

**PROPOSED RESIDENTIAL DEVELOPMENT,
COWM TOP LANE,
ROCHDALE**

AIR QUALITY ASSESSMENT

**For: GLP Ltd and
Barratt Homes**

August 2021

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CONTENTS

1. Introduction
2. Technical and Legislative Context
3. Assessment Methodology
4. Site Location and Proposed Development
5. Baseline Conditions
6. Construction Dust Assessment
7. Vehicle Emissions Assessment – Human Health
8. Vehicle Emissions Assessment - Ecological
9. Mitigation
10. Summary and Conclusions

APPENDICES

- A Traffic Data
- B ADMS-Roads Modelling Results – Human Health
- C ADMS-Roads Modelling Results – Ecological
- D Parameters Plan

1 Introduction

1.1 General

1.1.1 GLP Ltd (GLP) and Barratt Homes (BH) propose to submit a joint outline planning application to Rochdale Borough Council (RBC) for a residential development at land off Cowm Top Lane in Rochdale. Proposals are for the delivery of up to 550 residential units with associated access.

1.1.2 BH accordingly instructed Smith Grant LLP (SGP) to undertake an Air Quality Assessment (AQA) of the proposed development and to provide a report to support the planning application.

1.2 Scope and Objectives of the Report

1.2.1 The following report describes the AQA undertaken by SGP in accordance with the brief agreed with the client.

1.3 The principal aspects considered during this assessment are:

- **disamenity dust and particulate matter:** the potential impacts of disamenity dust and fine particulate matter (PM₁₀) emissions on local human health and ecological receptors arising during the construction phase;
- **road traffic emissions:** potential impacts of vehicle emissions (NO₂ and PM₁₀) on local air quality and local human health and ecological receptors, including those receptors to be introduced by the development and as part of committed developments in the surrounding area, during the operational phase.

1.4 The report describes the methods used to assess the impacts, the baseline conditions currently existing at the Site and surroundings, the potential direct and indirect impacts of the development arising from construction dust and vehicle emissions, and the mitigation measures required to prevent, reduce, or offset the impacts and the residual impacts.

1.5 SGP is an environmental consultancy specialising in air quality assessments. The report reviewer, Katrina Hawkins, Partner, is a Member of the Institute of Air Quality Management (IAQM). The assessment methodology follows the frameworks described in IAQM guidance on air quality and planning¹ and construction dust² and the Planning Practice Guidance provided in relation to planning and air quality³ under the National Planning Policy Framework (NPPF)⁴.

¹ Institute of Air Quality Management (IAQM), (2017), *Land-use Planning & Development Control: Planning for Air Quality*. v1.2.

² Institute of Air Quality Management (IAQM), (February 2014), *Guidance on the Assessment of Dust from Demolition and Construction*

³ Ministry of Housing, Communities and Local Government, National Planning Policy Framework, issued 27th March 2012; last updated 20th July 2021

⁴ Ministry of Housing, Communities and Local Government, Planning Practice Guidance, Air Quality, 6th March 2014, last updated 1st November 2019

2 Technical and Legislative Context

2.1 Technical Context

- 2.1.1 The airborne pollutants of principal concern in connection with demolition and construction activities and which are considered in the following assessment are disamenity dust and particulate matter less than less than 10µm (PM₁₀). The pollutants of principal concern in connection with road traffic are nitrogen oxides (NO_x), nitrogen dioxide (NO₂) and particulate matter less than 10µm (PM₁₀).
- 2.1.2 The term 'dust' typically refers to all airborne particulate matter and can be categorised on the basis of the size of particles². Dust can give rise to both soiling effects through dust deposition (*'disamenity dust'*) and human health effects through suspended particulates. Dust accumulation may also affect sensitive habitats through impacts on vegetation and aquatic ecosystems. Dust soiling will arise from the deposition of particulate matter (PM) in all size fractions but will be associated mostly with particulate matter greater than 30µm.
- 2.1.3 Particles below 10µm (referred to as PM₁₀) correspond to the inhalable fraction of particulate matter and have been related to various adverse health effects⁵. PM_{2.5} (those particles of less than 2µm and which form a proportion of PM₁₀) has been shown to give a stronger association with the observed ill-effects.
- 2.1.4 The majority of construction dust is larger than 10 µm and hence the key potential impacts are associated with soiling effects.
- 2.1.5 Road transport is the main source in the UK of oxides of nitrogen (NO_x; comprises nitrogen dioxide (NO₂) and nitric oxide (NO)). NO itself is not considered harmful to human health. However, on release to the atmosphere it usually oxidises rapidly to NO₂ which is associated with adverse effects on human health, causing inflammation of the lungs at high concentrations. Long term exposure to NO₂ can affect lung function and respiratory symptoms.
- 2.1.6 Road transport is also a major contributor to ambient PM both as direct emissions through vehicle exhausts and as indirect emissions through tyre and brake wear, re-suspension of particulate matter on the road and road wear (mechanical abrasion and corrosion). Road transport may also be responsible for secondary PM formed via gas-to-particle conversion.

⁵ Air Quality Expert Group (AQEP), Fine Particulate Matter (PM_{2.5}) in the United Kingdom, December 2012

2.2 Legislation and Guidance

European Legislation

2.2.1 Action to manage and improve air quality within the UK has historically been driven largely by European (EU) legislation. The majority of European air quality legislation is consolidated under Directive 2008/50/EC on Ambient Air Quality and Cleaner Air for Europe, which came into force on 11th June 2008 consolidating an earlier Directive and three daughter directives. The legislation sets legally binding European-wide air quality limit and interim target values (Ambient Air Directive (AAD) Limit and Target Values) for concentrations in outdoor air of major air pollutants for the protection of human health and ecosystems and prescribes how air quality should be assessed and managed by Member States.

UK Legislation

2.2.2 The **Air Quality (Standards) Regulations 2010** implemented EU Directives 2008/50/EC and 2004/107/EC, a fourth daughter directive, transposing the AAD values into UK legislation. In the UK responsibility for meeting the AAD Limit and Target Values was devolved to the national administrations; the Department for Environment, Food and Rural Affairs (Defra) co-ordinates assessment and air quality plans for the UK as a whole. These standards and requirements remain in place post the UK departure from the EU.

2.2.3 Under the Environment Act 1995 the UK Government and the devolved administrations are required to produce a national **Air Quality Strategy (AQS)**. This was last reviewed and published in 2007⁶. The UK AQS sets out air quality objectives (AQOs) and policy options to improve air quality within the UK. The strategy sets AQOs for specific pollutants deemed to pose a risk for human health or other receptors, a number of which are derived from the EU limit and target values, although requirements for compliance vary. The UK AQS includes more exacting AQOs for some pollutants than those required by EU legislation.

2.2.4 Part IV of the Environment Act 1995 imposes a duty on local authorities in the UK to review existing and projected air quality in their area. Any location likely to exceed the UK AQOs must be declared an Air Quality Management Area (AQMA) and an Action Plan prepared and implemented, with the aim of achieving the objectives. This process is referred to as **Local Air Quality Management (LAQM)**. The LAQM process is supported by national statutory policy⁷ and technical guidance⁸ provided by Defra.

2.2.5 The standards and objectives relevant to the LAQM framework are prescribed through the Air Quality (England) Regulations (2000) and Air Quality (England)(Amendments) Regulations 2002.

⁶ DEFRA, (2007), *The Air Quality Strategy for England, Scotland, Wales and Northern Ireland*

⁷ Defra, Local Air Quality Management, Policy Guidance (PG16), April 2016

⁸ Defra, Local Air Quality Management, Technical Guidance (TG16), February 2018

2.2.6 The applicable EU limit and target values and UK AQOs relevant to the Site and proposed development with regards to protection of human health and vegetation and ecosystems, referred to in this report as Air Quality Assessment Levels (AQALs), are summarised in Table 2.1. below.

Table 2.1: Relevant Air Quality Assessment Levels (AQALs)

Pollutant	AQAL	Averaging Period	Source
NO ₂	40 µg/m ³	annual mean	AAD Limit Value / AQO
	200 µg/m ³	hourly mean, not to be exceeded more than 18 times per annum	AAD Limit Value / AQO
NO _x	30 µg/m ³	annual mean	AAD Limit Value / AQO
PM ₁₀	40 µg/m ³	annual mean	AAD Limit Value / AQO
	50 µg/m ³	24 hour mean, not to be exceeded more than 35 times per annum	AAD Limit Value / AQO
PM _{2.5}	25 µg/m ³	annual mean	AAD Target Value / AQO ¹
	% reduction relative to average exposure indicator (AEI), dependant on initial concentration; to at least 18 µg/m ³	annual mean	AAD Target Value / AQO ¹

1: standards not included within LAQM system

2.2.7 Statutory objectives, limit and / or target values for NO₂, PM₁₀ and PM_{2.5} are provided in the Air Quality Standards Regulations 2010 and Air Quality Strategy 2007, the 2010 Regulations imposing stricter standards on PM_{2.5} than the Strategy. However, there are no regulatory standards for PM_{2.5} within the LAQM system, and PM_{2.5} is currently regulated at a national, rather than local, level. Local Authorities do not presently have an obligation to review and monitor PM_{2.5} but are expected to work towards reducing PM_{2.5} emissions and concentrations in their area as practicable.

2.2.8 For the purposes of the AQALs ambient air refers to the outdoor air and excludes workplaces where members of the public do not have regular access. Advice is given in Defra guidance⁵ as to where the UK AQOs should apply as summarised below; slightly different compliance requirements are provided for EU limit and target values:

Table 2.2: Summary of where the AQOs should apply

averaging period	objective should apply at
annual mean	all locations where members of the public might be regularly exposed; including facades of residential properties, schools, hospitals, care homes etc
24-hour mean and 8-hr mean	all locations where the annual mean objectives apply together with hotels and gardens of residential properties

averaging period	objective should apply at
1-hr mean	all locations where the annual mean, 24-hour and 8-hour means apply; also kerbside Sites, parts of car parks, bus stations and railway stations which are not fully enclosed and any outdoor locations where members of the public might reasonably be expected to spend 1 hour or longer.
15-min mean	all locations where members of the public may be reasonably exposed for a period of 15 minutes

Note: the AQOs do not apply at building facades or other places of work where members of the public do not have regular access

2.2.9 Additional statutory and non-statutory ambient air quality standards (termed Critical Levels) are also provided by the UK Air Quality Strategy and EA guidance for the protection of vegetation and ecosystems to be applied at nature conservation sites. Applicable standards for this assessment are detailed below:

Table 2.3: Critical Levels for Protection of Vegetation and Ecosystems

Pollutant	Concentration ($\mu\text{g}/\text{m}^3$)	Measured as
nitrogen oxides (as NO_2)	30	annual mean
	75 / 200 ¹	daily mean

1: The Critical Level is generally considered to be $75 \mu\text{g}/\text{m}^3$, but this only applies where there are high concentrations of SO_2 and this is not generally the situation in the UK. See Section 8 for more information.

2.2.10 Additional standards, termed Critical Loads, are also established in relation to nitrogen and acid deposition. These are habitat specific and discussed further in Section 8 where relevant.

Dust Standards and Control

2.2.11 Disamenity dust as such is not regulated as a pollutant under the above requirements and there are no European or UK statutory or recommended levels that define the point when deposited dust causes annoyance or disamenity. Public concerns in relation to dust accumulation and soiling may be related to a range of factors including the nature of a site and locality and baseline levels.

2.2.12 Controls of soiling and annoyance impacts are typically achieved through conditions within planning permissions and / or environmental permits requiring the implementation of a dust management plan to prevent amenity impacts. Deposited dust may also give rise to 'nuisance', as statutory, private and public nuisance as defined in environmental law and in so far as nuisance relates to unacceptable effects of emissions. It is recognised however that a significant loss of amenity may occur at lower levels of emission than would constitute a statutory nuisance.

2.3 National Planning Policy and Guidance

2.3.1 The **National Planning Policy Framework 2012**³ (NPPF) sets out the Government's planning policies for England and how these are expected to be applied. The Framework provides some guidance to local authorities on taking air pollution into account in planning policies and decisions.

Paragraph 174 of the Framework states: *‘Planning policies and decisions should contribute to and enhance the natural and local environment by [...] preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability. Development should, wherever possible, help to improve local environmental conditions such as air and water quality, taking into account relevant information such as river basin plans.*

2.3.2 The Framework further states in paragraph 185 that: *‘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.’*

2.3.3 More specific guidance regarding air quality is provided in Paragraph 186, which states: *‘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.’*

2.3.4 Further guidance is provided in the supporting **Planning Practice Guidance on Air Quality (nPPG)**⁴ which provides guiding principles on how planning can take account of the impact of new development on air quality. The guidance states that: “the level of air quality assessment should be proportionate to the nature and scale of the development and level of concern about air quality and that each assessment is locationally specific.”

2.4 Local Planning Policy and Guidance

2.4.1 The **Rochdale Core Strategy**⁹ was adopted in October 2016. It is the strategic planning framework for the borough through to 2028 and sets out a range of strategic objectives and policies. The Core Strategy identifies improving air quality as an objective and several policies refer to air quality explicitly, including Policy G9, Policy T2, Policy DM1 and Policy DM2.

2.4.2 Policy G9 in particular states: *‘We will reduce all forms of pollution, contamination and land instability in the borough, by:*

⁹ Wigan Council, Wigan Local Plan Core Strategy, September 2013

- a. *Focusing on measures that reduce air pollution in Air Quality Management Areas, and other areas where pollution levels are unacceptable, particularly around motorways and main roads;*
- b. *Requiring that development does not have impacts that lead to an unacceptable increase in air, water, noise, light or other pollution;*
- c. *Ensuring sensitive new developments such as housing, schools and hospitals are not adversely affected by existing sources of pollution such as roads and certain types of industry;*
- d. *Requiring a Low Emissions Strategy (LES) where development requires a Transport Assessment, and in other circumstances as appropriate.'*

2.4.3 RBC Council also has regard for the **Places for Everyone: Joint Development Plan Document**¹⁰ (PfE), which will detail strategic policies and proposals that are relevant to nine of the Greater Manchester Councils. The draft Plan details a proposed policy (JP-S 6: Clean Air) which specifies a range of measures to be taken by councils to support improvements in air quality, including that planning applications should be determined in accordance with the most recent guidance (or successor guidance) published by the IAQM.

2.4.4 The draft PfE contains a draft policy allocation for the Site itself, allocation 25. This policy states that: *"Development of the Site will be required to [...] incorporate appropriate noise and air quality mitigation along the M62 and A627(M) motorway corridors."*

2.4.5 The **Greater Manchester Air Quality Action Plan 2016-2021**¹¹ was developed to cover the Greater Manchester area and includes Rochdale. The overall aim of the plan is to improve air quality across Greater Manchester and reduce the effects of poor air quality on the health of people by setting out objectives and actions to improve air quality across Greater Manchester, including actions for managing new development and forms of transport including private cars. . The plan was developed jointly with Transport for Greater Manchester (TfGM) owing to the fact that the largest proportion of air pollution (in particular nitrogen dioxide) directly experienced by people in the urban areas of the GMCA arises from road traffic.

2.4.6 The GMCA has also released the **Greater Manchester Low Emission Strategy**¹² and the **Climate Change and Low Emissions Strategies**¹³.

¹⁰ GMCA (2021), Places for Everyone: Joint Development Plan Document, Publication Stage, August 2021; www.greatermanchester-ca.gov.uk

¹¹ GMCA and TfGM, Greater Manchester Air Quality Action Plan 2016-2021

¹² GMCA and TfGM (2016), Greater Manchester Low Emission Strategy, available at <https://www.greatermanchester-ca.gov.uk/media/1276/low-emission-strategy-dec-2016.pdf>

¹³ GMCA (2018), Climate Change and Low Emission Strategies: Whole Place Implementation Plan for Greater Manchester (2016-2020). Available at <https://www.greatermanchester-ca.gov.uk/news/life-saving-air-quality-and-climate-change-plans-published/>

2.5 Additional Guidance and Best Practice

2.5.1 The IAQM **Planning for Air Quality**¹ document provides specific non-statutory guidance on air quality and the planning system for new development. The guidance clarifies when an air quality assessment is required, what it should contain and how impacts should be described and assessed. The guidance sets out a recommended approach to assess the significance of the air quality impacts and sets out suggested approaches to reducing emissions and impacts.

2.5.2 The IAQM **Guidance on the Assessment of Dust from Demolition and Construction**² document provides specific non-statutory guidance on the assessment of the impacts of dust and fine particulate matter (PM₁₀) from demolition and construction activities. The guidance also provides recommended mitigation measures taking into account the risk posed by a site.

2.5.3 The **IAQM A guide to the assessment of air quality impacts on designated nature conservation sites**¹⁴ document provides non-statutory guidance to assist in the assessment of the air quality impacts of development on designated nature conservation sites.

¹⁴ Institute of Air Quality Management (IAQM), A guide to the assessment of air quality impacts on designated nature conservation sites, v1.1, June 2020

3 Site Location and Proposed Development

3.1 Site Details

3.1.1 The Site encompasses Trows Farm and surrounding agricultural land located to the west of the A627(M) and north of the M62 in Castleton, Rochdale, as shown below in Figures 3.1 and 3.2. The site is bound by residential development off Leander Drive to the west; the A627(M) to the east; Trows Lane and land to the M62 to the south; and Cripple Gate Lane to the north.

3.1.2 The site setting is mixed with residential areas to the west and northeast beyond the A627(M), and commercial / industrial premises to the north and south.

3.1.3 Summary site details are:

Table 31: Site Details

Address	Cowm Top Lane / Trows Lane, Rochdale, near OL11 2XD
National Grid Reference	389081 410286
Local Authority	Rochdale Borough Council (RBC)
Site Area	approximately 20 hectares
Nature of Current Site	agricultural land
Proposed Development	up to 550 dwellings with associated infrastructure and access roads

Figure 3.1: Site Location

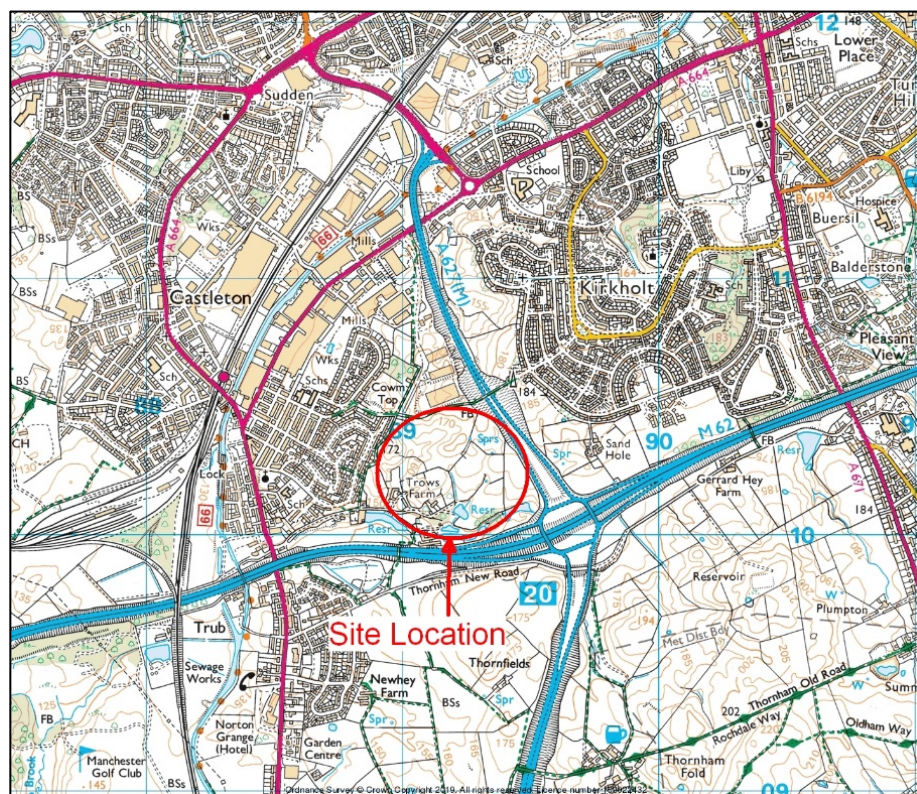
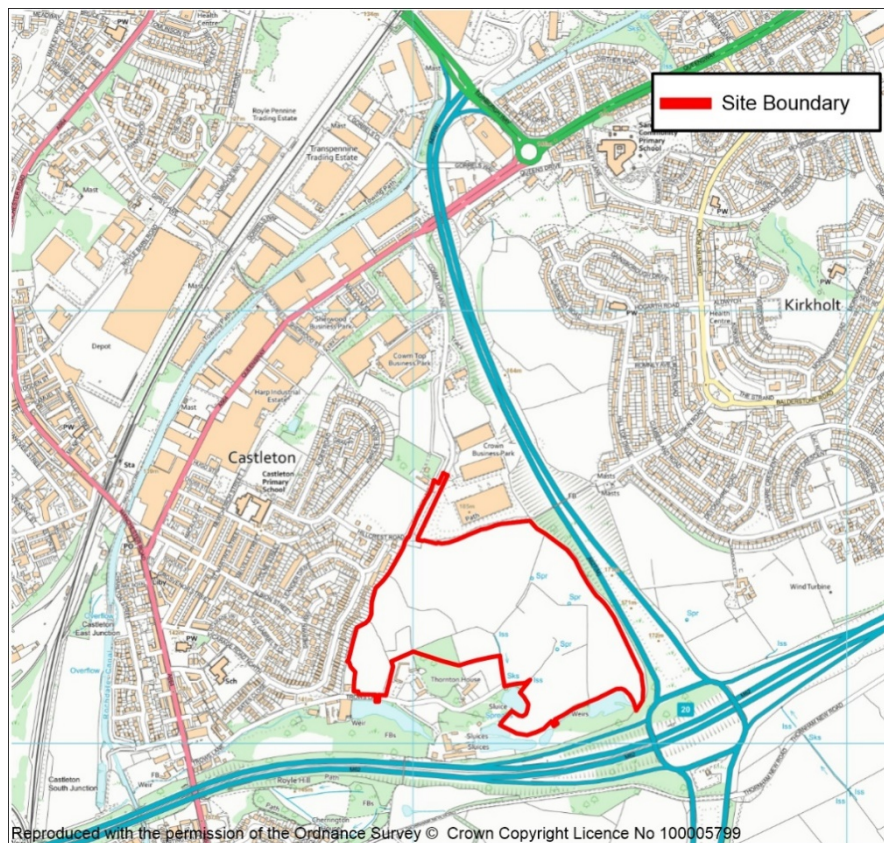


Figure 3.2: Site Location



3.2 Proposed Development

3.2.1 Full details of the proposed development are included within the outline planning application documentation, and only those of relevance to the AQA are provided below.

