

ENVIRONMENT

Brackley Property Developments Ltd

Axis 50 near Willington, Derby

Air Quality Assessment

NTH2364

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Air Quality Assessment

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EXECUTIVE SUMMARY

BWB Consulting Ltd was appointed by Brackley Property Developments Ltd to undertake an air quality assessment, for submission with a planning application, for a commercial/industrial development at Axis 50 near Willington, Derby.

The proposed development site is located within the administrative area of South Derbyshire District Council and is not located within, or close to, an existing Air Quality Management Area (AQMA).

A qualitative construction phase dust assessment was undertaken in accordance with Institute of Air Quality Management Guidance and measures were recommended for inclusion in a Dust Management Plan to minimise emissions during construction activities. With the implementation of these mitigation measures the impact of construction phase dust emissions was considered to be 'not significant' in accordance with IAQM guidance.

A detailed road traffic emissions assessment was undertaken to consider the impact of development-generated road traffic on local air quality at identified existing receptor locations. Road traffic emissions were modelled using the dispersion model ADMS-Roads and concentrations of nitrogen dioxide (NO₂) and particulate matter (PM₁₀ and PM_{2.5}) were predicted at identified sensitive receptor locations. The modelling assessment was undertaken in accordance with Defra Local Air Quality Management Technical Guidance. Concentrations were predicted to be below the relevant air quality objectives at all considered receptor locations and the development impact on local air quality was defined as 'negligible'.

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1. INTRODUCTION

Appointment & Background

- 1.1 BWB Consulting Ltd was appointed by Brackley Property Developments Ltd to undertake an air quality assessment for a proposed commercial/industrial development at land off Etwall Road, Willington, Derby.
- 1.2 The assessment considers construction phase dust impacts and operational phase road traffic emissions. A qualitative construction phase dust assessment was undertaken in accordance with relevant guidance. A detailed road traffic emissions assessment was undertaken to consider the impact of development-generated road traffic on local air quality at identified receptor locations. In addition, pollutant concentrations were predicted at the proposed development site ('the site').
- 1.3 This report is necessarily technical in nature, so to assist the reader, a glossary of air quality terminology can be found in **Appendix A**.

Site Setting

- 1.4 The site is located 9km to the south-west of Derby within the administrative area of South Derbyshire District Council (SDDC).
- 1.5 The site is bounded to the north by two isolated dwellings and their grounds; beyond these is a major road junction, where the A50 and A38 trunk roads intersect. To the north of the junction is a large Toyota manufacturing plant. To the east of the site is the B5008 Etwall Road, beyond which are a large service station (public house, hotel and petrol station), isolated dwellings and open farmland. To the south the site is bound by the Crewe-Derby railway line, beyond which is open farmland. To the west of the site is the A38 dual carriageway, beyond which lies further open farmland.
- 1.6 **Figure 1.1** details the Site location.

Figure 1.1: Site Context Plan

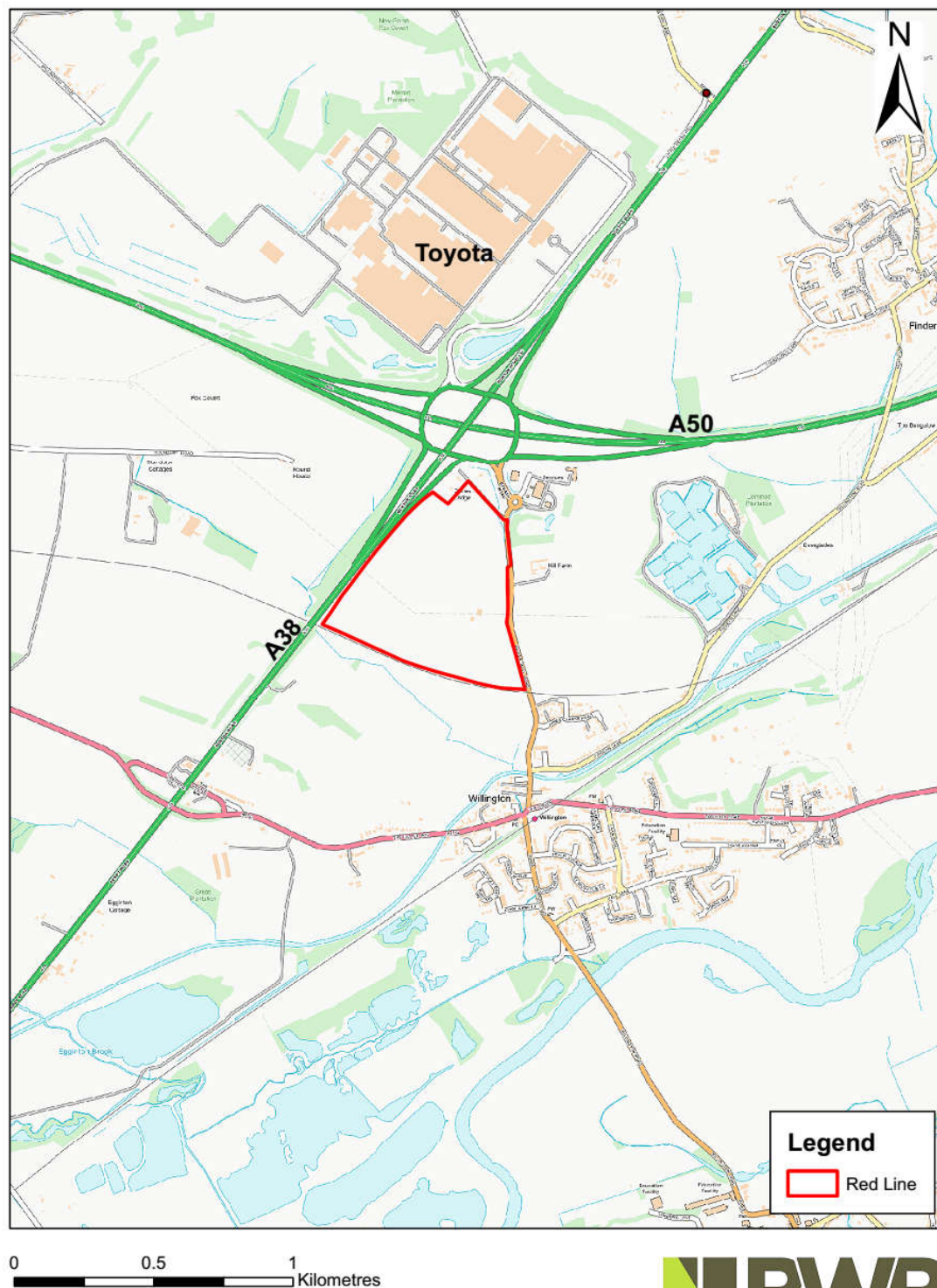


Figure 1.1: Site Location

Contains Ordnance Survey data © Crown copyright and database right 2018

Proposed Development

- 1.7 The proposed development comprises the construction of a number of warehousing units with a total Gross Internal Area (GIA) of circa 8.9ha, across a total site area of 31.5ha. There will also be Heavy Goods Vehicle (HGV) parking, unloading and turning areas, car parking and a new access road and junction, with alterations made to the layout of the existing Etwall Road.
- 1.8 Drawings detailing the proposed development are provided in **Appendix B**.

