Woolley Colliery, Darton

Air Quality Assessment

Gleeson Developments Ltd

6 Europa Court, Sheffield Business Park, Sheffield, S9 1XE

Prepared by:

SLR Consulting Limited

5th Floor, 35 Dale Street, Manchester, United Kingdom, M1 2HF

SLR Project No.: 402.065375.00001

Client Reference No: 030440

20 September 2024

Revision: 2.0

Revision Record

Revision	Date	Prepared By	Checked By	Authorised By
1.0	2 August 2024	OP	GB	GB
2.0	20 September 2024	OP	GB	GB

Basis of Report

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1.0 Introduction

SLR Consulting Ltd (SLR) has been commissioned by Gleeson Developments Ltd ('Gleeson') to undertake an Air Quality Assessment to accompany the planning application for c.114 residential units and associated infrastructure (the 'Proposed Development'), across two parcels of land at Woolley Colliery Road, Darton, S75 5JA (the 'Site').

The Site currently comprises partially wooded brownfield space which has historically been used as a colliery. The northern parcel of land is located at the approximate National Grid Reference (NGR): x431200, y410800, whilst the southern parcel of land is located at the approximate NGR: x431150, y410450. The surrounding area comprises:

- Woolley Colliery Road running adjacent to the eastern boundary of both parcels, beyond which is agricultural land;
- The Woolley Miners Welfare Cricket Club situated between the two parcels of land (i.e. to the south of the northern parcel and to the north of the southern parcel);
- To the immediate west of the northern parcel and immediate north of the southern parcel is partially wooded brownfield space, forming part of the historic colliery;
- The Hallam Line railway runs adjacent to the western boundary of the southern parcel;
- Existing residential dwellings to the immediate north of the northern parcel; and
- Existing residential dwellings at approximately 50m to the south-east of the southern parcel.

Primary vehicular access to both parcels will be via Woolley Colliery Road to the east.

1.1 Scope of Assessment

Consultation with the Environmental Health Officer (EHO) at Barnsley Metropolitan Borough Council (BMBC) was attempted to agree upon the extent and methodology of the air quality assessment[1]. At the time of writing, no response had been received. Nonetheless, the following scope of works has been undertaken as part of this Air Quality Assessment in line with published guidance and best practice:

- Baseline Evaluation – Assessment of existing air quality in the local area;
- Construction Phase – Identification and assessment of potential air quality impacts associated with the construction phase of the Proposed Development;
- Operational Phase – Identification and assessment of potential air quality impacts associated with the operational phase of the Proposed Development; and
- Mitigation Measures – Identification of mitigation measures, as appropriate.

As mentioned above, the Hallam Line rail line runs adjacent to the southern and eastern boundary of the Site with the Normanton and Colton Junction Line rail line located just beyond. However, these rail lines are not identified within the Department for Environment Food and Rural Affairs' (Defra) Local Air Quality Management Technical Guidance (LAQM.TG(22))[2] as requiring assessment to determine potential emission impacts from moving diesel locomotives. Furthermore, all proposed residential units are at a distance

[1] Email sent from SLR Consulting Ltd to BMBC, dated 25th July 2024.

[2] Local Air Quality Management Technical Guidance (22), Published by Defra in partnership with the Scottish Government, Welsh Assembly Government and Department of the Environment Northern Ireland. August 2022.

greater than 15m from the rail lines and, therefore, beyond the distance requiring potential assessment of stationary diesel or steam locomotives. Therefore, consideration of emissions from the rail lines has been scoped out from further assessment.

2.0 Background Context

2.1 Legislation

A dual set of regulations, applicable to National and Local Government separately are currently operable within the UK.

2.1.1 National Obligations

The Air Quality Standards Regulations 2010[3] (AQSR) transpose both the EU Ambient Air Quality Directive (2008/50/EC), and the Fourth Daughter Directive (2004/107/EC) within UK legislation, in order to align and mirror European obligations. The AQSR includes Limit Values which are legally binding ambient concentration thresholds, however, must be assessed at specific locations (micro and macroscale sampling points). Carriageways or central reservations of roads and any location where the public do not have access (e.g. industrial sites) are exempt. If the sampling point does not comply with the siting locations (Schedule 1: AQSR), then strict comparison cannot be made.

Following the UK's withdrawal from the EU, the Environment (Miscellaneous Amendments) (EU Exit) Regulations 2020[4] was introduced to mirror revisions to supporting EU legislation. The fine particulate matter ($PM_{2.5}$) Limit Value is 20µg/m^3 (to be met by 2020).

The responsibility of achieving the AQSR (and European equivalent Directives) is a national obligation for Central Government and Devolved Administrations who undertake assessments on an annual basis. Local Authorities have no responsibility to achieve the AQSR or the European equivalent Directives, unless otherwise instructed to assist Central Government under Ministerial Direction.

In response to persistent exceedances, the Government published its 2017 plan[5] for reducing roadside nitrogen dioxide (NO_2) concentrations in order to achieve compliance in the shortest time possible. This has resulted in the introduction of Clean Air Zones across England. However, BMBC were not identified as required to conduct a feasibility study to achieve compliance.

2.1.1.1 Environment Targets (Fine Particulate Matter) Regulations

The Environmental Targets (Fine Particulate Matter) (England) Regulations 2023[6] introduced an annual mean concentration target of 10µg/m^3 to be met across England by 2040. Central Government and Devolved Administrations is responsible for meeting this target, however not until 2040. Local Authorities have no responsibility to achieve this target.

2.1.2 Local Obligations

Part IV of the Environment Act 1995 (as amended) requires the Secretary of State to publish a national Air Quality Strategy (AQS) every five years and established the system of Local Air Quality Management (LAQM) for Local Authorities to regularly review and assess air quality within its area.

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

[4] The Environment (Miscellaneous Amendments) (EU Exit) Regulations 2020, Statutory Instrument No. 1313, The Stationary Office Limited.

[5] UK Plan for Tackling Roadside Nitrogen Dioxide Concentrations, 2017.

[6] The Environmental Targets (Fine Particulate Matter) (England) Regulations 2023. UK Statutory Instruments 2023 No. 96.

The Air Quality (England) Regulations 2000 (as amended) ('the Regulations') provide the statutory basis for the Air Quality Objectives Local Authorities must adhere to under LAQM in England. $PM_{2.5}$ is not currently cited within the Regulations; Local Authorities are however required to work towards reducing $PM_{2.5}$.

The Air Quality Objectives apply at locations where members of the public are regularly present and might reasonably be expected to be exposed to pollutant concentrations over the relevant averaging period (relevant exposure). Table B provides an indication of those locations. Where any of the prescribed Air Quality Objectives are not likely to be achieved, the authority must designate an Air Quality Management Area (AQMA). For each AQMA, the local authority is required to prepare an Air Quality Action Plan (AQAP), which details measures the authority intends to introduce to deliver improvements in local air quality in pursuit of the objective.

The latest AQS for England was published in 2023[7]. The AQS provides the delivery framework for air quality management across England for local authorities and summarises the air quality standards and objectives operable within England for the protection of public health and the environment.

