Land at 264 Dodworth Road, Barnsley

AIR QUALITY ASSESSMENT

January 2025

LAND AT 264 DODWORTH ROAD, BARNSLEY

Air Quality Assessment

Applicant
Brewster Bye Architects Ltd
5 North Hill Road Headingley Leeds LS6 2EN

Document Information	
Issue Version	v1
Status	FINAL
Reference	264DodworthRd_AQA_R001
Date	January 2025

Document Control

This document has been prepared by IAQS document for Brewster Bye Architects Ltd (the Client) and may not be used or relied on by any other person or by the Client in relation to any other matters not covered specifically by the scope of this report.

Notwithstanding anything to the contrary contained in the report, IAQS is obliged to exercise reasonable skill, care and diligence in the performance of the services required by the Client and shall not be liable except to the extent that it has failed to exercise reasonable skill, care and diligence, and this report shall be read and construed accordingly.

This report is based on and incorporates information and data from information preceding IAQS's involvement and IAQS is unable to defend any inaccuracies within this information.

TABLE OF CONTENTS

TABLES

FIGURES

1. INTRODUCTION

This report presents an air quality assessment to support a planning application for a residential development on land at 264 Dodworth Road, Barnsley (hereafter referred to as the 'Proposed Development' or 'Application Site').

The Proposed Development will comprise five (5no) residential properties with associated garages, driveways, and gardens. Access to the Proposed Development will utilise the existing access road off the A628 Dodworth Road. The Application Site location is presented in **Figure 1** and the Proposed Development layout is presented in **Figure 2**.

This report provides a review of existing air quality conditions at and in proximity to the Application Site. The potential impacts of the Proposed Development on local air quality are assessed with respect to emissions associated with the construction and operation phases. Where applicable, air quality mitigation measures are proposed to minimise emissions to air and avoid/minimise any potential adverse impacts.

The assessment is undertaken with reference to current Barnsley Metropolitan Borough Council (BMBC) air quality planning guidance, in addition to technical guidance published by the Department of Environment Food and Rural Affairs (Defra) and the Institute of Air Quality Management (IAQM).

Air pollution in proximity to roads is generally dominated by emissions from road vehicles. The main pollutants of health concern from road traffic exhaust emissions are nitrogen dioxide (NO_2) and fine particulates assessed as the fraction of airborne particles of mean aerodynamic diameter less than 10 micrometres (PM_{10}) and 2.5 micrometres ($PM_{2.5}$). As such, emissions of NO_2, PM_{10}, and $PM_{2.5}$ form the focus of this assessment.

Figure 1: Application Site Location

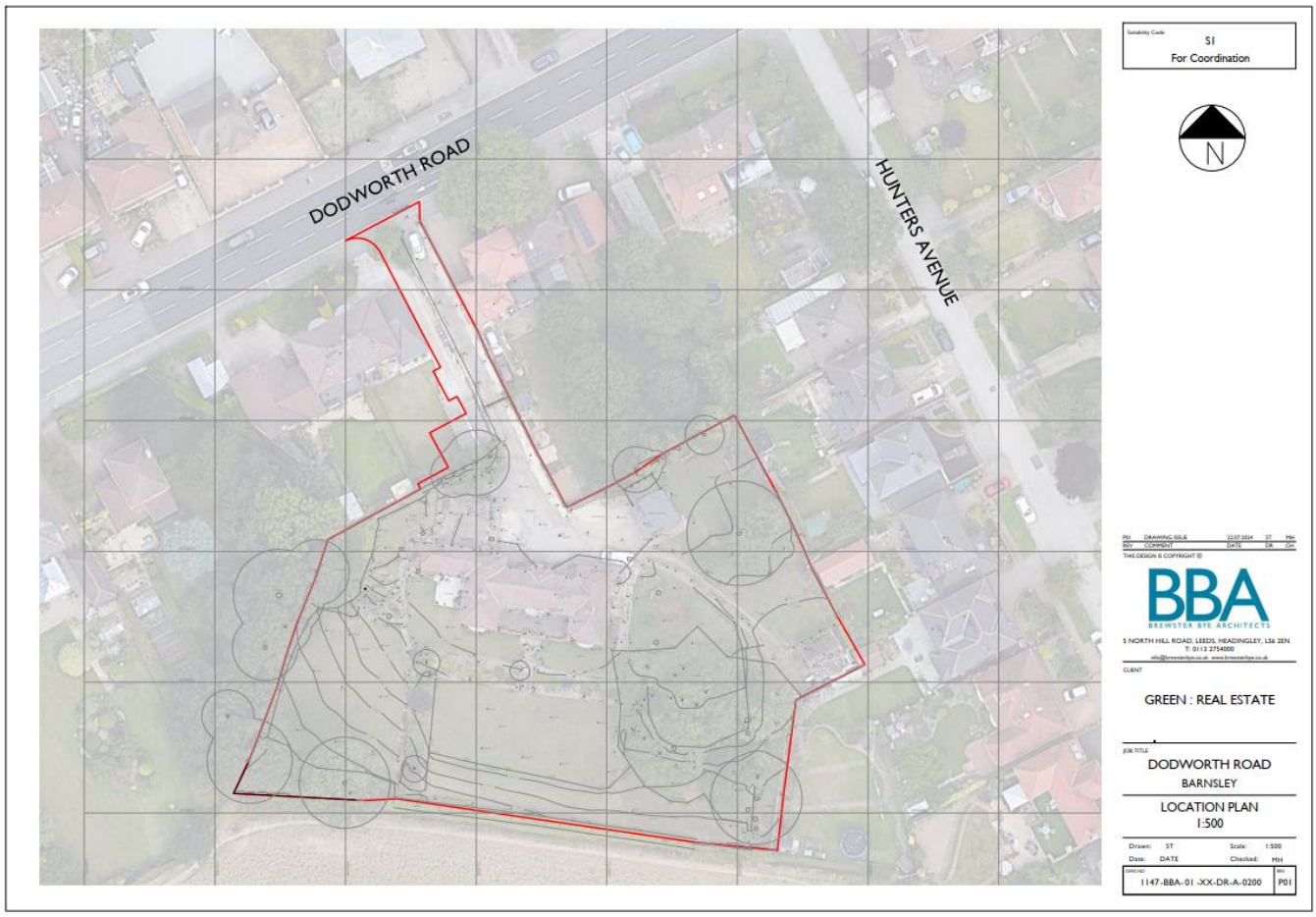

Figure 2: Proposed Development Layout Plan

2. LEGISLATIVE FRAMEWORK & PLANNING POLICY

2.1. LEGISLATION

The *European Directive on Ambient Air Quality* (2008/50/EC) set legally binding limits for ambient concentrations of air pollutants that impact public health such as NO_2, PM_{10}, and $PM_{2.5}$. The Directive and associated pollutant limit values were transposed into the UK law under the *Air Quality Standards Regulations 2010* and, following the UK's exit from the EU, the *Environment (Legislative Functions from Directives) (EU Exit) Regulations 2019*.

