

LAND SOUTH OF WHITE HORSE BUSINESS PARK, NORTH BRADLEY

Proposed Residential Development

Air Quality Assessment

Prepared for: Castlewood Properties Ventures Ltd

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1.0 INTRODUCTION

SLR Consulting Ltd (SLR) has been commissioned by Castlewood Properties Ventures Ltd to undertake an air quality assessment in support of an outline planning application for a proposed residential development ('Proposed Development'), on land south of White Horse Business Park, North Bradley, Trowbridge (the 'Site'). The planning application seeks approval for a residential development comprising up to 100 dwellings as well as vehicular access from the A363.

The Site is located within North Bradley, Trowbridge, largely comprising greenfield, residential and commercial land uses, at the approximate National Grid Reference (NGR): x385750, y155750. The Site is bounded by:

- green space to the north, with commercial and residential properties further afield. There is an ongoing application on the green space land for a residential scheme (ref. 19/11459/OUT) which forms part of the 'Elm Grove' allocation;
- White Horse Business Park to the east;
- green space to the south, with residential properties beyond this. There is an ongoing application on this green space land for a residential scheme, which forms a wider part of the allocation (ref. 20/05805/OUT) alongside the Site; and
- residential properties to the west and local sports club facilities, with green space further afield.

1.1 Scope of Assessment

The Environmental Health Office (EHO) at Wiltshire Council (WC – the Council)¹ outlined the requirement to undertake an air quality assessment in support of the planning application to assess potential air quality effects and design constraints associated with the construction and operation of the Proposed Development.

Preassessment consultation was undertaken with the Environmental Health Office (EHO) at WC² to agree upon the extent and methodology of the air quality assessment. The following scope of works, as agreed upon by WC, has been undertaken:

- Baseline Evaluation – Assessment of existing air quality in the local area;
- Construction Phase Assessment – Identification and assessment of potential air quality effects associated with the construction phase of the Proposed Development;
- Operational Phase Assessment – Identification of air quality effects and design constraints associated with the operational phase of the Proposed Development; and
- Mitigation Measures – As required.

To ensure consistency with the Council's own work on air quality, this assessment has utilised guidance prescribed within WC's drafted '*Air quality supplementary planning document*'³, alongside established best practice.

¹ Consultation letter from Steven Manning, EHO, Wiltshire Council, dated 11th August 2020.

² Consultation E-mail approval received from Peter Nobes, EHO, Wiltshire Council, dated 28th April 2021.

³ Air quality supplementary planning document, draft, Wiltshire Council. 2012.

2.0 RELEVANT AIR QUALITY LEGISLATION AND GUIDANCE

2.1.1 Air Quality Standards

The Air Quality Standards Regulations 2010⁴ (AQSR) transpose both the EU Ambient Air Quality Directive (2008/50/EC)⁵, and the Fourth Daughter Directive (2004/107/EC)⁶ within UK legislation, in order to align and bring together in one statutory instrument the Government's obligations. The AQSR includes Limit Values, Target Values, Objectives, Critical Levels and Exposure Reduction Targets for the protection of human health and the environment. Limit values are legally binding and are considered to apply everywhere with the exception of the carriageway and central reservation of roads and any location where the public do not have access (e.g. industrial sites). Compliance is regulated at a national level (based upon a series of zones/agglomerations).

The UK nationally has failed to meet the Limit Values, as outlined in the Ambient Air Quality Directive (2008/50/EC), for NO₂ by the 2010 target date. As a result, the Government has had to submit time extension applications for compliance with the EU Limit Values, which has since passed and its continued failure to achieve these limits is currently giving rise to infraction procedures being implemented. In July 2017, the Government published its plan for tackling roadside NO₂ concentrations⁷, to achieve compliance with EU Limit Values. This sets out Government policies for bringing NO₂ concentrations within statutory limits in the shortest time period possible.

In the interim period the UK has formally left the EU, however despite this, EU rules and regulations referred above have subsequently been written into UK law and are still relevant - although there is uncertainty as to who will enforce these requirements domestically.

2.1.2 Air Quality Strategy

Irrespective of the above, the UK Government and the devolved administrations are required under the Environment Act 1995 to produce a national air quality strategy to improve air quality. The latest Air Quality Strategy (AQS) for England, Scotland, Wales and Northern Ireland was published in 2007⁸. The AQS provides the over-arching strategic framework for air quality management in the UK and contains non-statutory national air quality standards and objectives established by the UK Government and Devolved Administrations for the protection of public health and the environment, taking into account epidemiological evidence and international regulations, as well as economic efficiency, practicability and technical feasibility. There is no legal requirement to meet these objectives except where they mirror an equivalent legally binding Limit Value as prescribed within EU legislation, however compliance is regulated at a local level by local planning authorities.

The AQS objectives apply at locations outside buildings or other natural or man-made structures above or below ground, where members of the public are regularly present and might reasonably be expected to be exposed to pollutant concentrations over the relevant averaging period – herein referred to as relevant exposure. Table 2-2 provides an indication of those locations.

The ambient air quality standards of relevance to human receptors in this assessment (collectively termed Air Quality Assessment Levels (AQALs) throughout this report) are provided in Table 2-1.

