

AIR QUALITY ASSESSMENT

on behalf of

DMG CONTRACTORS LTD

for

WATERFOLD LANE, HEAP BRIDGE

REPORT DATE: 5TH AUGUST 2022

REPORT NUMBER: 102852

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Summary

This air quality report has been prepared to accompany a planning application for a proposed residential development at Waterfold Lane, Heap Bridge. It assesses the potential changes in air quality due to the construction and operation of the proposed development and whether these potential changes would significantly alter air quality.

The assessment of dust soiling and human health impacts during the demolition and construction phase of the development results in the proposal of dust mitigation measures. The implementation of these will ensure that residual dust impacts during the demolition and construction phase are not significant.

Concentrations of NO₂ and PM₁₀ are likely to be below their respective long and short-term objectives at the proposed development site which is therefore considered suitable for residential use with regards to air quality. Concentrations of PM_{2.5} are expected to be below the annual mean target.

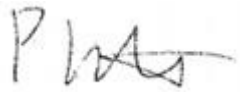
The proposed development is not expected to have a significant impact on local air quality.

There is, therefore, no reason for this application to be refused on the grounds of air quality.

Prepared By Philip Walton

Reviewed By Unam Ejaz

Signed



Signed



Date

5th August 2022

Date

5th August 2022

Record of changes

Version	Date	Change	Initials
1	5th August 2022	First issue	PW

Contents

Summary	1
Contents	0
1 Introduction.....	1
2 Site Description	1
3 Proposed Development	1
4 Policy Context	2
4.1 Air Quality Objectives	2
4.2 Greater Manchester Action Plan 2016-2021	3
4.3 Greater Manchester Clean Air Plan	3
5 Methodology	3
5.1 Data Sources	3
5.2 Consultation	4
5.4 IAQM Construction Dust Assessment	5
5.5 Road Traffic Emissions Assessment	5
6 Baseline Air Quality	10
6.1 Local Air Quality	10
6.2 Air Quality Monitoring	10
6.3 Background Concentrations	11
7 Construction Dust Impact Assessment	12
7.1 Step 1 – Requirement for a Detailed Assessment.....	12
7.2 Step 2 – Assess the Risk of Dust Impacts	12
7.3 Step 3 – Site-Specific Mitigation.....	13
7.4 Step 4 – Determine Significant Effects	14
8 Road Traffic Assessment	14
8.1 Baseline Assessment	14
8.3 Site Suitability Assessment	15
9 Mitigation.....	18
10 Summary of Impacts and Conclusion	18
APPENDICES	19
Glossary of Terms	43

1 Introduction

- 1.1 Miller Goodall Ltd has been instructed to prepare an air quality assessment to accompany a planning application for a proposed residential development at Waterfold Lane, Heap Bridge. The site lies within the administrative boundary of Rochdale Borough Council (RBC).
- 1.2 The report provides a review of the existing air quality in proximity to the proposed development site and assesses the potential impact of the proposed development on local air quality following Local Air Quality Management Technical Guidance¹ and EPUK and IAQM guidance².
- 1.3 The report provides an assessment of the potential air quality impacts associated with the construction and operational phases of the proposed development. The potential air quality changes at existing sensitive receptors adjacent to the site and roads subject to increased vehicle generation from the development are assessed. The suitability of the site for the intended use is also assessed.
- 1.4 The main pollutants of health concern from road traffic exhaust releases are nitrogen dioxide (NO₂) and fine particulates, normally assessed as the fraction of airborne particles of mean aerodynamic diameter less than ten micrometres (PM₁₀) and 2.5 micrometres (PM_{2.5}) since these pollutants are most likely to approach their respective air quality objectives in proximity to major roads and congested areas. This assessment has therefore focused on the impact of the proposed development on concentrations of NO₂, PM₁₀ and PM_{2.5}.

2 Site Description

- 2.1 The site is currently unoccupied. The proposed development site is partially located within the wider Greater Manchester Air Quality Management Area (AQMA). The AQMA at this location has been declared to an approximate 100 m width either side of the M66.
- 2.2 The proposed development borders the south on-slip lane of the M66 Junction 2. The River Roch borders the site to the north, with open land beyond. The River Roch borders the site to the east, with residential housing beyond. Waterfold Lane borders the site to the south, with open land beyond. The on-slip lane borders the site to the west, with the M66 carriageway located approximately 30 m further west of the site.
- 2.3 The location of the closest AQMA in relation to the development site is shown in **Appendix A**.

3 Proposed Development

- 3.1 The proposed development includes two residential apartment blocks for 36 apartments, with associated car parking, landscaping, and site access from Waterfold Lane.

¹ Department for the Environment Food and Rural Affairs (2018) 'Local Air Quality Management Technical Guidance Document LAQM.TG (16)', London: Defra.

² EPUK and IAQM (January 2017) Land Use Planning and Development Control: Planning for Air Quality (v1.2)

4 Policy Context

4.1 Air Quality Objectives

- 4.1.1 The standards and objectives relevant to the LAQM framework have been prescribed through the Air Quality (England) Regulations (2000) and the Air Quality (England) (Amendment) Regulations 2002; the Air Quality Standards Regulations 2010 set out the combined Daughter Directive limit values and interim targets for Member State compliance.
- 4.1.2 The United Kingdom left the European Union on 31st January 2020 and is no longer a member state. However, the current framework of air quality legislation was converted into domestic law through the European Union (Withdrawal) Act 2018^[3].
- 4.1.3 The relevant air quality standards and objectives are presented in **Table 1**. Pollutant standards relate to ambient pollutant concentrations in air, set on the basis of medical and scientific evidence of how each pollutant affects human health.

Table 1: Air Quality Strategy Objectives (England) for the Purposes of Local Air Quality Management

Pollutant	Air Quality Objective	
	Concentration	Measured As
Nitrogen dioxide (NO ₂)	200 µg/m ³	1-hour mean not to be exceeded more than 18 times per year
	40 µg/m ³	Annual mean
Particles (PM ₁₀)	50 µg/m ³	24-hour mean not to be exceeded more than 35 per year
	40 µg/m ³	Annual mean
Particles (PM _{2.5})	25 µg/m ³	Annual mean (target)

- 4.1.4 Where an air quality objective is unlikely to be met by the relevant deadline, local authorities must designate those areas as Air Quality Management Areas (AQMA) and take action to work towards meeting the objectives. Following the designation of an AQMA, local authorities are required to develop an Air Quality Action Plan (AQAP) to work towards meeting the objectives and to improve air quality locally.
- 4.1.5 Possible exceedances of air quality objectives are generally assessed in relation to those locations where members of the public are likely to be regularly present and are likely to be exposed for a period of time appropriate to the averaging period of the objective.

³ UK Parliament (2018): <http://www.legislation.gov.uk/ukpga/2018/16/contents/enacted>

4.2 Greater Manchester Action Plan 2016-2021

- 4.2.1 The Greater Manchester Combined Authority (GMCA) Air Quality Action Plan 2016-2021 ^[4] provides information in respect of the actions planned by the Greater Manchester Authorities in relation to declared AQMAs. Action Plans are the mechanism by which the local authorities, in collaboration with national agencies and others, outline their plans for working towards achieving the air quality objectives through the powers available to them. In relation to managing new development, the action plan states that:

“Action 1.1

Greater Manchester (GM)councils to adopt the most recent IAQM Guidance on the Assessment of Dust from Demolition and Construction as current best practice to assess and mitigate emissions from construction sites. i. Where a key priority area is affected by a proposed scheme, a high level of mitigation control will be requested.

Action 1.2

GM local authorities will adopt the most recent IAQM/EPUK guidance for air quality assessment as current best practice, to help ensure that planning applications consider potential local air quality impacts and opportunities to improve air quality are realised. i. Where a Key Priority Area is significantly adversely affected by a proposed scheme, a high level of mitigation control will be requested. ii. The IAQM/EPUK guidance will also be used to screen and assess industrial sources, such as boilers or large stationary engines. GM local authorities to recommend mitigation controls in accordance with the most recent guidance and the other actions in this document for new developments that contribute to a deterioration of air quality in Air Quality Management Areas (AQMAs). Where an air quality assessment is triggered, it should include a review of monitoring data. Where monitoring is not currently undertaken, it may be requested to inform the application or to confirm the effects.”

4.3 Greater Manchester Clean Air Plan

- 4.3.1 GMCA is required to integrate a Clean Air Zone (CAZ) to improve air quality in the shortest time possible (required per previous legal cases brought against the UK Government). Until recently, this was proposed to be a charging CAZ, however, a revision has now been entered for agreement to provide an investment-led CAZ.
- 4.3.2 The Greater Manchester Air Quality Administration Committee has submitted the ‘GM Clean Air Plan – July 2022 update’, as a draft document, to the Secretary of State on the 1st of July 2022. This document aims to achieve compliance with NO₂ concentrations, below the air quality objectives, by 2024. Miller Goodall assume a Air Quality Action Plan update (2022 onward) is subject to the conclusions of these submissions.

5 Methodology

5.1 Data Sources

- 5.1.1 The air quality assessment has been undertaken and prepared with reference to information from several sources, as detailed in **Table 2**.

⁴ GMCA (2016) Greater Manchester Air Quality Action Plan 2016-2021

Table 2: Key Information Sources

Data Source	Reference
Rochdale Borough Council (RBC) / Greater Manchester Combined Authority (GMCA)	RBC / GMCA (2016) <i>Greater Manchester Air Quality Action Plan 2016-2021</i> RBC / GMCA (2020) <i>2020 Air Quality Annual Status Report</i>
Clean Air Greater Manchester	Air quality monitoring data
Institute of Air Quality Management (IAQM)	IAQM (2014) <i>Assessment of Dust from Demolition and Construction (v1.1)</i>
Department for Environment Food and Rural Affairs (Defra)	Defra <i>Local Air Quality Management Technical Guidance TG(16), updated 2021</i>
Environmental Protection UK (EPUK) and Institute of Air Quality Management (IAQM)	EPUK and IAQM (January 2017) <i>Land Use Planning and Development Control: Planning for Air Quality (v1.2)</i>
Ministry of Housing, Communities & Local Government	Planning Practice Guidance: Air Quality, November 2019 National Planning Policy Framework (NPPF), July 2021
Defra's LAQM Support Tools	Local Air Quality Management 1 km x 1 km grid background pollutant maps NO _x to NO ₂ Calculator
SCP Transportation Planning : Infrastructure Design	Traffic Data
Air Pollution Services	Meteorological data from Manchester Airport for the year 2019

5.2 Consultation

- 5.3 Pre-application discussions were held with the Applicant and RBC (date unknown). The following advice was provided in relation to the air quality discipline:

"Air Quality"

As the site is located immediately to the east of M66 motorway an Air Quality Assessment (AQA) will be required. The eastern part of the site is located within the Air Quality Management Area (AQMA).

