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Leeds Road, Heckmondwike

Air Quality Assessment

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1.0 INTRODUCTION

1.1 Introduction

Orion Homes Limited has appointed Dragonfly Consulting to undertake an Air Quality Assessment to inform the full planning application for the proposed residential development, located at Leeds Road, Heckmondwike (the 'Site').

The Site is located within the jurisdiction of Kirklees Council (KC), in an area where air quality is mainly influenced by road traffic emissions along the A62 Leeds Road and the local road network.

This report assesses the potential air quality impacts associated with the proposed development, through considering existing baseline air quality conditions across, and in the vicinity of, the Site and determining its suitability for the proposed residential end-use. Potential sources of emissions are identified and assessed in the context of existing air quality and emission sources and the nature and location of both existing and proposed sensitive receptors.

A glossary of common air quality terminology is provided in Appendix A and a map of the Site and surrounding area is presented in Appendix B.

1.2 Scope of Assessment

Following a review of the West Yorkshire Low Emissions Strategy (WYLES) '*Air Quality & Emissions Technical Planning Guidance*¹', the scheme is categorised as 'Minor', based on the proposals falling below the criteria set out in Table 1 of the document, with less than 50 dwellings proposed. Whilst the adjacent A62 Leeds Road has >10,000 annual average daily traffic (AADT) flows, the proposed dwellings will be >20m from the road network meaning that a detailed exposure assessment is not required. Furthermore, the proposals do not meet the criteria detailed in Table 2 of the document and therefore, there is no requirement for an Emissions Damage Cost Calculation to be undertaken.

Air quality across, and in the vicinity of, the Site has been assessed to determine the suitability of the Site for the proposed residential end-use. The assessment has concentrated on nitrogen dioxide (NO₂) and particulate matter with an aerodynamic diameter of less than 10µm and 2.5µm (PM₁₀ and PM_{2.5}), the pollutants most associated with traffic emissions and which can affect local amenity.

An assessment of air quality impacts associated with the construction phase activities has been undertaken, in accordance with the Institute of Air Quality Management (IAQM) '*Guidance on the assessment of dust from demolition and construction*²' document, to determine the potential risk of dust soiling, human health and ecological impacts, where appropriate, at the closest sensitive receptors. Based on the results of the assessment, the most appropriate mitigation measures have been recommended.

Furthermore, the development has the potential to generate additional vehicle movements on the adjacent local road network. The potential impacts of any operational phase traffic associated with the scheme have therefore been considered with regard to the Environmental Protection UK (EPUK) and IAQM '*Land-Use Planning and Development Control: Planning for Air Quality*' guidance document³, and the baseline air quality assessment undertaken, to provide an appraisal of Site suitability.

¹ West Yorkshire Low Emissions Strategy (WYLES) Air Quality & Emissions Technical Planning Guidance.

² IAQM (2024) Guidance on the assessment of dust from demolition and construction, Version 2.2, January 2024.

³ IAQM (2017) Land-use Planning and Development Control: Planning for Air Quality, January 2017.

2.0 SITE DESCRIPTION

2.1 Existing Site

The Site is located in an existing residential area, bound by dwellings to the south and west, a farm to the north and the farm access road to the east with farmland extending beyond. The Site is within a sustainable location, within close proximity and walking distance to bus stops.

Due to the proximity of sensitive receptors in the vicinity of the Site, consideration of road traffic emissions and their associated impacts on both existing and proposed sensitive receptors is required, considering the vehicles that are already on the surrounding road network, and the additional vehicle trips generated by the development during both the construction and operational phases.

2.2 Proposed Development

The proposals comprise a residential development of 51 dwellings. The proposed Site Layout Plan indicates that a suitable buffer is proposed between the dwellings and the A62 Leeds Road, with the existing residential properties to the south located closer to this emission source. This allows a greater distance for dispersion of pollutants from road traffic emissions associated with the A62. It is therefore anticipated that pollutant concentrations would be similar within the Site boundary, if not less, than at existing dwellings surrounding the Site.

The proposed Site Layout is shown in Figure 2.1, below.

Figure 2.1
Proposed Site Layout



3.0 LEGISLATION, POLICY AND GUIDANCE

The relevant legislation, policy and guidance documents are detailed below.

3.1 Legislation

3.1.1 *European Directive on Ambient Air Quality and Cleaner Air for Europe*

The EU Directive 2008/50/EC⁴ on ambient air quality and cleaner air for Europe (the CAFE directive) sets out the ambient air quality standards for a number of pollutants and the dates by which these objectives should be met. The Air Quality Standards (Amendment) Regulations 2016 amend the Air Quality Standards Regulations 2010⁵, which implements the requirements of the EU Directive 2008/50/EC into UK legislation. The Directive contains a series of limit values for the protection of human health and critical levels for the protection of vegetation. These limit values are legally binding, and the UK may incur infringement action if it does not meet the required objective limits within the agreed time limits. A recast EU Ambient Air Quality Directive 2024/2881⁶ was adopted by the European Union in October 2024, which supersedes the previous Directive 2008/50/EC and introduces more stringent limits for key pollutants, such as particulate matter (PM_{2.5} and PM₁₀) and nitrogen dioxide (NO₂), to reduce harmful effects on human health and the environment. These updated air quality standards are more closely aligned with the World Health Organisation's (WHO) recommendations, reflecting the latest scientific evidence on the health impacts of air pollution. Whilst the UK is not obligated to implement EU Directive 2024/2881, it may choose to adopt similar standards or draw from it as a benchmark in the future, especially as air quality is a shared concern and the EU's new limits are closely aligned with WHO recommendations, which the UK supports.

3.1.2 *Local Air Quality Management - The Environment Act 1995*

Local authorities are seen to play a particularly important role. Section 82 of the Environment Act 1995 requires every local authority to conduct a review of the air quality from time to time within the authority's area. The DEFRA technical guidance, LAQM.TG22, continues with the streamlined approach to the LAQM regime, whereby every authority has to undertake and submit a single Annual Status Report/Annual Progress Report within its area, to identify whether the objectives have been or will be achieved at relevant locations by the applicable date. If the objectives are not being met, the authority must declare an AQMA (section 83 of the Act) and prepare an action plan (section 84) which identifies measures that will be introduced in pursuit of the objectives.

3.1.3 *Environmental Targets (Fine Particulate Matter) (England) Regulations 2023*

The Environmental Targets (Fine Particulate Matter) (England) Regulations 2023⁷ establish legally binding targets in England to reduce concentrations of fine particulate matter (PM_{2.5}), a key air pollutant harmful to human health and the environment. The regulations set two key objectives: achieving an annual mean PM_{2.5} concentration of 10 micrograms per cubic metre or lower by 2040 and reducing population exposure to PM_{2.5} by 35% compared to 2018 levels within the same timeframe. These measures aim to improve air quality, safeguard public health, and contribute to environmental sustainability.

⁴ 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.

⁵ Air Quality Regulations 2010 - Statutory Instrument 2010 No. 1001.

⁶ Directive (EU) 2024/2881 of the European Parliament and of the Council of 23 October 2024 on ambient air quality and cleaner air for Europe (recast).

⁷ Environmental Targets (Fine Particulate Matter) (England) Regulations 2023, 2023 No. 96.

DEFRA are developing guidance for applicants and Planning Authorities in England to demonstrate that they have appropriately considered the PM_{2.5} targets when making planning applications and planning decisions. The new approach moves away from a requirement to assess solely whether a scheme is likely to lead to an exceedance of a legal limit and instead ensures that appropriate mitigation measures are implemented from the design stage, streamlining the process for planning and ensuring the minimum amount of pollution is emitted and that exposure is minimised.

Pending publication of the new guidance, applicants are advised to provide evidence in their planning applications that they have identified key sources of air pollution within their schemes and taken appropriate action to minimise emissions of PM_{2.5} and its precursors as far as is reasonably practicable.

3.2 Policy

3.2.1 National Planning Policy

National Planning Policy Framework (2024)

The National Planning Policy Framework (NPPF)⁸ sets out the Government's planning policies for England and how these are expected to be applied. At the heart of the NPPF is a presumption in favour of sustainable development. It requires Local Plans to be consistent with the principles and policies set out in the NPPF with the objective of contributing to the achievement of sustainable development.

The NPPF states that the planning system has three overarching objectives in achieving sustainable development including a requirement to *'protect and enhance our natural, built and historic environment; including making effective use of land, improving biodiversity, using natural resources prudently, minimising waste and pollution, and mitigating and adapting to climate change, including moving to a low carbon economy.'* Under Section 15: Conserving and Enhancing the Natural Environment, the NPPF (paragraph 187) requires that *'planning policies and decisions should contribute to and enhance the natural and local environment by ...preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability. Development should, wherever possible help to improve local environmental conditions such as air and water quality.'*

The NPPF (paragraph 110) states that *'Significant development should be focused on locations which are or can be made sustainable, through limiting the need to travel and offering a genuine choice of transport modes. This can help to reduce congestion and emissions, and improve air quality and public health.'* Furthermore, paragraph 198 states *'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.'*

In dealing specifically with air quality (paragraph 199), the NPPF also states that *'planning policies and decisions should sustain and contribute towards compliance with relevant limit values or national objectives for pollutants, taking into account the presence of Air Quality Management Areas and Clean Air 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.'*

⁸ Ministry of Housing, Communities and Local Government: National Planning Policy Framework, December 2024.

