

LOCKWOOD ROAD, GOLDTHORPE

Proposed Residential Development

Air Quality Assessment

Prepared for: Gleeson Developments Ltd

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1.0 INTRODUCTION

SLR Consulting Ltd (SLR) has been commissioned by Gleeson Developments Ltd to undertake an air quality assessment in support of a planning application for a proposed residential development ('Proposed Development'), on land at Lockwood Road, Goldthorpe (the 'Site'). The planning application seeks approval for a residential development comprising of 137 residential units.

The Site is located within Goldthorpe, largely comprising residential and commercial land uses, at the approximate National Grid Reference (NGR): x446500, y404700. The Site is bounded by:

- the A635 Doncaster Road to the north and Phoenix Park beyond this;
- agricultural land and residential properties to the east;
- Dearne Goldthorpe Primary School and residential properties to the south; and
- Saint John and St Mary Magdalene Goldthorpe church, Lockwood Road and Sacred Heart Catholic Primary School to the west.

Vehicular access to the Site will be via East Street (to the south of the Site).

1.1 Scope of Assessment

It is understood that an air quality assessment is required to assess potential air quality effects and design constraints associated with the construction and operation of the Proposed Development.

The following scope of works, has been undertaken:

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

To ensure consistency with the Council's own work on air quality, this assessment has utilised guidance prescribed within Barnsley Metropolitan Borough Council's (BMBC's) adopted '*Air quality and emissions good practice planning guidance*¹, alongside established best practice.

At the time of writing, SLR are awaiting traffic data from the appointed transport consultant. Therefore this report is intended to provide an initial overview with regards policy, assessment guidance and approach pertinent to the assessment, whilst the outcomes are still yet to be determined/clarified – which will be provided within an updated report.

¹ Barnsley Metropolitan Borough Council, Air quality and emissions good practice planning guidance, March 2020.

2.0 RELEVANT AIR QUALITY LEGISLATION AND GUIDANCE

2.1 Legislative Context

2.1.1 Air Quality Standards

The Air Quality Standards Regulations 2010² (AQSR) transpose both the EU Ambient Air Quality Directive (2008/50/EC)³, and the Fourth Daughter Directive (2004/107/EC)⁴ within UK legislation, in order to align and bring together in one statutory instrument the Government's obligations. The AQSR includes Limit Values, Target Values, Objectives, Critical Levels and Exposure Reduction Targets for the protection of human health and the environment. Limit values are legally binding and are considered to apply everywhere with the exception of the carriageway and central reservation of roads and any location where the public do not have access (e.g. industrial sites). These locations are harmonised across all Member States. Compliance is regulated at a national level (based upon a series of zones and agglomerations).

The UK nationally has failed to meet the Limit Values, as outlined in the Ambient Air Quality Directive (2008/50/EC), for nitrogen dioxide (NO₂) by the 2010 target date. As a result, the Government has had to submit time extension applications for compliance with the EU Limit Values, which has since passed and its continued failure to achieve these limits is currently giving rise to infraction procedures being implemented. In July 2017, the Government published its plan for tackling roadside NO₂ concentrations⁵, to achieve compliance with EU Limit Values. This sets out Government policies for bringing NO₂ concentrations within statutory limits in the shortest time period possible.

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

2.1.2 Air Quality Strategy

Irrespective of the above, the UK Government and the devolved administrations are required under the Environment Act 1995 to produce a national air quality strategy to improve air quality. The latest Air Quality Strategy (AQS) for England, Scotland, Wales and Northern Ireland was published in 2007⁶. The AQS provides the over-arching strategic framework for air quality management in the UK and contains non-statutory national air quality standards and objectives established by the UK Government and Devolved Administrations for the protection of public health and the environment, taking into account epidemiological evidence and international regulations, as well as economic efficiency, practicability and technical feasibility. There is no legal requirement to meet these objectives except where they mirror an equivalent legally binding Limit Value as prescribed within EU legislation, however compliance is regulated at a local level by local planning authorities.

The AQS objectives apply at locations outside buildings or other natural or man-made structures above or below ground, where members of the public are regularly present and might reasonably be expected to be exposed to pollutant concentrations over the relevant averaging period – herein referred to as relevant exposure. Table 2-1 provides an indication of those locations.

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

² The Air Quality Standards Regulations 2010, Statutory Instrument No 1001, The Stationary Office Limited.

³ Directive 2008/50/EC of the European Parliament and of the Council of 21 May 2008 on ambient air quality and cleaner air for Europe.

⁴ Directive 2004/107/EC of the European Parliament and of the Council of 15 December 2004.

⁵ Defra, DfT (2017), UK plan for tackling roadside nitrogen dioxide concentrations.

⁶ The Air Quality Strategy for England, Scotland, Wales and Northern Ireland, Defra. July 2007.

Table 2-1
Relevant Ambient AQALs

Pollutant	Standard ($\mu\text{g}/\text{m}^3$)	Measured As	Equivalent percentile
NO ₂	40	Annual Mean	-
	200	1-hour Mean	99.79 th percentile of 1-hour means (equivalent to 18 1-hour exceedences)
Particles (PM ₁₀)	40	Annual Mean	-
	50	24-hour mean	90.41 th percentile of 24-hour means (equivalent to 35 24-hour exceedences)
Particles (PM _{2.5})	25	Annual Mean	-

Table 2-2
Human Health Relevant Exposure

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

2.1.3 Local Air Quality Management

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

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

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

2.2 Clean Air Strategy

The Clean Air Strategy (CAS)⁷, published in 2019, sets out the Government's proposals aimed at delivering cleaner air in England, and also indicates how devolved administrations intend to make emissions reductions. It sets out the comprehensive action that is required from across all parts of government and society to deliver clean air.