The ambient air quality standards of relevance this assessment (collectively termed Air Quality Assessment Levels (AQALs) throughout this report) are provided in Table A. These are primarily based upon the Air Quality Objectives Local Authorities are responsible for achieving – reflective of the Local Planning Authority's duties. The $PM_{2.5}$ AQSR AQAL has also been included for completeness, to provide an indicative assessment (as the sampling point may not comply with the siting locations prescribed under Schedule 1: AQSR).

Table A: Relevant Ambient AQALs

Pollutant	AQAL (µg/m^3)	Averaging Period
NO_2	40	Annual mean
	200	1-hour mean (not to be exceeded on more than 18 occasions per annum)
Particles (as PM_{10})	40	Annual mean
	50	24-hour mean (not to be exceeded on more than 35 occasions per annum)
Particles (as $PM_{2.5}$)	20	Annual mean
Table Notes: The $PM_{2.5}$ AQAL is not prescribed within the Air Quality (England) Regulations 2000 / 2002 and there is no requirement for local authorities to meet it. Exceedances are only valid at specific siting locations (Schedule 1: AQSR).		

Table B: Human Health Relevant Exposure

AQAL Averaging Period	AQALs should apply at	AQALs should not apply at
Annual Mean	Building facades of residential properties, schools, hospitals etc.	Facades of offices Hotels Gardens of residences Kerbside sites

[7] Air Quality Strategy: Framework for Local Authority Delivery, Department for Environment Food and Rural Affairs, April 2023.

AQAL Averaging Period	AQALs should apply at	AQALs should not apply at
24-hour mean	As above together with hotels and gardens of residential properties	Kerbside sites where public exposure is expected to be short term
1-hour mean	As above together with kerbside sites of regular access, car parks, bus stations etc.	Kerbside sites where public would not be expected to have regular access

2.1.3 Clean Air Strategy

The 2019 Clean Air Strategy[8] sets out the Government's proposals aimed at delivering cleaner air in England and indicates how devolved administrations intend to make emissions reductions. It sets out the comprehensive action that is required from across all parts of government and society to deliver clean air.

2.1.4 Environment Improvement Plan 2023

The 2023 Environment Improvement Plan[9] is the first revision of the UK Government's 25 Year Environment Plan (25YEP) – planned on a five-year rolling cycle. This document sets out the 5-year delivery plan to improve the natural environment. The 2023 Environment Improvement Plan builds on the 2019 Clean Air Strategy by setting environmental targets and commitments to reduce air pollution.

2.1.5 Environmental Protection Act 1990

The Environmental Protection Act 1990[10] sets out provisions for the regulation of statutory nuisances. Section 79 sets out this statutory nuisance as, 'any dust, steam, smell or other effluvia arising on industrial, trade or business premises and being prejudicial to health or a nuisance'.

Section 79 requires that, where a complaint of a statutory nuisance is made to it by a person living within its area, a Local Authority must take steps as are reasonably practicable to investigate the complaint and decide whether the odour is prejudicial to health or a nuisance. Proposed developments which result in the introduction of future sensitive receptors are however subject to the Agent of Change principle to ensure potential interactions with the existing environment and operations are assessed and mitigated to minimise restrictions being placed on existing businesses.

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

[8] The Clean Air Strategy, Defra. January 2019.

[9] Environmental Improvement Plan 2023, Defra. 2023.

[10] The Environmental Protection Act 1990. Available at http://www.legislation.gov.uk/ukpga/1990/43/contents.

2.2 Policy

2.2.1 National Policy

2.2.1.1 National Planning Policy Framework

The December 2023 update to the National Planning Policy Framework[11] (NPPF) sets out planning policy for England. The NPPF states that the planning system should contribute to and enhance the natural and local environment, by preventing new development from contributing to or being adversely affected by unacceptable concentrations of air pollution and development should, wherever possible, help to improve local environmental conditions such as air quality.

In specific relation to air quality policy, the document states:

> **Chapter 15 - Conserving and Enhancing the Natural Environment**
>
> *"Para 192: Planning policies and decisions should sustain and contribute towards compliance with relevant limit values or national objectives for pollutants, taking into account the presence of Air Quality Management Areas and Clean Air Zones, and the cumulative impacts from individual sites in local areas. Opportunities to improve air quality or mitigate impacts should be identified, such as through traffic and travel management, and green infrastructure provision and enhancement. So far as possible these opportunities should be considered at the plan-making stage, to ensure a strategic approach and limit the need for issues to be reconsidered when determining individual applications. Planning decisions should ensure that any new development in Air Quality Management Areas and Clean Air Zones is consistent with the local air quality action plan."*

The NPPF is accompanied by web based supporting Planning Practice Guidance (PPG)[12] which includes guiding principles on how planning can take account of the impacts of new development on air quality. In regard to air quality, the PPG states:

> *"The Department for Environment, Food and Rural Affairs carries out an annual national assessment of air quality using modelling and monitoring to determine compliance with relevant limit values. It is important that the potential impact of new development on air quality is taken into account where the national assessment indicates that relevant limits have been exceeded or are near the limit, or where the need for emissions reductions has been identified."*
>
> *"Whether air quality is relevant to a planning decision will depend on the proposed development and its location. Concerns could arise if the development is likely to have an adverse effect on air quality in areas where it is already known to be poor, particularly if it could affect the implementation of air quality strategies and action plans and/or breach legal obligations (including those relating to the conservation of habitats and species)."*

The PPG sets out the information that may be required within the context of a supporting air quality assessment, stating that "*Assessments need to be proportionate to the nature and scale of development proposed and the potential impacts (taking into account existing air quality conditions), and because of this are likely to be locationally specific. […] Mitigation options will need to be locationally specific, will depend on the proposed development and need to be proportionate to the likely impact*".

[11] National Planning Policy Framework, Ministry of Housing, Communities & Local Government. 2023.

[12] Planning Practice Guidance: Air Quality. Department for Levelling Up, Housing and Communities and Ministry of Housing, Communities & Local Government. November 2019.

2.2.2 Local Policy

2.2.2.1 Local Plan

The Barnsley Local Plan[13] is the currently adopted strategic planning document within BMBC and provides a framework for guiding planning decisions. The Local Plan was adopted in January 2019 and contains the following policies relating to air quality and the Proposed Development:

> ***"Policy T5: Reducing the Impact of Road Travel***
>
> *We will reduce the impact of road travel by:*
>
> *Developing and implementing robust, evidence based air quality action plans to improve air quality;*
>
> *Working with our sub regional partners, fleet and freight operators to improve the efficiency of vehicles and goods delivery, and reduce exhaust emissions; and*
>
> *Implementing measures to ensure the current road system is used efficiently."*
>
> ***"Policy AQ1: Development in Air Quality Management Areas***
>
> *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, employees, visitors and customers), taking into account any suitable and proportionate mitigation required for the development.*
>
> *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.*
>
> *Furthermore, development which impacts on areas sensitive to air pollution due to traffic emissions will be expected to demonstrate suitable and proportionate mitigation relative to the increased traffic emissions generated by the development."*

Furthermore, the Site is allocated for residential development within the Barnsley Local Plan, under policy reference HS1. Policy HS1 does not make any specific references to air quality requirements.