3.2.2 The outline application is for the delivery of up to 550 dwellings with associated access. The main vehicular access to the development will be from an extension to Cowm Top Lane to the north, which connects to the A664 Queensway approximately 700m to the north of the proposed residential area. An emergency access, along with pedestrian and cycle access, is to be provided off Trows Lane at the south of the site.

3.2.3 The parameters plan¹⁵ (provided in Appendix D) includes for the provision of green infrastructure and public open space to the east, south and west.

¹⁵ e*SCAPE, Parameters Plan, Cowm Cop Lane, ref: 019-019-003 Rev -, August 2021

4 Assessment Methodology

4.1 Information Sources and Surveys

4.1.1 In undertaking the air quality assessment, SGP carried out the following activities:

- site visit to view the Site, its' setting and the local road network;
- review of development proposals and plans;
- review of baseline air quality, including existing potential pollution sources, Rochdale and Greater Manchester air quality reports and data, and Defra background air quality data;
- review of local weather conditions including local windspeed and direction statistics;
- review of current and post-development traffic data and Transport Assessment;
- screening assessment of development traffic movements and routing;
- assessment of potential road traffic emissions using the ADMS-Roads model;
- construction dust assessment;
- provision of recommendations for mitigation; and
- assessment of residual impacts.

4.1.2 The baseline data has mainly been gathered through a desk top study and the Site visit. In undertaking the assessment reference has been made to the following principal sources of information:

Table 4.1: Information Sources

Reference	Author and Source	Purpose and Information Content
Background and Topographical Information		
Promap	Ordnance Survey	general mapping information including topographic, ground features, rights of way, communications etc
Google Earth (<i>imagery date April 2020</i>)	aerial photography	Site setting
www.magic.gov.uk ;	multi-agency	web-based interactive map containing information on nature conservation areas
Air Quality Information		
2020 Air Quality Annual Status Report (ASR) for Manchester, June 2021 (<i>and earlier reports</i>)	Greater Manchester Combined Authority (GMCA)	update of local authority air quality monitoring and assessment
www.aqma.defra.gov.uk	Defra	details and maps of AQMAs throughout UK
www.defra.gov.uk	Defra	Local Authority air quality management support; background pollutant mapping

Note: all websites accessed in July 2021

4.1.3 The air quality assessment has been based on the Transport Assessment¹⁶, Travel Plan¹⁷ and traffic data prepared by SCP. The traffic data provided by SGP is based on construction of 550 dwellings.

4.1.4 A site visit was conducted by F Hartley, Consultant, SGP, on 16th December 2019. At the time of the visit the weather was dry and cool, at a temperature of 4°C and with a south-southwesterly light breeze.

4.2 Key Consultations

The proposed outline scope and methodology for the AQA was provided to the Environmental Health Department of RBC. At the time of preparing this report a response had not been received.

4.3 Construction Phase Assessment

4.3.1 The assessment of the air quality impacts due to the generation and dispersion of dust and PM₁₀ during the construction phase has been undertaken in accordance with the current guidance issued by the IAQM². The guidance describes a qualitative assessment methodology to assess the risks of dust and PM₁₀ effects from demolition, earthworks and construction activities and from trackout and provides guidance for assessing the significance of the effects. The assessment takes into account the proposed site activities, scale of the site, proximity of sensitive receptors, local topography and the prevailing local wind direction.

4.4 Operational Phase Assessment

4.4.1 The assessment of vehicle emissions during the operational phase has been undertaken in accordance with the IAQM guidance¹ and incorporates a review of predicted traffic flows, existing and future receptors, existing and future predicted background pollutant concentrations and modelling of vehicle emissions using an atmospheric dispersion model, ADMS-Roads.

4.5 Scoped Out Matters

4.5.1 The operation of on-site plant and machinery (non-road machinery (NRMM)) during the construction phase would also give rise to vehicle exhaust and combustion plant emissions. However, these are typically considered unlikely to give rise to significant impacts on local air quality¹ and further consideration has been scoped out of this assessment. Similarly, construction traffic movements on the local road network are unlikely to be of a scale that would give rise to significant air quality impacts and have been scoped out.

¹⁶ SCP, Proposed Residential Development, Cowm Top Lane, Rochdale, Transport Assessment, Ref: PT/15399/TA/3, January 2021

¹⁷ SCP, Proposed Residential Development, Cowm Top Lane, Rochdale, Travel Plan, Ref: PT/15399/TP/3, January 2021

5 Baseline Conditions

5.1 General Site Setting

5.1.1 The Site encompasses agricultural land located to the west of the A627(M) and north of the M62. The M62 / A627(M) junction. Crown Business Park is located to the north, beyond Cripple Gate Lane, and residential development is located to the east.

5.1.2 Existing Site boundaries and immediate environs are:

Table 5.1: Site Boundaries and Environs

Direction	Boundary	Neighbouring Land
north	Cripple Gate Lane	Crown Business Park
east	trees / embankment	A627(M)
south	trees / vegetation	individual dwellings off Trows Lane, angling lakes, M62
west	mature trees / fencing	residential housing (Castleton)

5.1.3 The Site is undulating with a general slope from around 175m AOD in the northeast corner down to 155m AOD in the southern area.

5.1.4 The nearest existing residential properties to the Site are those off Leander Drive to the west, where the facades are approximately 15m from the Site boundary, and several properties to the south including Trows Farm and Thornton House.

5.1.5 St Gabriels RC Primary School is located 270m to the west of the site and Castleton Primary School is located 325m to the northwest. No other highly sensitive receptors such as hospitals have been identified within 500m of the Site.

5.2 Nature Conservation Sites

5.2.1 No statutory international, national or local designated ecological sites have been identified within 500m of the Site. The Rochdale Canal SAC / SSSI lies 560m to the west of the Site.

5.2.2 An unnamed Site of Biological Importance (SBI) is shown on mapping around a small stretch of the east corridor of the A627(M), lying about 40m from the Site boundary. No other non-statutory locally designated SBIs have been identified within 500m.

5.3 Air Quality Review

5.3.1 RBC is one of 10 local councils included in the Greater Manchester Combined Authority (GMCA) which shares the same statutory powers for LAQM as the district authorities across the Manchester region and is responsible for coordinating LAQM in the area.

5.3.2 Reference has been made to the reports prepared by the GMCA in fulfilment under the LAQM reporting requirements which incorporate air quality data for WMBC, including, but not limited to, the GMCA's 2020 Annual Status Report (ASR) and associated monitoring data. The 2020 ASR summarises air quality monitoring undertaken by the local authorities across the GMCA region up until the end of 2020. At the time of preparing this report this formed the most up to date ASR available.

5.3.3 Air Quality Management Areas (AQMA) had previously been declared in each of the Council areas across the GMCA. A new single AQMA was designated in May 2016 for the whole of Greater Manchester following a review of the latest monitoring data and revised modelling^{18, 19}. The new AQMA incorporates the previously designated AQMA's but encompasses a much smaller area than previously. The AQMA was declared due to exceedances, or predicted potential exceedances, of the long-term UK objective for nitrogen dioxide (NO₂). To provide a conservative approach, the AQMA boundary was based on predicted potential exceedances of an annual mean NO₂ concentration of 35 µg/m³, rather than the objective value of 40 µg/m³. The primary source of NO₂ resulting in the exceedances is vehicle emissions and the area of the AQMA reflects the location of major roads, motorways and urban areas.

5.3.4 The AQMA incorporates all major roads and highways within the city and includes the M62 and A627(M) motorways, as well as small sections of the A664 Manchester Road to the west and northeast of the Site, as summarised below:

Table 5.2: AQMA's declared within Greater Manchester

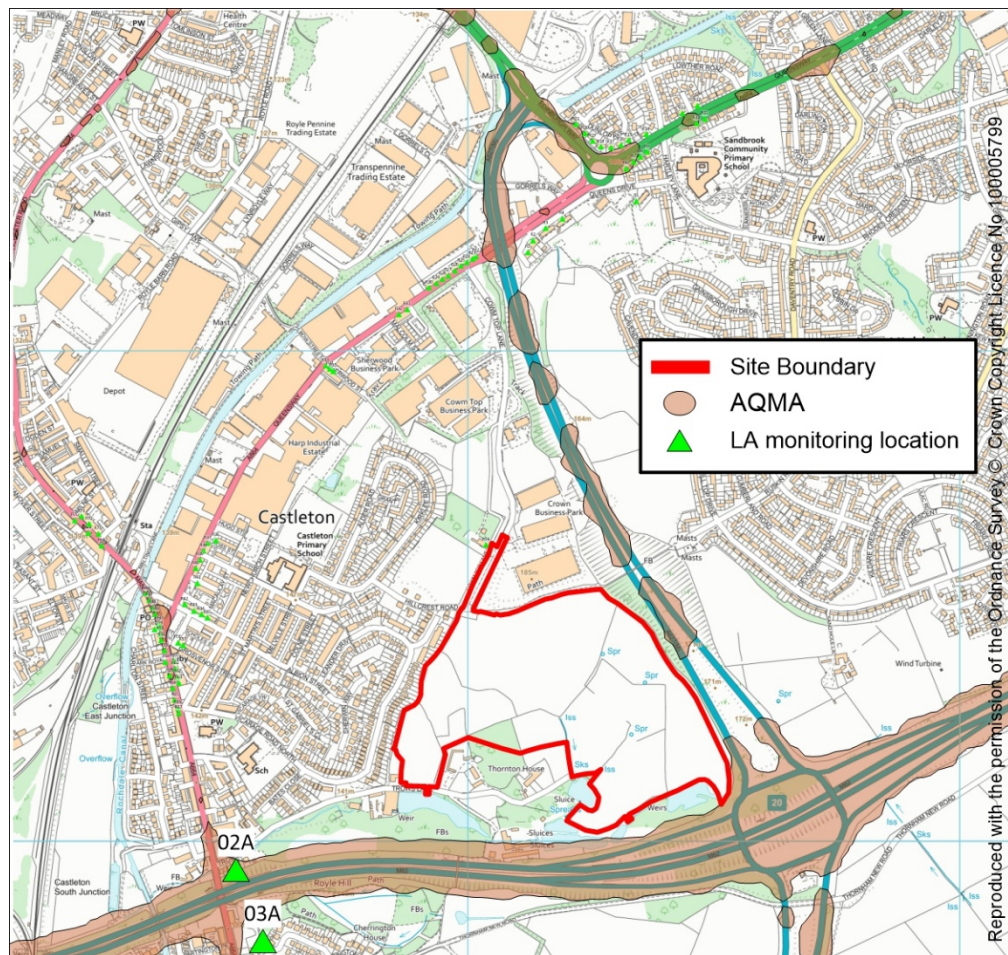
AQMA name	location	comment
Greater Manchester	extends across the principal road network across Greater Manchester	extends along the M62 to the south; the A627(M) to the east; short sections of the A664 to the west and northeast of the site; declared due to potential exceedances of the annual mean NO ₂ objective

5.3.5 The location of the AQMA in relation to the Site and immediate road network is provided below in Figure 5.1.

¹⁸ Greater Manchester Combined Authority, Air Quality Management Area Order 2016, 19th April 2016

¹⁹ Royal HaskoningDHV: 2014 Detailed Air Quality Assessment Greater Manchester, for The Greater Manchester Combined Authority, 9Y1637/R001/303345, September 2015

Figure 5.1: Local Air Quality Features



5.4 Background Airborne Pollutant Concentrations

5.4.1 Predicted background air quality data were obtained from the Defra LAQM website for the 1km x 1km grid squares in which the application Site and local road network are located. The Defra data is derived from the Pollution Climate Model (PCM) which models air quality data to inform the UK's annual assessment of compliance with the EU air quality directives.

5.4.2 At the time of preparation of this report the available predicted data was that issued in August 2020 and was based on 2018 ambient monitoring and meteorological data. The data incorporated information on the age and distribution of vehicles and emission factors and was provided by Defra for each year from 2018 to 2030.

5.4.3 Predicted background concentrations for the current year (2021) and a future year (2026) are summarised in the following tables.

Table 5.3: Predicted Background Air Quality Data

Grid Square	Location	Concentrations (µg/m³)			
		NO ₂	NO _x	PM ₁₀	PM _{2.5}
2021					
388500, 410500	West site, Castleton	15.87	21.90	11.95	8.11
389500, 410500	Site, motorways	18.39	25.72	12.78	8.35
388500, 411500	A664	15.96	22.05	11.57	7.82
389500, 411500	Cowm Top Lane	15.79	21.70	12.05	8.05
2026					
388500, 410500	West site, Castleton	13.13	17.76	11.54	7.80
389500, 410500	Site, motorways	14.43	19.64	12.37	8.03
388500, 411500	A664	13.29	18.01	11.15	7.50
389500, 411500	Cowm Top Lane	12.88	17.34	11.64	7.73
	objective (annual mean)	40	30	40	30

data downloaded from Defra website on 9th February 2021; data issued by Defra in August 2020

5.4.4 The maximum background NO₂ and PM₁₀ concentrations for the grid squares in which the assessment Site is located are predicted to be substantially below the AQALs at 46% and 32% in 2021. NO₂ concentrations are predicted to fall to 36% by 2026.

5.4.5 It should be noted that the data are effectively an average concentration across each 1 km square. The pollutant concentrations will therefore be higher close to any significant source, such as main roads, junctions and concentrated habitation e.g. the motorway network and Castleton.

5.5 Monitored Air Quality

Continuous Monitoring

5.5.1 There are no real-time continuous NO₂ monitoring stations within the RBC area. The closest automatic monitor operated by the GMCA councils is in Shaw, Oldham to the southeast. The details of the monitor are provided below:

Table 5.4: Continuous Monitoring Sites

Location	Grid Ref.	Distance to Site	Type ¹	Pollutants Monitored
Oldham Crompton Way	393887 409191	4.5km SE	Urban traffic	NO ₂ , PM ₁₀

1: Defra definitions

5.5.2 The Oldham Crompton Way monitor is located 4.5km to the southeast of the Site, distant from the Site and key associated transport routes. As such the monitor is not considered to provide information applicable to the Site and assessment.

Diffusion Tube Monitoring

5.5.3 RBC operates a network of diffusion tubes for monitoring NO₂ concentrations across the Borough.

Two tubes are located within a 1km radius of the Site as shown in Figure 5.1 and detailed below.

Table 5.5: Details of Diffusion Tube Monitoring Sites

Site ID	Location	Grid Ref.	Distance to Site	Type	In AQMA?
02a (RO2ANO)	Trows Lane, Castleton	388537, 409942	385m west	Urban background	No
03a (RO3ANO)	52 Cherrington Drive, Castleton	388581, 409797	430m southwest	Urban background	No

Data provided by GMCA

5.5.4 Additional tubes in the wider Rochdale area are located adjacent to Manchester Road in the centre of Rochdale, the A664 and the A6193 near junction 21 of the M62. These are not considered to provide data of relevance to this assessment.

5.5.5 Annual mean NO₂ concentrations for the diffusion tubes 02a and 03a from 2015–2020 are as detailed below:

Table 5.6: Diffusion Tube Monitor – Annual Nitrogen Dioxide Concentrations

Monitor	Annual Mean (µg/m ³) (<i>bias adjusted</i>)					
	2015	2016	2017	2018	2019	2020 ¹
02a	35.8	33.3	35.0	28.9	32.7	21.7
03a	26.0	29.9	23.4	20.6	22.1	16.0

1: Data for 2020 will be affected by the COVID-19 pandemic²⁰ resulting in reductions in traffic movements and hence ambient air pollutant concentrations

5.5.6 No exceedances of the annual mean AQAL of 40 µg/m³ have been reported at these locations since 2015.

5.6 Industrial Emissions and Other Emission Sources

5.6.1 No Environment Agency permitted activities have been identified within the immediate vicinity of the Site that may influence background concentrations of NO₂ or PM₁₀. No other industrial activities have been identified in the area that may result in impacts on the local air quality that may affect the development.

²⁰ COVID-19: Following the outbreak of a global pandemic of the Coronavirus disease 2019 (COVID-19) due to the SAR-CoV-2 virus, the UK Government declared several restrictions on non-essential travel and movement during March 2020. Various restrictions remained in place during 2020 and 2021 with resulting implications on transport movements across the UK.

5.7 Wind Speed and Direction

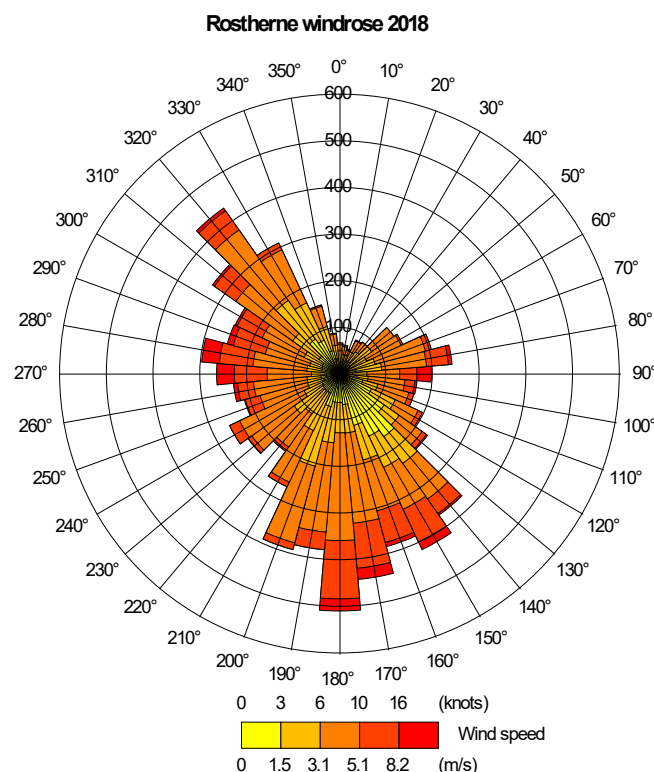
5.7.1 The most important meteorological parameters governing the atmospheric dispersion of pollutants are:

- wind direction: determines the broad direction of the transport of the emission;
- wind speed: affects the ground levels emissions by determining the initial dilution of pollutants emitted;
- atmospheric stability: a measure of the turbulence and hence dispersion of pollutants.

5.7.2 The closest location for which appropriate meteorological data for use within atmospheric dispersion modelling (hourly sequential) is available is Rostherne No.2 (NGR: 374678 384866), about 29.1km southwest of the Site. Data for Rostherne No.2 for 2018 has been utilised in this assessment.

5.7.3 The annual windrose for 2018 is provided below; this depicts average wind speeds and directions for the whole year.

Figure 5.2: Summary Wind Rose – Rostherne No.2 (2018)



5.7.4 The wind rose shows the prevailing wind direction to be from the south and the northwest. Rostherne No.2 has an altitude of 35m above sea level, similar to the Site, and the local topography is flat.