⁷ The Clean Air Strategy, DEFRA. January 2019.

2.3 General Nuisance Legislation

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

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

2.4 Planning Policy

2.4.1 National Policy

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

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

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

'Para 180: Planning policies and decisions should also ensure that new development is appropriate for its location taking into account the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, as well as the potential sensitivity of the site or the wider area to impacts that could arise from the development.'

Specifically, in terms of development with regards to air quality:

'Para 181: Planning policies and decisions should sustain and contribute towards compliance with relevant limit values or national objectives for pollutants, taking into account the presence of Air Quality Management Areas and Clean Air Zones, and the cumulative impacts from individual sites in local areas. Opportunities to improve air quality or mitigate impacts should be identified, such as through traffic and travel management, and green infrastructure provision and enhancement. So far as possible these opportunities should be considered at the plan-making stage, to ensure a strategic approach and limit the need for issues to be reconsidered when determining individual applications. Planning decisions should ensure that any new development in Air Quality Management Areas and Clean Air Zones is consistent with the local air quality action plan.'

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

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

"Whether or not air quality is relevant to a planning decision will depend on the proposed development and its location. Concerns could arise if the development is likely to generate air quality impact in an area where

air quality is known to be poor. They could also arise where the development is likely to adversely impact upon the implementation of air quality strategies and action plans and/or, in particular, lead to a breach of EU legislation (including that applicable to wildlife)".

The PPG sets out the information that may be required within the context of a supporting air quality assessment, stating that *"assessments should be proportional to the nature and scale of development proposed and the level of concern about air quality [...] Mitigation options where necessary, will depend on the proposed development and should be proportionate to the likely impact"*.

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

2.4.2 Local Policy

The BMBC Local Plan⁸ sets out the strategic objectives and policies for development within the borough. Within the Adopted Local Plan, the following policies relate to air quality:

"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."

These policies relating to air quality are addressed within this assessment.

2.5 Assessment Guidance

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

⁸ Barnsley metropolitan Borough Council, Local Plan, Adopted January 2019.

2.5.1 Barnsley Metropolitan Borough Council – Air Quality and Emissions Good Practice Planning Guidance

Following the adoption of the Local Plan, BMBC has produced new and updated supplementary planning documents, including the *BMBC Air Quality and Emissions Good Practice Planning Guidance* which has been adopted by BMBC for air quality assessments.

As part of the guidance, the classification of the development (minor, medium or major) is required to determine proportionate appropriate assessment and mitigation requirements.

2.5.2 Local Air Quality Management Technical Guidance (2016)

Department of Environment Food and Rural Affairs (DEFRA) Local Air Quality Management Technical Guidance (LAQM.TG(16))⁹ was published for use by local authorities in their LAQM review and assessment work. The document provides key guidance in aspects of air quality assessment, including screening, model verification, use of monitoring data, and use of background data that are applicable to all air quality assessments.

2.5.3 Environmental Protection UK and Institute of Air Quality Management Guidance

Environmental Protection UK (EPUK) and the Institute of Air Quality Management (IAQM) have together published guidance¹⁰ to help ensure that air quality is appropriately accounted for in the development control process. The guidance clarifies when an air quality assessment should be undertaken, as well as the likely proportional scope, with reference to indicative screening criteria, and provides a significance criterion for use to evaluate and describe potential developmental impacts and effects.

2.5.4 Construction and Demolition Dust Guidance

Guidance on the assessment of dust from demolition and construction has been published by the IAQM¹¹. The guidance provides a series of matrices to determine the risk magnitude of potential dust sources associated with construction activities in order to identify appropriate mitigation measures that are defined within further IAQM guidance.

⁹ Local Air Quality Management Technical Guidance 16, Published by DEFRA in partnership with the Scottish Government, Welsh Assembly Government and Department of the Environment Northern Ireland. February 2018.

¹⁰ Environmental Protection UK and Institute of Air Quality Management, Land-Use Planning and Development Control: Planning for Air Quality', v1.2 2017.

¹¹ Institute of Air Quality Management (IAQM), Guidance on the assessment dust from demolition and construction (2016).

3.0 ASSESSMENT METHODOLOGY

3.1 Development Classification

As per BMBC's air quality guidance, the air quality assessment requirements are dependent on the development's classification (minor, medium or major). This classification is initially determined based on thresholds (developed by the Department for Transport (DfT)) in determining when a Transport Assessment is required and is reflective of the proposed land use (i.e. residential, retail, office etc.). In relation to residential (C3) land uses, the threshold criteria is >50 units along with the following:

- any development generating 30 or more two-way vehicle movements in any hour;
- any development generating 100 or more two-way vehicle movements per day;
- any development proposing 100 or more parking spaces;
- any relevant development proposed in a location where local transport infrastructure is inadequate; or
- any relevant development proposed in a location adjacent to an AQMA.

