



RAYMOND BROWN
QUARRY PRODUCTS

Sandland Extension to Brickworth Quarry, Whiteparish, Wiltshire

ENVIRONMENTAL STATEMENT

CHAPTER No.10

CHAPTER: Air Quality & Dust

September 2025

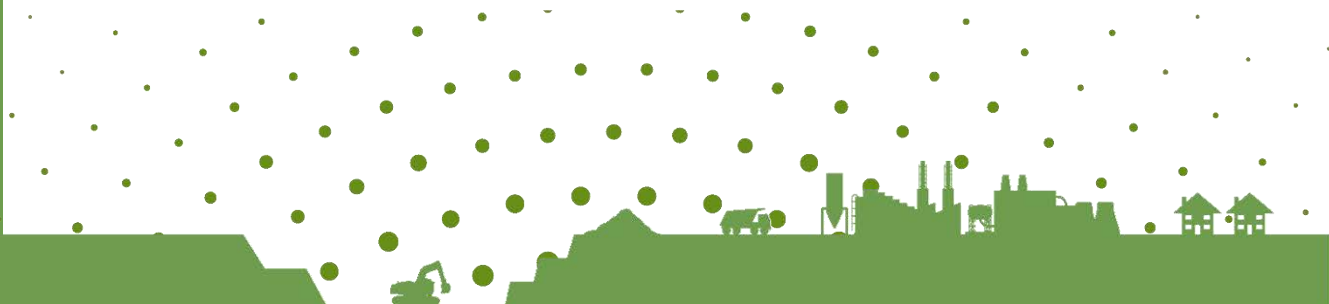


Dust and Air Quality Assessment

Proposed extension to Brickworth Quarry

August, 2025

Raymond Brown Quarry Products Ltd



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Table of Contents

1	Introduction	1
1.1	Overview	1
1.2	Objective	1
1.3	Key pollutants	1
1.3.1	Disamenity dust	2
1.3.2	Particulate matter	2
1.4	Site setting	2
1.4.1	Proposed development	4
2	Legislation, policy and non-statutory guidance	5
2.1	Legislative Framework	5
2.1.1	National (UK)	5
2.2	Planning Policy	11
2.2.1	National Planning Policy Framework	11
2.2.2	National Planning Practice Guidance	12
2.3	Non-statutory guidance	13
3	Methodology	14
3.1	Scope of the assessment	14
3.2	Nitrogen dioxide (NO ₂)	14
3.3	Fine particulate matter (PM ₁₀ and PM _{2.5})	14
3.4	Disamenity dust	15
3.5	Dust sources, potential for emissions and Residual Source Emissions (with mitigation in place)	16
3.5.1	Soil and overburden stripping, storage and reinstatement (including inert fill)	17
3.5.2	Material extraction	17
3.5.3	Material processing	18
3.5.4	On-site vehicle movements and material handling	18
3.5.5	Off-site vehicle movements	18
3.5.6	Wind scouring of stockpiles and exposed surfaces	18
3.5.7	Summary of Residual Source Emissions	19
3.6	Meteorological data	19
3.7	Receptors	20
3.8	Assessment criteria	22
3.9	Dust assessment uncertainties, limitations and assumptions	25
4	Baseline conditions	26
4.1	PM ₁₀ and PM _{2.5}	26
4.1.1	Defra background pollution concentrations	26
4.2	Disamenity dust	27

5	Potential Impacts	28
5.1	Potential disamenity dust impacts	28
5.2	Potential impacts to human health	30
5.3	Cumulative impacts	30
6	Mitigation measures	31
6.1	Soil and overburden stripping, storage and reinstatement (including inert fill)	31
6.2	Mineral extraction	31
6.2.1	Mineral processing	31
6.3	On-site transportation and material handling	32
6.4	Off-site transportation	32
6.5	Wind scouring of exposed surfaces	32
7	Conclusion	33
Appendix A: Dust Source Types and Characteristics (AEA Good Practice Guide, 2010)		1
Appendix B: Guidance on the estimation of Residual Source Emissions (from IAQM, 2016)		2

List of Figures

Figure 1.1: Site location	3
Figure 2.1: Site assessment flow chart (from Planning Practice Guidance)	10
Figure 3.1: Wind rose, dry days (five-year average), Middle Wallop (2016 – 2020)	20
Figure 3.2: Locations of receptors with respect to the proposed development area	22

List of Tables

Table 2.1: AQO relevant to the proposed development	7
Table 2.2: Examples of where the AQO should apply.....	8
Table 3.1: Summary of Residual Source Emissions	19
Table 3.2: Receptors considered in the assessment and distances to site areas	21
Table 3.3: Categorisation of receptor distance from source (reproduced from IAQM, 2016)	22
Table 3.4: Categorisation of frequency of potentially dusty winds (reproduced from IAQM, 2016)	23
Table 3.5: Pathway effectiveness (reproduced from IAQM, 2016)	23
Table 3.6: Estimation of dust impact risk (reproduced from IAQM, 2016)	24
Table 3.7: Descriptors for magnitude of dust effects (reproduced from IAQM, 2016)	24
Table 4.1: Defra estimated background ambient PM ₁₀ concentrations for the grid squares in which the proposed development is located	26
Table 4.2: Defra estimated background ambient PM _{2.5} concentrations for the grid squares in which the proposed development is located	26
Table 5.1: R1 - Woodpeckers.....	28
Table 5.2: R2 – Clover Farm	28
Table 5.3: R3 - Brickworth Car Wash and Cafe	29

Table 5.4: R4 – Brickworth Bungalow	29
Table 5.5: R5 - The Lodge.....	29
Table 5.6: R6 - Paddock View	30

1 Introduction

1.1 Overview

Raymond Brown Quarry Products Limited are seeking planning permission for an extension to the existing Brickworth Quarry located in Whiteparish, Wiltshire.

The site is located within the jurisdiction of Wiltshire Council (WC). WC is the authority responsible for local air quality management, environmental permitting, and mineral planning.

The proposed extension area is named 'Sandland' and it is anticipated that the mineral output would comprise the extraction of approximately 140,000 tonnes of sand per annum for one and a half years. Due to the relatively small size of the area, the extension would be worked and restored as a single phase, with mineral extraction and backfill consecutively.

As with the current site, soils would be stripped and formed into storage bunds or placed into the storage area either in the southern section of the extension area or south of the existing plant site. Sand will be extracted using a 360 excavator and processed at the plant site. Following extraction, site derived clay waste will be used to form a base layer before inert fill is used to restore the area to existing levels.

There is no standard method for carrying out dust assessments for minerals sites although this report has been prepared with reference to relevant documents and best practice guidance, including the National Planning Policy Framework (NPPF) and associated Planning Practice Guidance (PPG) relating to Air Quality¹ and guidance on dust and air quality assessments for minerals sites produced by the Institute of Air Quality Management (IAQM)², together with guidance developed by Environmental Protection UK (EPUK) in conjunction with the IAQM³.

1.2

Objective

The objective of the assessment is to consider potential impacts to air in relation to the pollutants identified below, and potentially arising from the proposed development.

1.3

Key pollutants

The assessment considers impacts from 'disamenity' (or 'nuisance') dust, associated with annoyance. Although there are no standards (such as AQO) for dust disamenity or annoyance, various 'custom and practice' criteria have become established.

¹ Ministry of Housing, Community & Local Government (2014). *Guidance: Air Quality*. Available at <http://planningguidance.planningportal.gov.uk/blog/guidance/air-quality/>

² Institute of Air Quality Management (2016). *Guidance on the Assessment of Mineral Dust Impacts for Planning (v1.1)*

³ Environmental Protection UK and the Institute of Air Quality Management (2017). *Land-Use Planning & Development Control: Planning for Air Quality (v1.2)*

The assessment also considers impacts to air in relation to the national Air Quality Objectives (AQO) for PM₁₀ (essentially particles less than 10 µm (micron) aerodynamic diameter), and PM_{2.5} (essentially particles less than 2.5 µm aerodynamic diameter).

1.3.1 Disamenity dust

'Dust' is generally regarded as particulate matter up to 75 µm in diameter and in an environmental context can be considered in two size categories; coarser dust (particles greater than 10 µm) and fine particulate matter (PM₁₀ and PM_{2.5}) as described above.

Coarser dust (particles greater than 10 µm) is generally regarded as 'disamenity dust' and can be associated with annoyance, although there are no official standards for dust annoyance⁴. Disamenity dust is more readily described than defined as it relates to the visual impact of short-lived dust clouds and the long-term soiling of surfaces.

Although it is a widespread environmental phenomenon, dust is also generated through many anthropogenic activities including materials handling, demolition, construction, vehicle use, arable farming and numerous industrial processes. Dust is generally produced by mechanical action on materials and is carried by moving air when there is sufficient energy in the airstream. Dust is removed through gravitational settling (sedimentation), washout (for example during rainfall or by wetting) and by impaction on surfaces (e.g. on vegetative screening). Dust can be re-suspended where conditions allow, such as from bare ground. More energy is required for dust to become airborne than for it to remain suspended.

1.3.2 Particulate matter

Particulate matter as a term refers to a mixture of solid particles and liquid droplets suspended in the air. These particles come in many sizes and shapes and can be made up of hundreds of different chemicals. Some particles, such as dust, dirt, soot or smoke, are large or dark enough to be seen with the naked eye. Others can be so small that they can only be detected using an electron microscope. Fine dust, essentially particles up to 10 microns (µm), is commonly referred to as PM₁₀.

