

Appendix 10.1 - Air Quality Supporting Information

Reference: 4805

Date: 10th April 2025



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1.0 INTRODUCTION

- 1.1.1 This Technical Appendix provides supporting information used to inform the assessment. This should be read in conjunction with the Air Quality Chapter of the Environmental Statement and the other Technical Appendices.

2.0 LEGISLATION AND POLICY

2.1 Legislation

2.1.1 The Air Quality Standards Regulations (2010) and subsequent amendments include Air Quality Limit Values (AQLVs) for the following pollutants:

- Nitrogen dioxide (NO₂);
- Sulphur dioxide;
- Lead;
- Particulate matter with an aerodynamic diameter of less than 10µm (PM₁₀);
- Particulate matter with an aerodynamic diameter of less than 2.5µm (PM_{2.5});
- Benzene; and,
- Carbon monoxide.

2.1.2 Air Quality Target Values were also provided for several additional pollutants. It should be noted that the AQLV for PM_{2.5} stated in the Air Quality Standards Regulations (2010) was amended in the Environment (Miscellaneous Amendments) (EU Exit) Regulations (2020)¹.

2.1.3 The Air Quality Strategy (AQS) was produced by the Department for Environment, Food and Rural Affairs (DEFRA) and published on 28th April 2023². The document contains standards, objectives and measures for improving ambient air quality, including a number of Air Quality Objectives (AQOs). These are maximum ambient pollutant concentrations that are not to be exceeded either without exception or with a permitted number of exceedences over a specified timescale. These are generally in line with the AQLVs, although the requirements for the determination of compliance vary.

2.1.4 The Environmental Improvement Plan 2023³ was published in January 2023, providing long term and Interim Targets in order to reduce population exposure to PM_{2.5}. The Concentration Target for 2040 was subsequently adopted in the Environmental Targets (Fine Particulate Matter) (England) Regulations (2023).

¹ The Environment (Miscellaneous Amendments) (EU Exit) Regulations 2020, UK Government, 2020.

² AQS: Framework for Local Authority Delivery, DEFRA, 2023.

³ Environmental Improvement Plan 2023, DEFRA, 2023.

2.1.5 Table 10.1.1 presents the AQOs, Interim Target and Concentration Target for pollutants considered within this assessment.

Table 10.1.1 Air Quality Objectives/ Interim Target/ Concentration Target

Pollutant	Air Quality Objective/Interim Target/Concentration Target	
	Concentration (µg/m ³)	Averaging Period
NO ₂	40	Annual mean
	200	1-hour mean, not to be exceeded on more than 18 occasions per annum
PM ₁₀	40	Annual mean
	50	24-hour mean, not to be exceeded on more than 35 occasions per annum
PM _{2.5}	12 ^(a)	Annual mean
	10 ^(b)	Annual mean

Note: (a) Interim Target to be achieved by end of January 2028.

(b) Concentration Target to be achieved by end of 2040.

2.1.6 Table 10.1.2 summarises the advice provided in DEFRA guidance⁴ on where the AQOs for pollutants considered within this assessment apply.

Table 10.1.2 Examples of Where the Air Quality Objectives Apply

Averaging Period	Objective Should Apply At	Objective Should Not Apply At
Annual mean	All locations where members of the public might be regularly exposed Building façades of residential properties, schools, hospitals, care homes etc.	Building façades of offices or other places of work where members of the public do not have regular access Hotels, unless people live there as their permanent residence Gardens of residential properties Kerbside sites (as opposed to locations at the building façade), or any other location where public exposure is expected to be short term

⁴ Local Air Quality Management Technical Guidance (TG22), DEFRA, 2022.

Averaging Period	Objective Should Apply At	Objective Should Not Apply At
24-hour mean	All locations where the annual mean objective would apply, together with hotels Gardens of residential properties	Kerbside sites (as opposed to locations at the building façade), or any other location where public exposure is expected to be short term
1-hour mean	All locations where the annual mean and 24 and 8-hour mean objectives apply. Kerbside sites (for example, pavements of busy shopping streets) Those parts of car parks, bus stations and railway stations etc which are not fully enclosed, where members of the public might reasonably be expected to spend one hour or more Any outdoor locations where members of the public might reasonably be expected to spend one hour or longer	Kerbside sites where the public would not be expected to have regular access

2.2 Local Air Quality Management

- 2.2.1 Local Authorities (LAs) are required to periodically review and assess air quality within their area of jurisdiction under the system of Local Air Quality Management (LAQM). This review and assessment of air quality involves comparing present and likely future pollutant concentrations against the AQOs. If it is predicted that levels at locations of relevant exposure are likely to be exceeded, the LA is required to declare an Air Quality Management Area (AQMA). For each AQMA the LA is required to produce an Air Quality Action Plan, the objective of which is to reduce pollutant concentrations in pursuit of the AQOs.

3.0 DISPERSION MODELLING METHODOLOGY

3.1 Introduction

3.1.1 There is the potential for NO₂, PM₁₀ and PM_{2.5} concentrations to be affected by changes to traffic flows associated with the Project for Assessment. These were therefore assessed using the criteria contained within the Institute of Air Quality Management (IAQM) 'Land-Use Planning & Development Control: Planning for Air Quality'⁵ guidance. This was informed by a dispersion modelling study undertaken in accordance with the following methodology.

3.2 Modelling Scenarios

3.2.1 Dispersion modelling was undertaken to inform the following assessments:

- Assessment 1 - Effects associated with Project for Assessment; and,
- Assessment 2 - Cumulative Effect Assessment.

3.2.2 Assessment 1 comprised the following specific modelling scenarios:

- Verification - Undertaken to allow verification of model results against local monitoring data. Considered traffic flows in 2023, as well as other relevant inputs for this year;
- Do-Minimum (DM) - Traffic flows for 2039 should the Project for Assessment not be completed, inclusive of predicted growth and vehicle movements from projects included within the Development Log, with the exception of allocation JPA1.2; and,
- Do-Something (DS) - Traffic flows for 2039 should the Project for Assessment be completed, inclusive of predicted growth and vehicle movements from projects included within the Development Log, with the exception of allocation JPA1.2.

3.2.3 Assessment 2 comprised the following specific modelling scenario:

⁵ Land-Use Planning & Development Control: Planning for Air Quality, IAQM, 2017.

- DS Cumulative - Traffic flows for 2039 should the Project for Assessment be completed, inclusive of predicted growth and vehicle movements from projects included within the Development Log, including allocation JPA1.2.

3.2.4 Assessment 2 was undertaken in order to take account of cumulative air quality effects on the local road network as a result of both the Project for Assessment and the JPA1.2 allocation.

3.2.5 Details of the Cumulative Projects included in both assessments are provided in Chapter 10: Air Quality of the ES.

3.3 Assessment Considerations

3.3.1 The following considerations were made as part of the assessment to ensure robust outputs:

- As assessment year of 2039 was selected to represent the completion year of the Places for Everyone Plan (PfE)⁶. This ensured traffic associated with all relevant allocations were included in the assessment;
- Changes in traffic flows associated with highways enhancements as a result of the South Heywood Road Link and Birch Services were not included. This does not allow for improvements in junction capacities and vehicle distribution on the local road network. As such, predicted concentrations can be considered robust;
- Traffic data representing the Project for Assessment rather than solely the Proposed Scheme was utilised. This ensured the maximum impact on the road network was considered; and,
- Emission factors for 2023 were utilised within the dispersion model. This does not allow for anticipated improvements in vehicle technology up to the assessment year of 2039. As such, predicted concentrations can be considered robust.

3.4 Sensitive Receptors

3.4.1 Sensitive receptors for inclusion in the dispersion model were identified within 200m of the highway network in accordance with the guidance provided within the Design Manual

⁶ PfE Plan, GMCA, 2024.

for Roads and Bridges (DMRB)⁷ on the likely limits of pollutant dispersion from road sources. The criteria provided within DEFRA guidance⁸ on where the AQOs apply, as summarised in Table 10.1.2, was utilised to determine worst-case receptor positions in the vicinity of links likely to be affected by changes in traffic flows as a result of the Project for Assessment.

3.4.2 Reference should be made to Chapter 10: Air Quality of the ES for the assessment criteria.

3.5 Dispersion Modelling Inputs

3.5.1 The following Sections detail the dispersion modelling inputs utilised for the assessment.

Dispersion Model

3.5.2 Dispersion modelling was undertaken using the ADMS-Roads dispersion model (version 5.0.1.3). ADMS-Roads is developed by Cambridge Environmental Research Consultants (CERC) and is routinely used throughout the world for the prediction of pollutant dispersion from road sources. Modelling predictions from this software package are accepted within the UK by the Environment Agency and the Department for Environment Food and Rural Affairs (DEFRA).

3.5.3 The models required input data that details the following parameters:

- Assessment area;
- Traffic flow data;
- Vehicle emission factors;
- Spatial co-ordinates of emissions;
- Street width;
- Meteorological data;
- Roughness length (z_0); and,
- Monin-Obukhov length.

⁷ LA 105: Air Quality, National Highways, 2024.

⁸ Local Air Quality Management Technical Guidance (TG22), DEFRA, 2022.

3.5.4 Additional inputs can also be selected for within the ADMS user interface in order to take account of site-specific characteristics which may affect model outputs, such as noise barriers.

3.5.5 The relevant inputs are detailed in the following Sections.

Assessment Area

3.5.6 Dispersion modelling of pollutant concentrations was undertaken at receptors potentially sensitive to changes in road vehicle exhaust emissions, as outlined in Section 3.4.

3.5.7 Reference should be made to **Figure 10.1** for a graphical representation of the modelling extents and **Figure 10.4** for a map of the modelled receptor locations.

Traffic Flow Data

3.5.8 Traffic data for use in the assessment, including 24-hour Annual Average Daily Traffic (AADT) flows and fleet composition as Heavy Duty Vehicle (HDV) proportion, was provided by Tetra Tech, the Transport Consultants for the project.

3.5.9 A summary of the traffic data for the assessments is provided in Table 10.1.3.

Table 10.1.3 Traffic Data

Link		24-hour AADT Flow				HDV Prop. of Fleet (%)			
		Verif.	DM	DS	DS1	Verif.	DM	DS	DS1
L1	M60 Southwest of Jct 17 - Eastbound (EB)	80,712	94,306	94,324	94,435	13.67	12.86	13.28	13.26
L2	M60 Southwest of Jct 17 - Westbound (WB)	73,674	82,016	82,038	82,033	13.48	12.83	13.21	13.19
L3	M60 Northbound (NB) off slip road (Immediately west of Junction 17)	11,881	13,694	13,465	13,490	10.21	8.87	8.89	8.91

Link		24-hour AADT Flow				HDV Prop. of Fleet (%)			
		Verif.	DM	DS	DS1	Verif.	DM	DS	DS1
L4	M60 NB off slip road (Immediately west of Junction 17), Slow Phase (SP)	11,881	13,694	13,465	13,490	10.21	8.87	8.89	8.91
L5	M60 South-westbound (SWB) on slip road (Immediately west of Junction 17)	11,689	17,378	17,861	17,871	15.06	10.92	10.68	10.65
L6	M60 Jct 17 - through roads North-eastbound (NEB) between slip roads	68,831	80,611	80,859	80,945	14.27	13.54	14.01	13.99
L7	M60 Jct 17 - through roads SWB between slip roads	61,983	64,637	64,182	64,168	13.18	13.34	13.91	13.89
L8	M60 NEB on slip road (Immediately east of Junction 17)	11,638	13,672	13,174	13,395	4.19	4.32	3.92	3.83
L9	M60 Southbound (SB) off slip road (Immediately east of Junction 17), SP	11,281	12,293	12,514	12,550	4.80	4.53	4.51	4.48
L10	M60 SB off slip road (Immediately east of Junction 17)	11,281	12,293	12,514	12,550	4.80	4.53	4.51	4.48
L11	M62 west of Jct 18 - NB	80,455	93,904	93,518	93,808	12.83	12.22	12.61	12.56
L11A	M62 west of Jct 18 - NB - Noise Barrier	80,455	93,904	93,518	93,808	12.83	12.22	12.61	12.56
L11B	M62 west of Jct 18 - Slip Road to M62 - NB	80,455	93,904	93,518	93,808	12.83	12.22	12.61	12.56
L12	M62 west of Jct 18 - SB	73,264	76,930	76,696	76,717	11.89	11.93	12.37	12.35
L13	A56 Bury New Road SB (Immediately south of Junction 17)	10,609	12,161	12,091	12,139	4.06	3.88	3.92	3.89

Link		24-hour AADT Flow				HDV Prop. of Fleet (%)			
		Verif.	DM	DS	DS1	Verif.	DM	DS	DS1
L14	A56 Bury New Road (Immediately south of Junction 17)	22,750	30,089	29,539	29,750	4.01	3.88	3.73	3.75
L15	A56 Bury New Road NB (Immediately south of Junction 17)	12,141	17,928	17,448	17,611	3.97	3.88	3.61	3.66
L16	A56 Bury New Road NB (Immediately south of Junction 17), SP	12,141	17,928	17,448	17,611	3.97	3.88	3.61	3.66
L17	A56 Bury New Road NB (Immediately north of Junction 17)	19,612	21,084	21,273	21,263	7.04	6.50	6.45	6.48
L18	A56 Bury New Road NB, SP	19,612	21,084	21,273	21,263	7.04	6.50	6.45	6.48
L18A	A56 Bury New Road NB	19,612	21,084	21,273	21,263	7.04	6.50	6.45	6.48
L19	A56 Bury New Road SB	18,244	20,373	20,962	21,008	10.00	9.16	8.98	8.87
L19A	A56 Bury New Road SB, SP	18,244	20,373	20,962	21,008	10.00	9.16	8.98	8.87
L20	A56 Bury New Road SB (Immediately north of Junction 17)	18,244	20,373	20,962	21,008	10.00	9.16	8.98	8.87
L21	A56 Bury New Road SB (Immediately north of Junction 17), SP	18,244	20,373	20,962	21,008	10.00	9.16	8.98	8.87
L22	M62 NB off slip (north of M62/M66 Jct 18)	34,960	38,184	37,956	37,718	10.81	9.70	10.69	10.75
L23	M62 NB off slip to roundabout (north of M62/M66 Jct 18), SP	17,480	19,092	18,978	18,859	10.81	9.70	10.69	10.75

Link		24-hour AADT Flow				HDV Prop. of Fleet (%)			
		Verif.	DM	DS	DS1	Verif.	DM	DS	DS1
L24	M62 NB off slip to M66 (north of M62/M66 Jct 18)	17,480	19,092	18,978	18,859	10.81	9.70	10.69	10.75
L25	M62 WB on slip (west of M62/M66 Jct 18)	29,136	21,231	21,113	21,156	8.35	10.01	11.87	11.80
L26	M62 WB on slip from roundabout (west of M62/M66 Jct 18)	14,568	10,615	10,556	10,578	8.35	10.01	11.87	11.80
L27	M62 WB on slip from M60 (west of M62/M66 Jct 18)	14,568	10,615	10,556	10,578	8.35	10.01	11.87	11.80
L28	Jun 18 - M62 through roads EB between slip roads	45,496	55,720	55,562	56,090	14.38	13.94	13.91	13.77
L29	Jun 18 - M62 through roads EB between slip roads	44,099	55,808	55,932	55,938	14.28	12.70	12.57	12.56
L30	M62 EB on slip from roundabout (east of M62/M66 Jct 18)	8,916	9,309	9,383	9,465	7.42	6.04	5.47	5.56
L31	M62 EB on slip from M66 (east of M62/M66 Jct 18)	8,916	9,309	9,383	9,465	7.42	6.04	5.47	5.56
L32	M62 EB on slip (east of M62/M66 Jct 18)	17,833	18,618	18,765	18,929	7.42	6.04	5.47	5.56
L33	M62 SB off slip (east of M62/M66 Jct 18)	11,561	16,129	15,940	16,842	5.27	4.29	4.26	4.46
L34	M62 SB off slip to roundabout (east of M62/M66 Jct 18), SP	5,781	8,064	7,970	8,421	5.27	4.29	4.26	4.46
L35	M62 SB off slip to M60 (east of M62/M66 Jct 18)	5,781	8,064	7,970	8,421	5.27	4.29	4.26	4.46
L36	M62 between Jct 18 and Birch Services - EB	63,318	74,309	74,301	74,994	12.43	11.99	11.81	11.73

Link		24-hour AADT Flow				HDV Prop. of Fleet (%)			
		Verif.	DM	DS	DS1	Verif.	DM	DS	DS1
L36A	M62 between Birch Services Slip Road - EB	59,587	71,168	71,151	71,842	11.26	10.80	10.61	10.54
L36B	M62 between Birch Services and Jct 19 - EB	63,211	74,416	74,436	75,136	12.43	11.99	11.84	11.76
L37	M62 between Jct 18 and Birch Services - WB	55,661	71,937	71,872	72,780	12.41	10.82	10.73	10.69
L37A	M62 between Birch Services Slip Road - WB	51,973	67,870	67,777	68,681	11.29	9.88	9.79	9.77
L37B	M62 between Birch Services and Jct 19 - WB	55,720	72,114	72,043	72,957	12.56	10.98	10.91	10.87
L38	Jun 18 - M62 through roads SWB between slip roads	24,665	29,058	30,231	30,749	5.00	4.69	5.76	5.66
L39	Jun 18 - M62 through roads NEB between slip roads	25,426	35,501	37,166	37,437	5.88	5.53	5.89	5.83
L40	M60 NB on slip from roundabout (north of M62/M66 Jct 18)	9,498	9,795	9,834	9,864	9.03	7.84	9.67	9.66
L41	M60 NB on slip (north of M62/M66 Jct 18)	18,997	19,590	19,667	19,727	9.03	7.84	9.67	9.66
L42	M60 EB off slip to roundabout (north of M62/M66 Jct 18)	9,741	12,597	12,612	12,623	9.33	7.98	9.03	9.02
L43	M60 EB off slip (north of M62/M66 Jct 18)	19,482	25,193	25,224	25,247	9.33	7.98	9.03	9.02
L44	M66 between Jct 3 and M62 Jct 18 - NB	44,425	55,085	56,824	57,154	7.22	6.36	7.21	7.16
L45	M66 between Jct 3 and M62 Jct 18 - SB	44,147	54,251	55,455	55,996	6.91	6.22	7.25	7.18

Link		24-hour AADT Flow				HDV Prop. of Fleet (%)			
		Verif.	DM	DS	DS1	Verif.	DM	DS	DS1
L46	M60 SB on slip from roundabout (south of M62/M66 Jct 18)	3,250	4,648	4,459	4,881	5.06	4.12	4.27	4.57
L47	M60 SB on slip (south of M62/M66 Jct 18)	6,501	9,295	8,918	9,762	5.06	4.12	4.27	4.57
L48	M60 WB off slip to roundabout (south of M62/M66 Jct 18)	13,607	7,512	7,555	7,657	6.12	6.83	7.09	7.13
L49	M60 WB off slip (south of M62/M66 Jct 18)	27,215	15,025	15,110	15,314	6.12	6.83	7.09	7.13
L50	M60 between M62 Jct 18 and M60 jct 19 - EB	51,914	63,181	63,831	64,944	7.00	6.21	6.69	6.67
L51	M60 between M62 Jct 18 and M60 jct 19 - WB	52,641	50,534	52,273	52,748	6.01	5.92	6.24	6.21
L52	M60 SEB off slip (west of M60 Jct 19)	10,935	15,637	16,494	17,396	3.39	3.06	3.44	3.30
L53	M60 SEB off slip (west of M60 Jct 19), SP	10,935	15,637	16,494	17,396	3.39	3.06	3.44	3.30
L54	M60 NWB on slip (west of M60 Jct 19)	12,175	10,084	12,007	12,204	4.20	3.51	3.81	3.67
L55	M60 NWB on slip from roundabout (west of M60 Jct 19)	6,087	5,042	6,003	6,102	4.20	3.51	3.81	3.67
L56	M60 NWB on slip from A576 (west of M60 Jct 19)	6,087	5,042	6,003	6,102	4.20	3.51	3.81	3.67
L57	Jun 19 - M60 EB through road link	40,979	47,543	47,337	47,549	7.97	7.25	7.83	7.91
L58	Jun 19 - M60 WB through road link	40,470	40,456	40,273	40,552	6.54	6.51	6.95	6.95