Table 2-1
Relevant Ambient AQALs

Pollutant	Standard (µg/m ³)	Measured As	Equivalent percentile
Nitrogen Dioxide (NO ₂)	40	Annual Mean	-

⁴ The Air Quality Standards Regulations (England) 2010, Statutory Instrument No 1001, The Stationary Office Limited.

⁵ Directive 2008/50/EC of the European Parliament and of the Council of 21 May 2008 on ambient air quality and cleaner air for Europe.

⁶ Directive 2004/107/EC of the European Parliament and of the Council of 15 December 2004.

⁷ Defra, DfT (2017), UK plan for tackling roadside nitrogen dioxide concentrations.

⁸ The Air Quality Strategy for England, Scotland, Wales and Northern Ireland, Defra. July 2007.

Pollutant	Standard ($\mu\text{g}/\text{m}^3$)	Measured As	Equivalent percentile
	200	1-hour Mean	99.79 th percentile of 1-hour means (equivalent to 18 1-hour exceedences)
Particles (PM_{10})	40	Annual Mean	-
	50	24-hour mean	90.41 th percentile of 24-hour means (equivalent to 35 24-hour exceedences)
Particles ($\text{PM}_{2.5}$)	25	Annual Mean	-

Table 2-2
Human Health Relevant Exposure

AQAL Averaging Period	Relevant Locations	AQALs should apply at	AQALs should not apply at
Annual Mean	Where individuals are exposed for a cumulative period of 6-months in a year	Building facades of residential properties, schools, hospitals etc.	Facades of offices Hotels Gardens of residences Kerbside sites
24-hour mean	Where individuals may be exposed for eight hours or more in a day	As above together with hotels and gardens of residential properties	Kerbside sites where public exposure is expected to be short term
1-hour mean	Where individuals might reasonably be expected to spend one hour or longer	As above together with kerbside sites of regular access, car parks, bus stations etc.	Kerbside sites where public would not be expected to have regular access

2.2 Local Air Quality Management

As reinforced within the AQS, Part IV of the Environment Act 1995 induces a statutory duty for local authorities to undergo a process of Local Air Quality Management (LAQM). This requires local authorities to Review and Assess air quality within their boundaries to determine the likeliness of compliance, regularly and systematically.

Where any of the prescribed AQS objectives are not likely to be achieved, the authority must designate an Air Quality Management Area (AQMA). For each AQMA, the local authority is required to prepare an Air Quality Action Plan (AQAP), which details measures the authority intends to introduce to deliver improvements in local air quality in pursuit of the objective. AQMAs can give rise to potential constraints to development, or at least a higher degree of scrutiny to air quality assessment work. Local authorities therefore have formal powers to control air quality through a combination of LAQM and through application of wider planning policies.

After a high number of declarations across the UK, it has become standard practice for planning authorities to require an air quality assessment to be carried out for a proposed development.

2.3 Clean Air Strategy

The Clean Air Strategy (CAS)⁹, published in 2019, sets out the Government's proposals aimed at delivering cleaner air in England, and also indicates how devolved administrations intend to make emissions reductions. It sets out the comprehensive action that is required from across all parts of government and society to deliver clean air.

⁹ The Clean Air Strategy, Defra. January 2019.

2.4 General Nuisance Legislation

Part III of the Environmental Protection Act (EPA) 1990 (as amended) contains the main legislation on Statutory Nuisance and allows LA and individuals to take action to prevent a statutory nuisance. Section 79 of the EPA defines, amongst other things, smoke, fumes, dust, and smells emitted from industrial, trade or business premises so as to be prejudicial to health or a nuisance, as a potential Statutory Nuisance.

Fractions of dust greater than 10µm (i.e. greater than PM₁₀) in diameter typically relate to nuisance effects as opposed to potential health effects and therefore are not covered within the UK AQS. In legislation there are currently no numerical limits in terms of what level of dust deposition constitutes a nuisance.

2.5 Planning Policy

2.5.1 National Policy

The 2019 update to the National Planning Policy Framework (NPPF) describes the policy context in relation to pollutants including air pollutants:

'Para 170: Planning policies and decisions should contribute to and enhance the natural and local environment by:

e) preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of [...] air [...] pollution [...]. Development should, wherever possible, help to improve local environmental conditions such as air [...] quality [...].'

'Para 180: 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.'

Specifically, within the context of development control:

'Para 181: 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 is accompanied by web based supporting Planning Practice Guidance (PPG) which includes guiding principles on how planning can take account of the impacts of new development on air quality. In regard to air quality, the PPG states:

"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 [...] where the national assessment indicates that relevant limits have been exceeded or are near the limit."

"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 sets out the information that may be required within the context of a supporting 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 [...] Mitigation options where necessary, will depend on the proposed development and should be proportionate to the likely impact".

The policies within the NPPF and accompanying PPG in relation to air pollution are considered within this AQA.

2.5.2 Local Policy

WC's Adopted Core Strategy (ACS)¹⁰ (2015), set out the Council's long-term spatial vision and strategy for the area until 2026, protecting and enhancing the quality of life.