2. LEGISLATION AND PLANNING POLICY

National Legislation and Planning Policy

The UK Air Quality Strategy

- 2.1 European Union (EU) legislation forms the basis of air quality policy and legislation in the UK. The EU 2008 ambient Air Quality Directive¹ sets limits for ambient concentrations of air pollutants including nitrogen dioxide (NO₂) and particulate matter (PM₁₀ and PM_{2.5}). The air quality standards and objectives are prescribed through the Air Quality (England) Regulations 2000², as amended, for the purpose of the Local Air Quality Management Framework.
- 2.2 The UK Government are required under the Environment Act 1995³ to produce a national Air Quality Strategy (AQS)^{4,5}. The AQS was first published in 1997 and was most recently reviewed and updated in 2007. The AQS provides an overview of the Government's ambient air quality policy and sets out the air quality standards and objectives to be achieved and measures to improve air quality.
- 2.3 Part IV of the Environment Act³ requires local authorities in the UK to review local air quality within their administrative area and, if relevant air quality standards and objectives are likely to be exceeded, designate Air Quality Management Areas (AQMAs). Following the designation of an AQMA, local authorities are required to publish an Air Quality Action Plan (AQAP) detailing measures to be taken to improve local air quality and work towards meeting the relevant air quality standards and objectives.

National Planning Policy Framework

- 2.4 The National Planning Policy Framework (NPPF)⁶ was amended in February 2019 and sets out the Government's planning policies for England and how these are expected to be applied.
- 2.5 With regard to assessing cumulative effects the NPPF⁶ 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

¹ European Parliament (2008) Council Directive 2008/50/EC on Ambient Air Quality and Cleaner Air for Europe

² HMSO (2000) Statutory Instrument 2000 No. 928, The Air Quality (England) Regulations 2000 (as amended), London: HMSO

³ HMSO (1995) The Environment Act 1995, London: TSO

⁴ Department of the Environment (DoE) (1997) The UK National Air Quality Strategy, London: HMSO

⁵ Department of the Environment, Food and Rural Affairs (Defra) (2007) The Air Quality Strategy for England, Scotland, Wales and Northern Ireland, London: HMSO

⁶ Ministry of Housing, Communities & Local Government (2019) National Planning Policy Framework, HMSO London

to impacts that could arise from the development.

[...]"

- 2.6 The NPPF⁶ recognises air quality within Section 15: Conserving and enhancing the natural environment, and states that:

"Planning policies and decisions should contribute to and enhance the natural and local environment by:

[...]

e) preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of 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, taking into account relevant information such as river basin management plans;

[...]

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.

[...]

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

Planning Practice Guidance

- 2.7 The Planning Practice Guidance (PPG) for air quality⁷ was updated in 2014 and provides guiding principles on how the planning process can take account of the impacts of new development on air quality.

⁷ Department for Communities and Local Government (2014) Planning Practice Guidance Air Quality

2.8 The PPG⁷ sets out the role of Local Plans with regard to air quality and when air quality could be relevant to a planning decision stating that:

“Whether or not air quality is relevant to a planning decision will depend on the proposed development and its location. Concerns could arise if the development is likely to generate air quality impact in an area where air quality is known to be poor. They could also arise where the development is likely to adversely impact upon the implementation of air quality strategies and action plans and/or, in particular, lead to a breach of EU legislation (including that applicable to wildlife).

[...]

When deciding whether air quality is relevant to a planning application, considerations could include whether the development would:

- Significantly affect traffic in the immediate vicinity of the proposed development site or further afield. This could be by generating or increasing traffic congestion; significantly changing traffic volumes, vehicle speed or both; or significantly altering the traffic composition on local roads. Other matters to consider include whether the proposal involves the development of a bus station, coach or lorry park; adds to turnover in a large car park; or result in construction sites that would generate Heavy Goods Vehicle flows over a period of a year or more.*
- Introduce new point sources of air pollution. This could include furnaces which require prior notification to local authorities; or extraction systems (including chimneys) which require approval under pollution control legislation or biomass boilers or biomass-fuelled CHP plant; centralised boilers or CHP plant burning other fuels within or close to an air quality management area or introduce relevant combustion within a Smoke Control Area.*
- Expose people to existing sources of air pollutants. This could be by building new homes, workplaces or other development in places with poor air quality.*
- Give rise to potentially unacceptable impact (such as dust) during construction for nearby sensitive locations.*
- Affect biodiversity. In particular, this is likely to result in deposition or concentration of pollutants that significantly affect a European-designated wildlife site, and is not directly connected with or necessary to the management of the site, or does it otherwise affect biodiversity, particularly designated wildlife sites.”*

2.9 The PPG provides guidance regarding what should be included within an air quality assessment. Examples of potential air quality mitigation measures are also provided.

2.10 Local Planning Policy

- 2.11 The Local Plan for South Derbyshire is formed of two parts. Part 1⁸ was adopted in June 2016 and is the strategic element of the Local Plan, whereas Part 2⁹ was adopted in November 2017 and proposes non-strategic housing allocations and detailed development management policies.
- 2.12 Neither part of the Local Plan contains policies specific to air quality, however Strategic Objective 1 states:

"To ensure future development is locally distinctive and environmentally, socially and economically sustainable through the achievement of design excellence, addressing the causes and effects of climate change and reducing waste and pollution."

⁸ South Derbyshire District Council. (2016). South Derbyshire Local Plan Part 1.
⁹ South Derbyshire District Council. (2017). South Derbyshire Local Plan Part 2.

3. METHODOLOGY

Consultation with South Derbyshire District Council

- 3.1 Consultation was undertaken with the Environmental Health department at SDDC, by e-mail¹⁰, outlining the proposed assessment methodology.
- 3.2 The agreed assessment methodology is detailed below:
- A construction phase assessment was undertaken and relevant measures to mitigate construction phase dust emissions were recommended. The assessment was undertaken in accordance with guidance provided by the Institute of Air Quality Management (IAQM)¹¹.
 - A detailed road traffic emissions assessment was undertaken to consider the impact of development-generated traffic on local air quality.
 - The dispersion model ADMS-Roads was used to model concentrations of oxides of nitrogen (NO_x) and particulate matter (PM₁₀ and PM_{2.5}) at the proposed development site.
 - The assessment was undertaken in accordance with Defra Local Air Quality Management Technical Guidance (LAQM.TG16)¹². Verification of the model was undertaken using SDDC NO₂ diffusion tube monitoring data.
 - 2018 meteorological data from the East Midlands Airport recording station was utilised in the dispersion modelling. This recording station is the closest to the proposed development and considered to be the most representative of local meteorological conditions.
 - Background pollutant concentrations were obtained from the Defra background maps, provided as a 1km x 1km grid of the UK for use in air quality assessments.
 - Emission factors, NO_x to NO₂ calculator inputs and background pollutant concentrations were utilised for the assessment years being considered (2018 and 2020).
- 3.3 Further to the above, SDDC made the following points:
- *"I understand that the proposed National Infrastructure Project on the land immediately to the west of this site is on ice. No cumulative assessment is therefore required; and*
 - *Finally, in order to meet the new Design Supplementary Planning Document¹³ we will expect the development to implement appropriate and proportionate air quality mitigations. I've attached a summary of the mitigations considered appropriate with ref to the*

¹⁰ Consultation undertaken with Matt Holford, Environmental Health Manager at SDDC, 01/05/2018.

¹¹ Institute of Air Quality Management (2014) Guidance on the assessment of dust from demolition and construction, Institute of Air Quality Management, London

¹² Defra (2016) Local Air Quality Management Technical Guidance (LAQM.TG16), London: Defra

¹³ SDDC, South Derbyshire Planning and Air Quality Supplementary Planning Document.

relevant use class of any given development type."

- 3.4 With respect to the Supplementary Planning Document, it was noted that developments of this type would be expected to include Electric Vehicle (EV) charging points.
- 3.5 SDDC was contacted again on 19/06/2019¹⁴ to obtain 2018 air quality monitoring data, which were received on the same day.