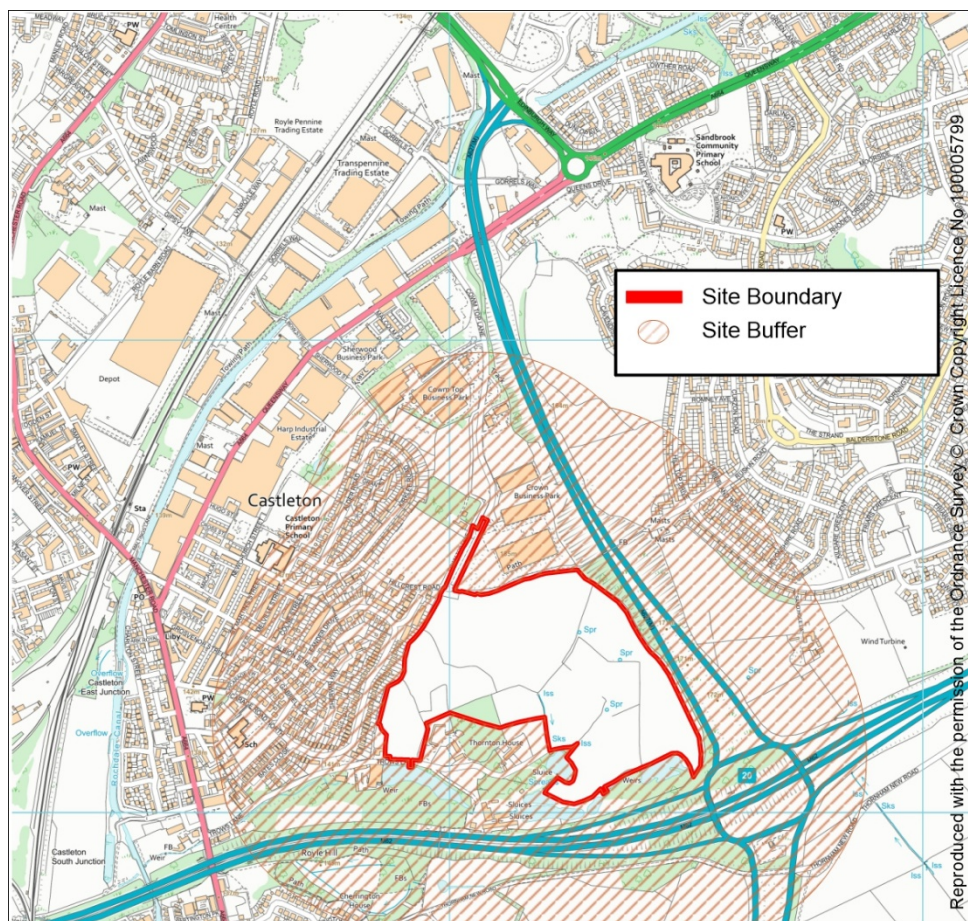
6 Construction Dust Assessment

6.1 Introduction

6.1.1 Construction works would include general earthworks and construction of properties and infrastructure. It is assumed construction traffic would access the Site via Cowm Top Lane.

6.1.2 In accordance with the IAQM guidance the assessment of construction dust considers receptors up to 350m from the Site boundary and 50m from edges of roads used for construction traffic up to a distance of 500m from the access / egress point, as shown below in Figure 6.1.

Figure 6.1: Construction Dust Assessment Area



6.2 General Observations

6.2.1 Airborne dust occurs when fine particles are disturbed and loosened by physical activity such as breaking, excavating, loading and transport, or by an airstream passing over such materials.

6.2.2 Light winds will transport fine particles already suspended in the atmosphere due to disturbance. In calm conditions, any raised dust tends to settle out in the vicinity of the source. In windier conditions, the dust may be carried for a greater distance before settling out. The distance the dust

will be carried depends on the wind speed, the particle size of the dust, the topography of the Site and its surroundings. It is generally accepted that winds of more than 10 knots across loose fine materials can cause windblown dust emissions.

6.3 Potential Dust Sources

6.3.1 Fugitive dust emissions arising from Site activities may result in:

- the soiling of dust surfaces,
- visible dust plumes,
- locally elevated PM₁₀ concentrations.

6.3.2 The principal potential sources of airborne dust arising from the proposed development are likely to be:

- earthworks / site preparation,
- loading and tipping,
- site haulage,
- road haulage,
- materials handling, including soils and building materials,
- windblow across stripped areas,
- windblow across stockpiles of construction materials, and
- concrete batching.

6.3.3 Site preparation would involve the breaking out of any surfaces within the small existing area of built development part of the Site. Preparatory works would also include stripping of surface soils and earthworks to create level development areas. The soils in the area may be clayey and significant quantities of dust may be raised during these operations if appropriate mitigation options are not adopted.

6.3.4 Loading and tipping of potentially dusty materials such as road base and other aggregates may create visible dust emissions although these will be short lived.

6.3.5 Site haulage is typically the principal potential dust source on construction sites due to the physical disturbance of particles by vehicle movements over bare soil or loose surfaces. The potential impact is increased over longer distances when speeds tend to be greater and more effort is required to maintain a smooth damp running surface. The haul distances at the application site may range up to about 500m. Over such distances, and in the absence of appropriate mitigation, significant quantities of dust may be raised.

6.3.6 Dust may also be raised by road haulage due to spillage or windblow from unsheeted loads and due to the adherence of mud and sand to the wheels and underbodies of vehicles leaving the Site.

This may subsequently be deposited as track-out on roads in the vicinity of the Site, and on drying, be raised as dust by the passage of vehicles. In the event of road vehicles travelling across unsurfaced and muddy ground, track-out may occur.

6.3.7 The handling of soils, construction materials, and aggregates can be a potentially significant dust source, particularly under dry conditions.

6.3.8 It is generally accepted that winds blowing at more than 10 knots across loose fine materials can lead to airborne dust emissions. Winds of 10 knots or greater blow in the UK for about one third of the time annually, decreasing slightly in summer months. Windblown dust from areas of bare soil and materials stockpiles could therefore arise for prolonged periods.

6.3.9 Plant emissions are generally not a significant source of dust except where large numbers of plant are present close to boundaries and then only if not operating in accordance with current emissions standards or emitting black smoke.

6.3.10 In summary, the principal potential sources of dust are likely to be initial soil stripping, windblow across disturbed surfaces and materials handling.

6.4 Risk of Dust Effects Arising

6.4.1 The risk of fugitive dust emissions from the application Site resulting in the loss of amenity and / or health or ecological effects is related to:

- the nature of the activities being undertaken;
- the duration of these activities;
- the size of the Site;
- the meteorological conditions (wind speed, direction and rainfall);
- the proximity of receptors;
- the adequacy of mitigation measures applied to reduce or eliminate dust; and,
- the sensitivity of the receptors to dust.

6.4.2 With reference to the IAQM guidance the potential dust emission magnitudes for activities at the application Site have been assessed as follows:

Table 6.1: Dust Emission Magnitude

Activity	Class	Comment
demolition	n/a	no demolition works
earthworks	large	site area of >10,000m ²
construction	large	total building volume >100,000m ³
trackout	large	potential unpaved road lengths of >100m

6.5 Sensitivity of the Area

6.5.1 The Site is currently agricultural with residential areas to the immediately to the west and south and within 250m to the north east. Residential areas also lie 350m to the southwest across the M62 motorway. St Gabriel's R C Primary School lies 240m west of the site boundary whilst Castleton Primary School lies 300m to the north west of the site boundary. To the north lies Crown Business Park. No other highly sensitive receptors to dust soiling or human health impacts such as schools, care homes, long-term car parks etc have been identified within 350m of the Site boundary.

6.5.2 There is no known sensitive horticultural land within the vicinity of the Site.

6.5.3 No statutory designated ecological Sites have been identified within 350m of the Site boundary or within 50m of the road network that may be affected by trackout. A non-statutory locally designated SBIs, has been identified lying about 40m to the west of the site boundary, lying alongside the A627(M).

6.5.4 The sensitivity of the area to dust soiling, human health and ecological impacts has been assessed in accordance with the IAQM guidance as follows:

Table 6.2: Sensitivity of Area

Activity	Sensitivity	Comment
Dust Soiling Effects on People & Property		
demolition	n/a	
earthworks	high	10-100 highly sensitive receptors within 20m of Site boundary
construction	high	
trackout	low	1 highly sensitive receptor within 50m of roads likely to be used for construction traffic (up to 500m from Site entrance)
Human Health Impacts		
demolition	n/a	
earthworks	low	10-100 highly sensitive receptors within 20m of Site boundary; background PM ₁₀ <24 µg/m ³
construction	low	
trackout	low	1 highly sensitive receptor within 50m of roads likely to be used by construction traffic (up to 500m from Site entrance)
Ecological Impacts		
demolition	n/a	
earthworks	low	1 SBI identified within 50m of Site boundary
construction		
trackout	n/a	no statutory or locally designated sites identified within 50m of roads likely to be used for construction traffic (up to 500m from Site entrance)

1: With reference to Tables 2 to 4 of IAQM guidance

2: IAQM guidance provides different sensitivity banding depending on the area background PM₁₀ concentrations. Defra data provides a predicted background PM₁₀ concentration of 12.78 µg/m³ for the grid square in which the

majority of the Site and receptors are located for 2021. On this basis reference to the background concentration band of <24 µg/m³ is considered appropriate.

6.5.5 The Site boundary has been used to measure the distances between receptors and potential sources of dust emissions in order to provide a conservative assessment, even though sources of dust emissions may be located well within the Site itself during much of the construction phase.

6.5.6 In determining the overall sensitivity of the area other factors should be taken into account such as other local dust generating sources and the prevailing wind direction. The following points are therefore noted with regards to the Site:

- no other sources of significant dust generation in the immediate locality have been identified;
- the prevailing wind direction is southerly through to northwesterly and adjoining residential areas are therefore potentially located downwind.

6.5.7 Taking these factors into account the overall sensitivity is defined as set out below:

Table 6.3: Outcome of Defining the Sensitivity of the Area

Potential Impact	Sensitivity of the Surrounding Area			
	Demolition	Earthworks	Construction	Trackout
Dust Soiling	n/a			
Human Health	low	low	low	low
Ecological	not sensitive	low	low	not sensitive

6.6 Assessment of Fugitive Dust and PM₁₀ Impacts

6.6.1 Taking into account the dust emission magnitude and the sensitivity of the area, the risk of dust impacts, in the absence of mitigation, at nearby sensitive receptors are as follows:

Table 6.4: Risk of Dust Impacts

Potential Impact	Risk			
	Demolition	Earthworks	Construction	Trackout
Dust Soiling	n/a			
Human Health	negligible	low	low	low
Ecological	n/a	low	low	n/a

Note: Based on Tables 7, 8 and 9 in the IAQM guidance

6.6.2 In summary, the assessment indicates that there is a *high* risk of dust soiling and a *low* risk of human health PM₁₀ impacts arising from fugitive dust during the construction phase due to the proximity of existing receptors to the Site boundary and access roads.

- 6.6.3 There is a *low* risk of dust impacts at ecological receptors during the construction phase relating to an SBI located within the north / south A627(M) carriageways to the east of the Site.
- 6.6.4 Depending on the phasing of the development, end users of the Site could be temporarily affected by airborne dust from uncompleted parts of the development undergoing construction.

7 Vehicle Emissions Assessment – Human Health

7.1 Introduction

7.1.1 The vehicle emissions assessment incorporated a review of predicted traffic flows, existing and future receptors and vehicle emissions. The level of assessment required was determined through an initial screening review taking into account the predicted changes in traffic flows along the roads and junctions within the transport assessment study area and locations of sensitive receptors.

7.1.2 The following criteria were used to determine potentially affected roads:

- LDV flows change by 500 AADT or more outside an AQMA, or 100 AADT or more within or adjacent to an AQMA;
- HDV flows change by 100 AADT or more outside an AQMA, or 25 AADT or more within, or adjacent to, an AQMA;
- road alignment of roads, i.e. changing proximity of receptors to traffic lanes
- introduction or removal of a junction.

7.1.3 Where these criteria are met and there are relevant receptors present further assessment is required. This may take the form of a Simple or Detailed Assessment. Relevant receptors include residential dwellings, schools and hospitals and areas of leisure use. The IAQM guidance does not specify at what distance a receptor should be to an affected road to indicate the need for further assessment. However, pollution concentrations are known to fall rapidly away from the roadside and are expected to return to background levels within 100m of a road source²¹. To provide a conservative assessment consideration has been made for receptors within 200m from affected roads. Where there are no receptors within 200m of affected roads no further assessment is required and potential impacts can be considered *negligible*.

7.1.4 The ADMS-Roads (v5.0.0) model, supplied by Cambridge Environmental Research Consultants (CERC), has been used to assess the likely impact of traffic emissions on the receptors screened as requiring further assessment. ADMS-Roads software is an atmospheric dispersion model developed for assessing the impacts of vehicular emissions. Full details of the dispersion modelling input parameters and methodology are provided in Section 7.3.

7.2 Screening Assessment

7.2.1 The proposed development is for up to 550 dwellings. The traffic data provided by SCP has been based the proposed development of up to 550 dwellings for on a submission year of 2021 and year of assessment of 2026. RBC has confirmed that there are no committed developments in the vicinity of the site that need to be taken into account in the TA and hence this assessment.

²¹ Air Quality Consultants (AQC), NO₂ Concentrations and Distance from Roads, J504, 18th July 2008

7.2.2 Information provided by SCP indicates that 550 dwellings would generate an annual average of 2,350 vehicle movements per day to / from the Site, with all vehicle movements to and from the Site travelling along Cowm Top Lane.

7.2.3 The traffic data provided (provided in Appendix A) considers Cowm Top Lane, A664 Queensway, A664 Manchester Road, Albion Street, Hope Place, A664 Edinburgh Way and the slip roads to / from the A627(M). Predicted changes in traffic flows for this road network are summarised below and shown in Figure 7.1:

Table 7.1: Summary of Predicted Changes in Traffic Flows (2026)¹

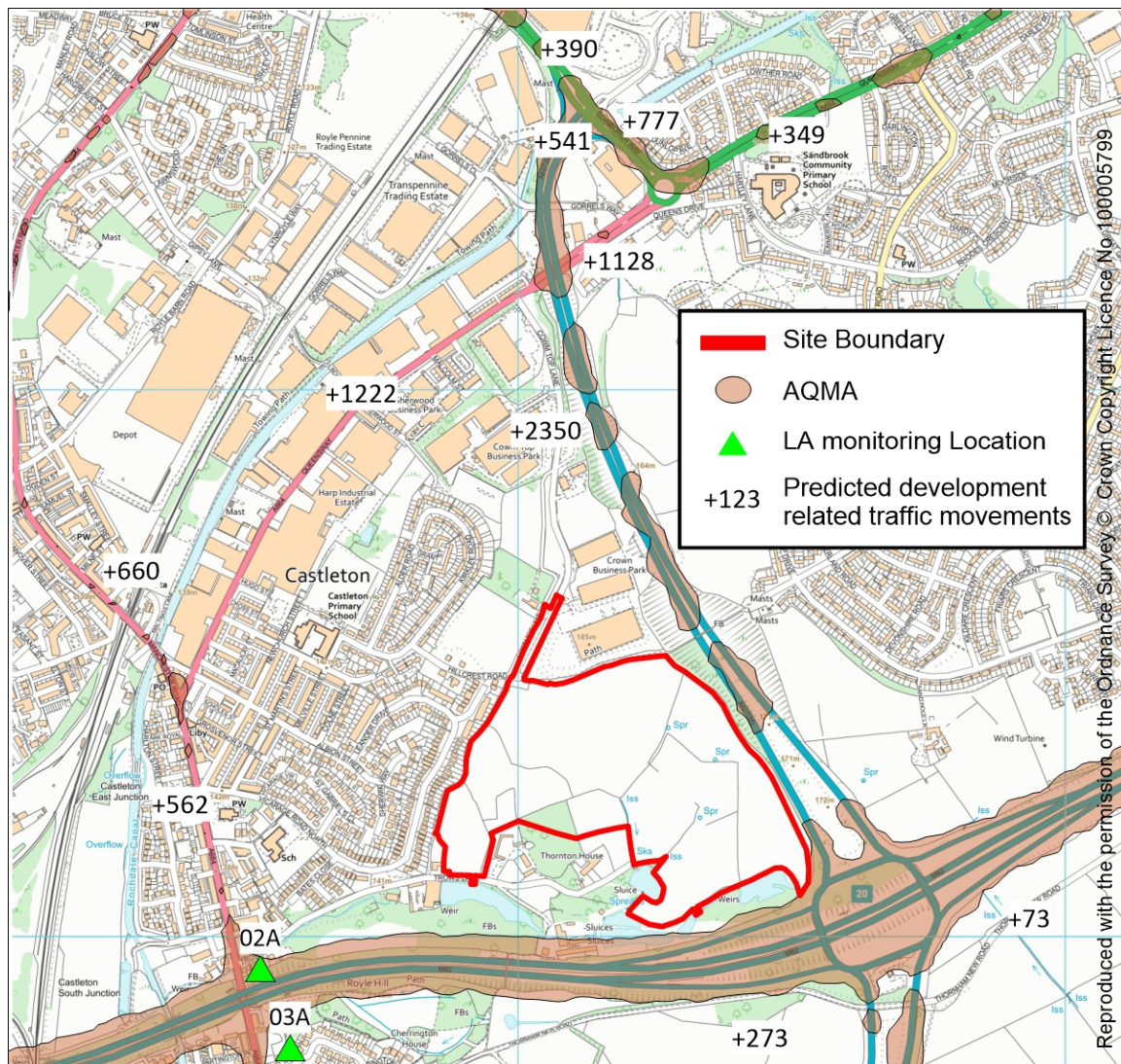
Link ref	Road Link	Description	No dev. ²	With dev. ²	Change AADT ³	% Change
Site Access						
1	Site Access		0	2,350	+2,350	
Local road network						
2	Cowm Top Lane	principal access road	1,055	3,405	+2,350	+222
3	A664 Queensway	between Town Cop Lane & Albion St	14,783	16,005	+1,222	+8.3
4	A664 Queensway	between Town Cop Lane & A664 Edinburgh Way	15,536	16,464	+1,128	+7.4
5	A664 Queensway	east of A664 Edinburgh Way	21,033	21,382	+349	+1.7
6	A664 Edinburgh Way	between A664 Queensway & A627(M)	20,280	21,057	+777	+3.8
7	A664 Edinburgh Way	north of A627(M)	35,789	36,179	+390	+1.1
8	A627(M)	slip roads to A627(M)	50,730	51,271	+541	+1.1
9	A664 Queensway	between Albion Street & A664 Manchester Road	10,378	11,172	+794	+7.7
10	Albion Street	south of A664 Queensway	502	502	0	0
11	A664 Manchester Road	north of A664 Queensway	18,683	19,343	+660	+3.5
12	A664 Queensway	west of A664 Manchester Road	6	6	0	0
13	A664 Manchester Road	south of A664 Queensway	18,717	19,279	+562	+3.0
14	M627 (East)	east of junction 20	137,566	137,639	+73	+0.1
15	M627 (West)	west of junction 20	135,373	135,648	+273	+0.2

1: traffic data provided by SCP; presented in Appendix A; above summarised from detailed data; data is based on combination of DfT counts and traffic surveys; based on up to 550 dwellings

2: development traffic will be all LDVs; therefore change is LDVs

3: highlighted cells indicate where above IAQM indicative criteria (>500 AADT where distant from an AQMA or >100 AADT in / near AQMA) for further assessment

Figure 7.1: Predicted Changes in Traffic Flows



7.2.4 Much of the local road network is not within an AQMA and it is therefore appropriate to refer to a screening criterion of +500 AADT as indicating the need for further assessment, where relevant receptors are present. However, parts of Manchester Road, Queensway, Edinburgh Way, A627(M) and M62 are included within the Greater Manchester AQMA (as shown on Figure 7.1) and it is therefore appropriate to refer to the more stringent screening criterion of +100 AADT as indicating the need for further assessment.

7.2.5 Predicted flows exceed the relevant criteria on Cowm Top Lane, Manchester Road, Queensway, Edinburgh Way, A627(M) and M62 (West). Sensitive receptors lie alongside parts of these roads and further detailed assessment has therefore been undertaken incorporating atmospheric dispersion modelling.

7.3 Detailed Assessment

7.3.1 ADMS-Roads v5, a recognised atmospheric dispersion model, has been used to predict the distribution of the key pollutants from the road transport (NO_x / NO₂ and PM₁₀) due to the development at selected receptors close to the affected road network.