The following policies relating to air quality are contained within the ACS:

"Core Policy 55: Air quality

Development proposals, which by virtue of their scale, nature or location are likely to exacerbate existing areas of poor air quality, will need to demonstrate that measures can be taken to effectively mitigate emission levels in order to protect public health, environmental quality and amenity. Mitigation measures should demonstrate how they will make a positive contribution to the aims of the Air Quality Strategy for Wiltshire and where relevant, the Wiltshire Air Quality Action Plan. Mitigation may include:

- i. landscaping, bunding or separation to increase distance from highways and junctions*
- ii. possible traffic management or highway improvements to be agreed with the local authority*
- iii. abatement technology and incorporating site layout/separation and other conditions in site planning*
- iv. traffic routing, site management, site layout and phasing*
- v. where appropriate, contributions will be sought toward the mitigation of the impact a development may have on levels of air pollutants."*

2.6 Assessment Guidance

This assessment has been carried out in accordance with the following principles contained within the guidance documents below.

2.6.1 Wiltshire Council – Air Quality Supplementary Planning Document

The *Air quality supplementary planning document*³ (SPD) has been drafted by WC to support and provide a regulatory air quality framework for the assessment of new developments.

In accordance with 'Appendix 2: Air Quality Assessment Toolkit', the Site is located within the 'Trowbridge Area Air Quality / Planning Zones August 2012' and therefore air quality needs to be considered within the planning application.

2.6.2 Local Air Quality Management Technical Guidance (2016)

Department of Environment Food and Rural Affairs (Defra) Local Air Quality Management Technical Guidance (LAQM.TG(16))¹¹ was published for use by local authorities in their LAQM review and assessment work. The

¹⁰ Wiltshire Council, Adopted Core Strategy Document, adopted January 2015.

¹¹ Local Air Quality Management Technical Guidance 16, Published by Defra in partnership with the Scottish Government, Welsh Assembly Government and Department of the Environment Northern Ireland. February 2018.

document provides key guidance in aspects of air quality assessment, including screening, model verification, use of monitoring data, and use of background data that are applicable to all air quality assessments.

2.6.3 Environmental Protection UK and Institute of Air Quality Management Guidance

Environmental Protection UK (EPUK) and the Institute of Air Quality Management (IAQM) have together published guidance¹² to help ensure that air quality is appropriately accounted for in the development control process. The guidance clarifies when an air quality assessment should be undertaken, as well as the likely proportional scope, with reference to indicative screening criteria, and provides a significance criterion for use to evaluate and describe potential developmental impacts and effects.

2.6.4 Construction and Demolition Dust Guidance

Guidance on the assessment of dust from demolition and construction has been published by the IAQM¹³. The guidance provides a series of matrices to determine the risk magnitude of potential dust sources associated with construction activities to identify appropriate mitigation measures that are defined within further IAQM guidance.

¹² Environmental Protection UK and Institute of Air Quality Management, Land-Use Planning and Development Control: Planning for Air Quality', v1.2 2017.

¹³ Institute of Air Quality Management (IAQM), Guidance on the assessment dust from demolition and construction, v1.1 (2016).

3.0 ASSESSMENT METHODOLOGY

3.1 Construction Phase

The assessment has been undertaken in accordance with IAQM guidance¹³. The assessment of risk is determined by considering the risk of dust effects arising from four activities in the absence of mitigation:

- demolition;
- earthworks;
- construction; and
- track-out.

The assessment methodology considers three separate dust impacts with account being taken of the sensitivity of the area that may experience these effects:

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

The first stage of the assessment involves a screening to determine if there are sensitive receptors within threshold distances of the site activities associated with the construction phase of the scheme. A detailed assessment is required where a:

- human receptor is located within 350m of the Site, and/or within 50m of routes used by construction vehicles, up to 500m from the site entrance(s); and/or
- ecological receptor is located within 50m of the Site, and/or within 50m of routes used by construction vehicles, up to 500m from the site entrance(s).

The dust emission class (or magnitude) for each activity is determined based on the guidance, indicative thresholds and expert judgement. The risk of dust effects arising is based upon the relationship between the dust emission magnitude and the sensitivity of the area. The risk of impact is then used to determine the appropriate mitigation requirements, whereby through effective application, residual effects are considered to be 'not significant'.

Given the short-term nature of the construction phase and the comparatively low volume of vehicle movements that will likely arise (when compared to the operational phase, for which a full assessment has been undertaken), there is not considered to be any potential for significant air quality effects from development related road traffic emissions during the construction phase. Such potential effects have therefore been scoped out from requiring detailed assessment based on their assumed insignificant impact.

3.2 Operational Phase Assessment

The operational phase assessment is required to:

- consider the air quality impacts associated with the Proposed Development on the existing environment (Impact Assessment); and
- ensure the Site is suitable for residential use (Site Suitability Assessment).

3.2.1 Impact Assessment

The assessment of air quality effects in relation to the development's operational phase has been undertaken qualitatively, in accordance with EPUK/IAQM Guidance.

The EPUK/IAQM guidance provides a series of indicative screening criteria where if exceeded, should consequently require a detailed assessment. If the Proposed Development is found not to exceed any of the relevant indicative criteria presented, then a detailed impact assessment is consequently not required. Impacts can therefore be considered as having an insignificant effect onto local air quality.

