



Air Quality Assessment

***The Gate, The Meadway, Reading.
RG30 4NX***

Client Name: Alastair Mitchell-Baker

Project Number: P3208.2.0

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Site:	The Gate, The Meadway, Reading, RG30 4NX
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1 Introduction

The client, Alastair Mitchell-Baker, is proposing to develop a plot at The Gate, The Meadway, Reading, RG30 4NX, hereafter referred to as 'the site'. The development proposals and purpose of investigation are detailed below.

1.1 Development Proposals

The proposed development will increase the capacity of The Gate Church, located at 184 The Meadway, Reading, RG30 4NX, and provide offices, meeting rooms and a café. The site location is shown in **Figure 1**.

1.2 Purpose of Investigation

agb Environmental Ltd has been commissioned to undertake an air quality assessment for the proposed development. Reading Borough Council has declared an air quality management area (AQMA) for exceedances of the annual mean nitrogen dioxide (NO₂) objective that covers Reading Town Centre and the major radial road and rail routes into Reading. The application site lies to the west of this area.

This report describes the existing air quality conditions in proximity to the site. The scale of the development is such that it will not significantly increase traffic on local roads; therefore, the requirement for detailed modelling of the air quality impacts has been screening out following Institute of Air Quality Management (IAQM) guidance.

There is the potential for construction activities to impact upon existing properties. The main pollutants of concern related to construction activities are dust and PM₁₀.

The assessment has been prepared taking into account all relevant local and national guidance and regulations.

2 Air Quality Legislation and Policy

2.1 EU Limit Values

The European Union's Directive on ambient air quality and cleaner air for Europe (European Parliament, Council of the European Union, 2008) set legally binding limit values for NO₂, PM₁₀ and PM_{2.5}. The Air Quality Standards Regulations 2010 (The Stationary Office, 2010) implement the EU Directive limit values in English legislation. Achievement of the limit values is a national obligation rather than a local one.

The limit values are the same as the objective values (described below and shown in **Table 1**); however, the compliance dates differ, and the limit values apply at all locations (apart from where the public does not have access, where health and safety at work provisions apply and on the road carriageway). The PM₁₀ and NO₂ limit value applied from 2005 and 2010 respectively, whereas the PM_{2.5} limit value applied from 2015.

2.2 Clean Air Strategy

The Clean Air Strategy (Defra, 2019a) provides an overview of the actions that the government will take to improve air quality and promises new legislation that will tackle air pollution.

Part IV of The Environment Act 1995 required the UK Government to prepare an Air Quality Strategy. The original Air Quality Strategy (Defra, 2007) set out air quality standards and objectives intended to protect human health and the environment.

Standards are the concentrations of pollutants in the atmosphere, below which there is a minimum risk of health effects or ecosystem damage; they are set with regard to scientific and medical evidence. Objectives are the policy targets set by the Government, taking account of economic efficiency, practicability, technical feasibility and timescale, where the standards are expected to be achieved by a certain date.

The original Air Quality Strategy also described the system of Local Air Quality Management (LAQM), introduced in Part IV of the Environment Act 1995, which requires every local authority to carry out regular review and assessments of air quality in its area. Where an objective has not been, or is unlikely to be achieved, the local authority must declare an Air Quality Management Area (AQMA), and prepare an action plan which sets out appropriate measures to be introduced in pursuit of the objectives.

The objectives for NO₂ and PM₁₀, as prescribed by the Air Quality (England) Regulations 2000 and the Air Quality (England) (Amendment) Regulations 2002 (The Stationary Office, 2000; The Stationary Office, 2002), are shown in **Table 1**. The objectives for PM₁₀ and NO₂ were to have been achieved by 2004 and 2005 respectively, and continue to apply in all future years thereafter. The PM_{2.5} objective, also shown in **Table 1**, is to be achieved by 2020; however, there is no obligation for local authorities to try to meet the PM_{2.5} objective, and it is not included in the Regulations.

The objectives apply at locations where members of the public are likely to be regularly present and are likely to be exposed for a period of time appropriate to the averaging period of the objective. Examples of where the objectives should apply are provided in the Local Air Quality Management Technical Guidance (Defra, 2016). The annual mean NO₂ and PM₁₀ objectives should apply at the building façades of residential properties, schools, hospitals, care homes *etc.*; they should not apply at the building façades of places of work, hotels, gardens or

kerbside sites. The 24-hour mean PM₁₀ objective should apply at all locations where the annual mean objective applies, as well as the gardens of residential properties and hotels. The 1-hour mean NO₂ objective should apply at all locations where the annual and 24-hour mean objectives apply, as well as at kerbside sites where the public have regular access, e.g. the pavements of busy shopping streets.

Table 1: The Objectives for NO₂, PM₁₀ and PM_{2.5}

Pollutant	Concentration Measured As	Objective
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
PM ₁₀	24-hour Mean	50 µg/m ³ not to be exceeded more than 35 times a year
	Annual Mean	40 µg/m ³
PM _{2.5}	Annual Mean	25 µg/m ³

2.3 Planning Policy

2.3.1 National Policies

The National Planning Policy Framework (NPPF) sets out the Government's planning policies for England and how these should be applied (Ministry of Housing, Communities & Local Government, 2019). It provides a framework within which locally-prepared plans for development can be produced. It states that the purpose of the planning system is to contribute to the achievement of sustainable development and includes an overarching environmental objective:

“to contribute to protecting and enhancing our natural, built and historic environment; including making effective use of land, helping to improve biodiversity, using natural resources prudently, minimising waste and pollution, and mitigating and adapting to climate change, including moving to a low carbon economy.”