Construction Phase Assessment

- 3.6 An assessment of the potential impacts arising from the construction of the proposed development was undertaken in accordance with IAQM Guidance¹¹. The full assessment methodology is not reproduced within this report but a summary of the assessment steps are provided below:
- Step 1 – screen the requirement for a more detailed assessment. No assessment is required if there are no receptors within a certain distance of the works;
 - Step 2 – assess the risk of dust impacts separately for each of the four activities considered (demolition, earthworks, construction and trackout).
 - Step 2A – determine the potential dust emission magnitude for each of the four activities;
 - Step 2B – determine the sensitivity of the area;
 - Step 2C – determine the risk of dust impacts by combining the findings of steps 2A and 2B.
 - Step 3 – determine the site-specific mitigation for each of the four activities; and
 - Step 4 – examine the residual effects and determine significance.

Road Traffic Emissions - Air Dispersion Modelling

- 3.7 The air dispersion model ADMS-Roads, version 4.1.1.0 was utilised in the assessment to predict concentrations of NO_x, PM₁₀ and PM_{2.5} at existing receptor locations.
- 3.8 The assessment was undertaken in accordance with Defra Local Air Quality Management Technical Guidance¹⁵ and IAQM and Environmental Protection UK (EPUK) guidance¹⁶.

Assessment Scenarios and Traffic Data

- 3.9 The following scenarios were considered in the air dispersion modelling:
- Scenario 1: 2018 Base Year;
 - Scenario 2: 2020 Opening Year Without Development; and
 - Scenario 3: 2020 Opening Year With Development.

¹⁴ Consultation undertaken with Matt Holford, Environmental Health Manager at SDDC, 27/06/2019.

¹⁵ Defra (2016) Local Air Quality Management Technical Guidance (LAQM.TG16), London: Defra

¹⁶ Institute of Air Quality Management and Environmental Protection UK (2017) Land-Use Planning & Development Control: Planning for Air Quality, v1.2, London

- 3.10 2020 was selected for the assessment of impacts from the proposed development's operational phase as this is the anticipated opening year of the development. However, it is noted that the scheme is not expected to be fully operational until 2025. The use of full 2025 development-generated trips with 2020 emissions factors and background concentrations is therefore considered to be conservative.
- 3.11 Traffic data were obtained from BSP Consulting, the Transport Consultant for the project. 24-hour Annual Average Daily Traffic Data (AADT) and Heavy Duty Vehicle (HDV) proportions were provided for the following roads for use in the assessment:
- A50;
 - A38 Burton Road;
 - A5132 Twyford Road;
 - A5132 The Castle Way;
 - A5132 Carriers Way;
 - B5008 Etwall Road;
 - B5008 Repton Road;
 - Access road to Toyota factory; and
 - Findern Road.
- 3.12 Consideration was given to the speeds in which vehicles are likely to travel within the study area. Free-flowing traffic conditions were modelled using average speed information provided by the Transport Consultants for the project. HDVs on dual carriageways were modelled at 90km.hr⁻¹ as these vehicles are limited to this speed. Queuing sections at junctions were modelled at 10km.hr⁻¹ below the speed limit in accordance with Defra guidance¹².
- 3.13 Traffic data used in the air dispersion modelling are provided in **Table 3.1**. Data for both 2020 scenarios included vehicle movements from general traffic growth in the area and from the following specific committed developments:
- Highfields Farm (App. Ref: 9/2006/0775) – 1,200 dwellings, primary school & local centre. The scheme is partially completed. It is estimated that approximately 60% (720 dwellings) of the scheme is still to be developed and occupied.
 - Chellaston Fields (App. Ref: 9/2012/0568) – 450 dwellings, small supermarket & local centre. Approved and yet to be developed.
 - Holmleigh Way, Chellaston (App. Ref: 9/2013/0663) – 157 dwellings. Approved and yet to be developed.
 - The Mease, Hilton (App. Ref: 9/2013/1044) – 485 dwellings, 22,000m² floor area for B1/B2/B8 commercial use, primary school & local centre. Approved and yet to be developed.
 - New House Farm, Phase 1 (App. Ref: 9/2014/1136) – 300 dwellings. Approved and yet to be developed.
 - New House Farm, Phase 2 (App. Ref: 9/2017/0349) – 1,100 dwellings, care facility, local centre and primary school. Approved and yet to be developed.

- Land West of Mickleover (App. Ref: 9/2015/0768) – 252 dwellings. Approved and yet to be developed.
- Boulton Moor (App Ref: 9/2016/0166) – 600 dwellings & primary school. Planning decision pending.
- Snelsmoor Grange (App. Ref: 04/13/00351) – 800 dwellings and primary school. Planning decision pending.
- Deep Dale Lane (App. Ref: 9/2017/0922) – 100 dwellings. Planning decision pending.
- Egginton Road, Etwall (App. Ref: 9/2017/1191) – 50 dwellings. Planning decision pending.
- Hackwood Farm (App. Ref: 9/2014/0562) - 700 dwellings, local centre and a primary school. Approved and yet to be developed.
- Willington Road Phase 2 (App. Ref: 9/2015/0354) – 99 dwellings. Approved and yet to be developed.
- Dove Valley Park (App. Ref: 9/2017/0816) – 61,061m² floor area for B2/B8 commercial use. Planning decision pending.

Table 3.1: Traffic Data Utilised in the Air Quality Assessment

Link	Speed	Scenario 1: 2018 Base Year		Scenario 2: 2020 Without Development		Scenario 3: 2020 With Development	
	km.hr ¹	Total AADT Flow	HDV	Total AADT Flow	HDV	Total AADT Flow	HDV
1 – A50 west of A38	112 / 90	51188	9911	59223	10396	59581	10503
2 – Toyota Access	48	6585	394	6848	410	6848	410
3 – A38 north of A50	112 / 90	73250	11016	80756	11525	81392	11715
4 – A50 east of A38	112 / 90	67699	13108	76255	13719	76756	13868
5 – B5008 south of A50	64	11550	691	12010	719	13799	1253
6 – A38 south of A50	112 / 90	73215	11011	80007	11508	80300	11596
7 – B5008 south of service station	53	10727	753	11155	783	12944	1317
8 – B5008 south of site access	64	10727	753	11155	783	11787	783
9 – Findern Road	48	4771	286	4962	297	5330	297
10 – B5008 south of Findern Road	48	12118	725	12601	754	12865	754
11 – A5132 Twyford Road	48	8108	459	8892	485	8921	485
12 – B5008 Repton Road	38	16018	840	17334	884	17569	884

Link	Speed	Scenario 1: 2018 Base Year		Scenario 2: 2020 Without Development		Scenario 3: 2020 With Development	
	km.hr ¹	Total AADT Flow	HDV	Total AADT Flow	HDV	Total AADT Flow	HDV
13 – A5132 The Castle Way	48	10867	684	12438	728	12438	728
14 – A38 link to The Castle Way	40	6493	389	6995	408	7002	408
15 – A38 link to Carriers Way	40	5526	331	6031	348	6038	348
16 – A5132 Carriers Way	64	8996	538	10735	581	10749	581
17 – A38 north of A5132	112 / 90	73215	11011	80007	11508	80300	11596
18 – A38 south of A5132	112 / 90	76021	11433	83452	11955	83730	12043
19 – New site access roundabout (with only)	30	0	0	0	0	12365	1050
20 – B5008 roundabout	30	11130	722	11582	751	13371	1285
21 – Site access (with only)	40	0	0	0	0	1789	534
22 – Toyota Island*	30	23624	3844	26258	4023	26556	4112

*Toyota Island was modelled as having an average of all of the road links from which it is accessed. This is believed to represent a very conservative scenario as much of the traffic flows past the roundabout on the A38 and A50 without entering it.

