with a 'Low Risk' of health effects. There is a 'Low Risk' of earthworks activities causing dust soiling effects at local receptors, and a 'Negligible' risk of health effects.

Summary	Demolition	Earthworks	Construction	Trackout
Dust Soiling	Medium Risk	Low Risk	Medium Risk	Medium Risk
Human Health	Low Risk	Negligible	Low Risk	Low Risk

TABLE 6.2: SUMMARY DUST RISK CATEGORY



7. OPERATIONAL IMPACTS

7.1 Methodology

- 7.1.1 This assessment of potential operational impacts follows the assessment procedure in the EPUK guidance.

7.2 EPUK Screening

Traffic

- 7.2.1 The transport assessment [21], produced by Motion, indicates that the proposed development will be 'car-free' with no on-site parking provided. The LDV movements during the operational period will be less than 100 per day and the HDV movements less than 25 per day, which is below the EPUK screening criteria and therefore does not require further assessment.
- 7.2.2 A Travel Plan Statement has been prepared to encourage sustainable travel at the site and provision of 107 bicycle spaces has been integrated into the development design.

Energy Plant

- 7.2.3 The energy plant proposed for the proposed development is proposed to comprise a centralised communal gas boiler. The exact model is currently not specified; however, the proposed plant is anticipated to have a combined NO_x emission rate of less than 5 mg·s⁻¹, which is below the EPUK guidance criterion that would trigger further assessment.¹ If the final plant model is found to have an emission rate of greater than 5 mg·s⁻¹, this may require future assessment to determine whether there would likely be air quality effects from the plant.

¹ This 5 mg·s⁻¹ criterion equates to a 450 kW ultra-low NO_x gas boiler or a 30kW CHP unit operating at <95mg/Nm³.



8. MITIGATION

8.1 Construction

8.1.1 Under best-practice guidance, the proposed development constitutes a medium risk for construction dust and there is the potential for temporary and intermittent 'slight adverse' air quality impacts on nearby receptors without the implementation of mitigation.

8.1.2 Impacts associated with the proposed development are likely to be in the form of dust generated primarily during construction-phase activities. The use of appropriate mitigation measures throughout the construction period will ensure that impacts to sensitive receptors are minimised or removed. The following broad best-practice measures should be included in the construction method statement:

- the contact details for the individuals accountable for air quality and dust issues should be displayed at the site boundary;
- complaints regarding air quality should be recorded in a site log, and the log made available to the local authority on request;
- the site should be at least visually monitored for dust on a weekly basis, with the frequency of monitoring increased during dry and windy conditions;
- the site should be organised so that:
 - physical barriers or screens are installed around the site to limit the dispersal of dust emissions; and
 - loose materials are covered as soon as possible;
- haul routes should be kept free from dust as far as possible, and swept regularly (water assisted);
- no dry sweeping of large areas will be carried out;
- all vehicles carrying loose or potentially dusty material to or from the working areas will be fully sheeted;
- materials will not be burnt on site;
- drop heights from conveyors, loading shovels and loading equipment will be minimised;
- adequate water provision will be available to the working areas; and
- suitable dust suppression techniques such as water sprays or local extraction will be used when cutting, grinding or sawing materials onsite.

8.1.3 The above measures are not intended to be a complete list of all best practice guidance; for full mitigation measures and control, the IAQM guidance on the construction and demolition sites should be consulted. Provided these measures are adhered to, emissions from the site during construction should not present a significant problem at local receptor locations.

8.1.4 The IAQM guidance details that the dust risk assessment should inform an Air Quality and Dust Management Plan (AQDMP), to confirm the dust and air quality emission control



measures to be implemented and to confirm monitoring methods and complaint response procedures. The AQDMP may form part of a Construction Environmental Management Plan (CEMP).

8.2 Operational

Traffic

- 8.2.1 The additional operational traffic from the development is likely to result in a 'Negligible' impact on air quality at nearby local receptors. No further mitigation is considered necessary.

Energy Plant

- 8.2.2 To comply with local authority Policy DM19 and minimise emissions at the development site, it is recommended that the boiler has a NO_x emission rate of less than 40 mg/kWh of dry NO_x (at 0% O₂). The commitment to a low NO_x boiler is expected to result in minimal emissions from the operation of the proposed development.