The NPPF states that:

“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.”

With specific reference to air quality, the NPPF 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.”

The NPPF goes on to say that:

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

The NPPF is supported by Planning Practice Guidance (PPG) (DCLG, 2014). The PPG states that:

“Defra carries out an annual national assessment of air quality using modelling and monitoring to determine compliance with EU Limit Values. It is important that the potential impact of new development on air quality is taken into account in planning where the national assessment indicates that relevant limits have been exceeded or are near the limit.”

The PPG goes on to state that:

“Whether or not 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 generate air quality impact in an area where air quality is known to be poor. They could also arise where the development is likely to adversely impact upon the implementation of air quality strategies and action plans and/or, in particular, lead to a breach of EU legislation (including that applicable to wildlife).”

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

“Assessments should be proportional to the nature and scale of development proposed and the level of concern about air quality.”

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

“Mitigation options where necessary, will depend on the proposed development and should be proportionate to the likely impact.”

2.3.2 Local Policies

The Reading Core Strategy (Reading Borough Council, 2008) includes Policy CS34: Pollution and Water Resources, which states that:

“Development will only be permitted where it would not be damaging to the environment through air, land, noise or light pollution; where it would preserve or ideally enhance ground and surface water quality; and where existing water resources, sewerage and wastewater treatment infrastructure are adequate to support the proposed development.”

Proposals for development that are sensitive to the effects of air, noise or light 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. ...”

The Reading Sites and Detailed Policy Document (Reading Borough Council, 2012) includes Policy DM19: Air Quality, which states that:

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 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, 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.

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

2.3.3 Air Quality Action Plan

The Reading Air Quality Action Plan includes a number of measures and actions that the council intends to implement in order to help meet the air quality objectives within its AQMA (Reading Borough Council, 2016; Reading Borough Council, 2017).

3 Methodology

3.1 Baseline Conditions

Information on existing air quality within the study area has been collated from the following sources:

- The results of monitoring and the LAQM review and assessment reports undertaken by Reading Borough Council (Reading Borough Council, 2017);
- Maps of roadside concentrations published by Defra (Defra, 2019b), used to identify current exceedances of the NO₂ EU limit value ¹;
- Background pollutant concentration maps published by Defra (Defra, 2019c); and
- Defra's Pollutant Release and Transfer Register (Defra, 2019d), used to screen for local industrial and waste management sources.

3.2 Construction Impacts

A construction dust risk assessment has been undertaken following the methodology in the Institute of Air Quality Management (IAQM) Guidance on the Assessment of Dust from Demolition and Construction (IAQM, 2016).

The guidance divides activities on construction sites into four main types: demolition, earthworks, construction and trackout. The methodology is based on a sequence of steps. Step 1 screens the requirement for more detailed assessment; if there are no receptors within 50 m of the site boundary, or within 50 m of roads used by construction vehicles, then there is no need for further assessment. Step 2 assesses the risk of dust impacts from each of the four activities, considering the scale and magnitude of the works (Step 2A), and the sensitivity of the area (Step 2B). Site-specific mitigation for each of the four activities is then determined based on a dust risk category defined at Step 2C. **Appendix A1** sets out the construction dust assessment methodology in more detail.

The IAQM construction dust assessment methodology ensures that, with appropriate mitigation in place, the residual effect from construction dust will normally be 'not significant'. Therefore, the assessment has been used to determine an appropriate level of mitigation for the construction phase.

3.3 Road Traffic Impacts

Guidance for air quality and planning officers within local authorities, and developers and consultants involved in air quality assessments, has been published by Environmental Protection UK (EPUK) and the Institute of Air Quality Management (IAQM) in Land-Use Planning & Development Control: Planning for Air Quality (EPUK and IAQM, 2017). The guidance sets out criteria to help establish when an air quality assessment is likely to be considered necessary.

For impacts of existing air quality in new development, the requirement for an assessment should be based on professional judgement, taking into account:

- the background and future baseline air quality and whether this will be likely to approach or exceed the values set by air quality objectives;

¹ There are no exceedances of the PM₁₀ limit values.

- the presence and location of Air Quality Management Areas as an indicator of local hotspots where the air quality objectives may be exceeded;
- the presence of a heavily trafficked road, with emissions that could give rise to sufficiently high concentrations of pollutants (in particular NO₂), that would cause unacceptably high exposure for users of the new development; and
- the presence of a source of odour and/or dust that may affect amenity for future occupants of the development.

For impacts of development on the local area, a two-stage approach is suggested, with the first stage intended to screen out small developments, and developments considered likely to have insignificant air quality effects. The full criteria are shown in **Appendix A2**.

The criteria in the EPUK/IAQM guidance and professional judgement have been used to screen the requirement for a full air quality assessment, with the professional experience of the consultant preparing this report set out in **Appendix A3**.

4 Baseline Conditions

4.1 Industrial Sources

The search of the UK Pollutant Release and Transfer Register did not identify any significant industrial or waste management sources that are likely to affect air quality at the application site.

4.2 EU Limit Values

There are no AURN monitoring sites within the study area and The Meadway, adjacent to the application site, is not included in the modelling undertaken by Defra.

4.3 LAQM Review and Assessment

Reading Borough Council has declared an air quality management area (AQMA) for exceedances of the annual mean NO₂ objective that covers Reading Town Centre and the major radial road and rail routes into Reading.