The indicative screening criteria relevant for this assessment is as follows:

- outside of an AQMA:
 - a change of Light-Duty Vehicle (LDV) flows of more than 500 Annual Average Daily Traffic (AADT); and/or
 - a change of Heavy-Duty Vehicle (HDV) flows of more than 100 AADT.
- within or adjacent to an AQMA:
 - a change of LDV flows of more than 100 AADT; and/or
 - a change of HDV flows of more than 25 AADT.

3.2.2 Site Suitability Assessment

A Site Suitability Assessment is required to assess the likely exposure that future residents associated with the Proposed Development may experience, to ensure the Site is suitable for residential use. As per the EPUK/IAQM guidance, the Site Suitability assessment is required to consider:

- the background and future baseline air quality and whether this will be likely to approach or exceed an AQAL;
- the presence and location of an AQMA as an indicator of local hotspots where the AQALs 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.

A qualitative Site Suitability Assessment will be undertaken, with reference to local monitoring data relative to the AQALs (detailed in Table 2-1), to determine whether further consideration is required.

4.0 BASELINE ENVIRONMENT

4.1 Baseline Air Quality

4.1.1 LAQM Review and Assessment

The Site is located within the jurisdiction of WC. The latest publicly available Annual Status Report (ASR) for the Council at the time of writing is the 2020 WC ASR¹⁴. This ASR has been consulted to determine existing baseline air quality conditions, relative to the preceding five years' monitoring (i.e. 2020 ASR includes monitoring data for the period 2015 - 2019), where available.

As part of statutory LAQM obligations, WC annually reviews and assesses concentrations of key air pollutants in the area to ascertain the requirement, or otherwise, to declare an AQMA. As a result of the process, WC presently have eight declared AQMAs.

The nearest AQMA relative to the Site (Westbury AQMA) is located approximately 4.5km south of the Site within Westbury – Westbury AQMA. As such, the vicinity of the Site is not considered sensitive in relation to air quality.

4.1.2 Review of Air Quality Monitoring

Automatic Air Quality Monitoring

The nearest automatic monitor to the Site is located approximately 6km north of the Site along the A363 Masons Lane, AM2 - operated by WC. Concentrations recorded here (or at other monitors located further afield) are not expected to be similar to those anticipated within the Site locale, and therefore are not considered further.

Passive Diffusion Tube Monitoring

Passive NO₂ diffusion tube monitoring is currently undertaken by WC within the Borough, at numerous locations – in fulfilment of their statutory LAQM obligations.

The details and results of the monitoring locations of relevance to the Site (i.e. located within approximately 2.5km of the Site, and adjacent to connecting arterial routes) are presented in Table 4-1 and Table 4-2 respectively, whilst their locations are illustrated in Figure 4-1. All monitoring results presented have been ratified and adjusted (where necessary) by WC.

Table 4-1
LAQM Diffusion Tube Monitoring Sites: Details

Site ID	Site Location	Site Type	NGR (m)		Height (m)	Within AQMA	Distance to Site (km)
			X	Y			
DT46	Newtown, Trowbridge	Kerbside	385244	157541	2.6	No	1.7
DT49	Wynsome, Southwick	Roadside	383812	155257	1.8	No	1.8
DT45	Rosset Gdns, Trowbridge	Urban background	384343	157806	2.3	No	2.3

¹⁴ Wiltshire Council (WC), 2020 Annual Status Report (2020).

Table 4-2
LAQM Diffusion Tube Monitoring Sites: Results

Site ID	2019 Data Capture %	Annual Mean NO ₂ Concentration (µg/m ³)				
		2015	2016	2017	2018	2019
DT46	100	35	37	33	31	29
DT49	100	-	-	-	22	17
DT45	100	-	-	-	11	10

All non-automatic monitoring locations of relevance to the Site have historically reported NO₂ annual mean concentrations to be below the AQAL (40µg/m³) for the period assessed, with concentrations more recently in 2019 considered 'well-below'.

DT46, the closest monitoring location to the Site, is located kerbside of Newtown, 1.7km north of the Site. The 2019 annual mean concentration recorded at DT46 was 29µg/m³. Concentrations recorded at DT46 are anticipated to be somewhat elevated relative to the Site, given the kerbside location of DT46 and presence of an urban street canyon at this location, potentially limiting dispersion.

Since 2015, NO₂ annual mean concentrations monitored at DT46 have largely demonstrated a slight downward trend – demonstrating local improvements in NO₂ concentrations at key roadside locations, correlating somewhat to national projections.

The empirical relationship given in LAQM.TG(16) states that exceedances of the 1-hour mean objective for NO₂ is only likely to occur where annual mean concentrations are 60µg/m³ or above at a location of relevant exposure (Table 2-2). This indicates that an exceedance of the 1-hour mean objective is unlikely to have occurred at these monitoring sites between 2015 and 2019.

4.1.3 Defra Mapped Background Concentrations

Defra maintains a nationwide model of existing and future background air quality concentrations at a 1km grid square resolution which is routinely used to support LAQM requirements and air quality assessments. The data sets include annual average concentration estimates for NO_x, NO₂, PM₁₀ and PM_{2.5} using a base year of 2018 (the year in which comparisons between modelled and monitoring are made)¹⁵.

The Defra mapped annual mean background concentrations for base year of 2019 and the predicted opening year of the development (2026) are presented in Table 4-3.