The Air Quality Strategy for England[1] establishes the framework for air quality improvements across the UK. The Strategy sets out standards for key air pollutants that reflect levels of pollutants thought to avoid or minimise risks to health or ecosystems. The associated air quality objectives are policy targets, expressed as maximum permissible outdoor concentrations of pollutants that take account of economic efficiency, practicability, technical feasibility and timescales.

The national air quality objectives for the aforementioned key pollutants considered in this assessment (NO_2, PM_{10}, $PM_{2.5}$) are enacted by the *Air Quality (England) Regulations 2000*. The national objectives are numerically identical to the European limit values, with the exception of $PM_{2.5}$. With respect to $PM_{2.5}$, the limit value was amended (reduced from 25 µg/m^3 to 20 µg/m^3) in 2020 by *The Environment (Miscellaneous Amendments and Revocations) (EU Exit) Regulations 2020*.

Where any of these pollutant objectives are exceeded, the relevant local authority must designate an Air Quality Management Area (AQMA), as stipulated by Part IV of the *Environment Act 1995* and establish an Air Quality Action Plan with measures aimed at reducing levels to below the respective objective(s).

Following the departure of the UK from the EU, the *Environment Act 2021* makes provision for targets, plans, and policies to improve the natural environment, including air quality. Long-term targets have been set within the first *Environmental Improvement Plan 2023* (EIP)[2] pursuant to Section 10(6) of the Act. These legal targets specifically relate to $PM_{2.5}$ and have been transposed into law via *The Environmental Targets (Fine Particulate Matter) (England) Regulations 2023*:

- Annual Mean Concentration Target – a maximum concentration of 10 µg/m^3 to be met across England by 2040
- Population Exposure Reduction Target – a 35% reduction in population exposure by 2040 (compared to a base year of 2018)

[1] Defra (2023) *Air Quality Strategy: Framework for local authority delivery*

[2] HM Government *Environment Improvement Plan 2023*. Available at: https://www.gov.uk/government/publications/environmental-improvement-plan

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 planning decisions. However, Defra has published interim guidance[3], which advises that:

"…*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. If quantitative evidence is not available, a qualitative approach can be taken*."

The interim guidance directs that the impact of developments on $PM_{2.5}$ levels in ambient air be considered at the planning application stage, whether a monitor is present or not. As such, the assessment approach should be to focus on identifying appropriate mitigation measures from the design stage, ensuring that $PM_{2.5}$ emissions and any exposure are minimised as far as possible.

The assessment of $PM_{2.5}$ concentrations within this report has been undertaken within the context of the both the above guidance for the targets and the current annual mean air quality standard for $PM_{2.5}$ (20 µg/m^3).

An overview of the national air quality objectives and targets for the aforementioned key pollutants relative to this assessment is presented in **Table 2.1**.

Table 2.1 National health-based air quality objectives / standards and targets relevant to assessment

Pollutant	Averaging Period	Objective / Limit Value / Target Concentration (µg/m^3)	Number of permitted exceedances per calendar year
NO_2	Annual	40	-
	1-Hour	200	18
PM_{10}	Annual	40	-
	24-Hour	50	35
$PM_{2.5}$	Annual	20	-
	Annual	10*	-
Notes: * To be achieved by 2040. A non-legally binding interim target of 12 µg/m^3 is set for January 2028.			

2.2. Local Planning Policy Context

Barnsley Adopted Local Plan (2019)

The Barnsley Local Plan[4] was adopted in January 2019 and sets out BMBC's policies and proposals to support development through to 2033. Given that the Application Site is located adjacent to an AQMA, *Policy AQ1 Development in Air Quality Management Areas* is most relevant to the Proposed Development, stating the following:

[3] Defra (4 Oct 2024) *$PM_{2.5}$ Targets: Interim Planning Guidance*. Available at: https://uk-air.defra.gov.uk/pm25targets/planning

[4] Barnsley MBC (2019) *Barnsley Local Plan Adopted January 2019*

"…*Development which impacts on areas sensitive to air pollution in air quality management areas will be expected to demonstrate that it will not have a harmful effect on the health or living conditions of any future users of the development in terms of air quality (including residents…*

We will only allow residential development which impacts on areas sensitive to air pollution, where the developer provides an assessment that shows living conditions will be acceptable for future residents, subject to any required mitigation.

We will only allow development which impacts on areas sensitive to air pollution which could cause more air pollution, where the developer provides an assessment that shows there will not be a significantly harmful effect on air quality, subject to any required mitigation."

The assessment reported herein actions the above policy, within the context of the BMBC Air Quality and Emissions Technical Planning Guidance, outlined below.

Air Quality & Emissions Good Practice Planning Guidance (November 2021)

BMBC's air quality and emissions good practice planning[5] aims to assist in reducing air quality impacts of new development, establishing a "…*template for integrating air quality considerations into land-use planning and development management policies that can influence the reduction of road transport emissions*".

The guidance adopts a three-stage process to be followed when undertaking an air quality assessment for relevant planning applications, as follows:

1. Determining the classification of the development proposal
2. Assessing and quantifying the impact on local air quality
3. Determining the level of mitigation required by the proposal to meet Local Plan requirements.

In relation to the first stage, the guidance provides criteria to determine the classification of the development, such that it can be identified as a 'Minor', 'Medium', or 'Major' development. Given the proposed residential land use, the Proposed Development can be classified as a *Minor* development with reference to the BMBC guidance, given that it will:

- Comprise fewer than 50 residential units;
- Not generate 100 or more two-way vehicle movements per day;
- Comprise fewer than 100 parking spaces.

At stage two, the guidance acknowledges that whilst smaller developments such as the Proposed Development may not themselves create an additional air quality issue, they could potentially introduce more people likely to be exposed to existing levels of poor air quality. The criteria that must be met to determine the likelihood of introducing additional exposure are:

[5] Barnsley MBC (Nov 2021) A*ir Quality and Emissions Good Practice Planning Guidance*

- The proposal is within or adjacent to an AQMA;
- The proposal is located within 20 m of a road(s) that is at or above the relevant pollutant objective;
- The proposal is for either residential land use (C1-C4) or a non-residential institution (Class D1).