Local Air Quality Monitoring

Reading Borough Council currently operates four automatic monitoring sites. Data from one of these sites, located on Oxford Road, approximately 2km northeast of the application site, are provided for NO₂ and PM₁₀ in **Table 2** and **Table 3** respectively. Reading Borough Council also operates a number of diffusion tube monitoring sites, and data from sites located within 2km of the applications are provided in **Table 2**. The monitoring site locations are shown in **Figure 1**.

An exceedance of the annual mean NO₂ objective was measured at the Oxford Road automatic roadside monitoring site in 2013; however, the objective has been achieved in all other years and shows a decreasing trend between 2014 and 2016. The annual mean NO₂ objective has been achieved at all of the roadside diffusion tube monitoring sites. Measured annual mean NO₂ concentrations ranged from 28 to 43 µg/m³ between 2012 and 2016.

No exceedances of the PM₁₀ objectives have been measured at the Oxford Road automatic monitoring site, where annual mean concentrations ranged from 20 to 24 µg/m³ between 2012 and 2016.

Table 2: Measured NO₂ Concentrations (2012 to 2016) ^a

Site ID	Location	Site Type	Annual Mean (µg/m³)				
			2012	2013	2014	2015	2016
Automatic Monitor							
RD3	Oxford Road	R	38	43	35	31	30
Diffusion Tube							
DT21	144 Bath Road	R	29	35	31	30	29
DT22	Tilehurst Rd/ Water Rd	R	37	39	37	34	32
DT23	Norcot/School Lane	R	-	-	32	28	28
Objective			40				
Site ID	Location	Site Type	Number of Hours > 200 µg/m³ ^b				
			2012	2013	2014	2015	2016
Automatic Monitor							
RD3	Oxford Road	R	0	3 (156)	0	0	0
Objective			18 (200)				

a Exceedances are shown in bold. R = roadside.

b The number in brackets is the 99.8th percentile of 1-hour means as less than 85% data capture.

Table 3: Summary of PM₁₀ Monitoring Data (2012 to 2016) ^a

Site ID	Location	Site Type	2012	2013	2014	2015	2016
Annual Mean (µg/m³)							
RD3	Oxford Road	R	24	20	20	23	22
Objective			40				
Number of Days > 50 µg/m³ ^b							
RD3	Oxford Road	R	13	4 (49)	3	7	3
Objective			35 (50)				

a Exceedances are shown in bold. R = roadside.

b The number in brackets is the 90.4th percentile of 24-hour means, used when data capture is low.

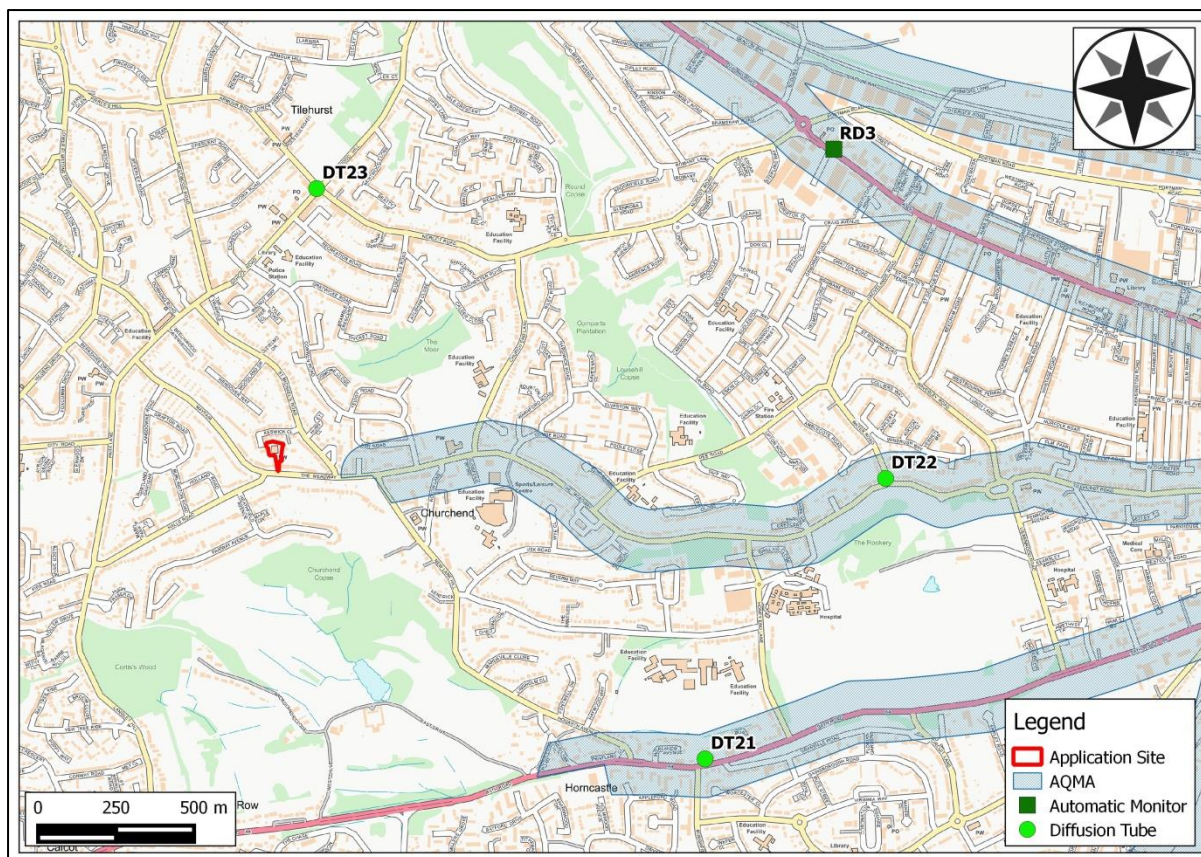


Figure 1: The Application Site, Air Quality Monitoring Sites and the Reading AQMA
Contains Ordnance Survey data © Crown copyright and database right 2019

4.4 Background Concentrations

Estimated background concentrations at the application site are shown in **Table 4**. The background concentrations have been derived from data in the national maps published by Defra. The background concentrations are all well below the objectives.