Any development that is below the above criteria is classified as 'minor'; developments that meet the criteria are classified as 'medium' unless they also meet the following additional criteria, in which case they are classified as 'major':

- where the proposed development requires an Environmental Impact Assessment;
- proposals located within an AQMA;
- proposals that could increase the existing traffic flows on roads of >10,000 annual average daily traffic (AADT) by 5% or more;
- proposals that increase traffic by 5% or more on road canyons with an AADT >5,000;
- proposals that could introduce or significantly alter congestion (DfT congestion) and includes the introduction of substantial road infrastructure changes;
- proposals that reduce average speeds by more than 10kph;
- proposals that include additional heavy goods vehicle (HGV) movements by more than 10% of total trips;
or
- where significant demolition or construction works are proposed.

With reference to the criteria presented, the Proposed Development is initially believed to be 'medium', given the proposed 137 residential (C3 land use) units, and does not trigger any major criteria. As such, this assessment has been undertaken with reference to these requirements.

It is acknowledged that 'medium' developments are required to undertake a qualitative exposure assessment. However, for conservatism, dispersion modelling will be utilised for the purposes of determining the suitability of the Site for its proposed residential use. This approach is recommended to be employed for 'major' developments. The outcome of the dispersion modelling will be detailed in the updated air quality assessment upon receipt of traffic data.

3.2 Construction Phase

The assessment has been undertaken in accordance with 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
- track-out.

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

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

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

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

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

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

3.3 Operational Phase Assessment

In order to appropriately assess road traffic impacts associated with the operation of the Proposed Development as well as the suitability of the Site for residential purposes, detailed dispersion modelling will be undertaken using the Cambridge Environmental Research Consultants (CERC) ADMS-Roads v5.0 dispersion model, focusing on concentrations of NO₂, PM₁₀ and PM_{2.5} for the following scenarios:

- 2019 Base Case (2019 BC) – Without development base flows for the year (2019);
- 2022 Do Minimum (2022 DM) – Without development flows for the proposed year of opening (2022), inclusive of any relevant committed development flows; and
- 2022 Do Something (2022 DS) – 'Do Minimum' flows, plus all trips associated with the Proposed Development flows for the proposed year of opening (2022).

For the above future year scenarios (2022), concurrent emission factors and background pollutant concentrations will be used.

Details of the model inputs and results will be discussed in detail in the updated air quality assessment when traffic data has been collected and is made available for use within the dispersion modelling.

4.0 BASELINE ENVIRONMENT

4.1 Baseline Air Quality

4.1.1 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 Annual Status Report (ASR) for the Council at the time of writing is the 2020 BMBC ASR¹². This ASR has been consulted to determine existing baseline air quality conditions, relative to the preceding five years' monitoring (i.e. 2020 ASR includes monitoring data for the period 2015 - 2019), where available.

Six AQMAs have been declared within BMBC's administrative area for the exceedence of the annual mean NO₂ AQAL. The closest AQMA to the Site within BMBC's area of jurisdiction is the Barnsley AQMA No.7, located 11.4km west of the Site, and therefore has not been considered further within this assessment. However, the Site is located 1.2km north east of AQMA No.7, which is located within Hickleton, within the jurisdiction of Doncaster Council (DC).

4.1.2 Review of Air Quality Monitoring

Automatic Air Quality Monitoring

The nearest automatic monitors are located >10km from the Site and are therefore are not considered further as concentrations recorded are not expected to be representative.

Passive Diffusion Tube Monitoring

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

The details and results of the monitoring locations of relevance to the Site (i.e. within 5km of the Site) are presented in Table 4-1 and

Table 4-2, respectively, whilst their locations are illustrated in Figure 4-1. All monitoring results presented have been ratified and adjusted (where necessary) by BMBC and DC.

¹² Barnsley Metropolitan Borough Council, 2020 Annual Status Report (June 2020).

Table 4-1
Local LAQM NO₂ Passive Diffusion Tube Monitoring Sites: Details

Site ID	Site Type	NGR (m)		Height (m)	Within AQMA	Distance to Site (Km)
		X	Y			
Barnsley Metropolitan Borough Council						
DT45	Urban Background	445699	402140	3.2	N	2.5
Doncaster Council						
DT44	Kerbside	448221	405303	2.0	Y	1.5
DT45	Roadside	447966	405303	2.0	Y	1.3
DT46	Roadside	448149	405296	2.0	Y	1.5
DT47	Kerbside	448054	405319	2.0	Y	1.4
DT48	Kerbside	448218	405320	2.0	Y	1.5
DT49	Kerbside	451331	405219	2.0	N	4.6
DT58	Kerbside	451824	405228	2.0	N	5.0
DT59	Roadside	451514	405247	2.0	N	4.8

Table 4-2
Local LAQM NO₂ Passive Diffusion Tube Monitoring Sites: Results

Site ID	2019 Data Capture %	Annual Mean NO ₂ Concentration (µg/m ³)				
		2015	2016	2017	2018	2019
Barnsley Metropolitan Borough Council						
DT45	100	23.7	24.1	24.8	21.7	22.6
Doncaster Council						
DT44	100	66.0	78.0	79.0	70.0	67.0
DT45	100	18.0	23.0	25.0	25.0	22.0
DT46	100	32.0	41.0	37.0	40.0	35.0
DT47	100	87.0	106.0	100.0	91.0	76.0
DT48	100	80.0	93.0	90.0	87.0	80.0
DT49	100	34.0	44.0	46.0	43.0	37.0
DT58	100	-	-	46.0	43.0	38.0
DT59	75	-	-	22.0	23.0	20.0

As shown in

Table 4-2, the Urban Background monitoring location within BMBC has historically reported annual mean NO₂ concentrations well-below the AQAL (40µg/m³) for the period assessed with a 2019 recorded concentration of 22.6µg/m³.