The above policies have been considered as part of this assessment.

2.3 Assessment Guidance

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

- BMBC: Air Quality and Emissions Good Practice Planning Guidance[14] (hereafter referred to as the 'BMBC Guidance');
- Defra: Local Air Quality Management Technical Guidance (LAQM.TG(22))[2];

[13] Barnsley Metropolitan Borough Council, Barnsley Local Plan, adopted January 2019.

[14] Barnsley Metropolitan Borough Council, Air Quality and Emissions Good Practice Planning Guidance, November 2021.

- Defra: COVID-19: Supplementary Guidance. Local Air Quality Management Reporting in 2021[15];
- Design Manual for Roads and Bridges LA 105[16];
- Environmental Policy Implementation Community (EPIC) (previously Environmental Protection UK (EPUK)) and the Institute of Air Quality Management (IAQM): Land-Use Planning and Development Control: Planning for Air Quality[17] (hereafter referred to as the 'EPIC & IAQM guidance');
- IAQM: Guidance on the Assessment Dust from Demolition and Construction[18]; and
- IAQM: Use of 2020 and 2021 Monitoring Datasets[19].

[15] Defra and the Greater London Authority, COVID-19: Supplementary Guidance. Local Air Quality Management Reporting in 2021. April 2021.

[16] DMRB, LA 105-Air Quality, Highways England, 2019.

[17] EPIC and IAQM, Land-Use Planning and Development Control: Planning for Air Quality, v1.2 2017.

[18] IAQM, Guidance on the Assessment Dust from Demolition and Construction, v2.1, August 2023.

[19] IAQM, Use of 2020 and 2021 Monitoring Datasets, v1.1, December 2023.

3.0 Assessment Methodology

3.1 Development Classification

The Proposed Development comprises c.114 dwellings and associated infrastructure. This meets the criteria for 'Medium' development, presented in Table C below and as referenced within the BMBC Guidance.

Table C: Relevant BMBC Guidance Development Classification Criteria

Land Use	Description	Criteria
Dwelling Houses (C3)	Dwellings for individuals, families or not more than six people in a single household.	>50 units

It is not considered that any of the 'additional trigger for major developments' have been met, as outlined in Table 4 of the BMBC Guidance.

As such, the Proposed Development is classified as 'medium'.

3.2 Construction Phase

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

- Demolition;
- Earthworks;
- Construction; and
- Trackout.

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

- Annoyance due to dust soiling;
- The risk of health effects due to an increase in exposure to PM_{10}; and
- Harm to ecological receptors.

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

- Human receptor is located within 250m of the Site, and/or within 50m of routes used by construction vehicles, up to 250m from the Site entrance(s); and/or
- Ecological receptor is located within 50m of the Site, and/or within 50m of routes used by construction vehicles, up to 250m from the Site entrance(s).

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

Given the short-term nature of the construction phase and the comparatively low volume of vehicle movements that will likely arise (when compared to the operational phase), it is unlikely that significant air quality effects from development related road traffic emissions during the construction phase will arise. Such potential impacts have therefore been scoped out from requiring detailed assessment based on their assumed 'insignificant' effect in reference to the EPIC & IAQM guidance.

3.3 Operational Phase

The assessment of potential air quality effects in relation to the operation of the Proposed Development has been undertaken qualitatively, in accordance with the EPIC & IAQM guidance.

The EPIC & IAQM guidance provides a series of '*indicative criteria for assessment*' where, if exceeded, requires further consideration to determine the potential effect on air quality. If the change in road traffic movements on the local road network is found not to exceed any of the relevant indicative criteria presented, then a detailed impact assessment is consequently not required. Impacts can therefore be described as having an 'insignificant' effect on local air quality.

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

- Outside of an AQMA:
  - A change of Light-Duty Vehicles (LDV - <3.5t) flows of more than 500 Annual Average Daily Traffic flows (AADT); and/or
  - A change of Heavy-Duty Vehicles (HDV - >3.5t) flows of more than 100 AADT.
- Inside of an AQMA:
  - A change of LDV flows of more than 100 AADT; and/or
  - A change of HDV flows of more than 25 AADT.

3.4 Exposure Assessment

In accordance with the BMBC Guidance and as required for all 'minor' and 'medium' developments, an 'exposure assessment' as been undertaken to determine whether future occupants of the scheme are likely to be exposed to existing levels of poor air quality.

Guidance for determining operational phase effects associated with air quality is provided by EPIC & IAQM. As per the EPIC & IAQM guidance, *"where the air quality is such that an air quality objective at the building façade is not met, the effect on residents or occupants will be judged as significant, unless provision is made to reduce their exposure by some means"*.