Table 4: Estimated Annual Mean Background Concentrations in 2019 ($\mu\text{g}/\text{m}^3$)

OS Grid	NO _x	NO ₂	PM ₁₀	PM _{2.5}
466500,173500	14.6	10.9	12.5	8.3
Objective	-	40	40	25

5 Impact Assessment

5.1 Construction Phase

Without mitigation, there is a risk that the construction phase of the development will lead to dust soiling and elevated concentrations of PM₁₀. These impacts may occur during demolition, earthworks and construction, as well as from track-out of dust onto the public highway, as vehicles leave the construction site.

5.1.1 Screening

There are human receptors within 350 m of the application site in all directions and receptors within 50 m of the route used by construction vehicles on the public highway, up to 500 m from the site entrance. Therefore, further assessment of the construction phase impacts is necessary. There are no sensitive ecological receptors within 50 m of the site boundary; therefore, the impacts on ecology will not be considered further.

5.1.2 Risk of Dust Impacts

Potential Dust Emission Magnitude

Any demolition will be limited to buildings with a volume of less than 20,000m³; therefore, based on the example definitions in **Table A1** in **Appendix A1**, the dust emission class for demolition is considered to be small.

Earthworks will take place across an area of less than 2,500 m². Data from the UK Soil Observatory (NERC, 2019) have been used to determine that the soil texture at the site is clayey loam to silty loam, which would be prone to suspension when dry. Given the small scale of the site, there are likely to be less than 5 heavy earth moving vehicles at any one time. Based on the example definitions in definitions in **Table A1** in **Appendix A1**, the dust emission class for earthworks is considered to be small.

The proposed development involves the construction of buildings with a total volume of less than 25,000m³; therefore, based on the example definitions in **Table A1** in **Appendix A1**, the dust emission class for construction is considered to be small.

The number of daily outward heavy duty vehicle (HDV) movements from the application site during the construction phase is currently unknown; however, given the small size of the site, it is likely to be less than 10; therefore, based on the example definitions in **Table A1** in **Appendix A1**, the dust emission class for track-out is considered to be small.

A summary of the likely dust emission magnitudes is shown in **Table 5**.

Table 5: Likely Dust Emission Magnitudes

Source	Dust Emission Magnitude
Demolition	Small
Earthworks	Small
Construction	Small
Trackout	Small

Sensitivity of the Area

The sensitivity of the area depends on the specific sensitivities of local receptors, the proximity and number of receptors, local PM₁₀ background concentrations and other site specific factors, e.g. natural screening by trees.

Sensitivity of the Area to Dust Soiling

The surrounding residential properties are considered to be high sensitivity receptors to dust soiling (see **Table A2** in **Appendix A1**). There are between 10 and 100 residential properties within 20 m of the application site boundary; therefore, with reference to **Table A5** in **Appendix A1**, the area is considered to be of high sensitivity to dust soiling.

Table 5 shows that the dust emission magnitude for track-out is small; therefore, there is a risk of material being tracked up to 50 m from the site exit. It has been assumed that all possible routes from the site could be affected. There are between 10-100 residential properties within 20 m of the roads along which material could be tracked. With reference to **Table A5** in **Appendix A1**, the area is thus considered to be of high sensitivity to dust soiling from track-out.

Sensitivity of the Area to the Health Effects of PM₁₀

Residential properties are considered to be high sensitivity receptors to the health effects of PM₁₀ (see **Table A3** in **Appendix A1**). Annual mean PM₁₀ concentrations at receptors within 20 m of the application site and the road along which construction vehicles will travel are likely to be between the background level and that measured at the Oxford Road automatic monitoring site, i.e. 12.5-22.0µg/m³ (see **Table 4**). With reference to **Table A6** in **Appendix A1**, the area is thus described to be of low sensitivity to the health effects of PM₁₀ with regard to on-site emissions and track-out.

A summary of the sensitivity of the area to the effects of the construction works is shown in **Table 6**.

Table 6: Summary of the Area Sensitivity

Potential Effect	Sensitivity of the Area	
	On-site Works	Trackout
Dust Soiling	High	High
Health	Low	Low

5.1.3 Risk of Impact and Significance

The dust emission magnitudes in **Table 5** have been combined with the area sensitivities in **Table 6** and a risk category has been assigned to each construction activity using the matrix in **Table A8** in **Appendix A1**. The resultant risk categories, shown in **Table 7**, have then been used to determine the appropriate level of mitigation necessary for a residual effect that is likely to be 'not significant'.