All the mapped background concentrations presented are well below the respective annual mean AQALs.

Table 4-3
Defra Background Pollutant Concentrations

Grid Square (X, Y)	Year	Annual Mean Background Concentration (µg/m ³)			
		NO _x	NO ₂	PM ₁₀	PM _{2.5}
385500, 155500	2019	9.6	7.5	12.7	8.6
	2026	7.5	5.9	11.7	7.7
AQAL		-	40	40	25

¹⁵ Defra Background Maps (2018 Reference)

4.1.4 Defra's Pollutant Climate Mapping Model

Defra's Pollutant Climate Mapping (PCM) model is a collection of models designed to fulfil part of the UK's AQSR requirements to report on the concentrations of particular pollutions in the atmosphere. The latest PCM model data, released by Defra in 2020, has modelled concentrations incorporating Defra's 2018 action plan (2018 reference year), up until 2030 taking into account the anticipated uptake of cleaner vehicles, along with other policy interventions.

The nearest PCM link to the Site (Census ID 802078057) is the A363 Bradley Road between Trowbridge and North Bradley as shown in Figure 4-1. Whilst this section of the road does not border the Site, it is expected to demonstrate comparable traffic flows to the section of A363 Bradley Road which borders the Site to the north, and therefore resultant roadside concentrations. The 2019 roadside NO₂ annual mean concentration reported in relation to this PCM link is 21.0µg/m³, and 14.1µg/m³ in 2026 (the predicted opening year of development) – both 'well below' the AQAL (40µg/m³). Concentrations reported by the PCM assume roadside locations, typically at a 4m separation distance. Proposed residential dwellings are expected to be set at a greater separation distance in comparison, resulting in lower concentrations experienced by future occupants (with distance from road).

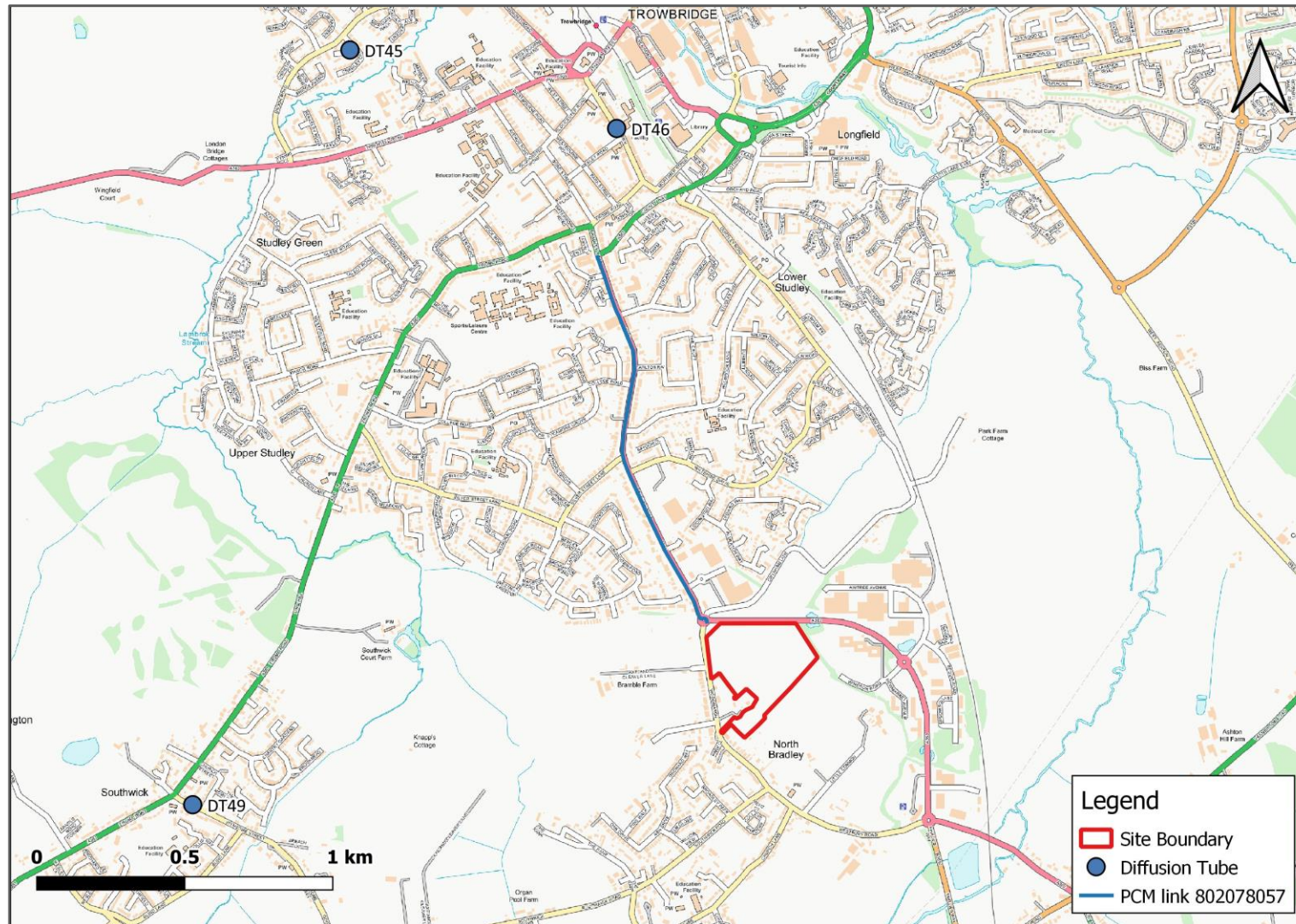


Figure 4-1
Local Monitoring Locations

5.0 CONSTRUCTION PHASE ASSESSMENT

This section presents the potential air quality impacts and effects associated with the construction of the development.