ADMS-Roads Model Inputs

3.14 The following model inputs were utilised in the assessment and agreed with SDDC during the consultation:

- Emission factors – emission factors were utilised from the Defra Emission Factor Toolkit¹⁷, version 9.0.
- Conversion of oxides of nitrogen – concentrations of NO_x were predicted using the ADMS-Roads dispersion model. These concentrations were converted to nitrogen dioxide (NO₂) using the Defra NO_x to NO₂ calculator, version 7.1¹⁸.
- Meteorological data – hourly sequential meteorological data for the base year of assessment (2018) were obtained for the East Midlands Airport recording station. This is the closest, most representation recording station to the proposed development site.
- Background pollutant concentrations – background concentrations of NO₂, PM₁₀ and PM_{2.5} for the study area were obtained from the pollutant concentrations maps¹⁹ provided by Defra as a 1km x 1km grid of the UK.

¹⁷ Defra (2019) Emission Factor Toolkit [<https://laqm.defra.gov.uk/review-and-assessment/tools/emissions-factors-toolkit.html>]

¹⁸ Defra (2019) NO_x to NO₂ Calculator [<https://laqm.defra.gov.uk/review-and-assessment/tools/background-maps.html#NOxNO2calc>]

¹⁹ Defra (2019) background pollutant concentration maps [<https://uk-air.defra.gov.uk/data/laqm-background-maps?year=2017>]

- Calculation of short term PM₁₀ concentrations – the following calculation, as detailed in Defra guidance¹², was utilised to calculate the number of exceedances of the 24-hour mean PM₁₀ air quality objective:

$$\text{Number of 24-Hour Mean Exceedance} = -18.5 + 0.00145 \times \text{Annual Mean}^3 + (206 / \text{Annual Mean})$$

- The IAQM released a position statement in July 2018²⁰ regarding dealing with the uncertainty in vehicle NOx emissions within air quality assessments. This recommends that sensitivity analyses be undertaken and professional judgement be applied to consider the scenario where NOx emissions do not reduce as rapidly as shown by the EFT. Defra released new versions of the air quality assessment tools in May 2019, including updated versions of the background concentration maps, Emission Factor Toolkit and NOx to NO₂ Calculator. At the time of writing the IAQM had not released a revised position statement. As such, and to provide a conservative assessment, a 2020 scenario was assessed with 2020 emission factors, NOx to NO₂ calculator inputs and background concentrations used alongside 2025 development-generated trips in the dispersion modelling assessment, which is considered to be conservative.

Assessment Criteria

- 3.15 Predicted pollutant concentrations were compared to the relevant air quality objectives. The current relevant air quality standards and objectives are detailed in **Table 3.2**.

²⁰ Institute of Air Quality Management (2018) Position Statement: Dealing with Uncertainty in Vehicle NOx Emissions within Air Quality Assessments, Version 1.1

Table 3.2: Air Quality Standards and Objectives (England)

Pollutant	Averaging Period	Air Quality Objective ($\mu\text{g.m}^{-3}$)	Date to Achieve by
NO ₂	Annual Mean	40	31 December 2005
	1-hour mean not to be exceeded more than 18 times per year	200	31 December 2005
PM ₁₀	Annual Mean	40	31 December 2004
	24-hour mean not to be exceeded more than 35 times per year	50	31 December 2004
PM _{2.5}	Annual mean target (15% cut in annual mean (urban background exposure))	25	2010 - 2020

- 3.16 Guidance is provided by the Institute of Air Quality Management and Environmental Protection UK¹⁶ to determine the significance of the impact of development-generated road traffic emissions on local air quality. The impact descriptors at receptor locations are detailed in **Table 3.3**. These impact descriptors consider the predicted magnitude of change in pollutant concentrations and the concentration in relation to the relevant air quality objectives.

Table 3.1: Impact Descriptors for Individual Receptors

Long Term Average Concentration at Receptor in Assessment Year	% Change in Concentration Relative to Air Quality Assessment Level (AQAL)			
	1%	2 – 5%	6 – 10%	>10%
75% or less of AQAL	Negligible	Negligible	Slight	Moderate
76 – 94% of AQAL	Negligible	Slight	Moderate	Moderate
95 – 102% of AQAL	Slight	Moderate	Moderate	Substantial
103 – 109% of AQAL	Moderate	Moderate	Substantial	Substantial
110% or more of AQAL	Moderate	Substantial	Substantial	Substantial

Note: Figures rounded up to the nearest whole number, therefore any value less than 1% after rounding (effectively less than 0.5%) will be described as negligible.

4. BASELINE CONDITIONS

Local Air Quality Management

- 4.1 The Site is not located within, or in close proximity to any existing AQMAs. No AQMAs are currently designated by SDDC.

Local Air Quality Monitoring

- 4.2 SDDC undertakes monitoring of air quality within its administrative boundary using a network of diffusion tube monitoring sites. SDDC does not currently operate any automatic continuous analysers.
- 4.3 Monitoring results for the two diffusion tube locations within the study area are detailed in **Table 4.1** for the most recent five year period available.

Table 4.1: SDDC Air Quality Monitoring Data in the Study Area

Diffusion Tube	Site Type	Grid Reference		NO ₂ Monitored Concentrations (µg.m ⁻³)				
		X	Y	2014	2015	2016	2017	2018
1 – Findern Lane, Burnaston	R	430040	331110	25.7	24.5	24.6	22.8	21.7
18 – Repton Road, Willington	R	430693	331831	29.1	33.0	35.9	35.4	31.3

Note: "R" = Roadside.

- 4.4 Annual mean NO₂ concentrations at the diffusion tubes within the study area were consistently below the 40µg.m⁻³ air quality objective between 2014 and 2018 and there has been a downward trend in concentrations of the pollutant in recent years.

Background Pollutant Concentrations

- 4.5 No background air pollutant concentration monitoring is undertaken by SDDC within the study area.
- 4.6 Background pollutant concentrations were therefore obtained from the latest Defra background concentration maps¹⁹, which are provided for the UK as a 1km x 1km grid network. The latest maps are based on 2017 monitoring and meteorological data. Background concentrations of NO₂, PM₁₀ and PM_{2.5} were obtained for the grid squares covering the study area for the years of assessments. The background concentrations used in the assessment are detailed in **Table 4.2**.

Table 4.2: Background Pollutant Concentrations used in the Assessment

Pollutant	Grid Square (Modelled Receptors and Diffusion Tubes)	2018 Background Concentration ($\mu\text{g.m}^{-3}$)	2020 Background Concentration ($\mu\text{g.m}^{-3}$)
NO ₂	429500, 329500 (Receptors 1 and 8)	16.7	15.3
PM ₁₀		15.4	15.0
PM _{2.5}		9.9	9.5
NO ₂	429500, 328500 (Receptors 2, 3, 4, 5, 6, 7 and 11)	15.8	14.6
PM ₁₀		13.7	13.3
PM _{2.5}		9.2	8.2
NO ₂	429500, 330500 (Receptors 9 and 10)	19.3	17.9
PM ₁₀		15.3	14.8
PM _{2.5}		9.9	9.6
NO ₂	426500, 330500 (Receptor 12)	12.6	11.5
PM ₁₀		15.4	15.0
PM _{2.5}		9.6	9.2
NO ₂	430500, 329500 (Receptor 13)	17.2	15.8
PM ₁₀		15.0	14.5
PM _{2.5}		9.8	9.4
NO ₂	431500, 330500 (Receptor 14)	16.7	15.3
PM ₁₀		15.8	15.3
PM _{2.5}		10.0	9.6
NO ₂	428500, 328500 (Receptor 15)	16.2	15.0
PM ₁₀		15.3	14.9
PM _{2.5}		9.7	9.3

Pollutant	Grid Square (Modelled Receptors and Diffusion Tubes)	2018 Background Concentration ($\mu\text{g.m}^{-3}$)	2020 Background Concentration ($\mu\text{g.m}^{-3}$)
NO ₂	427500, 328500 (Receptor 16)	13.7	12.2
PM ₁₀		14.3	13.9
PM _{2.5}		9.3	8.9
NO ₂	430500, 331500 (Diffusion tubes SDDC 1 and 18)	15.8	14.6
PM ₁₀		14.7	14.3
PM _{2.5}		9.7	9.3

- 4.7 2018 and 2020 background concentrations are below the relevant annual mean air quality objectives for NO₂, PM₁₀ and PM_{2.5}. It is noted that there is a relatively small predicted decrease in background concentrations between 2018 and 2020 of circa 1.2 $\mu\text{g.m}^{-3}$ for NO₂ and 0.4 $\mu\text{g.m}^{-3}$ for PM₁₀ and PM_{2.5}.