Of the monitoring locations within the AQMA No.7, four of the five monitors (DT44, DT46, DT47 and DT48) have historically recorded annual mean NO₂ concentrations above or close to the AQAL (40µg/m³) for the period assessed. The maximum recorded concentration in 2019 was 80.0µg/m³ at DT48. Due to the location within a

declared AQMA, these monitoring locations are not considered representative of baseline Air Quality conditions at the Site.

The monitoring locations DT49, DT58 and DT59, are located outside of an AQMA, along the A635 Barnsley Road arterial route within Marr, Doncaster. Diffusion tube locations DT49 and DT58 monitored annual average concentrations of NO₂ between 92.5 – 95% of the AQAL in 2019. Both of these diffusion tubes are roadside monitors and therefore are not representative of relevant exposure at the facades of the nearby residential properties. Monitoring location DT59 is located 18m north from the closest kerb, and therefore demonstrates a decrease in NO₂ concentrations with distance from the A635, Barnsley Road.

The empirical relationship given in LAQM.TG(16) states that exceedences of the 1-hour mean AQAL for NO₂ is unlikely to occur where annual mean concentrations are <60µg/m³. This indicates that an exceedence of the 1-hour mean AQAL is unlikely to have occurred at any of the monitoring sites outside of the AQMA between 2015 and 2019. Within AQMA No.7, DT44, DT47 and DT48 have all recorded annual average NO₂ concentrations >60µg/m³ between 2015-2019. There is an observed decreasing trend in annual average NO₂ concentrations at all three monitoring locations between 2017-2019. These monitoring locations are classified as 'Kerbside' and therefore are not representative of locations of relevant exposure. It is unlikely that exceedences of the 1-hour mean AQAL for NO₂ will occur at locations of relevant exposure due to their distance from the roadside.