Table 7: Summary of the Risk of Impacts Without Mitigation

Construction Activity	Dust Soiling	Health
Demolition	Medium	Negligible
Earthworks	Low	Negligible
Construction	Low	Negligible
Trackout	Low	Negligible

5.2 Operational Phase

5.2.1 Impact of the Development

The proposed development will generate an additional 30 vehicle trips on a Sunday, with no increase in traffic on weekdays (Glanville, 2019). Once distributed across the local road network and averaged to annual average daily traffic (AADT) movements, the increase in traffic due to the proposed development would be well below the screening criterion of 100 daily movements that would require a detailed assessment of the air quality impacts. Therefore, with regard to the screening criteria set out in **Appendix A2**, detailed assessment of the road traffic impacts of the development on the surrounding area should not be required.

5.2.2 Impact on the Development

The buildings at the application site will be located more than 50m from The Meadway. Based on data from diffusion tube monitoring sites located close to local roads, annual mean NO₂ concentrations at the application site are likely to be achieved by a wide margin. In any case, receptors at the proposed development would not be considered relevant exposure with regard to annual mean pollutant concentrations. Given that there have been no exceedences of the short-term objectives for NO₂ and PM₁₀ at the Oxford Road automatic monitoring site, where there is a much heavier flow of traffic, air quality at the application site will be acceptable.

Therefore, with regard to the IAQM screening criteria, it is considered that a detailed assessment of the effects of existing air quality on the development should not be required.

6 Mitigation

6.1 Construction Phase

The application site has been identified as a negligible risk to health and a low risk site due to dust soiling during the construction phase, with a medium risk during the demolition phase, as set out in **Table 7**. The dust risk category has been used, along with the professional judgement of the consultant, to determine the appropriate level of mitigation at the site. The mitigation measures, taken from the IAQM guidance, are described in **Appendix A4**.

The mitigation measures should be written into a dust management plan (DMP), which should be approved by the local planning authority prior to commencement of work on site.

6.2 Operational Phase

The screening assessment has shown that the air quality impacts will be insignificant, and no mitigation should be required.

7 Residual Impacts

7.1 Construction Phase

The IAQM guidance is clear that, with appropriate mitigation in place, the residual effect will normally be 'not significant'. With the implementation of the mitigation measures set out in **Appendix A4**, the residual effects are judged to be insignificant.

During adverse weather conditions, or where there is an interruption to the water supply, there may be occasional, short-term dust annoyance; however, the likely scale and duration of these effects would not change the conclusion that the residual effects are insignificant.

7.2 Operational Phase

The residual impacts will be the same as those identified in **Section 5**.

8 Conclusions and Recommendations

The construction phase will have the potential to create dust. It will therefore be necessary to implement mitigation measures to minimise dust emission. With these measures in place, it is expected that any residual effects will be not significant.

The increase in traffic on local roads due to the development will be significantly less than the IAQM/EPUK criteria indicating that detailed air quality assessment would be necessary. Therefore, the proposed development will have an insignificant effect on local air quality.

Based on the distance of the application site from any significant road traffic emissions sources and the results of local air quality monitoring, air quality at the application site is likely to be acceptable.

There should be no constraints to the development of the application site with regard to air quality as the proposed development is consistent with:

- The NPPF;
- Policy CS34 of the Reading Core Strategy; and
- Policy DM19 of the Reading Sites and Detailed Policy Document.

9 References

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10 Glossary

AADT	Annual Average Daily Traffic
ADMS-Roads	Atmospheric Dispersion Modelling System
AQMA	Air Quality Management Area
AURN	Automatic Urban and Rural Network
Defra	Department for Environment, Food and Rural Affairs
DfT	Department for Transport
EFT	Emissions Factor Toolkit
EPUK	Environmental Protection UK
Exceedance	A period of time when the concentration of a pollutant is greater than the appropriate air quality objective. This applies to specified locations with relevant exposure
HDV	Heavy Duty Vehicles (> 3.5 tonnes)
HGV	Heavy Goods Vehicle
IAQM	Institute of Air Quality Management
LAQM	Local Air Quality Management
µg/m³	Microgrammes per cubic metre
NAEI	National Atmospheric Emissions Inventory
NO₂	Nitrogen dioxide
NO_x	Nitrogen oxides (taken to be NO ₂ + NO)
NPPF	National Planning Policy Framework
Objectives	A nationally defined set of health-based concentrations for nine pollutants, seven of which are incorporated in Regulations, setting out the extent to which the standards should be achieved by a defined date. There are also vegetation-based objectives for sulphur dioxide and nitrogen oxides
PM₁₀	Small airborne particles, more specifically particulate matter less than 10 micrometres in aerodynamic diameter
PM_{2.5}	Small airborne particles less than 2.5 micrometres in aerodynamic diameter
Standards	A nationally defined set of concentrations for nine pollutants below which health effects do not occur or are minimal

11 Limitations

The conclusions and recommendations made in this report are limited to those that can be made on the basis of the research carried out. The results of the research should be viewed in the context of the work that has been carried out and no liability can be accepted for matters outside the stated scope of the research. Any comments made on the basis of information obtained from third parties are given in good faith on the assumption that the information is accurate. No independent validation of third party information has been made by agb Environmental Ltd.

Advice provided within this report is based on current guidelines available at the time of writing. This report is subject to amendment in light of additional information becoming available or statutory consultee review.

This report is written in the context of an agreed scope of work between agb Environmental Ltd and the Client and should only be used in this specific context. Re-interpretation of this report in whole or part may become necessary if additional information becomes available or practices or legislation changes.

agb Environmental Ltd does not provide legal advice; the advice of the Client's legal advisors may also be required. agb Environmental Ltd Terms and Conditions apply.