Planning decisions should ensure that any new development in Air Quality Management Areas and Clean Air Zones is consistent with the local air quality action plan'.

Paragraph 201 states that *'the focus of planning policies and decisions should be on whether proposed development is an acceptable use of land, rather than the control of processes or emissions (where these are subject to separate pollution control regimes). Planning decisions should assume that these regimes will operate effectively'.*

National Planning Practice Guidance - Air Quality (2019)

The National Planning Practice Guidance (NPPG) document for Air Quality⁹ provides tailored guidance on how planning can take account of the potential impact of new development on air quality. The document provides useful sources of information relating to the assessment of air quality, outlines when an Air Quality Assessment is likely to be required for planning purposes and provides an example of how such reports should be structured. With regard to mitigation measures, these are development specific, however, the guidance does provide a useful suite of typical measures that can be incorporated into the scheme's design to have a beneficial impact on air quality.

The Air Quality Strategy for England (2023)

The Air Quality Strategy for England (2023)¹⁰, is a strategic framework for local authorities and other partners and supersedes the Air Quality Strategy: Volume 1 in England only. This document sets out the actions that DEFRA expects local authorities to take in support of the long-term air quality targets.

The Air Quality Strategy (AQS) sets out a framework for reducing hazards to health from air pollution and ensuring that international commitments are met in the UK. The AQS is designed to be an evolving process that is monitored and regularly reviewed.

The AQS sets standards and objectives for ten main air pollutants to protect health, vegetation, and ecosystems. These are benzene (C₆H₆), 1,3-butadiene (C₄H₆), carbon monoxide (CO), lead (Pb), NO₂ oxides of nitrogen (NO_x), particulate matter (PM₁₀, PM_{2.5}), sulphur dioxide (SO₂), ozone (O₃) and polycyclic aromatic hydrocarbons (PAHs).

The air quality standards are long-term benchmarks for ambient pollutant concentrations which represent negligible or zero risk to health, based on medical and scientific evidence reviewed by the Expert Panel on Air Quality Standards (EPAQS) and the World Health Organisation (WHO). These are general concentration limits, above which sensitive members of the public (e.g. children, the elderly and the These unwell) might experience adverse health effects. The AQOs are medium-term policy-based targets set by the Government which take into account economic efficiency, practicability, technical feasibility and timescale. Some objectives are equal to the EPAQS recommended standards or WHO guideline limits, whereas others involve a margin of tolerance, i.e. a limited number of permitted exceedances of the standard over a given period.

For some pollutants there is both a long-term (annual mean) standard and a short-term standard. In the case of NO₂, the short-term standard is for a 1-hour averaging period, whereas for PM₁₀ it is for a 24-hour averaging period. These periods reflect the varying impacts on health of differing exposures to pollutants (e.g. temporary exposure on the pavement adjacent to a busy road, compared with the exposure of residential properties adjacent to a road).

⁹ Ministry of Housing, Communities and Local Government (2019) National Planning Practice Guidance - Air Quality, November 2019.

¹⁰ The Air Quality Strategy for England, August 2023.

Of the pollutants included in the AQS, NO₂ and PM₁₀ would be particularly relevant to this project as these are the primary pollutants associated with vehicle emissions, the main source of pollutants in the vicinity of the Site. The current statutory standards and objectives for NO₂ and PM₁₀ in relation to human health are set out in Table 3.1.

In relation to PM_{2.5} the 2019 Clean Air Strategy¹¹ includes a commitment to set ‘new, ambitious, long-term targets to reduce people’s exposure to PM_{2.5}’ which the Environment Act 2021¹² commits the Secretary of State to setting. As discussed in Local Air Quality Management Technical Guidance 2022 (LAQM.TG22)¹³ issued by DEFRA, local authorities are expected to work towards reducing PM_{2.5} in their area, setting this out as the current objectives within England for PM_{2.5}. Historically, limit values were established via the EU Directive with both a Stage 1 and Stage 2 limit value identified. For the purposes of this assessment the Stage 2 limit value for PM_{2.5} (as provided in Table 3.1) is considered to be appropriate to use for assessing impacts of development proposals.

Table 3.1
Relevant Objectives set out in the Air Quality Strategy

Pollutant	Concentrations	Measured As	Date to be Achieved By
Nitrogen Dioxide (NO ₂)	200 µg/m ³ not to be exceeded more than 18 times per year	1 hour mean	31 December 2005
	40 µg/m ³	Annual mean	
Particulate Matter (PM ₁₀)	50 µg/m ³ not to be exceeded more than 35 times per year	24-hour mean	31 December 2004
	40 µg/m ³	Annual mean	
Particulate Matter (PM _{2.5})	Stage 1 - 25 µg/m ³	Annual mean	1 st January 2020
	Stage 2 - 20 µg/m ³	-	-

The statutory standards and objectives apply to external air where there is relevant exposure to the public over the associated averaging periods within each objective. Guidance is provided within Local Air Quality Management Technical Guidance 2022 (LAQM.TG22) issued by DEFRA for Local Authorities on where the objectives apply, as detailed in Table 3.2. The objectives do not apply in workplace locations, to internal air or where people are unlikely to be regularly exposed (i.e. centre of roadways).

Table 3.2
Locations Where Air Quality Objectives Apply

Averaging Period	Objectives should apply at:	Objectives should generally not apply at:
Annual Mean	All locations where members of the public might be regularly exposed. Building façades of residential properties, schools, hospitals, care home etc.	Building façades of offices or other places of work where members of the public do not have regular access. Hotels, unless people live there as their permanent residence.

¹¹ Department for Environment, Food & Rural Affairs (DEFRA) (2019) Clean Air Strategy. London: HMSO.

¹² Secretary of State, The Environment Act 2021 HMSO.

¹³ Department for Environment, Food & Rural Affairs (DEFRA) (2022) Local Air Quality Management. Technical Guidance (LAQM.TG22).

Averaging Period	Objectives should apply at:	Objectives should generally not apply at:
		Gardens of residential properties. Kerbside sites (as opposed to locations at the building façade), or any other location where public exposure is expected to be short term.
24-Hour Mean	All locations where the annual mean objective would apply together with hotels. Gardens of residential properties.	Kerbside sites (as opposed to locations at the building façade), or any other location where public exposure is expected to be short term.
1-Hour Mean	All locations where the annual mean and 24-hour mean objectives apply. Kerbside Sites (e.g. pavements of busy shopping streets). Those parts of car parks, bus stations and railway stations etc. which are not fully enclosed, where the public might reasonably be expected to spend 1-hour or more. Any outdoor locations where the public might reasonably be expected to spend 1-hour or longer.	Kerbside sites where the public would not be expected to have regular access.

National Air Quality Plan for NO₂ in the UK (2017)

The National Air Quality Plan¹⁴ was written as a joint venture between DEFRA and Department for Transport (DfT) and aims to tackle roadside concentrations of NO₂ in the UK. It includes a number of measures such as those aimed at investing in Ultra Low Emission Vehicles (ULEVs) charging infrastructure, public transport and grants to help local authorities in improving air quality.

The plan requires all local authorities (LAs) in England with areas expected not to meet the Limit Values by 2020 (known as 'air quality hotspots') to develop plans to bring concentrations within these values in 'the shortest time possible'. These plans are to be reviewed by the government and suggestions included in the plan include actions such as utilising retrofitting technologies, changing road layout and encouraging public transport and ULEV use.

Where these approaches are not considered sufficient, the LA may need to consider implementation of a Clean Air Zone (CAZ) which places restrictions on vehicle access to an area and may include charging certain (or all) vehicles or restrictions on the type of vehicle allowed to access an area.

Clean Air Strategy (2019)

The Clean Air Strategy¹⁵ sets out policies to lower national emissions of pollutants in order to reduce background pollution and human exposure. It aims to create a strong framework to tackle air pollution and to reduce the number of people living in locations with PM_{2.5} concentrations exceeding 10µg/m³ by 50% by 2025.

¹⁴ Department for Environment, Food & Rural Affairs (DEFRA) and Department for Transport (DfT) (2017) UK plan for tackling roadside nitrogen dioxide concentrations. London: HMSO.

¹⁵ Department for Environment, Food & Rural Affairs (DEFRA) Clean Air Strategy 2019.

3.2.2 Local Planning Policy

Kirklees Local Plan Strategy and Policies (2019)

The Kirklees Local Plan Strategy and Policies document¹⁶, adopted by KC in February 2019, sets out the Council's vision, strategy, development principles and policies to guide development in the district until 2031.

It is noted that in line with the 5-year review of the Local Plan, a full update is required and this is currently in the Early Engagement Local Plan Survey Stage until February 2025. The updated Local Plan document will deliver a vision for Kirklees up to 2043.