PM₁₀ is known to arise from a number of sources such as construction sites, road traffic movement, industrial and agricultural activities. Very fine particles (PM_{0.1} – PM_{2.5}) are known to be associated with pollutants such as NO_x and sulphur dioxide (SO₂) emitted from power plants, industrial installations and road transport sources. PM_{2.5} is generally associated with combustion and traffic rather than mineral sources.

1.4 Site setting

The site (shown in Figure 1.1) is situated in south-eastern Wiltshire, approximately 1.8 km to the west of the village of Whiteparish and immediately north of the existing Brickworth Quarry. The city of Salisbury is approximately 9 km to the northwest.

⁴ Note that the expression 'nuisance dust' refers here to 'generally visible particulate matter' rather than specifically and in a legal sense to statutory nuisance, as defined in Section 79 of the Environmental Protection Act 1990.

The site is currently in agricultural use, with a hedgerow and public footpath separating the site from the existing quarry to the south, and the site entrance route running to the northeast, with the A36 just beyond it.

There are residential properties to the north along the A36, the nearest of which is Woodpeckers, approximately 100 m north of the proposed extraction area.

Access to the extraction area will be from close to the existing plant site and the current site entrance route. On the northeastern boundary of the site is a large oak tree which will remain undisturbed.

The site is approximately 1 km north of part of the New Forest Sites of Special Scientific Interest (SSSI), with the New Forest Special Area of Conservation (SAC) and other SSSIs located 1- 2 km to both the north and south, as can be seen in Figure 1.1.

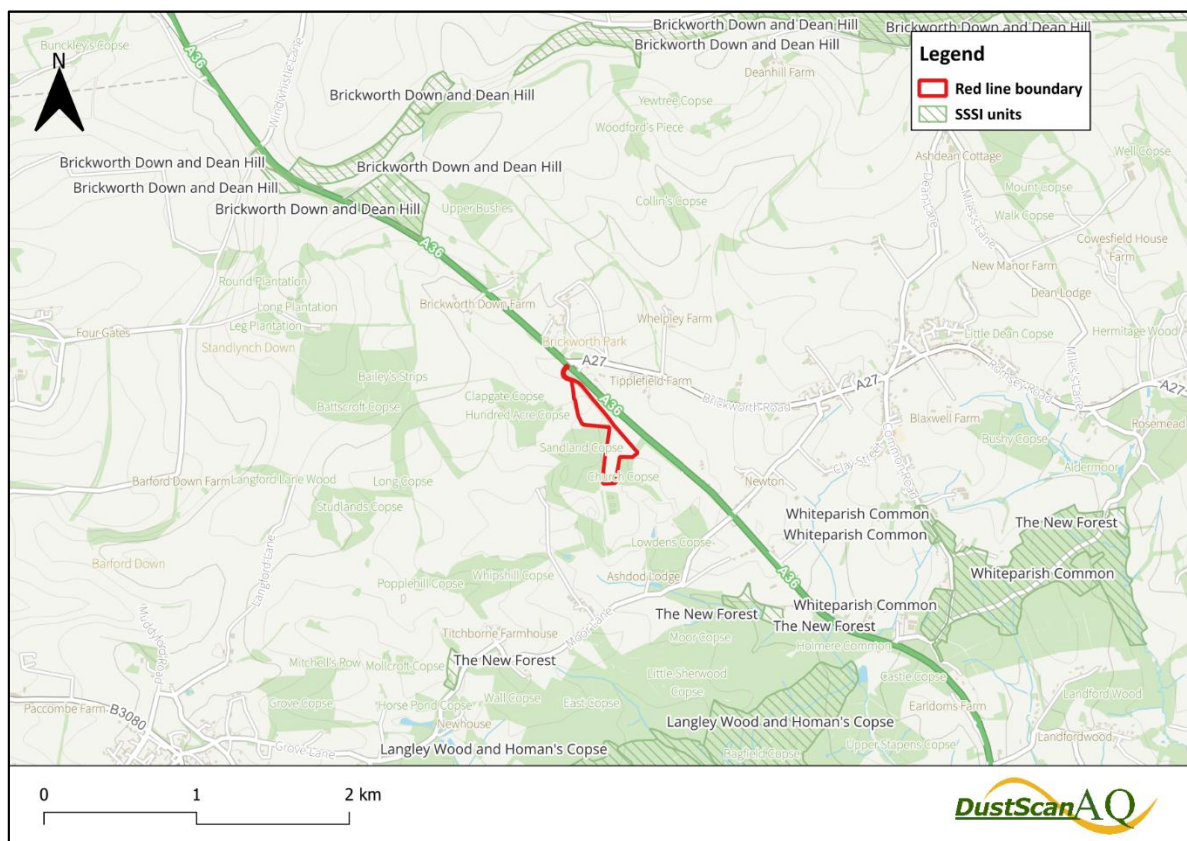


Figure 1.1: Site location

1.4.1 Proposed development

The proposed extraction will release approximately 140,000 tonnes of sand per annum over a working period of 18 months.

Due to the relatively small size of the area, the extension would be worked and restored as a single phase, with mineral extraction and backfill consecutively.

Soils would be stripped and formed into storage bunds or placed into the storage area either in the southern section of the extension area or south of the existing plant site.

Sand will be extracted using a 360 excavator and processed at the plant site.

Following extraction, site derived clay waste will be used to form a base layer before inert fill is used to restore the area to existing levels. The site would be restored to a combination of agriculture and nature conservation, which would take approximately two further years following the extraction period. Permission is therefore sought until Autumn 2030 to complete the works.

2 Legislation, policy and non-statutory guidance

2.1 Legislative Framework

2.1.1 National (UK)

Whilst the UK has left the European Union (EU), it is relevant to understand the source of the current UK legislation. Following exit day on the 31st January 2020, the current framework of air quality legislation was converted into domestic law through the European Union (Withdrawal) Act 2018⁵. The EU sets legally binding limit values for outdoor air pollutants to be met by EU countries by a given date. These limit values are based on the World Health Organisation (WHO) guidelines on outdoor air pollutants. These are legally binding and set out to protect human health and the environment by avoiding, preventing or reducing harmful air pollution effects.

Directive 2008/50/EC⁶ on ambient air quality and cleaner air for Europe entered into force in June 2008. This merged the existing 'Daughter' Directives^{7 8 9 10} (apart from the fourth Daughter Directive), maintaining existing air quality objectives set out by 'Daughter' Directives for:

- Sulphur dioxide (SO₂);
- Nitrogen dioxide (NO₂);
- Oxides of nitrogen (NO_x);
- Particulate matter (PM_{2.5} and PM₁₀);
- Lead (Pb);
- Benzene (C₆H₆);
- Carbon monoxide (CO); and
- Ozone (O₃).

Directive 2008/50/EC also includes related objectives, exposure concentration obligations and exposure reduction targets for PM_{2.5} (fine particles). The 'Daughter' Directives were based upon requirements set out in the first EU Ambient Air Quality Framework Directive 96/92/EEC¹¹.

2.1.1.1 The Environment Act (1995)

The Environment Act 1995¹² established the system of 'local air quality management' (LAQM) and the designation of Air Quality Management Areas (AQMAs). Part IV of the 1995 Environmental Act and Part II of the Environment (Northern Ireland) Order 2002¹³ requires

⁵ European Union. (2018): <http://www.legislation.gov.uk/ukpga/2018/16/contents/enacted>

⁶ European Union. (2008), 'Ambient air quality assessment management', Framework Directive 2008/50/EC.

⁷ European Union. (1999), 'Ambient air quality assessment management', Framework Directive 1999/30/EC.

⁸ European Union. (2000), 'Ambient air quality assessment management', Framework Directive 2000/3/EC.

⁹ European Union. (2002), 'Ambient air quality assessment management', Framework Directive 2002/3/EC.

¹⁰ European Union. (2004), 'Ambient air quality assessment management', Framework Directive 2004/107/EC.

¹¹ European Union. (1996), 'Ambient air quality assessment management', Framework Directive 96/62/EC.

¹² Parliament of the United Kingdom. (1995), 'Environment Act'. King's Printer of Acts of Parliament

¹³ Northern Ireland Orders in Council. (2002), 'The Environment (Northern Ireland) Order', No. 3153. King's Printer of Acts of Parliament

local authorities to designate AQMAs where legal objectives are not being achieved or are not likely to be achieved within the relevant period. Where an AQMA is designated, local authorities are also required to produce an 'Air Quality Action Plan' (AQAP) detailing the pollution reduction measures that need to be adopted to achieve the relevant air quality objectives within an AQMA.

The Environment Act 1995 requires the Government to produce a National Air Quality Strategy (NAQS) for the UK, outlining the air quality standards, objectives and measures for improving ambient air quality.

2.1.1.2 National Air Quality Strategy (UK)

Following the Environment Act 1995, the first Air Quality Strategy (AQS) was published in 1997¹⁴. A review of the AQS, Air Quality Strategy for England, Scotland, Wales and Northern Ireland, was published in 2007¹⁵, with a review yielding some minor changes in 2011. Each revision introduced strategies and regulations that consider measures for different pollutants by tightening existing objectives and also by introducing new ones to establish a common framework to protect human health and the environment by achieving ambient air quality improvements.