Appendices

A1 Dust Risk Assessment Methodology

The IAQM guidance divides activities on construction sites into four types to reflect their different potential impacts:

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

A series of steps then consider the potential impact due to:

- annoyance due to dust soiling;
- the risk of health effects due to increased in exposure to PM₁₀;
- harm to ecological receptors.

Step 1: Screen the Need for a Detailed Assessment

An assessment is required where there is a human receptor within 350 m of the site boundary, and/or within 50 m of the route(s) used by construction vehicles on the public highway, up to 500 m from the site entrance(s), or where there is an ecological receptor within 50 m of the site boundary, and/or within 50 m of the route(s) used by construction vehicles on the public highway, up to 500 m from the site entrance(s).

Where the need for a more detailed assessment is screened out, it can be concluded that the level of risk is negligible, and any effects will be not significant.

Step 2: Assess the Risk of Dust Impacts

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

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

These two factors are combined at Step 2C to determine the risk of dust impacts from each type of construction activity, with no mitigation applied.

Step 2A: Potential Dust Emissions Magnitude

The dust emission magnitude is classified as small, medium or large. Examples of how the potential dust emission magnitude for each activity can be defined are shown in **Table A1**.

Table A1: Examples of How the Dust Emission Magnitude can be Defined

Class	Example
Demolition	
Large	Total building volume >50,000 m ³ , potentially dusty construction material (e.g. concrete), on site crushing and screening, demolition activities >20 m above ground level.
Medium	Total building volume 20,000 m ³ – 50,000 m ³ , potentially dusty construction material, demolition activities 10-20 m above ground level.
Small	Total building volume <20,000 m ³ , construction material with low potential for dust release (e.g. metal cladding or timber), demolition activities <10 m above ground, demolition during wetter months.
Earthworks	
Large	Total site area >10,000 m ² , potentially dusty soil type (e.g. clay, which will be prone to suspension when dry to due small particle size), >10 heavy earth moving vehicles active at any one time, formation of bunds >8 m in height, total material moved >100,000 tonnes.
Medium	Total site area 2,500 m ² – 10,000 m ² , moderately dusty soil type (e.g. silt), 5-10 heavy earth moving vehicles active at any one time, formation of bunds 4 m – 8 m in height, total material moved 20,000 tonnes – 100,000 tonnes.
Small	Total site area <2,500 m ² , soil type with large grain size (e.g. sand), <5 heavy earth moving vehicles active at any one time, formation of bunds <4 m in height, total material moved <20,000 tonnes, earthworks during wetter months.
Construction	
Large	Total building volume >100,000 m ³ , piling, on site concrete batching; sandblasting.
Medium	Total building volume 25,000 m ³ – 100,000 m ³ , potentially dusty construction material (e.g. concrete), on site concrete batching.
Small	Total building volume <25,000 m ³ , construction material with low potential for dust release (e.g. metal cladding or timber).
Trackout ^a	
Large	>50 HDV (>3.5t) outward movements in any one day, potentially dusty surface material (e.g. high clay content), unpaved road length >100 m.
Medium	10-50 HDV (>3.5t) outward movements in any one day, moderately dusty surface material (e.g. high clay content), unpaved road length 50 m – 100 m.
Small	<10 HDV (>3.5t) outward movements in any one day, surface material with low potential for dust release, unpaved road length <50 m.

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

Step 2B: Define the Sensitivity of the Area

The sensitivity of the area takes account of:

- the specific sensitivities of receptors in the area;
- the proximity and number of those receptors;
- in the case of PM₁₀, the local background concentrations; and

- site-specific factors, such as whether there are natural shelters, such as trees, to reduce the risk of wind-blown dust.

The specific sensitivities of different types of receptor to dust soiling and PM₁₀ are shown **Table A2**, **Table A3** and **Table A4**. Professional judgement should be used to identify where on the spectrum of sensitivity a receptor lies, taking account of specific circumstances, i.e. the first occupants of residential units on a phased development may be expected to be less sensitive to dust soiling.

The sensitivity of the area is then determined from the specific sensitivities of the receptors using the matrices set out in **Table A5**, **Table A6** and **Table A7**. Professional judgement should be used to determine the final sensitivity of the area, taking account of:

- any history of dust generating activities in the area;
- the likelihood of concurrent dust generating activity on nearby sites;
- any pre-existing screening between source and receptors;
- any conclusions drawn from analysing local meteorological data which accurately represents the area; and if relevant, the season during which the works will take place;
- any conclusions drawn from local topography;
- duration of the potential impact, as a receptor may become more sensitive over time; and
- any other known specific receptor sensitivities.

Step 2C: Define the Risk of Impacts

The dust emission magnitude determined at Step 2A is combined with the sensitivity of the area determined at Step 2B to determine the risk of impacts with no mitigation applied. The level of risk for each activity is determined using the matrix in **Table A8**.

Step 3: Determine Site Specific Mitigation

The dust risk category determined at Step 2C has been used, along with the professional judgement of the consultant, to determine the appropriate level of mitigation at the site. The highly recommended and desirable mitigation measures set out in the IAQM guidance form the basis of the mitigation set out in **Appendix A4**.

Step 4: Determine Significant Effects

The IAQM guidance is clear that, with appropriate mitigation in place, the residual effect will normally be 'not significant'.