The AQA should cover NO₂, PM₁₀ and PM_{2.5} emissions and it is suggested the NO_x data from the Cherrington Drive Castleton AQ monitoring site as this is located adjacent to a motorway and to the NE of the M62. As the site in question is adjacent and NE of the M66 the prevailing wind directions affect the two locations is similar. The Council's Senior Transport Strategy & Projects Officer has also required that any submission include the

provision of electric vehicle charging points at each residence, and a contribution to provide a NOx diffusion tube and the cost of data collection on Bury Old Road”.

- 5.3.1 The proposed air quality assessment methodology was sent by email to RBC on 24th June, 14th July and 25th July 2022. At the time of writing, no response had been received.
- 5.3.2 The methodology included details of the modelling approach to be taken, including the use of ADMS-Roads and air quality monitor ‘Bury 7’ in the model verification procedure. The ‘Bury 7’ air quality monitor is adjacent to the M66 and is part of the GMCA network (located to the north of the site, further details within this report), which is considered to be more representative of the development site than the M62 Cherrington Drive air quality monitor discussed in the pre-app. The traffic patterns and issues between the M62 and M66 are considered to be fundamentally different.
- 5.3.3 In addition to the above methodology, there has been difficulties in obtaining suitable traffic flow information for the slip lanes of the M66 Junction 2. An alternative modelling methodology has been undertaken, by extending the full width of the motorway and the significant increase in traffic compared to a slip lane up to the site boundary. Various worst-case modelling and calculation approaches have been included to limit the limitations of this modelling approach. Miller Goodall also raised this during the consultation request.
- 5.3.4 The assessment has been prepared to the latest legislation and guidance.

5.4 IAQM Construction Dust Assessment

- 5.4.1 The IAQM has produced guidance⁵ on the assessment of air quality impacts arising from dust associated with construction and demolition activities and provides a methodology by which to complete such assessments. The IAQM methodology provides a risk assessment structure to determine the likely impact of the development on nearby receptor locations and recommends mitigation measures that should be implemented to reduce any such impact. The methodology for the assessment is shown in **Appendix B**. The study area in relation to dust and the zones of interest used within the assessment (<20 m, 20 m – 50 m and 50 – 100 m from the site) are shown in **Appendix C**. The dust assessment informed the recommended mitigation outlined in **Appendix D**.

5.5 Road Traffic Emissions Assessment

Air Dispersion Model

- 5.5.1 The validated Atmospheric Dispersion Modelling System for Roads (ADMS-Roads) v5.0.1.3 was used to assess the local air quality impact of vehicle exhaust emissions, on concentrations of NO₂, PM₁₀ and PM_{2.5} at proposed sensitive receptors to be introduced at the development site.
- 5.5.2 The total vehicle generation is below the recommended requirements for when a detailed assessment is needed, per the EPUK 2017 Guidance² criterion. Further details are provided further into this section to the reasoning. A qualitative discussion has been provided in relation to the potential air quality changes to existing sensitive receptors. A detailed modelling assessment of site suitability has been undertaken.

Assessment Scenarios

⁵ IAQM “Assessment of dust from demolition and construction” v1.1 2014

5.5.3 The assessment considered the following scenarios:

- Scenario 1: 2019 - base year;
- Scenario 2: 2025 - opening year 'with development'; and
- Scenario 3: No improvement sensitivity test (2019 concentrations with 2025 traffic).

Traffic Data

5.5.4 The spatial scope for the assessment focused on those routes affected by the proposed development. The traffic data used in the assessment and a map of the road network is provided in **Appendix E**.

5.5.5 Vehicles within the study area have been modelled at posted speed limits apart from the approach to junctions where queuing traffic sections are included in the model at 5 to 32 kph where appropriate following Defra guidance.

5.5.6 Traffic data has been obtained from the Department for Transport Road Traffic Statistics⁶. The 2019 data was adjusted to 2025 using a TempPRO Growth Factor of 1.0714.

5.5.7 LAQM.TG (16) recommends temporal variations to be considered within air quality modelling. Therefore, a 7-day profile based on the Department for Transport's statistics was used within the model.

Meteorological Data

5.5.8 Meteorological data for 2019 from the Manchester Airport recording station was used in the ADMS-Roads model. This is the most representative recording station for the development site.

5.5.9 The wind rose for 2019 from Manchester Airport recording station is provided in **Appendix E**. Dispersion values for the site and meteorological station have been used. The factors applied for surface roughness (m) and the minimum monin-obukhov length (m) are outlined in **Appendix E**.

Modelling Approach

5.5.10 During the preparation of this assessment, it proved difficult to obtain suitable traffic data information for the slip lanes of the M66 Junction 2. It is not possible to organise traffic surveys without National Highways consent. The southbound on-slip lane borders, and is west of, the development site. The slip lane is, therefore, a potentially important road in the context of the development site. Its omission in an air quality model would present possible underpredictions, as the next input to the model would be the M66 link road, creating a 30 m zone between the site and the M66 where no emissions would arise.

5.5.11 An alternative modelling methodology has been undertaken to reduce the limitations of this assessment. Several worst-case inclusions have been taken to reduce the assumptions and limitations of the missing slip lane traffic flow data.

⁶ Department for Transport, Road Traffic Statistics. Available at: <https://roadtraffic.dft.gov.uk/manualcountpoints/47852>

- 5.5.12 The approach taken has been to extend the M66 carriageway road width in the model. The road width is extended beyond the carriageway and covers the slip lane width. An image of the model and road width is shown in **Appendix E**. The purpose of this is create pollution at the distance of the slip lane to the development, rather than having an area of zero emission. This methodology, therefore, assumes that the entirety of the M66 traffic is passing adjacent to the site, rather than at its current position 30 m from the site. This ensures that a proxy is included in the model for the emissions arising at the distance of the slip lane to the development site.
- 5.5.13 The M66 2019 baseline flow (south of Junction 2 roundabout) is 111,851 Annual Average Daily Flow, with 7.3% heavy-duty vehicle percentage⁷. Air pollution decreases with distance from the source, therefore, in the current baseline pollution would reduce over the 30 m distance. For this modelling assessment, it is modelled so that all 111,851 AADT pass adjacent to the site boundary (up to the eastern edge of the slip lane). The slip lane would have significantly less traffic than the flows on the M66. Therefore, this is expected to present a worst-case approach and limits the effect of omitting traffic flow data from the slip lane position.
- 5.5.14 In addition to this road width methodology, several other parameters and approaches have been included to present a worst-case approach, to demonstrate whether there is a risk of future residents being exposed to adverse air quality and to allow an informed conclusion of the overall significance:
- Model verification has been completed with 'Bury 7' which is located at a similar distance to the M66 as the development site.
 - The M66 is elevated and is not level with the development site. The site is approximately 5 m below the level of the M66 carriageway. The ADMS-Roads model allows for elevated road inputs, as this can have a significant effect on the pollution dispersion potential. Broadly, pollution disperses horizontally from the road source and then disperses upwards into the airflow. If the M66 link was placed 5 m above the development site in the model, then this would reduce the pollution arriving at site. For this modelling approach, the M66 is assumed to be level with the development site, to ensure maximum pollution contributions.
 - A no-improvement sensitivity test has been included. The no-improvement test was a common approach utilised in Emission Factor Toolkit versions 9 and below, however, with the release and updates of versions 10 and 11, it is no longer needed⁷. The no-improvement test models the future traffic flow to the baseline emission year (2019). This freezes the vehicle fleet at 2019 levels, whereas improvements to the fleet would be expected through new vehicle purchases of Euro VI class and the removal of older polluting vehicles from the network. Background concentrations are also held at the baseline (2019). This approach, therefore, presents an overly conservative approach by assuming there would be no air quality improvements between 2019 to 2025.

Sensitive Receptors

- 5.5.15 The appointed transport consultant SCP Transportation Planning has confirmed that the total vehicular generation of the proposed development is 87 light-duty vehicle (LDV) Annual Average Daily Traffic (AADT). The EPUK 2017 Guidance² states a detailed assessment is recommended where either 500 LDV AADT outside an AQMA, or 100 LDV AADT at an AQMA are met. Neither criterion is met by the proposed development.
- 5.5.16 An assessment of the air quality change to existing sensitive receptors has been screened out due to low vehicle trip generation associated with the proposed development.

⁷ Air Quality Consultants, 2020. Comparison of EFT v10 with EFT v9. Available at: <https://www.aqconsultants.co.uk/CMSPages/GetFile.aspx?guid=9d6b50e1-3897-46cf-90f1-3669c6814f1d>

5.5.17 An assessment of site suitability has been undertaken for concentrations of NO₂, PM₁₀ and PM_{2.5} at proposed sensitive receptors (PSRs). The design of the site includes standoff between future housing and the M66 / slip lanes; this is due to the requirements of other disciplines to maintain a zone of separation. This standoff equally has benefits for the air quality discipline.

5.5.18 Nine proposed sensitive receptor locations have been selected across the development footprint. NO₂, PM₁₀ and PM_{2.5} concentrations were calculated at these locations to determine whether future site users may be exposed to elevated pollutant levels. PSRs were selected at worst-case positions closest to the main sources of pollution affecting the site. The PSR locations are presented in **Table 3** and **Appendix A**.

Table 3: Proposed Sensitive Receptor Locations

Receptor	Grid Ref	
PSR 1	382094	410378
PSR 2	382090	410343
PSR 3	382084	410303
PSR 4	382102	410383
PSR 5	382100	410349
PSR 6	382096	410310
PSR 7	382110	410388
PSR 8	382111	410354
PSR 9	382109	410316

5.5.19 To show how pollution disperses in the no-improvement sensitivity test, an NO₂ contour plot has been produced. The contour plot has been modelled at a 1.5 m height. The contour plot is shown in **Appendix F**.