The AQS sets clear, measurable, outdoor air quality standards and target dates by which these must be achieved; the combined standard and target date is referred to as the Air Quality Objective (AQO) for that pollutant. Adopted national standards are based on the recommendations of the Expert Panel on Air Quality Standards (EPAQS) and have been translated into a set of Statutory Objectives within the Air Quality (England) Regulations (2000) SI 928, and subsequent amendments.

The latest comprehensive review of the AQS for England was published in April 2023¹⁶, since updated in August 2023. This revised strategy supersedes the Air Quality Strategy: Volume 1 in England.

The AQS sets out the framework to enable local authorities to contribute to long-term air quality goals, with a notable focus on the new PM_{2.5} targets outlined in the Environmental Targets (Fine Particulate Matter) (England) Regulations, published January 2023.

The new AQS outlines the interim targets for PM_{2.5} of an annual mean concentration of 12 µg/m³ and a population exposure reduction target of 22% to be achieved by January 2028, compared to a 2018 baseline.

2.1.1.3 Air Quality Standards (Amendment) Regulations (2016)

The 2008 EU ambient air quality directive, 2008/50/EC, was transposed into UK national legislation through the introduction of the Air Quality Standards (Amendment) Regulations

¹⁴ Department for Environment Food and Rural Affairs. (1997), 'The United Kingdom National Air Quality Strategy', Cm 3587, Department for Environment Food and Rural Affairs.

¹⁵ Department for Environment Food and Rural Affairs. (2007), 'The Air Quality Strategy for England, Scotland, Wales and Northern Ireland', Cm 7169, Department for Environment Food and Rural Affairs.

¹⁶ Department for Environment Food and Rural Affairs. (2023), 'Air Quality Strategy: Framework for local authority delivery'.

Accessible at: <https://www.gov.uk/government/publications/the-air-quality-strategy-for-england/air-quality-strategy-framework-for-local-authority-delivery>

2016¹⁷. This also incorporated the fourth EU Daughter Directive (2004/107/EC). The Air Quality Limit Values from the EU directives are transposed as Air Quality Standards.

2.1.1.4 The Environment Act (2021)

Under the Environment Act 2021¹⁸, the Secretary of State must review the NAQS for England at least every five years, with a commitment for an initial review within 12 months of the measures coming into force. The Environment Act 2021 also introduced a commitment to create a legally binding duty on government to reduce the concentration of fine particles (PM_{2.5}) in ambient air and to set a new long-term annual mean PM_{2.5} target to supersede the target set out within the Environment (Miscellaneous Amendments) (EU Exit) regulations 2020.

2.1.1.5 The Environmental Targets (Fine Particulate Matter) (England)

Regulations (2023)

The Environmental Targets (Fine Particulate Matter) (England) Regulations 2023¹⁹ came into force in January 2023. This includes a new annual mean concentration target of less than or equal to 10 µg/m³ for PM_{2.5} by 31st December 2040. There is also an exposure reduction target; the population exposure reduction target is at least a 35% reduction in population exposure by the end of 31st December 2040, compared to a three-year baseline period from 1st January 2016 to 31st December 2018.

Defra is developing guidance for applicants and Planning Authorities in England to demonstrate that they have appropriately considered the PM_{2.5} targets when making planning applications and decisions. Pending publication of the new guidance, applicants are advised to “provide evidence in their planning applications that they have identified key sources of air pollution within their schemes and taken appropriate action to minimise emissions of PM_{2.5} and its precursors as far as is reasonably practicable”.

2.1.1.6 National Air Quality Objectives

A summary of the relevant Air Quality Objectives (AQOs) is presented in Table 2.1.

The AQO listed in Table 2.1 are only applicable at locations where a member of the public could be reasonably expected to spend the relevant averaging period. Further examples of this are presented in Table 2.2.

Table 2.1: AQO relevant to the proposed development

Pollutant	Averaging Period	AQO (µg/m ³)	Exceedance Allowance	Percentile Equivalent
Nitrogen Dioxide (NO ₂)	Annual	40	-	-
	1-hour	200	18 per annum	99.8 th
Particulate Matter (as PM ₁₀)	Annual	40	-	-
	24-hour	50	35 per annum	90.4 th

¹⁷ Statutory Instrument. (2016), ‘The Air Quality Standards Regulations’, No. 1184. King’s Printer of Acts of Parliament.

¹⁸ Parliament of the United Kingdom. (2021), ‘Environment Act’. King’s Printer of Acts of Parliament

¹⁹ Statutory Instrument. (2023), ‘The Environmental Targets (Fine Particulate Matter) (England) Regulations’, No. 96. King’s Printer of Acts of Parliament.

Pollutant	Averaging Period	AQO ($\mu\text{g}/\text{m}^3$)	Exceedance Allowance	Percentile Equivalent
Particulate Matter (as $\text{PM}_{2.5}$)	Annual	20 ^a	-	-

(a) The Environmental Targets (Fine Particulate Matter) (England) Regulations (2023) introduced new national targets for $\text{PM}_{2.5}$. These are legally binding but do not formally replace the AQO. The annual mean concentration target is that by the end of 31st December 2040 the annual mean level of $\text{PM}_{2.5}$ in ambient air must be equal to or less than $10 \mu\text{g}/\text{m}^3$ ("the target level"). There is also an interim target for $\text{PM}_{2.5}$ of an annual mean concentration of $12 \mu\text{g}/\text{m}^3$ and a population exposure reduction target of 22% to be achieved by January 2028, compared to a 2018 baseline.

Table 2.2: Examples of where the AQO should apply

Averaging period	Objectives should apply at	Objectives should not apply at
Annual	All locations where members of the public might be regularly exposed. Building façades of residential properties, schools, hospitals, care homes etc.	Building façades of offices or other places of work where members of the public do not have regular access. Hotels, unless people live there as their permanent residence. Gardens of residential properties. Kerbside sites (as opposed to locations at the building façade), or any other location where public exposure is expected to be short-term.
24 Hour	All locations where the annual mean objective would apply, together with hotels and gardens of residential properties ^(a) .	Kerbside sites (as opposed to locations at the building façade), or any other location where public exposure is expected to be short-term.
1 Hour	All locations where the annual mean and 24 and 8-hour mean objectives apply. Kerbside sites (for example, pavements of busy shopping streets). Those parts of car parks, bus stations and railway stations etc. which are not fully enclosed, where members of the public might reasonably be expected to spend one hour or more. Any outdoor locations where members of the public might reasonably have expected to spend one hour or longer.	Kerbside sites where the public would not be expected to have regular access.

As an overall perspective, the NPPF PPG sets out a Site Assessment Flow Chart (reproduced at Figure 2.1) to determine the potential impact of a site in relation to the AQO.

Consequently, where residential properties or other sensitive land uses are within 1 km of the actual source of emission (e.g. materials handling) the potential for PM₁₀ and PM_{2.5} emissions to cause a breach of AQO should be assessed.

Where PM₁₀ emissions from site activities are unlikely to cause a breach of AQO, the site should apply good practice measures in dust management to avoid causing dust annoyance, such as set out in PGN 3/08(12)²⁰.

Under the Air Quality Standards Regulations, and through Local Air Quality Management (LAQM), local authorities are required to review the existing and projected airborne concentrations of relevant pollutants and compare them with the AQO. If an exceedance of any AQO appears likely, an Air Quality Management Area (AQMA) is to be designated with the aim of achieving the objective by the due date.

The local authority responsible for assessing air quality in the area of the proposed development is WC.

In their 2024 Air Quality Annual Status Report (ASR)²¹, WC state that they monitor PM₁₀ and PM_{2.5} at three locations within their district, and have declared 8 AQMAs, all for exceedances of the NO₂ annual mean objective.

²⁰ Department for Environment, Food & Rural Affairs (2012). *Process Guidance Note 3/08(12): Statutory guidance for quarry processes*

²¹ Wiltshire Council (2024). 2024 Air Quality Annual Status Report (ASR).