Table A2: Sensitivities of People to Dust Soiling

Class	Principles	Examples
High	Users can reasonably expect enjoyment of a high level of amenity; or the appearance, aesthetics or value of their property would be diminished by soiling; and the people or property would reasonably be expected to be present continuously, or at least regularly for extended periods, as part of the normal pattern of use of the land.	Dwellings, museum and other culturally important collections, medium and long term car parks and car showrooms.
Medium	Users would expect to enjoy a reasonable level of amenity, but would not reasonably expect to enjoy the same level of amenity as in their home; or the appearance, aesthetics or value of their property could be diminished by soiling; or the people or property wouldn't reasonably be expected to be present here continuously or regularly for extended periods as part of the normal pattern of use of the land.	Parks and places of work.
Low	The enjoyment of amenity would not reasonably be expected; or property would not reasonably be expected to be diminished in appearance, aesthetics or value by soiling; or there is transient exposure, where the people or property would reasonably be expected to be present only for limited periods of time as part of the normal pattern of use of the land.	Playing fields, farmland (unless commercially-sensitive horticultural), footpaths, short term car parks and roads.

Table A3: Sensitivities of People to PM₁₀

Class	Principles	Examples
High	Locations where members of the public may be exposed for eight hours or more in a day.	Residential properties, hospitals, schools and residential care homes.
Medium	Locations where the people exposed are workers, and where individuals may be exposed for eight hours or more in a day.	Office and shop workers, but will generally not include workers occupationally exposed to PM ₁₀
Low	Locations where human exposure is transient.	Public footpaths, playing fields, parks and shopping streets.

Table A4: Sensitivities of Receptors to Ecological Effects

Class	Principles	Examples
High	Locations with an international or national designation and the designated features may be affected by dust soiling; or locations where there is a community of a particularly dust sensitive species.	Special Areas of Conservation (SAC) with dust sensitive features.
Medium	Locations where there is a particularly important plant species, where its dust sensitivity is uncertain or unknown; or locations with a national designation where the features may be affected by dust deposition.	Sites of Special Scientific Interest (SSSI) with dust sensitive features.
Low	Locations with a local designation where the features may be affected by dust deposition.	Local Nature Reserves with dust sensitive features.

Table A5: Sensitivity of the Area to Dust Soiling Effects on People and Property ^a

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

^a For demolition, earthworks and construction, the distances are measured from the dust source, or the application site boundary. For trackout, the distances are measured from the side of the roads used by construction traffic. Without site-specific mitigation, trackout may occur from roads up to 500 m from large sites, 200 m from medium sites and 50 m from small sites, as measured from the site exit. The impact declines with distance from the site, and it is only necessary to consider trackout impacts up to 50 m from the edge or the road.

Table A6: Sensitivity of the Area to Human Health Effects ^a

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

^a For demolition, earthworks and construction, the distances are measured from the dust source, or the application site boundary. For trackout, the distances are measured from the side of the roads used by construction traffic. Without site-specific mitigation, trackout may occur from roads up to 500 m from large sites, 200 m from medium sites and 50 m from small sites, as measured from the site exit. The impact declines with distance from the site, and it is only necessary to consider trackout impacts up to 50 m from the edge or the road.

Table A7: Sensitivity of the Area to Ecological Effects ^a

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

^a For demolition, earthworks and construction, the distances are measured from the dust source, or the application site boundary. For trackout, the distances are measured from the side of the roads used by construction traffic. Without site-specific mitigation, trackout may occur from roads up to 500 m from large sites, 200 m from medium sites and 50 m from small sites, as measured from the site exit. The impact declines with distance from the site, and it is only necessary to consider trackout impacts up to 50 m from the edge or the road.

Table A8: — Defining the Risk of Dust Impacts

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

A2 Criteria Used to Establish when an Air Quality Assessment is Likely to be Necessary

Criteria to Proceed to Stage 2.

A. If any of the following apply:

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

B. Coupled with any of the following:

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

Note: Consideration should still be given to the potential impacts of neighbouring sources on the site, even if an assessment of impacts of the development on the surrounding area is screened out.

The Stage 2 criteria are shown in **Table A9**.

Table A9: Indicative Criteria for Requiring an Air Quality Assessment

The development will:	Indicative Criteria to Proceed to an Air Quality Assessment
1. Cause a significant change in Light Duty Vehicle (LDV) traffic flows on local roads with relevant receptors. (LDV = cars and small vans <3.5t gross vehicle weight)	A change of LDV flows of: - more than 100 AADT within or adjacent to an AQMA; - more than 500 AADT elsewhere.
2. Cause a significant change in Heavy Duty Vehicle (HDV) flows on local roads with relevant receptors. (HDV = goods vehicles + buses >3.5t gross vehicle weight)	A change of HDV flows of: - more than 25 AADT within or adjacent to an AQMA; - more than 100 AADT elsewhere.
3. Realign roads, i.e. changing the proximity of receptors to traffic lanes.	Where the change is 5m or more and the road is within an AQMA.
4. Introduce a new junction or remove an existing junction near to relevant receptors.	Applies to junctions that cause traffic to significantly change vehicle accelerate/decelerate, e.g. traffic lights, or roundabouts.
5. Introduce or change a bus station.	Where bus flows will change by: - more than 25 AADT within or adjacent to an AQMA; - more than 100 AADT elsewhere.
6. Have an underground car park with extraction system.	The ventilation extract for the car park will be within 20 m of a relevant receptor; coupled with the car park having more than 100 movements per day (total in and out).