Whilst the Proposed Development is located adjacent to both the A628 Dodworth Road AQMA and M1 Motorway AQMA, the nearest proposed residential property (i.e. sensitive receptor exposure) will be located approximately 70 m to the south of the A628 Dodworth Road and approximately 100 m to the east of the M1 on-slip at Junction 37. Therefore, the Application Site is located outside of the 20 m criterion.

Based on the above, the Proposed Development does not meet the exposure criteria and does not require any further mitigation with respect to reducing the level of exposure of future occupants. However, for assurance, additional exposure assessment has been undertaken, as reported in **Sections 3.6** and **5.2**.

Notwithstanding the above, this report also provides a qualitative assessment of potential construction phase air quality impacts and a qualitative assessment of operational phase air quality impacts, with reference to both the BMBC air quality and emissions good practice guidance and the Institute of Air Quality Management (IAQM) guidance[6,7].

[6] Institute of Air Quality Management (Jan 2024) Guidance on the Assessment of Dust from Demolition and Construction Version 2.2

[7] Environmental Protection UK and Institute of Air Quality Management (January 2017) Land Use Planning & Development Control: Planning for Air Quality Version 1.2

3. ASSESSMENT METHODOLOGY

3.1. CONSULTATION WITH BARNSLEY MBC

BMBC's Pollution Control were contacted via email on 13 January 2025 to agree the below methodology for the air quality assessment. At the time of completing this assessment, no response has been received from BMBC.

3.2. PROPOSED DEVELOPMENT CLASSIFICATION

The Proposed Development is classified as a 'Minor' development with reference to the BMBC guidance (see **Section 2.2**).

Therefore, a qualitative assessment is reported herein, focussed on the potential local air quality impacts and associated mitigation measures relating to construction phase activities and operational phase vehicle emissions.

For assurance, an exposure assessment is undertaken, relating to the potential for future occupants of the completed Proposed Development to be exposed to elevated levels of air pollution.

3.3. KEY DATA AND RESOURCES

An index of the key data and resources used within the assessment is presented in **Table 3.1**.

Table 3.1 Key Data and resources

Data/Resource	Summary	Source/Reference
Proposed Development layout	Scaled drawing of the Proposed Development masterplan.	Document reference: *1147-BBA-01-XX-DR-A-0201 P02.pdf* (Brewster Bye Architects)
BMBC 2023 Air Quality Annual Status Report (ASR)	Review and assessment of air quality within Barnsley Metropolitan Borough. Provides the latest available air quality monitoring data near to the Application Site.	Document published by BMBC (Oct 2023) *2023 Air Quality Annual Status Report*[8]
Defra national background pollutant mapping data	Background 1 km x 1 km grid air pollutant data obtained for the respective grid squares encompassing the Application Site and immediate vicinity.	Background pollutant data sourced from 2018-based maps, as published by Defra: https://uk-air.defra.gov.uk/data/laqm-background-maps?year=2018 Webpage accessed 22 July 2024.
Guidance on the assessment of dust from demolition and construction	Guidance provided by the Institute of Air Quality Management (IAQM) on assessing and mitigating potential dust impact risks associated with construction phase activities.	Document published by IAQM (2024) *Guidance on the assessment of dust from demolition and construction v2.2*[6]

[8] Barnsley MBC (2024) *2023 Air Quality Annual Status Report*

Data/Resource	Summary	Source/Reference
Land Use Planning & Development Control Guidance	Guidance provided by Environmental Protection UK (EPUK) and IAQM on assessing potential local air quality impacts arising from new development.	Document published by EPUK/IAQM (2017) *Land-Use Planning & Development Control: Planning for Air Quality*[7]

3.4. Baseline Air Quality Review

The 2023 Air Quality ASR[8] published by BMBC was reviewed to establish baseline air quality conditions within the vicinity of the Application Site. The ASR provides the NO_2 and PM_{10} monitoring results within the vicinity of the Application Site for the latest five years of reported data (2018 – 2022). BMBC began monitoring of $PM_{2.5}$ in 2023.

Background NO_2, PM_{10}, and $PM_{2.5}$ pollutant concentrations corresponding to the 1 km x 1 km grid squares covering the Application Site and surrounding area were obtained from Defra's published national pollutant mapping data for use in the air quality assessment. Background concentrations for 2025 (base year) and 2026 (potential opening year) were obtained to represent current and future baseline air quality conditions at and near to the Application Site.

3.5. Construction Phase Assessment Approach

Construction phase activities associated with the Proposed Development may result in the generation of fugitive dust emissions, including PM_{10} and $PM_{2.5}$. If transported beyond the site boundary, dust and particulates can have an adverse impact on local air quality. An assessment of the likely impacts on local air quality due to the generation and dispersion of dust and particulates during the construction phase has been undertaken using the relevant assessment methodology published by the IAQM[6]; the available information for the Proposed Development provided by the Client and Project Team; and, professional judgement.

The construction phase air quality assessment focusses on the following sensitive locations:

- 'human receptors' within 250 m of the site boundary, or within 50 m of the route(s) used by construction vehicles on the public highway, up to 250 m from the site entrance(s); and/or,
- 'ecological receptors' within 50 m of the site boundary, or within 50 m of the route(s) used by construction vehicles on the public highway, up to 250 m from the site entrance(s).

It is within these distances that the impacts of dust soiling and increased particulate matter in the ambient air will have the greatest impact on local air quality at sensitive receptors.

There were no ecologically sensitive locations identified within 50 m of the Proposed Development boundary or within 50 m of roads used by construction vehicles.

The guidance facilitates assessment of the potential for dust nuisance and impact due to activities carried out during the following stages of construction:

- **Demolition** – Any activity involved with the removal of an existing structure (or structures).

- **Earthworks** – Covers the processes of soil-stripping, ground-levelling, excavation and landscaping.
- **Construction** – Any activity involved with the provision of a new structure(s) (e.g. residential dwelling, retail outlet, road etc.), its modification or refurbishment.
- **Trackout** – The transport of dust and dirt from the construction/demolition site onto the public road network, where it may be deposited and then re-suspended by vehicles using the network. This arises when heavy duty vehicles (HDVs) leave the construction/demolition site with dusty materials, which may then spill onto the road, and/or when HDVs transfer dust and dirt onto the road after travelling on site.