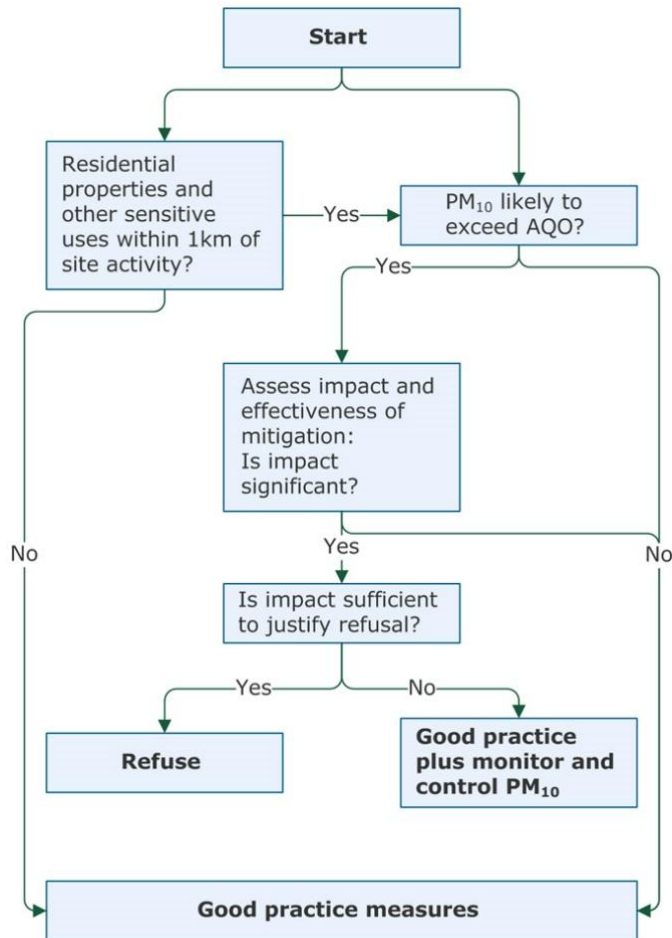


Figure 2.1: Site assessment flow chart (from Planning Practice Guidance)

2.1.1.7 Statutory Nuisance

It is recognised that the planning system presents a way of protecting amenity. However, in cases where planning conditions are not applicable to a development/installation, the requirements of the Environmental Protection Act 1990 still apply. Under Part III of the Environmental Protection Act 1990, local authorities have a statutory duty to investigate any complaints of:

- *“any premises in such a state as to be prejudicial to health or a nuisance*
- *smoke emitted from premises so as to be prejudicial to health or a nuisance*
- *fumes or gases emitted from premises so as to be prejudicial to health or a nuisance*
- *any dust, steam, smell or other effluvia arising on industrial, trade or business premises and being prejudicial to health or a nuisance*
- *any accumulation or deposit which is prejudicial to health or a nuisance”*

Where the local authority establishes any one of these issues constitutes a statutory nuisance and believes it to be unreasonably interfering with the use or enjoyment of someone’s premises and/or is prejudicial to health, an abatement notice will be served on the person responsible for the offence or the owner / occupier. Failure to comply with the

notice could lead to a prosecution. However, it is considered as a defence if the best practicable means to prevent or to counteract the effects of the nuisance are employed.

2.2 Planning Policy

2.2.1 National Planning Policy Framework

The principle national planning policy framework in respect to the proposed development is the National Planning Policy Framework (NPPF)²². This sets out the government's planning policies for England and how they should be applied. The revised NPPF was published in December 2024, and amended in February 2025, by the Ministry of Housing, Communities & Local Government (MHCLG).

The NPPF 2024 contains six paragraphs which are relevant to air quality.

Paragraph 110 states that:

“The planning system should actively manage patterns of growth in support of these objectives. Significant development should be focused on locations which are or can be made sustainable, through limiting the need to travel and offering a genuine choice of transport modes. This can help to reduce congestion and emissions, and improve air quality and public health. However, opportunities to maximise sustainable transport solutions will vary between urban and rural areas, and this should be taken into account in both plan-making and decision-making.”

Paragraph 187 (e) states that:

“Preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability. Development should, wherever possible, help to improve local environmental conditions such as air and water quality, taking into account relevant information such as river basin management plans...”

Paragraph 198 includes:

“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.”

Paragraph 199 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

²² National Planning Policy Framework. Accessible at:
<https://assets.publishing.service.gov.uk/media/675abd214cbda57cacd3476e/NPPF-December-2024.pdf>

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.”

Paragraph 201 states 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.”

Paragraph 224 states that:

“When determining planning applications, great weight should be given to the benefits of mineral extraction, including to the economy[...]. In considering proposals for mineral extraction, minerals planning authorities should: [...]

b) ensure that there are no unacceptable adverse impacts on the natural and historic environment, human health or aviation safety, and take into account the cumulative effect of multiple impacts from individual sites and/or from a number of sites in a locality;

7.1 c) ensure that any unavoidable noise, dust and particle emissions and any blasting vibrations are controlled, mitigated or removed at source⁷⁹, and establish appropriate noise limits for extraction in proximity to noise sensitive properties; [...]

2.2.2 National Planning Practice Guidance

The MHCLG published a number of supporting web-based resources of Planning Practice Guidance (PPG)²³ to supplement the NPPF. With respect to minerals the PPG²⁴ provides guidance on the assessment of potential dust impacts from minerals sites:

“Where dust emissions are likely to arise, mineral operators are expected to prepare a dust assessment study, which should be undertaken by a competent person/organisation with acknowledged experience of undertaking this type of work.

There are 5 key stages to a dust assessment study:

²³ National Planning Practice Guidance web-based resource. Accessible at: <http://planningguidance.planningportal.gov.uk/>

²⁴ Paragraph: 023 Reference ID: 27-023-20140306, revision date 06/03/2014

- *Establish baseline conditions of the existing dust climate around the site of the proposed operations;*
- *Identify site activities that could lead to dust emission without mitigation;*
- *Identify site parameters which may increase potential impacts from dust;*
- *Recommend mitigation measures, including modification of site design; and*
- *Make proposals to monitor and report dust emissions to ensure compliance with appropriate environmental standards and to enable an effective response to complaints.”*

This assessment has been carried out with reference to the above guidance.

2.3 Non-statutory guidance

There is no standard method for carrying out a dust assessment for minerals sites although the IAQM (2016) and others provide guidance, as noted above.

This assessment has been carried out with reference to the minerals guidance from IAQM, which states:

“The assessment approach described here requires a degree of professional judgement from a competent and suitably experienced air quality professional in order to reach a conclusion on the overall significance of the effect... This guidance is based on the judgement of the IAQM Minerals Guidance Working Group. The IAQM does not expect practitioners to follow the suggested approach in all circumstances.”

2.4 Local guidance

Wiltshire Council give *Environmental advice for developers and planning agents* on their website²⁵ and with regard to Air Quality also have an *Air Quality Supplementary Planning Document*, which seeks to assist developers in improving air quality and lowering transport emissions in line with national planning policy along with the aims and objectives of Wiltshire's *Air Quality Action Plan* and *Air Quality Strategy*.

This assessment has been carried out with consideration to the above guidance where necessary.

²⁵ Available from: <https://www.wiltshire.gov.uk/env-protection-developer-advice>

3 Methodology

This section of the report sets out the methodology followed for the assessment, which consider potential impacts arising from the key pollutants and 'residual source emissions' (i.e. dust emissions after mitigation) in relation to the operational stages of the proposed development.

3.1 Scope of the assessment

This assessment considers impacts to air from the following key pollutants, and whether they are scoped into or out of the assessment:

- NO₂ and NO_x, (associated with road traffic);
- PM₁₀ and PM_{2.5} (associated both with road traffic and with mineral operations); and
- Disamenity dust (associated with mineral operations).

3.2 Nitrogen dioxide (NO₂)

NO₂ and NO_x are largely associated with exhaust emissions, especially Heavy Duty Vehicle (HDV) traffic, and current guidance suggests that a detailed air quality assessment is required if any indicative criteria are met. Any change in traffic movements of 100 HDV movements per day (or 25 within or adjacent to an AQMA) as an AADT (Annual Average of Daily Traffic) can be an indicative trigger level for when the operational traffic of a development could have a significant effect on air quality. In effect, NO₂ could be scoped out of the EIA if vehicle movements were below the indicative threshold.

The proposed development will not result in any increase to existing HGV movements from the site. Impacts on the NO₂ AQOs are therefore expected to be Negligible; consequently, the need to have a detailed air quality assessment to assess NO₂ and NO_x has been scoped out of this report.

3.3 Fine particulate matter (PM₁₀ and PM_{2.5})

Particulate matter can also arise from a wide range of sources other than traffic at minerals sites thus the potential impacts of PM₁₀ and PM_{2.5} arising from the site require further consideration.

With regard to PM₁₀ and PM_{2.5} impacts associated with the proposed development, one approach is that the potential impacts on the AQO can be determined by comparing the total predicted environmental concentration (PEC) of particulate matter estimated to arise from the site with the annual mean objective. The PEC can be determined by combining the existing background ambient concentration (AC) and the expected process contribution (PC).

The AC for PM₁₀ and PM_{2.5} can be determined from publicly available monitoring data or, where this is not representative, site-specific monitoring data. For this assessment, the AC has been obtained from the Defra national annual estimated average background concentrations, which are determined for every local authority in the UK at 1 × 1 km grid square resolution²⁶.

The IAQM minerals guidance (2016) states at Section 5.2:

“If the long term background PM₁₀ concentration is less than 17 µg/m³ there is little risk that the Process Contribution (PC) would lead to an exceedance of the annual-mean objective and such a finding can be put forward qualitatively, without the need for further consideration, in most cases.”

It also states in Section 1.3, with regard to PM_{2.5}:

“For quarries most of this suspended dust will be in the coarse sub-fraction (PM_{2.5-10}), rather than in the fine (PM_{2.5}) fraction.”

The PC for the operation, the consequent PEC and resultant impacts on the AQO for PM₁₀ and PM_{2.5} arising from the operation are considered in Section 4.1.

3.4 Disamenity dust

Dust emissions from a minerals site, its propagation and potential impacts can be considered in terms of ‘source-pathway-receptor’ relationships. Dust can arise from a variety of processes and locations within a site and can be difficult to quantify.

PGN 3/08 (12) states that dust emissions can arise from a range of processes at minerals sites. The AEA Good Practice Guide²⁷ sets out a table of dust source types and characteristics for minerals sites (reproduced at Appendix B).