Link		24-hour AADT Flow				HDV Prop. of Fleet (%)			
		Verif.	DM	DS	DS1	Verif.	DM	DS	DS1
L59	M60 SWB off slip to roundabout (east of M60 Jct 19), SP	9,013	11,077	11,064	11,202	3.57	3.57	3.49	3.14
L60	M60 SWB off slip (east of M60 Jct 19)	9,013	11,077	11,064	11,202	3.57	3.57	3.49	3.14
L61	M60 EB on slip from roundabout (east of M60 Jct 19)	4,718	6,266	6,472	6,483	3.06	2.95	2.63	2.11
L62	M60 EB on slip from Manchester Old Road (east of M60 Jct 19)	4,718	6,266	6,472	6,483	3.06	2.95	2.63	2.11
L63	M60 EB on slip (east of M60 Jct 19)	9,436	12,532	12,943	12,967	3.06	2.95	2.63	2.11
L64	M60 South of Jct 19 - EB	50,416	60,071	60,276	60,516	7.05	6.36	6.72	6.66
L65	M60 South of Jct 19 - WB	49,483	51,530	51,338	51,756	6.00	5.88	6.21	6.13
L66	A576 Middleton Road SWB (south of M60 Jct 19)	18,433	23,195	22,936	22,880	1.91	1.73	1.78	1.77
L67	A576 Middleton Road NWB to roundabout (south of M60 Jct 19)	10,691	11,580	12,112	12,051	2.19	1.61	1.89	1.89
L68	A576 Middleton Road NWB (south of M60 Jct 19)	21,381	23,161	24,224	24,102	2.19	1.61	1.89	1.89
L69	A576 WB (north of M60 Jct 19), SP	5,290	5,737	6,354	6,397	3.45	3.61	3.10	2.45
L70	A576 WB (north of M60 Jct 19)	10,580	11,473	12,708	12,793	3.45	3.61	3.10	2.45
L71	A576 NEB (north of M60 Jct 19), SP	11,864	15,295	16,314	17,128	3.18	3.51	3.68	3.33
L72	A576 NEB (north of M60 Jct 19)	11,864	15,295	16,314	17,128	3.18	3.51	3.68	3.33

Link		24-hour AADT Flow				HDV Prop. of Fleet (%)			
		Verif.	DM	DS	DS1	Verif.	DM	DS	DS1
L73	A576 Manchester Old Road (east of A6045/ A576 / Kelvin Avenue Jct), SP	14,696	18,520	19,499	19,486	3.52	3.54	3.84	3.52
L74	A576 Manchester Old Road (east of A6045/ A576 / Kelvin Avenue Jct)	14,696	18,520	19,499	19,486	3.52	3.54	3.84	3.52
L75	A576 Manchester Old Road (east of A6045/ A576 / Kelvin Avenue Jct) to Kemp Street, SP	14,696	18,520	19,499	19,486	3.52	3.54	3.84	3.52
L76	A576 Middleton Way, SEB	7,613	10,164	10,392	10,563	3.29	3.19	3.94	3.90
L77	A576 Middleton Way, NWB, SP	7,083	8,356	9,107	8,923	3.76	3.96	3.73	3.07
L78	A6045 Heywood Old Road (north of A6045/ A576 / Kelvin Avenue Jct), SP	10,930	12,669	13,703	14,113	2.84	4.05	3.35	2.11
L79	A6045 Heywood Old Road (north of A6045/ A576 / Kelvin Avenue Jct)	10,930	12,669	13,703	14,113	2.84	4.05	3.35	2.11
L80	A6045 Heywood Old Road (South of A6045/ Langley Lane Junction), SP	13,530	14,809	16,281	16,631	2.03	3.28	2.65	1.64
L81	A6045 Heywood Old Road (North of A6045/ Langley Lane Junction)	8,690	10,752	12,763	13,126	3.18	4.51	3.43	2.10
L82	A6045 Manchester Road (south of the A6045 Manchester Road/ Workers Way Jct), SP	4,649	6,946	8,637	9,042	3.44	4.85	3.73	2.55
L83	SHLR (A6045 to M62 J19) to Manchester Road, NB	4,041	4,777	6,035	6,061	2.89	4.01	2.64	1.48

Link		24-hour AADT Flow				HDV Prop. of Fleet (%)			
		Verif.	DM	DS	DS1	Verif.	DM	DS	DS1
L84	M62 NEB off slip (Junction 19)	4,793	6,533	7,502	7,939	8.85	15.61	15.05	14.42
L85	M62 NEB off slip to roundabout (Junction 19), SP	2,396	3,266	3,751	3,970	8.85	15.61	15.05	14.42
L86	QEII Way, WB (Immediately Northwest of Jct 19)	3,737	7,077	9,257	9,733	11.72	17.33	23.28	22.37
L87	M62 SWB on slip (Junction 19)	5,894	8,663	8,442	8,884	6.65	7.79	7.71	8.11
L88	Jun 19 - M62 through roads SWB between slip roads	58,418	67,883	66,935	67,196	12.72	11.65	11.48	11.44
L89	Jun 19 - M62 through roads NEB between slip roads	49,825	63,451	63,599	64,068	13.26	11.41	11.33	11.25
L90	M62 NEB on slip (Junction 19)	5,473	9,049	11,406	11,463	6.25	10.31	13.73	13.64
L91	M62 SWB off slip (Junction 19)	6,151	7,404	8,737	9,025	7.19	10.30	16.37	15.87
L92	M62 SWB off slip (Junction 19), SP	6,151	7,404	8,737	9,025	7.19	10.30	16.37	15.87
L93	M62 between Jct 19 and 20 - EB	63,889	76,931	78,343	78,660	12.17	11.49	11.80	11.76
L94	M62 between Jct 19 and 20 - WB	55,974	70,855	72,336	73,093	12.59	11.30	11.94	11.82
L95	A6046 Middleton Road NB (south of the A6046 Middleton Road/ Tangmere Avenue/ Lenten Grove Jct)	8,296	7,615	7,768	7,914	4.30	6.45	6.41	6.41
L96	A6046 Middleton Road SB (south of the A6046 Middleton Road/ Tangmere Avenue/ Lenten Grove Jct), SP	9,655	10,589	10,506	10,665	3.17	4.43	4.49	5.02

Link		24-hour AADT Flow				HDV Prop. of Fleet (%)			
		Verif.	DM	DS	DS1	Verif.	DM	DS	DS1
L97	A6046 Middleton Road (south of the A6046 Middleton Road/ Tangmere Avenue/ Lenten Grove Jct)	17,952	18,204	18,274	18,578	3.69	5.28	5.30	5.61
L98	A6046 Middleton Road (south of the A6046 Middleton Road/ Tangmere Avenue/ Lenten Grove Jct), SP	17,952	18,204	18,274	18,578	3.69	5.28	5.30	5.61
L99	A6046 Middleton Road (north of the A6046 Middleton Road/ Tangmere Avenue/ Lenten Grove Jct), SP	17,555	17,809	17,941	18,258	3.59	5.20	5.22	5.54
L100	A6046 Middleton Road (north of the A6046 Middleton Road/ Tangmere Avenue/ Lenten Grove Jct)	17,555	17,809	17,941	18,258	3.59	5.20	5.22	5.54
L101	A6046 Middleton Road (south of Coronation Avenue), SP	17,555	17,809	17,941	18,258	3.59	5.20	5.22	5.54
L102	Coronation Avenue (West of the Middleton Road/Coronation Avenue Junction), SP	5,577	5,305	5,671	6,260	9.07	15.64	14.71	14.42
L103	Coronation Avenue (West of the Middleton Road/Coronation Avenue Junction)	5,577	5,305	5,671	6,260	9.07	15.64	14.71	14.42
L104	Coronation Avenue (East of Manchester Road), SP	5,577	5,305	5,671	6,260	9.07	15.64	14.71	14.42

Link		24-hour AADT Flow				HDV Prop. of Fleet (%)			
		Verif.	DM	DS	DS1	Verif.	DM	DS	DS1
L105	A6046 Middleton Road NB (Immediately South of M62 J19), SP	6,890	10,397	10,796	10,821	2.47	4.70	5.62	6.18
L106	A6046 Middleton Road SB (Immediately South of M62 J19)	6,766	7,783	8,002	8,181	2.67	3.85	4.12	3.87
L107	A6046 Middleton Road (Immediately South of M62 J19)	13,657	18,180	18,798	19,002	2.57	4.33	4.99	5.18
L108	QEII Way SEB (Immediately Northwest of Jct 19), SP	2,677	5,266	7,451	7,810	13.67	16.77	21.13	19.42
L109	QEII Way SEB (Immediately Northwest of Jct 19)	2,677	5,266	7,451	7,810	13.67	16.77	21.13	19.42
L110	SHLR NWB (A6184 to A6184 north of Manchester Road), SP	3,737	7,077	9,257	9,733	11.72	17.33	23.28	22.37
L111	SHLR NWB (West of Junction with A6045 Manchester Road)	3,864	6,309	7,975	7,963	10.73	19.79	27.50	27.44
L112	SHLR SEB (West of Junction with A6045 Manchester Road)	2,966	4,758	5,946	5,977	11.53	17.59	25.39	25.23
L113	SHLR SEB to A6045 Manchester Road, SP	5,098	7,355	7,130	7,450	3.53	3.25	3.14	2.96
L114	SHLR SEB (West of Junction with A6045 Manchester Road) to A6184, SP	1,483	2,379	2,973	2,988	11.53	17.59	25.39	25.23
L115	SHLR (West of Junction with A6045 Manchester Road)	6,831	10,715	13,484	13,449	11.08	19.49	27.45	27.44

Link		24-hour AADT Flow				HDV Prop. of Fleet (%)			
		Verif.	DM	DS	DS1	Verif.	DM	DS	DS1
L116	A6045 Manchester Road (Immediately North-east of Junction with SHLR), SP	9,424	12,281	11,922	12,083	3.38	3.28	3.23	2.61
L117	A6045 Manchester Road (North-east of Junction with SHLR)	9,424	12,281	11,922	12,083	3.38	3.28	3.23	2.61
L118	A6045 Manchester Road (North of Junction with Coronation Avenue)	10,469	11,506	12,084	12,180	2.89	3.29	3.18	2.67
L119	A6046 Manchester Road (north of the A6046 Manchester/A6045 Manchester/Middleton Road Jct)	22,792	25,478	25,303	25,886	3.64	4.65	4.65	4.58
L120	Church Street WB	9,512	10,107	10,357	10,434	3.52	3.97	5.71	5.78
L121	Rochdale Road	9,512	10,107	10,357	10,434	3.52	3.97	5.71	5.78
L122	Market Place to York Street	9,440	9,766	9,913	9,847	2.69	3.83	6.23	6.23
L123	Market Street	9,512	10,107	10,357	10,434	3.52	3.97	5.71	5.78
L124	Dawson Street to Market Place	9,440	9,766	9,913	9,847	2.69	3.83	6.23	6.23
L125	Dawson Street	9,440	9,766	9,913	9,847	2.69	3.83	6.23	6.23
L126	A58 Bury Street (East of A58 Bury Street/ Pilsworth Jct)	18,953	19,873	20,270	20,281	3.11	3.90	5.97	6.00
L127	A58 Bury Street (west of A58 Bury Street/ Pilsworth Jct)	14,123	16,475	16,198	16,508	4.87	5.04	4.91	4.83
L128	A58 Bury Street (west of A58 Bury Street/ Pilsworth Jct), SP	14,940	16,781	16,847	17,035	3.02	3.46	3.83	3.77

Link		24-hour AADT Flow				HDV Prop. of Fleet (%)			
		Verif.	DM	DS	DS1	Verif.	DM	DS	DS1
L129	A58 Bury Street (East of A58 Bury Street/ Pilsworth Jct), SP	18,953	19,873	20,270	20,281	3.11	3.90	5.97	6.00
L130	A58 Bury Street (Between Pilsworth Jct and Bury Old Road)	14,940	16,781	16,847	17,035	3.02	3.46	3.83	3.77
L131	Market Place	18,953	19,873	20,270	20,281	3.11	3.90	5.97	6.00
L132	Church Street to Market Place	9,512	10,107	10,357	10,434	3.52	3.97	5.71	5.78
L133	York Street	9,440	9,766	9,913	9,847	2.69	3.83	6.23	6.23
L134	York Street to Rochdale Road E	18,953	19,873	20,270	20,281	3.11	3.90	5.97	6.00
L135	A58 Bury New Road (west of the A58 Bury New Road/ Heap Brow Jct)	20,117	22,371	23,184	23,445	4.03	4.21	5.76	5.72
L136	A58 Bury New Road from roundabout (west of the A58 Bury New Road/ Heap Brow Jct)	9,447	10,218	10,015	10,160	3.88	4.32	5.54	5.51
L137	A58 Bury New Road to roundabout (west of the A58 Bury New Road/ Heap Brow Jct)	10,670	12,153	13,170	13,284	4.16	4.11	5.93	5.88
L138	A58 Rochdale Road from roundabout (east of the B6221 Wash Lane/A58 Rochdale Road Jct)	23,364	27,163	28,295	28,246	3.43	3.20	3.93	3.93

Link		24-hour AADT Flow				HDV Prop. of Fleet (%)			
		Verif.	DM	DS	DS1	Verif.	DM	DS	DS1
L139	A58 Rochdale Road to roundabout (east of the B6221 Wash Lane/A58 Rochdale Road Jct)	21,066	23,664	25,012	25,077	3.41	3.29	3.76	3.75
L140	A58 Rochdale Road (west of the B6221 Wash Lane/A58 Rochdale Road Jct)	25,195	30,980	33,137	33,122	3.78	3.50	4.02	4.02
L141	A58 Rochdale Road to Derby Way	25,195	30,980	33,137	33,122	3.78	3.50	4.02	4.02
L142	B6221 Wash Lane (immediately north of the B6221 Wash Lane/A58 Rochdale Road Jct)	18,916	20,053	20,065	20,066	2.98	2.93	3.59	3.60
L143	B6221 Wash Lane (north of the B6221 Wash Lane/A58 Rochdale Road Jct)	18,916	20,053	20,065	20,066	2.98	2.93	3.59	3.60
L144	M66 NB on slip (north of M66 Jct 2)	4,599	4,932	4,537	4,430	3.94	3.67	3.99	4.09
L145	M66 SB off slip (north of M66 Jct 2)	5,871	6,570	5,858	5,898	3.76	4.31	3.27	3.25
L146	M66 SB off slip to roundabout (north of M66 Jct 2)	5,871	6,570	5,858	5,898	3.76	4.31	3.27	3.25
L147	M66 north of Jct 2 - NB	30,770	38,090	38,991	38,993	6.45	6.02	5.95	5.95
L148	M66 north of Jct 2 - SB	32,805	38,476	39,284	39,390	6.20	5.44	5.12	5.11
L149	M66 NB off slip to roundabout (south of M66 Jct 2)	16,402	20,151	20,951	21,001	4.83	4.27	4.15	4.15
L150	M66 NB off slip (south of M66 Jct 2)	16,402	20,151	20,951	21,001	4.83	4.27	4.15	4.15

Link		24-hour AADT Flow				HDV Prop. of Fleet (%)			
		Verif.	DM	DS	DS1	Verif.	DM	DS	DS1
L151	M66 SB on slip (south of M66 Jct 2)	15,986	19,320	21,113	21,352	4.78	4.37	3.96	3.92
L152	Jun 2 - M66 through roads NB between slip roads	26,172	33,160	34,455	34,564	6.88	6.37	6.21	6.19
L153	Jun 2 - M66 through roads SB between slip roads	26,935	31,905	33,426	33,493	6.73	5.67	5.45	5.43
L154	M66 between Jct 2 and Jct 3 - NB	42,575	53,311	55,406	55,566	6.09	5.58	5.43	5.42
L155	M66 between Jct 2 and Jct 3 - SB	42,922	51,228	54,543	54,850	6.00	5.18	4.87	4.84
L156	M66 NB on slip (north of M66 Jct 3)	4,967	6,223	7,813	7,788	3.69	4.48	3.80	3.79
L157	M66 SB off slip (north of M66 Jct 3)	4,615	4,841	7,626	7,596	2.86	3.34	3.22	3.23
L158	M66 SB off slip to roundabout (north of M66 Jct 3)	4,615	4,841	7,626	7,596	2.86	3.34	3.22	3.23
L159	M66 NB off slip to roundabout (south of M66 Jct 3)	6,815	7,994	9,226	9,370	11.76	10.14	15.05	14.71
L160	M66 NB off slip (south of M66 Jct 3)	6,815	7,994	9,226	9,370	11.76	10.14	15.05	14.71
L161	M66 SB on slip (south of M66 Jct 3)	5,839	7,865	8,563	8,767	10.40	11.26	18.59	18.16
L162	Jun 3 - M66 through roads NB between slip roads	37,611	47,091	47,598	47,783	6.40	5.72	5.69	5.68
L163	Jun 3 - M66 through roads SB between slip roads	38,308	46,387	46,917	47,254	6.38	5.37	5.14	5.10
L164	Pilsworth Road (Immediately West of M66 J3)	22,881	26,630	27,716	27,798	3.36	3.58	4.52	4.51
L165	Pilsworth Road (SW of the Pilsworth Road/ Pilsworth Way Jct)	22,881	26,630	27,716	27,798	3.36	3.58	4.52	4.51

Link		24-hour AADT Flow				HDV Prop. of Fleet (%)			
		Verif.	DM	DS	DS1	Verif.	DM	DS	DS1
L166	Hollins Brow to Manchester Road	13,995	15,920	15,651	15,652	1.95	1.91	3.28	3.33
L167	M66 J3 Connector Road (East of Junction with Pilsworth Road)	17,118	19,489	20,245	20,372	5.90	5.78	9.65	9.57
L168	Pilsworth Road (west of the Pilsworth Road / Viridor Haul Road Jct)	10,644	12,107	21,853	22,194	11.42	12.61	15.68	15.42
L169	Pilsworth Road (East of M66 Jct 3)	10,644	12,107	21,853	22,194	11.42	12.61	15.68	15.42
L170	Langley Lane to Heywood Old Road (East of Junction with A6045)	7,299	7,551	7,538	7,900	0.60	0.71	0.80	0.79
L171	Langley Lane (East of Junction with A6045)	7,299	7,551	7,538	7,900	0.60	0.71	0.80	0.79
L172	Whittle Lane (South of site centre)	4,326	4,260	7,279	7,214	0.00	0.00	0.00	0.00
L173	Whittle Lane (North of site centre)	4,703	4,855	18,817	19,015	6.97	9.31	25.02	24.72
L174	Moss Hall Road (Immediately North of 3-Arrows Junction)	12,667	14,063	25,468	25,759	9.64	10.92	15.94	15.73
L175	Moss Hall Road (North of Junction with Pilsworth Road)	5,863	5,837	8,610	8,692	3.12	3.31	7.98	7.88
L176	Heap Brow (north of the Heap Brow/ Bury Old Road/ Moss Hall Road Jct)	7,097	6,979	7,747	7,719	2.53	2.70	7.89	7.97
L177	Bury Old Road (east of the Heap Brow/ Bury Old Road/ Moss Hall Road Jct)	5,241	5,287	6,879	6,905	1.87	2.06	3.25	3.25

Link		24-hour AADT Flow				HDV Prop. of Fleet (%)			
		Verif.	DM	DS	DS1	Verif.	DM	DS	DS1
L178	Pilsworth Road (Between Plot 3 Access to 3-Arrows)	9,542	11,750	15,787	15,821	11.34	11.68	22.86	22.81
L179	Pilsworth Road (Immediately North of Junction with SHLR)	7,833	11,374	11,409	11,468	5.11	4.95	9.67	9.65
L180	Pilsworth Road (South of A58 Bury Street/ Pilsworth Jct)	8,665	10,601	11,886	11,946	2.58	3.33	6.37	6.43
L181	A56 Manchester Road (south of A56 Manchester Road/ Hollins Brow Jct)	19,829	22,553	24,085	24,202	2.24	2.22	2.09	2.11
L182	A56 Manchester Road immediately south of Hollins Brow	19,829	22,553	24,085	24,202	2.24	2.22	2.09	2.11
L183	A56 Manchester Road immediately north of Hollins Brow	25,647	29,930	30,951	31,058	1.46	1.38	1.97	1.96
L184	A56 Manchester Road (north of A56 Manchester Road/ Hollins Brow Jct)	25,647	29,930	30,951	31,058	1.46	1.38	1.97	1.96
L185	A6046 Hollin Lane (south of Hollin Lane/ Langley Lane Jct)	16,719	20,861	21,348	21,811	2.21	3.87	4.50	4.63
L186	Middleton Road (southeast of the A6046 Manchester/ A6045 Manchester/ Middleton Road Jct)	12,468	12,653	12,372	12,149	0.95	0.95	0.97	0.99
L187	Middleton Road (North of the Middleton Road/Coronation Avenue Junction)	12,468	12,653	12,372	12,149	0.95	0.95	0.97	0.99

Link		24-hour AADT Flow				HDV Prop. of Fleet (%)			
		Verif.	DM	DS	DS1	Verif.	DM	DS	DS1
L188	Middleton Road (immediately north of the Middleton Road/Coronation Avenue Junction)	12,468	12,653	12,372	12,149	0.95	0.95	0.97	0.99
R1	M60 Jct 17 Roundabout	11,991	13,800	13,601	13,701	8.59	8.05	7.97	7.84
R2	M60 Jct 18 Roundabout	20,311	10,056	10,949	11,069	9.73	9.51	11.01	11.03
R3	M60 Jct 19 Roundabout	13,324	16,690	17,289	17,474	2.80	2.65	2.55	2.39
R4	M62 Jct 19 Roundabout	12,489	16,400	17,627	18,054	5.33	7.94	10.38	10.44
R5	M66 Jct 2 Roundabout	13,426	15,521	16,119	16,181	3.99	3.83	4.24	4.23
R6	Middleton Way Roundabout	7,348	9,260	9,750	9,743	3.52	3.54	3.84	3.52

3.5.10 Road widths were estimated from aerial photography and UK highway design standards. Vehicle speeds were estimated as an average for the relevant road link over the course of a 24-hour period. These were determined following review of speed limits within the study extents, as well as congestion data available from GoogleMaps. Speeds specific to slow phases were determined using the methodology outlined in the DEFRA guidance⁹ and any necessary adjustments made based upon congestion data available from GoogleMaps. A summary of the input parameters is provided in Table 10.1.4.