Conversion of NO_x to NO₂

5.5.20 Oxides of nitrogen (NO_x) concentrations were predicted using the ADMS-Roads model. The modelled road contribution of NO_x at the identified receptor locations was then converted to NO₂ using the NO_x to NO₂ calculator (v8.1, 2020)⁸ following Defra guidance.

Emission Factors

5.5.21 Defra's Emission Factor Toolkit (EFT)⁹ (V11, 2021) was used within the ADMS-Roads model to predict emissions from road vehicles for all scenarios.

5.5.22 For the no-improvement sensitivity test, the emission factors for 2019 are applied to the with development scenario. Background concentrations for 2019 are also held and assumed to not improve with time. This methodology provides an overly robust approach as it assumes there would be no air quality improvements between 2019 to 2025. Local air quality monitoring data indicates that this situation is highly unlikely, due to

⁸ [Background maps. Tools. Local Air Quality Management Support - Defra, UK](#)

⁹ [Emissions Factors Toolkit \(defra.gov.uk\)](#)

continued air quality improvements over time, as demonstrated on the monitoring data pages of the Clean Air website¹⁰.

Background Concentrations

- 5.5.23 The ADMS model requires the derivation of background pollutant concentration data that are factored to the year of assessment, to which the contributions from the assessed roads are added.
- 5.5.24 There are no background monitoring locations in the vicinity of the proposed development and receptor locations, therefore background NO_x, NO₂, PM₁₀ and PM_{2.5} concentrations were obtained from the Defra LAQM support tools for the 1 km x 1 km grid squares covering the proposed development site and receptor locations for the years of assessment (2019 and 2025).

Model Verification

- 5.5.25 Model verification is the process of adjusting model outputs to improve the consistency of modelling results with respect to available monitored data.
- 5.5.26 Verification has been undertaken for NO₂. The verification procedure considers diffusion tube ID 'Bury 7' which is adjacent to the M66. The locations of these air quality monitoring sites are shown in **Appendix A** and the results are provided in **Section 6.2**.
- 5.5.27 This monitor is managed by Bury Council (BC), however, as it is part of the wider Greater Manchester air quality management network, there is no significant difference between this monitor and those managed by RBC in their own network. The monitor is considered suitable for use for this assessment, which is to be submitted to RBC.
- 5.5.28 The verification procedure and associated calculations are shown in **Appendix E**. A single verification factor has been derived and applied to all sensitive receptors assessed. All modelled road NO_x concentrations have been adjusted by a factor of 1.0136.
- 5.5.29 RBC or BC does not undertake any PM₁₀ or PM_{2.5} monitoring near the site, therefore it was not possible to undertake verification for particulate matter concentrations.

Relevant Objectives

- 5.5.30 As the development is for residential use, both the annual mean and the short-term objectives apply.
- 5.5.31 LAQM.TG(16) provides a qualitative screening approach to determine whether there is a risk of exceedance of the one-hour NO₂ air quality objective. If the ambient NO₂ annual mean concentration is above 60 µg/m³ there is a risk that the one-hour objective (200 µg/m³) may be exceeded. A qualitative comparison to this screening method has been undertaken for this assessment.
- 5.5.32 Pollutant concentrations are compared to the air quality objectives of The Air Quality Standards Regulations 2010 to determine site suitability.

¹⁰ Clean Air Greater Manchester. Available at: <https://cleanairgm.com/data-hub/>

6 Baseline Air Quality

6.1 Local Air Quality

- 6.1.1** Baseline air quality at the proposed development has been established by examining monitoring data produced by RBC and the Greater Manchester Combined Authority (GMCA, displayed on the Clean Air Greater Manchester webpages) and background concentration maps provided by Defra for the grid squares covering the proposed development.
- 6.1.2** The extents and boundaries of the Greater Manchester AQMA were declared based on the outputs of 2016 air quality modelling. All locations that were predicted to be above 35 µg/m³ were declared as part of the AQMA. At the proposed development, the entire route of the M66 (as it passes through the GMCA administrative area) has been declared as an AQMA. The AQMA extends approximately 50 m outwards from the carriageway in the areas near the development site. The site location and its relationship to the AQMA is shown in **Appendix A**.

6.2 Air Quality Monitoring

Nitrogen Dioxide (NO₂)

- 6.2.1** RBC operates an extensive air quality monitoring network, however, there is no monitoring carried out within several kilometres of the development site.
- 6.2.2** The development is close to the BC administrative area. BC operate several monitors near the development, including 'Bury 7' which is adjacent to the M66.
- 6.2.3** 'Bury 7' is located approximately 12 m to the east of the M66. The development site boundary is of a similar distance. 'Bury 7' is located approximately 1.4 km to the north of the site. It is considered to be representative of the development site.
- 6.2.4** 'Bury 13' is located approximately 380 m to the north west of the site. This monitor is located at the A58 (Rochdale Road), which is one arm of the M66 Junction 2 roundabout routes. Due to congestion and the monitors position adjacent to the road network, concentrations at this monitor are expected to be higher than the free-flowing sections of the motorway.
- 6.2.5** Air quality monitoring data for 2020 is available. The Covid-19 pandemic caused significant traffic reductions on the UK road network during 2020. Consequently, air quality concentrations during 2020 experienced significant and noticeable reductions compared to the pre-2019 record.
- 6.2.6** The results from the diffusion tube are shown in **Table 4** and the monitor locations are shown in **Appendix A**.

Table 4: Annual Mean NO₂ Concentrations Monitored by RBC within the Study Area

Site ID & Classification	Location	Annual Mean NO ₂ Concentrations (µg/m ³)				
		2016	2017	2018	2019	2020
Bury 7 (Roadside)	381984 411866	28.5	24.0	25.1	30.6	23.4
Bury 13 (Roadside)	381804 410657	-	-	-	49.7	34.0

Annual Mean NO ₂ air quality objective	40 µg/m ³
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6.2.7 The monitoring results in **Table 4** indicate that annual mean concentrations of NO₂ were below the NO₂ annual mean objective adjacent to the M66. During 2019, pre-pandemic, an exceedance was recorded at the A58 AQMA. The trip generation of the development will not exceed levels that would cause significant effects at the A58.

6.2.8 The results indicate that the short-term objective for NO₂ was unlikely to be exceeded at the identified monitoring sites as monitored annual mean concentrations were well below the indicative screening concentration of 60 µg/m³ during the period shown.

Particulate Matter (PM₁₀ & PM_{2.5})

6.2.9 RBC does not operate any automatic monitors near the site. Concentrations are not expected to be above the air quality objectives near the site. This conclusion is based on below objectives monitoring data recorded throughout the Greater Manchester area.

6.3 Background Concentrations

6.3.1 There are no background monitoring locations in the vicinity of the proposed development site or at receptor locations included in the air quality assessment

6.3.2 Background concentrations of NO₂, PM₁₀ and PM_{2.5} obtained from the background concentration maps provided by Defra for the grid squares covering the proposed development and receptor locations¹¹ are shown in **Table 5**.

Table 5: Background Pollutant Concentrations Obtained for the 1km x 1km Grid Squares Covering the Site and Receptor Locations*

Grid Square	Pollutant	2019	2025
		(µg/m ³)	(µg/m ³)
PSRs/Site (380500, 410500)	NO ₂	19.95	15.15
	PM ₁₀	13.53	12.77
	PM _{2.5}	8.87	8.29

** Background concentrations obtained from the latest 2018 based background maps*

¹¹ <http://uk-air.defra.gov.uk/data/laqm-background-maps?year=2018>

7 Construction Dust Impact Assessment

7.1 Step 1 – Requirement for a Detailed Assessment

- 7.1.1 There are sensitive receptors located within 350m of the site boundary, therefore, a detailed assessment of the construction phase of the development has been undertaken. There are no ecological designations within 50m of the site boundary or trackout routes which require assessment.

7.2 Step 2 – Assess the Risk of Dust Impacts

Step 2A Dust Emission Magnitude

- 7.2.1 The potential dust emission magnitude in relation to the development has been determined using the criteria detailed in **Table B1** in **Appendix B**. The scale and nature of works onsite were considered to determine the potential dust emission magnitude for earthwork activities, construction and trackout activities. No demolition is required. Information to determine the classification has been estimated from the site plans, Google Earth and information provided by the Applicant. The dust emission magnitude is outlined in **Table 6**.

Table 6: Dust Emission Magnitudes for Each Activity

Activity	Dust Emission Magnitudes	Justification for Sensitivity Classification
Demolition	N/A	N/A
Earthworks	Medium	the site area is between 2,500 to 10,000 m²
Construction	Medium	total building volume to be constructed is estimated to be between 25,000 to 100,000 m³
Trackout	Small	there are likely to be between less than 10 HDV outward movements in any one day

Step 2B Sensitivity of the Receptors to Dust Soiling and Health Effects

- 7.2.2 Dwellings are located within a distance of 50 m from earthwork and construction and within 20 m of road edges used by traffic associated with the site construction. In accordance with the criteria in **Table B2** in **Appendix B** and the IAQM guidance, the sensitivity of human receptors is **high**.

Step 2B Sensitivity of the Area to Dust Soiling and Human Health Effects of PM₁₀

- 7.2.3 The sensitivity of the area for dust soiling and human health effects has been determined using the criteria detailed in **Table B3** and **Table B4** respectively in **Appendix B**.
- 7.2.4 The sensitivity of the area to dust soiling and human health for each activity is summarised in **Table 7**.