A review of the adopted 2019 Local Plan has identified the following policies relevant to this assessment:

'Policy LP15 Residential Use in Town Centres

Proposals for residential uses (including student accommodation) within the defined town centres as set out on the Policies Map will be supported subject to: [...]

- d) the protection of the amenity of existing residents and future occupiers of the proposed residential use in accordance with amenity and design policies within the plan, and will in particular consider matters such as privacy, noise and air quality;*
- e) The provision of space for the storage of sustainable modes of transport such as bicycles, where appropriate charging points of electric vehicles, and access to public transport; [...]*

'LP24 Design

Good design should be at the core of all proposals in the district and should be considered at the outset of the development process, ensuring that design forms part of pre-application consultation of a proposal. Development briefs, design codes and masterplans should be used to secure high quality, green, accessible, inclusive and safe design, where applicable. Where appropriate and in agreement with the developer schemes will be submitted for design review.

Proposals should promote good design by ensuring: [...]

- b) they provide a high standard of amenity for future and neighbouring occupiers; including maintaining appropriate distances between buildings and the creation of development-free buffer zones between housing and employment uses incorporating means of screening where necessary;*

[...]

- d) high levels of sustainability, to a degree proportionate to the proposal, through:
 - ii) design that promotes behavioural change, promoting walkable neighbourhoods and making walking and cycling more attractive;*
 - iv) where practicable, minimising resource use in the building by orientating buildings to utilise passive solar design. This includes encouraging the incorporation of vegetation and tree planting to assist heating and cooling and considering the use of renewable energy;**

¹⁶ Kirklees Council (2019) Kirklees Local Plan Strategy and Policies, February 2019.

v) *providing charging points to encourage the use of electric and low emission vehicles;*

'Policy LP47 Healthy, Active and Safe Lifestyles

The council will, with its partners, create an environment which supports healthy, active and safe communities and reduces inequality.

Healthy, active and safe lifestyles will be enabled by: [...]

- g) ensuring that the current air quality in the district is monitored and maintained and, where required, appropriate mitigation measures included as part of new development proposals;*
- h) creating high-quality and inclusive environments incorporating active design and the creation of safe, accessible and green environments which minimise and mitigate against potential harm from risks such as pollution and other environmental hazards; [...]*

'Policy LP51 Protection and Improvement of Local Air Quality

- 1. Development will be expected to demonstrate that it is not likely to result, directly or indirectly, in an increase in air pollution which would have an unacceptable impact on the natural and built environment or to people.*
- 2. Proposals that have the potential to increase local air pollution either individually or cumulatively must be accompanied by evidence to show that the impact of the development has been assessed in accordance with the relevant guidance. Development which has the potential to cause levels of local air pollution to increase must incorporate sustainable mitigation measures that reduce the level of this impact. If sustainable measures cannot be introduced the development will not be permitted.*
- 3. Where the development introduces new receptors into Air Quality Management Areas or Areas of Concern or near other areas of relatively poor air quality, for example near roads or junctions, the development must incorporate sustainable mitigation measures that protect the new receptors from unacceptable levels of air pollution. Where sustainable mitigation measures cannot be introduced which prevent receptors from being exposed to unsafe levels of air pollution, development will not be permitted.'*

'Policy LP52 Protection and Improvement of Environmental Quality

Proposals which have the potential to increase pollution from noise, vibration, light, dust, odour, shadow flicker, chemicals and other forms of pollution or to increase pollution to soil or where environmentally sensitive development would be subject to significant levels of pollution, must be accompanied by evidence to show that the impacts have been evaluated and measures have been incorporated to prevent or reduce the pollution, so as to ensure it does not reduce the quality of life and well-being of people to an unacceptable level or have unacceptable impacts on the environment.

Such developments which cannot incorporate suitable and sustainable mitigation measures which reduce pollution levels to an acceptable level to protect the quality of life and well-being of people or protect the environment will not be permitted.

Where possible, all new development should improve the existing environment.'

The above policies related to air quality and amenity have been considered within this assessment.

3.3 Guidance

The following guidance documents have been referred to throughout this assessment.

3.3.1 DEFRA Technical Guidance, LAQM.TG22

LAQM.TG22 sets out detailed guidance on how air quality should be assessed and monitored by local authorities. The document provides useful guidance on how air quality from specific sources should be screened and the approaches that should be used to undertake detailed assessment where potentially significant emissions are identified, including details on model verification and consideration of monitoring data for use in assessments.

3.3.2 IAQM Land-Use Planning and Development Control: Planning for Air Quality (2017)

The IAQM and EPUK have published joint guidance on the assessment of air quality impacts for planning purposes. This includes information on when an air quality assessment is required, what should be included in an assessment and criteria for assessing the significance of any impacts.

3.3.3 IAQM Guidance on the Assessment of Dust from Demolition and Construction (2024)

Guidance produced by the IAQM on assessing impacts from construction and demolition activities includes a methodology for identifying the risk magnitude of potential dust sources associated with demolition, construction, earthworks and trackout. This is then used to identify the level of mitigation necessary in order for the impacts to be not significant.

3.3.4 West Yorkshire Air Quality & Emissions Technical Planning Guidance

The West Yorkshire Air Quality & Emissions Technical Planning Guidance¹⁷ document forms part of the overarching West Yorkshire Low Emissions Strategy (WYLES) and provides information on the required scope of an Air Quality Assessment, based on its categorisation and whether the site will introduce new receptors to an area of poor air quality. Mitigation measures are also provided, which should be reviewed based on the classification of the scheme.

3.3.5 West Yorkshire Low Emissions Strategy 2016 to 2021 (2016)

The West Yorkshire Low Emissions Strategy 2016-2021 outlines a coordinated approach to improving air quality across West Yorkshire by reducing harmful emissions, particularly NO₂ and particulate matter (PM). The strategy focuses on promoting sustainable transport, reducing emissions from road traffic, and supporting cleaner technologies in vehicles and industries. The strategy aims to safeguard public health, meet national and EU air quality standards, and support economic growth while reducing environmental impacts.

3.3.6 West Yorkshire Low Emission Procurement Guidance

The West Yorkshire Low Emission Procurement Guidance¹⁸ provides a framework for public sector procurement to reduce emissions and improve air quality. It encourages the adoption of low-emission vehicles and sustainable transport services, aligning with the EU Clean Vehicles Directive and local climate goals. The guidance integrates environmental considerations into procurement decisions, focusing on reducing carbon footprints, enhancing efficiency, and achieving social value through responsible sourcing. It supports councils in balancing environmental, economic, and social priorities.

¹⁷ West Yorkshire Low Emissions Strategy 2016 to 2021, December 2016.

¹⁸ <https://www.kirklees.gov.uk/beta/crime-and-safety/pdf/WYLES-procurement-guide.pdf>

3.3.7 Kirklees Council Housebuilders Design Guide SPD (2021)

The purpose of the Housebuilders Design Guide¹⁹ Supplementary Planning Document (SPD) is to set out what the Council considers to be good residential design, to raise the quality of housing that is delivered in the district, supporting the Local Plan Vision. In relation to air quality, the following is relevant:

'Proposals should consider local air quality in the area and how mitigation measures can be integrated into the design where the proposal seeks to introduce new residential development into Air Quality Management Areas, Areas of Concern or near other areas of relatively poor air quality in accordance with Local Plan Policy LP51. All development proposals are expected to incorporate suitable and sustainable mitigation measures which reduce pollution from a range of sources including noise, odour and light. Mitigation measures can include planting, screening and use of green walls and green roofs.'

3.3.8 Air Quality Action Plan for Kirklees Council (2019)

The Air Quality Action Plan for Kirklees Council²⁰ sets out the measures that KC intend to introduce to improve air quality within their area of jurisdiction. The primary priority relates to emissions associated with vehicles, the local topography and congestion and therefore, measures have been identified and appraised as to their cost effectiveness and likely impact on the declared AQMAs and district as a whole.

3.3.9 Kirklees Council Air Quality Strategy (2019)

The Kirklees Air Quality Strategy²¹ is a narrative summary of the detailed contents of the Air Quality Action Plan and Air Quality Annual Status Reports. It is a broader framework outlining the Council's vision and priorities for improving air quality. It sets strategic goals, such as aligning with climate change objectives and promoting public health, while emphasising collaborative efforts across sectors.

¹⁹ Kirklees Council (2021) Housebuilders Design Guide SPD, June 2021.

²⁰ Kirklees Council (2019) Air Quality Action Plan for Kirklees Council, Version 1.4, September 2019.

²¹ Kirklees Council (2019) Air Quality Strategy 2019.

4.0 METHODOLOGY

4.1 Baseline Assessment

A baseline assessment of air quality across, and in the vicinity of, the Site has been carried out through a review of local monitoring data contained within the latest available Air Quality Annual Status Report (ASR) prepared by KC²². Predicted background pollutant data have also been obtained from DEFRA's UK Air Information Resource (UK-AIR) website²³, using the 2021 based Background Mapping Data for the Local Authority in which the Site is located.