7.3.2 The model has been based on individual road links as determined by road layout information, observations of traffic flows and traffic lights using the AADT traffic data provided by SCP. The provided data has been used to generate appropriate data for input into the ADMS-Roads model. Traffic speeds used in the model are based on site observations and Defra guidance, particularly with respect to junctions and traffic lights. The model set-up has taken into account the elevated nature of the M62.

7.3.3 The ADMS-Roads v5 model incorporates the Defra Emissions Factor Toolkit (EFT v10.1) issued by Defra in August 2020.

7.3.4 The dispersion modelling has been undertaken using 1 year of hourly sequential meteorological data from Rostherne No 2.

7.3.5 The general model conditions are summarised below:

Table 7.2: ADMS-Roads Model Input Parameters

Variables	Model Input
Surface roughness at source	0.5 m
Minimum Monin-Obukhov length for stable conditions	default
Emissions	NO _x , PM ₁₀
Emission factors	EFT 10.1; issued August 2020 (modelled for 2018 and 2026)
Emission profiles	average throughout 24 hours
Meteorological data	1 year (2018) hourly sequential data from Rostherne No.2; consistent with the year of baseline traffic data
Traffic data	derived from AADT data provided by SCP
Receptors	x, y coordinates, z = 1.5m; selected receptors as provided on Figure 7.1
Model outputs	long-term annual mean road-NO _x concentrations long-term annual mean road-PM ₁₀ concentrations

7.3.6 The model has been run for the following scenarios:

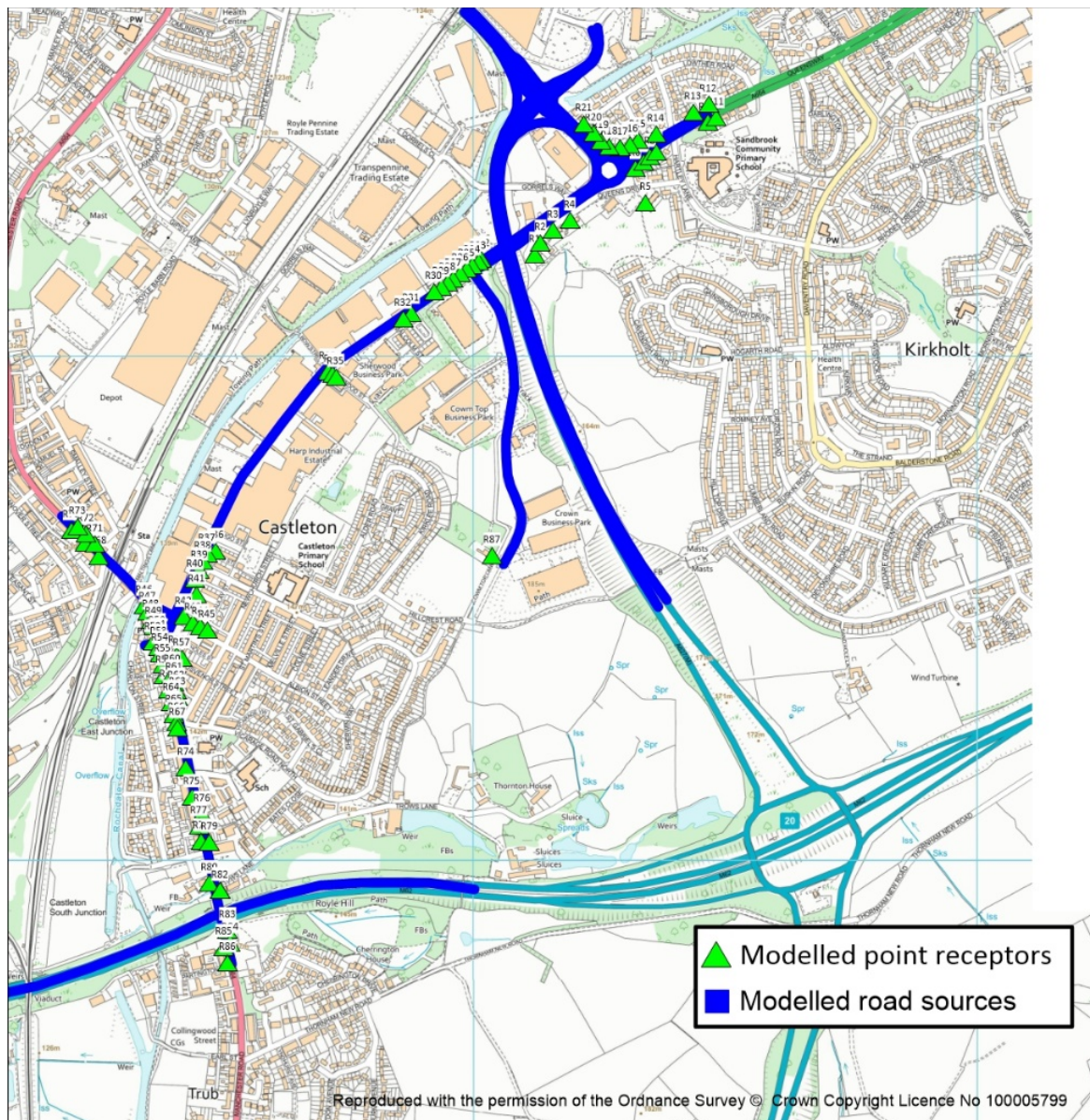
Table 7.3: Model Scenarios

Scenario	Year	Description
A	2018	baseline traffic data
B	2026	future baseline – ‘without development’
C		with development

7.3.7 Data has been provided by SCP for 2021 ‘Submission Year’ and 2026 ‘Year of Assessment’. The assessment has been undertaken for 2026 Year of Assessment.

7.3.8 The modelled road network and receptors is provided below in Figure 7.2.

Figure 7.2: ADMS Modelled Road Network and Receptors



7.3.9 The severity of impacts of the predicted changes in pollutant concentrations at modelled receptors is assessed in accordance with the IAQM guidance. This provides an assessment methodology based on the predicted pollutant changes and resulting total concentration as summarised below.

7.3.10 The IAQM guidance provides a methodology for assessing the severity of impacts at individual receptors based on the predicted change in concentration of a pollutant due to a development and the resulting total concentration (as a long-term average) as summarised in Table 7.4.

Table 7.4: Impact descriptors for individual receptors

Long term average concentration at a receptor in assessment year	% Change in concentration relative to AQAL ¹				
	0	1	2-5	6-10	>10
75% of less of AQAL	negligible	negligible	negligible	slight	moderate
76-94% of AQAL	negligible	negligible	slight	moderate	moderate
95-102% of AQAL	negligible	slight	moderate	moderate	substantial
103-109% of AQAL	negligible	moderate	moderate	substantial	substantial
110% of more of AQAL	negligible	moderate	substantial	substantial	substantial

Note: Refer to Table 6.3 of IAQM¹⁰ guidance for detail and explanatory notes

1. The change in concentration relative to the AQAL is rounded to the nearest whole number; i.e. where the % change is less than 0.5% the % change is 0%; where between 0.5% and 1% the change is 1%

7.3.11 Once the impact has been described at each specific receptor the overall significance of the air quality impacts is assessed. IAQM guidelines do not provide a traditional matrix of significant effects with regards to air quality. The judgement on the overall significance of air quality effects of the proposals is informed by the predicted impacts at individual receptors and takes into account a number of factors such as, but not limited to:

- the existing and future air quality in the absence of the Proposed Development;
- the extent of current and future population exposure to the impacts; and
- the influence and validity of any assumptions adopted when undertaking the prediction of impacts.

7.4 Existing Baseline

7.4.1 The model has been used to predict road contributions of concentrations of NO_x and PM₁₀ at the receptor facades. The model has been run for 2018 using the 2018 traffic data and 2018 met data to establish the current conditions. Where possible it is usual practice to verify the model in accordance with Defra guidance⁵. This is done by comparing modelled data with monitored data and, where necessary, deriving an adjustment factor.

7.4.2 The only monitoring data available for the area is that for diffusion tubes O2A and O3a located in Castleton. Tube O2A is located on Trows Lane near the bottom of the embankment to the M62. Tube O3A is located on Cressington Drive set-back about 55m from the A664 Manchester Road and 98m from the M62.

- 7.4.3 Modelled long-term NO₂ concentrations at O2A and O3a are 31.1 µg/m³ and 27.4 µg/m³ respectively using the Defra predicted 2018 background NO₂. The resulting concentrations with the motorway contribution for that grid square removed (as per the methodology discussed below) are 26.43 µg/m³ and 22.18 µg/m³. For comparison, the 2018 monitored concentrations are 28.9 µg/m³ and 20.6 µg/m³. The differences between the modelled NO₂ concentrations (with motorway contribution removed) and monitored concentrations are less than 10%. On this basis, and given the differences in the nature of the localities of these monitoring locations and the wider road network being assessed, it is not considered appropriate or necessary to carry out model verification using these locations.
- 7.4.4 Total NO₂ concentrations at each modelled receptor for the existing baseline scenario (2018) have been calculated from the adjusted modelled road-NO_x concentration using the 'NO_x to NO₂' calculator provided on the Defra website (version 8, dated 19th August 2020). The calculator requires the input of background NO₂ concentrations. Predicted Defra NO₂ concentrations for 2018 for the grid squares in which relevant receptors are located were used.
- 7.4.5 The model domain includes receptors located across several grid squares and located both close to, and distant, from the M62 and A627(M) and other major roads. The model set-up has included stretches of these roads. For those receptors close to the motorways and major roads there will be a degree of double counting these road contributions as these will also be incorporated in the Defra background data. Where necessary sensitivity analysis of the results has been undertaken through modelling through road network without the motorway and / or adjusting the background NO₂ concentrations through the Defra 'NO_x sector removal tool'²² to remove the appropriate motorway contribution. Full results are provided in Appendix B.
- 7.4.6 Total PM₁₀ concentrations are calculated by summing the predicted road source PM₁₀ contributions and the predicted background PM₁₀ concentrations for 2018 for the grid square in which the receptors are located.
- 7.4.7 No exceedances of the long-term NO₂ AQAL are predicted at any modelled representative receptors for 2018.
- 7.4.8 The highest predicted annual mean long-term NO₂ concentrations across the modelled domain are at R22 and R23 which represent residential receptors on Queensway at 38.57 and 38.05 µg/m³. These are located close to the A627(M) and these concentrations are likely to be an over-estimate due to double counting the motorway and Queensway within the background NO₂ concentrations

²² Defra 'NO₂ adjustment for NO_x sector removal tool', v8.0, issued 19 August 2020

used in the calculation. Using the Defra 'NO_x sector removal tool' the resulting annual mean concentrations following removal of the 'motorway in' component at R22 and R23 are 34.71 and 34.14 µg/m³. These are considered to more representative, but are still likely to remain an over-estimate of conditions here as the inclined nature of the A627(M) has not been modelled and there will be double counting of the Queensway contributions. The implications of the potential double counting of motorway and Queensway contributions would similarly be expected at other receptors close to the A627(M) and Queensway.

7.4.9 No exceedances of the long-term PM₁₀ AQAL are predicted at any modelled receptor for 2018, and the highest concentration of 15.85 µg/m³ at R83 on Manchester Road junction is substantially below the AQAL (<75%).

7.4.10 Predicting short-term NO₂ concentrations (averaging period of 1-hour) is difficult as these are highly variable. Research²³ has identified that that exceedances of the NO₂ 1-hour mean are unlikely to occur where the annual mean is below 60 µg/m³⁵ and reference is therefore made to the long-term concentrations as exceedance of the long-term AQAL would occur before exceedance of the short-term AQAL. Predicting short-term PM₁₀ concentrations (averaging period of 24 hours) can also be challenging. A relationship has been derived between the annual mean PM₁₀ concentration and number of exceedances of the 24-hour mean of 50 µg/m³⁵, this provides an annual mean PM₁₀ concentration of 31.5 µg/m³ as being the concentration at which exceedances of the short-term AQAL may occur.

7.4.11 At 38.57 µg/m³ the highest predicted annual mean concentration of NO₂ is substantially below the concentration of 60 µg/m³ that may indicate potential exceedances of the short-term AQAL. Similarly, annual mean concentrations of PM₁₀ are well below concentrations that would indicate potential exceedances of the PM₁₀ short-term AQAL.

7.4.12 It is considered the results are broadly consistent with expectations for the local road network, although the comments regarding the double counting of contribution of major roads at certain receptors should be noted.

7.5 Detailed Assessment - Results

7.5.1 As for the baseline scenario total NO₂ and PM₁₀ concentrations have been calculated through reference to relevant Defra background concentrations; data for 2021 and 2026 have been referred to and total NO₂ concentrations have been calculated from the Defra 'NO_x to NO₂' calculator (v8.0).

²³ Local Air Quality Management Technical Guidance (TG16) (7.90 – 7.91) February 2018

7.5.2 The receptors have been broadly broken down into key areas of interest. The maximum predicted modelled increases in post-development NO₂ and PM₁₀ concentrations (Scenario C) in each key area are assessed in accordance with the guidance provided by IAQM and are detailed in Appendix B and summarised below for 2021 and 2026.

Table 7.7: Summary of Maximum Modelled Increases in NO₂ in each Key Area – 2026

Key Area	Receptor Ref	Maximum Change in Annual Mean Concentration		Predicted Façade Concentration (µg/m ³) ²	Impact
		µg/m ³	% ¹		
Queens Drive	R1-R5	+0.19	+0	21.13	negligible
Queensway / Edinburgh Way	R6 – R21	+0.13	+0	18.43	negligible
Queensway / Colm Top Lane jn	R22 – R30	+0.70	+2	23.72	negligible
Queensway	R31 – R41	+0.33	+1	19.26	negligible
Albion Street	R42-R45	+0.18	0	18.23	negligible
Queensway / Manchester Road jn	R46 – R55	+0.22	+1	22.27	negligible
Manchester Road south	R56-R67; R74-R86	+0.17	0	24.11	negligible
Manchester Road north	R68 – R73	+0.22	+1	21.44	negligible

1: maximum change in annual mean concentration as % of assessment level; rounded in accordance with IAQM guidance

2: maximum NO₂ concentration based on predicted background concentrations for grid squares in which receptors are located for 2021, 'motorway in' contribution to background concentrations not removed

Table 7.8: Summary of Maximum Modelled Increases in PM₁₀ in each Key Area - 2026

Road Link	Receptor Ref	Maximum Change in Annual Mean Concentration		Predicted Façade Concentration (µg/m ³) ²	Impact
		µg/m ³	% ¹		
Queens Drive	R1-R5	0.07	0	13.46	negligible
Queensway / Edinburgh Way	R6– R21	0.06	0	13.48	negligible
Queensway / Colm Top Lane jn	R22 – R30	0.28	1	14.86	negligible
Queensway	R31 – R41	0.14	0	13.78	negligible
Albion Street	R42-R45	0.07	0	13.30	negligible
Queensway / Manchester Road jn	R46 – R55	0.09	0	14.99	negligible

Road Link	Receptor Ref	Maximum Change in Annual Mean Concentration		Predicted Façade Concentration ($\mu\text{g}/\text{m}^3$) ²	Impact
		$\mu\text{g}/\text{m}^3$	% ¹		
Manchester Road south	R56-R67; R74-R86	0.07	0	17.29	negligible
Manchester Road north	R68 – R73	0.09	0	14.71	negligible

1: maximum change in annual mean concentration as % of assessment level; rounded in accordance with IAQM guidance

2: maximum NO₂ concentration based on predicted background concentrations for grid squares in which receptors are located for 2021, 'motorway in' contribution to background concentrations not removed

7.5.3 The maximum predicted change in façade annual mean NO₂ concentrations in 2026 within the modelled domain is +0.70 $\mu\text{g}/\text{m}^3$, 2% of the AQAL. This occurs at R24, on Queensway, immediately adjacent to the main site access at Colm Top Lane. The resulting predicted facade concentration is 23.58 $\mu\text{g}/\text{m}^3$ (without the motorway contribution to background NO₂ removed), 60% of the AQAL, with a resulting severity of impact of *negligible*. With reference to paragraph 7.4.8 above this is likely to be an over-estimate of the resulting total concentrations due to both the double counting of the motorway contribution and the elevated nature of the A627(M) in this area. A small number of other modelled receptors in this vicinity also experience a change of 1-2% of the AQAL. Resulting total façade concentrations (without the motorway contribution to background NO₂ removed) are similarly all well below the AQAL (<30 $\mu\text{g}/\text{m}^3$) with resulting *negligible* impacts.

7.5.4 Predicted changes in long-term NO₂ concentrations at receptor facades 1% of the AQAL range are also predicted at several receptors along Queensway to the west of the Cowm Top Lane junction. The maximum predicted change is +0.33 $\mu\text{g}/\text{m}^3$ at receptor R32, 1% of the AQAL. Resulting total façade concentrations are all well below the AQAL and with resulting *negligible* impacts.

7.5.5 Elsewhere along the wider road network along Queensway and Manchester Road predicted changes of 1% of the AQAL are predicted at several receptors. Resulting total façade concentrations are all well below the AQAL and with resulting *negligible* impacts.

7.5.6 No exceedances of the long-term NO₂ AQAL are predicted at any modelled receptors with or without the development. The maximum predicted façade long-term NO₂ concentration within the domain is 23.58 $\mu\text{g}/\text{m}^3$ at R24 on Queensway; however as discussed above it is considered this would be an over-estimate.

7.5.7 The maximum predicted change in façade annual mean PM₁₀ concentrations within the modelled domain is +0.28 $\mu\text{g}/\text{m}^3$, 1% of the AQAL, at R24 at the Queensway / Cowm Top Lane junction. The

resulting predicted facade concentration is 14.86 $\mu\text{g}/\text{m}^3$, well below 75% of the AQAL, with resulting *negligible* impacts.

- 7.5.8 No exceedances of the long-term PM_{10} AQAL are predicted at any modelled receptor with or without the Development. The maximum predicted facade long-term PM_{10} concentration within the domain is 14.86 $\mu\text{g}/\text{m}^3$ at R24 on Queensway, discussed above. As for NO_2 this is likely to be an over-estimate due to both double counting of the motorway contribution and the elevated nature of the motorway in this area but remains well below 75% of the AQAL.

7.6 Other Considerations

- 7.6.1 The A627(M) and M62 will contribute to ambient NO_2 concentrations in the local area and at the Site, with parts of the Site extending towards the AQMA declared along these roads. However, as shown in Figure 5.1, although close, the Site boundary does not extend into the AQMA. NO_2 concentrations drop off rapidly from the roadside²⁴ and the indicative layout²⁴ (provided in Appendix D) includes for areas of green infrastructure on the eastern and southern boundaries providing a set-back distance of properties to these highways.

- 7.6.2 The AQMA boundary has been based on relatively recent modelling (declared in 2016 based on 2010 data) and a threshold of 35 $\mu\text{g}/\text{m}^3$. The long-term NO_2 concentrations at the facade of the built development would therefore be expected to be below 35 $\mu\text{g}/\text{m}^3$, i.e. less than 87% of the AQAL. The buffer provided on the eastern and southern eastern edges of the Site, as shown in the Parameters Plan in Appendix D, is therefore considered to be adequate to provide mitigation from the impacts of vehicle exhaust emissions from the nearby highway network on the proposed development.

7.7 Assumptions and Limitations

- 7.7.1 Predicted traffic data has been provided by SCP and is based on a combination of measured and modelled traffic flows and predicted trip generation factors for the development. Traffic speeds used in the model are based on field observations and local speed limits.
- 7.7.2 There has been considerable uncertainty in recent years over projected background and roadside airborne pollution concentrations: reasons for uncertainty include an aging UK vehicle fleet, a greater than expected proportion of diesel vehicles within the fleet and that new engine emission standards have not produced expected improvements. The vehicle emissions assessment has been undertaken utilising predicted background air quality data, vehicle emissions factors and 'NO_x to NO₂ calculator' issued by Defra in 2020 and comprises the most up to date official published data at the time of the preparation of the report.

²⁴ e*SCAPE, Indicative Parameters Masterplan, Cowm Cop Lane, ref: 019-019-003 Rev G, September 2020

7.7.3 It is noted however that both the projected traffic data provided by SCP and the vehicle fleet composition and emission factors provided by Defra do not take into account any implications of the COVID-19 pandemic²⁰. At present the possible long-term implications on these factors can not be determined.

7.7.4 The model has been run using meteorological data from Rostherne which provides some of the closest available data. Local variations in weather conditions and wind direction are likely to exist, however the use of this data is considered appropriate for this assessment.

7.7.5 The modelled road-contributions of NO_x and PM₁₀ are considered to be consistent with expectations given the local road network, baseline traffic flows and predicted development flows, allowing for acknowledged uncertainty in modelling pollutant concentrations and potential double counting of contributions from major roads and motorways.