5. CONSTRUCTION PHASE ASSESSMENT

- 5.1 The construction phase of the proposed development will involve a number of activities which have the potential to impact on local air quality. These include emissions of dust generated through demolition, excavation, construction, earthworks and trackout activities, exhaust pollutant emissions from construction traffic on the local highways network, and exhaust emissions from non-road mobile machinery (NRMM) within the construction site itself.
- 5.2 The location of sensitive receptors in relation to construction activities will affect the potential for such construction activities to cause dust soiling, nuisance and local air quality impacts. Meteorological conditions and the use of control measures will also contribute to the effects experienced.

Step 1: Screen the Need for a Detailed Assessment

- 5.3 Step 1 of the IAQM guidance¹¹ involves a screening assessment to consider whether a more detailed construction phase dust assessment is required.
- 5.4 In accordance with the guidance, a detailed assessment is required if:
- Human receptors are located within 350m of the boundary of the site or 50m of routes used by construction vehicles on the public highways, up to 500m from the site entrances; or
 - Ecological receptors are located within 50m of the boundary of the site or 50m of routes used by construction vehicles on the public highways, up to 500m from the site entrances.
- 5.5 From a review of the Multi Agency Geographic Information for the Countryside (MAGIC)²¹ website, no designated ecological sites were identified the vicinity of the proposed development. However human receptors are located within 350m of the site boundary, with the closest of these receptors being isolated dwellings located to the north and east of the site, and the new housing estate to the south-east on James Clarke Road. A construction phase assessment was therefore undertaken.

Step 2: Assess the Risk of Dust Impacts

Step 2A: Define the Potential Dust Emission Magnitude

- 5.6 The dust emission magnitudes for the construction activities were defined using the criteria detailed in the IAQM guidance¹¹. These criteria and the dust emission magnitude defined for the proposed development are detailed in **Table 5.1**.

²¹ Defra, Multi Agency Geographic Information for the Countryside (MAGIC) [<http://magic.defra.gov.uk/>]

Table 5.1: Dust Emission Magnitude Criteria and Definition

Activity	IAQM Dust Emission Magnitude	IAQM Dust Emission Magnitude Criteria	Dust Emission Magnitude
Demolition	Large	Total building volume >50,000m ³ , potentially dusty construction material (e.g. concrete), on-site crushing and screening, demolition activities >20m above ground.	Small: Total building volume to be demolished will be <20,000m ³
	Medium	Total building volume 20,000 – 50,000m ³ , potentially dusty construction material (e.g. concrete), demolition activities 10-20m above ground.	
	Small	Total building volume <20,000m ³ , construction material with low potential for dust release (e.g. metal cladding or timber), demolition activities <10m above ground.	
Earthworks	Large	Total site area >10,000m ² , 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 >8 m in height, total material moved >100,000 tonnes.	Large: The total site area is >10,000m ² .
	Medium	Total site area 2,500m ² – 10,000m ² , moderately dusty soil type (e.g. silt), 5 - 10 heavy earth moving vehicles active at any one time, formation of bunds 4m - 8m in height, total material moved 20,000 tonnes – 100,000 tonnes.	
	Small	Total site area <2,500m ² , soil type with large grain size (e.g. sand), <5 heavy earth moving vehicles active at any one time, formation of bunds <4m in height, total material moved <20,000 tonnes, earthworks during wetter months.	
Construction	Large	Total building volume >100,000m ³ , on site concrete batching, sandblasting.	Large: The proposed building volume is >100,000m ³
	Medium	Total building volume 25,000m ³ – 100,000m ³ , potentially dusty construction material (e.g. concrete), on site concrete batching.	
	Small	Total building volume <25,000m ³ , construction material with low potential for dust release (e.g. metal cladding or timber).	
Trackout	Large	>50 HDV (>3.5t) outward movements in any one day, potentially dusty surface material (e.g. high clay content), unpaved road length >100m.	Large: >50 HDV movements are likely per day during the construction phase at peak periods
	Medium	10-50 HDV (>3.5t) outward movements in any one day, moderately dusty surface material (e.g. high clay content), unpaved road length 50m – 100m.	
	Small	<10 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

- 5.7 The sensitivity of the study area takes into account the specific receptors in the vicinity of the site, the proximity and number of those receptors, the local background concentration of PM₁₀ and site-specific factors. The assessment requires the determination of the sensitivity of the area for the purposes of dust soiling, human health and ecological impacts and these are presented in **Table 5.2**.

Table 5.1: Determination of the Sensitivity of the Area

Potential Impact	Justification	Sensitivity			
		Demolition	Earthworks	Construction	Trackout
Dust Soiling	There are <100 highly sensitive receptors within 100m of the proposed development.	Low	Low	Low	Low
Human Health	There are <10 highly sensitive within 20m of the proposed development. The 2018 background concentration of PM ₁₀ is less than 24µg.m ⁻³ .	Low	Low	Low	Low
Ecological	There are no ecological receptors within 50m of the redline boundary.	-	-	-	-

Step 2C: Define the Risk of Impacts

- 5.8 The dust emission magnitude determined in Step 2A is then combined with the sensitivity of the area determined in Step 2B to define the risk of dust impacts with no mitigation applied. The results of this assessment are detailed in **Table 5.2**.

Table 5.2: Summary Dust Risk Table to Define Site Specific Assessment

Activity	Step 2A: Dust Emission Magnitude	Step 2B: Sensitivity of the Area	Step 2C: Risk of Dust Impacts
<i>Dust Soiling Effects on People and Property</i>			
Demolition	Small	Low	Negligible
Earthworks	Large	Low	Low Risk
Construction	Large	Low	Low Risk

Activity	Step 2A: Dust Emission Magnitude	Step 2B: Sensitivity of the Area	Step 2C: Risk of Dust Impacts
Trackout	Large	Low	Low Risk
Human Health Impacts			
Demolition	Small	Low	Negligible
Earthworks	Large	Low	Low Risk
Construction	Large	Low	Low Risk
Trackout	Large	Low	Low Risk

Step 3: Site-Specific Mitigation

- 5.9 The risk of dust impacts defined in Step 2C is used to determine the measures required to mitigate construction phase dust impacts. The mitigation measures are detailed in Section 7 of this report.

Step 4: Determine Significant Effects

- 5.10 In accordance with IAQM guidance¹¹, with the implementation of the mitigation measures detailed in Section 7, the residual impacts from the construction phase are considered to be 'not significant'.

6. ROAD TRAFFIC EMISSIONS EXPOSURE ASSESSMENT

Existing Receptor Locations

- 6.1 Existing receptor locations were identified within the study area and considered in the operational phase road traffic emissions assessment. Concentrations of NO₂, PM₁₀ and PM_{2.5} were predicted at the identified existing receptor locations for the assessment scenarios detailed in paragraph 3.9.
- 6.2 The existing sensitive receptor locations considered in the assessment were chosen based on their relative proximity to road links within the study area. Where possible the closest receptors to those road links were considered, as these receptors are likely to experience the greatest change in pollutant concentrations as a result of the proposed development. All receptors heights were modelled at 1.5m.
- 6.3 The existing receptor locations are detailed in **Table 6.1** and **Figure 6.1**.