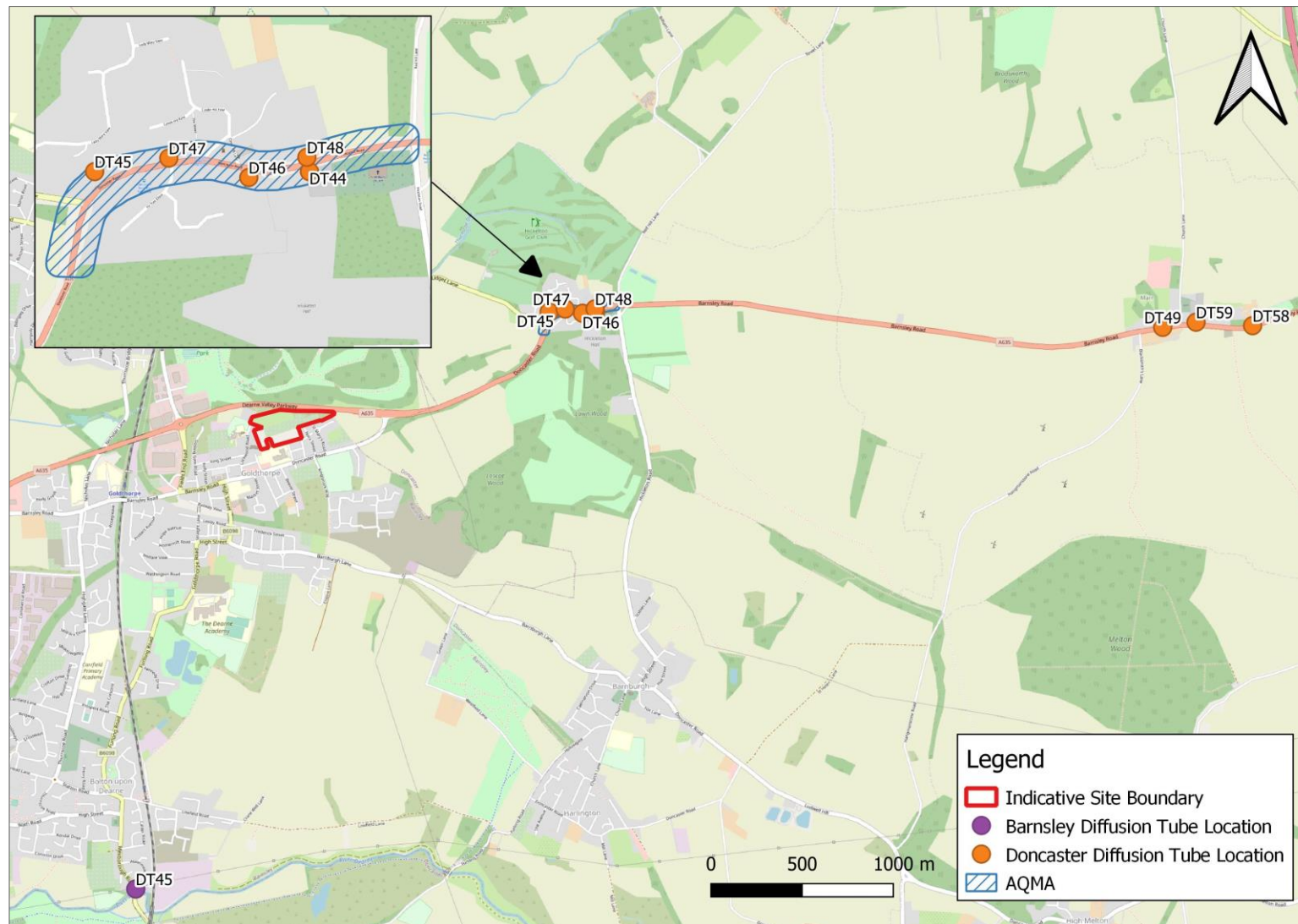


Figure 4-1
Local Monitoring Locations and AQMAs in relation to the Site

4.1.3 DEFRA Mapped Background Concentrations

DEFRA maintains a nationwide model of existing and future background air quality concentrations at a 1km grid square resolution which is routinely used to support LAQM requirements and air quality assessments. The data sets include annual average concentration estimates for NO_x, NO₂, PM₁₀ and PM_{2.5} using a base year of 2018 (the year in which comparisons between modelled and monitoring are made)¹³.

The DEFRA mapped annual mean background concentrations for base year of 2019 and the predicted opening year of the development (2022) are presented in Table 4-3.

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

Table 4-3
DEFRA Background Pollutant Concentrations

Grid Square (X, Y)	Year	Annual Mean Background Concentration (µg/m ³)			
		NO _x	NO ₂	PM ₁₀	PM _{2.5}
446500, 404500	2019	15.3	11.5	12.1	7.7
	2022	13.4	10.2	11.6	7.3
AQAL		-	40	40	25

4.2 DEFRA's Pollution Climate Mapping Model

The BMBC air quality guidance states that DEFRA's National Pollutant Climate Mapping (PCM) GIS website¹⁴ should be used to ascertain if the development is located within 20m of roads identified to be at, or above, the relevant AQAL. This can be used (among other sources) to determine whether future occupants of the scheme are likely to be exposed to existing levels of poor air quality. Whilst dispersion modelling has been undertaken for the purposes of determining the suitability of the Site for residential purposes, due consideration has been given to the Site's location, relevant to sensitive PCM road links.

The latest PCM model data, released by DEFRA in 2020, has modelled concentrations incorporating the DEFRA action plan measures for 2018 (reference year), with projected concentrations up to 2030, taking into account policy interventions as well as future vehicle mixes.

The nearest PCM link (Census ID 802077565) is the A635 Doncaster Road which is located 3.7km west of the Site (Figure 4-2). The 2019 roadside NO₂ annual mean concentration for reported in relation to this PCM link is 22.5µg/m³ – 'well below' the AQAL.

¹³ DEFRA Background Maps (2018 Reference).

¹⁴ <https://uk-air.defra.gov.uk/data/gis-mapping>.