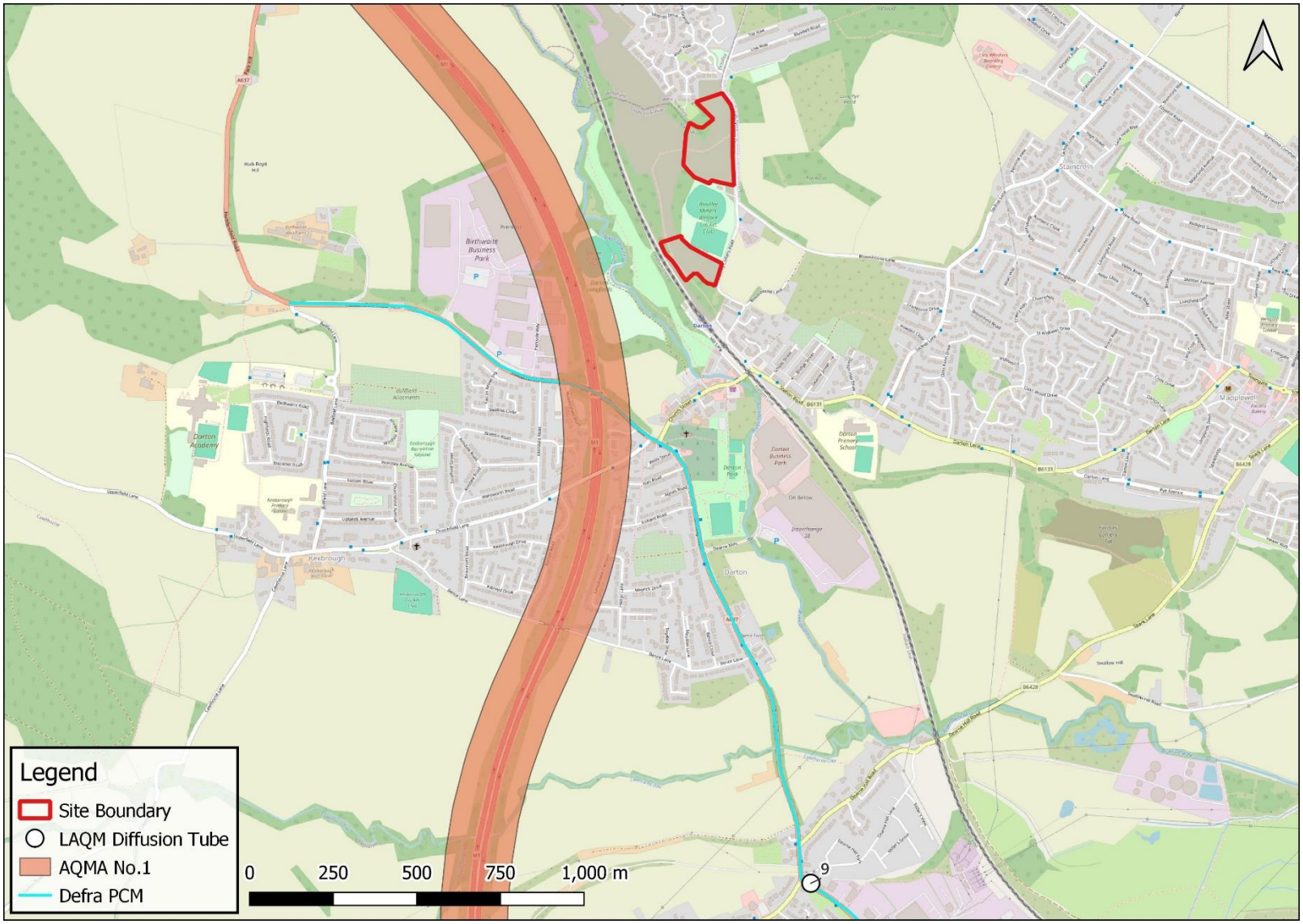


Figure 1: Site Setting & Baseline Datasets

4.0 Baseline Environment

4.1 LAQM Review and Assessment

BMBC, in fulfilment of statutory requirements, has conducted an on-going exercise to review and assess air quality within their administrative area. The latest publicly available LAQM report for BMBC at the time of writing is the 2023 Annual Status Report[20] (ASR).

BMBC currently has five declared AQMAs within their administrative area, three of which have been declared due to exceedences of the annual mean NO_2 AQAL only (i.e. AQMAs No.1, No.2A & 4), whilst AQMAs No.6 & No.7 have been declared for exceedences of both the annual mean and the 1-hour mean NO_2 AQALs. The nearest AQMA to the Site is AQMA No.1, is located approximately 190m to the west of the southern parcel of the Site boundary (see Figure 1) and approximately 210m from the nearest proposed dwelling. AQMA No.1 is described as *'an area encompassing residential properties one hundred metres either side of the central reservation of the M1 motorway in Barnsley'*. Given that the boundary of AQMA No.1 extends 100m either side of the central reservation, it is worth noting that the Site boundary is located approximately 275m from the edge of the carriageway (i.e. beyond 200m which is defined within DMRB LA 105[16] as being the distance beyond which any potential road traffic emission contributions and associated impacts on air quality are considered to be imperceptible).

Within BMBC's 2023 ASR, there is discussion around revoking the AQMA No.1:

> *"The Council is considering and collating the evidence for the revocation of AQMA 1. AQMA 1 covers parts of the M1 and extends to 100 m either side of the motorway carriageway. The case for revocation is based on monitoring data showing compliance with the Air Quality Objective for NO_2 for several years. Barnsley Council previously postponed the revocation process as a proposed "Smart Motorway" was planned for the stretch of M1 passing though the Borough; however, an announcement by the UK Government in April 2023 stated that "plans for new smart motorways will be cancelled in recognition of the current lack of public confidence felt by drivers and cost pressures" and so the Council is revisiting the case."*

Figure A.1.1 of BMBC's 2023 ASR shows the trends in annual mean NO_2 concentrations within AQMA No.1 between 2018 and 2022. It is evident that monitored concentrations within AQMA No.1 have remained below 90% of the AQAL across 2018 and 2022, with the greatest monitored annual mean NO_2 concentration of 33.4µg/m^3 being monitored in 2019 at diffusion tube 30 (located 9.8km to the south of the Site). All monitoring locations across the five years have remained 'well-below (i.e. <75% of the AQAL) the AQAL.

4.2 Review of Air Quality Monitoring

4.2.1 Automatic Air Quality Monitoring

BMBC undertook automatic monitoring at three locations within their administrative area during 2022. The nearest automatic monitor to the Site is the AQS2 monitor, located approximately 3.2km to the south-south-east. Given the separation distance between this monitor and the Site and the differences in local characteristics, comparable pollutant concentrations are not anticipated and no further consideration has been given to the BMBC automatic monitoring network within this assessment.

[20] Barnsley Metropolitan Borough Council, Air Quality Annual Status Report 2023, October 2023.

The above-mentioned automatic monitor is also affiliated with the Automatic Urban and Rural Network (AURN) and is the closest of these monitors to the Site. The AURN has been discounted from this assessment on the same basis.

4.2.2 Passive Diffusion Tube Monitoring

Passive NO_2 diffusion tube monitoring is currently undertaken by BMBC within the Site locale and wider authority area.

The details and results of the monitoring location of relevance to the Site (i.e. those within 2km) are presented in Table D and Table E, respectively, whilst also shown in Figure 1. All monitoring data presented has been ratified by BMBC.

Table D: Local NO_2 Diffusion Tube Monitoring Sites: Details

Site ID	Site Type	NGR (m)		Height (m)	Within AQMA?	Distance and Direction to Site (km)
		X	Y			
DT9	Kerbside (A)	431482	408572	2.8	No	1.8, S

Note:
(A) Kerbside site defined by LAQM.TG(22) as: "*A site sampling within one metre of the kerb of a busy road*".

Table E: Local NO_2 Diffusion Tube Monitoring Sites: Results

Site ID	2022 Data Capture %	Annual Mean NO_2 Concentration (µg/m^3)				
		2018	2019	2020 (A)	2021 (A)	2022
DT9	100	27.7	31.7	19.2	20.0	21.2

Table Notes:
(A) As per guidance published by Defra[15] and the IAQM's Position Statement[19], monitoring results obtained in 2020 and 2021 are likely to be atypical due to the impacts of the COVID-19 pandemic. The IAQM's Position Statement[19] further states "*the 2022 (or later year) monitoring data is likely to represent a post-pandemic baseline*".

As shown in Table D & Table E, there is only one monitoring location within 2km of the Site: DT9. DT9 is, however, located adjacent to the A637 which is considered to be the primary access road into the centre of Barnsley from the Site (see Table J which shows Link 11 as predicted to witness development trips of 245 LDVs as a 24-hour AADT). The 2022 annual mean NO_2 concentration at DT9 was 21.2µg/m^3, representing 53% of the AQAL (i.e. 'well-below').

Overall, there has been a downward trend in annual mean NO_2 concentrations at DT9 between 2018 and 2022. Despite this, there was an increase in annual mean NO_2 concentration in 2019 compared to 2018, which subsequently dropped again in 2020 (likely as a consequence of the COVID-19 pandemic) with concentrations gradually increasing into 2022. However, the post-pandemic annual mean NO_2 concentration (i.e. 2022) is 10.5µg/m^3 less (i.e. 26.3% of the AQAL) than pre-pandemic (i.e. 2019) concentrations.