In addition, the IAQM minerals guidance (2016) sets out suggested site processes that may be considered distinctly as having the potential to generate dust at a minerals site. This is outlined at Appendices 3 and 4 of the guidance (reproduced in part within the text below). From this, the residual source emissions for different activities may be determined. A guide to the estimation of residual source emissions, reliant on the professional judgement of the assessor, is provided at Appendix 4 of the IAQM minerals guidance (2016).

Consequently, however it is recognised that there is a potential for dust emissions to occur at various stages of the operation, but it is also known that these can generally be controlled by recognised practices, as set out below.

The most common pathway for dust propagation is by air. Dust propagation depends on particle size, wind energy and disturbance activities. Large dust particles generally travel shorter distances than small particles. It is often considered that particles greater than

²⁶ Department for Environment, Food & Rural Affairs (2018). *Background Mapping data for local authorities – 2018*. Available at <https://uk-air.defra.gov.uk/data/iaqm-background-maps?year=2018>

²⁷ AEA (2010). *Good Practice Guide: Control and Measurement of Nuisance Dust and PM₁₀ from the Extractive Industries*

30 µm will largely deposit within 100 m of sources, those between 10 – 30 µm will travel up to 250 – 500 m and particles less than 10 µm will travel up to 1 km from sources, however there is a significant reduction in concentration with distance.

The IAQM minerals guidance (2016) states that unmitigated dust impacts will mainly occur within 250 m of the operation for sand and gravel quarries, and within 400 m of the operation for hard rock (e.g. granite, limestone) quarries although, as noted in various guidance documents, residents' concerns are most likely to be experienced within 100 m of the dust source, or sources.

In accordance with the guidance, receptors up to 250 m from the proposed development site have been scoped into this assessment.

3.5 Dust sources, potential for emissions and Residual Source Emissions (with mitigation in place)

Residual Source Emissions (RSE) are defined in the 2016 IAQM guidance as the potential dust emissions from a site activity after designed-in mitigation measures have been taken into account.

The scale and nature of proposed works determines the level of RSE. Judgement of the categorisation of RSE (generally Small, Medium and Large) takes into account the emission potential for each on-site source (including source strength, frequency and duration) and how effectively they are likely to be controlled by designed-in mitigation measures.

Specific factors include:

- The activities being undertaken;
- The types of materials involved and their inherent properties;
- The size of the site;
- The duration and frequency of activities;
- The likely effectiveness of the designed-in mitigation measures;
- Other mitigation measures applied to reduce or eliminate dust; and
- The meteorological conditions that can promote or inhibit dust generation.

Guidance from the IAQM on the estimation of RSEs is reproduced in Appendix B.

Potential sources or site activities that may give rise to dust as a result of the proposed development are:

- Soil and overburden stripping, storage and reinstatement (including inert fill);
- Material extraction;
- Material processing;

- On-site vehicle movements and material handling;
- Off-site transport; and
- Wind scouring of exposed surfaces and stockpiles.

The potential dust sources are considered below, setting out both the potential for emissions and suggested mitigation methods in Section 6.

From these, the determined RSE (i.e. the potential dust emissions after designed-in mitigation measures have been taken into account) are stated per activity.

The RSE outlined below take into account the recommended mitigation measures provided in Section 6 further below and those already in place on site.

3.5.1 Soil and overburden stripping, storage and reinstatement (including inert fill)

There is potential for high levels of airborne and wind-blown dust propagation from soil and overburden stripping, storage and reinstatement, although these are generally short-term, transient operations. The risks of dust emission from inert material will vary according to the nature of the materials handled.

Soils would be removed initially from the extraction area and used for the construction of a small bunds on west of the extraction area, with excess soils also taken to the soil storage area to the south of the plant site and in the southeastern area of the extraction area, either side of the entrance route.

There is potential for moderate levels of dust emissions during overburden and inert fill handling, storage and replacement, although it can usually be worked at higher moisture contents than soils, thus reducing the risk of unacceptable dust emissions from this aspect of site operations.

With reference to the guidance reproduced in Appendix B, the Residual Source Emissions from soil and overburden stripping, storage and reinstatement are conservatively considered to be Medium.

3.5.2 Material extraction

There is a moderate risk of airborne dust propagation emissions from mineral extraction due to the method of extraction, location of activities within the quarry void and screening towards receptors from existing vegetation.

Sand would be extracted by 360° excavator. Extracted mineral would then be loaded onto dump trucks and transported to the plant site for processing.

With reference to the guidance reproduced in Appendix B, the Residual Source Emissions from material extraction are considered to be Small.

3.5.3 Material processing

In general, the risk of airborne dust propagation from mineral processing depends on the process involved. Without mitigation, there is a high potential for dust emissions from activities such as crushing and screening and there is also a moderately high risk of dust emissions from open conveyors, at transfer points and at conveyor discharge points onto stockpiles.

Mineral processing will be undertaken at the plant site within the existing quarry area and away from receptors to the north. As with the existing site, the mineral will be fed by loading shovel into a screener for processing and removal of any naturally occurring clay waste.

With reference to the mitigation measures set out below the residual source emissions from mineral processing are considered to be Small.

3.5.4 On-site vehicle movements and material handling

There is a high risk of dust propagation from transport on unpaved roads unless appropriate mitigation measures are applied. Dust may be generated from downward-blowing exhausts and cooling fans as well as air turbulence caused by the movement of vehicles so these should be avoided where possible.

After site preparation all on-site HGV movements will be to and from the plant site and within the quarry void, away from the site boundary and receptor locations to the north.

With these points in mind and with reference to the guidance reproduced in Appendix B, the Residual Source Emissions from on-site transportation vehicle movements and material handling are considered to be Small.

3.5.5 Off-site vehicle movements

There is a high risk of dust propagation from transport off-site unless appropriate mitigation measures are applied. Dust may be generated from downward-blowing exhausts and cooling fans as well as air turbulence caused by the movement of vehicles so these should be avoided where possible.

The existing site entrance route is paved and will not be impacted by the proposed development, with the same quantity of vehicles travelling on the same route exiting the site.

With these points in mind and with reference to the guidance reproduced in Appendix B, the Residual Source Emissions from off-site transportation vehicle movements are considered to be Small.

3.5.6 Wind scouring of stockpiles and exposed surfaces

As a general rule, there is a moderate risk of wind-blown dust propagation from dry surface layers of stripped surfaces, freshly constructed soil storage bunds and from bare ground.

Soil bunds will be seeded, and material will be stockpiled within the plant site ensuring it is away from the site boundary to the north.

With these points in mind and with reference to the guidance reproduced in Appendix B, the Residual Source Emissions from wind scouring of exposed surfaces and stockpiles are considered to be Small.

3.5.7 Summary of Residual Source Emissions

The estimated RSE for the primary aspects of the site are summarised in Table 3.1.

Table 3.1: Summary of Residual Source Emissions

Activity	Residual Source Emission
Soil and overburden stripping, storage and reinstatement	Medium
Mineral extraction	Small
On-site transportation and material handling	Small
Mineral processing	Small
Off-site haulage	Small
Wind scouring of exposed surfaces and/or stockpiles	Small

3.6 Meteorological data

Meteorological conditions can have a significant effect on the potential for dust propagation from a minerals site. Of particular importance are wind speed, wind direction and precipitation.

Dust can be carried from a source towards receptors (such as nearby homes, other businesses and designated ecological sites) according to the strength and direction of wind. Precipitation is recognised to suppress dust and 0.2 mm of antecedent rainfall is considered sufficient to suppress windblown dust for a number of hours.

Middle Wallop meteorological station is approximately 17 km north east of the site and was identified as the most representative of those with sufficient data available near to the site.

A wind rose showing the 'dry' days²⁸ for Middle Wallop is presented at Figure 3.1. This demonstrates that westerly winds are generally prevailing in this area, with frequent winds also from the south-west, north-west, north and north-east.

²⁸ 'Dry' days are those with less than 0.2 mm liquid equivalent precipitation and are associated with an increased risk of dust propagation

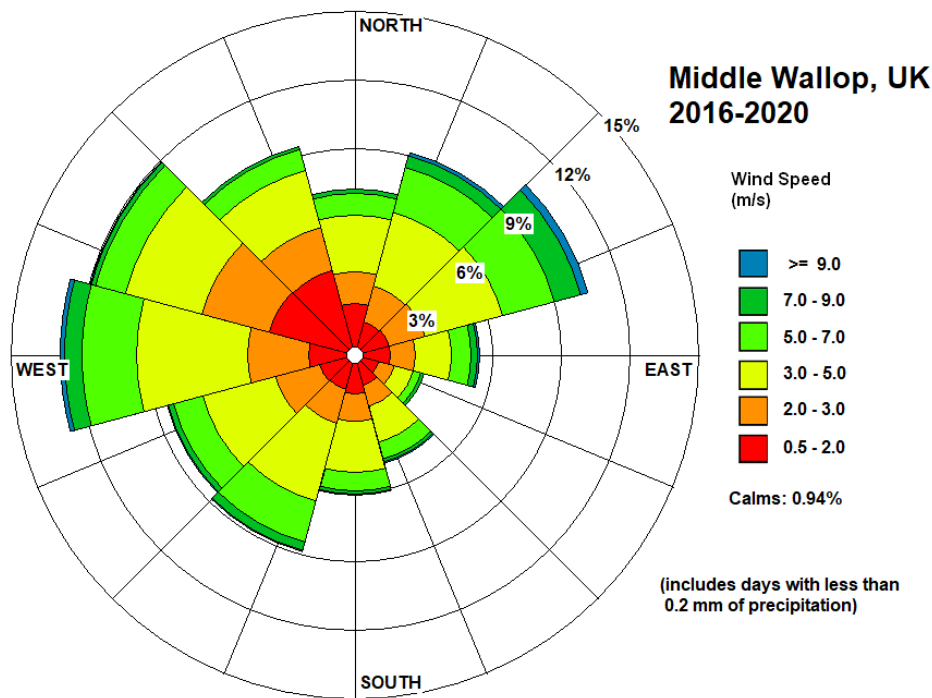


Figure 3.1: Wind rose, dry days (five-year average), Middle Wallop (2016 – 2020)

3.7 Receptors

Dust receptors can be within or beyond the quarry boundary. Whilst dust generation within a minerals site is primarily of concern to its operator, staff and visitors, dust can propagate beyond the site boundary to affect people and properties beyond, unless adequate control measures are in place. It is important to recognise that there may be other dust sources in the vicinity of a site (such as road traffic or arable farmland).