Table 7: Outcome of Defining the Sensitivity of the Area

Pollution	Activity	Sensitivity of the Surrounding Area	Justification for Sensitivity Classification
Dust Soiling	N/A	N/A	N/A
	Earthworks	Low	There are 1 – 10 highly sensitive residential receptors within 50 m of the site boundary
	Construction	Low	There are 1 – 10 highly sensitive residential receptors within 50 m of the site boundary
	Trackout	High	There are 10 – 100 highly sensitive residential receptors within 20 m of the trackout route, up to 200 m of the site exit
Human Health	N/A	N/A	N/A
	Earthworks	Low	There are 1 – 10 highly sensitive residential receptors within 50 m of the site boundary. Background pollutant concentrations are below 24 µg/m ³
	Construction	Low	There are 1 – 10 highly sensitive residential receptors within 50 m of the site boundary. Background pollutant concentrations are below 24 µg/m ³
	Trackout	Low	There are 10 – 100 highly sensitive residential receptors within 20 m of the trackout route. Background pollutant concentrations are below 24 µg/m ³

Step 2C Risk of Impacts

- 7.2.5 The dust emission magnitude and sensitivity of the area were combined and the risk of impacts have been determined using the criteria detailed in **Table B5 to Table B8** in **Appendix B**.
- 7.2.6 A summary of the risks, before mitigation measures are applied, for dust soiling and human health are shown in **Table 8**.

Table 8: Risk of Dust Impacts

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

7.3 Step 3 – Site-Specific Mitigation

- 7.3.1 Step 3 of the IAQM guidance identifies appropriate site-specific mitigation. These measures are related to the site risk for each activity. Mitigation measures specific to earthworks, construction and trackout are proposed based on the risk classifications in **Table 8**. Recommended mitigation measures are shown in **Appendix D**.

- 7.3.2 The general mitigation measures (for site management, preparing and maintaining the site, operating vehicle/machinery, operations and waste management), are appropriate for a site with a 'low risk' classification (in this instance the site is classified as "low" risk due to earthworks)¹².

7.4 Step 4 – Determine Significant Effects

- 7.4.1 The characteristics of the site and the surrounding area suggest that mitigation would not be impracticable or ineffective. With the implementation of the mitigation measures, therefore, the residual impacts from the construction are considered to be not significant when considered following IAQM guidance.

8 Road Traffic Assessment

8.1 Baseline Assessment

- 8.1.1 Due to the low trip generation, an assessment of the air quality change to existing sensitive receptors has been screened out.
- 8.1.2 Model verification has been completed for 'Bury 7' to obtain an appropriate verification adjustment factor. This factor has been applied to the proposed sensitive receptor assessment in the 2025 With Development scenario. The verification and model inputs can be viewed in **Appendix E**.
- 8.1.3 To reduce the limitations of the methodology taken, the results for the PSRs in the 2019 baseline are shown. In reality, these sensitive receptors would not exist in the baseline, as construction must first proceed before any receptors are introduced into the site. It demonstrates a worst-case approach.
- 8.2 The results of the air quality assessment are shown in **Table 9**. Proposed sensitive receptor locations are shown in **Appendix A**.

Table 9: Air Quality Concentrations at Proposed Sensitive Receptors, 2019

Proposed Sensitive Receptor	2019 Baseline – Pollutant Concentrations		
	NO ₂ Concentration with Development µg/m ³	PM ₁₀ Concentration with Development µg/m ³	PM _{2.5} Concentration with Development µg/m ³
PSR 1	34.65	14.96	9.84
PSR 2	33.55	14.84	9.76
PSR 3	33.41	14.83	9.75
PSR 4	32.33	14.72	9.68
PSR 5	31.24	14.61	9.60
PSR 6	30.76	14.56	9.57
PSR 7	30.67	14.55	9.56

¹² For those mitigation measures that are general, the highest risk category should be applied. For example, if the site is medium risk for earthworks and construction, but a high risk for demolition and track-out, the general measures applicable to a high risk site should be applied.

Proposed Sensitive Receptor	2019 Baseline – Pollutant Concentrations		
	NO ₂ Concentration with	PM ₁₀ Concentration with	PM _{2.5} Concentration with
	Development µg/m ³	Development µg/m ³	Development µg/m ³
PSR 8	29.42	14.43	9.48
PSR 9	28.73	14.36	9.43

8.2.1 The results of the dispersion modelling assessment indicate that annual mean concentrations of NO₂, PM₁₀ and PM_{2.5} would be below the annual mean objectives at proposed residential receptors in the 2019 baseline scenario.

8.3 Site Suitability Assessment

8.3.1 NO₂, PM₁₀, and PM_{2.5} concentrations have been predicted at nine proposed sensitive receptor locations. Sensitive receptor positions represent the future locations where residential use is proposed.

Emission Factor Toolkit Assessment

8.3.2 NO₂, PM₁₀, and PM_{2.5} concentrations have been predicted across the development site. Modelled results were adjusted using the derived verification adjustment factor. This section presents the results of the Emission Factor Toolkit Assessment. This first scenario assumes air quality will improve in accordance with the predictions made by Defra (background concentrations and EFT v11).

8.3.3 The results of the air quality assessment are shown in **Table 10**. Proposed sensitive receptor locations are shown in **Appendix A**.

Table 10: Air Quality Concentrations at Proposed Sensitive Receptors, 2025 Emission Factor Toolkit

Proposed Sensitive Receptor	2025 With Development – Pollutant Concentrations		
	Scenario 2: Emission Factor Toolkit		
	NO ₂ Concentration with	PM ₁₀ Concentration with	PM _{2.5} Concentration with
	Development µg/m ³	Development µg/m ³	Development µg/m ³
PSR 1	23.46	14.08	9.11
PSR 2	22.82	13.98	9.05
PSR 3	22.73	13.97	9.04
PSR 4	22.12	13.87	8.97
PSR 5	21.49	13.76	8.91
PSR 6	21.21	13.72	8.88
PSR 7	21.17	13.71	8.88
PSR 8	20.45	13.60	8.81

2025 With Development – Pollutant Concentrations			
Scenario 2: Emission Factor Toolkit			
Proposed Sensitive Receptor	NO ₂ Concentration with Development µg/m ³	PM ₁₀ Concentration with Development µg/m ³	PM _{2.5} Concentration with Development µg/m ³
PSR 9	20.06	13.54	8.77

- 8.3.4 The results of the dispersion modelling assessment indicate that annual mean concentrations of NO₂, PM₁₀ and PM_{2.5} would be below the annual mean objectives at proposed residential receptors in the 2025 with development scenario. This scenario assumes air quality will improve between 2019 to 2025.
- 8.3.5 The results indicate there will be no exceedances of the air quality objectives in any location of the proposed development site. Proposed sensitive receptors will not be exposed to adverse air quality exceeding the relevant long term and short-term air quality objectives.
- 8.3.6 LAQM.TG(16) provides a qualitative screening approach to determine whether there is a risk of exceedance of the one-hour NO₂ air quality objective. If the ambient NO₂ annual mean concentration is above 60 µg/m³ there is a risk that the one-hour objective (200 µg/m³) may be exceeded.
- 8.3.7 The site is therefore considered suitable for residential use with regard to air quality in this scenario.

No-Improvement Sensitivity Test

- 8.3.8 NO₂, PM₁₀, and PM_{2.5} concentrations have been predicted across the development site. Modelled results were adjusted using the derived verification adjustment factor. This scenario presents the results of the no improvement sensitivity test. This assumes there will be no air quality improvements between 2019 to 2025. 2019 background concentrations have been used but the 2025 traffic has been used for conservatism.
- 8.3.9 The results of the air quality assessment are shown in **Table 11**. Proposed sensitive receptor locations are shown in **Appendix A**.

Table 11: Air Quality Concentrations at Proposed Sensitive Receptors, No-Improvement Sensitivity Test

2025 With Development – Pollutant Concentrations			
Scenario 3: No-improvement Sensitivity Test			
Proposed Sensitive Receptor	NO ₂ Concentration with Development µg/m ³	PM ₁₀ Concentration with Development µg/m ³	PM _{2.5} Concentration with Development µg/m ³
PSR 1	35.62	15.06	9.91
PSR 2	34.45	14.94	9.82
PSR 3	34.30	14.92	9.81
PSR 4	33.16	14.80	9.73
PSR 5	32.00	14.68	9.65

Proposed Sensitive Receptor	2025 With Development – Pollutant Concentrations		
	Scenario 3: No-improvement Sensitivity Test		
	NO ₂ Concentration with Development µg/m ³	PM ₁₀ Concentration with Development µg/m ³	PM _{2.5} Concentration with Development µg/m ³
PSR 6	31.49	14.63	9.62
PSR 7	31.40	14.62	9.61
PSR 8	30.07	14.49	9.52
PSR 9	29.33	14.42	9.47

- 8.3.10** The results of the dispersion modelling assessment indicate that annual mean concentrations of NO₂, PM₁₀ and PM_{2.5} would be below the annual mean objectives at proposed residential receptors in the 2025 with development scenario. This scenario assumes air quality there is no air quality improvements between 2019 to 2025.
- 8.3.11** The results indicate there will be no exceedances of the air quality objectives in any location of the proposed development site. Proposed sensitive receptors will not be exposed to adverse air quality exceeding the relevant long term and short-term air quality objectives.
- 8.3.12** To show how pollution disperses in the no-improvement sensitivity test, an NO₂ contour plot has been produced. The contour plot has been modelled at a 1.5 m height. The contour plot is shown in **Appendix F**. The contour plot indicates that the site is not located in an exceedance area, but the location of exceedance instead occurs just beyond the western boundary line. Note, this scenario assumes there would be no air quality improvements between 2019 to 2025 so is overly pessimistic.
- 8.3.13** LAQM.TG(16) provides a qualitative screening approach to determine whether there is a risk of exceedance of the one-hour NO₂ air quality objective. If the ambient NO₂ annual mean concentration is above 60 µg/m³ there is a risk that the one-hour objective (200 µg/m³) may be exceeded.
- 8.3.14** The site is therefore considered suitable for residential use with regard to air quality in this scenario.

Discussion and Assessment of Significance

- 8.3.15** The model results demonstrate that NO₂ concentrations are below the 40 µg/m³ the annual mean objective. The site can, therefore, accommodate increased traffic before an exceedance would be observed. It is recognised that the slip lane would have its own traffic flows, however, what must also be observed is that the M66 traffic flows would be a further 30 m from the site; as opposed to all 111,851 AADT passing adjacent to the site. Therefore, the increased emissions from slip lane traffic, would also be offset by the dispersion of M66 flows over 30 m, and its elevated position.
- 8.3.16** The Greater Manchester Combined Authority declared the AQMA boundary based on the outputs of air quality modelling completed in 2016. All locations predicted to exceed 35 µg/m³ NO₂ were declared as part of the AQMA. The AQMA over the development site is only present along the western boundary and does not extend far into the site. It is noted that the model results presented in **Table 11** are not dissimilar to the likely concentrations output from the GMCA model i.e. the further extent of the AQMA boundary will have

concentrations of approximately 35 µg/m³.