This downward trend in monitored concentrations is highlighted within BMBC's 2023 ASR, which states:

> *"There have been inter-year fluctuations of NO_2 concentrations, but there is a general downward trend"*

The empirical relationship given in LAQM.TG(22) states that exceedences of the 1-hour mean NO_2 AQAL is unlikely to occur where annual mean concentrations are <60µg/m^3. This

indicates that an exceedence of the 1-hour mean AQAL was unlikely to have occurred at the above location in between 2018 and 2022.

4.3 Defra Mapped Background Concentrations

Defra maintains a nationwide model of existing and future background air quality concentrations at a 1km grid square resolution which is routinely used to support LAQM requirements and air quality assessments. The data sets include annual average concentration estimates for NO_2, PM_{10} and $PM_{2.5}$ using a base year of 2018 (the year in which comparisons between modelled and monitoring are made).

The Defra mapped background concentrations for the base year (2022) and the earliest anticipated opening year of the development (2029) are presented in Table F.

All of the mapped background concentrations presented are “well-below” the respective annual mean AQALs.

Table F: Defra Mapped Background Pollutant Concentrations

Grid Square (X, Y) (m)	Year	Annual Mean Concentration (µg/m^3)		
		NO_2	PM_{10}	$PM_{2.5}$
431500, 410500	2022	9.4	10.6	6.7
	2029	7.5	10.2	6.4
AQAL		***40***	***40***	***20***

4.4 Defra’s Pollutant Climate Mapping Model

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

The nearest PCM link to the Site (Census ID: 802047420 – see Figure 1) is located along the A637 Huddersfield Road, approximately 430m to the south-west of the Site. The 2022 roadside annual mean NO_2 concentration reported in relation to this PCM link is 16.9µg/m^3, and 11.5µg/m^3 in 2029 (the predicted opening year) – both ‘well-below’ the AQAL (40µg/m^3).

Concentrations reported by the PCM assume roadside locations, typically at a 4m separation distance.

5.0 Construction Phase Assessment

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

5.1 Construction Dust Assessment

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

5.1.1 Assessment Screening

There are 'human receptors' within 250m of the Site but no designated habitat sites within 50m of the Site boundary or up to 250m of the Site entrance(s) / 50m of the roads anticipated to witness construction traffic movements. Therefore, an assessment of construction dust on human receptors, only, is required.

5.1.2 Potential Dust Emissions Magnitude

5.1.2.1 Demolition

The Site currently comprises partially wooded open green space, with no buildings or structures which require demolition. As such, impacts associated with demolition have been scoped out of this assessment.

5.1.2.2 Earthworks

The total area of the northern parcel is approximately 30,000m^2, whilst the southern parcel is approximately 13,150m^2. Site earthworks are therefore required over an area between 18,000m^2 – 110,000m^2. In addition, according to Magic[21], the main surface texture class of the underlying soil is regarded to be 'loamy', which is considered to have a moderate dust generating potential.

The dust emission magnitude for earthworks is therefore considered to be 'medium'.

5.1.2.3 Construction

The proposals constitute a total of c.114 dwellings. The total building volume associated with the Proposed Development is predicted to be >12,000m^3. However, in recognition of the phased construction of residential schemes, the total building volume associated with the Proposed Development is considered likely to be <75,000m^3 at any given time. Building materials are anticipated to be as standard brick masonry.

As such, the dust emission magnitude for construction is therefore initially considered to be 'medium'.

5.1.2.4 Trackout

Construction vehicles will access the Site from Woolley Colliery Road. Given the scale and nature of works required, there are anticipated to be a maximum 20 – 50 HDV outward movements in any worst-case day. Due to the size of the Site, the unpaved road length may be 50 – 100m at any given time.

[21] https://magic.defra.gov.uk/MagicMap.aspx.

Therefore, the dust emission magnitude for earthworks is considered to be 'medium'.

5.1.2.5 Summary

A summary of the potential dust emission magnitude for each of the activities is displayed in Table G.

Table G: Potential Dust Emission Magnitude

Activity	Dust Emission Magnitude
Demolition	N/A
Earthworks	Medium
Construction	Medium
Trackout	Medium

5.1.3 Sensitivity of the Area

5.1.3.1 Dust Soiling Impacts

Overall, there are anticipated to be 1 – 10 residential properties (highly sensitive receptors) within 20m of the northern periphery of the northern parcel. However, development in this section is limited to the creation of a drainage basin, which is located approximately 40m from the nearest residential property. As such, it can be considered that there 1 – 10 residential properties within 50m of any earthworks. Overall, it is considered that there are <100 residential properties within 100m of any construction works. The Barnsley Woolley Miners Welfare Cricket Club is situated <20m from the boundary of both parcels and is considered to be a medium sensitive receptor.

There are believed to be 10 – 100 residential receptors within 20m of sections of Site accesses within 250m of the Site entrance.

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

5.1.3.2 Human Health Impacts

The maximum background PM_{10} concentration for the $1km^2$ grid square which covers the development (x431500, y410500) is estimated to be 10.6µg/m³, based upon 2022 mapped background estimates (i.e. falls into the <24µg/m^3 class).

Given the above information regarding the number and nature of surrounding receptors within specified screening distances of the Site boundary, the sensitivity of the area with respect to human health impacts in relation to earthworks, construction and trackout is considered to be 'low'.

5.1.3.3 Summary

A summary of the sensitivity of the area defined for each potential impact is displayed in Table H, whereas the spatial densities of receptors discussed in relation to the Site boundary are illustrated in Figure 2.

Table H: Sensitivity of the Area

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

5.1.4 Risk of Impacts (Unmitigated)

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

Table I: Risk of Dust Impacts (Unmitigated)

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

5.1.5 Mitigation

Following the construction dust assessment, the Site is found to be at worst 'medium risk' in relation to dust soiling effects on people and property and 'low risk' in relation to human health impacts (Table K). However, potential dust effects during the construction phase are considered to be temporary in nature and may only arise at particular times (i.e. certain activities and/or meteorological conditions).