Table 3.2 provides a summary of receptors situated within 250 m of the proposed development area, along with the closest distance to dust-generating activities, and their deemed sensitivity to dust soiling (as set out below). As outlined in Section 3.4, the IAQM minerals guidance (2016) states that dust impacts will mainly occur within 250 m of the operation for sand and gravel quarries, and within 400 m of the operation for hard rock (e.g. granite, limestone, sandstone) quarries. Therefore, due to the nature of the proposed development, receptors within 250 m of any working area have been scoped into this assessment.

The locations of receptors are shown in Figure 3.2, along with the boundary for the proposed development area.

The IAQM minerals guidance (2016) sets out guidance regarding the sensitivity of human receptors to dust; residential properties are considered to have a High sensitivity, and commercial properties are typically considered to have a Medium sensitivity. However, due to the nature of the car wash and café and to ensure a conservative assessment, it has also been considered to have a High sensitivity.

With regard to ecological receptors the IAQM minerals guidance (2016) stresses that professional judgement is required to identify the specific sensitivity of a given ecological receptor but notes that sensitivity to dust for ecological receptors may relate to international, national or local designations. The nearest designated ecological receptor is the New Forest Site of Special Scientific Interest (SSSI) approximately 1 km to the south east. Ecological receptors have therefore been scoped out of this assessment.

The IAQM minerals guidance (2016) suggests that potential dust impacts arising from a minerals site may be considered in relation to the identified dust source activities and locations. From above, consideration is made of potential impacts to the receptors identified in Table 3.2 with regard to principal dust sources.

The distances shown are the minimum between any potential receptor and any given stage of site operations and thus can be considered to represent a 'worst-case' evaluation. Similarly, the directions to dust sources consider the maximum potential arc of direction (in 30° segments and taking into account activities within the relevant distance), so are also considered to represent a 'worst-case' evaluation.

Table 3.2: Receptors considered in the assessment and distances to site areas

No.	Receptor	Sensitivity	Primary direction/s to dust source (°)	Minimum distance to dust sources (m)
R1	Woodpeckers	High	165 - 285	80
R2	Clover Farm	High	195 - 255	235
R3	Brickworth Car Wash and Café	High	165 - 285	70
R4	Brickworth Bungalow	High	165 - 285	110
R5	The Lodge	High	135 - 195	30
R6	Paddock View	High	135 - 165	235

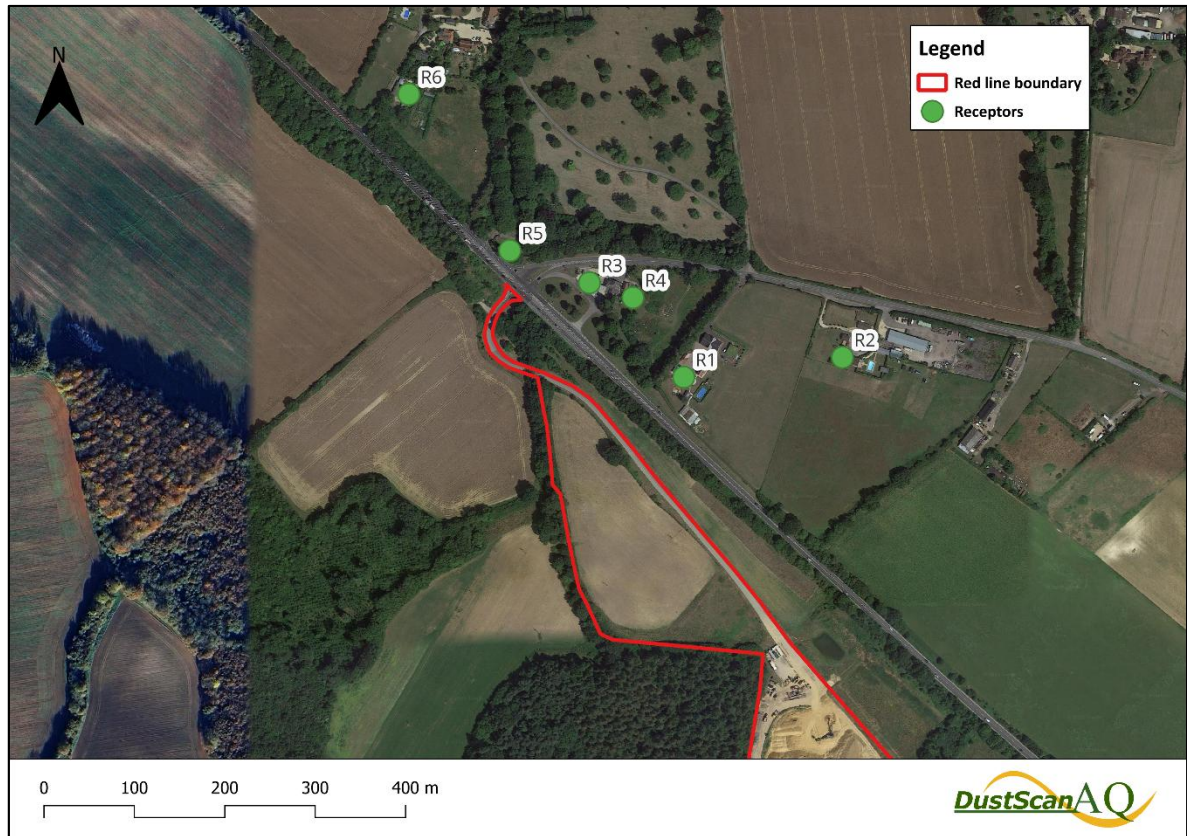


Figure 3.2: Locations of receptors with respect to the proposed development area

3.8 Assessment criteria

The assessment has been carried out with reference to relevant guidance, in particular the PPG minerals guidance (2014) and the IAQM minerals guidance (2016). Key tables and figures from that guidance are reproduced below.

From above, it is recognised that dust impacts reduce with distance. IAQM suggest that minerals dust assessments are carried out in relation to three distance criteria, as reproduced in Table 3.3. These criteria have been applied to this assessment.

Table 3.3: Categorisation of receptor distance from source (reproduced from IAQM, 2016)

Category	Criteria
Distant	Receptor is between 200 and 250m m from the dust source
Intermediate	Receptor is between 100 and 200 m from the dust source
Close	Receptor is less than 100 m from the dust source

In addition to the above, wind speed is recognised to affect dust propagation. The IAQM minerals guidance (2016) suggests a range of wind speed criteria, as reproduced in. These wind speed criteria have been applied to this assessment.

Table 3.4: Categorisation of frequency of potentially dusty winds (reproduced from IAQM, 2016)

Frequency Category	Criteria
Infrequent	Frequency of winds (>5 m/s) from the direction of the dust source on dry days are less than 5%
Moderately frequent	The frequency of winds (>5 m/s) from the direction of the dust source on dry days are between 5% and 12%
Frequent	The frequency of winds (>5 m/s) from the direction of the dust source on dry days are between 12% and 20%
Very frequent	The frequency of winds (>5 m/s) from the direction of the dust source on dry days are greater than 20%

From this, the IAQM (2016) suggest that the effectiveness of the pathway for dust propagation may be evaluated by combining the distance/s to receptors and the frequencies of potentially dusty winds (as set out in Table 3.5). This method has been applied to this assessment.

Table 3.5: Pathway effectiveness (reproduced from IAQM, 2016)

		Frequency of potentially dusty winds			
		Infrequent	Moderately frequent	Frequent	Very frequent
Receptor Distance Category	Close	Ineffective	Moderately Effective	Highly Effective	Highly Effective
	Intermediate	Ineffective	Moderately Effective	Moderately Effective	Highly Effective
	Distant	Ineffective	Ineffective	Moderately Effective	Moderately Effective

The IAQM minerals guidance (2016) suggest that the 'risk of dust impact' may be assessed by considering the pathway effectiveness (from Table 3.5) with the RSE (from Table 3.1), using Table 3.6. This approach has been followed for this assessment.