- 8.3.17 Based on the different model approaches taken and the measures to produce overly pessimistic modelling scenarios, all of which show pollution would be comfortably below the air quality objectives, it is considered there is a not significant effect.

9 Mitigation

- 9.1 The air quality assessment has predicted pollutant concentrations across the development footprint. Air quality concentrations were predicted to be below the air quality objectives. No specific mitigation to protect future occupants from adverse air quality is deemed to be required.
- 9.2 For matters beyond air quality, a separation distance between future properties and the western boundary has been required. This standoff is presented in the site layout documents accompanying this planning application submission. The standoff increases the distances between future residential properties and the M66/slip lane, it is, therefore, favourable for air quality .
- 9.3 Mitigation in relation to vehicular emission impacts is not deemed to be required. However, best practice measures should still be adopted where possible, these may include:
- Electric vehicle charging infrastructure or charge points.
 - Travel Plan.
 - Any gas-fired boilers installed to meet a minimum standard of <40 mgNO_x/kWh [2]. It is intended to phase out fossil-fuel boilers from 2025, which may be relevant to the site due to the intended opening year.
- 9.4 Dust emissions during the construction phase will be achieved by the use of the mitigation measures outlined in **Appendix D**.

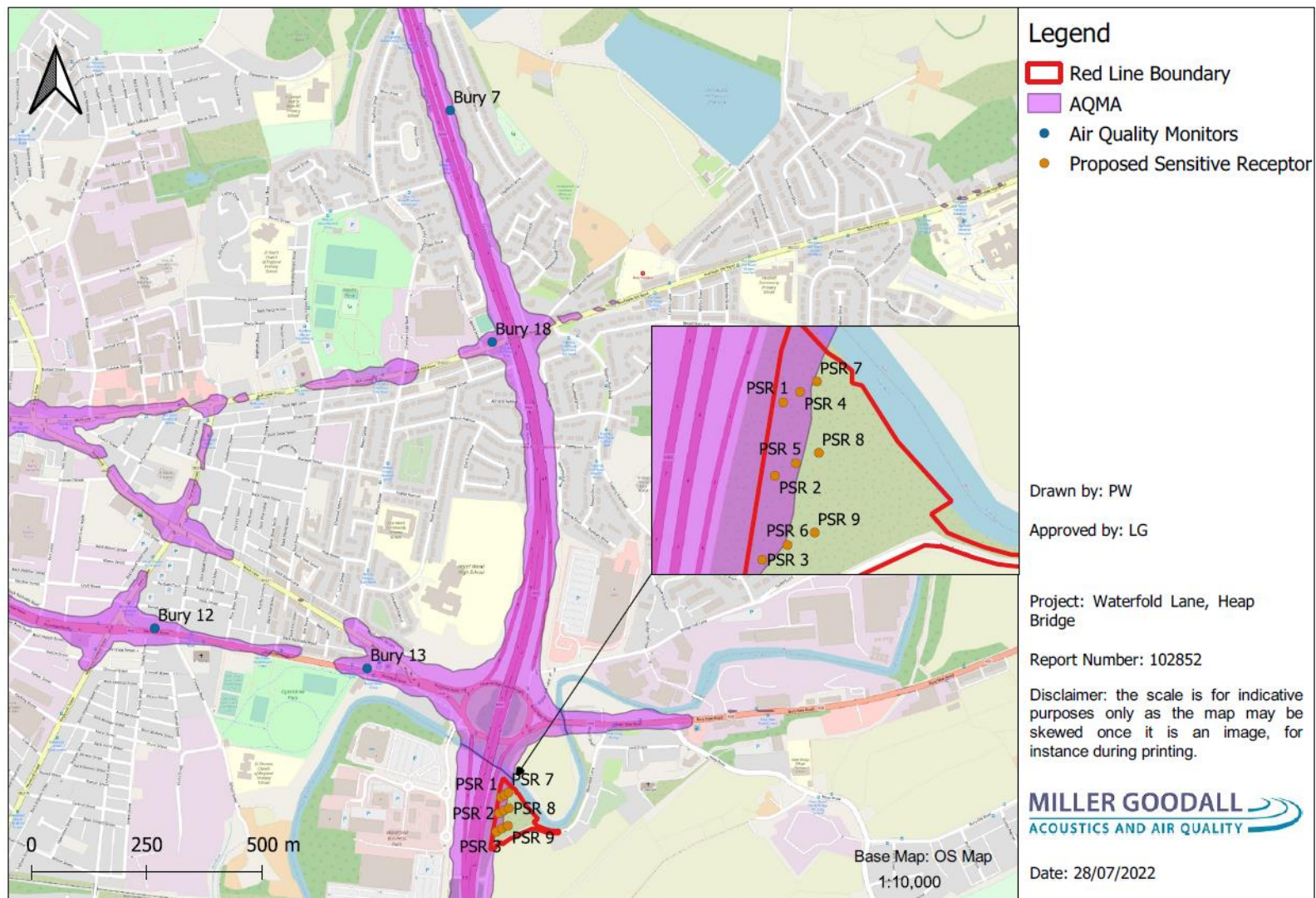
10 Summary of Impacts and Conclusion

- 10.1 This air quality report assesses the potential changes in air quality due to the construction and operation of the proposed development and whether these potential changes would significantly alter air quality.
- 10.2 The assessment of dust soiling and human health impacts during the demolition and construction phase of the development results in the proposal of dust mitigation measures. The implementation of these will ensure that residual dust impacts during the demolition and construction phase are not significant.
- 10.3 Concentrations of NO₂ and PM₁₀ are likely to be below their respective long and short-term objectives at the proposed development site which is therefore considered suitable for residential use with regards to air quality. Concentrations of PM_{2.5} are expected to be below the annual mean target.
- 10.4 The proposed development is not expected to have a significant impact on local air quality.
- 10.5 There is, therefore, no reason for this application to be refused on the grounds of air quality.

APPENDICES

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Appendix A: Location of site



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Appendix B: IAQM Dust Risk Assessment Methodology

The following section outlines criteria developed by the IAQM for the assessment of air quality impacts arising from construction and demolition activities⁵. The assessment procedure is divided into four steps and is summarised below:

Step 1: Screen the Need for a Detailed Assessment

An assessment will normally be required where there are human receptors within 350 m of the site boundary and/or within 50 m of the route(s) used by construction vehicles on the public highway, up to 500 m from the site entrance(s). Ecological receptors within 50 m of the site boundary or within 50 m of the route(s) used by construction vehicles on the public highway, up to 500 m from the site entrance(s), are also identified at this stage. An ecological receptor refers to any sensitive habitat affected by dust soiling. For locations with a statutory designation, such as a Site of Specific Scientific Interest (SSSI), Special Area of Conservation (SACs) and Special Protection Areas (SPAs), consideration should be given as to whether the particular site is sensitive to dust. Some non-statutory sites may also be considered if appropriate.

Where the need for a more detailed assessment is screened out, it can be concluded that the level of risk is 'negligible' and any effects will not be significant.

Step 2: Assess the Risk of Dust Impacts

In step two, a site is allocated to a risk category on the basis of the scale and nature of the works (Step 2A) and the sensitivity of the area to dust impacts (Step 2B). These two factors are combined in Step 2C to determine the risk of dust impacts before the implementation of mitigation measures. The assigned risk categories may be different for each of the construction activities outlined by the IAQM (construction, demolition, earthworks and trackout). A site can be divided into zones, for example on a large site where there are differing distances to the nearest receptors.

Step 2A: Define the Potential Dust Emission Magnitude

Dust emission magnitude is based on the scale of the anticipated works and is classified as Small, Medium or Large. The IAQM guidance recommends that the dust emission magnitude is determined separately for demolition, earthworks, construction and trackout. **Table B1** describes the potential dust emission class criteria for each outlined activity.

Table B1: Criteria Used in the Determination of Dust Emission Magnitude

Activity	Criteria used to Determine Dust Emission Magnitude		
	Small	Medium	Large
Demolition	Total building volume <20,000 m ³ , construction materials with low potential for dust release.	Total building volume 20,000 m ³ – 50,000 m ³ , potential dusty construction material.	Total building volume >50,000 m ³ , potentially dusty construction material.
Earthworks	Total site area <2,500 m ² , soil type with large grain	Total site area 2,500 – 10,000 m ² , moderately dusty soil type	Total site area >10,000 m ² , potentially dusty soil type
Construction	Total building volume <25,000 m ³ .	Total building volume 25,000 – 100,000 m ³ .	Total building volume >100,000 m ³ .
Trackout	<10 outward HDV trips in any one day. Unpaved road length <50 m.	10-50 outward HDV trips in any one day. Unpaved road length 50-100 m.	>50 outward HDV trips in any one day. Unpaved road length >100 m.

Step 2B: Define the Sensitivity of the Area

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;
- the local background PM₁₀ concentration; and
- site-specific factors, such as whether there are natural shelters, such as trees, to reduce the risk of windblown dust.

The criteria detailed in **Table B2** is used to determine the sensitivity of the receptor in relation to dust soiling, health effects and ecological effects.

Table B2: Criteria for Determining Sensitivity of Receptors

Sensitivity of Receptor	Criteria for Determining Sensitivity		
	Dust Soiling Effects	Health Effects of PM ₁₀	Ecological Sites
High	Dwellings, museums and other culturally important collections, medium and long-term car parks and car showrooms	Residential properties, hospitals, schools and residential care homes	International or national designation <i>and</i> the features may be affected by dust soiling
Medium	Parks, places of work	Office and shop workers not occupationally exposed to PM ₁₀	Presence of an important plant species where dust sensitivity is uncertain or locations with a national designation with features that may be affected by dust deposition
Low	Playing fields, farmland, footpaths, short-term car parks and roads	Public footpaths, playing fields, parks and shopping streets	Local designation where features may be affected by dust deposition

Table B3 and **Table B4** are then used to define the sensitivity of the area to dust soiling and human health effects. This should be derived for each of construction, demolition, earthworks and trackout.