4.2 Construction Phase

4.2.1 Construction Phase Vehicle Emissions

During the construction phase of the proposed development, heavy goods vehicles (HGVs) will require access to the Site to deliver and remove materials, where applicable; there is the potential that other mobile machinery such as earthmoving plant may also work on-site in addition to generators and cranes. These machines produce exhaust emissions; of particular concern are emissions of NO₂ and PM₁₀.

The IAQM air quality planning guidance sets out criteria to determine when significant effects are likely to occur, and a more detailed assessment of traffic emissions is required. The criteria indicates that significant impacts on air quality are unlikely to occur where a development results in less than 25 HDV movements per day in locations within or adjacent to an AQMA and less than 100 HDV outside of an AQMA. Based on the development proposals it is anticipated that there would be no more than 25 HDV generated on any one road link on any given day during the construction phase. Therefore, construction traffic generated by the proposed development would result in a **negligible** impact on local NO₂ and PM₁₀ concentrations and has not been considered any further in this assessment.

4.2.2 Construction Phase Fugitive Dust Emissions:

Construction phase activities associated with the proposed development may result in the generation of fugitive dust emissions (i.e. dust emissions generated by site-specific activities that disperse beyond the construction site boundaries).

If transported beyond the site boundary, dust can have an adverse impact on local air quality. The IAQM has published a guidance document for the assessment of demolition and construction phase impacts. The guidance considers the potential for dust nuisance and impacts to human health and ecosystems to occur due to activities carried out during the following stages of construction:

- Demolition (removal of existing structures);
- Earthworks (soil-stripping, ground-levelling, excavation and landscaping);
- Construction (activities involved in the provision of a new structure); and
- Trackout (the transport of dust and dirt from the construction site onto the public road network where it may be deposited and then re-suspended by vehicles using the network).

²² Kirklees Council (2024) 2024 Air Quality Annual Status Report (ASR), June 2024.

²³ Department for Environment, Food & Rural Affairs (DEFRA) (undated) UK Air Information Resource - Background Mapping Data for Local Authorities - 2021 [Online] Available at: <https://uk-air.defra.gov.uk/data/laqm-background-maps?year=2021> [Accessed on 11/12/2024].

A qualitative assessment of air quality impacts due to the release of fugitive dust and particulates (PM₁₀) during the construction phase was undertaken in accordance with the methodology detailed in the IAQM guidance. The assessment takes into account the nature and scale of the activities undertaken for each source and the sensitivity of the area to an increase in dust and PM₁₀ levels, thus enabling a level of risk to be assigned. Risks are described in terms of there being a low, medium, or high risk of dust impacts. Once the level of risk has been ascertained, then site specific mitigation proportionate to the level of risk is identified, and the significance of residual effects determined.

A summary of the IAQM Construction Phase Risk Assessment methodology is provided in Appendix C.

4.2.3 Selection of Receptors

The IAQM Construction Phase Risk Assessment is undertaken where there are:

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

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

4.2.4 Significance Criteria

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

4.3 Operational Assessment

The air quality planning guidance published by IAQM sets out criteria for establishing when there is a risk of significant impacts on local air quality as a result of traffic generated by a proposed development. The guidance states that where the following criteria are exceeded a more detailed assessment may be required:

- An increase in light goods vehicles (LGV) of more than 100 vehicles per day within or adjacent to an AQMA, or an increase of more than 500 annual average daily traffic (AADT) flows per day elsewhere; and
- An increase in HGV of more than 25 vehicles per day within or adjacent to an AQMA, or an increase of more than 100 AADT per day elsewhere.

The anticipated trip generation associated with the proposed development has therefore been assessed against the above criteria. Where these criteria are not exceeded then a detailed assessment of operational impacts is not typically required.

5.0 BASELINE ASSESSMENT

5.1 Kirklees Council LAQM Review

According to the latest available Air Quality Annual Status Report (ASR)²² from Kirklees Council (KC), dated June 2024, there are currently ten Air Quality Management Areas (AQMA) within KC's area of jurisdiction, with the majority declared due to exceedances of the annual mean Air Quality Objectives (AQO) for NO₂ and one declared due to exceedances of the 24-hour mean AQO for PM₁₀. In accordance with the 2024 ASR, the analysis of 2023 air quality data concluded that the annual mean NO₂ AQO was only exceeded within one of the ten AQMAs and therefore, KC propose to remove three AQMAs and amend three to reflect the smaller geographical areas which are at risk of exceeding the objectives.

The closest AQMA, Kirklees AQMA 7, is located approximately 1.1km south-west of the site and was declared due to exceedances of the annual mean AQO for NO₂. Therefore, the trip generation and associated distribution from the Site had to be reviewed to determine whether sensitive receptors needed to be assessed in this location. The number of trips generated by the proposed development will be below the applicable criteria and therefore, consideration of sensitive receptors within this area was not required.

5.2 Local Emission Sources

The Site is located in an area where air quality is mainly influenced by road traffic emissions along the A62 Leeds Road and the local road network. There are no commercial sources identified within the vicinity of the Site which would affect local air quality conditions.

5.3 Air Quality Monitoring

5.3.1 Nitrogen Dioxide

Automatic Monitoring

KC monitored at three automatic (continuous) monitoring locations during 2023, one of which is an Automatic Urban and Rural Network (AURN) site with the other two Council owned. However, due to unforeseen challenges, KC were not able to produce ratified data from the two Council owned monitors for annual reporting purposes and therefore, monitoring was ceased at these locations. The AURN monitor at Dewsbury Ashworth Grange is not located in the vicinity of the Site and therefore, the data are not considered within this assessment.

Non-Automatic Monitoring

KC monitored NO₂ concentrations at 120 non-automatic (passive) diffusion tube sites during 2023. Diffusion tubes, due to their relative in-expense, allow for a much greater spatial coverage than automatic monitoring sites. To allow the results to be reliably compared against the AQO, the data should be bias corrected using data collected from diffusion tubes co-located with continuous monitoring sites. The data provided in Table 5.1 below have been adjusted by KC using the national bias correction factor provided on the DEFRA LAQM website²⁴. The closest diffusion tube to the Site is K35, located outside 45 Leeds Road, Liversedge, approximately 1.08km south-west of the Site. Data recorded from the closest monitoring sites are set out in Table 5.1, with the locations of the diffusion tubes shown in Appendix B.

²⁴ <https://laqm.defra.gov.uk/air-quality/air-quality-assessment/national-bias/>.

Table 5.1
KC Diffusion Tube Annual Mean NO₂ Concentrations (µg/m³)

Site ID	Site Description	Classification	Monitoring Year				
			2019	2020	2021	2022	2023
K18	Huddersfield Road Birstall - lamppost 246	Roadside	36.8	32.2	35.8	34.4	30.2
K29	LC255 Gelderd Road Birstall, by 62a Gelderd Road, opposite Britannia Mills	Roadside	0.0	0.0	0.0	0.0	29.6*
K33	Wakefield Rd / Huddersfield Road - Liversedge outside Fastrack solutions	Roadside	31.1	26.8	31.4	30.2	27.7
K34	Frost Hill Liversedge	Roadside	33.6	29.9	30.5	33.6	30.3
K35	Outside 45 Leeds Road Liversedge	Roadside	45.3	34.7	44.3	44.7	38.8
K48	Flush Liversedge	Roadside	36.1	38.1	41.2	43.0	38.0
K51	High Street Heckmondwike	Kerbside	34.5	28.6	30.0	31.2	28.5
K81	Gelderd Road, Hawthorne House, lamppost 276	Roadside	29.8	28.4	29.5	28.2	27.2
K88	Huddersfield Road, Birstall Smithies - the greyhound public house - lamppost 231	Roadside	0.0	0.0	0.0	0.0	25.1*
K60a	Huddersfield Road, Birstall Smithies - the greyhound public house - lamppost 231	Roadside	0.0	22.2	29.0	27.9	25.6
K88a	Huddersfield Road, Birstall - lamppost 229	Roadside	0.0	24.5	31.1	30.1	26.8

* Valid data capture was below 75%.

As presented in Table 5.1, there were no exceedances of the annual mean AQO for NO₂ at any of the closest diffusion tube monitoring locations during the most recent monitoring year of 2023, with concentrations below the AQO limit of 40µg/m³. Exceedances were only recorded at K35 during 2019, 2021 and 2022 and at K48 during 2021 and 2022. However, both locations are in close proximity to the AQMA and therefore, are not considered to be representative of the Site location. The most representative diffusion tubes are considered to be K60a, K88 and K88a, which are located along the A62 Huddersfield Road east of the Site, which recorded no exceedances of the annual mean AQO for NO₂.

It should be noted that due to the prevailing travel restrictions as a result of the COVID-19 pandemic, pollutant levels during 2020 and 2021 were significantly suppressed, with pollutant levels during these years considered to be lower than 'normal'. The data for these years have therefore been presented for completeness only and should not be used to inform the baseline assessment.

Therefore, with no recent exceedances recorded at the most representative monitoring locations, it is considered that concentrations at the Site would be similar, if not less, than those presented in Table 5.1, with the proposed dwellings to be set back from the main road allowing a greater distance for dispersion of pollutants.