The assessment considers the nature and scale of the activities undertaken for each source and the sensitivity of the area to an increase in dust and particulate levels, which enables an appropriate level of risk to be assigned. Risks are described in terms of there being a *low*, *medium* or *high* risk of dust impacts.

Following assignment of risk, site specific mitigation proportionate to the level of risk is identified for the Proposed Development, and the significance of residual effects is determined. A summary of the IAQM assessment methodology is provided in **Appendix A**.

During the construction phase of the Proposed Development, there will be additional construction vehicle movements along the road network. However, the frequency of these movements will be temporary and intermittent relative to existing flows on the local road network. Data relating to the number, type and routing of construction vehicles and non-road mobile machinery (NRMM) were not available at the time of assessment, therefore professional judgement was used to qualitatively assess potential local air quality effects associated with emissions from construction vehicles and NRMM.

3.6. Operation Phase Assessment Approach

Vehicle Emissions Generated by Proposed Development

Potential local air quality impacts associated with the operation of the Proposed Development will predominantly relate to changes in vehicle flows, and thus pollutant emissions, on the local road network, particularly where sensitive receptors (e.g. residential properties) are located.

With respect to potential impacts on local air quality associated with vehicle emissions generated by a new development, IAQM guidance[7] provides a set of criteria that can be used to inform the need for a detailed air quality assessment. These criteria align with the BMBC's Air Quality and Emissions guidance[5] and relate to the change in vehicle movements for developments that are located within or adjacent to an AQMA, such as the Proposed Development site:

- A change of Light-Duty Vehicle (LDV) flows of more than 100 Annual Average Daily Traffic (AADT) movements on local roads with relevant receptors; and/or
- A change of Heavy-Duty Vehicle (HDV) flows of more than 25 AADT movements on local roads with relevant receptors.

The operation phase assessment is based on a qualitative review of likely traffic movements generated by the Proposed Development within the context of the above criteria.

Suitability of Application Site for Proposed Land Use: Exposure Assessment

The Proposed Development will introduce new sensitive receptors (human health) to the Application Site and thus the suitability of the site for the proposed end use needs to be assessed with respect to current and future levels of air quality.

To facilitate this assessment and understand the expected potential exposure of new residents to air pollution, the outcomes of the baseline air quality review were used in conjunction with a review of local existing sources of air pollutants, based on the Application Site location.

In addition, Defra's NO_2 Fall Off with Distance Calculator[9] was used to predict the expected levels of NO_2 at the Application Site resulting from high volumes of traffic utilising the adjacent A628 Dodworth Road, which is located approximately 70 m to the north of the nearest proposed residential dwelling within the Proposed Development.

To do this, a suitable NO_2 roadside monitoring site was identified from BMBC's local air quality monitoring network to be representative of annual mean NO_2 concentrations adjacent to the A628 Dodworth Road. The calculator allows an annual mean NO_2 value to be calculated at a given distance from a road source (A628) based on the monitored value and known relationships between NO_2 concentration and the distance from a road source.

The calculation was completed using a suitable background annual mean NO_2 value for the Application Site for the same year as roadside monitoring was undertaken.

The results of the calculations were assessed within the context of the national air quality objective for annual mean NO_2 to further inform the overall appraisal of the suitability of the Application Site for residential land use.

3.7. SIGNIFICANCE CRITERIA

Construction Phase Assessment

The IAQM assessment methodology[6] recommends that significance criteria are only assigned to the identified risk of dust impacts occurring from a construction activity once appropriate mitigation measures are established. For almost all construction activities, the application of effective mitigation should prevent any significant effects occurring to sensitive receptors and therefore the residual effect will normally be negligible.

For the qualitative assessment of local air quality impacts relating to exhaust emissions from plant used on-site and construction vehicles accessing and leaving the Application Site, the significance of effects

[9] Defra (2016) *NO_2 Fall Off With Distance Calculator v4.2* (Accessed via: https://laqm.defra.gov.uk/air-quality/air-quality-assessment/no2-falloff/)

has been determined within the context of existing flows on the local road network, existing land uses, with professional judgement applied to reach a conclusion.

Operation Phase Assessment

The EPUK/IAQM Planning Guidance[7] recommends the use of impact descriptors to describe the predicted quantitative air quality impacts relating to additional emissions from traffic generated by the Proposed Development.

Given that a qualitative approach was applied for the operational phase assessment, the EPUK/IAQM guidance on impact descriptors is not applicable and professional judgement has been applied to determine overall significance of the Proposed Development operation on local air quality. However, this guidance is referenced throughout the assessment to assist in informing the professional judgement on significance.

4. BASELINE CONDITIONS

4.1. LOCAL AIR QUALITY MANAGEMENT

The 2023 ASR published by BMBC[8] confirms that there are currently five AQMAs designated within Barnsley, including the M1 Motorway AQMA and A628 Dodworth Road AQMA in proximity to the Application Site.

The 2023 ASR confirmed that has been a general decline in concentrations of NO_2 in recent years and there have been no exceedances of the air quality objectives in both the M1 and A628 AQMAs adjacent to the Application Site. Indeed, BMBC is stated to be exploring the revocation of the M1 Motorway AQMA.

4.2. APPLICATION SITE & SURROUNDING AREA

The Application Site is located adjacent to the south of the A628 Dodworth Road and within 100 m of the M1 motorway and Dodworth Roundabout. There are existing residential properties adjacent to the north, east, and west of the Application Site boundary, with agricultural fields delimiting the southern boundary. The nearest proposed residential properties within the Proposed Development will be approximately 70 m to the south of A628 Dodworth Road and approximately 100 m to the west of the M1 on-slip at Junction 37.

Given the relatively suburban-rural nature of the surrounding area, the predominant source of ambient air pollution at and near to the Application Site will be vehicle emissions on the local road network, predominantly from the A628 and the M1.

4.3. LOCAL AIR QUALITY MONITORING: NITROGEN DIOXIDE (NO_2)

BMBC undertakes automatic and passive air quality monitoring within the district, focused on monitoring roadside NO_2 concentrations. The most recent annual mean NO_2 concentration results published by BMBC in the 2023 ASR, for monitoring locations within 500 m of the Application Site, are presented in Table 4.1. In addition, data recorded at automatic monitoring sites for years 2023 and 2024 are available from the 'Air Quality in England' website[10], which are also reported in the table.