Introduction of New Receptors

- 8.2.3 Baseline information indicates that annual mean NO₂ concentrations at the site are likely to exceed the AQO of 40 µgm⁻³ in 2020.
- 8.2.4 The annual mean NO₂ concentration at the site is predicted to be well below 60 µgm⁻³, indicating that the short-term (one-hour) NO₂ objective is unlikely to be exceeded.
- 8.2.5 Mechanical ventilation with heat recovery (MVHR) is recommended for the residential units on the first three floors of the development, including sealed facades bordering Market Place. This will ensure compliance with national and local policy, including Policy CS34 of the Reading Core Strategy. For best-practice, boiler flues should be sited as far away from windows and ventilation inlets as is practicable.



9. CONCLUSIONS

- 9.1.1 The assessment shows that baseline air quality conditions closest to Market Place at the development site are likely to exceed the annual mean NO₂ AQO of 40 µgm⁻³ in 2020. The AQOs for one-hour NO₂, annual mean PM₁₀ and daily PM₁₀ are likely to be met. Ambient concentrations of NO₂ and PM₁₀ are predicted to decrease in future years.
- 9.1.2 The development will introduce new sensitive receptors into the area. With the recommendations in Section 8, new receptor locations will not be exposed to pollution levels exceeding the annual mean NO₂ AQO and air quality impacts at the new receptors are expected to be negligible.
- 9.1.3 The results of the dust risk assessment indicate that construction activities may have, at worst, temporary and intermittent 'slight adverse' air quality impacts at nearby receptors. These impacts can be minimised or removed through the implementation of a construction phase dust management plan detailing the appropriate mitigation measures.
- 9.1.4 Air quality impacts from construction vehicles are anticipated to be negligible, due to the low number of vehicle movements. Air quality impacts from operational traffic are also anticipated to be negligible, due to the 'car-free' nature of the development. There will be a negligible impact on local air quality from construction and operational traffic.
- 9.1.5 The energy plant within the proposed development is unlikely to have an adverse effect on local receptors. Assuming a combined plant NO_x emission rate of less than 5 mg·s⁻¹, there will be a negligible impact on local air quality as a result of the operation of the building. If these emission rates are exceeded, assessment of the chosen boiler plant may be required.
- 9.1.6 Overall, the air quality effects from the development are not considered to be significant. With the recommended mitigation in place, it is considered that the proposed development will comply fully with national and local policy relating to air quality.



10. REFERENCES

1. Moorcroft and Barrowcliffe. et al. 2017. *Land-use Planning & Development Control: Planning for Air Quality*. Institute of Air Quality Management & EPUK, London.
2. Council Directive 2008/50/EC of 21 May 2008 on ambient air quality and cleaner air for Europe.
3. Defra. 2010. The Air Quality Standards (England) Regulations.
4. Office of the Deputy Prime Minister. 1995. *The Environment Act*.
5. Defra. 2007. *The Air Quality Strategy for England, Scotland, Wales & Northern Ireland*.
6. HMSO. 1990. *Environmental Protection Act*.
7. HMSO. 1993. *Clean Air Act*.
8. Department for Communities and Local Government. 2012. *National Planning Policy Framework*.
9. Department for Communities and Local Government. 2014. *National Planning Policy Guidance: Air Quality*.
10. SI 1927. 2012. The Conservation of Habitats and Species (Amendment) Regulation.
11. Reading Borough Council. 2008. *Core Strategy (With Alteration Adopted 27th January 2015)*. Local Development Framework.
12. Reading Borough Council. 2012. *Sites and Detailed Policies Document (With Alteration Adopted 27th January 2015)*. Local Development Framework.
13. Reading Borough Council. 2009. *Central Area Action Plan*. Local Development Framework.
14. Reading Borough Council. 2011. *Revised Sustainable Design and Construction Supplementary Planning Document*. Local Development Framework.
15. Reading Borough Council. 2016. *Air Quality Action Plan Update*.
16. Institute of Air Quality Management (IAQM). 2014. *Guidance on the Assessment of Dust from Demolition and Construction*.
17. Reading Borough Council. 2017. *Air Quality Annual Status Report (ASR)*. Local Air Quality Management.
18. Department for Environment, Food and Rural Affairs. (Defra). 2017. *Background mapping for local authorities*. [online] <https://uk-air.defra.gov.uk/data/laqm-background-maps?year=2015> . Accessed March 2018.
19. Department for Environment, Food and Rural Affairs. (Defra). 2016. *Technical Guidance TG(16)*. Local Authorities Guidance.