Table 3.6: Estimation of dust impact risk (reproduced from IAQM, 2016)

		Residual Source Emissions		
		Small	Medium	Large
Pathway Effectiveness	Highly effective pathway	Low Risk	Medium Risk	High Risk
	Moderately effective pathway	Negligible Risk	Low Risk	Medium Risk
	Ineffective pathway	Negligible Risk	Negligible Risk	Low Risk

As stated by the IAQM minerals guidance (2016) estimation of residual source emissions is a matter of professional judgement based on knowledge of the site and its locality, the processes involved and how these might relate to corresponding activities at other minerals sites.

Consequently, it should be recognised that these are wide ranging and therefore not prescriptive criteria and, as with all other aspects of dust assessment for minerals sites, rely on professional judgement based on the experience of the assessor.

From this, the magnitude of dust impacts may be evaluated by combining the dust impact risk with the receptor sensitivity (noted above), as shown in Table 3.7. This approach has been followed for this assessment.

Table 3.7: Descriptors for magnitude of dust effects (reproduced from IAQM, 2016)

		Receptor Sensitivity		
		Low	Medium	High
Dust impact risk	High Risk	Slight Adverse Effect	Moderate Adverse Effect	Substantial Adverse Effect
	Medium Risk	Negligible Effect	Slight Adverse Effect	Moderate Adverse Effect
	Low Risk	Negligible Effect	Negligible Effect	Slight Adverse Effect
	Negligible Risk	Negligible Effect	Negligible Effect	Negligible Effect

Consequently, from the IAQM minerals guidance (2016) an assessment of the potential severity of dust impacts associated with the operation may be determined.

3.9 Dust assessment uncertainties, limitations and assumptions

As set out above, there is no standard method for carrying out a minerals dust assessment and the most recent guidance (IAQM, 2016) recognises the need for professional judgement in carrying out such an assessment. Consequently, an uncertainty associated with any minerals dust assessment is that the assessor's judgement is appropriate. The lead author of this assessment was suitably experienced to carry out the assessment, and the assessment and calculations went through a rigorous internal review and approval protocol prior to issuing to the client.

A limitation of this assessment is that it has been carried out with reference to weather data from beyond the site boundary. This is in accordance with the IAQM minerals guidance (2016), and every effort has been made to ensure the data are representative of the area.

It is assumed that the site will be developed and operated as described for the purposes of this assessment.

It is assumed that there is no change in the relevant AQO, or that any AQO or similar national or local objective, threshold or limit value will be introduced for disamenity dust.

It is assumed that the suggested mitigation measures will be applied to the proposed development, and consequently that the RSE values determined in this assessment will be realistic estimates of dust emissions associated with the operations described.

4 Baseline conditions

4.1 PM₁₀ and PM_{2.5}

4.1.1 Defra background pollution concentrations

Modelled background concentrations have been obtained from Defra, who provide background pollution concentration estimates to assist local authorities in undertaking their 'Review and Assessment' work. This data is available to download from the Defra air quality resource website for NO_x, NO₂, PM₁₀ and PM_{2.5} for every 1 km x 1 km grid square for all local authorities. The current dataset is based on 2021 background data and future year projections are available for 2021 to 2040.

The estimated PM₁₀ and PM_{2.5} concentrations for 2021 (the Defra baseline year) and 2025, for the grid squares at the proposed development area are set out in Table 4.1 and Table 4.2.

Table 4.1: Defra estimated background ambient PM₁₀ concentrations for the grid squares in which the proposed development is located

Grid reference		PM ₁₀ concentration (µg/m ³)	
Eastings	Northings	2021	2025
423500	122500	11.16	10.82
423500	123500	11.18	10.83
Average		11.17	10.82

Table 4.1 shows that the 2025 predicted PM₁₀ background concentration in the vicinity of the site is 14.1 µg/m³, equivalent to 27.1% of the PM₁₀ annual mean objective (40 µg/m³).

Table 4.2: Defra estimated background ambient PM_{2.5} concentrations for the grid squares in which the proposed development is located

Grid reference		PM _{2.5} concentration (µg/m ³)	
Eastings	Northings	2021	2025
423500	122500	6.48	6.17
423500	123500	6.47	6.17
Average		6.47	6.17

Table 4.2 shows that the 2025 predicted PM_{2.5} background concentration in the vicinity of the site is 6.17 µg/m³. This is below the annual mean AQO as well as the more recently legislated for target of 10 µg/m³ to be achieved by 2040. Given that PM_{2.5} emissions from the site are also expected to be minimal, and that predicted background concentrations are also low (< 70% of the AQO), the impacts of operations on the future target value for PM_{2.5} are also not considered to be significant.

4.2 Disamenity dust

No baseline disamenity dust data for the development site are available. In accordance with relevant minerals industry guidance, baseline levels can be estimated based on published dust deposition rates for different environments²⁹:

- Rural areas: 10 to 50 mg/m²/day;
- Suburban areas: 30 to 80 mg/m²/day; and
- Town centre or industrial areas: 80 to 160 mg/m²/day.

As the immediate site setting is generally rural, the baseline dust deposition rates are likely to lie in the typical range for rural areas.

For reference and comparison, Environment Agency M17 guidance³⁰ suggests a 'custom and practice' threshold of 200 mg/m²/day where complaints may be likely and as a means of assessing site performance in the absence of any recognised limits values for visible deposited dust.

²⁹ Waller Associates for DoE (1991) *Environmental Effects of Surface Mineral Workings*

³⁰ Environment Agency (2013) *Monitoring Particulate Matter in Ambient Air around Waste Facilities*

5 Potential Impacts

5.1 Potential disamenity dust impacts

This section sets out the potential impacts of the operation, which have been determined by means of the method outlined by the IAQM (2016).

The potential impacts as a result of the closest specific site activity with respect to each receptor are listed below in Table 5.1 to Table 5.5.

It should be noted that only activities within approximately 250 m of each receptor have been considered. For example, as there are no receptors within 250 m of the plant site, mineral processing has not been included in the assessment.

Table 5.1: R1 - Woodpeckers

Dust source type	Pathway effectiveness	Dust impact risk	Magnitude of dust effects
Site preparation (soil and overburden strip and bund creation) and restoration (including inert fill)	Ineffective	Negligible Risk	Negligible Effect
Mineral extraction	Ineffective	Negligible Risk	Negligible Effect
On site transportation and material handling	Ineffective	Negligible Risk	Negligible Effect
Wind scouring of stockpiles and exposed surfaces	Ineffective	Negligible Risk	Negligible Effect
Off-site transport	Moderately Effective	Negligible Risk	Negligible Effect

Table 5.2: R2 – Clover Farm

Dust source type	Pathway effectiveness	Dust impact risk	Magnitude of dust effects
Site preparation (soil and overburden strip and bund creation) and restoration (including inert fill)	Ineffective	Negligible Risk	Negligible Effect
Mineral extraction	Ineffective	Negligible Risk	Negligible Effect
On site transportation and material handling	Ineffective	Negligible Risk	Negligible Effect
Wind scouring of stockpiles and exposed surfaces	Ineffective	Negligible Risk	Negligible Effect
Off-site transport	Ineffective	Negligible Risk	Negligible Effect

Table 5.3: R3 - Brickworth Car Wash and Cafe

Dust source type	Pathway effectiveness	Dust impact risk	Magnitude of dust effects
Site preparation (soil and overburden strip and bund creation) and restoration (including inert fill)	Ineffective	Negligible Risk	Negligible Effect
Mineral extraction	Ineffective	Negligible Risk	Negligible Effect
On site transportation and material handling	Ineffective	Negligible Risk	Negligible Effect
Wind scouring of stockpiles and exposed surfaces	Ineffective	Negligible Risk	Negligible Effect
Off-site transport	Ineffective	Negligible Risk	Negligible Effect

Table 5.4: R4 – Brickworth Bungalow

Dust source type	Pathway effectiveness	Dust impact risk	Magnitude of dust effects
Site preparation (soil and overburden strip and bund creation) and restoration (including inert fill)	Ineffective	Negligible Risk	Negligible Effect
Mineral extraction	Ineffective	Negligible Risk	Negligible Effect
On site transportation and material handling	Ineffective	Negligible Risk	Negligible Effect
Wind scouring of stockpiles and exposed surfaces	Ineffective	Negligible Risk	Negligible Effect
Off-site transport	Moderately Effective	Negligible Risk	Negligible Effect

Table 5.5: R5 - The Lodge

Dust source type	Pathway effectiveness	Dust impact risk	Magnitude of dust effects
Site preparation (soil and overburden strip and bund creation) and restoration (including inert fill)	Ineffective	Negligible Risk	Negligible Effect
Mineral extraction	Ineffective	Negligible Risk	Negligible Effect
On site transportation and material handling	Ineffective	Negligible Risk	Negligible Effect
Wind scouring of stockpiles and exposed surfaces	Ineffective	Negligible Risk	Negligible Effect
Off-site transport	Ineffective	Negligible Risk	Negligible Effect

Table 5.6: R6 - Paddock View

Dust source type	Pathway effectiveness	Dust impact risk	Magnitude of dust effects
Off-site transport	Ineffective	Negligible Risk	Negligible Effect

The results of the assessment show that all off-site receptors are predicted to experience Negligible dust effects as a result of activities within the proposed development area.

This assessment assumes that standard mitigation measures are in place. With reference to the IAQM minerals guidance (2016) the overall impact of the operation is therefore considered to be not significant.