Table 10.1.4 Road Parameters

Link		Road Width (m)	Average Vehicle Speed (km/h)
L1	M60 Southwest of Jct 17 - EB	14.8	110
L2	M60 Southwest of Jct 17 - WB	15.0	110

⁹ Local Air Quality Management Technical Guidance (TG22), DEFRA, 2022.

Link		Road Width (m)	Average Vehicle Speed (km/h)
L3	M60 NB off slip road (Immediately west of Junction 17)	8.7	80
L4	M60 NB off slip road (Immediately west of Junction 17), SP	9.0	25
L5	M60 SWB on slip road (Immediately west of Junction 17)	6.2	80
L6	M60 Jct 17 - through roads NEB between slip roads	13.1	110
L7	M60 Jct 17 - through roads SWB between slip roads	13.3	110
L8	M60 NEB on slip road (Immediately east of Junction 17)	4.4	80
L9	M60 SB off slip road (Immediately east of Junction 17), SP	9.4	25
L10	M60 SB off slip road (Immediately east of Junction 17)	6.1	80
L11	M62 west of Jct 18 - NB	14.8	110
L11A	M62 west of Jct 18 - NB - Noise Barrier	14.8	110
L11B	M62 west of Jct 18 - Slip Road to M62 - NB	14.8	110
L12	M62 west of Jct 18 - SB	14.2	110
L13	A56 Bury New Road SB (Immediately south of Junction 17)	7.6	45
L14	A56 Bury New Road (Immediately south of Junction 17)	14.4	45
L15	A56 Bury New Road NB (Immediately south of Junction 17)	8.3	35
L16	A56 Bury New Road NB (Immediately south of Junction 17), SP	15.2	25
L17	A56 Bury New Road NB (Immediately north of Junction 17)	6.5	45
L18	A56 Bury New Road NB, SP	12.3	25
L18A	A56 Bury New Road NB	6.8	45
L19	A56 Bury New Road SB	6.8	45
L19A	A56 Bury New Road SB, SP	11.8	25
L20	A56 Bury New Road SB (Immediately north of Junction 17)	6.7	35
L21	A56 Bury New Road SB (Immediately north of Junction 17), SP	9.6	25
L22	M62 NB off slip (north of M62/M66 Jct 18)	10.7	80
L23	M62 NB off slip to roundabout (north of M62/M66 Jct 18), SP	6.8	25
L24	M62 NB off slip to M66 (north of M62/M66 Jct 18)	4.4	65

Link		Road Width (m)	Average Vehicle Speed (km/h)
L25	M62 WB on slip (west of M62/M66 Jct 18)	13.1	80
L26	M62 WB on slip from roundabout (west of M62/M66 Jct 18)	7.4	65
L27	M62 WB on slip from M60 (west of M62/M66 Jct 18)	3.7	65
L28	Jun 18 - M62 through roads EB between slip roads	11.2	110
L29	Jun 18 - M62 through roads EB between slip roads	11.0	110
L30	M62 EB on slip from roundabout (east of M62/M66 Jct 18)	9.9	65
L31	M62 EB on slip from M66 (east of M62/M66 Jct 18)	4.0	65
L32	M62 EB on slip (east of M62/M66 Jct 18)	8.1	80
L33	M62 SB off slip (east of M62/M66 Jct 18)	6.3	80
L34	M62 SB off slip to roundabout (east of M62/M66 Jct 18), SP	9.0	25
L35	M62 SB off slip to M60 (east of M62/M66 Jct 18)	3.9	65
L36	M62 between Jct 18 and Birch Services - EB	13.8	110
L36A	M62 between Birch Services Slip Road - EB	13.4	110
L36B	M62 between Birch Services and Jct 19 - EB	13.8	110
L37	M62 between Jct 18 and Birch Services - WB	14.2	110
L37A	M62 between Birch Services Slip Road - WB	13.4	110
L37B	M62 between Birch Services and Jct 19 - WB	13.8	110
L38	Jun 18 - M62 through roads SWB between slip roads	7.3	110
L39	Jun 18 - M62 through roads NEB between slip roads	7.3	110
L40	M60 NB on slip from roundabout (north of M62/M66 Jct 18)	8.6	65
L41	M60 NB on slip (north of M62/M66 Jct 18)	9.8	80
L42	M60 EB off slip to roundabout (north of M62/M66 Jct 18)	12.6	25
L43	M60 EB off slip (north of M62/M66 Jct 18)	9.4	80
L44	M66 between Jct 3 and M62 Jct 18 - NB	10.4	110
L45	M66 between Jct 3 and M62 Jct 18 - SB	11.7	110
L46	M60 SB on slip from roundabout (south of M62/M66 Jct 18)	7.6	65

Link		Road Width (m)	Average Vehicle Speed (km/h)
L47	M60 SB on slip (south of M62/M66 Jct 18)	10.1	80
L48	M60 WB off slip to roundabout (south of M62/M66 Jct 18)	8.6	25
L49	M60 WB off slip (south of M62/M66 Jct 18)	10.8	80
L50	M60 between M62 Jct 18 and M60 jct 19 - EB	14.1	110
L51	M60 between M62 Jct 18 and M60 jct 19 - WB	14.1	110
L52	M60 SEB off slip (west of M60 Jct 19)	7.2	80
L53	M60 SEB off slip (west of M60 Jct 19), SP	9.7	25
L54	M60 NWB on slip (west of M60 Jct 19)	7.4	80
L55	M60 NWB on slip from roundabout (west of M60 Jct 19)	6.1	65
L56	M60 NWB on slip from A576 (west of M60 Jct 19)	4.8	65
L57	Jun 19 - M60 EB through road link	10.9	110
L58	Jun 19 - M60 WB through road link	11.1	110
L59	M60 SWB off slip to roundabout (east of M60 Jct 19), SP	9.5	25
L60	M60 SWB off slip (east of M60 Jct 19)	6.8	80
L61	M60 EB on slip from roundabout (east of M60 Jct 19)	7.5	65
L62	M60 EB on slip from Manchester Old Road (east of M60 Jct 19)	4.2	65
L63	M60 EB on slip (east of M60 Jct 19)	6.1	80
L64	M60 South of Jct 19 - EB	14.8	110
L65	M60 South of Jct 19 - WB	11.3	110
L66	A576 Middleton Road SWB (south of M60 Jct 19)	7.8	65
L67	A576 Middleton Road NWB to roundabout (south of M60 Jct 19)	8.6	25
L68	A576 Middleton Road NWB (south of M60 Jct 19)	7.8	65
L69	A576 WB (north of M60 Jct 19), SP	10.9	25
L70	A576 WB (north of M60 Jct 19)	7.4	45
L71	A576 NEB (north of M60 Jct 19), SP	8.0	25
L72	A576 NEB (north of M60 Jct 19)	9.6	45

Link		Road Width (m)	Average Vehicle Speed (km/h)
L73	A576 Manchester Old Road (east of A6045/ A576 / Kelvin Avenue Jct), SP	12.4	25
L74	A576 Manchester Old Road (east of A6045/ A576 / Kelvin Avenue Jct)	8.5	45
L75	A576 Manchester Old Road (east of A6045/ A576 / Kelvin Avenue Jct) to Kemp Street, SP	11.7	25
L76	A576 Middleton Way, SEB	7.9	45
L77	A576 Middleton Way, NWB, SP	8.2	25
L78	A6045 Heywood Old Road (north of A6045/ A576 / Kelvin Avenue Jct), SP	10.0	25
L79	A6045 Heywood Old Road (north of A6045/ A576 / Kelvin Avenue Jct)	7.2	45
L80	A6045 Heywood Old Road (South of A6045/ Langley Lane Junction), SP	18.5	45
L81	A6045 Heywood Old Road (North of A6045/ Langley Lane Junction)	8.7	45
L82	A6045 Manchester Road (south of the A6045 Manchester Road/ Workers Way Jct), SP	11.2	25
L83	SHLR (A6045 to M62 J19) to Manchester Road, NB	4.0	25
L84	M62 NEB off slip (Junction 19)	7.1	80
L85	M62 NEB off slip to roundabout (Junction 19), SP	5.9	25
L86	QEII Way, WB (Immediately Northwest of Jct 19)	8.0	65
L87	M62 SWB on slip (Junction 19)	6.9	80
L88	Jun 19 - M62 through roads SWB between slip roads	14.0	110
L89	Jun 19 - M62 through roads NEB between slip roads	13.4	110
L90	M62 NEB on slip (Junction 19)	4.9	80
L91	M62 SWB off slip (Junction 19)	6.7	80
L92	M62 SWB off slip (Junction 19), SP	6.5	25
L93	M62 between Jct 19 and 20 - EB	13.4	110
L94	M62 between Jct 19 and 20 - WB	13.4	110

Link		Road Width (m)	Average Vehicle Speed (km/h)
L95	A6046 Middleton Road NB (south of the A6046 Middleton Road/ Tangmere Avenue/ Lenten Grove Jct)	6.1	45
L96	A6046 Middleton Road SB (south of the A6046 Middleton Road/ Tangmere Avenue/ Lenten Grove Jct), SP	6.9	25
L97	A6046 Middleton Road (south of the A6046 Middleton Road/ Tangmere Avenue/ Lenten Grove Jct)	8.5	45
L98	A6046 Middleton Road (south of the A6046 Middleton Road/ Tangmere Avenue/ Lenten Grove Jct), SP	9.5	25
L99	A6046 Middleton Road (north of the A6046 Middleton Road/ Tangmere Avenue/ Lenten Grove Jct), SP	10.5	25
L100	A6046 Middleton Road (north of the A6046 Middleton Road/ Tangmere Avenue/ Lenten Grove Jct)	10.5	45
L101	A6046 Middleton Road (south of Coronation Avenue), SP	8.7	25
L102	Coronation Avenue (West of the Middleton Road/Coronation Avenue Junction), SP	8.2	25
L103	Coronation Avenue (West of the Middleton Road/Coronation Avenue Junction)	8.2	45
L104	Coronation Avenue (East of Manchester Road), SP	10.2	25
L105	A6046 Middleton Road NB (Immediately South of M62 J19), SP	8.1	25
L106	A6046 Middleton Road SB (Immediately South of M62 J19)	7.4	45
L107	A6046 Middleton Road (Immediately South of M62 J19)	7.5	45
L108	QEII Way SEB (Immediately Northwest of Jct 19), SP	8.0	25
L109	QEII Way SEB (Immediately Northwest of Jct 19)	8.0	65
L110	SHLR NWB (A6184 to A6184 north of Manchester Road), SP	10.0	25
L111	SHLR NWB (West of Junction with A6045 Manchester Road)	7.5	65
L112	SHLR SEB (West of Junction with A6045 Manchester Road)	7.5	65
L113	SHLR SEB to A6045 Manchester Road, SP	7.5	25
L114	SHLR SEB (West of Junction with A6045 Manchester Road) to A6184, SP	7.5	25
L115	SHLR (West of Junction with A6045 Manchester Road)	15.0	65

Link		Road Width (m)	Average Vehicle Speed (km/h)
L116	A6045 Manchester Road (Immediately North-east of Junction with SHLR), SP	10.5	25
L117	A6045 Manchester Road (North-east of Junction with SHLR)	8.3	45
L118	A6045 Manchester Road (North of Junction with Coronation Avenue)	8.5	45
L119	A6046 Manchester Road (north of the A6046 Manchester/ A6045 Manchester/ Middleton Road Jct)	8.1	45
L120	Church Street WB	8.7	35
L121	Rochdale Road	9.3	35
L122	Market Place to York Street	3.7	25
L123	Market Street	5.7	25
L124	Dawson Street to Market Place	16.5	25
L125	Dawson Street	5.9	25
L126	A58 Bury Street (East of A58 Bury Street/ Pilsworth Jct)	7.4	35
L127	A58 Bury Street (west of A58 Bury Street/ Pilsworth Jct)	7.9	45
L128	A58 Bury Street (west of A58 Bury Street/ Pilsworth Jct), SP	8.0	25
L129	A58 Bury Street (East of A58 Bury Street/ Pilsworth Jct), SP	7.7	25
L130	A58 Bury Street (Between Pilsworth Jct and Bury Old Road)	8.0	45
L131	Market Place	9.8	25
L132	Church Street to Market Place	9.0	25
L133	York Street	9.0	35
L134	York Street to Rochdale Road E	10.0	45
L135	A58 Bury New Road (west of the A58 Bury New Road/ Heap Brow Jct)	8.5	45
L136	A58 Bury New Road from roundabout (west of the A58 Bury New Road/ Heap Brow Jct)	8.0	35
L137	A58 Bury New Road to roundabout (west of the A58 Bury New Road/ Heap Brow Jct)	10.4	25

Link		Road Width (m)	Average Vehicle Speed (km/h)
L138	A58 Rochdale Road from roundabout (east of the B6221 Wash Lane/A58 Rochdale Road Jct)	9.4	45
L139	A58 Rochdale Road to roundabout (east of the B6221 Wash Lane/A58 Rochdale Road Jct)	9.7	25
L140	A58 Rochdale Road (west of the B6221 Wash Lane/ A58 Rochdale Road Jct)	12.2	45
L141	A58 Rochdale Road to Derby Way	15.3	25
L142	B6221 Wash Lane (immediately north of the B6221 Wash Lane/A58 Rochdale Road Jct)	11.9	25
L143	B6221 Wash Lane (north of the B6221 Wash Lane/A58 Rochdale Road Jct)	9.5	45
L144	M66 NB on slip (north of M66 Jct 2)	5.6	80
L145	M66 SB off slip (north of M66 Jct 2)	6.3	80
L146	M66 SB off slip to roundabout (north of M66 Jct 2)	11.4	25
L147	M66 north of Jct 2 - NB	7.4	110
L148	M66 north of Jct 2 - SB	7.4	110
L149	M66 NB off slip to roundabout (south of M66 Jct 2)	9.4	25
L150	M66 NB off slip (south of M66 Jct 2)	6.7	80
L151	M66 SB on slip (south of M66 Jct 2)	7.5	80
L152	Jun 2 - M66 through roads NB between slip roads	7.0	110
L153	Jun 2 - M66 through roads SB between slip roads	7.0	110
L154	M66 between Jct 2 and Jct 3 - NB	10.6	110
L155	M66 between Jct 2 and Jct 3 - SB	10.1	110
L156	M66 NB on slip (north of M66 Jct 3)	6.1	80
L157	M66 SB off slip (north of M66 Jct 3)	6.7	80
L158	M66 SB off slip to roundabout (north of M66 Jct 3)	7.6	25
L159	M66 NB off slip to roundabout (south of M66 Jct 3)	7.3	25
L160	M66 NB off slip (south of M66 Jct 3)	5.8	80

Link		Road Width (m)	Average Vehicle Speed (km/h)
L161	M66 SB on slip (south of M66 Jct 3)	6.4	80
L162	Jun 3 - M66 through roads NB between slip roads	10.9	110
L163	Jun 3 - M66 through roads SB between slip roads	10.9	110
L164	Pilsworth Road (Immediately West of M66 J3)	11.8	25
L165	Pilsworth Road (SW of the Pilsworth Road/ Pilsworth Way Jct)	7.4	45
L166	Hollins Brow to Manchester Road	9.3	25
L167	M66 J3 Connector Road (East of Junction with Pilsworth Road)	11.1	35
L168	Pilsworth Road (west of the Pilsworth Road / Viridor Haul Road Jct)	9.4	25
L169	Pilsworth Road (East of M66 Jct 3)	6.7	45
L170	Langley Lane to Heywood Old Road (East of Junction with A6045)	7.6	45
L171	Langley Lane (East of Junction with A6045)	8.0	45
L172	Whittle Lane (South of site centre)	7.4	45
L173	Whittle Lane (North of site centre)	7.4	45
L174	Moss Hall Road (Immediately North of 3-Arrows Junction)	8.3	45
L175	Moss Hall Road (North of Junction with Pilsworth Road)	7.1	45
L176	Heap Brow (north of the Heap Brow/ Bury Old Road/ Moss Hall Road Jct)	7.1	45
L177	Bury Old Road (east of the Heap Brow/ Bury Old Road/ Moss Hall Road Jct)	9.6	45
L178	Pilsworth Road (Between Plot 3 Access to 3-Arrows)	7.1	45
L179	Pilsworth Road (Immediately North of Junction with SHLR)	7.5	45
L180	Pilsworth Road (South of A58 Bury Street/ Pilsworth Jct)	13.9	25
L181	A56 Manchester Road (south of A56 Manchester Road/ Hollins Brow Jct)	10.8	45
L182	A56 Manchester Road immediately south of Hollins Brow	12.5	25
L183	A56 Manchester Road immediately north of Hollins Brow	11.6	25

Link		Road Width (m)	Average Vehicle Speed (km/h)
L184	A56 Manchester Road (north of A56 Manchester Road/ Hollins Brow Jct)	11.8	45
L185	A6046 Hollin Lane (south of Hollin Lane/ Langley Lane Jct)	7.0	45
L186	Middleton Road (southeast of the A6046 Manchester/ A6045 Manchester/ Middleton Road Jct)	7.1	25
L187	Middleton Road (North of the Middleton Road/Coronation Avenue Junction)	7.4	45
L188	Middleton Road (immediately north of the Middleton Road/Coronation Avenue Junction)	9.2	25
R1	M60 Jct 17 Roundabout	9.6	35
R2	M60 Jct 18 Roundabout	15.0	35
R3	M60 Jct 19 Roundabout	10.8	35
R4	M62 Jct 19 Roundabout	9.8	35
R5	M66 Jct 2 Roundabout	12.2	35
R6	Middleton Way Roundabout	8.9	35

3.5.11 Reference should be made to **Figure 10.1** for a graphical representation of the road link locations.

Noise Barriers

3.5.12 Where noise barriers are present adjacent to pollution sources, such as roads, there is the potential for pollutant dispersion characteristics to be altered downwind of the barrier. This may lead to changes in pollution levels at modelled locations. Therefore, it is important to take consideration of their effects when undertaking dispersion modelling.

3.5.13 The release of ADMS-Roads version 5.0.1 in February 2022 incorporated a number of new features, including a noise barrier module. This option was selected within the ADMS User Interface for the relevant links. It should be noted that these included existing noise barriers only and did not consider any additional measures that may be required to support the Project for Assessment. This ensured robust predictions and avoided uncertainty over delivery of future mitigation.