The development will:	Indicative Criteria to Proceed to an Air Quality Assessment
7. Have one or more substantial combustion processes	Where the combustion unit is: - any centralised plant using bio fuel; - any combustion plant with single or combined thermal input >300kW; - a standby emergency generator associated with a centralised energy centre (if likely to be tested/used >18 hours a year).
8. Have a combustion process of any size	Where the pollutants are exhausted from a vent or stack in a location and at a height that may give rise to impacts at receptors through insufficient dispersion. This criterion is intended to address those situations where a new development may be close to other buildings that could be residential and/or which could adversely affect the plume's dispersion by way of their size and/or height.

A3 Professional Experience

Bob Thomas, BSc (Hons) PgDip MSc MEnvSc MIAQM CSci

Bob Thomas has over eleven years' experience in the field of air quality management and assessment. He has carried out air quality assessments for a wide range of developments, including residential, commercial, industrial, minerals and waste developments. He has been responsible for air quality projects that include ambient air quality monitoring of nitrogen dioxide, dust and PM₁₀, the assessment of nuisance odours and dust, and the preparation of Review and Assessment reports for local authorities. He has extensive dispersion modelling experience for road traffic, energy centre and industrial sources, and has completed many stand-alone reports and chapters for inclusion within an Environmental Statement. Bob has worked with a variety of clients to provide expert air quality services and advice, including local authorities, planners, developers, architects and process operators, and has provided expert witness services at public inquiry. He is a Chartered Scientist, a Member of the Institute of Air Quality Management and a Member of the Institution of Environmental Sciences.

A full CV for Bob Thomas is available at <http://aqassessments.co.uk/about>

A4 Construction Mitigation

The following is a set of measures that should be incorporated into the specification for the works.

Communications

- display the name and contact details of person(s) accountable for air quality and dust issues on the site boundary. This may be the environmental manager/engineer or the site manager; and
- display the head or regional office contact information.

Dust Management Plan

- Develop and implement a Dust Management Plan (DMP) approved by the Local Authority which documents the mitigation measures to be applied, and the procedures for their implementation and management.

Site Management

- Record all dust and air quality complaints, identify cause(s), take appropriate measures to reduce emissions in a timely manner, and record the measures taken;
- make the complaints log available to the local authority when asked; and
- record any exceptional incidents that cause dust and/or air emissions, either on- or off-site, and the action taken to resolve the situation in the log book.

Monitoring

- Carry out regular site inspections to monitor compliance with the DMP, record inspection results, and make an inspection log available to the Local Authority when asked; and
- increase the frequency of site inspections by the person accountable for air quality and dust issues on site when activities with a high potential to produce dust area being carried out and during prolonged dry or windy conditions.

Preparing and Maintaining the Site

- Plan the site layout so that machinery and dust-causing activities are located away from receptors, as far as is possible;
- erect solid screens or barriers around dusty activities or the site boundary that are as at least as high as any stockpiles on site;
- fully enclose site or specific operations where there is a high potential for dust production and the site is active for an extensive period;
- avoid site runoff of water or mud;
- keep site fencing, barriers and scaffolding clean using wet methods;
- remove materials that have a potential to produce dust from site as soon as possible, unless being re-used on site. If they are being re-used on-site cover as described below; and
- cover, seed, or fence stockpiles to prevent wind whipping.

Operating Vehicle/Machinery and Sustainable Travel

- Ensure all vehicles switch off their engines when stationary – no idling vehicles;
- avoid the use of diesel- or petrol-powered generators and use mains electricity or battery-powered equipment where practicable; and
- impose and signpost a maximum-speed-limit of 15 mph on surfaced and 10 mph on un-surfaced haul roads and work areas (if long haul routes are required these speeds may be increased with suitable additional control measures provided, subject to the approval of the nominated undertaker and with the agreement of the local authority, where appropriate).

Operations

- Only use cutting, grinding or sawing equipment fitted or in conjunction with suitable dust suppression techniques such as water sprays or local extraction, e.g. suitable local exhaust ventilation systems;
- ensure an adequate water supply on the site for effective dust/particulate matter suppression/mitigation, using non-potable water where possible and appropriate;
- use enclosed chutes, conveyors and covered skips;
- minimise drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment and use fine water sprays on such equipment wherever appropriate; and
- ensure equipment is readily available on site to clean any dry spillages, and clean up spillages as soon as reasonably practicable after the event using wet cleaning methods.

Waste Management

- No bonfires and burning of waste materials.

Measures Specific to Demolition

- Soft strip inside buildings before demolition (retaining walls and windows in the rest of the building where possible, to provide a screen against dust);
- ensure effective water suppression is used during demolition operations. Hand held sprays are more effective than hoses attached to equipment as the water can be directed to where it is needed. In addition high volume water suppression systems, manually controlled, can produce fine water droplets that effectively bring the dust particles to the ground;
- avoid explosive blasting, using appropriate manual or mechanical alternatives; and
- bag and remove any biological debris or damp down such material before demolition.

Measures Specific to Construction

- Ensure sand and other aggregates are stored in bunded areas and are not allowed to dry out, unless this is required for a particular process, in which case ensure that appropriate additional control measures are in place.

Measures Specific to Trackout

- Use water-assisted dust sweeper(s) on the access and local roads, to remove, as necessary, any material tracked out of the site. This may require the sweeper being continuously in use;
- avoid dry sweeping of large areas;

- ensure vehicles entering and leaving sites are covered to prevent escape of materials during transport; and
- implement a wheel washing system (with rumble grids to dislodge accumulated dust and mud prior to leaving the site where reasonably practicable).