Table B3: Sensitivity of the Area to Dust Soiling Effects on People and Property.

Receptor Sensitivity	Number of Receptors	Distance from Source (m)*			
		<20	<50	<100	<350
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

*distances considered are to the dust source

Table B4: Sensitivity of the Area to Human Health Impacts

Receptor Sensitivity	Annual Mean PM ₁₀ Concentrations	Number of Receptors	Distance from the Source (m)				
			<20	<50	<100	<200	<350
High	>32 µg/m ³	>100	High	High	High	Medium	Low
		10-100	High	High	Medium	Low	Low
		1-10	High	Medium	Low	Low	Low
	28-32 µg/m ³	>100	High	High	Medium	Low	Low
		10-100	High	Medium	Low	Low	Low
		1-10	High	Medium	Low	Low	Low
	24-28 µg/m ³	>100	High	Medium	Low	Low	Low
		10-100	High	Medium	Low	Low	Low
		1-10	Medium	Low	Low	Low	Low
	<24 µg/m ³	>100	Medium	Low	Low	Low	Low
		10-100	Low	Low	Low	Low	Low
		1-10	Low	Low	Low	Low	Low
Medium	>32 µg/m ³	>10	High	Medium	Low	Low	Low
		1-10	Medium	Low	Low	Low	Low
	28-32 µg/m ³	>10	Medium	Low	Low	Low	Low
		1-10	Low	Low	Low	Low	Low
	24-28 µg/m ³	>10	Low	Low	Low	Low	Low
		1-10	Low	Low	Low	Low	Low
	<24 µg/m ³	>10	Low	Low	Low	Low	Low
		1-10	Low	Low	Low	Low	Low
Low	-	>1	Low	Low	Low	Low	Low

The sensitivity of the area is then summarised.

Step 2C Define the Risks of Impacts

The dust emission magnitude from **Table B1** and sensitivity of the area and receptors from **Table B2**, **Table B3** and **Table B4** are combined, and the risk of impacts from each activity (demolition, earthworks, construction and trackout) before mitigation is applied, is determined using the criteria detailed in **Table B5** to **Table B8**.

Table B5: Risk of Dust Impacts - Demolition

Potential Impact Sensitivity of the Area	Dust Emission Magnitude		
	Large	Medium	Small
High	High Risk	Medium Risk	Medium Risk
Medium	High Risk	Medium Risk	Low Risk
Low	Medium Risk	Low Risk	Negligible

Table B6: Risk of Dust Impacts- Earthworks

Potential Impact Sensitivity of the Area	Dust Emission Magnitude		
	Large	Medium	Small
High	High Risk	Medium Risk	Low Risk
Medium	Medium Risk	Medium Risk	Low Risk
Low	Low Risk	Low Risk	Negligible

Table B7: Risk of Dust Impacts- Construction

Potential Impact Sensitivity of the Area	Dust Emission Magnitude		
	Large	Medium	Small
High	High Risk	Medium Risk	Low Risk
Medium	Medium Risk	Medium Risk	Low Risk
Low	Low Risk	Low Risk	Negligible

Table B8: Risk of Dust Impacts- Trackout

Potential Impact Sensitivity of the Area	Dust Emission Magnitude		
	Large	Medium	Small
High	High Risk	Medium Risk	Low Risk
Medium	Medium Risk	Low Risk	Negligible
Low	Low Risk	Low Risk	Negligible

Step 3 Determine Site Specific Mitigation

Step three of the IAQM guidance identifies appropriate site-specific mitigation. These measures are related to whether the site is a low, medium or high risk site.

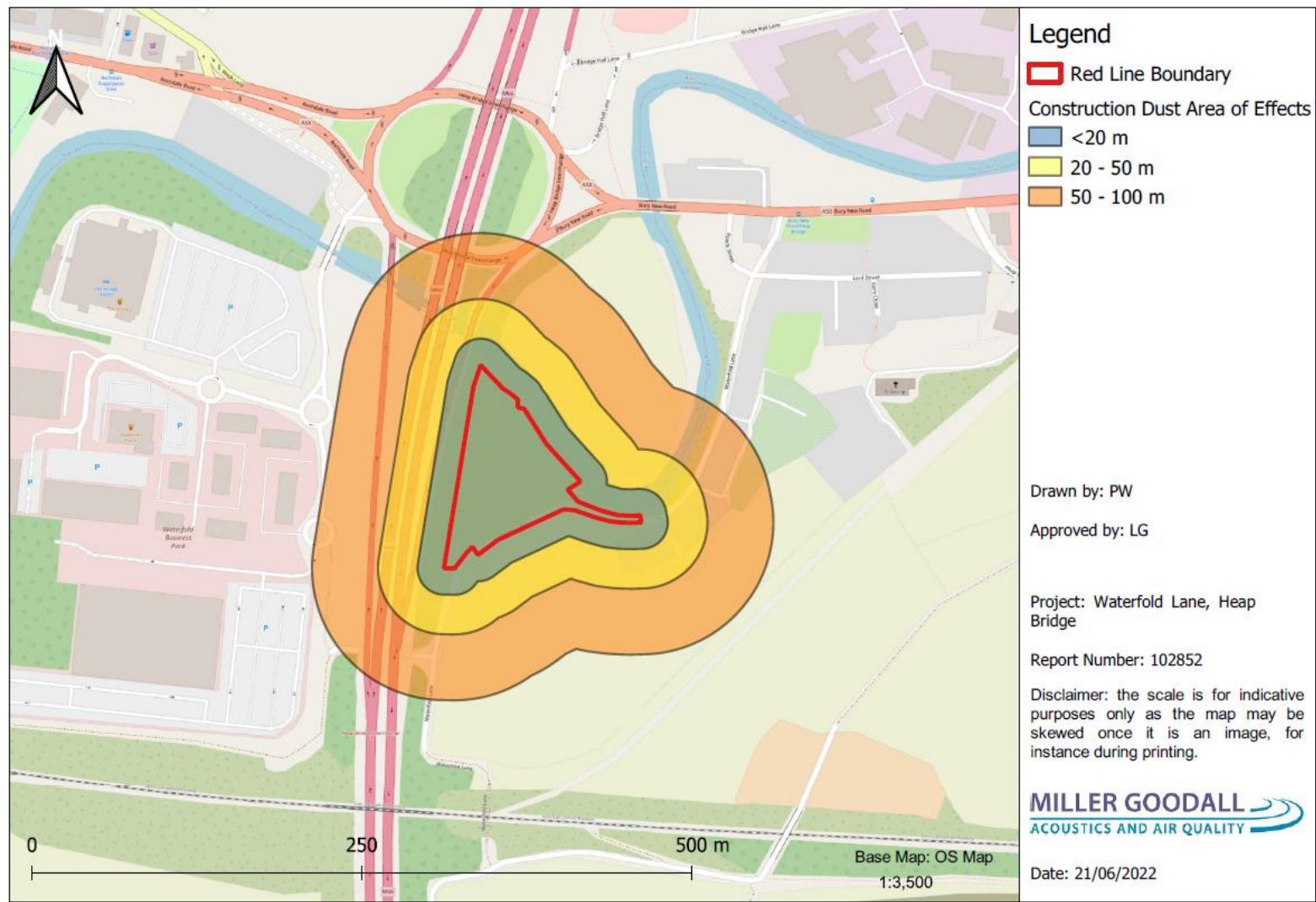
Step 4 Determine Significance of Residual Effects

At step four the significance of residual effects is assessed. For almost all construction activity, the aim should be to prevent significant effects on receptors through the use of effective mitigation. Experience shows that this is normally possible. Hence the residual effect will normally be 'not significant'.

There may be cases where, for example, there is inadequate access to water for dust suppression to be effective, and even with other mitigation measures in place there may be a significant effect. Therefore, it is important to consider the specific characteristics of the site and the surrounding area to ensure that a conclusion of no significant effect is robust.

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Appendix C: Construction Dust Area of Effects



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Appendix D: IAQM Dust Assessment Mitigation

xx Highly Recommended

x Desirable

Measures relevant for demolition, earthworks, construction and trackout

Mitigation Measure	Low Risk
Communications	
Display the name and contact details of person(s) accountable for air quality and dust issues on the site boundary. This may be the environment manager/engineer or the site manager.	xx
Display the head or regional office contact information.	xx
Develop and implement a Dust Management Plan (DMP).	x
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.	xx
Make the complaints log available to the local authority when asked.	xx
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 log book.	xx
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 100 m of site boundary, with cleaning to be provided if necessary.	x
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.	xx
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.	xx
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.	xx
Erect solid screens or barriers around dusty activities or the site boundary that are at least as high as any stockpiles on site.	xx
Fully enclose site or specific operations where there is a high potential for dust production and the site is active for an extensive period.	x
Avoid site runoff of water or mud.	xx
Keep site fencing, barriers and scaffolding clean using wet methods.	x
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.	x
Cover, seed or fence stockpiles to prevent wind whipping.	x
Operating vehicle/machinery and sustainable travel	
Ensure all vehicles switch off engines when stationary - no idling vehicles.	xx

Mitigation Measure	Low Risk
Avoid the use of diesel or petrol-powered generators and use mains electricity or battery powered equipment where practicable.	xx
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).	x
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.	xx
Ensure an adequate water supply on the site for effective dust/particulate matter suppression/mitigation, using non-potable water where possible and appropriate.	xx
Use enclosed chutes and conveyors and covered skips.	xx
Minimise drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment and use fine water sprays on such equipment wherever appropriate.	xx
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.	x
Waste management	
Avoid bonfires and burning of waste materials.	xx

Measures specific to construction

Mitigation Measure	Low Risk
Avoid scabbling (roughening of concrete surfaces) if possible.	x
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.	x

Measures specific to trackout

Mitigation Measure	Low Risk
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.	x
Avoid dry sweeping of large areas.	x
Ensure vehicles entering and leaving sites are covered to prevent escape of materials during transport.	x
Record all inspections of haul routes and any subsequent action in a site log book.	x

Mitigation Measure	Low Risk
Implement a wheel washing system (with rumble grids to dislodge accumulated dust and mud prior to leaving the site where reasonably practicable).	x

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Appendix E: Assessment and Model Inputs

This appendix outlines the inputs used in the road traffic emissions assessment.