5.2 Potential impacts to human health

As discussed in Section 4.1, the predicted background PM₁₀ concentrations at the site are well below 17 µg/m³, so there is a very low risk that the process contribution would lead to an exceedance of the relevant objectives.

As the operation is not likely to significantly impact the PM₁₀ and PM_{2.5} concentrations locally, the potential impacts to human health are considered to be Negligible.

5.3 Cumulative impacts

There are no other significant or planned sources of dust in the vicinity of the site that have the potential to cause significant cumulative dust impacts, other than the previous quarry which will not be worked concurrently. There may be other sources of dust in the vicinity of the site such as from arable farming, however dust generation from farming activities is generally very short-lived and therefore any cumulative impacts are not considered to be significant.

6 Mitigation measures

It is recommended that the following control measures are incorporated into on-site dust management control measures and formalised within an updated Dust Management Plan (DMP) for the site. These measures are based on the results of the assessment and are drawn from experience and best practice guidance.

6.1 Soil and overburden stripping, storage and reinstatement (including inert fill)

Unacceptable dust emissions from soil stripping, storage and reinstatement can be controlled by minimising working of soil in very dry, windy conditions, by reducing drop heights at material transfer points and controlling vehicle speeds. This is especially important when soil is being in the northern area of the extension site boundary towards off-site receptors and during formation of the screening bunds.

As with soils, working of overburden and inert fill near the site boundary should be minimised in very dry, windy conditions. Drop heights should be minimised at material transfer points (e.g. during loading and tipping). Operations should be suspended when wind conditions would be likely to result in visible dust being carried towards off-site receptors.

Additional control measures, such as the use of water sprays or wetting down with a bowser, should be considered where there is a risk of wind-blow across the site boundary towards off-site receptors.

6.2 Mineral extraction

There is a moderate risk of airborne dust propagation emissions from mineral extraction, but additional control measures (such as wetting down with a water bowser) should be considered if there is a risk of visible dust from the extraction faces being blown over the site boundary towards off-site receptors.

At upper levels and near the site boundary the risk of dust emissions is greater and care should therefore be taken to minimise unacceptable dust emissions over the site boundary, especially in dry, windy conditions.

6.2.1 Mineral processing

Without mitigation, there is a high potential for dust emissions from mineral processing and there is also a moderately high risk of dust emissions from open conveyors, at transfer points and at discharge points onto stockpiles.

Mineral should only be screened within the plant site, which is located away from receptors to the north.

All plant should be maintained appropriately and any dust emission controls such as water sprays should be operational during dry conditions.

6.3 On-site transportation and material handling

To avoid dust generation relating to vehicle movements, mobile plant with upward or sideways exhausts should be used. Site haulage should keep to designated haul routes wherever possible. Vehicle speed limits should be kept to a minimum.

Any unmade roads should be kept in good repair and wetted as required with a water bowser or sprinkler system where necessary.

6.4 Off-site transportation

The surface of the access route should be maintained to a high standard and any sprinkler systems installed should be maintained and used in dry periods when appropriate.

All HGVs leaving the site should be sheeted before joining the road network.

Vehicles should be checked for loose deposits that might fall onto the public highway and spillages should be cleared as quickly as possible.

6.5 Wind scouring of exposed surfaces

The effects of wind-blow across exposed surfaces, unpaved vehicle circulation areas and other areas of bare ground should be minimised by ensuring that loose materials are removed or treated as necessary. A high standard of housekeeping can also help to minimise the effect of wind scouring. Additionally, dust emissions from exposed surfaces such as stockpiles and exposed extraction areas can be minimised by wetting down with the site water bowser as necessary, especially in periods of dry, windy weather.

Any long term material stockpiles should be managed in accordance with the Quarries Regulations 1999 and, where practicable, formed to maintain a smooth profile to minimise the spreading of loose materials.

Soil bunds around the site perimeter should be seeded, and material will be stockpiled within the plant site ensuring it is away from the site boundary to the north.

7 Conclusion

Raymond Brown Quarry Products Limited are seeking planning permission for an extension to the existing Brickworth Quarry located in Whiteparish, Wiltshire. The proposed extension area is named 'Sandland' and it is anticipated that the mineral output would comprise of the extraction of approximately 140,000 tonnes of sand per annum for one and a half years. Due to the relatively small size of the area, the extension would be worked and restored as a single phase, with mineral extraction and backfill consecutively.

A Dust and Air Quality Assessment was carried out by DustScanAQ as part of this application.

This assessment was carried out by competent professionals and with appropriate reference to relevant policy and guidance.

The assessment considered the potential impacts of the Air Quality Objectives (AQO) for PM₁₀ and PM_{2.5}, and from 'nuisance' or 'disamenity' dust arising from the proposed development.

An assessment of emissions for PM₁₀ and PM_{2.5} has shown that activities associated with the proposed development are unlikely to have a significant impact on particulate matter concentrations with regard to the AQO. Consequently, exceedances of the relevant AQOs are not likely.

Provided that this site is operated in accordance with the suggested dust mitigation measures, the assessment shows there would be Negligible Effects at all receptors.

Consequently, this assessment shows that the proposed development can be operated in a manner unlikely to cause significantly adverse dust impacts in its vicinity. With reference to best practice guidance, the overall impact of the proposed development is considered to be not significant.

The proposal is considered not to conflict with any national, regional or local planning policy.

Appendix A: Dust Source Types and Characteristics (AEA Good Practice Guide, 2010)

Activity	Relevance for mineral types	Duration of activity	Potential for dust emission
Soil handling	Most minerals	Relatively short	Significant but depends on dryness and silt or clay content of the material and transportation to stockpiles.
Overburden handling	Most minerals, but quantities vary considerably	Varies. Can be intermittent over life of site	Significant but depends on nature of overburden, particularly during unloading and haulage.
Drilling and blasting	Usually for hard rocks	Short, but can take place frequently	Without control, drill rigs can be significant . However, most drill rigs now use shrouds and any dust generation is very localised. Properly designed and controlled blasts have limited potential for the creation of dust.
Initial loading activities	All mineral types	Ongoing during extraction	Can be significant but varies depending on nature of material, whether wet or dry, volumes handled and equipment used.
Crushing and grading	Most minerals, but not always at the place of extraction	Varies, generally ongoing	Significance varies depending on type of equipment and exposure to wind. Controlled through the EPR permit at regulated sites.
Storage of minerals within site	Most mineral types	Usually ongoing during extraction	Significance varies depending on the volume of material stored, moisture content, exposure to wind, covering of stockpiles.
Transport and load-out within site	All mineral types	Usually ongoing	Significance varies depending on type of vehicle. If transported by road then the size of vehicle, speed and nature of roads (surfaced or unmade) are important factors.
Transport off-site (mainly by road)	All mineral types	Usually ongoing	Not generally significant (except near site exits due to the re-suspension of road dust) as lorries tend to be covered. Can be mitigated by road sweeping but this can also raise dust.

Appendix B: Guidance on the estimation of Residual Source Emissions (from IAQM, 2016)

A: Site Preparation/Restoration

LARGE	SMALL
Large working area	Small working area
High bunds	Low bunds
High volume of material movement	Low volume of material movement
High no. heavy plant.....	Low no. heavy plant
Minimal seeding/sealing of bund surface	Bunds seeded/sealed immediately
Material of high dust potential	Material of low dust potential

B: Mineral Extraction

LARGE	SMALL
Large working area	Small working area
High energy extraction methods.....	Low energy extraction methods
Material of high dust potential	Material of low dust
Potential high extraction rate	Low extraction rate

C: Materials Handling

LARGE	SMALL
High no. heavy plant.....	Low no. heavy plant
Unconsolidated/bare surface.....	Hard standing surface
Activities close to site boundary	Activities within quarry void
Material of high dust potential	Material of low dust potential

D: On-Site Transportation

LARGE	SMALL
Use of unconsolidated haul roads.....	Use of conveyors
Unpaved haul roads.....	Paved haul roads
Road surface of high dust potential	Road surface of low dust potential
High no. HDV movements	Low no. HDV movements
High total length of haul roads.....	Low total length of haul roads
Uncontrolled vehicle speed	Controlled (low) vehicle speed

E: Mineral Processing

LARGE	SMALL
Raw material of high dust potential	Raw material of low dust potential
End product of high dust potential	End product of low dust potential
Complex or combination of processes.....	Single process
High volume material processed.....	Low volume material processed

F: Stockpiles/Exposed Surfaces

LARGE	SMALL
Long term stockpile.....	Short term stockpile
Frequent material transfers.....	Infrequent material transfers
Material of high dust potential.....	Material of low dust potential
Ground surface unconsolidated/un-kept.....	Ground surface hardstanding/clean
Stockpiles close to site boundary.....	Stockpiles well within quarry void
Large areas of exposed surfaces.....	Small areas of exposed surfaces
High wind speeds/low dust threshold.....	Low wind speeds/high dust threshold

G: Off-Site Transportation

LARGE	SMALL
High No. HDV Movements.....	Low No. HDV Movements
Unconsolidated Access Road.....	Paved Access Road
Limited/No Vehicle Cleaning Facilities.....	Extensive Vehicle Cleaning Facilities
Small Length of Access Road.....	Large Length of Access Road