[10] Air Quality in England; website accessed 14 January 2025 https://www.airqualityengland.co.uk/

Table 4.1 Annual mean NO_2 monitoring data (2018 – 2022) published by BMBC 2023 ASR

Site ID	Location (Type)*	Distance to Site	Annual Mean NO_2 (µg/m^3)						
			2018	2019	2020	2021	2022	2023	2024
DT22+	315 Dodworth Road, Pogmoor (Kerbside)	15 m	**44.2**	**48.1**	32.6	34.6	35.8	-	-
DT21+	305 Dodworth Road (Roadside)	115 m	**45.8**	**46.2**	29.5	31.8	32.8	-	-
DT66^	272 Dodworth Road, J37, Outbound (Roadside)	120 m	-	-	-	-	29.1	-	-
DT23^	329 Dodworth Road (Roadside)	125 m	**43.4**	**47.0**	28.9	31.5	31.6	-	-
DT19+	Post Office, Crown Hill Road (Passive; Roadside)	270 m	25.7	27.2	18.1	19.1	19.5	-	-
DT20+	Dodworth Road, Outbound - LC54 (Roadside)	350 m	37.0	39.6	29.3	31.0	29.7	-	-
BAR11+	A628 Roadside 2 (Automatic Monitor; Roadside)	440 m	-	-	-	24	19	16	17**
Annual Mean Objective (µg/m^3)			**40**						

Notes:
* Monitoring at these sites is undertaken using passive diffusion tube sampling unless stated.
+ Monitoring site is within the A628 Dodworth Road AQMA.
^ Monitoring sites is within the M1 Motorway AQMA.
** Provisional data
- Data not available / yet to be published

The monitoring sites presented in Table 4.1 represent locations at or near to sensitive exposure within the A628 Dodworth Road AQMA and M1 Motorway AQMA. It is evident that roadside and kerbside annual mean NO_2 concentrations have remained below the objective over the latest three years of published data (2020-2022). Notwithstanding the relative anomalous results for 2020 and 2021, which were influenced by the national travel restrictions imposed during the Covid-19 pandemic, there has been an overall downward trend in NO_2 concentrations over the period reviewed.

The above monitoring sites are located at roadside to Dodworth Road (i.e. within 5 m of the kerb). These locations will experience relatively elevated levels of pollutant concentrations compared to the nearest proposed properties at the Application Site, which will be approximately 70 m from the kerb. Therefore, it is reasonable to assume that levels of NO_2 at and near to the Application Site will be lower than those reported in Table 4.1.

Local Air Quality Monitoring: Particulate Matter (PM_{10} and $PM_{2.5}$)

BMBC report PM_{10} concentrations at one automatic site located at roadside to the A635 Kendray, which is located approximately 3.8 km to the east-southeast of the Application Site. Over the period 2018 to 2024, including data published by Air Quality in England[10] for 2023 and 2024, the reported annual mean concentrations have remained well below the national objective. The provisional annual mean concentration for 2024 is reported as 17 µg/m^3, which is well below the 40 µg/m^3 objective.

Levels of $PM_{2.5}$ have only been monitored since 2023 at two automatic monitoring sites within Barnsley, namely 'A635 Kendray' (roadside) and 'Barnsley Gawber' (background). The annual mean concentration in 2023 and 2024 at Barnsley Gawber was reported by Air Quality in England[10] to be 7 µg/m^3, which is well below the current standard (20 µg/m^3) and also below the 2040 target (10 µg/m^3). Levels at A635 Kendray have only been monitored since August 2024, with the provisional annual

mean concentration reported to be 10 µg/m^3 based on only 40% data capture. This is still well below the current standard and although it is equal to the 2040 target, it is below the 2028 interim target (12 µg/m^3).

Given that the nearest proposed residential properties included in the Proposed Development will be approximately 70 m from the A628 Dodworth Road, the background levels recorded at Barnsley Gawber are more representative of conditions at the Application Site relative to roadside levels recorded at A635 Kendray.

Defra Background Pollutant Maps

The Defra mapped background NO_2, PM_{10}, and $PM_{2.5}$ pollutant concentrations corresponding to the 1 km x 1 km grid squares covering the Application Site and surrounding area were obtained for 2025 (current year) and 2026 (potential Proposed Development opening year). These are presented in Table 4.2.

Background annual mean concentrations for each pollutant are well below the respective objectives and targets at and near to the Application Site.

Table 4.2 Defra mapped background NO_2, PM_{10}, and $PM_{2.5}$ concentrations for 2025 (current year) and 2026 (Proposed Development opening year)

OS Grid Square (m)	Annual Mean NO_2 (µg/m^3)		Annual Mean PM_{10} (µg/m^3)		Annual Mean $PM_{2.5}$ (µg/m^3)	
	2025	2026	2025	2026	2025	2026
432500, 410500	10.1	9.6	13.3	13.2	6.4	6.4
Objective (2040 Target)	**40**		**40**		**20 (10)**	

4.4. SUMMARY

The Application Site is situated near the A628 Dodworth Road and close to the M1 motorway, surrounded by residential properties to the north, east, and west, while agricultural fields border the south. Proposed residential properties will be approximately 70 meters south of Dodworth Road and 100 meters west of the M1 on-slip at Junction 37. Given the suburban-rural character of the area, vehicle emissions from the A628 and M1 are the primary source of ambient air pollution.

Local air quality monitoring by BMBC focuses on NO_2 concentrations, with recent data indicating that annual mean NO_2 levels have remained below the national objective. Representative monitoring for PM_{10} and $PM_{2.5}$ concentrations also indicates that current levels are well below the respective objectives. Background pollutant levels from Defra mapped data for 2025 and 2026 suggest that NO_2, PM_{10}, and $PM_{2.5}$ concentrations will remain well below relevant objectives and targets.

Therefore, air quality at the Application Site and particularly at the proposed property locations is expected to be good.

5. IMPACT ASSESSMENT

5.1. CONSTRUCTION PHASE

Construction activities that have the potential to generate and/or re-suspend dust and PM_{10} include:

- Site clearance and preparation;
- Preparation of temporary access/egress to the Proposed Development;
- Earthworks;
- Materials handling, storage and stockpiling;
- Movement of construction traffic within the Proposed Development;
- Exhaust emissions from site plant;
- Construction of buildings and areas of hardstanding; and
- Site landscaping works.

The main potential air quality impacts that may arise from the aforementioned activities are:

- Dust deposition, resulting in the soiling of surfaces;
- Dust plumes, affecting visibility and amenity;
- Elevated ambient PM_{10}, $PM_{2.5}$, and NO_2 concentrations due to fugitive dust releases and exhaust emissions from NRMM and other vehicles accessing the site.