5.1 Construction Dust Assessment

Where figures relating to area of the site, volume of the site, approximate number of construction vehicles or distances to receptors are given, these relate to thresholds as defined in the IAQM guidance to guide the assessor to define the dust emissions magnitude and sensitivity of the area.

5.1.1 Assessment Screening

As shown in Figure 5-1, there are 'human receptors' within 350m of the Site but no designated habitat sites within 50m of the Site boundary or up to 500m of the Site entrance(s) / 50m of the roads anticipated to witness construction traffic movements. Therefore, an assessment of construction dust on human receptors is only required.

5.1.2 Potential Dust Emissions Magnitude

Demolition

The Site is currently vacant rural land with no current buildings or structures that require demolition. As such, impacts associated with demolition have been screened out of this assessment.

Earthworks

The proposals comprise the development of up to 100 residential dwellings, and associated infrastructure. Due to the typical phased nature of construction of residential schemes, the total Site area at any given time is not expected to be greater than 10,000m², relative to what is proposed (i.e. 100 units). Consistent with a phased approach to construction, the number of heavy moving earth vehicles is considered to be less than 10 at any one time. The dust emission magnitude for earthworks is therefore initially considered to be 'medium'.

Construction

Construction activities at the Site will include a total building volume expected to be no greater than 100,000m³. The dust emission magnitude for construction is therefore initially considered to be 'medium'.

Trackout

Construction vehicles are considered likely to access the Site via the proposed access off the A363 Bradley Road. Details are unavailable at the time of assessment on the number of additional HDV movements associated with the construction works, however, there are expected to be less than 50 outward HDV movements on a worst-case day. The dust emission magnitude for trackout is therefore initially considered to be 'medium'.

Summary

A summary of the dust emission magnitude for the four activities is detailed in Table 5-1.

Table 5-1
Potential Dust Emission Magnitude

Activity	Dust Emission Magnitude
Earthworks	Medium
Construction	Medium
Trackout	Medium

5.1.3 Sensitivity of the Area

Dust Soiling Impacts

The Site is immediately located adjacent to a residential locality, towards the west and south of the Site, with a retail park and workplace car parks to the north and east of Site, respectively. Overall, there are an estimated 1-10 highly sensitive residential receptors within 20m of the Site and <100 receptors within 50m. There are also between 1-10 residential properties (high sensitivity receptors) located less than 20m from the access routes within 200m of the Site entrance (assumed to be off A363) - commensurate of a medium site¹⁶.

The sensitivity of the area with respect to dust soiling effects on people and property in relation to earthworks, construction and trackout is therefore considered to be 'medium'.

Human Health Impacts

The maximum 2019 mapped background PM₁₀ concentration (2018 reference year) for the 1km² grid squares centred on the Site is estimated to be 12.7µg/m³ (i.e. falls into the <24µg/m³ class). As discussed in Section 4.1, no local background automatic monitoring exists within the development locale.

Given the above information regarding the number of residential receptors within 50m of the Site boundary and within 20m of the identified trackout route along A363 Bradley Road, the sensitivity of the area with respect to human health impacts in relation to earthworks, construction and trackout is therefore considered to be 'low'.

Summary

A summary of the sensitivity of the surrounding area is detailed in Table 5-2, whilst the spatial density of nearby receptors is provided in Figure 5-1.

Table 5-2
Sensitivity of the Area

Potential Impact	Sensitivity of Surrounding Area		
	Earthworks	Construction	Trackout
Dust Soiling Impacts	Medium	Medium	Medium
Human Health Impacts	Low	Low	Low

5.1.4 Risk of Impacts (Unmitigated)

The outcome of the assessment of the potential 'magnitude of dust emissions', and the 'sensitivity of the area' are combined in Table 5-3 below to determine the risk of impact which is used to inform the selection of appropriate mitigation.

Table 5-3
Risk of Dust Impacts

Potential Impact	Earthworks	Construction	Trackout
Dust Soiling Impacts	Medium Risk	Medium Risk	Low Risk
Human Health Impacts	Low Risk	Low Risk	Low Risk

Following the construction dust assessment, the Site is found to be at worse a 'Medium Risk' in relation to dust soiling effects on people and property, and 'Low Risk' in relation to human health impacts (Table 5 1). However,

¹⁶ As per the IAQM's 'Guidance on the Assessment of Dust from Demolition and Construction', without site-specific mitigation, trackout may occur along the public highway up to 500m from large sites, 200m from medium sites and 50m from small sites (determined by the calculated trackout dust emission magnitude), as measured from the site exit.

potential dust effects during the construction phase are considered to be temporary in nature and may only arise at particular times (i.e. certain activities and/or meteorological conditions).