It is therefore considered that there is no predicted risk of the proposed development exposing sensitive receptors to elevated air pollutant concentrations.

5.3.2 Particulate Matter (PM₁₀ and PM_{2.5})

There are no automatic monitoring stations which record PM₁₀ and PM_{2.5} concentrations located in the vicinity of the Site.

5.4 DEFRA Background Pollutant Concentrations

In addition to the review of monitored pollutant data in the vicinity of the Site, additional information on estimated background pollutant concentrations at the Site has been obtained from the DEFRA background maps provided on the UK-AIR website²³. Estimated air pollutant concentrations for oxides of nitrogen (NO_x), NO₂, PM₁₀ and PM_{2.5} have been sourced from the 2021 based background maps for the UK for the current assessment year of 2024 and for the year 2026 which is representative of a predicted first year of phased operation for the proposed development, to consider future air quality conditions in the vicinity of the Site. These maps are available in 1km x 1km grid squares. The Site is located within grid square NGR: 421500, 424500. Concentrations for this location have been taken which are considered to be representative of the Site. The concentrations for each pollutant are provided in Table 5.2.

Table 5.2
Background Air Pollutant Concentrations at the Site

OS Grid Reference	Pollutant Concentrations for 2024				Pollutant Concentrations for 2026			
	NO ₂ (µg/m ³)	NO _x (µg/m ³)	PM ₁₀ (µg/m ³)	PM _{2.5} (µg/m ³)	NO ₂ (µg/m ³)	NO _x (µg/m ³)	PM ₁₀ (µg/m ³)	PM _{2.5} (µg/m ³)
421500, 424500	12.2	16.2	11.7	7.0	11.4	15.1	11.6	6.9

As shown in Table 5.2, there were no exceedances of the annual mean AQOs for NO₂, PM₁₀ or PM_{2.5} in 2024, with background concentrations predicted to decrease by 2026. For PM_{2.5}, the predicted background concentrations were also below the target exposure level of 10µg/m³, implemented at the end of January 2023 under the Environment Act 2021 and in accordance with the Environmental Targets (Fine Particulate Matter) (England) Regulations 2023. Therefore, there is no predicted risk of the proposed development exposing future occupants to elevated air pollutant concentrations.

Furthermore, guidance set out in LAQM.TG22 indicates that where annual mean NO₂ concentrations exceed 60µg/m³ there is a risk that the 1-hour objective is also being exceeded. Based on the data outlined in Table 5.2, NO₂ background concentrations for the Site location were significantly below 60µg/m³ and therefore, it is unlikely that concentrations will exceed the 1-hour objective at the Site.

5.5 Site Suitability

The proposed development comprises the introduction of new sensitive receptors to an existing residential area. As presented in Table 5.1, representative monitored annual mean NO₂ concentrations in the vicinity of the Site are below 40µg/m³ and it can be concluded that concentrations at the Site are likely to be similar, based on the monitoring stations being considered representative of the Site location, also being located along busy road networks. Annual mean NO₂ concentrations at the Site are therefore expected to meet the AQO for this pollutant, resulting in no predicted risk of the proposed development exposing future occupants to elevated pollutant concentrations.

As presented in Table 5.2, the background NO₂, PM₁₀ and PM_{2.5} concentrations predicted at the Site are below the relevant annual mean AQOs. For PM_{2.5}, the predicted background concentration are also below the target exposure level of 10µg/m³, implemented at the end of January 2023 under the Environment Act 2021.

Given the low concentrations of these pollutants, even allowing for a reasonable traffic contribution, it can be concluded that pollutant concentrations at the Site will be below the relevant AQOs. Therefore, there is no predicted risk of the proposed development exposing future occupants to elevated pollutant concentrations, with annual mean NO₂, PM₁₀ and PM_{2.5} concentrations expected to meet the AQO for these pollutants.

The short-term objective limits such as the 1-hour NO₂ objective are also considered relevant to the Site. As presented in Table 5.1, the annual mean NO₂ concentrations at representative locations in the vicinity of the Site are well below 60µg/m³. It can therefore be concluded that concentrations at the Site will be below 60µg/m³. Short-term NO₂ concentrations at the Site are therefore expected to be meeting the 1-hour objective limit for this pollutant.

For PM₁₀, the short-term objective of 50µg/m³ should not be exceeded more than 35 times per year. As presented in Table 5.2, predicted background concentrations of PM₁₀ were significantly below 50µg/m³ and therefore, even when considering the road traffic emission contribution, short-term concentrations are expected to meet the short-term AQO at the Site.

There is no short-term AQO for PM_{2.5}, and therefore, these concentrations are compared against the AQO for PM₁₀. Based on this, there is no predicted risk of exceedance for PM_{2.5} at the Site.

It is therefore concluded that the proposed development will not introduce future occupants into a location of poor air quality, and as such, the impact of the proposals in terms of new exposure is therefore considered to be **negligible**.

6.0 ASSESSMENT OF IMPACTS

6.1 Construction Impacts

6.1.1 Site and Surroundings

Step 1 - Screen the Need for a Detailed Assessment

A review of the Site location has identified the closest residential receptors being located to the north, west and south of the Site boundary, all within 20m of the red line boundary. An assessment of construction related impacts in relation to human receptors has therefore been undertaken.

A review of the DEFRA MAGIC website²⁵ has identified no designated ecological designations within the relevant screening distances and therefore, this element of the assessment is not considered further within this assessment. It is therefore concluded that, the level of risk for ecological receptors is **negligible**.

6.1.2 Meteorological Data

The precise behaviour of the dust, its residence time in the atmosphere, and the distance it may travel before being deposited would depend upon a number of factors. These include wind direction and strength, local topography, and the presence of intervening structures (buildings, etc.) that may intercept dust before it reaches sensitive locations. Furthermore, dust would be naturally suppressed by rainfall. To consider the prevailing conditions at the Site, a review of historical weather data has been undertaken. The closest observation station with a suitable dataset is Emley Moor No.2, located approximately 13.2km to the south of the Site. It is anticipated that meteorological conditions would be reasonably similar over a distance of this magnitude. Meteorological data were obtained for the period 1st January 2014 to 31st December 2023 (inclusive), and reference should be made to Appendix D for a wind rose of these data. A review of the wind rose has shown that any receptors located to the east of the Site have the greatest potential to be affected by dust and particulate matter emitted and re-suspended during the construction phase, as a result of the prevailing wind direction. However, under low wind speed conditions, it is likely that the majority of dust would be deposited in the area immediately surrounding the source.

6.1.3 Risk Assessment of Dust Impacts

Step 2A - Defining the Potential Dust Emission Magnitude

With reference to the criteria detailed in Appendix C, the dust emission magnitude has been determined for each of the following categories: demolition, earthworks, construction and trackout. These have been summarised in Table 6.1.

Table 6.1
Dust Emission Magnitude

Activity	Criteria	Dust Emission Magnitude
Demolition	The total building volume to be demolished is <12,000m ³ .	Small
Earthworks	Total site area <18,000m ² .	Small
Construction	Total building volume assumed to be between 12,000m ³ and 75,000m ³ , with potentially dusty construction materials used (e.g. concrete) and on-site concrete batching likely.	Medium
Trackout	Unpaved road length in the Site boundary is >100m.	Large

²⁵ DEFRA (2024) MAGIC [Online] Available at: <https://magic.DEFRA.gov.uk/magicmap.aspx> [Accessed on 11/12/2024].

Step 2B - Defining the Sensitivity of Surrounding Area

Using the criteria set out in Tables C2 to C4 in Appendix C, the sensitivity of the surrounding area to impacts from dust emissions has been determined and is set out in Table 6.2.

Dust Soiling

There are 10-100 residential dwellings located within 20m of the Site boundary. Given the proximity and number of existing **high sensitivity** receptors, the overall sensitivity of the surrounding area is considered to be **high**, at worst.

Human Health Effects

As discussed in Section 5.0, the PM₁₀ concentrations taken from the DEFRA background maps, for the Site location, are predicted to be below the relevant AQO (Table 5.2). The data indicates background concentrations <12µg/m³ and based on professional judgment, it is anticipated that PM₁₀ concentrations at the Site are unlikely to be much higher than background. Therefore, PM₁₀ concentrations are expected to be below 24µg/m³. Based on the number of sensitive receptors nearby and the distance of these from the source, the sensitivity of the area is therefore considered to be **low** for human health impacts.

Table 6.2
Sensitivity of Receptors

Potential Impact		Sensitivity at Site
Dust Soiling	Receptor Sensitivity	High
	Number of Receptors	10-100 receptors within 20m
	Sensitivity of the area	High
Human Health	Receptor Sensitivity	High
	Annual mean PM ₁₀ Concentrations	<24µg/m ³
	Number of Receptors	10-100 receptors within 20m
	Sensitivity of the area	Low

Step 2C - Defining the Risk of Impacts

The dust emission magnitude as set out in Table 6.1 is combined with the sensitivity of the area (Table 6.2) to determine the risk of both dust soiling and human health impacts, assuming no mitigation measures applied at Site. The risk of impacts associated with each activity is provided in Table 6.3 below.