7.8 Summary and Discussion

7.8.1 The modelling predicts changes in long-term NO₂ concentrations at a small number of receptors at the Cowm Top Lane / Queensway Road junction to be up to 2% of the AQAL. Resulting predicted façade concentrations at these receptors are less than 75% of the AQAL with resulting *negligible* impacts at all modelled receptors. In addition, the total predicted NO₂ concentrations here are likely to be an over-estimate due to both double counting of contributions from the motorway and the elevated nature of the A627(M) which has not been incorporated in the model set-up. Reduced increases, at 1% of the AQAL, are also predicted at some receptors at the Cowm Top Lane / Queensway Road junction, Queensway / Manchester Road junction and to the north along Manchester Road. Resulting façade concentrations are again all less than 75% of the AQAL and the impact descriptors are *negligible*.

7.8.2 On this basis, the overall impact of the development on local air quality is not considered to be significant.

8 Vehicle Emissions Assessment – Ecological

8.1 Screening Assessment

8.1.1 Separate guidance is provided by Natural England (NE) in relation to ecological sites²⁵ and is reiterated in IAQM guidance².

8.1.2 To assess whether assessment in relation to ecological receptors was required reference was initially made to the following screening criteria:

- Total vehicle flow change by 1,000 AADT or more; or HDV flows change by 200 HGV AADT or more, where an ecological receptor is located within 200m of the affected road.

8.1.3 With reference to Table 7.1 above development related LDV movements are above 1,000 AADT on Cowm Top Lane and Queensway. Stretches of these roads are within 200m of the Rochdale Canal SAC and therefore further assessment has been undertaken of potential impacts on the SAC.

8.2 Detailed Assessment Approach

8.2.1 As for human receptors ADMS-Roads has been used to calculate the predicted increases in NO_x contributions due to the development related road traffic at the selected points within the Rochdale Canal SAC. Modelled receptor points are provided in Figure 8.1.

8.2.2 The IAQM guidance in relation to nature conservation sites² provides outline principals on the approach to the assessment of air quality impacts on such sites in a planning context. There is however no specific methodology for determining significance in relation to designated sites. What guidance is available is primarily aimed at undertaking 'appropriate assessments' as required under the Habitats Directive, but the principals are also typically applied to other designated nature conservation sites.

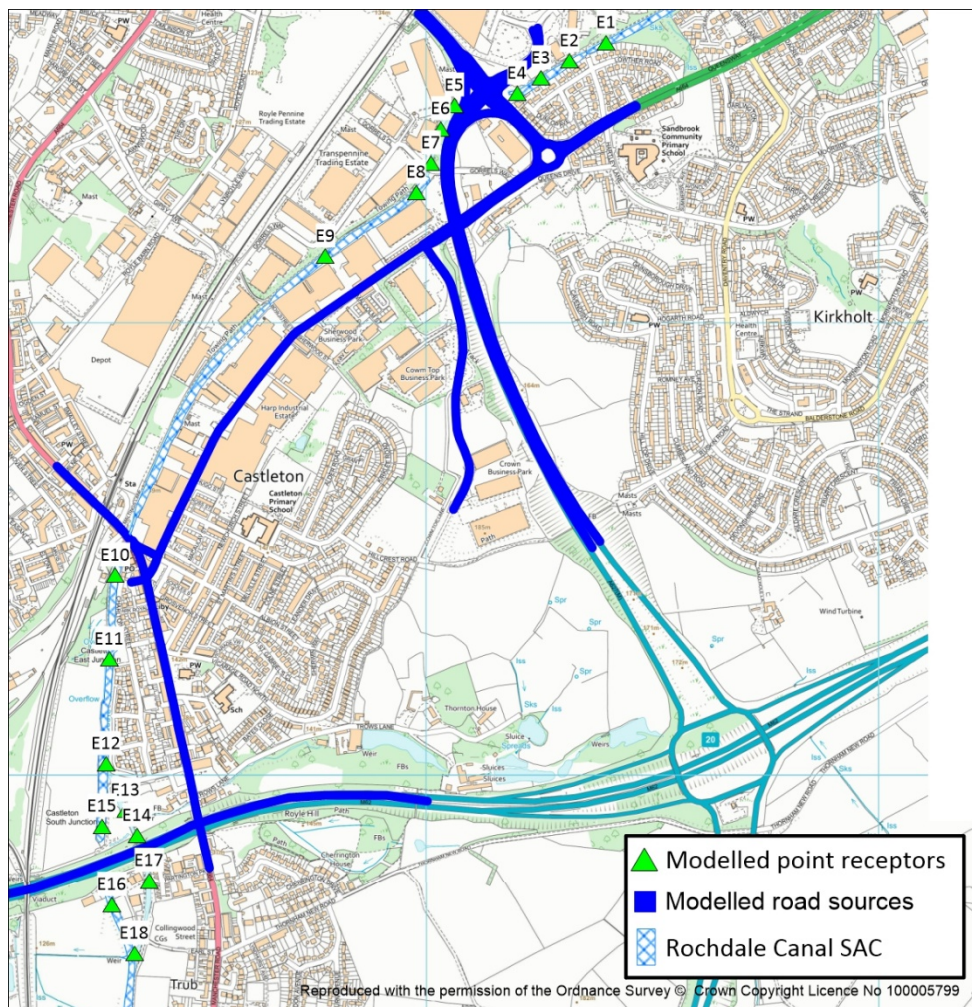
8.2.3 Some guidance is provided in EA guidance for environmental permitting applications²⁶. The impact assessment terminology varies depending on the protection status of the nature conservation sites. For European sites an assessment is made as to whether the proposed development is '*likely to have a significant effect*', and whether this could lead to an '*adverse effect on site integrity*'. For SSSIs the assessment needs to determine whether the proposed development is '*likely to damage*'

²⁵ Natural England (NE), Natural England's approach to advising competent authorities on the assessment of road traffic emissions under the Habitats Regulations, v1.4 Final, June 2018

²⁶ <https://www.gov.uk/guidance/air-emissions-risk-assessment-for-your-environmental-permit#risk-assessment-tool>, published 1 February 2016, last updated 7 October 2020

the site. For all other nature conservation sites the assessment needs to determine whether the proposed developed would result in 'significant pollution'.

Figure 8.1: ADMS-Modelled Ecological Receptors



8.2.4 The EA guidance provides the following screening ('de minimis') thresholds with regards to nature conservation sites and pollutant contributions to indicate whether impacts may have likely significant effects and the need for further detailed assessment:

Table 8.1: Screening ('Simple') Assessment Criteria for Nature Conservation Receptors

European Sites and SSSIs
PC _{long-term} is <i>insignificant</i> where less than 1% of relevant Critical Level / Load
PC _{short-term} is <i>insignificant</i> where less than 10% of relevant Critical Level / Load
PEC _{long-term} will result in <i>no likely significant effect</i> (European sites) / <i>no likely damage</i> (SSSIs) where less than 70% of relevant Critical Level / Load
Local Nature Sites (NNRs, LNRs, LWSs and Ancient Woodland)
PC _{long-term} is <i>insignificant</i> where less than 100% of relevant Critical Level / Load / will result in <i>no potential pollution</i>

PC_{short-term} is *insignificant* where less than 100% of relevant Critical Level / Load / will result in *no potential pollution*

PC = Process Contribution; PEC = Predicted Environmental Concentration

8.2.5 Where the PC_{long-term} and PC_{short-term} are less than the screening thresholds, they are considered *insignificant* and it can be concluded there would be **no significant effect**. The use of the 1% and 10% screening thresholds in relation to PCs and European sites and SSSIs are also referred to elsewhere in the IAQM², NE⁵ and HE⁴ guidance. The IAQM guidance does however note that the reference of the 100% PC screening threshold in relation to ancient woodlands and local sites may not provide sufficient protection.

8.2.6 The screening thresholds are provided as trigger thresholds to indicate the requirement for further assessment and are not intended to be damage thresholds. Similarly, exceedance of 70% of the Critical Level / Load does not therefore infer that a significant effect / damage is likely, but that further detailed assessment, including modelling, may be necessary.

8.3 Critical Levels: Ambient NO_x

8.3.1 Total annual mean NO_x concentrations are calculated by summing the predicted road-source NO_x contributions and the predicted background NO_x concentrations for 2026 for the grid square in which the receptors are located. Given the proximity of the SAC to the M62 and A627(M) the motorway-in contribution to the background NO_x has been removed in the calculations. Results are summarised below in Table 8.2; full results are presented in Appendix C.

8.3.2 The highest predicted changes in annual mean NO_x concentrations at the SAC in 2021 are predicted at the stretch close to the Queensway / A627(M) junction at +0.32 µg/m³ (receptor point E8) representing a change of +1% (with rounding) of the AQAL. The resulting predicted total NO_x at this point is below the AQAL of 30 µg/m³ at 29.03 µg/m³. Predicted changes of +1% (with rounding) of the AQAL have also been predicted at other modelled receptor points E4-E9 in this area and are 0% at E1-E3. At E5-E7 the background NO_x concentrations are predicted to be above the AQAL and hence the resulting concentrations with the proposed development are equally predicted to be above the AQAL. It should be noted however that the total NO_x concentrations are likely to be an over-estimate due to double counting of the contributions from main roads, in particular Queensway, which have not been removed from the background levels and the inclined nature of the A627(M) along this stretch which has not been incorporated in the model set-up.

8.3.3 Predicted changes at modelled points close to the Manchester Road / Queensway junction are all 0% of the AQAL.

Table 8.2: Maximum Predicted Changes in Ambient NO_x Concentrations at Modelled Points with Rochdale Canal SAC: 2021 and 2026

Nature Conservation Site	Receptor	Total Ambient NO _x Concentration (µg/m ³) ¹			Change as %AQAL ²
		Without Development	With Development	Change	
2026					
Rochdale Canal SAC – stretch near Queensway / A627(M) junction	E8	28.72	29.03	0.32	+1
Rochdale Canal SAC – stretch near M62 and Manchester Road	E10	24.51	24.64	0.13	0

1: Background NO_x based on predicted Defra data for 2026 for relevant grid square; motorway-in contribution removed

2: AQAL = 30 µg/m³ as an annual mean; any highlighted cells indicate predicted exceedances of the AQAL

8.3.4 Critical Loads: Nitrogen Deposition and Acidification

8.3.5 The modelled road-NO_x concentration at each modelled receptor point has been converted to road-NO₂ and the resulting dry nutrient nitrogen (N) deposition calculated. The road-NO₂ has been calculated from the modelled road-NO_x and background NO₂ concentrations using the Defra NO_x to NO₂ convertor. Adjusted background NO₂ concentrations have been used following removal of the road-in NO_x contribution.

8.3.6 The habitat features provided for nutrient nitrogen deposition as provided by APIS for the Rochdale Canal SAC are summarised below:

Table 8.3: Rochdale Canal SAC – Nitrogen and Acid Deposition Critical Loads

Site	Status	Feature	Habitat	Critical Load Range (kg N/ha/y)
Nitrogen Deposition				
Rochdale Canal	SAC / SSSI	Luronium natans – floating water plantain	Standing open water and canal	3-10
Acid Deposition				
Rochdale Canal	SAC / SSSI	Luronium natans – floating water plantain	Standing open water and canal	None provided; site specific

1: most sensitive habitat feature and Critical Load range noted for the site, *where feature is sensitive to nutrient nitrogen / acidification impacts on broad habitat*; feature may not be present within area of impacts;

2: Critical Loads are dependent on aspects of habitat including the nature of the surface and the sensitivity of the habitat to changing deposition rates.

8.3.7 It should be noted that the identified sensitive habitats may not be present within the area of interest and the assessment at this stage is therefore conservative.

8.3.8 The resulting modelled maximum nitrogen dry deposition due to NO₂ at the modelled receptor points within the Rochdale Canal are presented below:

Table 8.4: Maximum Predicted Changes in N Deposition at Modelled Nature Conservation Receptors: 2021 and 2026

Nature Conservation Site	Receptor	N-deposition (kg N/ha/yr) ¹			Change as %CL _{min} ²	Change as %CL _{max} ³
		Without Development	With Development	Change		
2026						
Rochdale Canal SAC – stretch near Queensway / A627(M) junction	E8	26.12	26.14	+0.02	+1	0
Rochdale Canal SAC – stretch near M62 and Manchester Road	E10	25.80	25.81	+0.01	0	0

1: Background N-Deposition based on average for 2017-2019 as provided on APIS; based on maximum value provided for relevant 5km grid square

2: CL_{min} = 3 kg N/ha/yr

3: CL_{max} = 10 kg N/ha/yr

8.3.9 The maximum predicted changes in N deposition at the Rochdale Canal are at the screening threshold of 1% of the minimum Critical Load at E8 in 2026, but <1% (i.e. 0%) of the maximum Critical Load. A 1% increase compared to the minimum Critical load is predicted at several modelled receptor points, E4-E9, falling to 0% at other modelled points close to the A627(M) / Queensway junction (E1-E3) and 0% further distant.

8.3.10 The average background nitrogen deposition along the Rochdale Canal, is however substantially above both the minimum and maximum Critical Loads at 19.0 kg N/ha/yr, with the maximum provided for the relevant 5km grid square being 25.3 kg N/ha/yr. The resulting PECs are therefore above both the minimum and maximum Critical Loads at all modelled receptor points.

8.3.11 The contributions from the additional road traffic would therefore result in a small additional increase in nitrogen deposition along the canal.

8.3.12 The above assessment however assumes the background of N-deposition remains at the 2017-2019 levels whereas reduction by 2026 would be expected. Furthermore, the actual additional road contributions are likely to be lower than predicted due to the inclined nature of the A627(M) along

this stretch. It is considered unlikely the additional nitrogen deposition contributions would result in significant impacts on the Canal.

8.3.13 APIS does not provide any acid deposition Critical Loads for the listed site interest features for the Rochdale Canal SAC or SSSI. No further assessment has therefore been undertaken.

9 Mitigation

9.1 Construction Phase

9.1.1 In the absence of adequate mitigation, the maximum estimated risk of adverse impacts due to dust soiling at nearby residential properties is *high*, and *low* for PM₁₀ human health impacts. The impact of construction activities however can be readily controlled through the implementation of standard best practice in respect to dust control and site management, as detailed in the IAQM Guidance.

9.1.2 As an over-riding requirement, should winds carry visible dust towards the Site boundaries, and particularly to the west, the operations giving rise to the dust in that part of the Site will be modified or suspended until more suitable conditions pertain, or until effective dust control measures are implemented.

9.1.3 Haulage across the Site will be restricted to designated haul routes, which will as far as possible be located towards the centre of the Site, and away from sensitive receptors. Wherever possible, haul routes will be prepared with compacted stone or other similar material. Once the internal access roads are constructed, haulage will wherever possible take place on these routes.

9.1.4 The surface of the internal haul routes will be inspected daily, and any potholes or other defects will be made good.

9.1.5 Further standard good practices in respect of haulage include:

- avoiding abrupt changes in horizontal and vertical alignment,
- grading and maintenance of unsurfaced routes,
- setting an appropriate Site speed limit,
- even loading of vehicles to avoid spillages,
- regular removal of spilled material from Site routes,
- dust suppression by regular spraying with clean water in dry conditions,
- inspection and cleaning of vehicles leaving Site, through provision of a wheel wash area, equipped with a high-pressure hose and an adequate water supply near the Site entrance,
- cleaning of any trackout or other deposits from the adjacent highways.

9.1.6 A suitable supply of clean water for dust suppression purposes will be maintained, under all climatic conditions, throughout the construction works. Dust suppression will be implemented through regular spraying of the haul routes, stockpiled material and any freshly exposed earthworks.

9.1.7 Other more general matters and the management of the Site can affect the likelihood of significant dust emissions. These include:

- minimisation of drop heights during tipping and loading,

- loading and tipping in the lee of existing structures and stockpiles,
- maintenance of equipment to ensure its efficient operation,
- use of clean water for dust suppression, to avoid re-circulating fine material,
- high standards of house-keeping to minimise trackout and windblown dust, and
- effective staff training in respect of the causes and prevention of dust.

9.1.8 No additional mitigation measures to those standard measures utilised for construction are considered necessary.

9.1.9 The effectiveness of the mitigation measures outlined above will, to a large extent, rely on the actions and behaviour of contractors. The procedures and measures for the control of dust during the construction phase will be incorporated within the Construction Management Plan (CMP) which will be implemented prior to work commencing on Site. The CMP will be developed and agreed with the Local Authority, and other regulators / consultees as required, prior to the commencement of the construction activities.

9.2 Operational Phase

9.2.1 The vehicle emissions assessment demonstrates that the Proposed Development would not result in a significant impact on air quality at human health receptors in the vicinity of the Site. It is similarly unlikely there would be significant impacts on the Rochdale Canal SAC. No specific mitigation measures have been identified as being necessary with regards to local air quality impacts.

9.2.2 The Proposed Development would however be supported by a Travel Plan as prepared by SCP in support of the planning application²⁷. The Plan provides details on welcome packs proposed to be supplied to residents occupying the properties which will provide information on public transport provision, active travel etc, to encourage residents to give up the use of the car in favour of more environmentally friendly modes of travel. The Plan also advises that an informal car sharing scheme will be set up and promoted to residents. The Plan will therefore enhance and encourage sustainable modes of travel to and from the application Site; these measures will mitigate against impacts on air quality.

9.2.3 It is considered that the proposed parameters masterplan provides a suitable set-back distance from the A627(M) to the east / southeast with regards to local air quality and potential impacts on the new residential receptors. No further mitigation is deemed necessary to ensure long-term NO₂ concentrations are acceptable at property facades on the eastern / south-eastern edges of the development.

¹⁹ SCP, Proposed Residential Development, Cowm Top Lane, Rochdale, Travel Plan, PT/153099/TP/3, January 2021

10 Summary and Conclusions

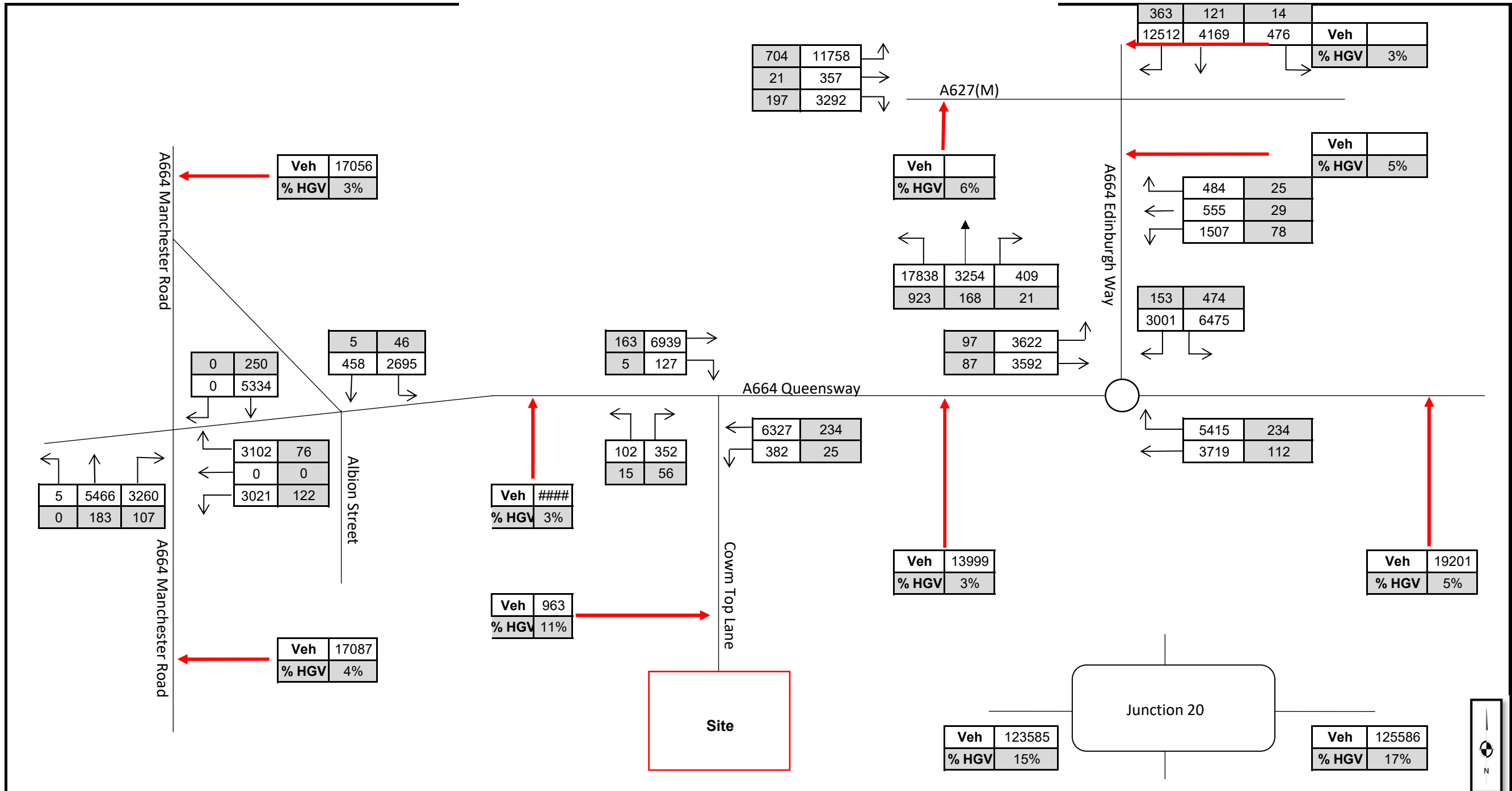
- 10.1 The air quality assessment has considered the potential impacts associated with fugitive dust and vehicle exhaust emissions during the construction and operational phases of the project.
- 10.2 An assessment has been undertaken of the potential for fugitive dust that may arise during the demolition, earthworks and construction phases of the project, and from track-out from the Site access point, to impact nearby sensitive receptors through both soiling and human health effects. The assessment takes into account the size of the development and the sensitivity of the surrounding area. Through the incorporation of standard dust mitigation measures during the construction works, to be implemented as part of the Construction Management Plan, no unacceptable impacts on human health, amenity or ecological receptors have been identified.
- 10.3 The air quality assessment has also incorporated an assessment of the potential impacts on local human and ecological receptors from vehicle exhaust emissions associated with the operational phase of the development. No unacceptable impacts on human health or amenity have been identified arising from local air quality impacts from the additional traffic associated with the development. The planning application is supported by a Travel Plan which will serve to promote sustainable travel thereby assisting in the reduction of vehicle exhaust emissions.
- 10.4 The Manchester AQMA extends along the M62 to the south and the A627(M) to the east, with the Site boundary extending towards the AQMA, particularly in the east and southeast. However, it is considered the proposed parameters masterplan and buffer provides a suitable set-back distance to the highways with regards to potential impacts of local air quality in these areas on the new residential receptors. Additional mitigation measures are not deemed necessary.
- 10.5 The assessment of ecological impacts has comprised a Critical Level and Critical Load assessment, where relevant Critical Load information is available.
- 10.6 Predicted long-term ambient NO_x and nitrogen deposition PCs at parts of the Rochdale Canal SAC are at the relevant screening thresholds in 2026. Predicted background annual mean NO_x concentrations, and hence resulting PECs, at parts of the Rochdale Canal SAC are predicted to be close to, but below, the relevant AQAL. Information is not provided on future background nitrogen deposition but existing nitrogen deposition is well above the relevant AQAL and hence the resulting PEC would be above the AQAL.
- 10.7 The assessment does not however take into account the elevated nature of the A627(M) and there will be a degree of double counting the contributions from Queensway in the background concentrations. Given the contributions from the development related traffic would only result in