Table 6.1: Existing Sensitive Receptor Locations

Receptor	Grid Reference		Details
	X	Y	
R1	429410	329401	Westview, Hill Farm
R2	429435	328900	Arthur Close
R3	429417	328591	4 The Street
R4	429358	328532	1 Green Close
R5	429350	328501	The Nook
R6	429437	328554	7 The Green
R7	429405	328472	3 Repton Road
R8	429240	329740	Willington Road
R9	429621	330458	Rumenco Farm
R10	429934	330974	Four Ways
R11	429467	328674	2 Canal Cottage
R12	426649	330745	Tynefield Care
R13	430876	329892	Heath Lane
R14	431284	330304	Common Piece La
R15	428254	328617	Carriers Road
R16	427857	328176	Egginton Cottage

Figure 6.1: Existing Receptor Locations

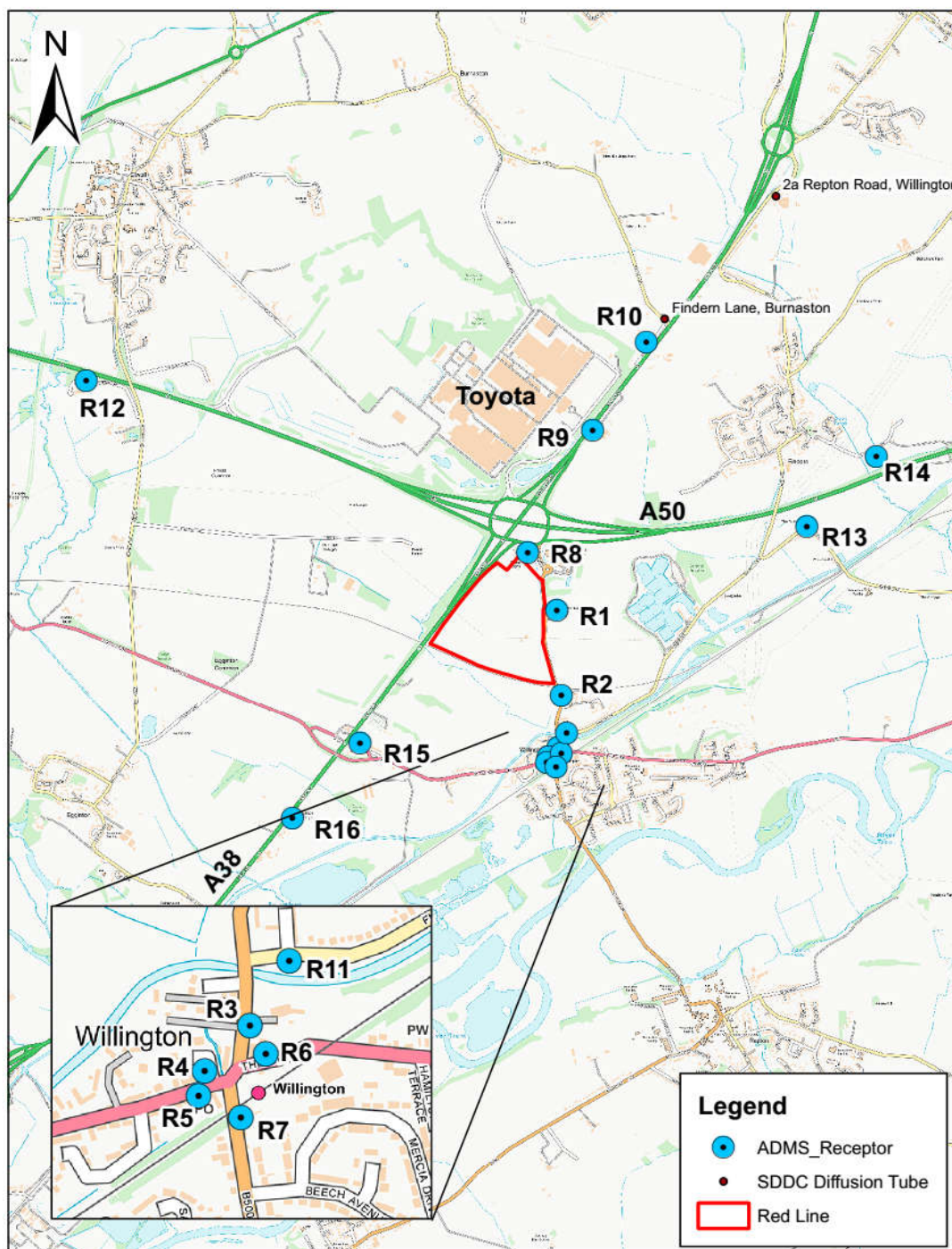


Figure 6.1: Modelled Receptors

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Baseline Assessment

- 6.4 Pollutant concentrations were predicted at the identified existing sensitive receptor locations using the dispersion model ADMS-Roads. Predicted pollutant concentrations for Scenario 1: 2018 Base Year and Scenario 2: 2020 Without Development are detailed in **Table 6.2**.

Table 6.2: Predicted Annual Mean Pollutant Concentrations for Scenario 1: 2018 Base Year and Scenario 2: 2020 Without Development at Existing Receptor Locations

Receptor	Scenario 1: 2018 Base Year ($\mu\text{g.m}^{-3}$)			Scenario 2: 2020 Opening Year Without Development ($\mu\text{g.m}^{-3}$)		
	NO ₂	PM ₁₀	PM _{2.5}	NO ₂	PM ₁₀	PM _{2.5}
R1	18.5	15.7	10.1	18.3	15.3	9.7
R2	18.9	14.2	9.4	18.5	13.8	9.1
R3	20.8	14.3	9.6	20.2	13.9	9.2
R4	18.9	14.1	9.4	18.7	13.7	9.1
R5	20.3	14.3	9.5	20.0	13.9	9.2
R6	20.0	14.2	9.5	19.6	13.9	9.1
R7	21.4	14.4	9.6	20.9	14.0	9.2
R8	22.4	16.3	10.4	21.8	15.9	10.1
R9	31.7	17.4	11.2	30.5	17.0	10.8
R10	26.1	16.4	10.6	25.4	16.0	10.2
R11	18.4	14.1	9.4	18.1	13.7	9.0
R12	16.0	16.0	9.9	15.8	15.6	9.6
R13	19.6	15.4	10.0	19.3	15.0	9.7
R14	19.8	16.3	10.3	19.5	15.9	9.9
R15	22.1	16.3	10.3	21.6	15.9	9.9
R16	24.9	16.2	10.4	23.8	15.8	10.1

- 6.5 The baseline assessment for Scenario 1 and Scenario 2 indicates that pollutant concentrations at identified existing receptor locations are below the respective annual mean air quality objectives at receptors considered.
- 6.6 With regard to short term air quality objectives for NO₂ and PM₁₀, the predicted annual mean NO₂ concentrations are less than 60 $\mu\text{g.m}^{-3}$ and therefore in accordance with Defra guidance¹² it may be assumed that exceedance of the 1-hour mean objective are unlikely. The calculation detailed in paragraph 3.14 was used to determine potential exceedance of the 24-hour PM₁₀ short term objective; no exceedances were predicted.

Impact Assessment

- 6.7 Concentrations of NO₂, PM₁₀ and PM_{2.5} were predicted at identified existing receptor locations for Scenario 3: 2020 With Development, to consider the impact of development-generated vehicles on local air quality.
- 6.8 Predicted pollutant concentrations are detailed in **Tables 6.3, 6.4** and **6.5** for NO₂, PM₁₀ and PM_{2.5} respectively together with Scenario 2: 2020 Without Development concentrations for comparison purposes. The predicted change in pollutant concentrations resulting from development-generated traffic, and the associated impact are also provided.