20. British Geological Survey. 2018. *Geology of Britain Viewer*. Natural Environment Research Council. <http://mapapps.bgs.ac.uk/geologyofbritain/home.html?> Accessed March 2018.
21. Motion. 2018. *Transport Statement: 29-32 Market Place and 173-175 Friar Street, Reading*. Sonic Star Properties Limited.



APPENDIX A: FIGURES



FIGURE A1: SITE LOCATION

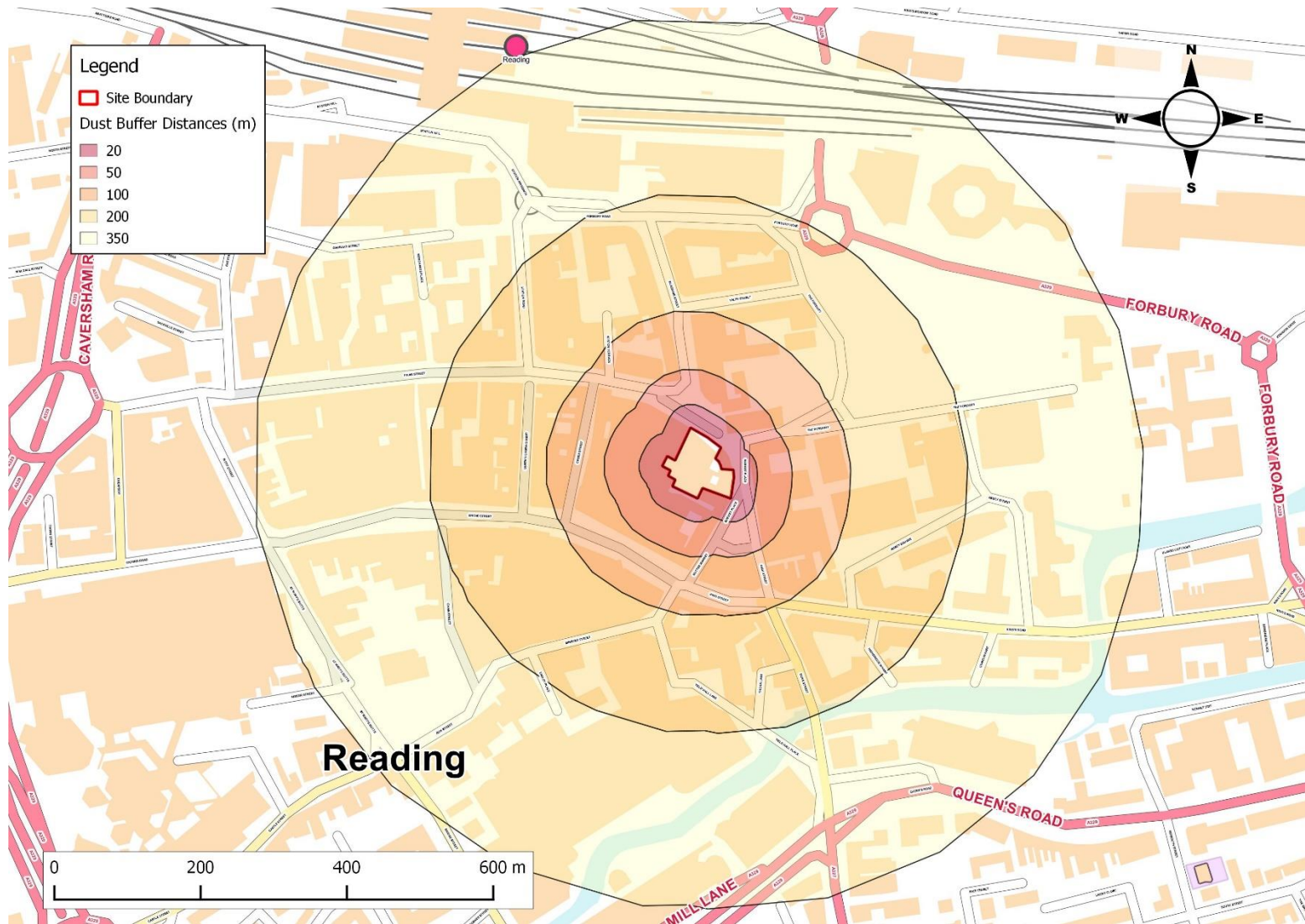


FIGURE A2: DUST RISK BUFFERS

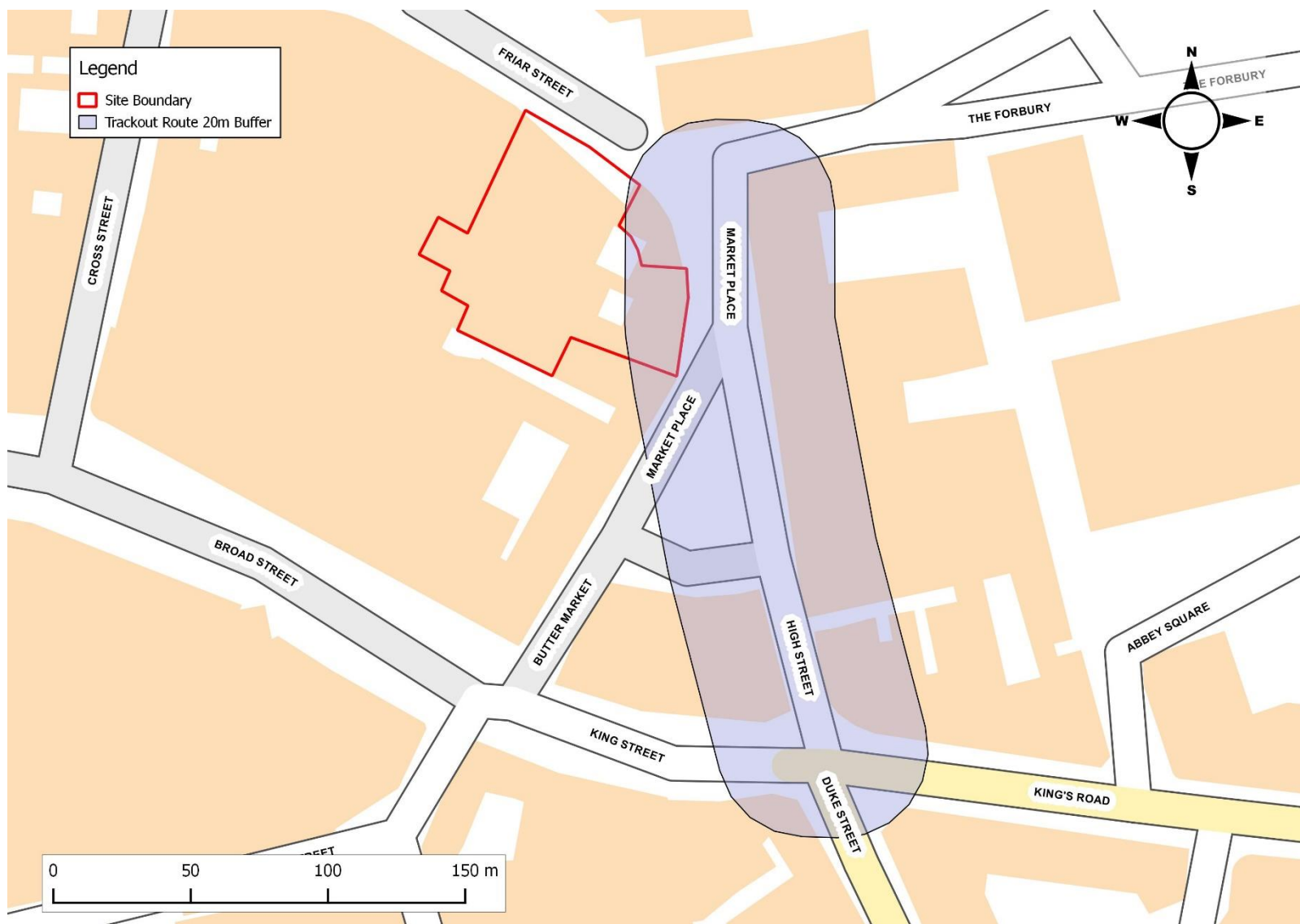


FIGURE A3: DUST RISK BUFFER 200 M ALONG PUBLIC HIGHWAY