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

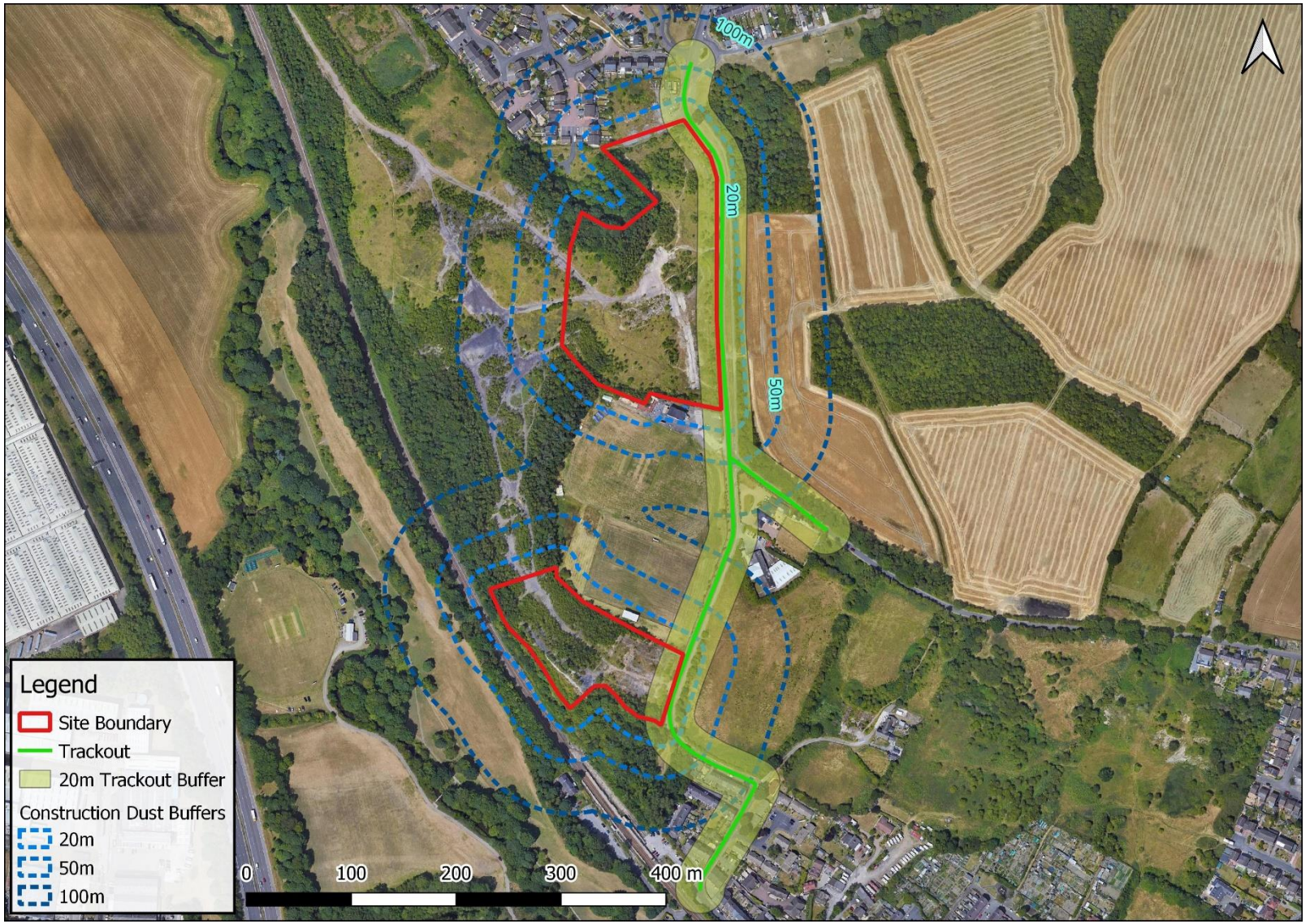


Figure 2: Construction Dust Buffers

6.0 Exposure Assessment

This section presents a review of monitoring data and the BMBC Guidance in consideration with the Proposed Development, for the purposes of identifying requirements for mitigation to be embedded into the scheme design.

6.1 BMBC Guidance – Exposure Assessment

The BMBC Guidance requires an 'exposure assessment' to determine whether future occupants of the scheme are likely to be exposure to existing levels of poor air quality. An 'exposure assessment' is required if the development meets any of the following criteria:

- The proposal is adjacent to or within an AQMA;
- The proposal is in a location 20m from roads at or above the relevant national objective highlighted on the Defra GIS modelled maps[22] and is one of the following Land Use Types;
  - C1 to C3;
  - C4 (Homes of Multiple Occupation); or
  - D1 in table1.
- And the Proposal is within the areas identified on Map 1 [of the BMBC Guidance] (this includes the area within or adjacent to an AQMA; applicable roads; and includes roads at or above the relevant national objective highlighted on the Defra GIS modelled maps.

In consideration of the above criterion:

- The Site is not located within or adjacent to an AQMA as discussed in Section 4.1;
- The Proposed Development is for C3 use-class but is not located within 20m of a road above the annual mean roadside NO_2 AQAL as presented within Section 4.4;
- The Proposal is not located within the areas identified on Map 1 of the BMBC Guidance.

Therefore, based upon the above there is no requirement to quantify air pollutant concentrations at the Site and no requirement for mitigation measure to make the scheme acceptable.

Overall, the findings of the exposure assessment show the Site is suitable for the proposed residential use, and no further assessment is required. Effects associated with the likely exposure of future occupants in relation to NO_2, PM_{10} and $PM_{2.5}$ concentrations are considered to be 'not significant' in reference to the stated EPIC & IAQM guidance and no further mitigation measures are required.

[22] http://uk-air.defra.gov.uk/data/gismapping.

7.0 Operational Phase Assessment

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

Bryan G Hall, the appointed transport consultant, has provided the Proposed Development's trip generation predicted as 24-hour AADT total and distributed trips, as presented in Table J. Based on the dataset provided by Bryan G Hall, trips comprise of LDVs, only.

Table J: Proposed Development Trip Generation

Link ID & Name		Within to an AQMA?	EPIC & IAQM Criteria (LDVs)	LDV AADT
1	Northern Site Access	N	500	384
2	Southern Site Access	N	500	224
3	Woolley Colliery Road (North of Northern Site Access)	N	500	11
4	Woolley Colliery Road (Between Northern Site Access and Bloomhouse Lane)	N	500	381
5	Bloomhouse Lane (East of Woolley Colliery Road)	N	500	81
6	Woolley Colliery Road (Between Bloomhouse Lane and Southern Site Access)	N	500	359
7	Woolley Colliery Road (South of Southern Site Access)	N	500	515
8	Station Road (West of Station Road/Church Street Junction)	N	500	515
9	Station Road (East of Station Road/Church Street Junction)	N	500	97
10	Church Street (Between Station Road/Church Street Junction and A637/Church Street/Churchfield Lane Junction)	N	500	419
11	A637 Barnsley Road (East of A637/Church Street/Churchfield Lane Junction)	N	500	242
12	Churchfield Lane (South of A637/Church Street/Churchfield Lane Junction)	N	500	17
13	A637 Huddersfield Road (West of A637/Church Street/Churchfield Lane Junction)	Y	100	159
14	M1 Northbound	Y	100	71
15	M1 Southbound	Y	100	62

In accordance with the EPIC & IAQM guidance, developments not located within or adjacent to an AQMA require consideration of potential air quality impacts where additional development trips are in excess of 500 LDV as a 24-hour AADT. For developments located within or adjacent to an AQMA, the more stringent criteria of 100 LDV as a 24-hour AADT is applicable. However, as detailed within the EPIC & IAQM guidance, the '*indicative criteria for assessment'* are precautionary and should be treated as *indicative*:

> *"The criteria provided are precautionary and should be treated as indicative. They are intended to function as a sensitive 'trigger' for initiating an assessment in cases where there is a possibility of significant effects arising on local air quality. This possibility will, self-evidently, not be realised in many cases. The criteria should not be applied rigidly; in some instances, it may be appropriate to amend them on the*

> *basis of professional judgement, bearing in mind that the objective is to identify situations where there is a possibility of a significant effect on local air quality. […]*
>
> *Where an air quality assessment is identified as being required, then this may take the form of either a Simple Assessment or a Detailed Assessment […]. In other words, exceeding a screening criterion […]* [the 'indicative criteria for assessment'] *does not automatically lead to the requirement for a Detailed Assessment. The principle underlying this guidance is that any assessment should provide enough evidence that will lead to a sound conclusion on the presence, or otherwise, of a significant effect on local air quality. A Simple Assessment will be appropriate, if it can provide this evidence. […]*
>
> *If none of the criteria are met, then there should be no requirement to carry out an air quality assessment for the impact of the development on the local area, and the impacts can be considered as having an insignificant effect."*

As shown in Table J, Links 7, 8 and 13 are marginally above the *indicative criteria for assessment*.