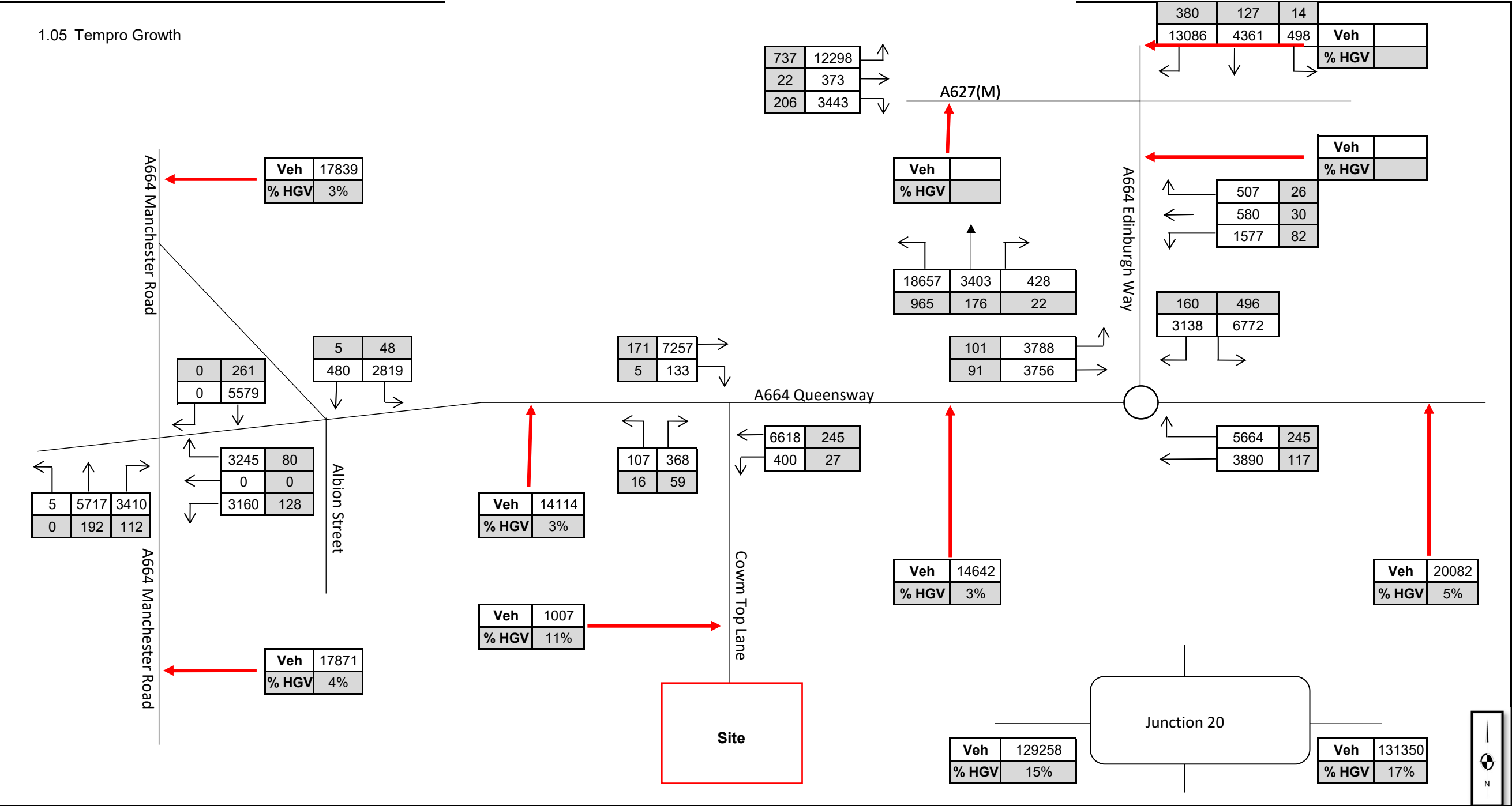
small increases in ambient NO_x concentrations and nitrogen deposition, predicted to be at the screening thresholds, it is considered unlikely that the proposals would result in a significant adverse effect at the SAC. However, for further information reference should be made to the separate ecological assessment.

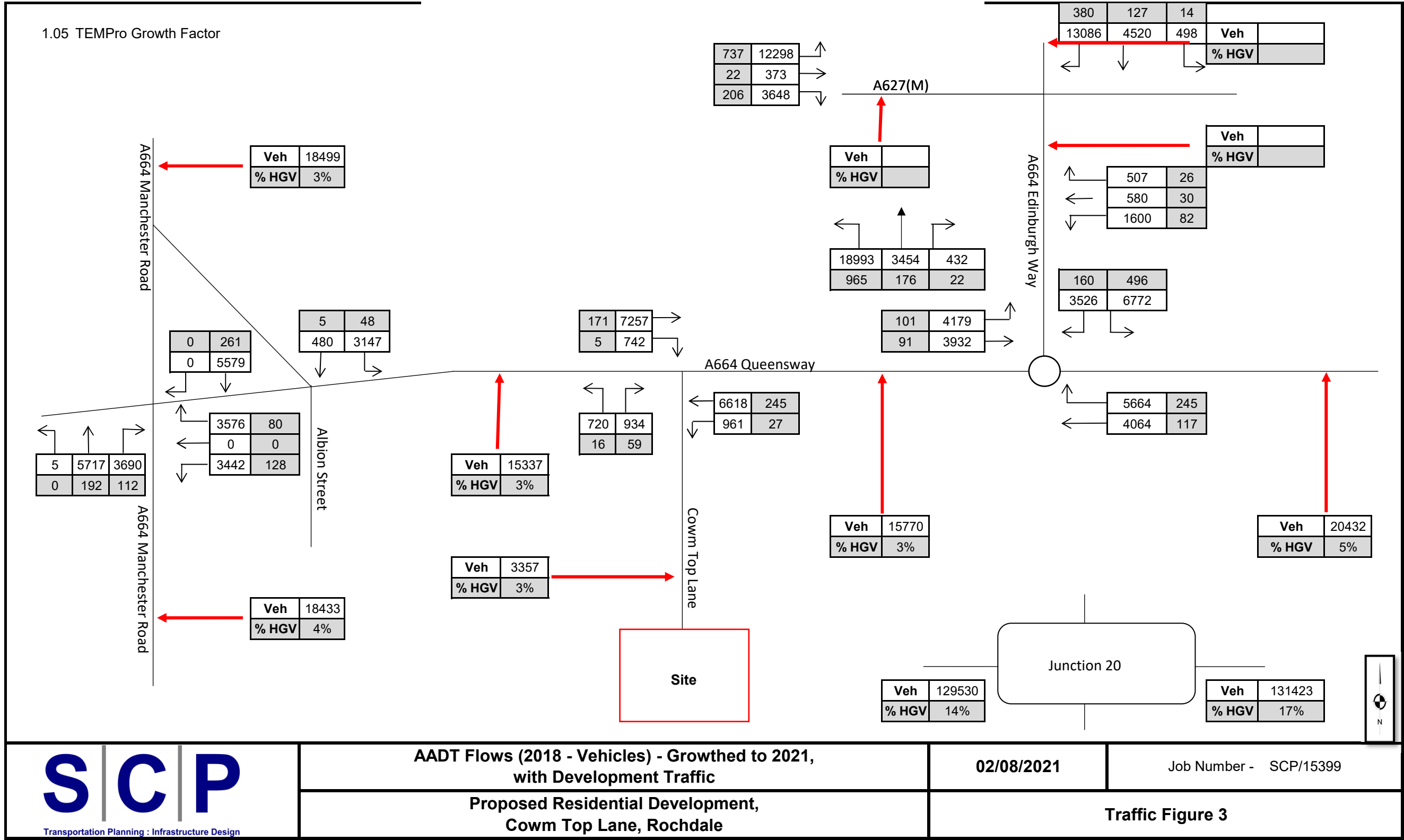
- 10.8 Overall, the impacts of the development are not predicted to be significant with respect to air quality. It is concluded that there is no reason on air quality grounds why the development proposals should not be granted outline planning permission.

APPENDIX A

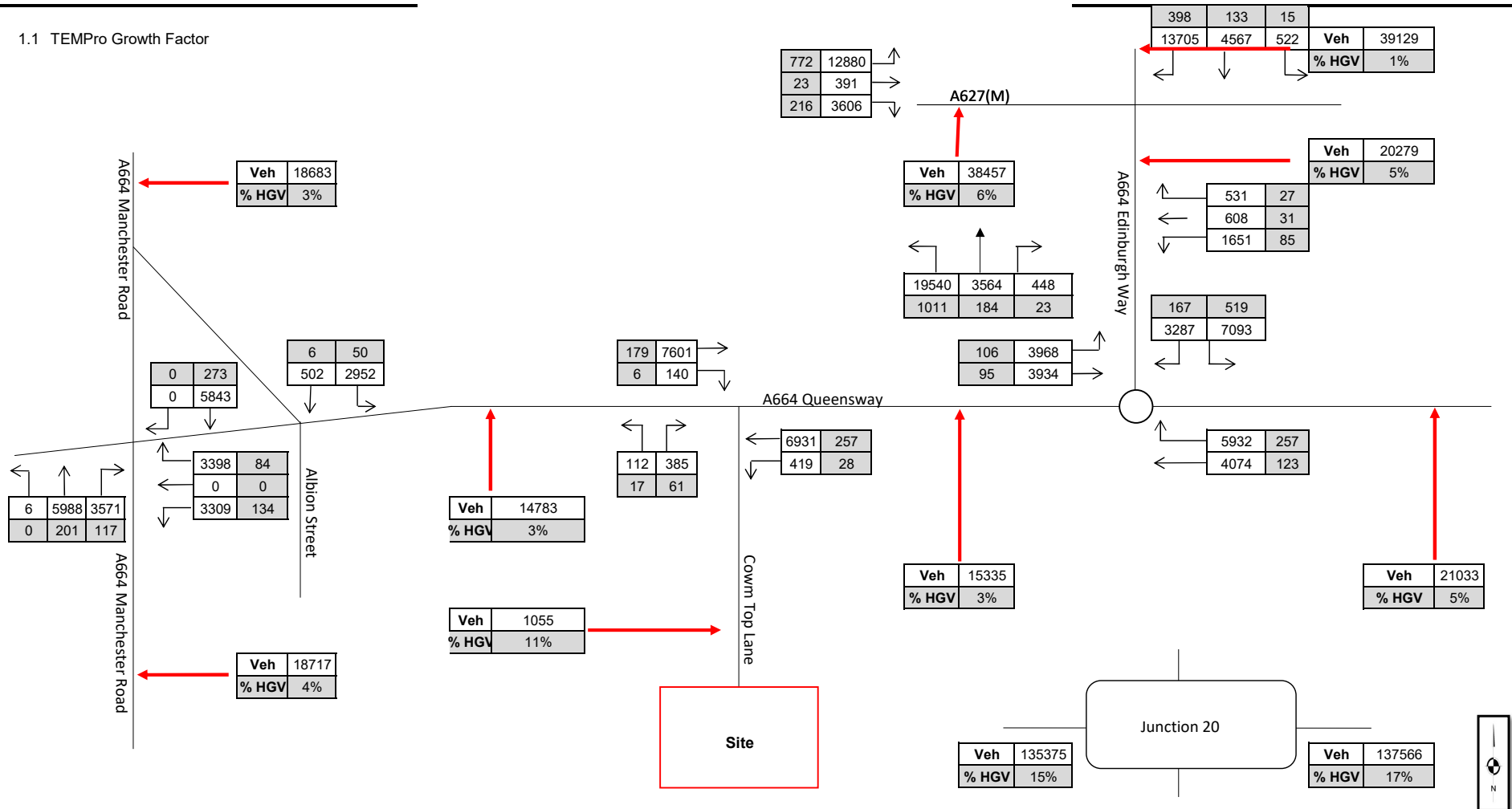
Traffic Data (provided by SCP)



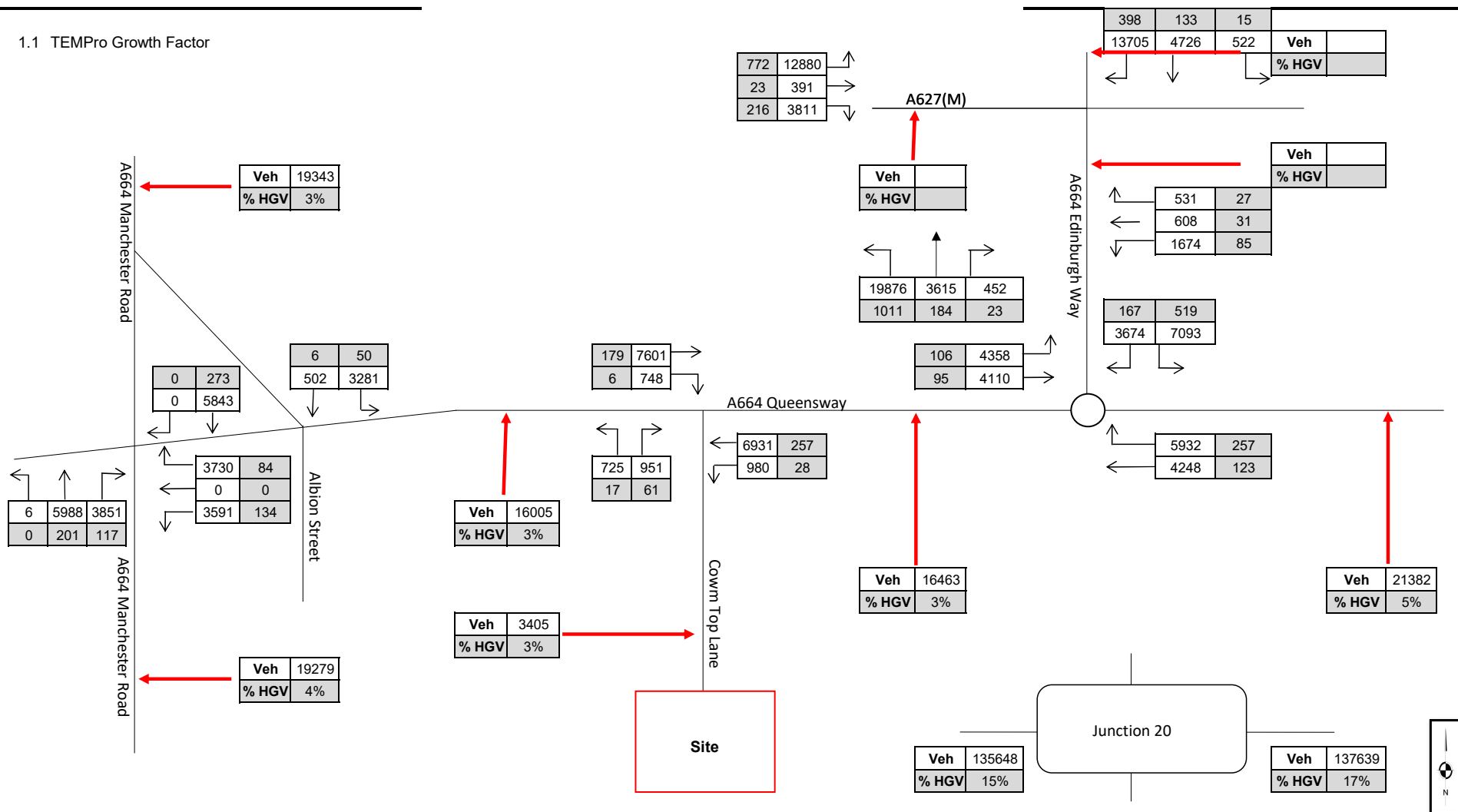




1.1 TEMPro Growth Factor



1.1 TEMPro Growth Factor



APPENDIX B

ADMS-Roads Modelling Results – Human Health

R2392 Trows Farm
Appendix B V4 Summary of ADMS-Roads Results
NO₂

2018 Scenario A-Baseline							2026 Scenario B-Do Nothing			2026 Scenario C-Do Something						
Receptor Name	X	Y	Z	Modelled Road-NO _x	Backgrou nd NO ₂ ¹	Total NO ₂ ²	Modelled Road-NO _x	Backgrou nd NO ₂ ¹	Total NO ₂ ²	Modelled Road-NO _x	Backgrou nd NO ₂ ¹	Total NO ₂ ²	Absolute change	% change NO ₂	% rounded	Impact descriptor
Queen's Drive																
R1	389120.59	411202.31	1.5	33.59	18.22	35	15.35	12.88	20.94	15.74	12.88	21.13	0.19	0.47	0	Negligible
R2	389131.81	411226.41	1.5	29.75	18.22	33.21	13.64	12.88	20.07	14.02	12.88	20.26	0.19	0.48	0	Negligible
R3	389156.81	411250.59	1.5	24.79	18.22	30.84	11.40	12.88	18.92	11.76	12.88	19.1	0.18	0.45	0	Negligible
R4	389190	411270.69	1.5	20.41	18.22	28.71	9.41	12.88	17.89	9.72	12.88	18.04	0.15	0.37	0	Negligible
R5	389341.09	411306.31	1.5	10.40	18.22	23.68	4.78	12.88	15.45	4.90	12.88	15.51	0.06	0.15	0	Negligible
Queensway eastern end																
R6	389320	411373.09	1.5	19.26	18.22	28.15	8.87	12.88	17.61	9.08	12.88	17.71	0.10	0.25	0	Negligible
R7	389336	411387.09	1.5	19.86	18.22	28.45	9.15	12.88	17.75	9.33	12.88	17.84	0.09	0.23	0	Negligible
R8	389349.5	411397.09	1.5	19.68	18.22	28.36	9.07	12.88	17.71	9.24	12.88	17.8	0.09	0.23	0	Negligible
R9	389362.81	411406.19	1.5	19.00	18.22	28.02	8.75	12.88	17.54	8.91	12.88	17.62	0.08	0.20	0	Negligible
R10	389463.81	411465.19	1.5	12.40	18.22	24.71	5.69	12.88	15.93	5.79	12.88	15.98	0.05	0.13	0	Negligible
R11	389480.5	411474.41	1.5	8.15	18.22	22.52	3.74	12.88	14.9	3.81	12.88	14.93	0.03	0.07	0	Negligible
R12	389465.59	411501.31	1.5	8.83	18.22	22.88	4.05	12.88	15.06	4.13	12.88	15.1	0.04	0.10	0	Negligible
R13	389435.41	411485.81	1.5	17.05	18.22	27.05	7.81	12.88	17.05	7.94	12.88	17.12	0.07	0.18	0	Negligible
R14	389361.19	411442.19	1.5	22.03	18.22	29.51	10.10	12.88	18.25	10.27	12.88	18.33	0.08	0.20	0	Negligible
R15	389325.09	411430.19	1.5	19.32	18.22	28.18	8.88	12.88	17.61	9.05	12.88	17.7	0.09	0.23	0	Negligible
R16	389309.5	411421.41	1.5	20.31	18.22	28.66	9.33	12.88	17.84	9.53	12.88	17.95	0.11	0.27	0	Negligible
R17	389289.41	411415.5	1.5	22.22	18.22	29.6	10.20	12.88	18.3	10.45	12.88	18.43	0.13	0.32	0	Negligible
Edinburgh Way																
R18	389269	411416.41	1.5	24.63	18.22	30.77	11.30	12.88	18.87	11.60	12.88	19.02	0.15	0.37	0	Negligible
R19	389251.41	411428.81	1.5	24.45	18.22	30.68	11.22	12.88	18.82	11.52	12.88	18.98	0.16	0.40	0	Negligible
R20	389237.31	411444.09	1.5	24.10	18.22	30.51	11.05	12.88	18.74	11.34	12.88	18.89	0.15	0.38	0	Negligible
R21	389218.31	411462.69	1.5	24.74	18.22	30.82	11.34	12.88	18.88	11.62	12.88	19.03	0.15	0.38	0	Negligible