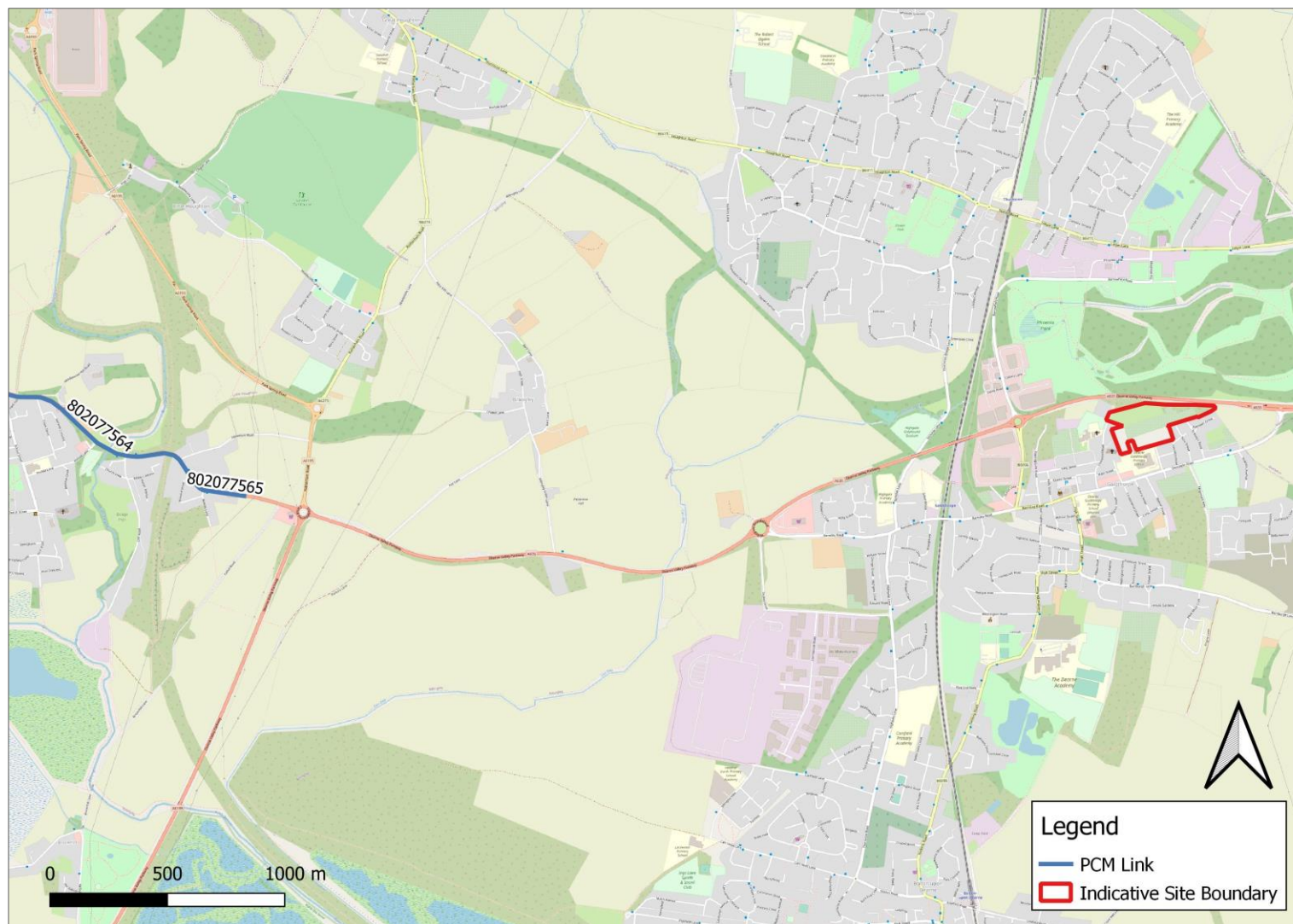


Figure 4-2
PCM Links Relative to the Site

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 of the site, volume of the site, approximate number of construction vehicles or distances to receptors are given, these relate to thresholds as defined in the IAQM guidance to guide the assessor to define the dust emissions magnitude and sensitivity of the area (as detailed in Section 3.1).

5.1.1 Assessment Screening

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

5.1.2 Potential Dust Emissions Magnitude

Demolition

The Site contains some small buildings, such as greenhouses and sheds, associated with the previous site use as allotments. These will be demolished as part of the proposed development. The total building volume for demolition is expected to be <20,000m³, and therefore the dust emission magnitude for earthworks is considered to be 'small'.

Earthworks

The proposals comprise the development of up to 137 residential dwellings, and associated infrastructure. Due to the typical phased nature of construction of residential schemes, the total Site area at any given time is not expected to be greater than 10,000m², relative to what is proposed (i.e. 137 units). The dust emission magnitude for earthworks is therefore initially considered to be medium. The dust emission magnitude for earthworks is therefore initially considered to be 'medium'.

Construction

Construction activities at the Site will include a total building volume expected to be no greater than 100,000m³, relative to what is proposed (i.e. 137 units). The dust emission magnitude for construction is therefore initially considered to be 'medium'.

Trackout

Construction vehicles will most likely access the Site via the access off East Street to the south of the Site during the construction phase. No details are available at the time of assessment on the number of additional HDV movements associated with the construction works, however, there are expected to be less than 50 outward HDV movements on a worst-case day. The dust emission magnitude for trackout is therefore initially considered to be 'medium'.

Summary

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

Table 5-1
Potential Dust Emission Magnitude

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

5.1.3 Sensitivity of the Area

Dust Soiling Impacts

The Site is immediately located adjacent to a residential locality and schools, towards the south and west, with further residential properties and open land to the east. Overall, there are an estimated 10-100 highly sensitive residential receptors within 20m of the Site. There are also between 10-100 residential properties (highly sensitivity receptors) located less than 20m from the access routes within 200m of the Site entrance (East Street) - commensurate of a medium site¹⁵. The sensitivity of the area with respect to dust soiling effects on people and property in relation to demolition, earthworks, construction and trackout activities is therefore 'high'.

Human Health Impacts

The maximum 2019 mapped background PM₁₀ concentration (2018 reference year) for the 1km² grid squares centred on the Site is estimated to be 12.1µg/m³ (i.e. falls into the <24µg/m³ class). As discussed in Section 4.1, no local background automatic monitoring exists within the development locale.

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

Summary

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

Table 5-2
Sensitivity of the Area

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

5.1.4 Risk of Impacts (Unmitigated)

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

¹⁵ As per the IAQM's 'Guidance on the Assessment of Dust from Demolition and Construction', without site-specific mitigation, trackout may occur along the public highway up to 500m from large sites, 200m from medium sites and 50m from small sites (determined by the calculated trackout dust emission magnitude), as measured from the site exit.

Table 5-3
Risk of Dust Impacts

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

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 5-3). 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'.