Table 6.3
Summary of Effects Without Mitigation

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

Step 3 - Site Specific Mitigation

The maximum dust risk category defined in Table 6.3 has been used to inform the required site-specific mitigation measures, which are set out in Appendix E. In accordance with the IAQM guidance, where the risk is assigned as negligible, no mitigation measures beyond those required by legislation are required.

Step 4 - Determine Significant Effects

Once the risk of dust impacts has been determined in Step 2C and the appropriate dust mitigation measures identified in Step 3, the final step is to determine whether there are significant effects arising from the construction phase of a proposed development.

For almost all construction activity, the aim should be to prevent significant effects on receptors through the use of effective mitigation. Following the application of all recommended best practice mitigation measures, the residual effect is likely to be **not significant**.

6.2 Operational Impacts

Due to the size of the development, the trip generation of the scheme is anticipated to be below the EPUK/IAQM screening criteria of 500 AADT for outside of an AQMA, as set out in Section 4.3. As such, impacts on local air quality across the local road network are concluded as being **negligible**, with further detailed assessment having been scoped out of the assessment.

Based on professional judgement and taking into account local monitoring showing NO₂ concentrations meeting the relevant AQOs at representative locations, the operational impact of the development is deemed to be **negligible**.

7.0 MITIGATION

7.1 Construction Phase

The control of dust emissions from construction phase site activities relies upon management provisions and mitigation techniques to reduce emissions of dust and limit dispersion. Where dust emission controls have been used effectively, large-scale operations have been successfully undertaken without impacts to nearby properties.

The proposed development has been identified as a **high risk** site for dust soiling effects, based on the highest category detailed in Table 6.3. For human health, the Site has also been identified as a **low risk** site, based on the highest category set out in Table 6.3.

The developer should therefore implement appropriate dust and pollution control measures as set out within the IAQM guidance. A summary of these measures is set out in Appendix E. If applicable, the proposed measures can be set out within an accompanying Construction Environmental Management Plan (CEMP) and should be approved by KC prior to commencement of any work on-site.

Following the implementation of the recommended mitigation measures, the impact of emissions during the construction phase of the proposed development would be **negligible**.

7.2 Operational Phase

The assessment has shown that the operational phase of the development would have a **negligible** impact on local air quality, and as such, no mitigation measures are required during the operational phase.

However, a key theme of the NPPF is that developments should enable future occupiers to make '*green vehicle choices*' and '*ensure an adequate provision of spaces for charging plug-in and other ultra-low emission vehicles*'. Therefore, an electric vehicle recharging provision rate is expected in addition to mitigation arising from the exposure assessment.

In accordance with the West Yorkshire '*Air Quality & Emissions Technical Planning Guidance*' document, based on the scheme being classified as a 'minor' development, the scheme is required to incorporate 'Type 1' mitigation measures to negate the potential effects upon health and the local environment. In addition, as the exposure criteria detailed in Stage 2 is met, further mitigation is required to reduce the level of exposure. The default Type 1 mitigation measures include:

- Improved design to minimise exposure to future occupiers, including a stand-off distance and/or vegetation boundary from the development;
- 1 charging point per unit (dwelling with dedicated parking); and
- Adherence to dust management guidance and best practice for all demolition and construction works provided in an appropriate Construction Environmental Management Plan (CEMP).

In terms of air quality impacts, a good basic design will reduce the level of additional mitigation. A basic design is expected to deliver:

- No additional exposure to increased air pollution for existing or future occupants;

- A location that maximises the use of sustainable transport, that:
 - reduces the number and distance of trips;
 - shifts the journeys to alternative, less polluting modes, and
 - provides for improved technology and efficiencies.
- Greenspace and people priority wherever practicable.

To reduce potential exposure of new occupiers to poor air quality, mitigation included in the design should consider:

- Moving occupied buildings back from the roadside;
- Reducing opening windows/doors facing the roadside;
- Re-organising main habitable rooms away from facing the roadside; and
- As a last resort, including non-opening windows and/or mechanical ventilation (with heat recovery) into the building.

In addition, the following mitigation measures, considered relevant to the scheme, are recommended by the guidance to be implemented to reduce the level of exposure:

- Designing the proposal to reduce the ingress of pollution; and
- Including a stand-off distance and/or vegetation boundary from the development.

It should be noted that the proposed dwellings will be set back from the A62 Leeds Road providing a suitable buffer allowing a greater distance for dispersion of pollutants from road traffic emissions associated with the A62. This is a beneficial mitigation measure and is referenced as a good example in the NPPG. The Site is therefore considered to be of a good basic design with regard to air quality impacts, making the Site suitable for the development proposals.

8.0 CONCLUSION

Orion Homes Limited has appointed Dragonfly Consulting to undertake an Air Quality Assessment to inform the full planning application for the proposed residential development, located at Leeds Road, Heckmondwike.

The IAQM guidance has been used to inform the qualitative assessment of the potential impacts on local air quality from construction phase activities at the Site, with the results used to determine the level of mitigation required at the Site to reduce dust emissions and associated impacts.

Due to the proximity and number of nearby sensitive receptors, the Site is considered to have a **high risk** of dust soiling impacts and a **low risk** with regard to PM₁₀ concentrations. However, through good site practice and the implementation of the recommended, appropriate mitigation measures, the effects of dust and PM₁₀ associated with the construction phase of the proposed development are considered to be **not significant**.

The baseline air quality assessment has predicted a **negligible** impact in terms of exposure to NO₂, PM₁₀ and PM_{2.5} concentrations. Furthermore, the proposed development would not generate operational trips in excess of the EPUK/IAQM criteria and therefore, the impact of the development on local air quality is considered to be **negligible**.

Based on the above, air quality does not pose a constraint to the development of the Site for the proposed residential use and the proposals meet the requirements of both national and local air quality planning policy. The Site is considered to be of a good basic design with regard to air quality impacts, making the Site suitable for the development proposals.

Appendix A - Glossary of Terminology

Term	Definition
Air quality objective	Policy target generally expressed as a maximum ambient concentration to be achieved, either without exception or with a permitted number of exceedances within a specific timescale (see also air quality standard).
Air quality standard	The concentrations of pollutants in the atmosphere which can broadly be taken to achieve a certain level of environmental quality. The standards are based on the assessment of the effects of each pollutant on human health including the effects on sensitive sub groups (see also air quality objective).
Ambient air	Outdoor air in the troposphere, excluding workplace air.
Annual mean	The average (mean) of the concentrations measured for each pollutant for one year. Usually this is for a calendar year, but some species are reported for the period April to March, known as a pollution year. This period avoids splitting winter season between 2 years, which is useful for pollutants that have higher concentrations during the winter months.
AQMA	Air Quality Management Area.
DEFRA	Department for Environment, Food and Rural Affairs.
Exceedance	A period of time where the concentration of a pollutant is greater than, or equal to, the appropriate air quality standard.
Fugitive emissions	Emissions arising from the passage of vehicles that do not arise from the exhaust system.
KC	Kirklees Council.
LAQM	Local Air Quality Management.
NO	Nitrogen monoxide, a.k.a. nitric oxide.
NO ₂	Nitrogen dioxide.
NO _x	Nitrogen oxides.
O ₃	Ozone.
PM ₁₀	Particulate matter with an aerodynamic diameter of less than 10 micrometres.
PM _{2.5}	Particulate matter with an aerodynamic diameter of less than 2.5 micrometres.
µgm ⁻³ micrograms per cubic metre	A measure of concentration in terms of mass per unit volume. A concentration of 1µg/m ³ means that one cubic metre of air contains one microgram (millionth of a gram) of pollutant.
WYLES	West Yorkshire Low Emission Strategy Group.

Appendix C - IAQM Construction Phase Dust Risk Assessment Methodology

In order to assess the potential impacts, the activities on construction sites are divided into four categories. These are:

- demolition (removal of existing structures);
- earthworks (soil-stripping, ground-levelling, excavation and landscaping);
- construction (activities involved in the provision of a new structure); and
- trackout (the transport of dust and dirt from the construction site onto the public road network where it may be deposited and then re-suspended by vehicles using the network).

For each activity, the risk of dust annoyance, health and ecological impact is determined using three risk categories: low, medium and high risk. The risk category may be different for each of the four activities. The risk magnitude identified for each of the construction activities is then compared to the number of sensitive receptors in the near vicinity of the site in order to determine the risks posed by the construction activities to these receptors.

Step 1 - Screen the Need for a Detailed Assessment

The first step is to screen the requirement for a more detailed assessment. An assessment is required where there is:

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

Step 2A - Define the Potential Dust Emission Magnitude

This is based on the scale of the anticipated works and the proximity of nearby receptors. The risk is classified as small, medium or large for each of the four categories.