Fugitive dust and particulate emissions during the construction phase are likely to occur during the 'working week' and be temporary in duration. However, for some potential release sources in the absence of dust control mitigation measures (e.g. exposed material stockpiles), dust generation has the potential to occur over longer periods.

Assessment of Potential Dust Emission Magnitude

The IAQM assessment methodology[6] has been used to determine the potential dust emission magnitude from demolition, earthworks, construction, and trackout activities associated with the Proposed Development. The findings of the assessment are presented below and further details of the methodology adopted is provided in **Appendix A**.

Demolition

The Application Site currently includes one large residential property, four small outbuildings, and associated gardens and driveway, which will be removed as part of the Proposed Development. Given the scale and nature of the buildings to be removed, the total volume of buildings to be removed will be below 12,000 m^3 and will be predominantly below 6 m in height above ground level. Therefore, the potential dust emission magnitude is classified as **small** for demolition activities.

Earthworks

The total area of the Application Site is approximately 12,500 m^2, below the guidance threshold of 18,000 m^2. Furthermore, given the scale and nature of the Application Site, there will likely be fewer than five heavy earth moving vehicles active at any one time and any soil/material bunds are likely to be below 3 m in height. Therefore, the potential dust emission magnitude is classified as **small** for earthworks activities.

Construction

Whilst the total volume of buildings to be constructed on the Proposed Development will be below 12,000 m^3, there will be the potential for dusty materials (e.g. concrete) to be used throughout construction. Therefore, the potential dust emission magnitude is conservatively classified as **medium**.

Trackout

Information on the number of HDVs associated with the construction phase is not available and therefore professional judgement has been used. Given the scale and nature of the Proposed Development, there will be less than 20 HDV outward movements in any one day on average throughout construction. Furthermore, given the current existence of a hardstanding access road within the Application Site, construction vehicles will only use paved roads within the site, resulting in a low potential for dust release. Therefore, the potential dust emission magnitude is classified as **small** for trackout activities.

A summary of the potential dust emission magnitude determined for each construction activity is presented in Table 5.1.

Table 5.1 Potential dust emission magnitude for each construction activity

Activity	Dust Emission Magnitude
Demolition	Small
Earthworks	Small
Construction	Medium
Trackout	Small

Sensitivity of the Study Area

The study area is defined by a series buffer zones set to distances of 20 m, 50 m, 100 m, and 250 m from the Application Site boundary. These bands are used to identify relevant sensitive receptors and/or land uses that may be impacted by dust and particulate emissions.

There are seven (7no.) highly sensitive human-health receptors within 20 m of the Application Site boundary, comprising residential properties adjacent to Dodworth Road to the north and/or Hunter's Avenue to the east. A further six (6no.) residential properties are within 50 m, and less than 30no. properties within 100 m and 250 m, respectively. The trackout route for construction vehicles will utilise the A628 Dodworth Road. Based on a 250 m trackout distance from the site entrance, approximately

15no. residential properties would be within 20 m of the route, with fewer than 10no. further properties within 50 m.

With a prevailing southwest to west wind, the potential for dust deposition and soiling is greatest on receptors to the east-northeast of the Application Site and trackout route (i.e. properties adjacent to Dodworth Road and Hunter's Avenue). However, during calm wind conditions, dust deposition can occur in the areas immediately surrounding the Application Site.

Background PM_{10} concentrations at the Application Site and surrounding area, as reported in **Section 4.3**, are demonstrably well below the annual mean objective. Therefore, whilst the properties within 50 m are potentially sensitive to dust soiling impacts, it is highly unlikely that the relevant health-based objectives will be either approached or exceeded as a result of construction activities associated with the Proposed Development.

The sensitivity of the study area to changes in dust and particulates has been assessed for each of the construction activities, with reference to the IAQM guidance (**Appendix A**). The results are presented in Table 5.2.

Table 5.2 Sensitivity of the study area to dust and PM_{10} emissions from construction

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

Risk of Impacts

The predicted dust emission magnitude has been combined with the defined sensitivity of the area to determine the risk of impacts during the construction phase, prior to mitigation, as per the risk matrices outlined in **Appendix A**. A summary of the risk of dust impacts for the Proposed Development construction phase is provided in Table 5.3.

Table 5.3 Summary of dust risks associated with Proposed Development construction

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

Overall, with no mitigation applies, there is a **low risk of dust soiling and human health impacts** relating to all activities except construction, where there is a **medium risk of dust soiling**. This risk rating has been used to determine the level of mitigation required to ensure there are no significant residual air quality effects (see **Section 6**).

Construction Vehicles and NRMM

The greatest impact on air quality due to emissions from vehicles and plant associated with the construction phase will be in the areas immediately adjacent to the site access. Construction traffic will access the site from the A628 Dodworth Road adjacent to the northern boundary, with sensitive residential receptors located adjacent to the access.

Given the review of existing air quality at and near to the Application Site (see **Section 4**), combined with the anticipated construction traffic volumes (<20 HDV movements per day on average) and the short-term duration and intermittent nature of construction works, emissions from construction vehicles are not expected to materially impact local air quality.

Therefore, based on the available information and professional judgement, the local air quality impact associated with emissions from construction vehicles and plant is expected to be **negligible**, corresponding to **no significant effect**.

5.2. OPERATION PHASE

Vehicle Emissions Generated by Proposed Development

This qualitative assessment evaluates the likely number of vehicle movements generated by the Proposed Development within the context of the IAQM[7] and BMBC[5] guidance criteria (see **Section 3.6**), existing flows on the adjacent A628 Dodworth Road, and the nature of surrounding land uses (i.e. sensitive receptors).

Based on Department for Transport (DfT) road traffic flow data[11] for the A628 (Site number: 57089) adjacent to the Application Site, the estimated annual average daily flow in 2023 was 28,479 movements. The Proposed Development, comprising of five (5no.) residential units and 10no. car park spaces, is likely to generate well below 100 vehicle movements per day on average.

Therefore, the Proposed Development is predicted to yield an increase in vehicle flows that is well below the IAQM criterion for LDVs (change of less than 100 AADT), which will represent a negligible change on the local road network within the context of existing flows on the A628 Dodworth Road.

Whilst there are sensitive residential receptors located adjacent to A628 Dodworth Road, this level of traffic change will not have a material impact on local air quality, particularly in the context of existing flows.

Based on the above review of vehicle movements, the Proposed Development will **have no significant effect** on local air quality.