With regard to Links 7 & 8, the limited extent of road which is predicted to witness development trips in excess of the *criteria* (i.e. 515 LDVs) covers Woolley Colliery Road south of the southern parcel access and onto Station Road, before dropping below the criteria at the Station Road / Church Street junction: the length of this section of road is approximately 375m. Beyond Station Road, the predicted development trips fall to 97 LDVs (Link 9) and 419 LDVs (Link 10).

As discussed in Section 4.2.2, the nearest BMBC air quality monitoring location to the Site is DT9, located approximately 1.8km to the south. The absence of further monitoring locations within the Site locale indicates that BMBC do not consider this area to be at risk of breaching the respective AQALs, in respect to its LAQM commitments. Nonetheless, DT9 monitored a 2022 annual mean NO_2 concentration of 21.2µg/m^3 (representing 53% of the AQAL). DT9 is located adjacent to the A637, which is considered highly likely to have a much greater baseline traffic flow and associated road traffic emission contributions than on Links 7 & 8[23]. It is, therefore, considered reasonable to assume that at receptor locations adjacent to Links 7 & 8 the 2022 annual mean NO_2 concentration would be less than that monitored by DT9. With a 47% headroom between DT9's 2022 annual mean NO_2 concentration and the AQAL, it is considered that the 15 LDVs which exceed the *indicative criteria for assessment* (which if not met "*can be considered as having an insignificant effect"*) in this location would not result in any adverse impacts. In addition, it is widely accepted that pollutant concentrations are forecast to drop in future years (as demonstrated in Section 4.3 and Table F), likely resulting in an even greater headroom in 2029 (i.e. the predicted opening year of the Proposed Development).

With regard to Link 13, 159 LDVs are predicted to travel along the A637 Huddersfield Road. A section of this road constitutes a bridge which travels over the M1 motorway, and as such through the BMBC AQMA No.1 (which covers the M1 motorway, see Section 4.1), where the more stringent *indicative criteria for assessment* would apply. The AQMA No.1 has been designated due to road traffic emissions from the M1 motorway, whereas the trips in question are not located on the M1, but on the bridge which crosses it. A review of the existing receptors in this location indicates that, within the extent of the AQMA designation, the nearest receptor to the A637 is situated approximately 25m from the kerbside. With reference to Section 4.4, Defra's PCM model predicts 2022 annual mean NO_2 concentrations to be 11.5µg/m^3 at a distance of 4m from the kerb in 2029 (the predicted opening year of the Proposed Development); this leaves a 71.3% headroom between the

[23] The Department for Transport (DfT) traffic count point ID: 47420 recorded 8,565 total vehicles as a 24-hour AADT in 2022.

predicted concentration and the AQAL. In addition, and as discussed in Section 4.1, BMBC are considering revoking AQMA No. 1 due to monitored concentrations showing consistent compliance with the AQAL. As such, it is considered that the 159 LDVs travelling over the M1 motorway and through the small section of the AQMA No.1 would not result in any adverse impacts.

As presented in Table J, predicted distributed development trips on all remaining links are below the *indicative criteria for assessment*.

As such, road traffic emission impacts associated with the operation of the Proposed Development can be considered as having an ‘insignificant’ effect on human receptors at all locations based upon the extent of distributed trips, and no further assessment is considered to be required.

8.0 Mitigation Measures

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

8.1 Construction Dust

As discussed in Section 5.0, construction impacts associated to the Proposed Development would result in the generation of dust and PM_{10}.

In order to control potential impacts, Table K presents a range of mitigation measures which could be applied and align with the IAQM guidance. With the effective application of the dust mitigation measures, residual effects will be 'not significant'.

Table K: Construction Dust Mitigation Measures

Site Application	Mitigation Measures
General Dust Management	Record all dust and air quality complaints and take appropriate measures to reduce emissions
	Record any exceptional; incidents that cause dust off site.
	Undertake daily visual inspection of dust soiling and dust generation and record in site log (available for the local authority if requested)
	Ensure an adequate supply of water is available onsite for effective dust suppression
	Use enclosed chutes and conveyors and cover skips
	Minimise drop heights from conveyors, loading shovels and other material handling equipment
	Impose a site speed limit of 10mph on unpaved haul roads
	Ensure all vehicles engines are switched off when stationary
	Plan site layout so machinery is located away from receptors as far as possible
	Enclose specific operations where there is a high potential for dust production
	Avoid site runoff of water or mud
	Keep site fencing, barriers and scaffolding clean using wet methods
	Remove material that have the potential to produce dust from the site as soon as possible
Earthworks	Re-vegetate earthworks and soil stockpiles to stabilise surfaces as soon as practicable
	Cover stockpiles if not vegetated and only remove in small areas during work
	Avoid Double Handling of material
	Cease operations during high winds in the direction of sensitive receptors
Construction	Avoid scabbling (roughing of concrete surfaces) if possible
	Ensure sand and other aggregates are stored in bunded areas and are not allowed to dry out
Trackout	Use water assisted dust sweepers on the access and local roads to removed tracked out material is necessary
	Avoid dry sweeping large areas

Site Application	Mitigation Measures
	Ensure vehicles entering and leaving site are covered to prevent escape of materials during transport
	Implementation of wheel washing system with hard surfacing between facility and public road
	Access gates to be located at least 10m from receptors where possible

8.2 Operational Phase

In accordance with the EPIC & IAQM guidance, road traffic impacts associated with the operation of the Proposed Development can be considered as having an 'insignificant' effect on local air quality. Furthermore, the Proposed Development is found to be suitable for residential purposes in accordance with the Exposure Assessment undertaken in Section 6.0, with site-suitability effects concluded to be 'not significant'. As such, long-term scheme-specific mitigation measures in relation to operational effects arising from road traffic emissions are therefore not considered to be necessary.

Nonetheless, in accordance with the BMBC Guidance, all 'minor' and 'medium' proposals are expected to implement the 'Type 1' and 'Type 2' mitigation measures detailed within the guidance document, as follows:

Type 1

- 1 charging point per unit (dwelling with dedicated parking) or 1 charging point per 10 spaces (unallocated parking).

Gleeson has committed to providing each dwelling with an electric vehicle (EV) charge point commensurate with the requirements of Approved Document S: Infrastructure for Charging Electric Vehicles of the Building Regulations[24]. The specific detail for such will come forward post-planning as a building control requirement.