Table 6.3: Predicted Annual Mean NO₂ Concentrations and Development Impact at Existing Receptor Locations

Receptor	Predicted NO ₂ Concentrations (µg.m ⁻³)			Impact
	Scenario 2: 2020 Without Development	Scenario 3: 2020 With Development	Change*	
R1	18.3	18.4	+0.1	Negligible
R2	18.5	18.6	+0.1	Negligible
R3	20.2	20.3	+0.1	Negligible
R4	18.7	18.7	0.0	Negligible
R5	20.0	20.1	0.0	Negligible
R6	19.6	19.6	0.0	Negligible
R7	20.9	21.0	+0.1	Negligible
R8	21.8	21.9	+0.1	Negligible
R9	30.5	30.6	+0.1	Negligible
R10	25.4	25.5	+0.1	Negligible
R11	18.1	18.2	+0.1	Negligible
R12	15.8	15.8	0.0	Negligible
R13	19.3	19.3	0.0	Negligible
R14	19.5	19.5	0.0	Negligible
R15	21.6	21.6	0.0	Negligible
R16	23.8	23.8	0.0	Negligible

*Discrepancies due to rounding effects.

Table 6.4: Predicted Annual Mean PM₁₀ Concentrations and Development Impact at Existing Receptor Locations

Receptor	Predicted PM ₁₀ Concentrations (µg.m ⁻³)			Impact
	Scenario 2: 2020 Without Development	Scenario 3: 2020 With Development	Change	
R1	15.3	15.3	0.0	Negligible
R2	13.8	13.8	0.0	Negligible
R3	13.9	13.9	0.0	Negligible
R4	13.7	13.7	0.0	Negligible
R5	13.9	13.9	0.0	Negligible
R6	13.9	13.9	0.0	Negligible
R7	14.0	14.0	0.0	Negligible
R8	15.9	15.9	0.0	Negligible
R9	17.0	17.1	0.0	Negligible
R10	16.0	16.0	0.0	Negligible
R11	13.7	13.7	0.0	Negligible
R12	15.6	15.6	0.0	Negligible
R13	15.0	15.0	0.0	Negligible
R14	15.9	15.9	0.0	Negligible
R15	15.9	15.9	0.0	Negligible
R16	15.8	15.8	0.0	Negligible

**Discrepancies due to rounding effects.*

Table 6.5: Predicted Annual Mean PM_{2.5} Concentrations and Development Impact at Existing Receptor Locations

Receptor	Predicted PM _{2.5} Concentrations (µg.m ⁻³)			Impact
	Scenario 2: 2020 Without Development	Scenario 3: 2020 With Development	Change	
R1	9.7	9.7	0.0	Negligible
R2	9.1	9.1	0.0	Negligible
R3	9.2	9.2	0.0	Negligible
R4	9.1	9.1	0.0	Negligible
R5	9.2	9.2	0.0	Negligible
R6	9.1	9.1	0.0	Negligible
R7	9.2	9.2	0.0	Negligible
R8	10.1	10.1	0.0	Negligible
R9	10.8	10.8	0.0	Negligible
R10	10.2	10.2	0.0	Negligible
R11	9.0	9.0	0.0	Negligible
R12	9.6	9.6	0.0	Negligible
R13	9.7	9.7	0.0	Negligible
R14	9.9	9.9	0.0	Negligible
R15	9.9	9.9	0.0	Negligible
R16	10.1	10.1	0.0	Negligible

**Discrepancies due to rounding effects.*

- 6.9 The predicted NO₂, PM₁₀ and PM_{2.5} concentrations for Scenario 2: 2020 Without Development and Scenario 3: 2020 With Development are below the relevant annual mean air quality objectives for all receptors. Predicted changes in NO₂, PM₁₀ and PM_{2.5} concentrations are considered to be negligible in accordance with IAQM and EPUK guidance¹⁶, which is 'not significant'.
- 6.10 With regard to short term air quality objectives for NO₂ and PM₁₀, the predicted annual mean NO₂ concentrations are less than 60µg.m⁻³ and therefore in accordance with Defra guidance¹² it may be assumed that exceedance of the 1-hour mean objective are unlikely. The calculation detailed in paragraph 3.14 was used to determine potential exceedance of the 24-hour PM₁₀ short term objective; no exceedances were predicted.

7. MITIGATION

Construction Phase Assessment

Step 3: Site-specific Mitigation

- 7.1 The risk of dust impacts, defined in Step 2C of the assessment, are used to determine the mitigation measures required to minimise the emission of dust during construction phase activities. The IAQM guidance¹¹ provides details of highly recommended and desirable mitigation measures which are commensurate with the risk of dust impacts defined in Step 2C for construction, earthworks and trackout activities. Where the mitigation measures are general in nature, the highest risk category was applied in accordance with the guidance¹¹. The highest risk category identified was 'Low Risk'. The identified mitigation measures detailed in **Tables 7.1** and **7.2** could be implemented through a Construction Environmental Management Plan (CEMP) or Dust Management Plan (DMP).

Table 7.1: Mitigation Measures for a Low Risk Site

Category	Mitigation Measures	
	Highly Recommended	Desirable
Communication	Display the name and contact details of person(s) accountable for air quality and dust issues on the site boundary. This may be the environmental manager/engineer or the site manager.	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.
	Display the head or regional office contact information.	
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.	None
	Make the complaints log available to the local authority when asked.	
	Record any exceptional incidents that cause and/or air emissions, either on- or off-site, and the action taken to resolve the situation in the log book.	
Monitoring	Carry out regular site inspections to monitor compliance with the DMP, record inspections results, and make an inspection log available to the local authority when asked.	Undertake daily on-site and off-site inspection, where receptors (including roads) are nearby, to monitor dust, record inspection results, and

Category	Mitigation Measures	
	Highly Recommended	Desirable
	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.	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 the site boundary, with cleaning to be provided as necessary.
Preparing and maintaining the site	Plan the site layout so that machinery and dust causing activities are located away from receptors, as far as is possible.	Fully enclose site or specific operations where there is a high potential for dust production and the site is active for an extended period.
	Erect solid screens or barriers around dusty activities or the site boundary that are at least as high as any stockpiles on site.	Keep site fencing, barriers and scaffolding clean using wet methods.
	Avoid site runoff of water or mud.	Remove materials that have a potential to produce dust from site as soon as possible. Unless being re-used on site. If they are being re-used on-site cover as described below.
		Cover, seed or fence stockpiles to prevent wind whipping.
Operating vehicle/ machinery and sustainable travel	Avoid the use of diesel or petrol powered generators and use mains electricity or battery powered equipment where practicable.	Impose and signpost a maximum-speed-limit of 15 mph on surfaced and 10 mph on un-surfaced haul roads and work areas (if long haul routes are required these speeds may be increased with suitable control measures provided, subject to the approval of the nominated undertaker with the agreement of the local authority, where appropriate).
	Ensure all vehicles switch off engines when stationary – no idling vehicles.	Implement a Travel Plan that supports and encourages sustainable travel (public transport, cycling, walking, and car-sharing).
Operations	Only use cutting, grinding or sawing equipment fitted or in conjunction with suitable dust suppression techniques	None

Category	Mitigation Measures	
	Highly Recommended	Desirable
	such as water sprays or local extraction, e.g. suitable local exhaust ventilation systems.	
	Ensure an adequate water supply on site for effective dust/particulate matter suppression/mitigation, using non-portable water where possible and appropriate.	
	Use enclose chutes and conveyors and covered skips.	
	Minimise drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment and use fine water sprays on such equipment wherever appropriate.	
Waste Management	Avoid bonfires and burning of waste materials.	None

Table 7.2: Mitigation Measures Specific to Demolition, Earthworks, Construction and Trackout

Category	Mitigation Measures	
	Highly Recommended	Desirable
Earthworks (Low Risk Site)	None	None
Construction (Low Risk Site)	None	Avoid scabbling (roughening of concrete surfaces) if possible.
		Ensure bulk cement and other fine powder materials are delivered in enclosed tankers and stored in silos with suitable emission control systems to prevent escape of material and overfilling during delivery.
Trackout (Low Risk Site)	None	None

Road Traffic Emissions

- 7.2 The development will result in minimal increases in pollutant concentrations and a negligible impact at identified existing receptor locations is predicted. It is therefore not considered necessary to recommend mitigation measures for road traffic emissions.