Suitability of Application Site for Proposed Land Use: Exposure Assessment

Background air pollutant levels at the Application Site, as reported in Table 4.2, are expected to be well below the respective annual mean objectives, with both hourly NO_2 and daily PM_{10} mean objectives not at risk of exceedance.

The layout of the Proposed Development (**Figure 2**) is such that the minimum separation distance from the A628 Dodworth Road to the nearest proposed residential property will be approximately 70 m, which falls well outside the 20 m exposure criterion stipulated by the BMBC guidance[5]. Roadside and urban background NO_2 monitoring adjacent to the A628 has confirmed that annual mean levels have remained below the air quality objective in recent years (see **Section 4.3**). Furthermore, representative urban background PM_{10} and $PM_{2.5}$ monitoring has indicated that levels at the Application Site are likely to be well within current standards and below future $PM_{2.5}$ target concentrations. Given the separation distance, it is reasonable to assume that pollutant concentrations at the proposed future properties will be even lower than those monitored.

For assurance, the results of the *Defra NO_2 Fall Off with Distance* calculation for the nearest proposed residential property to the A628 Dodworth Road are presented in Table 5.4. The calculation relied upon

[11] Department for Transport Road traffic statistics: Website accessed 13 January 2025 via https://roadtraffic.dft.gov.uk/manualcountpoints/57089

BMBC monitored data at diffusion tube site DT22, located approximately 15 m from the Application Site boundary. To provide a conservative assessment, the calculation was undertaken using the 2019 annual mean concentration, when the monitored value was above the air quality objective (see Table 4.1).

Table 5.4: Predicted annual mean NO_2 concentrations at the nearest proposed residential property within the Application Site to A628 Dodworth Road based on Defra's *NO_2 Fall Off with Distance Calculator*

BMBC Monitoring Site	Year	Distance (m)		Annual Mean NO_2 Concentration (µg/m^3)		
		Monitoring Site to kerb	Proposed Development to kerb*	Background	Monitoring Site	Predicted at Development*
315 Dodworth Road (DT22)	2019	2.5	70	16.7	48.1	24.8
Annual Mean Objective (µg/m^3)				**40**		
* Distance from A628 kerb to nearest proposed residential property within Application Site is 70 m, but calculator only considers distances up to 50 m. As a worst case approach, 50 m was used in the calculation.						

The results of the calculation, inclusive of the conservative assumptions applied, indicate that current and future levels of annual mean NO_2 within the Application Site will be well below the respective air quality objective.

Overall, based on the review of local air quality at and surrounding the Application Site, in addition to the outcomes of the NO_2 fall off with distance calculation, the **Application Site is suitable for the proposed residential land use**.

6. MITIGATION

6.1. CONSTRUCTION PHASE

Based on the construction phase air quality assessment results, there is a *low risk* of dust soiling and human health impacts occurring at identified sensitive receptors in relation to demolition, earthworks, and trackout activities. There is, however, a *medium risk* of dust soiling impacts on sensitive receptors adjacent to the Application Site in relation to construction activities.

Appropriate mitigation is required to further prevent or minimise the release of dust entering the atmosphere and/or being deposited on nearby receptors. Particular attention should be paid to operations that unavoidably take place adjacent to the Application Site boundary.

With reference to the BMBC air quality planning guidance[5], it is anticipated that a Construction Management Plan (CMP) will be secured by a planning condition. With respect to air quality, the CMP will be used to address how the risk of impacts from dust, NRMM emissions, and any other emissions to air will be mitigated and managed.

The following recommended mitigation measures are typical for a development of this nature and are consistent with IAQM guidance[6] and the level of risk identified by the assessment. These measures should be included within the CMP for the Proposed Development.

Communications:

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

Site Management and Maintenance:

- Carry out regular site inspections to monitor compliance with the DMP, increasing the frequency when activities with a high potential to produce dust are being carried out and during prolonged dry or windy conditions.
- Record all complaints/incidents, identify cause(s), take appropriate measures to reduce emissions in a timely manner, and record the measures taken.
- Plan site layout so that machinery and dust-generating activities are located away from receptors, as far as is possible.
- Avoiding site runoff of water or mud.
- Erect solid screens or barriers around dusty activities or the site boundary that are at least as high as any stockpiles on site.
- Provision of an adequate water supply on the site for effective dust/particulate matter suppression, particularly during prolonged dry and windy conditions.

- Using enclosed chutes, conveyors and covered skips, as applicable.
- Minimise drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment and use fine water sprays on such equipment wherever appropriate.

Operating Vehicles / NRMM:

- Ensure all vehicles switch off engines when stationary (no idling vehicles).
- Use electricity or battery powered equipment in preference to diesel or petrol powered generators, where practicable.

Demolition

- Ensure effective water suppression is used during demolition operations. Handheld sprays are more effective than hoses attached to equipment as the water can be directed to where it is needed.
- Bag and remove any biological debris or damp down such material before demolition.

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.

Trackout

- If applicable, use water-assisted dust sweeper(s) on the access and local roads, to remove, as necessary, any material tracked out of the site.
- Ensure vehicles entering and leaving site are covered to prevent escape of materials during transport, where needed.

Appropriate provision of the above mitigation measures will ensure that the residual effect of construction activities on local air quality will be **negligible** and correspond to **no significant effect**.

6.2. OPERATION PHASE

The air quality impact assessment has demonstrated that the Proposed Development will have no significant effect on local air quality, with the Application Site being assessed as suitable for the proposed residential land uses. As such, no specific air quality mitigation measures are required.

However, with reference to the BMBC planning guidance[5] and relevant national Building Regulations, each new residential property within the Proposed Development will benefit from an electric vehicle charging point. This will encourage the uptake of zero emission vehicles, thereby promoting the reduction of petrol/diesel vehicles and associated emissions to air.

The effect of the Proposed Development on local air quality is expected to be **not significant**.

7. CONCLUSIONS

This report presents the outcomes of an air quality impact assessment for the proposed residential development on land at 264 Dodworth Road, Barnsley. The assessment has considered potential local air quality impacts associated with both the construction and operation phases of the Proposed Development.

The Application Site is situated within a suburban-rural area. However, it is located in proximity to both the A628 and M1 AQMAs. Whilst the Proposed Development will introduce new sensitive receptors, the minimum separation distance between the nearest proposed residential property and both the A628 and M1 is 70 m. A review of local air quality at and near to the Application Site demonstrated that monitored levels of key air pollutants associated with traffic emissions have been below the respective air quality objectives for NO_2, PM_{10}, and $PM_{2.5}$ in recent years.