R2392 Trows Farm
Appendix B V4 Summary of ADMS-Roads Results
NO₂

				2018 Scenario A-Baseline			2026 Scenario B-Do Nothing			2026 Scenario C-Do Something						
Receptor Name	X	Y	Z	Modelled Road-NO _x	Backgrou nd NO ₂ ¹	Total NO ₂ ²	Modelled Road-NO _x	Backgrou nd NO ₂ ¹	Total NO ₂ ²	Modelled Road-NO _x	Backgrou nd NO ₂ ¹	Total NO ₂ ²	Absolute change	% change NO ₂	% rounded	Impact descriptor
Queensway adjacent to Cown Top Lane																
R22	389014.91	411194.09	1.5	43.03	18.22	39.29	19.87	12.88	23.21	20.90	12.88	23.72	0.51	1.28	1	Negligible
R23	389007.81	411189	1.5	41.83	18.22	38.75	19.34	12.88	22.94	20.48	12.88	23.5	0.56	1.40	1	Negligible
R24	388996.09	411181.41	1.5	39.85	18.35	37.99	18.43	13.29	22.88	19.83	13.29	23.58	0.70	1.75	2	Negligible
R25	388984.91	411173.91	1.5	37.03	18.35	36.7	17.19	13.29	22.26	18.52	13.29	22.93	0.67	1.68	2	Negligible
R26	388972.5	411165	1.5	36.42	18.35	36.43	17.01	13.29	22.17	18.19	13.29	22.76	0.59	1.48	1	Negligible
R27	388958.59	411154.81	1.5	36.10	18.35	36.28	16.92	13.29	22.12	18.04	13.29	22.68	0.56	1.40	1	Negligible
R28	388947	411147	1.5	34.83	18.35	35.7	16.35	13.29	21.84	17.42	13.29	22.37	0.53	1.33	1	Negligible
R29	388934.19	411138.69	1.5	32.88	18.35	34.8	15.44	13.29	21.38	16.44	13.29	21.88	0.50	1.25	1	Negligible
R30	388919.5	411129.31	1.5	30.65	18.35	33.75	14.40	13.29	20.85	15.32	13.29	21.32	0.47	1.18	1	Negligible
Queensway adjacent to Malcolm Street																
R31	388874.59	411085.5	1.5	20.93	18.35	29.09	9.80	13.29	18.49	10.41	13.29	18.81	0.32	0.80	1	Negligible
R32	388858.19	411075.59	1.5	21.65	18.35	29.44	10.16	13.29	18.68	10.81	13.29	19.01	0.33	0.83	1	Negligible
Queensway adjacent to Sherwood Street																
R33	388708.59	410970.5	1.5	18.63	18.37	27.98	8.74	13.13	17.78	9.28	13.13	18.06	0.28	0.70	1	Negligible
R34	388718.31	410964.41	1.5	12.94	18.37	25.13	6.02	13.13	16.35	6.36	13.13	16.53	0.18	0.45	0	Negligible
R35	388724.69	410959.91	1.5	11.47	18.37	24.38	5.31	13.13	15.98	5.61	13.13	16.14	0.16	0.40	0	Negligible
Queensway between Sherwood and Albion Street																
R36	388486	410614.19	1.5	15.14	18.37	26.24	6.94	13.13	16.84	7.26	13.13	17.01	0.17	0.43	0	Negligible
R37	388469	410608.59	1.5	22.34	18.37	29.8	10.39	13.13	18.64	10.95	13.13	18.93	0.29	0.72	1	Negligible
R38	388460.59	410593.09	1.5	23.63	18.37	30.43	11.00	13.13	18.95	11.60	13.13	19.26	0.31	0.78	1	Negligible
R39	388453.59	410575.19	1.5	22.11	18.37	29.69	10.25	13.13	18.57	10.78	13.13	18.84	0.27	0.67	1	Negligible
R40	388444.91	410557.09	1.5	22.72	18.37	29.99	10.53	13.13	18.71	11.06	13.13	18.99	0.28	0.70	1	Negligible
R41	388448.31	410527.41	1.5	16.44	18.37	26.89	7.50	13.13	17.13	7.80	13.13	17.29	0.16	0.40	0	Negligible
Albion Street																
R42	388422.09	410483.31	1.5	20.20	18.37	28.76	9.25	13.13	18.05	9.60	13.13	18.23	0.18	0.45	0	Negligible
R43	388440.91	410471.09	1.5	16.01	18.37	26.68	7.24	13.13	17	7.46	13.13	17.11	0.11	0.27	0	Negligible
R44	388455.59	410463.41	1.5	14.57	18.37	25.95	6.55	13.13	16.63	6.73	13.13	16.73	0.10	0.25	0	Negligible
R45	388468.91	410456.59	1.5	13.72	18.37	25.53	6.14	13.13	16.42	6.30	13.13	16.5	0.08	0.20	0	Negligible

R2392 Trows Farm
Appendix B V4 Summary of ADMS-Roads Results
NO₂

2018 Scenario A-Baseline							2026 Scenario B-Do Nothing			2026 Scenario C-Do Something						
Receptor Name	X	Y	Z	Modelled Road-NO _x	Backgrou nd NO ₂ ¹	Total NO ₂ ²	Modelled Road-NO _x	Backgrou nd NO ₂ ¹	Total NO ₂ ²	Modelled Road-NO _x	Backgrou nd NO ₂ ¹	Total NO ₂ ²	Absolute change	% change NO ₂	% rounded	Impact descriptor
Manchester Road N of Queensway																
R46	388344.19	410505.69	1.5	30.82	18.37	33.85	14.24	13.13	20.62	14.60	13.13	20.8	0.18	0.45	0	Negligible
R47	388350.41	410492.91	1.5	29.32	18.37	33.15	13.51	13.13	20.24	13.84	13.13	20.41	0.17	0.43	0	Negligible
R48	388357	410477.59	1.5	29.54	18.37	33.25	13.59	13.13	20.28	13.91	13.13	20.45	0.17	0.42	0	Negligible
R49	388362.81	410463.59	1.5	31.91	18.37	34.36	14.69	13.13	20.84	15.04	13.13	21.02	0.18	0.45	0	Negligible
Manchester Road S of Queensway																
R50	388369.69	410444.69	1.5	37.06	18.37	36.74	17.09	13.13	22.05	17.52	13.13	22.27	0.22	0.55	1	Negligible
R51	388371.19	410436.19	1.5	34.73	18.37	35.67	15.96	13.13	21.49	16.38	13.13	21.7	0.21	0.53	1	Negligible
R52	388361.09	410432.59	1.5	23.02	18.37	30.13	10.46	13.13	18.68	10.71	13.13	18.8	0.12	0.30	0	Negligible
R53	388372.81	410423.19	1.5	31.32	18.37	34.09	14.32	13.13	20.66	14.67	13.13	20.83	0.17	0.42	0	Negligible
R54	388375.31	410410.69	1.5	30.93	18.37	33.9	14.12	13.13	20.55	14.45	13.13	20.72	0.17	0.42	0	Negligible
R55	388380.5	410389.19	1.5	31.93	18.37	34.37	14.55	13.13	20.78	14.89	13.13	20.94	0.16	0.40	0	Negligible
Grosvenor Street																
R56	388409	410406.09	1.5	21.64	18.37	29.46	9.78	13.13	18.32	10.01	13.13	18.44	0.12	0.30	0	Negligible
R57	388418.69	410400.81	1.5	19.46	18.37	28.39	8.76	13.13	17.79	8.96	13.13	17.89	0.10	0.25	0	Negligible
Manchester Road S of Queensway																
R58	388383.81	410366.69	1.5	29.68	18.37	33.32	13.48	13.13	20.23	13.77	13.13	20.38	0.15	0.37	0	Negligible
R59	388391.41	410338.31	1.5	31.42	18.37	34.13	14.25	13.13	20.62	14.55	13.13	20.77	0.15	0.37	0	Negligible
R60	388399.59	410368.59	1.5	33.48	18.37	35.09	15.25	13.13	21.13	15.60	13.13	21.3	0.17	0.43	0	Negligible
R61	388403.5	410352.81	1.5	32.67	18.37	34.72	14.85	13.13	20.93	15.18	13.13	21.09	0.16	0.40	0	Negligible
R62	388407.69	410336	1.5	32.39	18.37	34.58	14.70	13.13	20.85	15.02	13.13	21.01	0.16	0.40	0	Negligible
R63	388410.5	410323.19	1.5	32.75	18.37	34.75	14.86	13.13	20.93	15.17	13.13	21.09	0.16	0.40	0	Negligible
R64	388397.69	410312.31	1.5	32.48	18.37	34.63	14.72	13.13	20.86	15.02	13.13	21.01	0.15	0.38	0	Negligible
R65	388402.59	410288.59	1.5	32.17	18.37	34.48	14.54	13.13	20.77	14.83	13.13	20.92	0.15	0.38	0	Negligible
R66	388408.09	410272.81	1.5	36.27	18.37	36.38	16.43	13.13	21.72	16.76	13.13	21.89	0.17	0.43	0	Negligible
R67	388410.09	410262.5	1.5	35.85	18.37	36.18	16.22	13.13	21.62	16.54	13.13	21.78	0.16	0.40	0	Negligible

R2392 Trows Farm
Appendix B V4 Summary of ADMS-Roads Results
NO₂

				2018 Scenario A-Baseline			2026 Scenario B-Do Nothing			2026 Scenario C-Do Something						
Receptor Name	X	Y	Z	Modelled Road-NO _x	Background NO ₂ ¹	Total NO ₂ ²	Modelled Road-NO _x	Background NO ₂ ¹	Total NO ₂ ²	Modelled Road-NO _x	Background NO ₂ ¹	Total NO ₂ ²	Absolute change	% change NO ₂	% rounded	Impact descriptor
Manchester Road N																
R68	388253.09	410603.09	1.5	26.23	18.37	31.68	12.19	13.13	19.57	12.52	13.13	19.73	0.16	0.40	0	Negligible
R69	388225.91	410629.91	1.5	26.00	18.37	31.57	12.10	13.13	19.52	12.42	13.13	19.69	0.17	0.43	0	Negligible
R70	388199	410655.5	1.5	23.58	18.37	30.41	10.97	13.13	18.94	11.26	13.13	19.09	0.15	0.37	0	Negligible
R71	388246.09	410627.5	1.5	32.99	18.37	34.87	15.43	13.13	21.22	15.86	13.13	21.44	0.22	0.55	1	Negligible
R72	388228	410647.41	1.5	28.25	18.37	32.64	13.18	13.13	20.08	13.54	13.13	20.26	0.18	0.45	0	Negligible
R73	388211.59	410662.69	1.5	28.38	18.37	32.7	13.26	13.13	20.11	13.62	13.13	20.3	0.19	0.48	0	Negligible
Manchester Road S of Raglan St																
R74	388427.19	410183.19	1.5	38.31	18.37	37.31	17.23	13.13	22.13	17.55	13.13	22.29	0.16	0.40	0	Negligible
R75	388438.59	410125.09	1.5	39.44	18.37	37.82	17.62	13.13	22.32	17.92	13.13	22.47	0.15	0.37	0	Negligible
R76	388459.09	410091.41	1.5	44.19	18.37	39.94	19.71	13.13	23.37	20.05	13.13	23.53	0.16	0.40	0	Negligible
R77	388452.69	410067.69	1.5	46.88	18.37	41.12	20.88	13.13	23.94	21.22	13.13	24.11	0.17	0.42	0	Negligible
R78	388457.81	410037.19	1.5	45.92	18.37	40.7	20.26	13.13	23.64	20.55	13.13	23.78	0.14	0.35	0	Negligible
R79	388473.91	410035.69	1.5	46.41	18.37	40.92	20.45	13.13	23.73	20.75	13.13	23.88	0.15	0.37	0	Negligible
R80	388473.69	409954	1.5	63.91	22.13	51.64	27.54	14.70	28.65	27.80	14.70	28.78	0.13	0.33	0	Negligible
R81	388494.19	409940.5	1.5	80.16	22.13	58.03	34.37	14.70	31.85	34.67	14.70	31.99	0.14	0.35	0	Negligible
R82	388494.81	409939	1.5	81.42	22.13	58.51	34.87	14.70	32.08	35.17	14.70	32.22	0.14	0.35	0	Negligible
R83	388509.69	409860.5	1.5	74.47	22.13	55.83	32.08	14.70	30.79	32.39	14.70	30.94	0.15	0.38	0	Negligible
R84	388515.5	409835.41	1.5	54.71	22.13	47.86	23.83	14.70	26.88	24.11	14.70	27.01	0.13	0.33	0	Negligible
R85	388502.59	409827.09	1.5	49.72	22.13	45.75	21.56	14.70	25.77	21.79	14.70	25.89	0.12	0.30	0	Negligible
R86	388509.81	409796.59	1.5	34.87	22.13	39.22	15.10	14.70	22.57	15.26	14.70	22.65	0.08	0.20	0	Negligible
Colm Top Lane																
R87	389035.59	410604.69	1.5	6.83	21.46	25.03	3.02	14.43	16.05	3.30	14.43	16.2	0.15	0.37	0	Negligible
02a	388537	409942	1.5	83.50	22.13	59.3	35.07	14.70	32.17	35.22	14.70	32.24	0.07	0.18	0	Negligible
03a	388581	409797	1.5	23.74	22.13	34.05	10.10	14.70	20.02	10.16	14.70	20.06	0.04	0.10	0	Negligible
max				83.50	22.13	59.30		14.70	32.17	35.22	14.70	32.24	0.70	1.75		0.00

Notes:

all concentrations in µg/m³

- Defra predicted background NO₂ concentrations for grid square in which receptor located
- NO₂ calculated using Defra 'NO_x to NO₂' Calculator (version 8.0, August 2020)
- All other urban UK traffic

				2018			2026			2026					
				Scenario A-Baseline			Scenario B-Do Nothing			Scenario C-Do Something					
Receptor Name	X	Y	Z	Modelled PM ₁₀	Background PM ₁₀	Total PM ₁₀	Modelled PM ₁₀	Background PM ₁₀	Total PM ₁₀	Modelled PM ₁₀	Background PM ₁₀	Total PM ₁₀	Absolute change	% change PM ₁₀	Impact descriptor
Queen's Drive															
R1	389120.59	411202.31	1.5	1.90	12.66	14.56	1.76	11.64	13.40	1.82	11.64	13.46	0.06	0	Negligible
R2	389131.81	411226.41	1.5	1.81	12.66	14.47	1.70	11.64	13.34	1.77	11.64	13.41	0.07	0	Negligible
R3	389156.81	411250.59	1.5	1.65	12.66	14.31	1.57	11.64	13.21	1.64	11.64	13.28	0.06	0	Negligible
R4	389190	411270.69	1.5	1.46	12.66	14.12	1.41	11.64	13.05	1.46	11.64	13.10	0.06	0	Negligible
R5	389341.09	411306.31	1.5	0.83	12.66	13.49	0.81	11.64	12.45	0.84	11.64	12.48	0.02	0	Negligible
Queensway eastern end															
R6	389320	411373.09	1.5	1.74	12.66	14.40	1.73	11.64	13.37	1.77	11.64	13.41	0.04	0	Negligible
R7	389336	411387.09	1.5	1.81	12.66	14.47	1.80	11.64	13.44	1.84	11.64	13.48	0.04	0	Negligible
R8	389349.5	411397.09	1.5	1.80	12.66	14.46	1.80	11.64	13.44	1.83	11.64	13.47	0.03	0	Negligible
R9	389362.81	411406.19	1.5	1.74	12.66	14.40	1.74	11.64	13.38	1.77	11.64	13.41	0.03	0	Negligible
R10	389463.81	411465.19	1.5	1.13	12.66	13.79	1.12	11.64	12.76	1.14	11.64	12.78	0.02	0	Negligible
R11	389480.5	411474.41	1.5	0.71	12.66	13.37	0.70	11.64	12.34	0.72	11.64	12.36	0.01	0	Negligible
R12	389465.59	411501.31	1.5	0.78	12.66	13.44	0.77	11.64	12.41	0.79	11.64	12.43	0.01	0	Negligible
R13	389435.41	411485.81	1.5	1.59	12.66	14.25	1.58	11.64	13.22	1.61	11.64	13.25	0.02	0	Negligible
R14	389361.19	411442.19	1.5	2.05	12.66	14.71	2.05	11.64	13.69	2.08	11.64	13.72	0.03	0	Negligible
R15	389325.09	411430.19	1.5	1.77	12.66	14.43	1.76	11.64	13.40	1.79	11.64	13.43	0.03	0	Negligible
R16	389309.5	411421.41	1.5	1.86	12.66	14.52	1.85	11.64	13.49	1.89	11.64	13.53	0.04	0	Negligible
R17	389289.41	411415.5	1.5	2.04	12.66	14.70	2.03	11.64	13.67	2.08	11.64	13.72	0.05	0	Negligible
Edinburgh Way															
R18	389269	411416.41	1.5	2.29	12.66	14.95	2.28	11.64	13.92	2.34	11.64	13.98	0.06	0	Negligible
R19	389251.41	411428.81	1.5	2.29	12.66	14.95	2.28	11.64	13.92	2.34	11.64	13.98	0.06	0	Negligible
R20	389237.31	411444.09	1.5	2.26	12.66	14.92	2.26	11.64	13.90	2.32	11.64	13.96	0.06	0	Negligible
R21	389218.31	411462.69	1.5	2.34	12.66	15.00	2.33	11.64	13.97	2.39	11.64	14.03	0.06	0	Negligible
Queensway adjacent to Cown Top Lane															
R22	389014.91	411194.09	1.5	3.12	12.66	15.78	3.00	11.64	14.64	3.20	11.64	14.84	0.20	0	Negligible
R23	389007.81	411189	1.5	3.10	12.66	15.76	3.00	11.64	14.64	3.22	11.64	14.86	0.22	1	Negligible
R24	388996.09	411181.41	1.5	3.04	12.16	15.20	2.95	11.15	14.10	3.23	11.15	14.38	0.28	1	Negligible
R25	388984.91	411173.91	1.5	2.87	12.16	15.03	2.80	11.15	13.95	3.07	11.15	14.22	0.27	1	Negligible
R26	388972.5	411165	1.5	2.91	12.16	15.07	2.86	11.15	14.01	3.10	11.15	14.25	0.24	1	Negligible
R27	388958.59	411154.81	1.5	2.97	12.16	15.13	2.93	11.15	14.08	3.16	11.15	14.31	0.23	1	Negligible
R28	388947	411147	1.5	2.90	12.16	15.06	2.87	11.15	14.02	3.10	11.15	14.25	0.22	1	Negligible
R29	388934.19	411138.69	1.5	2.77	12.16	14.93	2.74	11.15	13.89	2.95	11.15	14.10	0.21	1	Negligible
R30	388919.5	411129.31	1.5	2.60	12.16	14.76	2.58	11.15	13.73	2.77	11.15	13.92	0.19	0	Negligible