Traffic Data

The ADMS-Roads model requires the inclusion of detailed road traffic data for the routes to be affected by the proposed development.

Traffic data has been provided as 24-hour Annual Average Daily Traffic (AADT) and heavy-duty vehicle percentages (HGV%). No average speed traffic survey information was available, therefore, posted speed limits have been utilised in the model. Areas of congestion, queuing and junction locations have been modelled at reduced speeds of 5 to 32 km/h.

Traffic data has been obtained from the relevant Traffic Counts on the Department for Transport Road Traffic Statistics webpages. The counter reference is provided in **Table E1**.

No street canyons or gradients exceeding 2.5% have been identified in the study area. No further assessment is deemed to be needed for these effects.

The total with development trip generation is 87 AADT. An assessment of air quality change to existing sensitive receptors is not required.

The traffic data used in the assessment is detailed in **Table E1** and presented in **Figure E1**.

Table E1: Traffic Data used in the Assessment

Link Number	Road	Speed (km/h)	2019 Base Year/Verification		2025 With Development		Total Development AADT
			AADT LDV	AAD T HDV	AADT LDV	AADT HDV	
1	M66 (South of Junction 2)	112 & 96	103,697	8,154	111,101	8,736	-
2	M66 (North of Junction 2)	112 & 96	53,421	4,652	57,236	4,984	-
3	A58 (Rochdale Road)	48	19,268	931	20,644	998	-
4	A58 (Bury New Road)	48	18,605	903	19,933	968	-

Figure E1: Spatial Model Scope

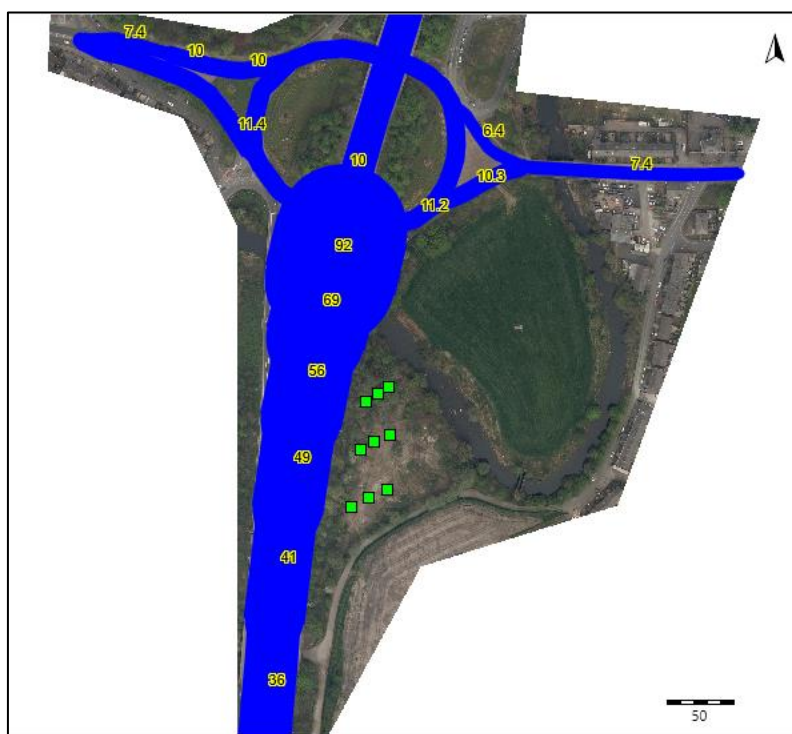
M66 Road Width

Due to the absence of traffic data flows for the slip lane, an alternative air quality modelling approach has been taken. Further details are discussed in the main body of this report.

The road width of the M66 has been extended to cover the extents of the slip lane. This method assumes the entirety of the M66 traffic flows are passing adjacent to the site, as opposed to the existing 30 m distance that exists in the baseline.

The road has been split into several sections, to represent the increasing width as the slip lanes approach the roundabout. The width between the northbound off-slip lane and the southbound on-slip lane (the one nearest to the site) is not even. Therefore, the left side does not fully cover the slip lane width, however, this is favourable for the assessment as the width on the right side slightly overlaps the extent of the slip lane nearest to the site.

The model was drawn using OS Mastermap, which ensure the widths used in the model are accurate. An image of the modelled road network, centred at the M66 passing the site is provided in **Figure E2**. The image also shows the road width distance (in meters) applied.

Figure E2: M66 Road Width

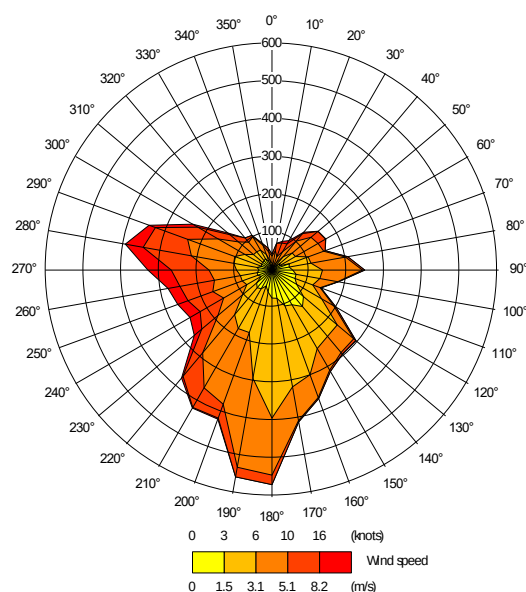
Meteorological Data

The air quality assessment includes the use of the 2019 Manchester Airport meteorological recording station.

The Manchester Airport recording station is located approximately 26 km to the south of the proposed development site and is considered to be the most representative of the site conditions in terms of altitude and distance.

The 2019 wind rose for Manchester Airport recording station is provided in **Figure E2**.

Figure E2: Wind Rose



Dispersion and Meteorological Site Characteristics

The air dispersion characteristics for the site and meteorological recording station differ, therefore, these have been adjusted accordingly within ADMS-Roads. **Table E2** details the adjustments made.

Table E2: Dispersion and Meteorological Site Characteristics

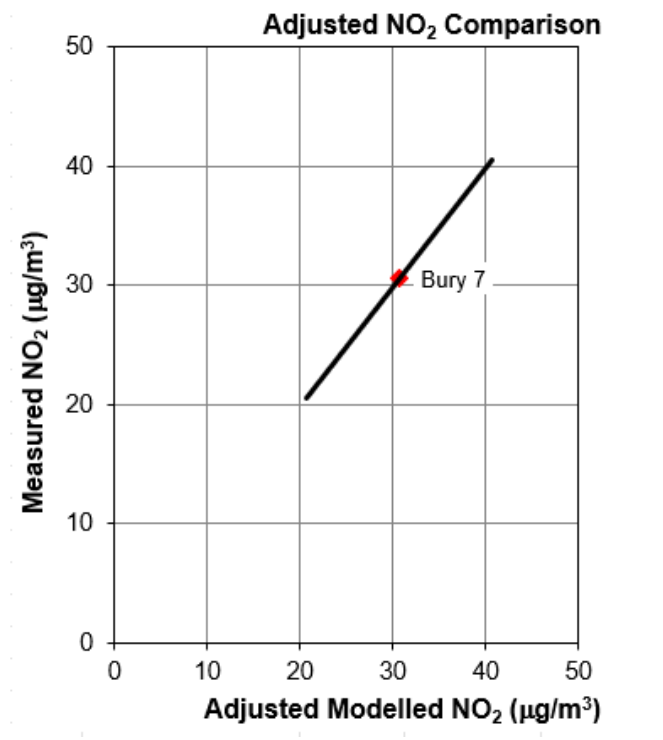
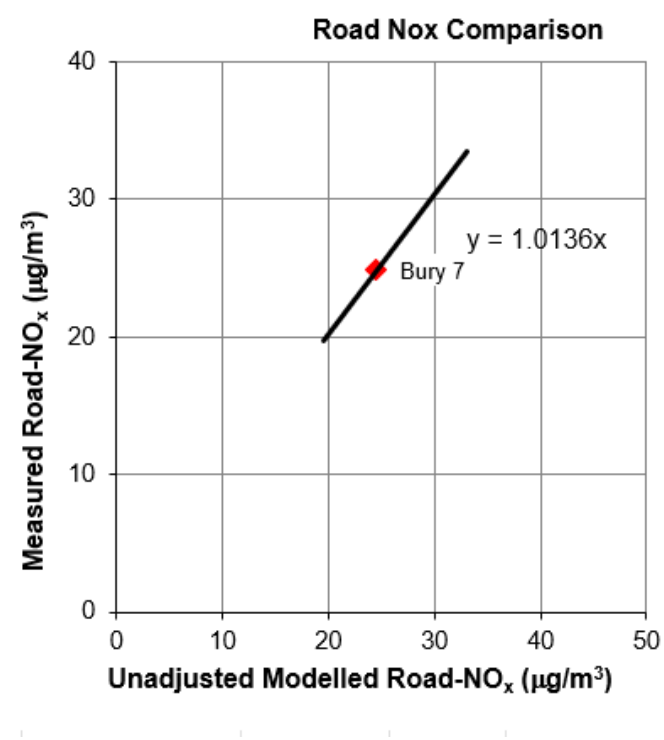
Parameter	Dispersion Site	Meteorological Site
Surface Roughness	0.5 m	0.2 m
Surface Albedo	0.23	0.23
Minimum Monin-Obukhov Length	30 m	30 m
Priestley-Taylor Parameter	1	1

Model Verification

Model verification has been completed for NO₂ using the nearby air quality monitor 'Bury 7'. This monitor is adjacent to the M66 and is considered to be representative of the likely conditions to be expected at the development site. The verification procedure for the selected air quality monitors of this assessment is detailed in **Table E3**. Air quality monitor positions can be seen on **Appendix A**.