Emission Factors

- 3.5.14 Emission factors for each link were calculated using the relevant traffic flows and the Emissions Factor Toolkit (version 12.1). This has been produced by DEFRA and incorporates COPERT 5.6 vehicle emission factors and fleet information.
- 3.5.15 There is current uncertainty over NO₂ concentrations within the UK, with the implementation of new vehicle emission standards not resulting in the previously expected reduction in roadside levels. Therefore, 2023 emission factors were utilised in preference to the assessment year in order to provide robust concentration predictions. As predictions for 2023 were verified, it is considered the results are a robust indication of worst-case concentrations for the future year.

Meteorological Data

- 3.5.16 Meteorological data used in the assessment was taken from Manchester Airport meteorological station over the period 1st January 2023 to 31st December 2023 (inclusive). Manchester Airport is located at NGR: 381792, 384116, which is approximately 23km south of the Assessment Boundary. It is anticipated that conditions would be reasonably similar over a distance of this magnitude. The data was therefore considered suitable for an assessment of this nature.
- 3.5.17 All meteorological records used in the assessment were provided by Atmospheric Dispersion Modelling (ADM) Ltd, which is an established distributor of data within the UK. Reference should be made to **Figure 10.5** for a wind rose of the utilised meteorological data.

Roughness Length

- 3.5.18 The z_0 is a modelling parameter applied to allow consideration of surface height roughness elements. A z_0 of 0.5m was used to describe the modelling extents. This is considered appropriate for the morphology of the area and is suggested within ADMS-Roads as being suitable for 'parkland, open suburbia'.

- 3.5.19 A z_0 of 0.2m was used to describe the meteorological site. This is considered appropriate for the morphology of the area and is suggested within ADMS-Roads as being suitable for 'agricultural areas (min)'.

Monin-Obukhov Length

- 3.5.20 The Monin-Obukhov length provides a measure of the stability of the atmosphere. A minimum Monin-Obukhov length of 30m was used to describe the modelling extents and meteorological site. This value is considered appropriate for the nature of both areas and is suggested within ADMS-Roads as being suitable for 'mixed urban/industrial'.

Background Concentrations

- 3.5.21 The annual mean NO₂ background concentration for use in the assessment was obtained from the DT11 - Seathwaite Close urban background monitor.
- 3.5.22 Monitoring of annual mean PM₁₀ and PM_{2.5} concentrations is not undertaken at a background location within the modelling extents. As such, predictions for these species were derived by averaging levels for all DEFRA mapping grid squares containing the Assessment Boundary.
- 3.5.23 Air quality is predicted to improve in the future. Therefore, in order to avoid overestimation of pollutant concentrations and subsequent air quality impacts at sensitive receptors in the future year assessment, background levels for 2039 were utilised in the analysis.
- 3.5.24 The annual mean NO₂ concentration for 2039 was calculated from the DT11 - Seathwaite Close monitor using a projection factor in accordance with the DEFRA guidance¹⁰. The background concentrations used in the verification and future year assessment are shown in Table 10.1.5.

¹⁰ Local Air Quality Management Technical Guidance (TG22), DEFRA, 2022.

Table 10.1.5 Background Pollutant Concentrations - Modelling

Scenario	Annual Mean Concentration (µg/m ³)		
	NO ₂	PM ₁₀	PM _{2.5}
Verification	15.03	13.15	6.92
Future Year Assessments	9.26	12.47	6.20

NO_x to NO₂ Conversion

3.5.25 Predicted annual mean NO_x concentrations were converted to NO₂ concentrations using the spreadsheet (version 9.1) provided by DEFRA, which is the method detailed within DEFRA guidance¹¹.

Verification

3.5.26 The predicted results from a dispersion model may differ from measured concentrations for a large number of reasons, including:

- Estimates of background concentrations;
- Uncertainties in source activity data such as traffic flows and emission factors;
- Variations in meteorological conditions;
- Overall model limitations; and,
- Uncertainties associated with monitoring data, including locations.

3.5.27 Model verification is the process by which these and other uncertainties are investigated and where possible minimised. In reality the differences between modelled and monitored results are likely to be a combination of all of these aspects.

3.5.28 For the purpose of the assessment, model verification was undertaken for 2023 using traffic data, meteorological data and monitoring results from this year.

Nitrogen Dioxide

¹¹ Local Air Quality Management Technical Guidance (TG22), DEFRA, 2022.

3.5.29 Monitoring of NO₂ concentrations was undertaken at 44 monitors in the vicinity of roads included within the modelling extents during 2023. Review of the monitors indicated that a number of positions were not suitable for use in the verification process. Commentary is provided in Table 10.1.6.

Table 10.1.6 Monitors Removed from Verification Process

Monitor		Justification
BU1NO	BU1 Baguley Crescent	Monitor set back from nearest road and a lower elevation than Middleton Road The adjacent portion of the M60 is within a 'cutting' and sits below the monitor elevation Pollutant concentrations are therefore underestimated at this position
BU3ANO, BU3BNO, BU3CNO	BU3 Bury Roadside (AURN)	Monitors are co-located with the automatic monitor BURW
BU4xNO	10 Hardmans Road	Monitor co-located with BU4NO
BU20NO	Droughts Lane	Monitor is both set back from and a lower elevation than the M60. Pollutant concentrations are therefore underestimated at this position
DT3	Middleton Road Roundabout	The adjacent portion of the M60 is within a 'cutting' and sits below the monitor elevation. Pollutant concentrations are therefore underestimate at this position
CAP_BURY_033	A58	Monitor co-located with BU12NO

3.5.30 Results from the remaining monitors were obtained and the road contributions to total NO_x concentrations calculated following the methodology contained within DEFRA guidance¹². The monitored annual mean NO₂ concentrations and calculated road NO_x concentrations are summarised in Table 10.1.7.

Table 10.1.7 NO_x Verification - Monitoring Results

Monitoring Site		Monitored NO ₂ Concentration (µg/m ³)	Calculated Road NO _x Concentration (µg/m ³)
BURW	Bury Whitefield	20	11

¹² Local Air Quality Management Technical Guidance (TG22), DEFRA, 2022.

Monitoring Site		Monitored NO ₂ Concentration (µg/m ³)	Calculated Road NO _x Concentration (µg/m ³)
BU4NO	BU4	29.1	33.74
BU12NO	Rochdale Road	38.7	62.71
BU13NO	Rochdale Road	35	50.84
BU15NO	Bury New Road/Bury Old Road	36.8	56.49
BU16NO	Bury New Road	34.8	50.22
BU17NO	Prestwich Centre	26.8	27.62
BU18NO	Rochdale Old Road	30.2	36.77
BU19NO	Balmoral Avenue	33.5	46.29
RO20ANO	Manchester Road / Bader Drive	29.6	35.11
RO21ANO	York Street, Heywood	26.1	25.81
RO32ANO	Heywood Old Rd, Middleton	27.9	30.51
CAP_BURY_001	A56 (Bury New Road)	32.5	43.37
CAP_BURY_002	A56 (Bury New Road)	33.9	47.6
CAP_BURY_003	A56 (Bury New Road)	34.5	49.27
CAP_BURY_004	A56 (Bury New Road)	42.8	77.1
CAP_BURY_005	A58 (Rochdale Road)	31.9	41.56
CAP_BURY_006	A576 (Middleton Road)	44.3	82.5
CAP_BURY_008	A576 (Middleton Road)	29.1	33.75
CAP_BURY_009	A58 (Rochdale Road)	35.8	53.21
CAP_BURY_010	A58 (Bury New Road)	30.0	36.35
CAP_BURY_011	A58 (Bury New Road)	40.7	69.45
CAP_BURY_023	A56	34.5	49.45
CAP_BURY_027	A57	39.9	66.88
CAP_BURY_028	Rochdale Rd	38.0	60.27
CAP_BURY_029	Walsh Ln	39.9	66.75
CAP_BURY_030	Walsh Ln	34.7	50.01

Monitoring Site		Monitored NO ₂ Concentration (µg/m ³)	Calculated Road NO _x Concentration (µg/m ³)
CAP_BURY_031	Walsh Ln	34.2	48.32
CAP_BURY_034	A59	33.7	46.83
DT1	M60	48.3	98.02
DT4	M60	25.4	24.01
DT5	Middleton Road Roundabout	18.6	7.78
DT6	Heywood Old Road	28.5	32.17
DT7	Heywood Old Road	27.0	28.09
DT8	Manchester Old Road	30.3	37.03
DT12	Manchester Old Road	27.2	28.67
DT14	Heywood Old Road	20.4	11.98
DT15	Simister Lane	35.3	51.71

3.5.31 The annual mean road NO_x concentrations predicted from the dispersion model and the calculated 2023 road NO_x monitoring results are summarised in Table 10.1.8.

Table 10.1.8 NO_x Verification - Modelling Results

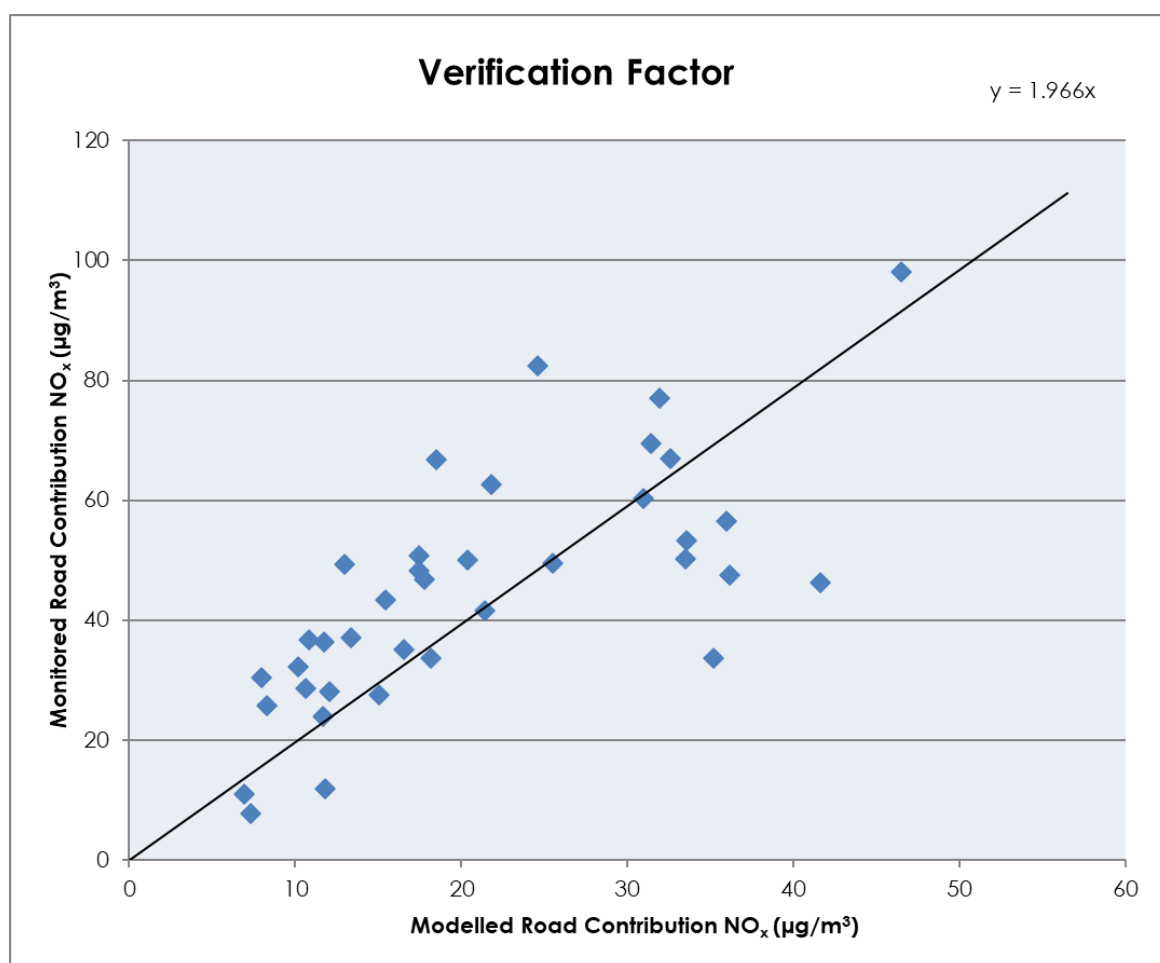
Monitoring Site		Calculated Road NO _x Concentration (µg/m ³)	Modelled Road NO _x Concentration (µg/m ³)
BURW	Bury Whitefield	11	6.90
BU4NO	BU4	33.74	35.18
BU12NO	Rochdale Road	62.71	21.80
BU13NO	Rochdale Road	50.84	17.47
BU15NO	Bury New Road/Bury Old Road	56.49	35.98
BU16NO	Bury New Road	50.22	33.51
BU17NO	Prestwich Centre	27.62	15.08
BU18NO	Rochdale Old Road	36.77	10.84
BU19NO	Balmoral Avenue	46.29	41.65

Monitoring Site		Calculated Road NO _x Concentration (µg/m ³)	Modelled Road NO _x Concentration (µg/m ³)
RO20ANO	Manchester Road / Bader Drive	35.11	16.58
RO21ANO	York Street, Heywood	25.81	8.31
RO32ANO	Heywood Old Rd, Middleton	30.51	7.99
CAP_BURY_001	A56 (Bury New Road)	43.37	15.45
CAP_BURY_002	A56 (Bury New Road)	47.6	36.19
CAP_BURY_003	A56 (Bury New Road)	49.27	12.96
CAP_BURY_004	A56 (Bury New Road)	77.1	31.92
CAP_BURY_005	A58 (Rochdale Road)	41.56	21.41
CAP_BURY_006	A576 (Middleton Road)	82.5	24.59
CAP_BURY_008	A576 (Middleton Road)	33.75	18.16
CAP_BURY_009	A58 (Rochdale Road)	53.21	33.57
CAP_BURY_010	A58 (Bury New Road)	36.35	11.72
CAP_BURY_011	A58 (Bury New Road)	69.45	31.44
CAP_BURY_023	A56	49.45	25.49
CAP_BURY_027	A57	66.88	32.61
CAP_BURY_028	Rochdale Rd	60.27	30.96
CAP_BURY_029	Walsh Ln	66.75	18.47
CAP_BURY_030	Walsh Ln	50.01	20.36
CAP_BURY_031	Walsh Ln	48.32	17.45
CAP_BURY_034	A59	46.83	17.77
DT1	M60	98.02	46.54
DT4	M60	24.01	11.67
DT5	Middleton Road Roundabout	7.78	7.33
DT6	Heywood Old Road	32.17	10.20
DT7	Heywood Old Road	28.09	12.09
DT8	Manchester Old Road	37.03	13.39

Monitoring Site		Calculated Road NO _x Concentration (µg/m ³)	Modelled Road NO _x Concentration (µg/m ³)
DT12	Manchester Old Road	28.67	10.66
DT14	Heywood Old Road	11.98	11.80
DT15	Simister Lane	51.71	19.94

3.5.32 The monitored and modelled road NO_x concentrations were graphed and the equation of the trendline based on linear progression through zero calculated. This indicated a verification factor of 1.966 was required to be applied to all road NO_x modelling results, as shown in Graph 1.

Graph 1 NO_x Verification Factor



3.5.33 Further analysis of model performance is recommended in DEFRA guidance¹³ in order to provide additional confidence in assessment predictions. As such, a comparison of the modelled and monitored NO₂ concentrations was undertaken. The NO_x verification factor was therefore applied to the modelled road NO_x concentrations at the monitoring locations and the total NO₂ concentrations calculated using the NO_x to NO₂ spreadsheet. This is summarised in Table 10.1.9.

Table 10.1.9 NO₂ Verification - Difference between Monitored and Modelled NO₂ Concentrations

Monitor	Modelled Road NO _x Concentration - Verified (µg/m ³)	Modelled NO ₂ Concentration (µg/m ³)	Monitored NO ₂ Concentration (µg/m ³)	Difference between Monitored and Modelled NO ₂ Concentration (%)
BURW	13.56	21.11	20.0	5.55
BU4NO	69.16	40.59	29.1	39.48
BU12NO	42.86	32.34	38.7	-16.43
BU13NO	34.35	29.32	35.0	-16.23
BU15NO	70.73	41.04	36.8	11.52
BU16NO	65.87	39.64	34.8	13.91
BU17NO	29.64	27.57	26.8	2.87
BU18NO	21.31	24.32	30.2	-19.47
BU19NO	81.89	44.12	33.5	31.70
RO20ANO	32.60	28.68	29.6	-3.11
RO21ANO	16.34	22.28	26.1	-14.64
RO32ANO	15.71	22.01	27.9	-21.11
CAP_BURY_001	30.37	27.85	32.5	-14.34
CAP_BURY_002	71.15	41.16	33.9	21.29
CAP_BURY_003	25.47	25.97	34.5	-24.70
CAP_BURY_004	62.76	38.72	42.8	-9.58
CAP_BURY_005	42.08	32.07	31.9	0.56

¹³ Local Air Quality Management Technical Guidance (TG22), DEFRA, 2022.

Monitor	Modelled Road NO _x Concentration - Verified (µg/m ³)	Modelled NO ₂ Concentration (µg/m ³)	Monitored NO ₂ Concentration (µg/m ³)	Difference between Monitored and Modelled NO ₂ Concentration (%)
CAP_BURY_006	48.34	34.18	44.3	-22.81
CAP_BURY_008	35.70	29.81	29.1	2.43
CAP_BURY_009	66.00	39.68	35.8	10.95
CAP_BURY_010	23.04	25.01	30.0	-16.77
CAP_BURY_011	61.80	38.43	40.7	-5.52
CAP_BURY_023	50.11	34.76	34.5	0.61
CAP_BURY_027	64.11	39.12	39.9	-2.04
CAP_BURY_028	60.87	38.15	38.0	0.49
CAP_BURY_029	36.31	30.03	39.9	-24.73
CAP_BURY_030	40.02	31.35	34.7	-9.73
CAP_BURY_031	34.31	29.31	34.2	-14.24
CAP_BURY_034	34.93	29.53	33.7	-12.32
DT1	91.49	46.62	48.3	-3.39
DT4	22.94	24.97	25.4	-1.66
DT5	14.42	21.47	18.6	15.51
DT6	20.06	23.81	28.5	-16.51
DT7	23.77	25.30	27.0	-6.23
DT8	26.32	26.30	30.3	-13.17
DT12	20.95	24.17	27.2	-11.14
DT14	23.19	25.07	20.4	22.73
DT15	39.19	31.06	35.3	-11.96

3.5.34 DEFRA guidance¹⁴ states that the majority of modelled results should be within +/-25% of the monitored concentrations, and preferably within 10%. As shown in Table 10.1.9, the

¹⁴ Local Air Quality Management Technical Guidance (TG22), DEFRA, 2022.

difference between the modelled and monitored NO₂ concentrations was less than 25% at 36 out of 38 monitors. Of these, 14 were within 10%.

3.5.35 In addition, the Root Mean Squared Error (RMSE) has been calculated to define the average error or uncertainty of the model. In accordance with DEFRA guidance¹⁵, if the RMSE value is higher than +/-25% of the AQO being assessed, it is recommended that the model inputs and verification is revisited in order to make improvements. The annual mean AQO of relevance to this assessment is 40µg/m³. As such, an RMSE value of +/- 10µg/m³ is required in order to have confidence in the predicted values. The RMSE calculated for the verification factor used in the study is 4.9µg/m³. This is within the stated limit.

3.5.36 Taking into account the above factors, the model is considered to be performing to an acceptable standard.

Particulate Matter

3.5.37 Monitoring of PM₁₀ was undertaken at one location within the modelling extents during 2023. The monitored annual mean PM₁₀ concentration and modelled PM₁₀ concentration is shown in Table 10.1.10.

Table 10.1.10 PM₁₀ Verification - Modelling Result

Monitor		Monitored PM ₁₀ Concentration (µg/m ³)	Modelled PM ₁₀ Concentration (µg/m ³)
BURW	Bury Whitefield	14	14.1

3.5.38 The monitored and modelled PM₁₀ concentration were compared to calculate the associated ratio. This indicated a verification factor of 0.9925 was required to be applied to all modelling results.

¹⁵ Local Air Quality Management Technical Guidance (TG22), DEFRA, 2022.