Nonetheless, commensurate with the above designation of dust risk, mitigation measures, as identified by IAQM guidance are required to ensure that any potential impacts arising from the construction phase of the Proposed Development are reduced and, where possible, completely removed. In accordance with IAQM guidance, providing effective mitigation measures are implemented, such as those outlined in Section 7.1, construction dust effects are considered to be 'not significant'.



Figure 5-1
Construction Dust Assessment Buffers

6.0 OPERATIONAL PHASE ASSESSMENT

This section presents the potential air quality impacts and effects associated with the operation of the Proposed Development.

6.1 Impact Assessment

Traffic data used for the purposes of the screening assessment was provided by Badingham UK - the appointed transport consultant (Table 6-1).

Table 6-1
Maximum Development Trip Generation Rate on Assessed Road Links

Road Link Name	AADT		
	All	LDVs	HDVs
A363 Bradley Road (west of Site access)	316	313	3
EPUK/IAQM Screening Criteria		500	100

The Proposed Development is expected to generate maximum 313 LDV and 3 HDV additional vehicle movements (as 24-hour AADT) onto the local road network – below the respective LDV and HDV EPUK/IAQM screening criteria. As such, road traffic impacts associated with the operation of the Site outside of an AQMA can be considered as having an insignificant effect on local air quality.

In recognition of the EHO's consultation comments regarding development flows within AQMAs (located 4.5km away), developmental flows were distributed onto the local road network with distance from the Site. Developmental flows within the nearby AQMAs were found to be less than the advised IAQM/EPUK screening criteria (100 LDVs and/or 25 HDVs as AADT) and therefore further assessment of road traffic impacts at AQMAs is not required.

6.2 Site Suitability Assessment

With reference to information already discussed, the following has been used to inform the suitability of the Site, relative to its proposed residential use:

- the Site is sufficiently distant (4.5km north) from the nearest declared AQMA, a localised hotspot where the annual mean NO₂ AQAL is known to be in exceedence;
- local monitoring of relevance to the Site indicates annual mean NO₂ concentrations have historically been below the AQAL for the period assessed (2015-2019), with concentrations more recently in 2019 considered 'well-below' (i.e. <75% of the AQAL);
- the nearby arterial road (A363 Bradley Road between Trowbridge and North Bradley), which has been included within the PCM model, indicates roadside annual mean NO₂ concentration to be 'well below' the annual mean NO₂ AQAL. The Site is located parallel to the A363 Bradley Road, which whilst not part of the PCM model, is predicted to experience similar traffic volumes and therefore anticipated roadside concentrations. Proposed residential dwellings are expected to be set at a greater separation distance in comparison to the PCM model (i.e. 4m), resulting in lower concentrations experienced by future residential occupants than predicted by the PCM model;
- the Defra mapped background annual mean NO₂, PM₁₀ and PM_{2.5} concentrations predicted at the Site (2018 reference year) are considered to be 'well below' the respective AQALs; and

- the Proposed Development is expected to generate additional road traffic volumes below the EPUK/IAQM screening criteria, consequently considered to have an insignificant impact on local air quality, including the Site.

Given the above information, and in line with the EPUK/IAQM guidance outlined in Section 3.2.2, a detailed Site Suitability Assessment is therefore not required, and the Site is found suitable for its proposed purpose (i.e. residential). Effects associated with likely exposure of future occupants are considered to be 'not significant'.

7.0 MITIGATION MEASURES

This section presents any proportionate mitigation measures required during the construction and operational phases of the Proposed Development.

7.1 Construction Dust Phase

As discussed in Section 5.1, construction impacts associated to the Proposed Development would result in the generation of dust and PM₁₀.

IAQM guidance outlines a number of site-specific mitigation measures based on the assessed site risk. The measures are grouped into those which are highly recommended and those which are desirable. With the effective application of the dust mitigation measures, as detailed in Table 7-1, it is considered that the overall effect at all receptors will be 'not significant'.