A qualitative assessment of the potential impacts on local air quality from construction phase activities was completed with reference to the IAQM methodology[6]. This identified that there is a *medium risk* of dust soiling impacts associated with construction activities and a *low risk* of impact to human health and dust soiling associated with all other related activities (demolition, earthworks, trackout). Through good site practice and the implementation of appropriate mitigation measures via a CMP, the impacts of construction phase activities on local air quality will be **negligible**, corresponding to **no significant effect**.

In terms of the operation phase, the Proposed Development will generate a negligible amount of traffic on the local road network, which will have no material impact on local air quality within the context of existing flows on the A828 Dodworth Road. As such, the Proposed Development will have **no significant effect on local air quality**.

In addition, based on existing local air quality at and surrounding the Application Site, the separation distance from the proposed new properties to the adjacent A628, and the outcomes of the NO_2 fall off with distance calculation, the **Application Site is suitable for the proposed residential land use**.

Whilst no mitigation measures specific to the operational Proposed Development are required, it will align with BMBC guidance[5] and national Building Regulations by allocating an electric vehicle charging point to each new property. This will encourage the uptake of zero emission vehicles.

This report has demonstrated that, with the implementation of appropriate mitigation for the construction phase, the Proposed Development will comply with relevant national and local air quality policy, with no constraints identified with respect to progressing the Proposed Development.

APPENDIX A CONSTRUCTION PHASE ASSESSMENT

This appendix provides a detailed overview of the assessment approaches adopted to defining the potential risk of impacts from dust/PM_{10} emissions associated with the construction phase of the Proposed Development.

STEP 1 – SCREENING THE NEED FOR A DETAILED ASSESSMENT

An assessment will normally be required where there are:

- 'Human receptors' within 250 m of the site boundary; or within 50 m of the route(s) used by construction vehicles on the public highway, up to 250 m from the site entrance(s); and/or
- 'Ecological receptors' within 50 m of the site boundary; or within 50 m of the route(s) used by construction vehicles on the public highway, up to 250 m from the site entrance(s).

Where the need for a more detailed assessment is screened out, it can be concluded that the level of risk is "negligible".

STEP 2A – DEFINE THE POTENTIAL DUST EMISSION MAGNITUDE

The following are examples of how the potential dust emission magnitude for different activities can be defined (note that not all the criteria need to be met for an activity). Other criteria may be used if justified in the assessment.

Dust Emission Magnitude	Activity	Criteria
Large	Demolition	> 75,000 m^3 building demolished, dusty material (e.g. concrete), on-site crushing/screening, demolition >12m above ground level
	Earthworks	> 110,000 m^2 site area, dusty soil type (e.g. clay) > 10 earth moving vehicles active simultaneously > 6 m high bunds formed
	Construction	> 75,000 m^3 building volume, on site concrete batching, sandblasting
	Trackout	> 50 HDVs out / day, dusty surface material (e.g. clay), > 100 m unpaved roads
Medium	Demolition	12,000 - 75,000 m^3 building demolished, dusty material (e.g. concrete); demolition activities 6-20 m above ground level
	Earthworks	18,000 - 110,000 m^2 site area, moderately dusty soil (e.g. silt), 5-10 earth moving vehicles active simultaneously, 3m – 6m high bunds

Dust Emission Magnitude	Activity	Criteria
	Construction	12,000 – 75,000 m^3 building volume, dusty material e.g. concrete, on site concrete batching
	Trackout	20 - 50 HDVs out / day, moderately dusty surface material (e.g. clay), 50 -100 m unpaved roads
Small	Demolition	< 12,000 m^3 building demolished, low dust potential material (e.g. metal cladding), demolition <6 m above ground level, work during wetter months
	Earthworks	< 18,000 m^2 site area, soil with large grain size (e.g. sand), < 5 earth moving vehicles active simultaneously, <3 m high bunds
	Construction	< 12,000 m^3, low dust potential material (e.g. metal cladding or timber)
	Trackout	< 20 HDVs out / day, low dust potential soil, < 50 m unpaved roads

STEP 2B – DEFINE THE SENSITIVITY OF THE AREA

The tables below present the IAQM assessment methodology to determine the sensitivity of the area to dust soiling, human health and ecological impacts respectively. The IAQM guidance provides guidance to allow the sensitivity of individual receptors to dust soiling and health effects to assist in the assessment of the overall sensitivity of the study area.

Sensitivity of the area to dust soiling impacts:

Receptor Sensitivity	Number of Receptors	Distance from the Source (m)			
		<20	<50	<100	<250
High	>100	High	High	Medium	Low
	10-100	High	Medium	Low	Low
	1-10	Medium	Low	Low	Low
Medium	>1	Medium	Low	Low	Low
Low	>1	Low	Low	Low	Low

Sensitivity of the area to human health impacts:

Receptor Sensitivity	Annual mean PM_{10} Concentration ($\mu g/m^3$)	Number of Receptors	Distance from the Source (m)			
			<20	<50	<100	<250
High	> 32	>100	High	High	High	Medium
		10-100	High	High	Medium	Low
		1-10	High	Medium	Low	Low
	28-32	>100	High	High	Medium	Low
		10-100	High	Medium	Low	Low
		1-10	High	Medium	Low	Low
	24-28	>100	High	Medium	Low	Low
		10-100	High	Medium	Low	Low
		1-10	Medium	Low	Low	Low
	< 24	>100	Medium	Low	Low	Low
		10-100	Low	Low	Low	Low
		1-10	Low	Low	Low	Low
Medium	> 32	>10	High	Medium	Low	Low
		1-10	Medium	Low	Low	Low
	28-32	>10	Medium	Low	Low	Low
		1-10	Low	Low	Low	Low
	24-28	>10	Low	Low	Low	Low
		1-10	Low	Low	Low	Low
	< 24	>10	Low	Low	Low	Low
		1-10	Low	Low	Low	Low
Low	-	≥1	Low	Low	Low	Low

Sensitivity of the area to ecological impacts:

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

STEP 2C – DEFINE THE RISK OF IMPACTS

The dust emissions magnitude determined at Step 2A should be combined with the sensitivity of the area determined at Step 2B to determine the risk of impacts without mitigation applied. For those cases where the risk category is 'negligible', no mitigation measures beyond those required by legislation will be required.

Matrices for defining risk of dust impacts:

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

Sensitivity of Area	Dust Emission Magnitude		
	Large	**Medium**	**Small**
Low	Low Risk	Low Risk	Negligible

Independent Air Quality Solutions

January 2025