3.5.39 Monitoring of PM_{2.5} concentrations is not undertaken within the assessment extents. The PM₁₀ verification factor was therefore used to adjust model predictions of this species in lieu of more accurate data in accordance with DEFRA guidance¹⁶.

¹⁶ Local Air Quality Management Technical Guidance (TG22), DEFRA, 2022.

4.0 BASELINE

4.1 Introduction

- 4.1.1 Existing air quality conditions in the vicinity of the Assessment Boundary were identified in order to provide a baseline for assessment. These are detailed in the following Sections.

4.2 Local Air Quality Management

- 4.2.1 As required by the Environment Act (1995), as amended by the Environment Act (2021), Bury Council (BC) has undertaken Review and Assessment of air quality within their area of jurisdiction. This process has indicated that annual mean concentrations of NO₂ are above the AQOs within their administrative extents. As such, a number of roads have been included within the Greater Manchester Combined Authority (GMCA) AQMA, which is described as follows:

"This is the part of the GMCA AQMA located within the Bury Council area."

- 4.2.2 The Assessment Boundary is partly located in the AQMA. As such, there is the potential for the Project for Assessment to increase pollution levels in this sensitive area. This has been considered throughout the assessment.

- 4.2.3 Rochdale Borough Council (RBC) has also undertaken Review and Assessment of air quality within their area of jurisdiction. This process has indicated that annual mean concentrations of NO₂ are above the AQO within the borough. As such, a number of roads have been included within the GMCA AQMA, which is described as follows:

"This is the part of the GMCA AQMA located within the Rochdale Council area."

- 4.2.4 The Assessment Boundary is partly located in the AQMA. As such, there is the potential for the Project for Assessment to increase pollution levels in this sensitive area. This has been considered throughout the assessment.

- 4.2.5 BC and RBC have concluded that concentrations of all other pollutants considered within the Air Quality Strategy are currently below the relevant AQOs. As such, no further AQMAs have been designated.

4.3 Local Authority Air Quality Monitoring

4.3.1 Monitoring of pollutant levels is undertaken by BC and RBC throughout their areas of jurisdiction. Data has also been collected by the GMCA to inform the Clean Air Plan (CAP). Recent annual mean NO₂ concentrations recorded in the vicinity of the Assessment Boundary, as provided in the 'Greater Manchester LAQM and CAP NO₂ Diffusion Tube Results 2011-2022'¹⁷ Spreadsheet, are shown in Table 10.1.11. Exceedences of the AQO are shown in **bold**.

Table 10.1.11 Monitoring Results - NO₂

Monitoring Site		Monitored NO ₂ Concentration (µg/m ³)			
		2020	2021	2022	2023
BURW	Bury Whitefield	19	20	21	20
BU1NO	BU1 Baguley Crescent	24.4	25.3	26.6	24.6
BU3ANO	BU3a Bury Roadside (AURN)	25.2	19.1	20.9	18.8
BU3BNO	BU3b Bury Roadside (AURN)	25.2	19.1	20.9	19.7
BU3CNO	BU3c Bury Roadside (AURN)	25.2	19.1	20.9	19.0
BU4NO	Hardmans Rd Whitefield	27.4	28.4	31.8	29.1
BU4xNO	10 Hardmans Road	-(a)	-(a)	-(a)	22.2
BU5NO	BU5 Radcliffe New Rd. Whitefield	21.1	20.9	21.0	19.6
BU11NO	Moorgate	32.3	33.5	34.7	31.4
BU12NO	Rochdale Road	35.0	40.9	38.7	38.7
BU13NO	Rochdale Road	34.0	39.8	36.9	35.0
BU15NO	Bury New Road/Bury Old Road	34.4	37.4	40.5	36.8
BU16NO	Bury New Road	32.5	36.1	39.0	34.8
BU17NO	Prestwich Centre	25.7	28.2	28.6	26.8
BU18NO	Rochdale Old Road	27.9	30.3	30.3	30.2
BU19NO	Balmoral Avenue	32.7	33.1	37.7	33.5

¹⁷ Greater Manchester LAQM and CAP NO₂ Diffusion Tube Results 2011-2022, GMCA, 2023.

Monitoring Site		Monitored NO ₂ Concentration (µg/m ³)			
		2020	2021	2022	2023
BU20NO	Droughts Lane	26.1	28.4	28.8	27.6
RO4ANO	Middleton Library	22.2	22.8	22.7	23.0
RO6ANO	Heywood Old Rd Birch	31.8	32.3	37.4	28.9
RO20ANO	Manchester Road / Bader Drive	23.9	24.9	24.3	29.6
RO21ANO	York Street, Heywood	28.3	28.2	27.7	26.1
RO24ANO	Ogden Street, Castleton	24.8	23.1	24.4	25.2
RO25ANO	Oldham Road, Middleton	25.9	30.9	33.0	31.1
RO32ANO	Heywood Old Rd, Middleton	-(a)	26.6	30.3	27.9
CAP_BURY_001	A56 (Bury New Road)	30.0	35.2	34.64	32.51
CAP_BURY_002	A56 (Bury New Road)	32.1	35.1	35.83	33.93
CAP_BURY_003	A56 (Bury New Road)	32.9	36.4	36.22	34.49
CAP_BURY_004	A56 (Bury New Road)	38.4	44.4	45.16	42.82
CAP_BURY_005	A58 (Rochdale Road)	29.5	34	32.43	31.89
CAP_BURY_006	A576 (Middleton Road)	40.2	42.6	46.2	44.3
CAP_BURY_007	A576 (Manchester Old Road)	24.0	29	27.8	-(a)
CAP_BURY_008	A576 (Middleton Road)	27.5	28.5	29.41	29.10
CAP_BURY_009	A58 (Rochdale Road)	32.8	32.1	36.08	35.76
CAP_BURY_010	A58 (Bury New Road)	29.8	31.1	30.6	30.0
CAP_BURY_011	A58 (Bury New Road)	37.3	41.2	42.66	40.68
CAP_BURY_021	A56 Bury New Rd	-(a)	-(a)	33.20	-(a)
CAP_BURY_022	A56 Bury New Rd	-(a)	-(a)	28.19	-(a)
CAP_BURY_023	A56	-(a)	-(a)	37.06	34.55
CAP_BURY_025	Hardmans Rd	-(a)	-(a)	25.87	-(a)
CAP_BURY_026	Hardmans Rd	-(a)	-(a)	26.88	-(a)
CAP_BURY_027	A57	-(a)	-(a)	42.40	39.93
CAP_BURY_028	Rochdale Rd	-(a)	-(a)	39.99	37.96

Monitoring Site		Monitored NO ₂ Concentration (µg/m ³)			
		2020	2021	2022	2023
CAP_BURY_029	Walsh Ln	-(a)	-(a)	40.80	39.90
CAP_BURY_030	Walsh Ln	-(a)	-(a)	37.91	34.73
CAP_BURY_031	Walsh Ln	-(a)	-(a)	37.70	34.18
CAP_BURY_032	A58	-(a)	-(a)	38.28	-(a)
CAP_BURY_033	A58	-(a)	-(a)	40.79	40.03
CAP_BURY_034	A58	-(a)	-(a)	39.31	33.68
CAP_BURY_035	B6222	-(a)	-(a)	34.00	-(a)
CAP_BURY_041	Whitefield	-(a)	-(a)	26.27	-(a)

Note: (a) No data available.

4.3.2 As shown in Table 10.1.11, annual mean NO₂ concentrations were above the AQO of 40µg/m³ at the following positions in recent years:

- BU12NO - Rochdale Road;
- BU15NO - Bury New Road/Bury Old Road;
- CAP_BURY_004 - A56 (Bury New Road);
- CAP_BURY_006 - A576 (Middleton Road);
- CAP_BURY_011 - A58 (Bury New Road);
- CAP_BURY_027- A57;
- CAP_BURY_029 - Walsh Lane; and,
- CAP_BURY_033 - A58.

4.3.3 The above monitors are positioned adjacent to roads within an AQMA. Elevated pollutant concentrations would therefore be expected. Pollution levels were below the AQO at all remaining sites between 2020 and 2023.

4.3.4 Recent annual mean PM₁₀ concentrations recorded in the vicinity of the Assessment Boundary are shown in Table 10.1.12.

Table 10.1.12 Monitoring Results - PM₁₀

Monitoring Site		Monitored PM ₁₀ Concentration (µg/m ³)			
		2020	2021	2022	2023
BURW	Bury Whitefield	16	15	16	14

4.3.5 As shown in Table 10.1.12, annual mean PM₁₀ concentrations were below the AQO of 40µg/m³ at the BURW - Bury Whitefield, monitor in recent years.

4.3.6 Reference should be made to **Figure 10.2** for a map of the monitoring locations.

4.3.7 Pollutant concentrations during 2020 and 2021 were affected by changes to travel patterns and associated exhaust emissions as a result of the COVID-19 pandemic. The results should therefore be viewed with caution. However, data for 2022 and beyond is now considered representative of post-pandemic conditions. This is supported by the IAQM¹⁸, who have adopted the following position:

"ambient air quality monitoring data for the year 2022 and beyond is generally considered to represent the current post-pandemic baseline."

4.3.8 BC and RBC do not undertake monitoring of PM_{2.5} concentrations within the vicinity of the Site.

4.4 Project Specific Air Quality Monitoring

4.4.1 At the request of BC¹⁹, monitoring of NO₂ concentrations was undertaken by Redmore Environmental Ltd between 5th June 2024 and 2nd September 2024 in order to provide a baseline for assessment. The methodology was agreed with BC on 8th July 2024 and RBC on 15th May 2024.

¹⁸ Use of 2020 and 2021 Monitoring Datasets - IAQM Position Statement V1.1, IAQM, 2023.

¹⁹ Northern Gateway Development Comments from Services with Public Protection, BC, 2022.

Monitoring Locations

4.4.2 Monitoring of NO₂ concentrations was undertaken at 15 locations in the vicinity of the Site. These were selected following a baseline review of the local road network and consideration of appropriate placements for fixing the samplers. Consideration was also made for suitable locations to inform the model verification.

4.4.3 A summary of the survey positions is provided in Table 10.1.13.

Table 10.1.13 Sampling Locations

Site ID	Approximate NGR (m)		Site Classification	Description
	X	Y		
DT1	383818	405296	Roadside	M60
DT2	384153	405123	Roadside	M60
DT3	384397	404917	Roadside	Middleton Road Roundabout
DT4	384593	405228	Roadside	Heywood Old Road
DT5	384375	406358	Roadside	Heywood Old Road
DT6	386565	405694	Roadside	Manchester Old Road
DT7	385068	405226	Roadside	Manchester Old Road
DT8	384594	405053	Roadside	Heywood Old Road
DT9	383733	406032	Roadside	Simister Lane
DT10	382751	405549	Roadside	Heywood Road
DT11	385944	406816	Urban Background	Seathwaite Close
DT12	382334	409130	Roadside	Pilsworth Road
DT13	383424	406547	Roadside	M62
DT14	384397	407858	Roadside	Whittle Lane
DT15	386360	409028	Roadside	Coronation Avenue

4.4.4 Reference should be made to **Figure 10.3** for a map showing the sampling positions.

Monitoring Methodology

- 4.4.5 Monitoring of NO₂ concentrations was undertaken passively at the sampling locations using Palmers type diffusion tubes. These contain a reagent which absorbs NO₂ at a known rate and from the period of exposure and subsequent analysis an ambient concentration can be calculated. For the purpose of the monitoring survey, a preparation of 20% triethanolamine (TEA) in water was utilised.
- 4.4.6 Diffusion tubes provide a time weighted average concentration over the exposure period. They are extensively used by Local Authorities and are recommended in the Environment Agency (EA) Technical Guidance Note (TGN) M8²⁰.
- 4.4.7 The tubes were exposed at each location for 1-month periods. This involved a technician visiting site at the start of the survey, positioning the tubes in appropriate positions to gather representative data whilst reducing risk of theft, and then returning at the end of each interval to undertake collection and replacement.
- 4.4.8 The monitoring periods were as follows:
- Month 1: 05/06/2024 - 03/07/2024;
 - Month 2: 03/07/2024 - 07/08/2024; and,
 - Month 3: 07/08/2024 - 02/09/2024.
- 4.4.9 The diffusion tube samplers were supplied and analysed by Gradko International. Concentrations of pollutants absorbed by the tubes were determined using ultra violet / visible spectrophotometry with reference to calibration curves derived from the analysis of standard solutions using UKAS accredited methods.

Projected Concentrations

- 4.4.10 In order to adjust for the general trend of reducing concentrations in future years and enable comparison against the verification year, the monitoring results were back-calculated from 2024 to 2023 using projection factors.

²⁰ TGN M8, Monitoring Ambient Air, EA, 2011.

4.4.11 For roadside monitoring locations, factors were obtained from the DEFRA website²¹. For positions classified as background, a ratio was derived by comparing background concentrations obtained from the DEFRA background mapping tool for the grid square containing the relevant monitor. This was in accordance with the DEFRA guidance²².

Annualisation of Results

4.4.12 Annualisation of the NO₂ monitoring results was undertaken in accordance with DEFRA guidance²³.

4.4.13 Annual mean NO₂ concentrations for use in the annualisation process were obtained from three background monitoring sites within a 50-mile radius of the project. A summary of the relevant data is provided in Table 10.1.14.

Table 10.1.14 Background Monitoring Sites

Site Name	NGR (m)		Station Type
	X	Y	
Crewe Coppenhall	369744	357736	Urban Background
Glazebury	368755	396030	Rural Background
Ladybower	416585	389645	Rural Background

4.4.14 The period mean for each site was calculated for the corresponding monitoring interval for the project (5th June 2024 to 2nd September 2024). The ratio of the 2024 annual mean to the period mean was then calculated and an average derived as the site specific annualisation factor. A summary of the data used to calculate the adjustment factor is provided in Table 10.1.15.

²¹ <https://laqm.defra.gov.uk/air-quality/air-quality-assessment/roadside-no2-projection-factors/>.

²² Local Air Quality Management (TG22), DEFRA, 2022.

²³ Local Air Quality Management (TG22), DEFRA, 2022.

Table 10.1.15 Annualisation Data

Site Name	Station Type	NO ₂ Concentration (µg/m ³)		Ratio (A _m /P _m)
		Annual Mean (A _m)	Period Mean (P _m)	
Crewe Coppenhall	Urban Background	11.23	7.81	1.44
Glazebury	Rural Background	12.19	7.28	1.67
Ladybower	Rural Background	4.16	3.18	1.31
Average (R_a)				1.47

4.4.15 An estimate of the annual mean NO₂ concentrations at the monitoring locations was then calculated by multiplying the measured period mean concentration by the adjustment factor (R_a).

4.4.16 Diffusion tubes are affected by several sources of interference which can cause under or overestimation of ambient pollutant concentrations. As such, a Bias Adjustment Factor (BAF) was applied to the annualised results in order to validate the data. The BAF was calculated using the DEFRA spreadsheet (version 09/24) using the relevant tube preparation method and laboratory analysis. The value obtained was 0.81. This was applied to the projected, annualised monitoring results to correct the monitored values at each sample location.

4.4.17 A summary of the unadjusted results is provided in Table 10.1.16.

Table 10.1.16 Unadjusted NO₂ Monitoring Results

Monitoring Location		NO ₂ Concentration (µg/m ³)		
		05/06/2024 - 03/07/2024	03/07/2024 - 07/08/2024	07/08/2024 - 02/09/2024
DT1	M60	39.24	37.58	37.47
DT2	M60	16.95	19.14	18.50
DT3	Middleton Road Roundabout	34.33	35.58	33.54
DT4	Heywood Old Road	22.19	20.68	17.27
DT5	Heywood Old Road	13.90	16.33	13.79

Monitoring Location		NO ₂ Concentration (µg/m ³)		
		05/06/2024 - 03/07/2024	03/07/2024 - 07/08/2024	07/08/2024 - 02/09/2024
DT6	Manchester Old Road	23.79	23.73	20.02
DT7	Manchester Old Road	20.54	23.34	20.02
DT8	Heywood Old Road	25.47	24.00	22.27
DT9	Simister Lane	15.34	14.87	16.73
DT10	Heywood Road	19.73	18.08	16.14
DT11	Seathwaite Close	11.33	12.98	11.93
DT12	Pilsworth Road	20.48	20.91	23.03
DT13	M62	15.87	15.43	20.09
DT14	Whittle Lane	15.89	16.96	15.53
DT15	Coronation Avenue	27.75	30.15	25.66

4.4.18 A summary of the projected, annualised and bias adjusted results is provided in Table 10.1.17.

Table 10.1.17 Adjusted NO₂ Monitoring Results

Monitoring Location		NO ₂ Concentration (µg/m ³)		
		P _m	Annualised Concentration	Bias Adjusted Concentration
DT1	M60	38.1	59.58	48.26
DT2	M60	18.2	28.46	23.05
DT3	Middleton Road Roundabout	34.5	53.93	43.68
DT4	Heywood Old Road	20.0	31.35	25.39
DT5	Heywood Old Road	14.7	22.95	18.59
DT6	Manchester Old Road	22.5	35.21	28.52
DT7	Manchester Old Road	21.3	33.31	26.98
DT8	Heywood Old Road	23.9	37.40	30.29
DT9	Simister Lane	15.6	24.38	19.75

Monitoring Location		NO ₂ Concentration (µg/m ³)		
		P _m	Annualised Concentration	Bias Adjusted Concentration
DT10	Heywood Road	18.0	28.04	22.71
DT11	Seathwaite Close	12.1	18.55	15.03
DT12	Pilsworth Road	21.5	33.58	27.20
DT13	M62	17.1	26.69	21.62
DT14	Whittle Lane	16.1	25.22	20.43
DT15	Coronation Avenue	27.9	43.56	35.28

4.4.19 The results of the monitoring campaign are summarised in Table 10.1.18. Exceedences of the relevant AQO are shown in **bold**.

Table 10.1.18 Monitoring Results

Monitoring Site		NGR (m)		Annual Mean NO ₂ Concentration 2023 (µg/m ³)
		X	Y	
DT1	M60	383818	405296	48.26
DT2	M60	384153	405123	23.05
DT3	Middleton Road Roundabout	384397	404917	43.68
DT4	Heywood Old Road	384593	405228	25.39
DT5	Heywood Old Road	384375	406358	18.59
DT6	Manchester Old Road	386565	405694	28.52
DT7	Manchester Old Road	385068	405226	26.98
DT8	Heywood Old Road	384594	405053	30.29
DT9	Simister Lane	383733	406032	19.75
DT10	Heywood Road	382751	405549	22.71
DT11	Seathwaite Close	385944	406816	15.03
DT12	Pilsworth Road	382334	409130	27.20
DT13	M62	383424	406547	21.62

Monitoring Site		NGR (m)		Annual Mean NO ₂ Concentration 2023 (µg/m ³)
		X	Y	
DT14	Whittle Lane	384397	407858	20.43
DT15	Coronation Avenue	386360	409028	35.28

4.4.20 As shown in Table 10.1.18, the annual mean NO₂ concentrations was above the AQO of 40µg/m³ at DT1 - M60 and DT3 - Middleton Road Roundabout. As these positions are situated adjacent to roads within an AQMA, elevated levels would be expected. Pollutant concentrations were below the relevant AQO at all remaining sites.

4.5 **Background Pollutant Concentrations**

4.5.1 Predictions of background pollutant concentrations on a 1km by 1km grid basis have been produced by DEFRA for the entire of the UK to assist LAs in their Review and Assessment of air quality. The Assessment Boundary is located in a number of grid squares. Data for these locations was downloaded from the DEFRA website²⁴ for the following scenarios:

- 2023 - Verification year;
- 2025 - Present year; and,
- 2039 - Future assessment year.

4.5.2 The data is summarised in Table 10.1.19.

Table 10.1.19 Background Pollutant Concentration Predictions

Pollutant	National Grid Reference (NGR)	Predicted Background Pollutant Concentration (µg/m ³)		
		2023	2025	2039
NO ₂	382500, 408500	13.93	12.70	8.20
	383500, 408500	12.07	11.12	7.54
	383500, 407500	13.28	12.07	7.76
	384500, 408500	12.34	11.29	7.49

²⁴ <https://uk-air.defra.gov.uk/data/laqm-background-maps?year=2021>.