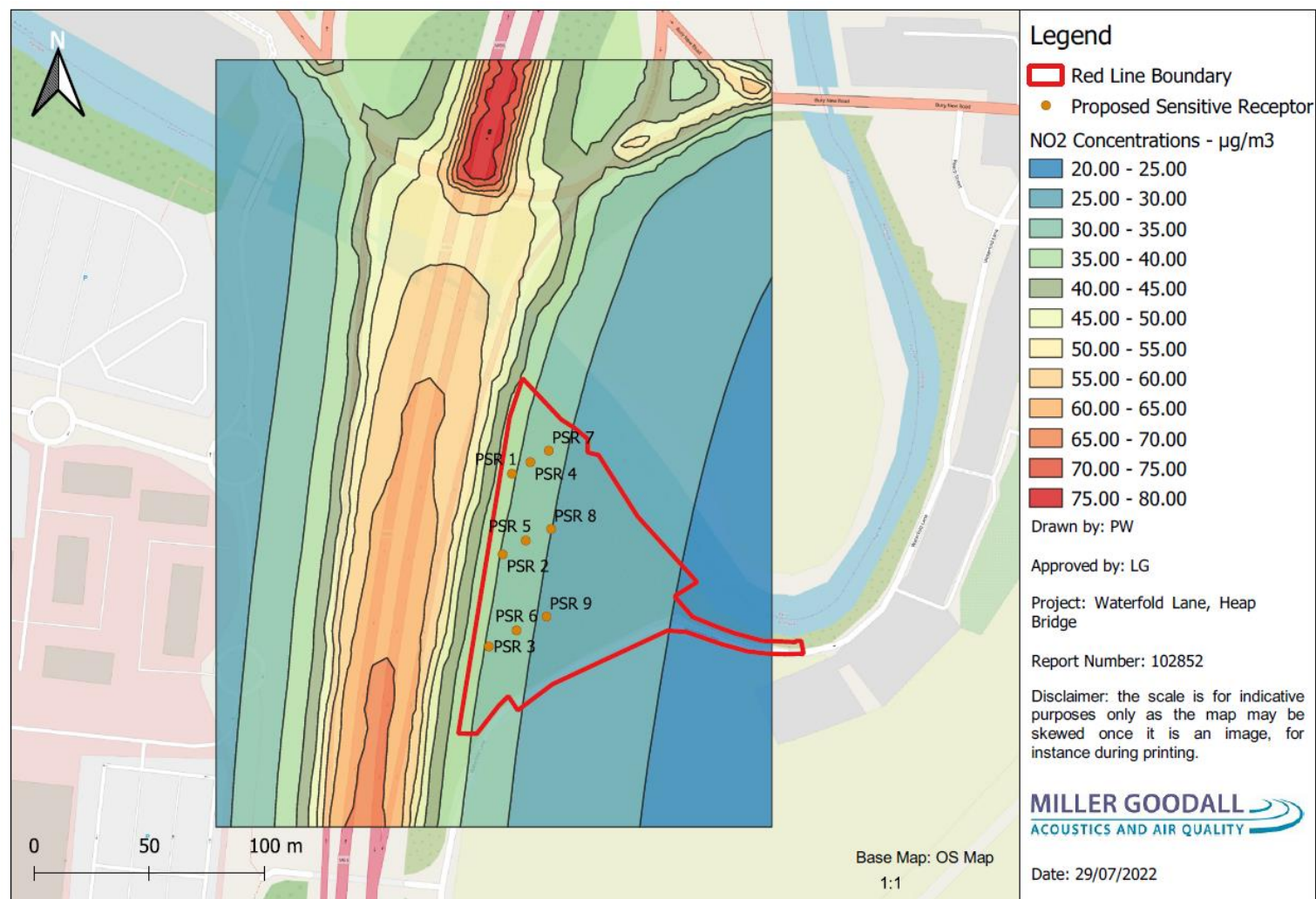
Table E3: NO₂ Model Verification Procedure

Monitor	Monitored Total NO ₂	Monitored Road NO _x	Background NO ₂	Background NO _x	Monitored Road Contribution NO ₂ (total - background)	Modelled Road Contribution NO _x (excludes background)	Ratio of Monitored Road Contribution NO _x / Modelled Road Contribution NO _x	Adjustment Factor	Adjusted Road Contribution NO _x	Adjusted Modelled Total Nox (including background NO _x)	Modelled Total NO ₂ (based on empirical NO _x / NO ₂ relationship)
Bury 7	30.60	24.86	17.90	25.19	12.70	24.53	1.0136	1.0136	24.86	50.05	30.6



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Appendix F: NO₂ Contour Plot



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Glossary of Terms

AADT Annual Average Daily Traffic flow

Air Quality Standard Pollutant standards relate to ambient pollutant concentrations in air, set on the basis of medical and scientific evidence of how each pollutant affects human health and the environment

Air Quality Objective Pollutant Objectives incorporate future dates by which a standard is to be achieved, taking into account economic considerations, practicability and technical feasibility

Annual Mean A mean pollutant concentration value in air which is calculated on a yearly basis, yielding one annual mean per calendar year. In the UK air quality regulations, the annual mean for a particular substance at a particular location for a particular calendar year is:

- (a) in the case of lead, the mean of the daily levels for that year;
- (b) in the case of nitrogen dioxide, the mean of the hourly means for that year;
- (c) in the case of PM₁₀, the mean of the 24-hour means for that year.

Annoyance (Dust) Loss of amenity due to dust deposition or visible dust plumes, often related to people making complaints, but not necessarily sufficient to be a legal nuisance.

AQAP Air Quality Action Plan

AQEG Air Quality Expert Group

AQMA Air Quality Management Area

AQMP Air Quality Management Plan

AQO Air Quality Objective

AQS Air Quality Strategy for England, Scotland, Wales and Northern Ireland

Background Concentrations The term used to describe pollutant concentrations which exist in the ambient atmosphere, excluding local pollution sources such as roads and stacks

Construction Any activity involved with the provision of a new structure (or structures), its modification or refurbishment. A structure will include a residential dwelling, office building, retail outlet, road, etc.

Construction Impact Assessment An assessment of the impacts of demolition, earthworks, construction and trackout. In this Guidance, specifically the air quality impacts.

Defra Department for Environment, Food and Rural Affairs

Demolition Any activity involved with the removal of an existing structure (or structures). This may also be referred to as de-construction, specifically when a building is to be removed a small part at a time.

Deposited Dust that is no longer in the air and which has settled onto a surface. Deposited dust is also sometimes called amenity dust or nuisance dust, with the term nuisance applied in the general sense rather than the specific legal definition.

DMP Dust Management Plan; a document that describes the site-specific methods to be used to control dust emissions.

Dust Solid particles that are suspended in air, or have settled out onto a surface after having been suspended in air. The terms dust and particulate matter (PM) are often used interchangeably, although in some contexts one term tends to be used in preference to the other. In this guidance the term 'dust' has been used to include the particles that give rise to soiling, and to other human health and ecological effects. Note: this is different to the definition given in BS 6069, where dust refers to particles up to 75 µm in diameter.

Earthworks Covers the processes of soil-stripping, ground-levelling, excavation and landscaping.

Effects The consequences of the changes in airborne concentration and/or dust deposition for a receptor. These might manifest as annoyance due to soiling, increased morbidity or mortality due to exposure to PM₁₀ or PM_{2.5} or plant dieback due to reduced photosynthesis. The term 'significant effect' has a specific meaning in EIA regulations. The opposite is an insignificant effect. In the context of construction impacts any effect will usually be adverse, however, professional judgement is required to determine whether this adverse effect is significant based in the evidence presented.

EPUK Environmental Protection UK

HDV Heavy Duty Vehicle

Impacts The changes in airborne concentrations and/or dust deposition. A scheme can have an 'impact' on airborne dust without having any 'effects', for instance if there are no receptors to experience the impact.

LAQM Local Air Quality Management

LDV Light Duty Vehicle

Mg/m³ Microgrammes (of pollutant) per cubic metre of air. A measure of concentration in terms of mass per unit volume. A concentration of 1 µg/m³ means that one cubic metre of air contains one microgramme (millionth of a gramme) of pollutant

NO₂ Nitrogen Dioxide

NO_x A collective term used to represent the mixture of nitrogen oxides in the atmosphere, as nitric oxide (NO) and nitrogen dioxide (NO₂)

NPPF National Planning Policy Framework

Nuisance The term nuisance dust is often used in a general sense when describing amenity dust. However, this term also has specific meanings in environmental law:

Statutory nuisance, as defined in S79(1) of the Environmental Protection Act 1990 (as amended from time to time).

Private nuisance, arising from substantial interference with a person's enjoyment and use of his land.

Public nuisance, arising from an act or omission that obstructs, damages or inconveniences the right of the community.

Each of these applying in so far as the nuisance relates to the unacceptable effects of emissions. It is recognised that a significant loss of amenity may occur at lower levels of emission than would constitute a statutory nuisance.

Note: as nuisance has a specific meaning in environmental law, and to avoid confusion, it is recommended that the term is not used in a more general sense.

PM_{2.5} The fraction of particles with a mean aerodynamic diameter equal to, or less than, 2.5 µm. More strictly, particulate matter which passes through a size selective inlet as defined in the reference method for the sampling and measurement of PM_{2.5}, EN 14907, with a 50% efficiency cut-off at 2.5 µm aerodynamic diameter

PM₁₀ The fraction of particles with a mean aerodynamic diameter equal to, or less than, 10 µm. More strictly, particulate matter which passes through a size selective inlet as defined in the reference method for the sampling and measurement of PM₁₀, EN 12341, with a 50% efficiency cut-off at 10 µm aerodynamic diameter

Running Annual Mean A mean pollutant concentration value in air which is calculated on an hourly basis, yielding one running annual mean per hour. The running annual mean for a particular substance at a particular location for a particular hour is the mean of the hourly levels for that substance at that location for that hour and the preceding 8759 hours

Trackout The transport of dust and dirt from the construction/demolition site onto the public road network, where it may be deposited and then re-suspended by vehicles using the network. This arises when heavy duty vehicles (HDVs) leave the construction/demolition site with dusty materials, which may then spill onto the road, and/or when HDVs transfer dust and dirt onto the road having travelled over muddy ground on site.