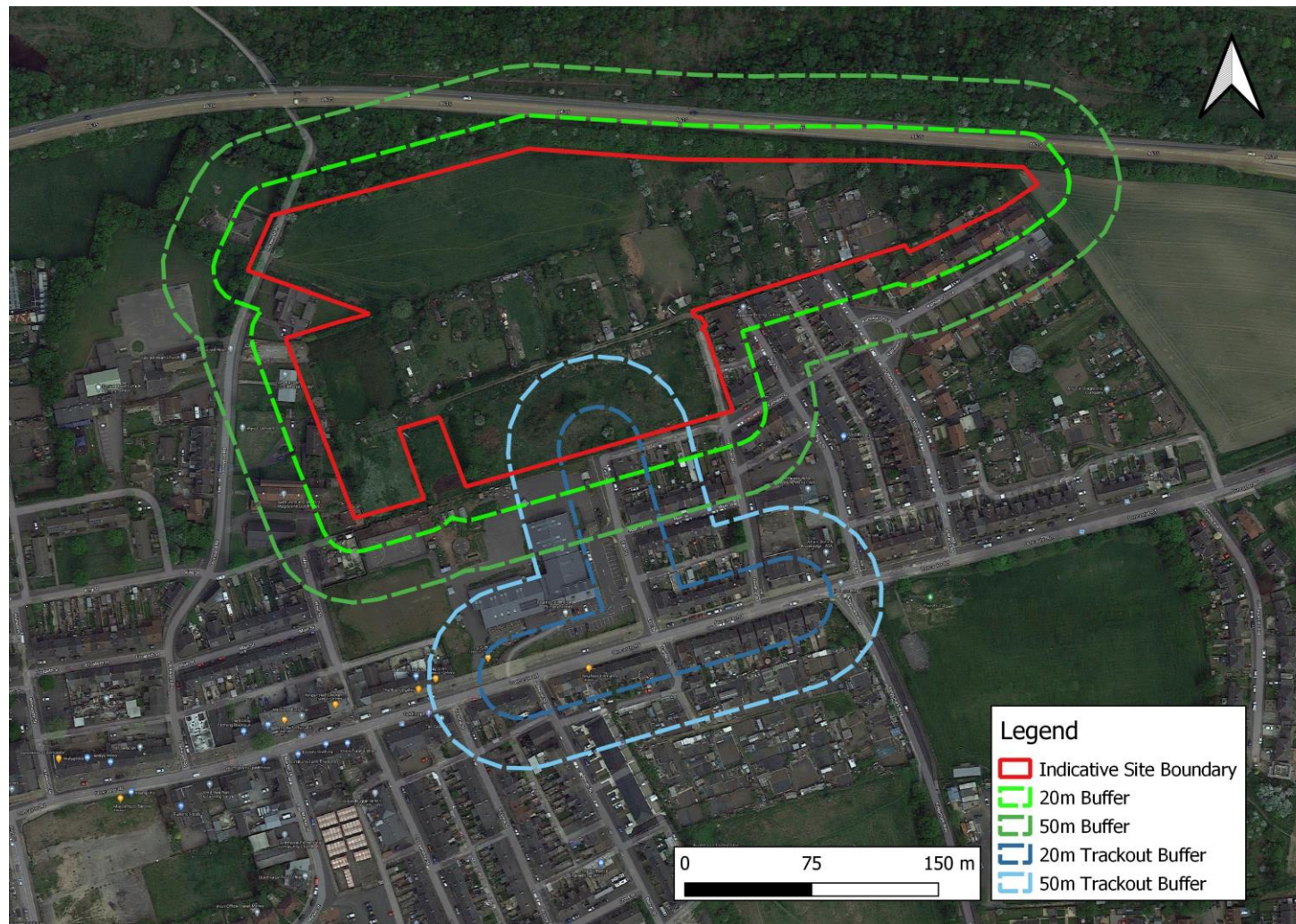


Figure 5-1
Construction Dust Assessment Buffers

6.0 OPERATIONAL PHASE ASSESSMENT

This section will present the potential air quality impacts and effects associated with the operation of the Proposed Development, upon receipt of traffic datasets.

7.0 MITIGATION MEASURES

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

7.1 Construction Dust Phase

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

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

Table 7-1
Construction Dust Mitigation Measures

Site Application	Mitigation Measures
Highly Recommended	
Communications	Develop and implement a stakeholder communications plan that includes community engagement before work commences on site.
	Display the name and contact details of person(s) accountable for air quality and dust issues on the site boundary. This may be the environment manager/engineer or the site manager.
	Display the head or regional office contact information.
	Develop and implement a Dust Management Plan (DMP), which may include measures to control other emissions, approved by the Local Authority. The level of detail will depend on the risk and should include as a minimum the highly recommended measures in this document. The desirable measures should be included as appropriate for the site.
Construction	Ensure sand and other aggregates are stored in bunded areas and are not allowed to dry out, unless this is required for a particular process, in which case ensure that appropriate additional control measures are in place.
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. In addition, high volume water suppression systems, manually controlled, can produce fine water droplets that effectively bring the dust particles to the ground.
	Avoid explosive blasting, using appropriate manual or mechanical alternatives.
	Bag and remove any biological debris or damp down such material before demolition.
Monitoring	Carry out regular site inspections to monitor compliance with the DMP, record inspection results, and make an inspection log available to the local authority when asked.
	Increase the frequency of site inspections by the person accountable for air quality and dust issues on site when activities with a high potential to produce dust are being carried out and during prolonged dry or windy conditions.
	Agree dust deposition, dust flux, or real-time PM ₁₀ continuous monitoring locations with the Local Authority. Where possible commence baseline monitoring at least three months before work commences on site or, if it a large site, before work on a phase commences. Further guidance is provided by IAQM on monitoring during demolition, earthworks and construction.