Pollutant	National Grid Reference (NGR)	Predicted Background Pollutant Concentration (µg/m ³)		
		2023	2025	2039
	384500, 407500	14.94	13.38	8.06
PM ₁₀	382500, 408500	13.56	13.48	12.88
	383500, 408500	12.45	12.36	11.74
	383500, 407500	13.20	13.12	12.51
	384500, 408500	12.79	12.70	12.08
	384500, 407500	13.78	13.69	13.11
PM _{2.5}	382500, 408500	7.04	6.95	6.81
	383500, 408500	6.73	6.64	6.50
	383500, 407500	6.91	6.82	6.67
	384500, 408500	6.78	6.68	6.54
	384500, 407500	7.12	7.02	6.87

4.5.3 As shown in Table 10.1.19, predicted NO₂, PM₁₀ and PM_{2.5} background concentrations are below the relevant AQOs and Concentration Target at the Assessment Boundary.

4.6 Sensitive Receptors

4.6.1 A sensitive receptor is defined as any location which may be affected by changes in air quality as a result of a development. Human receptors sensitive to potential operational phase road vehicle exhaust emission impacts were identified from a desk-top study and are summarised in Table 10.1.20. Receptor heights were provided to take account of less sensitive land uses at ground floor level, such as retail.

Table 10.1.20 Operational Phase Road Vehicle Exhaust Emission Human Sensitive Receptor Locations

Receptor		NGR (m)		Height (m)
		X	Y	
R1	Residential - Bury New Road	381111.6	404188.2	1.5
R2	Residential - Bury New Road	381103.2	404317.6	1.5

Receptor		NGR (m)		Height (m)
		X	Y	
R3	Residential - Willow Road	381019.4	404590.4	1.5
R4	Cloughside College	380800.3	404527.0	1.5
R5	Our Lady of Grace RC Primary School	381115.7	404670.4	1.5
R6	Residential - Philips Park Road East	380684.4	404669.1	1.5
R7	Residential - Beech Avenue	380871.3	404807.9	1.5
R8	Residential - Cross Avenue	381041.7	404730.4	1.5
R9	Residential - Hardman's Road	380938.3	404829.3	1.5
R10	Residential - Bury New Road	380876.7	404957.5	1.5
R11	Residential - Kensington Street	381574.2	405283.7	1.5
R12	Residential - Bury New Road	380811.7	405404.6	1.5
R13	Regency Care Centre	380566.0	406902.7	1.5
R14	The Bridge Day Nursery	380699.9	407860.3	1.5
R15	Residential - Hollins Brow	380838.9	407787.8	1.5
R16	Residential - Hollins Brow	381015.6	408068.6	1.5
R17	Residential - Pilsworth Road	381367.2	408643.0	1.5
R18	Jackson Fold Barn	382520.7	409230.2	1.5
R19	Residential - Waterfold Lane	382208.4	410273.9	1.5
R20	Residential - Rochdale Road	381979.1	410561.4	1.5
R21	Residential - Wash Lane	381895.7	410697.3	1.5
R22	Residential - Rochdale Road	381619.4	410704.5	1.5
R23	Hazel Wood High School	382013.9	410807.7	1.5
R24	Residential - Alder Avenue	382151.8	411041.7	1.5
R25	Residential - Ferngrove	382047.6	411681.5	1.5
R26	Residential - Bury New Road	382400.7	410514.1	1.5
R27	Residential - Heap Brow	382728.9	410425.9	1.5
R28	Residential - Moss Hall Road	382942.4	410074.5	1.5

Receptor		NGR (m)		Height (m)
		X	Y	
R29	Residential - Moss Hall Road	382908.1	410264.2	1.5
R30	Residential - Bury Old Road	384057.9	410572.1	1.5
R31	Residential - Bury New Road	384470.3	410758.5	1.5
R32	Residential - Bury New Road	383581.1	410737.0	1.5
R33	Residential - Bridge Street	384972.4	410773.1	1.5
R34	Woodland Community Primary School	384841.6	410412.8	1.5
R35	Residential - Pilsworth Road	384857.1	410137.1	1.5
R36	Coal Pits Farm	383643.9	408867.7	1.5
R37	Siddal Moor Farm	385265.3	409036.8	1.5
R38	Residential - Manchester Road	385781.1	409046.8	1.5
R39	Residential - Manchester Road	385672.5	408763.4	1.5
R40	Residential - Manchester Road	385427.4	408344.9	1.5
R41	Siddal Farm	385769.3	408383.1	1.5
R42	Residential - Coronation Avenue	386096.6	409549.3	1.5
R43	Residential - Coronation Avenue	386280.4	409457.4	1.5
R44	Residential - Middleton Road	386301.0	409671.0	1.5
R45	Residential - Manchester Road	386243.2	409862.1	1.5
R46	Highfield Manor Care Home	386178.5	409987.3	1.5
R47	Residential - Church Street	385827.9	410696.5	1.5
R48	Residential - Rochdale Road	386073.7	410731.9	1.5
R49	Residential - Rochdale Road	386582.0	410978.3	1.5
R50	Residential - Market Place	385541.2	410783.0	3.5
R51	Residential - Market Street	385326.6	410812.9	3.5
R52	Residential - Coronation Avenue	386369.8	409203.9	1.5
R53	Residential - Coronation Avenue	386390.2	408996.1	1.5
R54	Residential - Middleton Road	386387.9	408719.5	1.5

Receptor		NGR (m)		Height (m)
		X	Y	
R55	Residential - Earl Street	388305.5	409756.4	1.5
R56	Residential - Hollin Lane	386552.5	407568.2	1.5
R57	Residential - Langley Lane	386501.1	407545.6	1.5
R58	Residential - Langley Lane	385153.3	407742.5	1.5
R59	Residential - Heywood Old Road	385131.9	407621.3	1.5
R60	Residential - Whittle Lane	384460.5	407794.7	1.5
R61	Whittle Fold Smallholding	384109.4	407437.9	1.5
R62	Egypt Farm	383279.0	406379.7	1.5
R63	Lower Drouhts Farm	383392.2	406316.3	1.5
R64	Cowgate Farm	382612.7	406157.5	1.5
R65	Drouhts Lane	382956.5	405924.5	1.5
R66	Residential - Heywood Road	382924.7	405694.9	1.5
R67	Heywood Farm	383398.8	405533.9	1.5
R68	Residential - Baguley Crescent	384377.7	404927.5	1.5
R69	Residential - Old Hall Lane	384177.0	404887.7	1.5
R70	Residential - Old Hall Lane	384218.8	404744.3	1.5
R71	Residential - Boothroyden Road	385135.5	404864.7	1.5
R72	Residential - Middleton Road	384534.3	405060.8	1.5
R73	Residential - Manchester Old Road	385215.9	405256.7	1.5
R74	Residential - Heywood Old Road	384442.0	406041.0	1.5
R75	Residential - Hills Lane	382538.5	406788.3	1.5
R76	Unsworth Academy	382166.9	407182.3	1.5
R77	Residential - Plantation Grove	382105.3	407926.8	1.5

4.6.2 Reference should be made to **Figure 10.4** for a graphical representation of road vehicle exhaust emission sensitive receptor locations.

5.0 DISPERSION MODELLING RESULTS

5.1 Introduction

5.1.1 There is the potential for NO₂, PM₁₀ and PM_{2.5} concentrations to be affected by changes to traffic flows associated with the Project for Assessment. Dispersion modelling was therefore undertaken in order to quantify potential changes in pollutant concentrations at sensitive locations within the vicinity of the Assessment Boundary.

5.1.2 The results are summarised in the following Sections.

5.2 Assessment 1 - Project for Assessment

Predicted Concentrations

5.2.1 Annual mean NO₂ concentrations were predicted at the sensitive receptor locations for the DM and DS scenarios. These are summarised in Table 10.1.21. Exceedences of the AQO are shown in **bold**.

Table 10.1.21 Predicted Annual Mean NO₂ Concentrations

Receptor		Predicted Annual Mean NO ₂ Concentration (µg/m ³)		
		DM	DS	Change
R1	Residential - Bury New Road	17.12	17.00	-0.12
R2	Residential - Bury New Road	19.04	18.91	-0.13
R3	Residential - Willow Road	19.02	18.93	-0.09
R4	Cloughside College	16.33	16.33	0.00
R5	Our Lady of Grace RC Primary School	15.97	15.96	-0.01
R6	Residential - Philips Park Road East	38.23	38.21	-0.02
R7	Residential - Beech Avenue	32.90	32.87	-0.03
R8	Residential - Cross Avenue	25.11	25.08	-0.03
R9	Residential - Hardman's Road	42.47	42.56	0.09
R10	Residential - Bury New Road	30.83	30.96	0.13

Receptor		Predicted Annual Mean NO ₂ Concentration (µg/m ³)		
		DM	DS	Change
R11	Residential - Kensington Street	48.69	48.61	-0.08
R12	Residential - Bury New Road	30.95	31.24	0.29
R13	Regency Care Centre	16.10	16.43	0.33
R14	The Bridge Day Nursery	19.52	20.00	0.48
R15	Residential - Hollins Brow	15.43	15.74	0.31
R16	Residential - Hollins Brow	19.79	20.40	0.61
R17	Residential - Pilsworth Road	18.87	19.44	0.57
R18	Jackson Fold Barn	15.40	17.49	2.09
R19	Residential - Waterfold Lane	15.85	16.21	0.36
R20	Residential - Rochdale Road	23.48	24.15	0.67
R21	Residential - Wash Lane	22.40	23.00	0.60
R22	Residential - Rochdale Road	23.60	24.54	0.94
R23	Hazel Wood High School	18.26	18.65	0.39
R24	Residential - Alder Avenue	28.62	29.10	0.48
R25	Residential - Ferngrove	29.77	30.19	0.42
R26	Residential - Bury New Road	16.37	16.83	0.46
R27	Residential - Heap Brow	15.22	16.14	0.92
R28	Residential - Moss Hall Road	14.80	16.76	1.96
R29	Residential - Moss Hall Road	14.19	15.45	1.26
R30	Residential - Bury Old Road	13.88	14.77	0.89
R31	Residential - Bury New Road	21.32	21.65	0.33
R32	Residential - Bury New Road	14.67	14.84	0.17
R33	Residential - Bridge Street	20.83	22.16	1.33
R34	Woodland Community Primary School	12.41	12.66	0.25
R35	Residential - Pilsworth Road	18.02	18.98	0.96
R36	Coal Pits Farm	15.06	25.91	10.85

Receptor		Predicted Annual Mean NO ₂ Concentration (µg/m ³)		
		DM	DS	Change
R37	Siddal Moor Farm	13.88	14.25	0.37
R38	Residential - Manchester Road	19.56	19.81	0.25
R39	Residential - Manchester Road	19.12	19.76	0.64
R40	Residential - Manchester Road	37.82	38.15	0.33
R41	Siddal Farm	20.05	20.13	0.08
R42	Residential - Coronation Avenue	17.55	17.71	0.16
R43	Residential - Coronation Avenue	16.88	17.10	0.22
R44	Residential - Middleton Road	18.17	18.22	0.05
R45	Residential - Manchester Road	19.50	19.66	0.16
R46	Highfield Manor Care Home	16.04	16.13	0.09
R47	Residential - Church Street	19.21	19.78	0.57
R48	Residential - Rochdale Road	17.45	17.95	0.50
R49	Residential - Rochdale Road	15.71	16.13	0.42
R50	Residential - Market Place	16.07	16.63	0.56
R51	Residential - Market Street	15.08	15.55	0.47
R52	Residential - Coronation Avenue	22.73	23.02	0.29
R53	Residential - Coronation Avenue	32.62	33.48	0.86
R54	Residential - Middleton Road	21.24	21.79	0.55
R55	Residential - Earl Street	21.44	21.67	0.23
R56	Residential - Hollin Lane	17.51	17.82	0.31
R57	Residential - Langleys Lane	14.37	14.53	0.16
R58	Residential - Langleys Lane	19.79	20.36	0.57
R59	Residential - Heywood Old Road	15.04	15.42	0.38
R60	Residential - Whittle Lane	28.38	28.65	0.27
R61	Whittle Fold Smallholding	31.05	31.09	0.04
R62	Egypt Farm	31.65	31.69	0.04

Receptor		Predicted Annual Mean NO ₂ Concentration (µg/m ³)		
		DM	DS	Change
R63	Lower Droughts Farm	21.63	21.69	0.06
R64	Cowgate Farm	23.37	23.63	0.26
R65	Droughts Lane	28.20	28.65	0.45
R66	Residential - Heywood Road	20.08	20.31	0.23
R67	Heywood Farm	21.83	22.05	0.22
R68	Residential - Baguley Crescent	29.13	29.49	0.36
R69	Residential - Old Hall Lane	20.58	20.85	0.27
R70	Residential - Old Hall Lane	19.06	19.25	0.19
R71	Residential - Boothroyden Road	18.68	18.71	0.03
R72	Residential - Middleton Road	21.86	22.35	0.49
R73	Residential - Manchester Old Road	18.74	19.05	0.31
R74	Residential - Heywood Old Road	15.48	15.73	0.25
R75	Residential - Hills Lane	19.45	19.66	0.21
R76	Unsworth Academy	17.10	17.28	0.18
R77	Residential - Plantation Grove	22.42	22.76	0.34

5.2.2 As indicated in Table 10.1.21, predicted annual mean NO₂ concentrations were above the AQO of 40µg/m³ at two receptors and below at 75 positions in the DM and DS scenarios. It should be noted that there were no new exceedences of the AQO in the DS scenario when compared with the DM. It should be noted that due to the conservative assumptions adopted regarding future year emission factors, actual concentrations during 2039 are likely to be lower than those presented.

5.2.3 Annual mean PM₁₀ concentrations were predicted at the sensitive receptor locations for the DM and DS scenarios. These are summarised in Table 10.1.22.

Table 10.1.22 Predicted Annual Mean PM₁₀ Concentrations

Receptor		Predicted Annual Mean PM ₁₀ Concentration (µg/m ³)		
		DM	DS	Change
R1	Residential - Bury New Road	13.63	13.60	-0.02
R2	Residential - Bury New Road	13.93	13.91	-0.02
R3	Residential - Willow Road	13.68	13.67	-0.01
R4	Cloughside College	13.10	13.10	0.01
R5	Our Lady of Grace RC Primary School	13.11	13.11	0.00
R6	Residential - Philips Park Road East	15.89	15.92	0.03
R7	Residential - Beech Avenue	15.56	15.57	0.01
R8	Residential - Cross Avenue	14.32	14.32	0.01
R9	Residential - Hardman's Road	17.45	17.50	0.05
R10	Residential - Bury New Road	15.77	15.81	0.04
R11	Residential - Kensington Street	17.25	17.28	0.03
R12	Residential - Bury New Road	16.19	16.26	0.07
R13	Regency Care Centre	13.41	13.47	0.06
R14	The Bridge Day Nursery	14.06	14.14	0.09
R15	Residential - Hollins Brow	13.25	13.31	0.05
R16	Residential - Hollins Brow	14.09	14.20	0.11
R17	Residential - Pilsworth Road	13.87	13.97	0.10
R18	Jackson Fold Barn	13.09	13.44	0.36
R19	Residential - Waterfold Lane	12.97	13.01	0.04
R20	Residential - Rochdale Road	14.17	14.27	0.10
R21	Residential - Wash Lane	14.23	14.32	0.09
R22	Residential - Rochdale Road	14.78	14.96	0.18
R23	Hazel Wood High School	13.31	13.36	0.05
R24	Residential - Alder Avenue	14.12	14.17	0.05
R25	Residential - Ferngrove	14.16	14.20	0.04

Receptor		Predicted Annual Mean PM ₁₀ Concentration (µg/m ³)		
		DM	DS	Change
R26	Residential - Bury New Road	13.28	13.35	0.07
R27	Residential - Heap Brow	13.18	13.33	0.15
R28	Residential - Moss Hall Road	13.12	13.45	0.33
R29	Residential - Moss Hall Road	13.02	13.23	0.21
R30	Residential - Bury Old Road	13.01	13.17	0.15
R31	Residential - Bury New Road	14.42	14.48	0.06
R32	Residential - Bury New Road	13.14	13.17	0.03
R33	Residential - Bridge Street	14.08	14.25	0.17
R34	Woodland Community Primary School	12.75	12.79	0.04
R35	Residential - Pilsworth Road	13.75	13.89	0.15
R36	Coal Pits Farm	13.14	15.09	1.95
R37	Siddal Moor Farm	12.86	12.92	0.06
R38	Residential - Manchester Road	13.82	13.87	0.04
R39	Residential - Manchester Road	13.58	13.70	0.12
R40	Residential - Manchester Road	15.71	15.80	0.09
R41	Siddal Farm	13.38	13.39	0.01
R42	Residential - Coronation Avenue	13.50	13.52	0.02
R43	Residential - Coronation Avenue	13.31	13.34	0.04
R44	Residential - Middleton Road	13.68	13.69	0.01
R45	Residential - Manchester Road	13.93	13.96	0.03
R46	Highfield Manor Care Home	13.34	13.35	0.01
R47	Residential - Church Street	13.94	14.02	0.08
R48	Residential - Rochdale Road	13.65	13.73	0.07
R49	Residential - Rochdale Road	13.35	13.41	0.06
R50	Residential - Market Place	13.28	13.34	0.06
R51	Residential - Market Street	13.13	13.18	0.05

Receptor		Predicted Annual Mean PM ₁₀ Concentration (µg/m ³)		
		DM	DS	Change
R52	Residential - Coronation Avenue	14.15	14.20	0.05
R53	Residential - Coronation Avenue	15.58	15.76	0.18
R54	Residential - Middleton Road	13.92	14.01	0.09
R55	Residential - Earl Street	13.47	13.51	0.04
R56	Residential - Hollin Lane	13.73	13.78	0.05
R57	Residential - Langley Lane	13.16	13.18	0.03
R58	Residential - Langley Lane	14.03	14.14	0.12
R59	Residential - Heywood Old Road	13.15	13.22	0.07
R60	Residential - Whittle Lane	14.26	14.32	0.06
R61	Whittle Fold Smallholding	14.54	14.55	0.00
R62	Egypt Farm	14.62	14.62	0.00
R63	Lower Droughts Farm	13.50	13.51	0.01
R64	Cowgate Farm	13.82	13.87	0.05
R65	Droughts Lane	14.59	14.66	0.08
R66	Residential - Heywood Road	13.36	13.39	0.03
R67	Heywood Farm	13.40	13.44	0.03
R68	Residential - Baguley Crescent	14.95	15.04	0.09
R69	Residential - Old Hall Lane	13.52	13.57	0.05
R70	Residential - Old Hall Lane	13.67	13.70	0.04
R71	Residential - Boothroyden Road	13.13	13.14	0.01
R72	Residential - Middleton Road	14.06	14.16	0.10
R73	Residential - Manchester Old Road	13.64	13.70	0.06
R74	Residential - Heywood Old Road	13.25	13.30	0.05
R75	Residential - Hills Lane	13.24	13.27	0.04
R76	Unsworth Academy	13.02	13.05	0.03
R77	Residential - Plantation Grove	13.47	13.53	0.06

5.2.4 As indicated in Table 10.1.22, predicted annual mean PM₁₀ concentrations were below the AQO of 40µg/m³ at all sensitive receptors in both scenarios.

5.2.5 Annual mean PM_{2.5} concentrations were predicted at the sensitive receptor locations for the DM and DS scenarios. These are summarised in Table 10.1.23.