Demolition: The potential dust emission classes for demolition are:

- Large: Total building volume >75,000m³, potentially dusty construction material (e.g. Concrete), on site crushing and screening, demolition activities >12m above ground level;
- Medium: total building volume 12,000m³ - 75,000m³, potentially dusty construction material, demolition activities 6-12m above ground level; and
- Small: total building volume <12,000m³, construction material with low potential for dust release (e.g. metal cladding or timber), demolition activities <6m above ground, demolition during wetter months.

Earthworks: This involves excavating material, haulage, tipping and stockpiling. The potential dust emission classes for earthworks are:

- Large: Total site area >110,000m², potentially dusty soil type (e.g. clay, which will be prone to suspension when dry due to small particle size), >10 heavy earth moving vehicles active at any one time, formation of bunds >6m in height;

- Medium: Total site area 18,000 m² - 110,000m², moderately dusty soil (e.g. silt), 5 - 10 heavy earth moving vehicles active at any one time, formation of bunds 3m - 6m in height; and
- Small: Total site area <18,000m², soil type with large grain size (e.g. sand), <5 heavy earth moving vehicles active at any one time, formation of bunds <3m in height.

Construction: The important issues here when determining the potential dust emission magnitude include the size of the building(s)/infrastructure, method of construction, construction materials, and duration of build. The categories are:

- Large: Total building volume >75,000m³, on site concrete batching, sandblasting;
- Medium: Total building volume 12,000m³ - 75,000m³, potentially dusty construction material (e.g. concrete), on site concrete batching; and
- Small: Total building volume <12,000m³, construction material with low potential for dust release (e.g. metal cladding or timber).

Trackout: The risk of impacts occurring during trackout is predominantly dependent on the number of vehicles accessing the Site on a daily basis. However, vehicle size and speed, the duration of activities and local geology are also factors which are used to determine the emission class of the Site as a result of trackout. The categories are:

- Large: >50 HDV (>3.5t) outward movements in any one day, potentially dusty surface material (e.g. high clay content), unpaved road length >100m;
- Medium: 20-50 HDV (>3.5t) outward movements in any one day, moderately dusty surface material (e.g. high clay content, unpaved road length 50-100m; and
- Small: <20 HDV (>3.5t) outward movements in any one day, surface material with low potential for dust release, unpaved road length <50m.

Step 2B - Define the Sensitivity of the Area

The sensitivity of the area is defined for dust soiling, human health (PM₁₀) and ecological receptors. The sensitivity of the area takes into account the following factors:

- the specific sensitivities of receptors in the area;
- the proximity and number of receptors;
- in the case of PM₁₀, the local background concentration; and
- site specific factors, such as whether there are natural shelters, such as trees, to reduce the risk of wind-blown dust.

Table C1 is used to define the sensitivity of different types of receptors to dust soiling, health effects and ecological effects.

Based on the sensitivities assigned to the different receptors surrounding the site and numbers of receptors within certain distances of the site, a sensitivity classification can be defined for each. Tables C2 to C4 indicate the criteria used to determine the sensitivity of the area to dust soiling, human health and ecological impacts.

Table C1
Examples of Factors Defining Sensitivity of an Area

Sensitivity of Area	Dust Soiling	Human Receptors	Ecological Receptors
High	<p>Users can reasonably expect enjoyment of a high level of amenity. The appearance, aesthetics or value of their property would be diminished by soiling'. The people or property would reasonably be expected to be present continuously, or at least regularly for extended periods, as part of the normal pattern of use of the land.</p> <p>E.g. dwellings, museums and other important collections, medium and long term car parks and car showrooms.</p>	<p>10 - 100 dwellings within 20 m of site.</p> <p>Local PM₁₀ concentrations close to the objective (e.g. annual mean 36-40 µg/m³).</p> <p>E.g. residential properties, hospitals, schools and residential care homes.</p>	<p>Locations with an international or national designation and the designated features may be affected by dust soiling. Locations where there is a community of a particularly dust sensitive species such as vascular species included in the Red List for Great Britain.</p> <p>E.g. A Special Area of Conservation (SAC).</p>
Medium	<p>Users would expect to enjoy a reasonable level of amenity, but would not reasonably expect to enjoy the same level of amenity as in their home.</p> <p>The appearance, aesthetics or value of their property could be diminished by soiling</p> <p>The people or property wouldn't reasonably be expected to be present here continuously or regularly for extended periods as part of the normal pattern of use of the land.</p> <p>E.g. parks and places of work</p>	<p>Less than 10 receptors within 20m.</p> <p>Local PM₁₀ concentrations below the objective (e.g. annual mean 30-36 µg/m³).</p> <p>E.g. office and shop workers but will generally not include workers occupationally exposed to PM₁₀ as protection is covered by the Health and Safety at Work legislation.</p>	<p>Locations where there is a particularly important plant species, where its dust sensitivity is uncertain or unknown.</p> <p>Locations with a national designation where the features may be affected by dust deposition</p> <p>E.g. A Site of Special Scientific Interest (SSSI) with dust sensitive features.</p>
Low	<p>The enjoyment of amenity would not reasonably be expected.</p> <p>Property would not reasonably be expected to be diminished in appearance, aesthetics or value by soiling.</p> <p>There is transient exposure, where the people or property would reasonably be expected to be present only for limited periods of time as part of the normal pattern of use of the land.</p> <p>E.g. playing fields, farmland unless commercially sensitive horticultural, footpaths, short lived car parks and roads.</p>	<p>Locations where human exposure is transient.</p> <p>No receptors within 20m.</p> <p>Local PM₁₀ concentrations well below the objectives (less than 75%).</p> <p>E.g. public footpaths, playing fields, parks and shopping streets.</p>	<p>Locations with a local designation where the features may be affected by dust deposition.</p> <p>E.g. Local Nature Reserve with dust sensitive features.</p>

Table C2
Sensitivity of the Area to Dust Soiling on People and Property

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

Table C3
Sensitivity of the Area to Human Health

Receptor Sensitivity	Annual Mean PM ₁₀ Concentration	Number of Receptors	Distance from the Source (m)			
			<20	<50	<100	<250
High	>32µg/m ³	>100	High	High	High	Medium
		10-100	High	High	Medium	Low
		1-10	High	Medium	Low	Low
	28-32µg/m ³	>100	High	High	Medium	Low
		10-100	High	Medium	Low	Low
		1-10	High	Medium	Low	Low
	24-28µg/m ³	>100	High	Medium	Low	Low
		10-100	High	Medium	Low	Low
		1-10	Medium	Low	Low	Low
	<24µg/m ³	>100	Medium	Low	Low	Low
		10-100	Low	Low	Low	Low
		1-10	Low	Low	Low	Low
Medium	>32µg/m ³	>10	High	Medium	Low	Low
		1-10	Medium	Low	Low	Low
	28-32µg/m ³	>10	Medium	Low	Low	Low
		1-10	Low	Low	Low	Low
	24-28µg/m ³	>10	Low	Low	Low	Low
		1-10	Low	Low	Low	Low
	<24µg/m ³	>10	Low	Low	Low	Low
		1-10	Low	Low	Low	Low
Low	-	>1	Low	Low	Low	Low

Table C4
Sensitivity of the Area to Ecological Impacts

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

Step 2C - Define the Risk of Impacts

The final step is to combine the dust emission magnitude determined in step 2A with the sensitivity of the area determined in step 2B to determine the risk of impacts with no mitigation applied. Tables C5 to C7 indicate the method used to assign the level of risk for each construction activity. The identified level of risk is then used to determine measures for inclusion within a site-specific Construction Environmental Management Plan (CEMP) aimed at reducing dust emissions and hence reducing the impact of the construction phase on nearby receptors. The mitigation measures are drawn from detailed mitigation set out within the IAQM guidance document.

Table C5
Risk of Dust Impacts from Demolition

Sensitivity of Area	Large	Medium	Small
High	High Risk	Medium Risk	Medium Risk
Medium	High Risk	Medium Risk	Low Risk
Low	Medium Risk	Low Risk	Negligible