Table 7-1
Construction Dust Mitigation Measures

Site Application	Mitigation Measures
Highly Recommended	
Communications	Develop and implement a stakeholder communications plan that includes community engagement before work commences on site.
	Display the name and contact details of person(s) accountable for air quality and dust issues on the site boundary. This may be the environment manager/engineer or the site manager.
	Display the head or regional office contact information.
	Develop and implement a Dust Management Plan (DMP), which may include measures to control other emissions, approved by the Local Authority. The level of detail will depend on the risk and should include as a minimum the highly recommended measures in this document. The desirable measures should be included as appropriate for the site.
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.
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.
	Increase the frequency of site inspections by the person accountable for air quality and dust issues on site when activities with a high potential to produce dust are being carried out and during prolonged dry or windy conditions.
	Agree dust deposition, dust flux, or real-time PM ₁₀ continuous monitoring locations with the Local Authority. Where possible commence baseline monitoring at least three months before work commences on site or, if it a large site, before work on a phase commences. Further guidance is provided by IAQM on monitoring during earthworks and construction.
Operating Vehicle/Machinery and Sustainable Travel	Ensure all vehicles switch off 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.
	Produce a Construction Logistics Plan to manage the sustainable delivery of goods and materials.
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 and conveyors and covered skips. Minimise drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment and use fine water sprays on such equipment wherever appropriate. Ensure equipment is readily available on site to clean any dry spillages and clean up spillages as soon as reasonably practicable after the event using wet cleaning methods.
Preparing and Maintaining the Site	Plan site layout so that machinery and dust causing activities are located away from receptors, as far as is possible. Erect solid screens or barriers around dusty activities or the site boundary that are at least as high as any stockpiles on site. Fully enclose site or specific operations where there is a high potential for dust production and the site is active for an extensive period. Avoid site runoff of water or mud. Keep site fencing, barriers and scaffolding clean using wet methods. Remove materials that have a potential to produce dust from site as soon as possible, unless being re-used on site. If they are being re-used on-site cover as described below. Cover, seed or fence stockpiles to prevent wind whipping.
Site Management	Record all dust and air quality complaints, identify cause(s), take appropriate measures to reduce emissions in a timely manner, and record the measures taken. Make the complaints log available to the local authority when asked. Record any exceptional incidents that cause dust and/or air emissions, either on- or offsite, and the action taken to resolve the situation in the logbook. Hold regular liaison meetings with other high risk construction sites within 500m of the site boundary, to ensure plans are co-ordinated and dust and particulate matter emissions are minimised. It is important to understand the interactions of the off-site transport deliveries which might be using the same strategic road network routes.
Waste Management	Avoid bonfires and burning of waste materials.
Desirable	
Construction	Avoid scabbling (roughening of concrete surfaces) if possible. Ensure bulk cement and other fine powder materials are delivered in enclosed tankers and stored in silos with suitable emission control systems to prevent escape of material and overfilling during delivery. For smaller supplies of fine powder materials ensure bags are sealed after use and stored appropriately to prevent dust.
Earthworks	Re-vegetate earthworks and exposed areas/soil stockpiles to stabilise surfaces as soon as practicable. Use Hessian, mulches or tackifiers where it is not possible to re-vegetate or cover with topsoil, as soon as practicable Only remove the cover in small areas during work and not all at once.
Monitoring	Undertake daily on-site and off-site inspection, where receptors (including roads) are nearby, to monitor dust, record inspection results, and make the log available to the local authority when asked. This should include regular dust soiling checks of surfaces such as street furniture, cars and windowsills within 100m of site boundary, with cleaning to be provided if necessary. With respect to operating vehicle/machinery and sustainable travel:

Trackout	Impose and signpost a maximum-speed-limit of 15 mph on surfaced and 10 mph on unsurfaced 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).
	Implement a Travel Plan that supports and encourages sustainable travel (public transport, cycling, walking, and car-sharing).
	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.
	Record all inspections of haul routes and any subsequent action in a site logbook.
	Implement a wheel washing system (with rumble grids to dislodge accumulated dust and mud prior to leaving the site where reasonably practicable).

7.2 Operation Phase

The operational phase impact assessment concluded road traffic impacts associated with the operation of the Site can be considered as having an insignificant effect on local air quality. Furthermore, the Site is found to be suitable for residential use. Therefore, mitigation measures are not required from an air quality perspective.

Notwithstanding, the EHO outlined the following requirement within pre application correspondence¹:

“No development shall commence on site until a scheme of Ultra Low Energy Vehicle infrastructure has been submitted to the LPA. The scheme must be approved by the LPA prior to implementation and thereafter be permanently retained.

Reason: *Core Policy 55; Development proposals, which by virtue of their scale, nature or location are likely to exacerbate existing areas of poor air quality, will need to demonstrate that measures can be taken to effectively mitigate emission levels in order to protect public health, environmental quality and amenity.”*

Addressing the above requirement, electric vehicle charging facilities will be provided in accordance with local policy requirements. Transport related mitigation measures proposed within the transport assessment would reduce the impact of the proposed development on air quality. The Travel Plan will bring forward an array of measures to encourage sustainable travel including walking and cycling improvements together with financial commitments.

8.0 CONCLUSIONS

SLR Consulting Ltd has been commissioned by Castlewood Venture Properties Ltd to undertake an air quality assessment to support a planning application for a proposed residential development comprising up to 100 dwellings, on land at North Bradley, Trowbridge.

8.1 Construction Phase

A qualitative assessment of the potential dust impacts during the construction of the development has been undertaken following IAQM guidance.

Following the construction dust assessment, the Site is found to have at worse 'Medium Risk' in relation to dust soiling effects on people and property, and 'Low Risk' in relation to human health impacts. Providing mitigation measures are implemented, such as those outlined in Section 7.1 of this report, residual effects from dust emissions arising during the construction phase are considered to be 'not significant'.

Given the short-term nature of the construction phase, there is predicted to be an insignificant effect on air quality from construction-generated vehicle emissions.

8.2 Operational Phase

The Proposed Development is expected to generate road traffic volumes below the relevant EPUK/IAQM 'indicative criteria for assessment'. As such, road traffic impacts associated with the operation of the Site can be considered as having an insignificant effect on local air quality.

A qualitative Site Suitability Assessment has been undertaken following EPUK/IAQM guidance, with reference to publicly available air quality datasets. Effects associated with likely exposure of future occupants are initially considered to be 'not significant'.

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