Table 10.1.23 Predicted Annual Mean PM_{2.5} Concentrations

Receptor		Predicted Annual Mean PM _{2.5} Concentration (µg/m ³)		
		DM	DS	Change
R1	Residential - Bury New Road	6.83	6.82	-0.01
R2	Residential - Bury New Road	6.99	6.98	-0.01
R3	Residential - Willow Road	6.89	6.88	-0.01
R4	Cloughside College	6.59	6.59	0.00
R5	Our Lady of Grace RC Primary School	6.58	6.59	0.00
R6	Residential - Philips Park Road East	8.32	8.34	0.02
R7	Residential - Beech Avenue	8.00	8.01	0.01
R8	Residential - Cross Avenue	7.28	7.28	0.00
R9	Residential - Hardman's Road	9.05	9.08	0.03
R10	Residential - Bury New Road	8.04	8.06	0.02
R11	Residential - Kensington Street	9.21	9.23	0.02
R12	Residential - Bury New Road	8.23	8.27	0.04
R13	Regency Care Centre	6.72	6.75	0.03
R14	The Bridge Day Nursery	7.06	7.11	0.05
R15	Residential - Hollins Brow	6.63	6.66	0.03
R16	Residential - Hollins Brow	7.08	7.14	0.06
R17	Residential - Pilsworth Road	6.97	7.02	0.05
R18	Jackson Fold Barn	6.56	6.76	0.19
R19	Residential - Waterfold Lane	6.51	6.53	0.02
R20	Residential - Rochdale Road	7.17	7.22	0.06

Receptor		Predicted Annual Mean PM _{2.5} Concentration (µg/m ³)		
		DM	DS	Change
R21	Residential - Wash Lane	7.17	7.22	0.05
R22	Residential - Rochdale Road	7.45	7.55	0.10
R23	Hazel Wood High School	6.70	6.73	0.03
R24	Residential - Alder Avenue	7.23	7.26	0.03
R25	Residential - Ferngrove	7.27	7.29	0.03
R26	Residential - Bury New Road	6.66	6.70	0.04
R27	Residential - Heap Brow	6.60	6.68	0.08
R28	Residential - Moss Hall Road	6.57	6.75	0.18
R29	Residential - Moss Hall Road	6.51	6.62	0.11
R30	Residential - Bury Old Road	6.51	6.59	0.08
R31	Residential - Bury New Road	7.25	7.29	0.03
R32	Residential - Bury New Road	6.57	6.59	0.02
R33	Residential - Bridge Street	7.07	7.17	0.09
R34	Woodland Community Primary School	6.37	6.39	0.02
R35	Residential - Pilsworth Road	6.90	6.98	0.08
R36	Coal Pits Farm	6.58	7.66	1.08
R37	Siddal Moor Farm	6.44	6.48	0.04
R38	Residential - Manchester Road	6.96	6.99	0.02
R39	Residential - Manchester Road	6.84	6.91	0.07
R40	Residential - Manchester Road	8.19	8.24	0.05
R41	Siddal Farm	6.77	6.78	0.01
R42	Residential - Coronation Avenue	6.78	6.79	0.01
R43	Residential - Coronation Avenue	6.68	6.70	0.02
R44	Residential - Middleton Road	6.87	6.88	0.00
R45	Residential - Manchester Road	7.00	7.01	0.02
R46	Highfield Manor Care Home	6.69	6.69	0.01

Receptor		Predicted Annual Mean PM _{2.5} Concentration (µg/m ³)		
		DM	DS	Change
R47	Residential - Church Street	7.00	7.04	0.04
R48	Residential - Rochdale Road	6.85	6.89	0.04
R49	Residential - Rochdale Road	6.68	6.72	0.04
R50	Residential - Market Place	6.65	6.68	0.03
R51	Residential - Market Street	6.57	6.60	0.03
R52	Residential - Coronation Avenue	7.15	7.18	0.03
R53	Residential - Coronation Avenue	7.99	8.09	0.10
R54	Residential - Middleton Road	7.03	7.08	0.05
R55	Residential - Earl Street	6.84	6.86	0.02
R56	Residential - Hollin Lane	6.88	6.91	0.03
R57	Residential - Langley Lane	6.58	6.59	0.01
R58	Residential - Langley Lane	7.05	7.11	0.06
R59	Residential - Heywood Old Road	6.59	6.62	0.04
R60	Residential - Whittle Lane	7.32	7.35	0.03
R61	Whittle Fold Smallholding	7.51	7.51	0.00
R62	Egypt Farm	7.56	7.56	0.00
R63	Lower Droughts Farm	6.85	6.86	0.00
R64	Cowgate Farm	7.03	7.06	0.03
R65	Droughts Lane	7.46	7.50	0.04
R66	Residential - Heywood Road	6.75	6.77	0.02
R67	Heywood Farm	6.80	6.81	0.02
R68	Residential - Baguley Crescent	7.61	7.66	0.05
R69	Residential - Old Hall Lane	6.83	6.86	0.03
R70	Residential - Old Hall Lane	6.88	6.90	0.02
R71	Residential - Boothroyden Road	6.62	6.63	0.01
R72	Residential - Middleton Road	7.09	7.14	0.05

Receptor		Predicted Annual Mean PM _{2.5} Concentration (µg/m ³)		
		DM	DS	Change
R73	Residential - Manchester Old Road	6.86	6.89	0.03
R74	Residential - Heywood Old Road	6.64	6.66	0.03
R75	Residential - Hills Lane	6.69	6.71	0.02
R76	Unsworth Academy	6.55	6.57	0.02
R77	Residential - Plantation Grove	6.83	6.87	0.04

5.2.6 As indicated in Table 10.1.23, predicted annual mean PM_{2.5} concentrations were below the Concentration Target of 10µg/m³ at all sensitive receptors in both scenarios.

Predicted Effects

5.2.7 Predicted effects on annual mean NO₂ concentrations at the sensitive receptor locations are summarised in Table 10.1.24.

Table 10.1.24 Predicted Effects - NO₂

Receptor		Receptor Sensitivity	Magnitude of Change	Effect Significance
R1	Residential - Bury New Road	Low	Negligible	Negligible
R2	Residential - Bury New Road	Low	Negligible	Negligible
R3	Residential - Willow Road	Low	Negligible	Negligible
R4	Cloughside College	Low	Negligible	Negligible
R5	Our Lady of Grace RC Primary School	Low	Negligible	Negligible
R6	Residential - Philips Park Road East	Medium	Negligible	Negligible
R7	Residential - Beech Avenue	Low	Negligible	Negligible
R8	Residential - Cross Avenue	Low	Negligible	Negligible
R9	Residential - Hardman's Road	High	Negligible	Negligible
R10	Residential - Bury New Road	Low	Negligible	Negligible

Receptor		Receptor Sensitivity	Magnitude of Change	Effect Significance
R11	Residential - Kensington Street	High	Negligible	Negligible
R12	Residential - Bury New Road	Low	Small	Negligible to Minor Adverse
R13	Regency Care Centre	Low	Small	Negligible to Minor Adverse
R14	The Bridge Day Nursery	Low	Small	Negligible to Minor Adverse
R15	Residential - Hollins Brow	Low	Small	Negligible to Minor Adverse
R16	Residential - Hollins Brow	Low	Medium	Minor Adverse
R17	Residential - Pilsworth Road	Low	Small	Negligible to Minor Adverse
R18	Jackson Fold Barn	Low	Medium	Minor Adverse
R19	Residential - Waterfold Lane	Low	Small	Negligible to Minor Adverse
R20	Residential - Rochdale Road	Low	Medium	Minor Adverse
R21	Residential - Wash Lane	Low	Medium	Minor Adverse
R22	Residential - Rochdale Road	Low	Medium	Minor Adverse
R23	Hazel Wood High School	Low	Small	Negligible to Minor Adverse
R24	Residential - Alder Avenue	Low	Small	Negligible to Minor Adverse
R25	Residential - Ferngrove	Low	Small	Negligible to Minor Adverse
R26	Residential - Bury New Road	Low	Small	Negligible to Minor Adverse
R27	Residential - Heap Brow	Low	Medium	Minor Adverse
R28	Residential - Moss Hall Road	Low	Medium	Minor Adverse
R29	Residential - Moss Hall Road	Low	Medium	Minor Adverse
R30	Residential - Bury Old Road	Low	Medium	Minor Adverse
R31	Residential - Bury New Road	Low	Small	Negligible to Minor Adverse
R32	Residential - Bury New Road	Low	Negligible	Negligible
R33	Residential - Bridge Street	Low	Medium	Minor Adverse
R34	Woodland Community Primary School	Low	Small	Negligible to Minor Adverse
R35	Residential - Pilsworth Road	Low	Medium	Minor Adverse
R36	Coal Pits Farm	Low	Large	Minor to Moderate Adverse

Receptor		Receptor Sensitivity	Magnitude of Change	Effect Significance
R37	Siddal Moor Farm	Low	Small	Negligible to Minor Adverse
R38	Residential - Manchester Road	Low	Small	Negligible to Minor Adverse
R39	Residential - Manchester Road	Low	Medium	Minor Adverse
R40	Residential - Manchester Road	Medium	Small	Minor Adverse
R41	Siddal Farm	Low	Negligible	Negligible
R42	Residential - Coronation Avenue	Low	Negligible	Negligible
R43	Residential - Coronation Avenue	Low	Small	Negligible to Minor Adverse
R44	Residential - Middleton Road	Low	Negligible	Negligible
R45	Residential - Manchester Road	Low	Negligible	Negligible
R46	Highfield Manor Care Home	Low	Negligible	Negligible
R47	Residential - Church Street	Low	Small	Negligible to Minor Adverse
R48	Residential - Rochdale Road	Low	Small	Negligible to Minor Adverse
R49	Residential - Rochdale Road	Low	Small	Negligible to Minor Adverse
R50	Residential - Market Place	Low	Small	Negligible to Minor Adverse
R51	Residential - Market Street	Low	Small	Negligible to Minor Adverse
R52	Residential - Coronation Avenue	Low	Small	Negligible to Minor Adverse
R53	Residential - Coronation Avenue	Low	Medium	Minor Adverse
R54	Residential - Middleton Road	Low	Small	Negligible to Minor Adverse
R55	Residential - Earl Street	Low	Small	Negligible to Minor Adverse
R56	Residential - Hollin Lane	Low	Small	Negligible to Minor Adverse
R57	Residential - Langley Lane	Low	Negligible	Negligible
R58	Residential - Langley Lane	Low	Small	Negligible to Minor Adverse
R59	Residential - Heywood Old Road	Low	Small	Negligible to Minor Adverse
R60	Residential - Whittle Lane	Low	Small	Negligible to Minor Adverse

Receptor		Receptor Sensitivity	Magnitude of Change	Effect Significance
R61	Whittle Fold Smallholding	Low	Negligible	Negligible
R62	Egypt Farm	Low	Negligible	Negligible
R63	Lower Droughts Farm	Low	Negligible	Negligible
R64	Cowgate Farm	Low	Small	Negligible to Minor Adverse
R65	Droughts Lane	Low	Small	Negligible to Minor Adverse
R66	Residential - Heywood Road	Low	Small	Negligible to Minor Adverse
R67	Heywood Farm	Low	Small	Negligible to Minor Adverse
R68	Residential - Baguley Crescent	Low	Small	Negligible to Minor Adverse
R69	Residential - Old Hall Lane	Low	Small	Negligible to Minor Adverse
R70	Residential - Old Hall Lane	Low	Negligible	Negligible
R71	Residential - Boothroyden Road	Low	Negligible	Negligible
R72	Residential - Middleton Road	Low	Small	Negligible to Minor Adverse
R73	Residential - Manchester Old Road	Low	Small	Negligible to Minor Adverse
R74	Residential - Heywood Old Road	Low	Small	Negligible to Minor Adverse
R75	Residential - Hills Lane	Low	Small	Negligible to Minor Adverse
R76	Unsworth Academy	Low	Negligible	Negligible
R77	Residential - Plantation Grove	Low	Small	Negligible to Minor Adverse

5.2.8 Predicted effects on annual mean PM₁₀ concentrations at the sensitive receptor locations are summarised in Table 10.1.25.

Table 10.1.25 Predicted Effects - PM₁₀

Receptor		Receptor Sensitivity	Magnitude of Change	Effect Significance
R1	Residential - Bury New Road	Low	Negligible	Negligible
R2	Residential - Bury New Road	Low	Negligible	Negligible

Receptor		Receptor Sensitivity	Magnitude of Change	Effect Significance
R3	Residential - Willow Road	Low	Negligible	Negligible
R4	Cloughside College	Low	Negligible	Negligible
R5	Our Lady of Grace RC Primary School	Low	Negligible	Negligible
R6	Residential - Philips Park Road East	Low	Negligible	Negligible
R7	Residential - Beech Avenue	Low	Negligible	Negligible
R8	Residential - Cross Avenue	Low	Negligible	Negligible
R9	Residential - Hardman's Road	Low	Negligible	Negligible
R10	Residential - Bury New Road	Low	Negligible	Negligible
R11	Residential - Kensington Street	Low	Negligible	Negligible
R12	Residential - Bury New Road	Low	Negligible	Negligible
R13	Regency Care Centre	Low	Negligible	Negligible
R14	The Bridge Day Nursery	Low	Negligible	Negligible
R15	Residential - Hollins Brow	Low	Negligible	Negligible
R16	Residential - Hollins Brow	Low	Negligible	Negligible
R17	Residential - Pilsworth Road	Low	Negligible	Negligible
R18	Jackson Fold Barn	Low	Small	Negligible to Minor Adverse
R19	Residential - Waterfold Lane	Low	Negligible	Negligible
R20	Residential - Rochdale Road	Low	Negligible	Negligible
R21	Residential - Wash Lane	Low	Negligible	Negligible
R22	Residential - Rochdale Road	Low	Negligible	Negligible
R23	Hazel Wood High School	Low	Negligible	Negligible
R24	Residential - Alder Avenue	Low	Negligible	Negligible
R25	Residential - Ferngrove	Low	Negligible	Negligible
R26	Residential - Bury New Road	Low	Negligible	Negligible
R27	Residential - Heap Brow	Low	Negligible	Negligible

Receptor		Receptor Sensitivity	Magnitude of Change	Effect Significance
R28	Residential - Moss Hall Road	Low	Small	Negligible to Minor Adverse
R29	Residential - Moss Hall Road	Low	Small	Negligible to Minor Adverse
R30	Residential - Bury Old Road	Low	Negligible	Negligible
R31	Residential - Bury New Road	Low	Negligible	Negligible
R32	Residential - Bury New Road	Low	Negligible	Negligible
R33	Residential - Bridge Street	Low	Negligible	Negligible
R34	Woodland Community Primary School	Low	Negligible	Negligible
R35	Residential - Pilsworth Road	Low	Negligible	Negligible
R36	Coal Pits Farm	Low	Medium	Minor Adverse
R37	Siddal Moor Farm	Low	Negligible	Negligible
R38	Residential - Manchester Road	Low	Negligible	Negligible
R39	Residential - Manchester Road	Low	Negligible	Negligible
R40	Residential - Manchester Road	Low	Negligible	Negligible
R41	Siddal Farm	Low	Negligible	Negligible
R42	Residential - Coronation Avenue	Low	Negligible	Negligible
R43	Residential - Coronation Avenue	Low	Negligible	Negligible
R44	Residential - Middleton Road	Low	Negligible	Negligible
R45	Residential - Manchester Road	Low	Negligible	Negligible
R46	Highfield Manor Care Home	Low	Negligible	Negligible
R47	Residential - Church Street	Low	Negligible	Negligible
R48	Residential - Rochdale Road	Low	Negligible	Negligible
R49	Residential - Rochdale Road	Low	Negligible	Negligible
R50	Residential - Market Place	Low	Negligible	Negligible
R51	Residential - Market Street	Low	Negligible	Negligible
R52	Residential - Coronation Avenue	Low	Negligible	Negligible

Receptor		Receptor Sensitivity	Magnitude of Change	Effect Significance
R53	Residential - Coronation Avenue	Low	Negligible	Negligible
R54	Residential - Middleton Road	Low	Negligible	Negligible
R55	Residential - Earl Street	Low	Negligible	Negligible
R56	Residential - Hollin Lane	Low	Negligible	Negligible
R57	Residential - Langley Lane	Low	Negligible	Negligible
R58	Residential - Langley Lane	Low	Negligible	Negligible
R59	Residential - Heywood Old Road	Low	Negligible	Negligible
R60	Residential - Whittle Lane	Low	Negligible	Negligible
R61	Whittle Fold Smallholding	Low	Negligible	Negligible
R62	Egypt Farm	Low	Negligible	Negligible
R63	Lower Droughts Farm	Low	Negligible	Negligible
R64	Cowgate Farm	Low	Negligible	Negligible
R65	Droughts Lane	Low	Negligible	Negligible
R66	Residential - Heywood Road	Low	Negligible	Negligible
R67	Heywood Farm	Low	Negligible	Negligible
R68	Residential - Baguley Crescent	Low	Negligible	Negligible
R69	Residential - Old Hall Lane	Low	Negligible	Negligible
R70	Residential - Old Hall Lane	Low	Negligible	Negligible
R71	Residential - Boothroyden Road	Low	Negligible	Negligible
R72	Residential - Middleton Road	Low	Negligible	Negligible
R73	Residential - Manchester Old Road	Low	Negligible	Negligible
R74	Residential - Heywood Old Road	Low	Negligible	Negligible
R75	Residential - Hills Lane	Low	Negligible	Negligible
R76	Unsworth Academy	Low	Negligible	Negligible
R77	Residential - Plantation Grove	Low	Negligible	Negligible

5.2.9 Predicted effects on annual mean PM_{2.5} concentrations at the sensitive receptor locations are summarised in Table 10.1.26.

Table 10.1.26 Predicted Effects - PM_{2.5}

Receptor		Receptor Sensitivity	Magnitude of Change	Effect Significance
R1	Residential - Bury New Road	Low	Negligible	Negligible
R2	Residential - Bury New Road	Low	Negligible	Negligible
R3	Residential - Willow Road	Low	Negligible	Negligible
R4	Cloughside College	Low	Negligible	Negligible
R5	Our Lady of Grace RC Primary School	Low	Negligible	Negligible
R6	Residential - Philips Park Road East	Low	Negligible	Negligible
R7	Residential - Beech Avenue	Low	Negligible	Negligible
R8	Residential - Cross Avenue	Low	Negligible	Negligible
R9	Residential - Hardman's Road	Low	Negligible	Negligible
R10	Residential - Bury New Road	Low	Negligible	Negligible
R11	Residential - Kensington Street	Low	Negligible	Negligible
R12	Residential - Bury New Road	Low	Negligible	Negligible
R13	Regency Care Centre	Low	Negligible	Negligible
R14	The Bridge Day Nursery	Low	Negligible	Negligible
R15	Residential - Hollins Brow	Low	Negligible	Negligible
R16	Residential - Hollins Brow	Low	Small	Negligible to Minor Adverse
R17	Residential - Pilsworth Road	Low	Small	Negligible to Minor Adverse
R18	Jackson Fold Barn	Low	Medium	Minor Adverse
R19	Residential - Waterfold Lane	Low	Negligible	Negligible
R20	Residential - Rochdale Road	Low	Small	Negligible to Minor Adverse
R21	Residential - Wash Lane	Low	Small	Negligible to Minor Adverse
R22	Residential - Rochdale Road	Low	Small	Negligible to Minor Adverse

Receptor		Receptor Sensitivity	Magnitude of Change	Effect Significance
R23	Hazel Wood High School	Low	Negligible	Negligible
R24	Residential - Alder Avenue	Low	Negligible	Negligible
R25	Residential - Ferngrove	Low	Negligible	Negligible
R26	Residential - Bury New Road	Low	Negligible	Negligible
R27	Residential - Heap Brow	Low	Small	Negligible to Minor Adverse
R28	Residential - Moss Hall Road	Low	Medium	Minor Adverse
R29	Residential - Moss Hall Road	Low	Small	Negligible to Minor Adverse
R30	Residential - Bury Old Road	Low	Small	Negligible to Minor Adverse
R31	Residential - Bury New Road	Low	Negligible	Negligible
R32	Residential - Bury New Road	Low	Negligible	Negligible
R33	Residential - Bridge Street	Low	Small	Negligible to Minor Adverse
R34	Woodland Community Primary School	Low	Negligible	Negligible
R35	Residential - Pilsworth Road	Low	Small	Negligible to Minor Adverse
R36	Coal Pits Farm	Low	Large	Minor to Moderate Adverse
R37	Siddal Moor Farm	Low	Negligible	Negligible
R38	Residential - Manchester Road	Low	Negligible	Negligible
R39	Residential - Manchester Road	Low	Small	Negligible to Minor Adverse
R40	Residential - Manchester Road	Low	Negligible	Negligible
R41	Siddal Farm	Low	Negligible	Negligible
R42	Residential - Coronation Avenue	Low	Negligible	Negligible
R43	Residential - Coronation Avenue	Low	Negligible	Negligible
R44	Residential - Middleton Road	Low	Negligible	Negligible
R45	Residential - Manchester Road	Low	Negligible	Negligible
R46	Highfield Manor Care Home	Low	Negligible	Negligible
R47	Residential - Church Street	Low	Negligible	Negligible

Receptor		Receptor Sensitivity	Magnitude of Change	Effect Significance
R48	Residential - Rochdale Road	Low	Negligible	Negligible
R49	Residential - Rochdale Road	Low	Negligible	Negligible
R50	Residential - Market Place	Low	Negligible	Negligible
R51	Residential - Market Street	Low	Negligible	Negligible
R52	Residential - Coronation Avenue	Low	Negligible	Negligible
R53	Residential - Coronation Avenue	Low	Small	Negligible to Minor Adverse
R54	Residential - Middleton Road	Low	Negligible	Negligible
R55	Residential - Earl Street	Low	Negligible	Negligible
R56	Residential - Hollin Lane	Low	Negligible	Negligible
R57	Residential - Langley Lane	Low	Negligible	Negligible
R58	Residential - Langley Lane	Low	Small	Negligible to Minor Adverse
R59	Residential - Heywood Old Road	Low	Negligible	Negligible
R60	Residential - Whittle Lane	Low	Negligible	Negligible
R61	Whittle Fold Smallholding	Low	Negligible	Negligible
R62	Egypt Farm	Low	Negligible	Negligible
R63	Lower Droughts Farm	Low	Negligible	Negligible
R64	Cowgate Farm	Low	Negligible	Negligible
R65	Droughts Lane	Low	Negligible	Negligible
R66	Residential - Heywood Road	Low	Negligible	Negligible
R67	Heywood Farm	Low	Negligible	Negligible
R68	Residential - Baguley Crescent	Low	Small	Negligible to Minor Adverse
R69	Residential - Old Hall Lane	Low	Negligible	Negligible
R70	Residential - Old Hall Lane	Low	Negligible	Negligible
R71	Residential - Boothroyden Road	Low	Negligible	Negligible
R72	Residential - Middleton Road	Low	Small	Negligible to Minor Adverse

Receptor		Receptor Sensitivity	Magnitude of Change	Effect Significance
R73	Residential - Manchester Old Road	Low	Negligible	Negligible
R74	Residential - Heywood Old Road	Low	Negligible	Negligible
R75	Residential - Hills Lane	Low	Negligible	Negligible
R76	Unsworth Academy	Low	Negligible	Negligible
R77	Residential - Plantation Grove	Low	Negligible	Negligible

Summary

5.2.10 The predicted effects as a result of the Project for Assessment can be summarised as follows:

- Effects on annual mean NO₂ concentrations ranged from **negligible** to **minor to moderate adverse**;
- Effects on annual mean PM₁₀ concentrations ranged from **negligible** to **minor adverse**; and,
- Effects on annual mean PM_{2.5} concentrations ranged from **negligible** to **minor to moderate adverse**.