Table C6
Risk of Dust Impacts from Earthworks/Construction

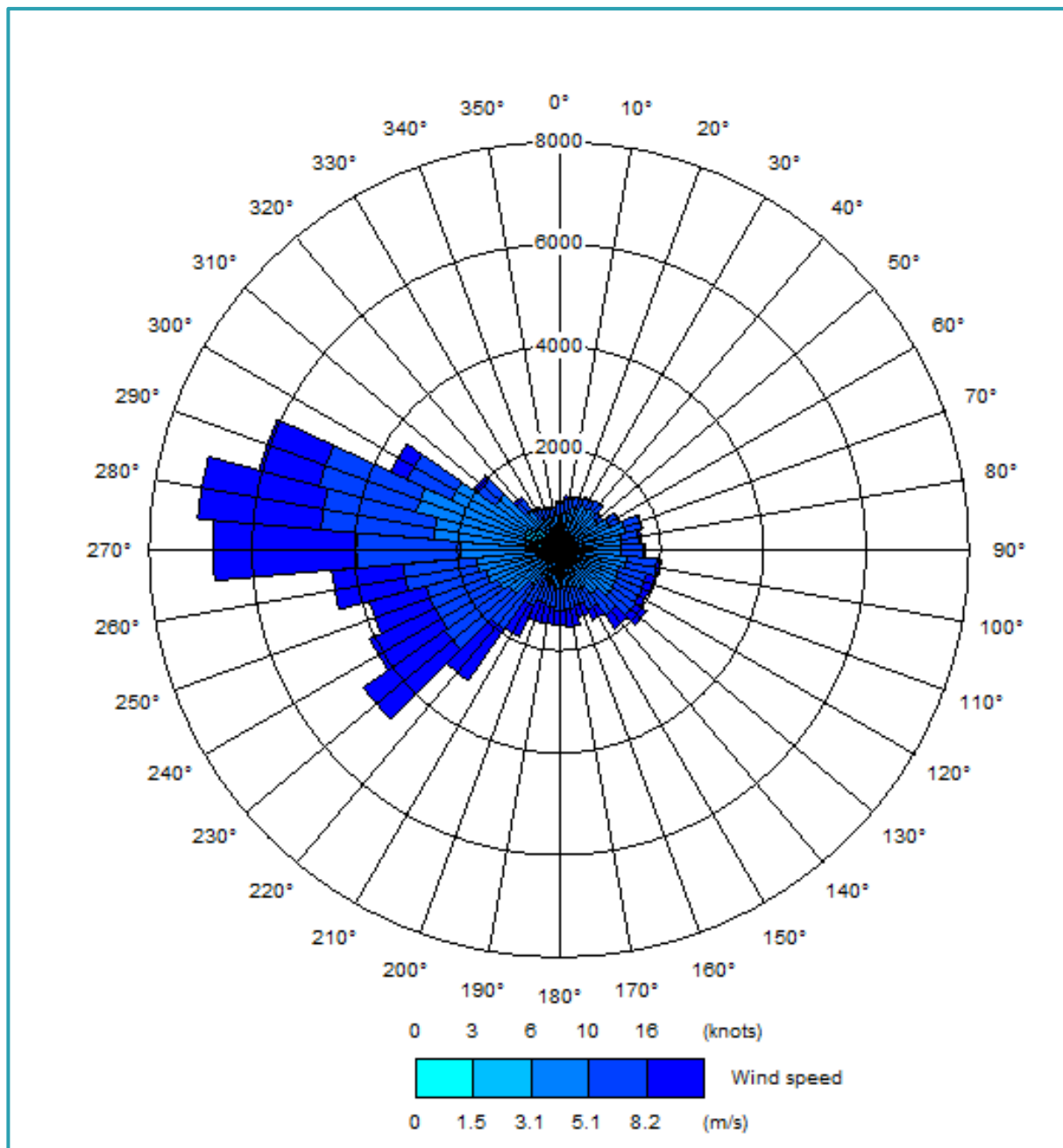
Sensitivity of Area	Large	Medium	Small
High	High Risk	Medium Risk	Low Risk
Medium	Medium Risk	Medium Risk	Low Risk
Low	Low Risk	Low Risk	Negligible

Table C7
Risk of Dust Impacts from Trackout

Sensitivity of Area	Large	Medium	Small
High	High Risk	Medium Risk	Low Risk
Medium	Medium Risk	Medium Risk	Low Risk
Low	Low Risk	Low Risk	Negligible

Appendix D - Wind Rose for Emley Moor No.2 (2014-2023)

Figure D1
Wind Rose for Emley Moor No.2 (2014-2023)



Appendix E - Construction Phase Mitigation Measures

The mitigation measures have been divided into general measures applicable to all sites and measures applicable specifically to demolition, earthworks, construction and trackout, for consistency with the IAQM assessment methodology.

The following table details the mitigation required for high, medium and low risk sites.

It is noted that not all mitigation measures will be applicable to every site and development, however, all of those recommended by the IAQM have been provided for completeness. Professional judgement should therefore be used, taking into consideration the site location, scale and nature of the proposed works.

Based on the assessment results, mitigation will be required during the construction phase of the proposed development, commensurate with a **high risk** site, which is the highest risk category identified in Section 6.0. The relevant column and mitigation measures have therefore been highlighted for ease.

Key to Table:

H - Highly Recommended	D - Desirable	N - Not Required
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Table E1
IAQM Construction Phase Mitigation Measures

Mitigation Measure	Low Risk	Medium Risk	High Risk
Communication			
1. Develop and implement a stakeholder communications plan that includes community engagement before work commences on site.	N	H	H
2. 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.	H	H	H
3. Display the head or regional office contact information.	H	H	H
4. 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. In London additional measures may be required to ensure compliance with the Mayor of London's guidance. The DMP may include monitoring of dust deposition, dust flux, realtime PM ₁₀ continuous monitoring and/or visual inspections.	D	H	H
Site Management			
5. 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.	H	H	H
6. Make the complaints log available to the local authority when asked.	H	H	H
7. Record any exceptional incidents that cause dust and/or air emissions, either on- or off-site, and the action taken to resolve the situation in the log book.	H	H	H

Mitigation Measure	Low Risk	Medium Risk	High Risk
8. 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.	N	N	H
Monitoring			
9. 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.	D	D	H
10. 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.	H	H	H
11. 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.	H	H	H
12. 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.	H	H	H
Preparing and Maintaining the Site			
13. Plan site layout so that machinery and dust causing activities are located away from receptors, as far as is possible.	H	H	H
14. Erect solid screens or barriers around dusty activities or the site boundary that are at least as high as any stockpiles on site.	H	H	H
15. Fully enclose site or specific operations where there is a high potential for dust production and the site is active for an extensive period.	D	H	H
16. Avoid site runoff of water or mud.	H	H	H
17. Keep site fencing, barriers and scaffolding clean using wet methods.	D	H	H
18. 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.	D	H	H
19. Cover, seed or fence stockpiles to prevent wind whipping.	D	H	H
Operating Vehicle/Machinery and Sustainable Travel			
20. Ensure all on-road vehicles comply with the requirements of the London Low Emission Zone and the London NRMM standards, where applicable.	H	H	H
21. Ensure all vehicles switch off engines when stationary - no idling vehicles.	H	H	H
22. Avoid the use of diesel or petrol powered generators and use mains electricity or battery powered equipment where practicable.	H	H	H
23. Impose and signpost a maximum-speed-limit of 15mph on surfaced and 10mph 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).	D	D	H
24. Produce a Construction Logistics Plan to manage the sustainable delivery of goods and materials.	N	N	H

Mitigation Measure	Low Risk	Medium Risk	High Risk
25. Implement a Travel Plan that supports and encourages sustainable travel (public transport, cycling, walking, and car-sharing).	N	D	H
Operations			
26. 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.	H	H	H
27. Ensure an adequate water supply on the site for effective dust/particulate matter suppression/mitigation, using non-potable water where possible and appropriate	H	H	H
28. Use enclosed chutes and conveyors and covered skips.	H	H	H
29. Minimise drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment and use fine water sprays on such equipment wherever appropriate.	H	H	H
30. 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.	D	H	H
Waste Management			
31. Avoid bonfires and burning of waste materials.	H	H	H
Measures Specific to Demolition			
32. Soft strip inside buildings before demolition (retaining walls and windows in the rest of the building where possible, to provide a screen against dust).	D	D	H
33. Ensure effective water suppression is used during demolition operations. Hand held 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.	H	H	H
34. Avoid explosive blasting, using appropriate manual or mechanical alternatives.	H	H	H
35. Bag and remove any biological debris or damp down such material before demolition	H	H	H
Measures Specific to Earthworks			
36. Re-vegetate earthworks and exposed areas/soil stockpiles to stabilise surfaces as soon as practicable.	N	D	H
37. Use Hessian, mulches or trackifiers where it is not possible to re-vegetate or cover with topsoil, as soon as practicable.	N	D	H
38. Only remove the cover in small areas during work and not all at once.	N	D	H
Measures Specific to Construction			
39. Avoid scabbling (roughening of concrete surfaces) if possible.	D	D	H
40. 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.	D	H	H
41. 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.	N	D	H
42. For smaller supplies of fine power materials ensure bags are sealed after use and stored appropriately to prevent dust.	N	D	D

Mitigation Measure	Low Risk	Medium Risk	High Risk
Measures Specific to Trackout			
43. 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.	D	H	H
44. Avoid dry sweeping of large areas.	D	H	H
45. Ensure vehicles entering and leaving sites are covered to prevent escape of materials during transport.	D	H	H
46. Inspect on-site haul routes for integrity and instigate necessary repairs to the surface as soon as reasonably practicable.	N	H	H
47. Record all inspections of haul routes and any subsequent action in a site logbook.	D	H	H
48. Install hard surfaced haul routes, which are regularly damped down with fixed or mobile sprinkler systems, or mobile water bowsers and regularly cleaned.	N	H	H
49. Implement a wheel washing system (with rumble grids to dislodge accumulated dust and mud prior to leaving the site where reasonably practicable).	D	H	H
50. 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.	N	H	H
51. Access gates to be located at least 10m from receptors where possible.	N	H	H