Site Application	Mitigation Measures
Operating Vehicle/Machinery and Sustainable Travel	Ensure all vehicles switch off engines when stationary - no idling vehicles.
	Avoid the use of diesel or petrol powered generators and use mains electricity or battery powered equipment where practicable.
	Produce a Construction Logistics Plan to manage the sustainable delivery of goods and materials.
Operations	Only use cutting, grinding or sawing equipment fitted or in conjunction with suitable dust suppression techniques such as water sprays or local extraction, e.g. suitable local exhaust ventilation systems.
	Ensure an adequate water supply on the site for effective dust/particulate matter suppression/mitigation, using non-potable water where possible and appropriate.
	Use enclosed chutes and conveyors and covered skips.
	Minimise drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment and use fine water sprays on such equipment wherever appropriate.
	Ensure equipment is readily available on site to clean any dry spillages and clean up spillages as soon as reasonably practicable after the event using wet cleaning methods.
Preparing and Maintaining the Site	Plan site layout so that machinery and dust causing activities are located away from receptors, as far as is possible.
	Erect solid screens or barriers around dusty activities or the site boundary that are at least as high as any stockpiles on site.
	Fully enclose site or specific operations where there is a high potential for dust production and the site is active for an extensive period.
	Avoid site runoff of water or mud.
	Keep site fencing, barriers and scaffolding clean using wet methods.
	Remove materials that have a potential to produce dust from site as soon as possible, unless being re-used on site. If they are being re-used on-site cover as described below.
	Cover, seed or fence stockpiles to prevent wind whipping.
Site Management	Record all dust and air quality complaints, identify cause(s), take appropriate measures to reduce emissions in a timely manner, and record the measures taken.
	Make the complaints log available to the local authority when asked.
	Record any exceptional incidents that cause dust and/or air emissions, either on- or offsite, and the action taken to resolve the situation in the logbook.
	Hold regular liaison meetings with other high risk construction sites within 500m of the site boundary, to ensure plans are co-ordinated and dust and particulate matter emissions are minimised. It is important to understand the interactions of the off-site transport deliveries which might be using the same strategic road network routes.
Trackout	Use water-assisted dust sweeper(s) on the access and local roads, to remove, as necessary, any material tracked out of the site. This may require the sweeper being continuously in use.
	Avoid dry sweeping of large areas.
	Ensure vehicles entering and leaving sites are covered to prevent escape of materials during transport.
	Inspect on-site haul routes for integrity and instigate necessary repairs to the surface as soon as reasonably practicable.
	Record all inspections of haul routes and any subsequent action in a site logbook.
	Install hard surfaced haul routes, which are regularly damped down with fixed or mobile sprinkler systems, or mobile water bowsers and regularly cleaned.

Site Application	Mitigation Measures
	Implement a wheel washing system (with rumble grids to dislodge accumulated dust and mud prior to leaving the site where reasonably practicable). Ensure there is an adequate area of hard surfaced road between the wheel wash facility and the site exit, wherever site size and layout permits. Access gates to be located at least 10m from receptors where possible.
Waste Management	Avoid bonfires and burning of waste materials.
Desirable	
Construction	Avoid scabbling (roughening of concrete surfaces) if possible. Ensure bulk cement and other fine powder materials are delivered in enclosed tankers and stored in silos with suitable emission control systems to prevent escape of material and overfilling during delivery. For smaller supplies of fine power materials ensure bags are sealed after use and stored appropriately to prevent dust.
Demolition	Soft strip inside buildings before demolition (retaining walls and windows in the rest of the building where possible, to provide a screen against dust).
Earthworks	Re-vegetate earthworks and exposed areas/soil stockpiles to stabilise surfaces as soon as practicable. Use Hessian, mulches or tackifiers where it is not possible to re-vegetate or cover with topsoil, as soon as practicable Only remove the cover in small areas during work and not all at once.
Monitoring	Undertake daily on-site and off-site inspection, where receptors (including roads) are nearby, to monitor dust, record inspection results, and make the log available to the local authority when asked. This should include regular dust soiling checks of surfaces such as street furniture, cars and window sills within 100m of site boundary, with cleaning to be provided if necessary. With respect to operating vehicle/machinery and sustainable travel: Impose and signpost a maximum-speed-limit of 15 mph on surfaced and 10 mph on unsurfaced haul roads and work areas (if long haul routes are required these speeds may be increased with suitable additional control measures provided, subject to the approval of the nominated undertaker and with the agreement of the local authority, where appropriate). Implement a Travel Plan that supports and encourages sustainable travel (public transport, cycling, walking, and car-sharing).

7.2 Operational Phase

At the time of writing, traffic data has not been collated for use within the air quality dispersion modelling. Therefore, mitigation measures for the operational phase of the Proposed Development will be suggested proportionally to the nature and scale of any predicted impacts arising from the detailed dispersion modelling, when available. As a minimum, these measures will be in accordance with the BMBC air quality guidance for a 'medium' development to include 'Type 1' and 'Type 2' mitigation measures.

Full details of mitigation will be included within an updated report.

8.0 CONCLUSIONS

SLR Consulting Ltd has been commissioned by Gleeson Developments Ltd to undertake an air quality assessment to support a planning application for a proposed residential development comprising up to 137 dwellings, on land at Lockwood Road, Goldthorpe.

8.1 Construction Phase

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

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

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

8.2 Operational Phase

At the time of writing, traffic data for inclusion within the proposed dispersion modelling exercise is outstanding. When this data is available, an updated air quality assessment will be produced to present the results of the air quality dispersion modelling and inform any required mitigation measures.

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