However, as indicated in SDDC's supplementary planning document, a development of this type would be expected to include EV charging provision.

8. CONCLUSIONS

- 8.1 An air quality assessment was undertaken for a proposed commercial/industrial development off Etwall Road, Willington, Derby.
- 8.2 A qualitative construction phase assessment was undertaken and measures were recommended for inclusion in a DMP to minimise emissions during construction activities. With the implementation of these mitigation measures the impact of construction phase dust emissions is considered to be 'not significant' in accordance with IAQM guidance¹¹.
- 8.3 A detailed road traffic emissions assessment was undertaken to consider the impact of development-generated road traffic on local air quality at identified existing receptor locations. Road traffic emissions were modelled using the dispersion model ADMS-Roads and concentrations of NO₂, PM₁₀ and PM_{2.5} were predicted at identified sensitive receptor locations. The modelling assessment was undertaken in accordance with Defra Local Air Quality Management Technical Guidance⁹. Concentrations were predicted to be below the relevant air quality objectives at all receptor locations considered in the assessment and impact of the development on local air quality was predicted to be 'negligible' in accordance with IAQM and EPUK guidance¹⁶.

APPENDICES

APPENDIX A: Glossary of Terms

Air Quality 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).
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 two years, which is useful for pollutants that have higher concentrations during the winter months.
AQAP	Air Quality Action Plan.
AQMA	Air Quality Management Area.
AQS	Air Quality Strategy.
Defra	Department for Environment, Food and Rural Affairs.
Exceedance	A period of time where the concentrations of a pollutant is greater than, or equal to, the appropriate air quality standard.
HDV	Heavy Duty Vehicles, (HGVs + buses)
HGV	Heavy Goods Vehicles.
IAQM	Institute of Air Quality Management.
LAQM	Local Air Quality Management.
LDV	Light Duty Vehicles (motorbikes, cars, vans and small trucks)
NO	Nitrogen monoxide, a.k.a. nitric oxide.
NO ₂	Nitrogen dioxide.
NO _x	Nitrogen oxides.
O ₃	Ozone.
Percentile	The percentage of results below a given value.
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.
micrograms per cubic metre (µg.m ⁻³)	A measure of concentration in terms of mass per unit volume. A concentration of 1 µg.m ⁻³ means that one cubic metre of air contains one microgram (millionth of a gram) of pollutant.
UK-AIR	UK Air Information Resource – A source of air quality information provided by Defra.
UKAQS	United Kingdom Air Quality Strategy.

APPENDIX B: Development Proposals



Notes:
To be read in conjunction with relevant conditions of sale.
Revisions:
A. CD 09/03/2018
Revisions:
B. 10/03/2018
Masterplan Updated to show final comments.
C. CD 12/04/2018
Masterplan Updated.

UNIT 1:	Warehouse	48,000 sqft	4,560 sqm
	Office (2 Storey)	4,338 sqft	403 sqm
	Total	52,338 sqft	4,963 sqm
NDA			3.5 acres
UNIT 2:	Warehouse	186,200 sqft	17,268.5 sqm
	Office (2 Storey)	8,500 sqft	803.2 sqm
	Total	194,700 sqft	18,071.7 sqm
NDA			8.0 acres
UNIT 3:	Warehouse	150,250 sqft	13,958 sqm
	Office (2 Storey)	8,000 sqft	750 sqm
	Total	158,250 sqft	14,708 sqm
NDA			7.1 acres
UNIT 4:	Warehouse	248,125 sqft	22,773 sqm
	Office (2 Storey)	8,275 sqft	770 sqm
	Total	256,400 sqft	23,543 sqm
NDA			11.4 acres
UNIT 5:	Warehouse	17,653 sqft	1,640 sqm
	Office (2 Storey)	2,622 sqft	243 sqm
	Total	20,275 sqft	1,883 sqm
NDA			1.2 acres
UNIT 6:	Warehouse	14,394 sqft	1,337 sqm
	Office (2 Storey)	1,408 sqft	131 sqm
	Total	15,802 sqft	1,468 sqm
NDA			1.2 acres
UNIT 7:	Warehouse	22,370 sqft	2,078 sqm
	Office (2 Storey)	1,410 sqft	131 sqm
	Total	23,780 sqft	2,209 sqm
NDA			1.4 acres
UNIT 8:	Warehouse	16,079 sqft	1,493 sqm
	Office (2 Storey)	1,410 sqft	131 sqm
	Total	17,489 sqft	1,624 sqm
NDA			1.2 acres
UNIT 9:	Warehouse	70,551 sqft	6,554 sqm
	Office (2 Storey)	4,088 sqft	379 sqm
	Total	74,639 sqft	6,933 sqm
NDA			3.5 acres
UNIT 10:	Warehouse	63,287 sqft	5,878 sqm
	Office (2 Storey)	3,200 sqft	298 sqm
	Total	66,487 sqft	6,176 sqm
NDA			3.4 acres
UNIT 11:	Warehouse	47,361 sqft	4,378 sqm
	Office (2 Storey)	2,618 sqft	243 sqm
	Total	49,979 sqft	4,621 sqm
NDA			3.4 acres

Total GEA: 955,884 sqft 88,817 sqm
Gross Site Plan: 77.9 acres
Net Developable Total Area: 45.3 acres

PROW - Existing
PROW - Diverted
PROW - Removed

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Burnaston Cross
Derby
Masterplan

Drawing status: Preliminary
Scale reference: 1:1000
Drawn: CD
Check: CD
Date: April 2018
Scale: 1:1000 @ A2

Project no: 10-078
Client: NDA
Rev: 0

APPENDIX C: Model Verification

Whilst ADMS Roads is widely validated for use in this type of assessment, model verification for the area around the Site will not have been included. To determine model performance at a local level, a comparison of modelled results with monitored results in the study area was done in accordance with the methodology provided by Defra¹². This process of verification aims to minimise modelling uncertainty by correcting modelled results by an adjustment factor to give greater confidence to the results.

The model was run for Scenario 1: 2018 Verification Year to predict the 2018 annual mean road contributions of NO_x at the SDDC 1 Findern Lane monitoring location. SDDC 18 was not included in the verification procedure as flows for the adjacent roads, Burton Road and the A38 slip road, were not available. The modelled NO_x output at this location was compared to the 2018 monitored concentration to provide adjustment factors. **Table C1** presents the verification process for NO_x, PM₁₀ and PM_{2.5}.

Table C1: NO_x Verification Process

Model Verification Steps	SDDC 1 Diffusion Tube
2018 background NO ₂ concentration (µg.m ⁻³)	15.8
Monitored road contribution NO _x (µg.m ⁻³)*	11.3
Modelled road contribution NO _x (µg.m ⁻³)	14.5
Ratio of monitored road NO _x to modelled road NO _x	0.78
Adjustment factor for modelled road contribution NO_x	N/A – Model is over-predicting

The model was shown to be over predicting annual mean NO₂ concentrations at the SDDC 1 diffusion tube. As such, no factor was applied to the modelled road-NO_x concentration at each receptor, before conversion to NO₂ concentrations using the NO_x to NO₂ calculator provided by Defra, as predicted concentrations should be conservative.



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