				2018			2026			2026					
				Scenario A-Baseline			Scenario B-Do Nothing			Scenario C-Do Something					
Receptor Name	X	Y	Z	Modelled PM ₁₀	Background PM ₁₀	Total PM ₁₀	Modelled PM ₁₀	Background PM ₁₀	Total PM ₁₀	Modelled PM ₁₀	Background PM ₁₀	Total PM ₁₀	Absolute change	% change PM ₁₀	Impact descriptor
Queensway adjacent to Malcolm Street															
R31	388874.59	411085.5	1.5	1.75	12.16	13.91	1.73	11.15	12.88	1.86	11.15	13.01	0.13	0	Negligible
R32	388858.19	411075.59	1.5	1.85	12.16	14.01	1.84	11.15	12.99	1.98	11.15	13.13	0.14	0	Negligible
Queensway adjacent to Sherwood Street															
R33	388708.59	410970.5	1.5	1.68	12.55	14.23	1.67	11.54	13.21	1.79	11.54	13.33	0.12	0	Negligible
R34	388718.31	410964.41	1.5	1.10	12.55	13.65	1.09	11.54	12.63	1.16	11.54	12.70	0.07	0	Negligible
R35	388724.69	410959.91	1.5	0.95	12.55	13.50	0.93	11.54	12.47	1.00	11.54	12.54	0.06	0	Negligible
Queensway between Sherwood and Albion Street															
R36	388486	410614.19	1.5	1.26	12.55	13.81	1.25	11.54	12.79	1.32	11.54	12.86	0.07	0	Negligible
R37	388469	410608.59	1.5	1.99	12.55	14.54	1.98	11.54	13.52	2.10	11.54	13.64	0.12	0	Negligible
R38	388460.59	410593.09	1.5	2.11	12.55	14.66	2.11	11.54	13.65	2.24	11.54	13.78	0.13	0	Negligible
R39	388453.59	410575.19	1.5	1.95	12.55	14.50	1.94	11.54	13.48	2.05	11.54	13.59	0.11	0	Negligible
R40	388444.91	410557.09	1.5	2.00	12.55	14.55	1.99	11.54	13.53	2.11	11.54	13.65	0.11	0	Negligible
R41	388448.31	410527.41	1.5	1.35	12.55	13.90	1.33	11.54	12.87	1.39	11.54	12.93	0.06	0	Negligible
Albion Street															
R42	388422.09	410483.31	1.5	1.71	12.55	14.26	1.69	11.54	13.23	1.76	11.54	13.30	0.07	0	Negligible
R43	388440.91	410471.09	1.5	1.27	12.55	13.82	1.25	11.54	12.79	1.30	11.54	12.84	0.05	0	Negligible
R44	388455.59	410463.41	1.5	1.12	12.55	13.67	1.09	11.54	12.63	1.13	11.54	12.67	0.04	0	Negligible
R45	388468.91	410456.59	1.5	1.03	12.55	13.58	1.00	11.54	12.54	1.03	11.54	12.57	0.03	0	Negligible
Manchester Road N of Queensway															
R46	388344.19	410505.69	1.5	2.79	12.55	15.34	2.78	11.54	14.32	2.85	11.54	14.39	0.08	0	Negligible
R47	388350.41	410492.91	1.5	2.63	12.55	15.18	2.62	11.54	14.16	2.69	11.54	14.23	0.07	0	Negligible
R48	388357	410477.59	1.5	2.65	12.55	15.20	2.63	11.54	14.17	2.69	11.54	14.23	0.07	0	Negligible
R49	388362.81	410463.59	1.5	2.87	12.55	15.42	2.86	11.54	14.40	2.93	11.54	14.47	0.07	0	Negligible
Manchester Road S of Queensway															
R50	388369.69	410444.69	1.5	3.38	12.55	15.93	3.36	11.54	14.90	3.45	11.54	14.99	0.09	0	Negligible
R51	388371.19	410436.19	1.5	3.14	12.55	15.69	3.12	11.54	14.66	3.21	11.54	14.75	0.09	0	Negligible
R52	388361.09	410432.59	1.5	1.96	12.55	14.51	1.93	11.54	13.47	1.98	11.54	13.52	0.05	0	Negligible
R53	388372.81	410423.19	1.5	2.78	12.55	15.33	2.76	11.54	14.30	2.83	11.54	14.37	0.07	0	Negligible
R54	388375.31	410410.69	1.5	2.73	12.55	15.28	2.71	11.54	14.25	2.78	11.54	14.32	0.07	0	Negligible
R55	388380.5	410389.19	1.5	2.82	12.55	15.37	2.79	11.54	14.33	2.86	11.54	14.40	0.07	0	Negligible

				2018			2026			2026					
				Scenario A-Baseline			Scenario B-Do Nothing			Scenario C-Do Something					
Receptor Name	X	Y	Z	Modelled PM ₁₀	Background PM ₁₀	Total PM ₁₀	Modelled PM ₁₀	Background PM ₁₀	Total PM ₁₀	Modelled PM ₁₀	Background PM ₁₀	Total PM ₁₀	Absolute change	% change PM ₁₀	Impact descriptor
Grosvenor Street															
R56	388409	410406.09	1.5	1.79	12.55	14.34	1.76	11.54	13.30	1.81	11.54	13.35	0.05	0	Negligible
R57	388418.69	410400.81	1.5	1.57	12.55	14.12	1.54	11.54	13.08	1.58	11.54	13.12	0.04	0	Negligible
Manchester Road S of Queensway															
R58	388383.81	410366.69	1.5	2.57	12.55	15.12	2.54	11.54	14.08	2.60	11.54	14.14	0.06	0	Negligible
R59	388391.41	410338.31	1.5	2.72	12.55	15.27	2.69	11.54	14.23	2.75	11.54	14.29	0.06	0	Negligible
R60	388399.59	410368.59	1.5	2.95	12.55	15.50	2.92	11.54	14.46	3.00	11.54	14.54	0.07	0	Negligible
R61	388403.5	410352.81	1.5	2.86	12.55	15.41	2.83	11.54	14.37	2.89	11.54	14.43	0.07	0	Negligible
R62	388407.69	410336	1.5	2.81	12.55	15.36	2.78	11.54	14.32	2.84	11.54	14.38	0.07	0	Negligible
R63	388410.5	410323.19	1.5	2.84	12.55	15.39	2.80	11.54	14.34	2.87	11.54	14.41	0.07	0	Negligible
R64	388397.69	410312.31	1.5	2.80	12.55	15.35	2.76	11.54	14.30	2.83	11.54	14.37	0.06	0	Negligible
R65	388402.59	410288.59	1.5	2.74	12.55	15.29	2.70	11.54	14.24	2.76	11.54	14.30	0.06	0	Negligible
R66	388408.09	410272.81	1.5	3.13	12.55	15.68	3.09	11.54	14.63	3.17	11.54	14.71	0.07	0	Negligible
R67	388410.09	410262.5	1.5	3.08	12.55	15.63	3.04	11.54	14.58	3.11	11.54	14.65	0.07	0	Negligible
Manchester Road N															
R68	388253.09	410603.09	1.5	2.39	12.55	14.94	2.38	11.54	13.92	2.45	11.54	13.99	0.07	0	Negligible
R69	388225.91	410629.91	1.5	2.38	12.55	14.93	2.37	11.54	13.91	2.44	11.54	13.98	0.07	0	Negligible
R70	388199	410655.5	1.5	2.15	12.55	14.70	2.14	11.54	13.68	2.20	11.54	13.74	0.06	0	Negligible
R71	388246.09	410627.5	1.5	3.09	12.55	15.64	3.08	11.54	14.62	3.17	11.54	14.71	0.09	0	Negligible
R72	388228	410647.41	1.5	2.62	12.55	15.17	2.61	11.54	14.15	2.69	11.54	14.23	0.08	0	Negligible
R73	388211.59	410662.69	1.5	2.63	12.55	15.18	2.63	11.54	14.17	2.71	11.54	14.25	0.08	0	Negligible
Manchester Road S of Raglan St															
R74	388427.19	410183.19	1.5	3.21	12.55	15.76	3.15	11.54	14.69	3.22	11.54	14.76	0.07	0	Negligible
R75	388438.59	410125.09	1.5	3.20	12.55	15.75	3.12	11.54	14.66	3.18	11.54	14.72	0.06	0	Negligible
R76	388459.09	410091.41	1.5	3.56	12.55	16.11	3.47	11.54	15.01	3.54	11.54	15.08	0.07	0	Negligible
R77	388452.69	410067.69	1.5	3.76	12.55	16.31	3.66	11.54	15.20	3.73	11.54	15.27	0.07	0	Negligible
R78	388457.81	410037.19	1.5	3.52	12.55	16.07	3.40	11.54	14.94	3.46	11.54	15.00	0.06	0	Negligible
R79	388473.91	410035.69	1.5	3.53	12.55	16.08	3.41	11.54	14.95	3.47	11.54	15.01	0.06	0	Negligible
R80	388473.69	409954	1.5	4.39	13.15	17.54	4.13	12.15	16.28	4.18	12.15	16.33	0.05	0	Negligible
R81	388494.19	409940.5	1.5	5.39	13.15	18.54	5.04	12.15	17.19	5.10	12.15	17.25	0.06	0	Negligible
R82	388494.81	409939	1.5	5.44	13.15	18.59	5.08	12.15	17.23	5.14	12.15	17.29	0.06	0	Negligible
R83	388509.69	409860.5	1.5	5.13	13.15	18.28	4.83	12.15	16.98	4.89	12.15	17.04	0.06	0	Negligible
R84	388515.5	409835.41	1.5	3.97	13.15	17.12	3.79	12.15	15.94	3.84	12.15	15.99	0.06	0	Negligible
R85	388502.59	409827.09	1.5	3.53	13.15	16.68	3.34	12.15	15.49	3.39	12.15	15.54	0.05	0	Negligible
R86	388509.81	409796.59	1.5	2.42	13.15	15.57	2.29	12.15	14.44	2.32	12.15	14.47	0.03	0	Negligible

				2018			2026			2026					
				Scenario A-Baseline			Scenario B-Do Nothing			Scenario C-Do Something					
Receptor Name	X	Y	Z	Modelled PM ₁₀	Background PM ₁₀	Total PM ₁₀	Modelled PM ₁₀	Background PM ₁₀	Total PM ₁₀	Modelled PM ₁₀	Background PM ₁₀	Total PM ₁₀	Absolute change	% change PM ₁₀	Impact descriptor
Colm Top Lane															
R87	389035.59	410604.69	1.5	0.41	13.38	13.79	0.38	12.37	12.75	0.44	12.37	12.81	0.06	0	Negligible
Diffusion Tubes															
02a	388537	409942	1.5	4.97	13.15	18.12	4.51	12.15	16.66	4.53	12.15	16.68	0.02	0	Negligible
03a	388581	409797	1.5	1.47	13.15	14.62	1.35	12.15	13.50	1.36	12.15	13.51	0.01	0	Negligible

Notes:

all concentrations in µg/m³

1: Defra predicted background PM10 concentrations for grid square in which receptor located

2: All other urban UK traffic

APPENDIX C

ADMS-Roads Modelling Results – Ecological

2026 Scenario B-Do Nothing												2026 Scenario C-Do Something											
Receptor Name	X	Y	Z	Modelled Road-NO _x	Backgrou nd NO _x ¹	Adjusted Backgrou nd NO _x ²	Total NO _x ³	Backgrou nd NO ₂ ¹	Adjusted Backgrou nd NO ₂ ²	Road NO ₂ ⁴	Road kg N/ha/yr ⁵	Backgrou nd N/kg/ha ⁶	Total N/kg/ha	Modelled Road-NO _x	Backgrou nd NO _x ¹	Adjusted Backgrou nd NO _x ²	Total NO _x ³	Backgrou nd NO ₂ ¹	Adjusted Backgrou nd NO ₂ ²	Road NO ₂ ⁴	Road kg N/ha/yr ⁵	Backgrou nd N/kg/ha ⁶	Total N/kg/ha
Rochdale Canal SAC																							
E1	389396.81	411621	0	2.34	17.35	16.55	18.89	12.88	12.35	1.27	0.18	25.3	25.48	2.39	17.35	16.55	18.94	12.88	12.35	1.29	0.19	25.30	25.49
E2	389315.41	411580.81	0	3.64	17.35	16.55	20.19	12.88	12.35	1.97	0.28	25.3	25.58	3.72	17.35	16.55	20.27	12.88	12.35	2.01	0.29	25.30	25.59
E3	389252.5	411542.69	0	5.52	17.35	16.55	22.07	12.88	12.35	2.97	0.43	25.3	25.73	5.64	17.35	16.55	22.19	12.88	12.35	3.03	0.44	25.30	25.74
E4	389199.5	411508.81	0	9.40	17.35	16.55	25.95	12.88	12.35	5.01	0.72	25.3	26.02	9.61	17.35	16.55	26.16	12.88	12.35	5.12	0.74	25.30	26.04
E5	389060.31	411482.19	0	16.56	17.35	16.55	33.11	12.88	12.35	8.69	1.25	25.3	26.55	16.80	17.35	16.55	33.35	12.88	12.35	8.81	1.27	25.30	26.57
E6	389030.31	411430.19	0	16.88	17.35	16.55	33.43	12.88	12.35	8.85	1.27	25.3	26.57	17.14	17.35	16.55	33.69	12.88	12.35	8.98	1.29	25.30	26.59
E7	389008.5	411354.5	0	15.16	17.35	16.55	31.71	12.88	12.35	7.98	1.15	25.3	26.45	15.45	17.35	16.55	32.00	12.88	12.35	8.13	1.17	25.30	26.47
E8	388976	411289.69	0	10.71	18.01	18.01	28.72	13.29	13.29	5.67	0.82	25.3	26.12	11.02	18.01	18.01	29.03	13.29	13.29	5.83	0.84	25.30	26.14
E9	388775.09	411148.19	0	4.26	18.01	18.01	22.27	13.29	13.29	2.29	0.33	25.3	25.63	4.48	18.01	18.01	22.49	13.29	13.29	2.40	0.35	25.30	25.65
E10	388309.69	410442	0	6.50	18.01	18.01	24.51	13.29	13.29	3.47	0.50	25.3	25.80	6.63	18.01	18.01	24.64	13.29	13.29	3.54	0.51	25.30	25.81
E11	388296.41	410256.41	0	6.30	17.76	17.76	24.06	13.13	13.13	3.37	0.48	25.3	25.78	6.37	17.76	17.76	24.13	13.13	13.13	3.41	0.49	25.30	25.79
E12	388289.5	410024.69	0	9.25	17.76	17.76	27.01	13.13	13.13	4.92	0.71	25.3	26.01	9.30	17.76	17.76	27.06	13.13	13.13	4.94	0.71	25.30	26.01
E13	388332.5	409921.81	0	16.09	20.05	15.62	31.71	14.70	11.72	8.47	1.22	25.3	26.52	16.15	20.05	15.62	31.77	14.70	11.72	8.50	1.22	25.30	26.52
E14	388358	409865.81	0	38.62	20.05	15.62	54.24	14.70	11.72	19.33	2.78	25.3	28.08	38.71	20.05	15.62	54.33	14.70	11.72	19.37	2.79	25.30	28.09
E15	388280.69	409886.59	0	17.53	20.05	15.62	33.15	14.70	11.72	9.20	1.32	25.3	26.62	17.58	20.05	15.62	33.20	14.70	11.72	9.22	1.33	25.30	26.63
E16	388302.31	409712.91	0	10.21	20.05	15.62	25.83	14.70	11.72	5.45	0.78	25.3	26.08	10.24	20.05	15.62	25.86	14.70	11.72	5.46	0.79	25.30	26.09
E17	388384.81	409765.91	0	13.24	20.05	15.62	28.86	14.70	11.72	7.02	1.01	25.3	26.31	13.28	20.05	15.62	28.90	14.70	11.72	7.04	1.01	25.30	26.31
E18	388351.81	409605.09	0	5.09	20.05	15.62	20.71	14.70	11.72	2.75	0.40	25.3	25.70	5.11	20.05	15.62	20.73	14.70	11.72	2.76	0.40	25.30	25.70

- 1: Defra predicted background NO_x and NO₂ concentrations for grid square in which receptor located
- 2: Adjusted background NO_x and NO₂ with 'motorway in' component removed
Calculated using Defra NO₂ Adjustment for NO_x Sector removal Tool v8.0
- 3: Total NO_x = background NO_x + modelled road-NO_x
- 4: Road-NO₂ calculated using Defra 'NO_x to NO₂' Calculator (version 8.0, August 2020)
- 5: Calculated from modelled road-NO₂ and deposition velocity
- 6: Background N-deposition as provided by APIS for relevant 5km grid square

Where:

Deposition flux (µg/m²/s) = ground level concentration (µg/m³) x deposition velocity (m/s)

Conversion factor:

forests & similar habitats

0.29

Critical Loads - Broadleaved, mixed and

min CL

3

kg N/ha/yr

1 µg/m³ NO₂

=

0.29 kg N/ha/yr

Yew Woodland

max CL

10

kg N/ha/yr

grassland

1 µg/m³ NO₂

0.14 kg N/ha/yr

2026 Assessment													
Abmbient NOx				D-deposition									
Receptor Name	X	Y	Z	Absolute change	% Change CL	% Change CL	Absolute change	% Change CL	% Change CL	PEC %CL	% Change alternatvi e CL	% Change alternativ r CL	PEC %CL
Rochdale Canal SAC													
E1	389396.81	411621	0	0.05	0.16	0	0.003	0.10	0	850	0.029	0	255
E2	389315.41	411580.81	0	0.08	0.25	0	0.006	0.19	0	853	0.058	0	256
E3	389252.5	411542.69	0	0.12	0.39	0	0.009	0.29	0	858	0.086	0	257
E4	389199.5	411508.81	0	0.20	0.68	1	0.016	0.53	1	868	0.158	0	260
E5	389060.31	411482.19	0	0.23	0.78	1	0.017	0.58	1	886	0.173	0	266
E6	389030.31	411430.19	0	0.27	0.88	1	0.019	0.62	1	886	0.187	0	266
E7	389008.5	411354.5	0	0.29	0.97	1	0.022	0.72	1	882	0.216	0	265
E8	388976	411289.69	0	0.32	1.06	1	0.023	0.77	1	871	0.230	0	261
E9	388775.09	411148.19	0	0.22	0.72	1	0.016	0.53	1	855	0.158	0	256
E10	388309.69	410442	0	0.13	0.43	0	0.010	0.34	0	860	0.101	0	258
E11	388296.41	410256.41	0	0.07	0.23	0	0.006	0.19	0	860	0.058	0	258
E12	388289.5	410024.69	0	0.05	0.16	0	0.003	0.10	0	867	0.029	0	260
E13	388332.5	409921.81	0	0.06	0.19	0	0.004	0.14	0	884	0.043	0	265
E14	388358	409865.81	0	0.09	0.30	0	0.006	0.19	0	936	0.058	0	281
E15	388280.69	409886.59	0	0.05	0.16	0	0.003	0.10	0	888	0.029	0	266
E16	388302.31	409712.91	0	0.03	0.09	0	0.001	0.05	0	870	0.014	0	261
E17	388384.81	409765.91	0	0.04	0.13	0	0.003	0.10	0	877	0.029	0	263
E18	388351.81	409605.09	0	0.02	0.06	0	0.001	0.05	0	857	0.014	0	257

APPENDIX D

Parameters Plan

Project Title
Cowm Top Lane, Castleton

e*SCAPE Job No.
019-019

Client
Barratt Homes & GLP Ltd

Drawing Number
019-019-003

Revision
REV -

Drawing Title
Parameters Plan

Scale
1:2,500 @ A3

Date
August '21

Key



Application Boundary



Indicative Primary Access Route



Indicative Emergency Vehicle, Pedestrian and Cycle Route



Proposed Pedestrian Links (indicative)



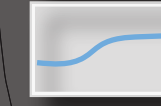
Existing Footpath/Cycle Links



Development Parcels (Maximum 3 Storeys)



Proposed Attenuation Basin



Retained Watercourse



Proposed Planted Amenity Buffer to Site Edges



Primary Vehicle Access



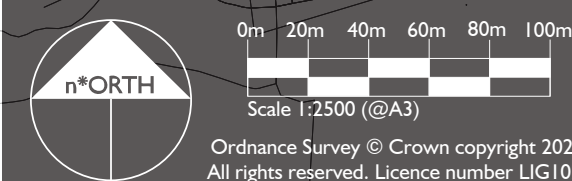
Indicative Emergency Access Only



Indicative Pedestrian & Cycle Gateway



Public Open Space



Indicative Emergency Access (alongside pedestrian and cycle access) Only

Attenuation Basin

Attenuation Basin

POS

POS

POS

POS

Primary Access

Primary Access

Leander Drive

Trows Lane

A627044