Type 2

- Travel Plan including agreed mechanisms for discouraging high emission vehicle use and encouraging modal shift (i.e. public transport, cycling and walking) as well as the uptake of low emission fuels and technologies;
- Improved pedestrian links to public transport stops;
- New or improved bus stop infrastructure including shelters, raised kerbing, information displays;
- Provision of subsidised or free public transport ticketing;
- Site layout designed to encourage walking;
- Cycle paths to link to local cycle network; and
- Improved convenient and segregated cycle paths to link to local cycle network.

A Travel Plan[25] has been produced by the appointed transport consultant to the Client. Within the Travel Plan there are a number of measures aimed to encourage the occupants to use more sustainable modes of transport to and from the Site. These measures would

[24] https://www.gov.uk/government/publications/infrastructure-for-charging-electric-vehicles-approved-document-s.

[25] Bryan G Hall, Proposed Residential Development, Woolley Colliery, Darton: Travel Plan, September 2024.

subsequently have a knock-on effect in terms of reducing road traffic emissions from personal car use. The measures within the Travel Plan are as follows:

- Appoint Travel Plan Coordinator;
- Site Specific Travel Guide, to include:
    - Maps showing walking routes and facilities, locations and routes to bus stops, cycle routes and other places of interest in the local areas.
    - Up to date information on electric bikes and cars, to be updated accordingly in future newsletters.
- Personalised Travel Planning;
- Periodic Travel Newsletter;
- Sustainable Travel Voucher;
- Sustainable Travel to Schools;
- Cycle User Group; and
- Measures to Encourage Car Sharing.

Furthermore, Gleeson has committed to providing Air Source Heat Pumps (ASHP) to provide hot water and space heating in all new developments, replacing the need for gas boilers and removing the associated on-site combustion emission contributions.

9.0 Conclusions

SLR Consulting Ltd has been commissioned by Gleeson Developments Ltd to undertake an Air Quality Assessment to accompany the planning application for c.114 residential units and associated infrastructure, across two parcels of land at Woolley Colliery Road, Darton, S75 5JA.

9.1 Construction Phase

A qualitative assessment of the potential dust impacts during the construction of the development has been undertaken following IAQM guidance. Following the construction dust assessment, the Site is found to be at worst 'Medium Risk' in relation to dust soiling effects on people and property, and 'Low Risk' in relation to human health impacts.

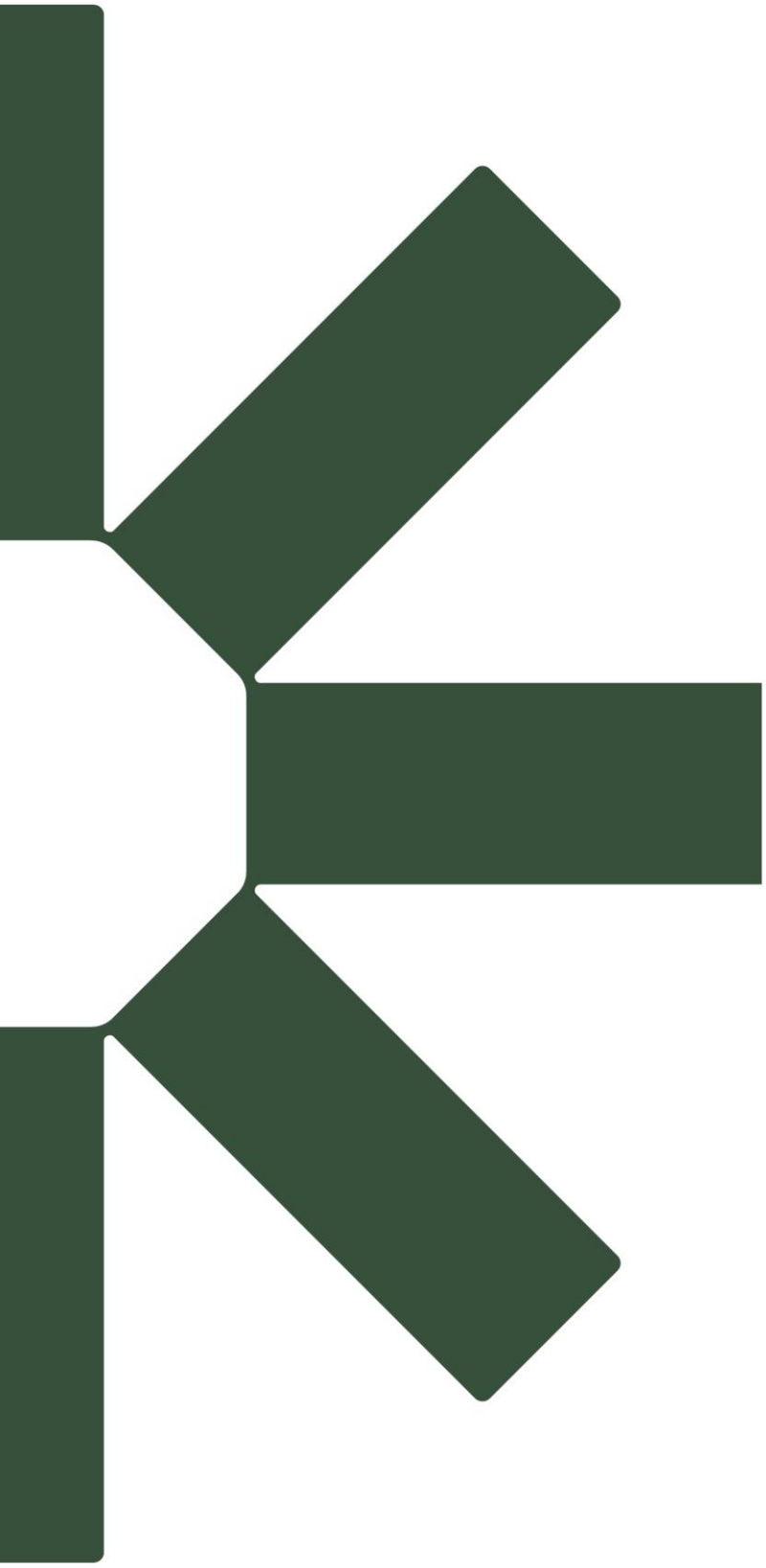
Providing effective mitigation measures are implemented, such as those outlined in Table K of this report, residual impacts from dust emissions during the construction phase are deemed to be 'not significant'.

Given the short-term nature of the construction phase and the comparatively low volume of vehicle movements that will likely arise, there is predicted to be an insignificant effect on air quality from construction-generated road traffic emissions.

9.2 Operational Phase

The Proposed Development is expected to generate road traffic volumes marginally in excess of the relevant EPIC & IAQM indicative criteria for assessment at two limited areas. However, given factors such as the limited extent of roads and the marginal volumes above the criteria, coupled with the considerable headroom between monitored concentrations and the AQAL, it is considered that road traffic impacts associated the operation of the Proposed Development will have an insignificant effect on local air quality.

An Exposure Assessment has been undertaken in accordance with the BMBC Guidance. The findings of the exposure assessment show the Site is suitable for the proposed residential use. Effects associated with the likely exposure of future occupants in relation to NO_2, PM_{10} and $PM_{2.5}$ concentrations are considered to be 'not significant' in reference to the stated EPIC & IAQM guidance and no further mitigation measures are required.



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