5.2.11 The assessment findings are discussed further in the main Environmental Statement Chapter.

5.3 Assessment 2 - Cumulative Assessment

Predicted Concentrations

5.3.1 Annual mean NO₂ concentrations were predicted at the sensitive receptor locations for the DM and DS Cumulative scenarios. These are summarised in Table 10.1.27. Exceedences of the AQO are shown in **bold**.

Table 10.1.27 Predicted Annual Mean NO₂ Concentrations

Receptor		Predicted Annual Mean NO ₂ Concentration (µg/m ³)		
		DM	DS Cumulative	Change
R1	Residential - Bury New Road	17.12	17.05	-0.07
R2	Residential - Bury New Road	19.04	18.97	-0.07
R3	Residential - Willow Road	19.02	18.97	-0.05
R4	Cloughside College	16.33	16.35	0.02
R5	Our Lady of Grace RC Primary School	15.97	15.98	0.01
R6	Residential - Philips Park Road East	38.23	38.23	0.00
R7	Residential - Beech Avenue	32.90	32.90	0.00
R8	Residential - Cross Avenue	25.11	25.12	0.01
R9	Residential - Hardman's Road	42.47	42.58	0.11
R10	Residential - Bury New Road	30.83	30.97	0.14
R11	Residential - Kensington Street	48.69	48.67	-0.02
R12	Residential - Bury New Road	30.95	31.24	0.29
R13	Regency Care Centre	16.10	16.46	0.36
R14	The Bridge Day Nursery	19.52	20.04	0.52
R15	Residential - Hollins Brow	15.43	15.77	0.34
R16	Residential - Hollins Brow	19.79	20.44	0.65
R17	Residential - Pilsworth Road	18.87	19.48	0.61
R18	Jackson Fold Barn	15.40	17.55	2.15
R19	Residential - Waterfold Lane	15.85	16.24	0.39
R20	Residential - Rochdale Road	23.48	24.19	0.71
R21	Residential - Wash Lane	22.40	23.02	0.62
R22	Residential - Rochdale Road	23.60	24.55	0.95
R23	Hazel Wood High School	18.26	18.67	0.41
R24	Residential - Alder Avenue	28.62	29.13	0.51

Receptor		Predicted Annual Mean NO ₂ Concentration (µg/m ³)		
		DM	DS Cumulative	Change
R25	Residential - Ferngrove	29.77	30.23	0.46
R26	Residential - Bury New Road	16.37	16.89	0.52
R27	Residential - Heap Brow	15.22	16.16	0.94
R28	Residential - Moss Hall Road	14.80	16.81	2.01
R29	Residential - Moss Hall Road	14.19	15.49	1.30
R30	Residential - Bury Old Road	13.88	14.80	0.92
R31	Residential - Bury New Road	21.32	21.79	0.47
R32	Residential - Bury New Road	14.67	14.91	0.24
R33	Residential - Bridge Street	20.83	22.22	1.39
R34	Woodland Community Primary School	12.41	12.68	0.27
R35	Residential - Pilsworth Road	18.02	19.03	1.01
R36	Coal Pits Farm	15.06	25.99	10.93
R37	Siddal Moor Farm	13.88	14.28	0.40
R38	Residential - Manchester Road	19.56	19.84	0.28
R39	Residential - Manchester Road	19.12	19.79	0.67
R40	Residential - Manchester Road	37.82	38.33	0.51
R41	Siddal Farm	20.05	20.24	0.19
R42	Residential - Coronation Avenue	17.55	17.86	0.31
R43	Residential - Coronation Avenue	16.88	17.28	0.40
R44	Residential - Middleton Road	18.17	18.21	0.04
R45	Residential - Manchester Road	19.50	19.63	0.13
R46	Highfield Manor Care Home	16.04	16.22	0.18
R47	Residential - Church Street	19.21	19.88	0.67
R48	Residential - Rochdale Road	17.45	17.99	0.54
R49	Residential - Rochdale Road	15.71	16.15	0.44

Receptor		Predicted Annual Mean NO ₂ Concentration (µg/m ³)		
		DM	DS Cumulative	Change
R50	Residential - Market Place	16.07	16.66	0.59
R51	Residential - Market Street	15.08	15.59	0.51
R52	Residential - Coronation Avenue	22.73	23.24	0.51
R53	Residential - Coronation Avenue	32.62	33.79	1.17
R54	Residential - Middleton Road	21.24	21.96	0.72
R55	Residential - Earl Street	21.44	21.76	0.32
R56	Residential - Hollin Lane	17.51	18.00	0.49
R57	Residential - Langley Lane	14.37	14.65	0.28
R58	Residential - Langley Lane	19.79	20.47	0.68
R59	Residential - Heywood Old Road	15.04	15.42	0.38
R60	Residential - Whittle Lane	28.38	28.81	0.43
R61	Whittle Fold Smallholding	31.05	31.28	0.23
R62	Egypt Farm	31.65	31.88	0.23
R63	Lower Droughts Farm	21.63	21.81	0.18
R64	Cowgate Farm	23.37	23.72	0.35
R65	Droughts Lane	28.20	28.93	0.73
R66	Residential - Heywood Road	20.08	20.43	0.35
R67	Heywood Farm	21.83	22.20	0.37
R68	Residential - Baguley Crescent	29.13	29.69	0.56
R69	Residential - Old Hall Lane	20.58	20.94	0.36
R70	Residential - Old Hall Lane	19.06	19.26	0.20
R71	Residential - Boothroyden Road	18.68	18.76	0.08
R72	Residential - Middleton Road	21.86	22.45	0.59
R73	Residential - Manchester Old Road	18.74	19.02	0.28
R74	Residential - Heywood Old Road	15.48	15.72	0.24

Receptor		Predicted Annual Mean NO ₂ Concentration (µg/m ³)		
		DM	DS Cumulative	Change
R75	Residential - Hills Lane	19.45	19.74	0.29
R76	Unsworth Academy	17.10	17.33	0.23
R77	Residential - Plantation Grove	22.42	22.85	0.43

5.3.2 As indicated in Table 10.1.27, predicted annual mean NO₂ concentrations were above the AQO of 40µg/m³ at two sensitive receptors and below at 75 positions in both scenarios. It should be noted that there were no new exceedences of the AQO in the DS Cumulative scenario when compared with the DM. It should be noted that due to the conservative assumptions adopted regarding future year emission factors, actual concentrations during 2039 are likely to be lower than those presented.

5.3.3 Annual mean PM₁₀ concentrations were predicted at the sensitive receptor locations for the DM and DS Cumulative scenarios. These are summarised in Table 10.1.28.

Table 10.1.28 Predicted Annual Mean PM₁₀ Concentrations

Receptor		Predicted Annual Mean PM ₁₀ Concentration (µg/m ³)		
		DM	DS Cumulative	Change
R1	Residential - Bury New Road	13.63	13.61	-0.01
R2	Residential - Bury New Road	13.93	13.92	-0.01
R3	Residential - Willow Road	13.68	13.68	-0.00
R4	Cloughside College	13.10	13.10	0.01
R5	Our Lady of Grace RC Primary School	13.11	13.11	0.01
R6	Residential - Philips Park Road East	15.89	15.92	0.03
R7	Residential - Beech Avenue	15.56	15.58	0.02
R8	Residential - Cross Avenue	14.32	14.33	0.01
R9	Residential - Hardman's Road	17.45	17.51	0.05
R10	Residential - Bury New Road	15.77	15.81	0.04

Receptor		Predicted Annual Mean PM ₁₀ Concentration (µg/m ³)		
		DM	DS Cumulative	Change
R11	Residential - Kensington Street	17.25	17.29	0.04
R12	Residential - Bury New Road	16.19	16.26	0.08
R13	Regency Care Centre	13.41	13.48	0.07
R14	The Bridge Day Nursery	14.06	14.15	0.09
R15	Residential - Hollins Brow	13.25	13.31	0.05
R16	Residential - Hollins Brow	14.09	14.21	0.12
R17	Residential - Pilsworth Road	13.87	13.98	0.10
R18	Jackson Fold Barn	13.09	13.45	0.36
R19	Residential - Waterfold Lane	12.97	13.01	0.04
R20	Residential - Rochdale Road	14.17	14.28	0.10
R21	Residential - Wash Lane	14.23	14.32	0.09
R22	Residential - Rochdale Road	14.78	14.96	0.18
R23	Hazel Wood High School	13.31	13.36	0.05
R24	Residential - Alder Avenue	14.12	14.17	0.05
R25	Residential - Ferngrove	14.16	14.20	0.05
R26	Residential - Bury New Road	13.28	13.36	0.08
R27	Residential - Heap Brow	13.18	13.33	0.15
R28	Residential - Moss Hall Road	13.12	13.46	0.34
R29	Residential - Moss Hall Road	13.02	13.23	0.21
R30	Residential - Bury Old Road	13.01	13.17	0.16
R31	Residential - Bury New Road	14.42	14.50	0.09
R32	Residential - Bury New Road	13.14	13.18	0.04
R33	Residential - Bridge Street	14.08	14.26	0.18
R34	Woodland Community Primary School	12.75	12.79	0.04
R35	Residential - Pilsworth Road	13.75	13.90	0.15

Receptor		Predicted Annual Mean PM ₁₀ Concentration (µg/m ³)		
		DM	DS Cumulative	Change
R36	Coal Pits Farm	13.14	15.10	1.97
R37	Siddal Moor Farm	12.86	12.92	0.07
R38	Residential - Manchester Road	13.82	13.87	0.05
R39	Residential - Manchester Road	13.58	13.71	0.13
R40	Residential - Manchester Road	15.71	15.83	0.11
R41	Siddal Farm	13.38	13.40	0.02
R42	Residential - Coronation Avenue	13.50	13.55	0.05
R43	Residential - Coronation Avenue	13.31	13.37	0.06
R44	Residential - Middleton Road	13.68	13.68	-0.00
R45	Residential - Manchester Road	13.93	13.95	0.02
R46	Highfield Manor Care Home	13.34	13.37	0.03
R47	Residential - Church Street	13.94	14.03	0.10
R48	Residential - Rochdale Road	13.65	13.73	0.08
R49	Residential - Rochdale Road	13.35	13.42	0.07
R50	Residential - Market Place	13.28	13.34	0.06
R51	Residential - Market Street	13.13	13.19	0.06
R52	Residential - Coronation Avenue	14.15	14.23	0.08
R53	Residential - Coronation Avenue	15.58	15.82	0.24
R54	Residential - Middleton Road	13.92	14.04	0.11
R55	Residential - Earl Street	13.47	13.52	0.04
R56	Residential - Hollin Lane	13.73	13.82	0.08
R57	Residential - Langleys Lane	13.16	13.20	0.05
R58	Residential - Langleys Lane	14.03	14.17	0.14
R59	Residential - Heywood Old Road	13.15	13.23	0.07
R60	Residential - Whittle Lane	14.26	14.33	0.08

Receptor		Predicted Annual Mean PM ₁₀ Concentration (µg/m ³)		
		DM	DS Cumulative	Change
R61	Whittle Fold Smallholding	14.54	14.57	0.02
R62	Egypt Farm	14.62	14.64	0.02
R63	Lower Droughts Farm	13.50	13.52	0.02
R64	Cowgate Farm	13.82	13.87	0.06
R65	Droughts Lane	14.59	14.71	0.12
R66	Residential - Heywood Road	13.36	13.40	0.04
R67	Heywood Farm	13.40	13.45	0.04
R68	Residential - Baguley Crescent	14.95	15.08	0.13
R69	Residential - Old Hall Lane	13.52	13.58	0.06
R70	Residential - Old Hall Lane	13.67	13.70	0.04
R71	Residential - Boothroyden Road	13.13	13.14	0.01
R72	Residential - Middleton Road	14.06	14.18	0.12
R73	Residential - Manchester Old Road	13.64	13.69	0.05
R74	Residential - Heywood Old Road	13.25	13.30	0.05
R75	Residential - Hills Lane	13.24	13.28	0.04
R76	Unsworth Academy	13.02	13.06	0.03
R77	Residential - Plantation Grove	13.47	13.53	0.07

5.3.4 As indicated in Table 10.1.28, predicted annual mean PM₁₀ concentrations were below the AQO of 40µg/m³ at all sensitive receptors in both scenarios.

5.3.5 Annual mean PM_{2.5} concentrations were predicted at the sensitive receptor locations for the DM and DS Cumulative scenarios. These are summarised in Table 10.1.29.

Table 10.1.29 Predicted Annual Mean PM_{2.5} Concentrations

Receptor		Predicted Annual Mean PM _{2.5} Concentration (µg/m ³)		
		DM	DS Cumulative	Change
R1	Residential - Bury New Road	6.83	6.82	-0.01
R2	Residential - Bury New Road	6.99	6.99	-0.01
R3	Residential - Willow Road	6.89	6.88	-0.00
R4	Cloughside College	6.59	6.59	0.00
R5	Our Lady of Grace RC Primary School	6.58	6.59	0.00
R6	Residential - Philips Park Road East	8.32	8.34	0.02
R7	Residential - Beech Avenue	8.00	8.01	0.01
R8	Residential - Cross Avenue	7.28	7.29	0.01
R9	Residential - Hardman's Road	9.05	9.08	0.03
R10	Residential - Bury New Road	8.04	8.07	0.02
R11	Residential - Kensington Street	9.21	9.24	0.02
R12	Residential - Bury New Road	8.23	8.27	0.04
R13	Regency Care Centre	6.72	6.75	0.04
R14	The Bridge Day Nursery	7.06	7.11	0.05
R15	Residential - Hollins Brow	6.63	6.66	0.03
R16	Residential - Hollins Brow	7.08	7.14	0.06
R17	Residential - Pilsworth Road	6.97	7.03	0.06
R18	Jackson Fold Barn	6.56	6.76	0.20
R19	Residential - Waterfold Lane	6.51	6.54	0.03
R20	Residential - Rochdale Road	7.17	7.23	0.06
R21	Residential - Wash Lane	7.17	7.23	0.05
R22	Residential - Rochdale Road	7.45	7.55	0.10
R23	Hazel Wood High School	6.70	6.73	0.03
R24	Residential - Alder Avenue	7.23	7.26	0.03

Receptor		Predicted Annual Mean PM _{2.5} Concentration (µg/m ³)		
		DM	DS Cumulative	Change
R25	Residential - Ferngrove	7.27	7.29	0.03
R26	Residential - Bury New Road	6.66	6.71	0.04
R27	Residential - Heap Brow	6.60	6.68	0.08
R28	Residential - Moss Hall Road	6.57	6.75	0.18
R29	Residential - Moss Hall Road	6.51	6.63	0.12
R30	Residential - Bury Old Road	6.51	6.59	0.08
R31	Residential - Bury New Road	7.25	7.30	0.05
R32	Residential - Bury New Road	6.57	6.60	0.02
R33	Residential - Bridge Street	7.07	7.17	0.10
R34	Woodland Community Primary School	6.37	6.39	0.02
R35	Residential - Pilsworth Road	6.90	6.99	0.09
R36	Coal Pits Farm	6.58	7.66	1.08
R37	Siddal Moor Farm	6.44	6.48	0.04
R38	Residential - Manchester Road	6.96	6.99	0.03
R39	Residential - Manchester Road	6.84	6.91	0.07
R40	Residential - Manchester Road	8.19	8.25	0.06
R41	Siddal Farm	6.77	6.79	0.01
R42	Residential - Coronation Avenue	6.78	6.80	0.03
R43	Residential - Coronation Avenue	6.68	6.72	0.03
R44	Residential - Middleton Road	6.87	6.87	0.00
R45	Residential - Manchester Road	7.00	7.01	0.01
R46	Highfield Manor Care Home	6.69	6.70	0.02
R47	Residential - Church Street	7.00	7.05	0.05
R48	Residential - Rochdale Road	6.85	6.89	0.05
R49	Residential - Rochdale Road	6.68	6.72	0.04

Receptor		Predicted Annual Mean PM _{2.5} Concentration (µg/m ³)		
		DM	DS Cumulative	Change
R50	Residential - Market Place	6.65	6.68	0.04
R51	Residential - Market Street	6.57	6.60	0.03
R52	Residential - Coronation Avenue	7.15	7.20	0.05
R53	Residential - Coronation Avenue	7.99	8.12	0.13
R54	Residential - Middleton Road	7.03	7.09	0.06
R55	Residential - Earl Street	6.84	6.87	0.03
R56	Residential - Hollin Lane	6.88	6.93	0.05
R57	Residential - Langley Lane	6.58	6.60	0.03
R58	Residential - Langley Lane	7.05	7.13	0.07
R59	Residential - Heywood Old Road	6.59	6.62	0.04
R60	Residential - Whittle Lane	7.32	7.36	0.04
R61	Whittle Fold Smallholding	7.51	7.52	0.01
R62	Egypt Farm	7.56	7.57	0.01
R63	Lower Droughts Farm	6.85	6.87	0.01
R64	Cowgate Farm	7.03	7.06	0.03
R65	Droughts Lane	7.46	7.53	0.07
R66	Residential - Heywood Road	6.75	6.78	0.03
R67	Heywood Farm	6.80	6.82	0.03
R68	Residential - Baguley Crescent	7.61	7.69	0.07
R69	Residential - Old Hall Lane	6.83	6.87	0.04
R70	Residential - Old Hall Lane	6.88	6.90	0.02
R71	Residential - Boothroyden Road	6.62	6.63	0.01
R72	Residential - Middleton Road	7.09	7.15	0.06
R73	Residential - Manchester Old Road	6.86	6.89	0.03
R74	Residential - Heywood Old Road	6.64	6.66	0.03

Receptor		Predicted Annual Mean PM _{2.5} Concentration (µg/m ³)		
		DM	DS Cumulative	Change
R75	Residential - Hills Lane	6.69	6.71	0.03
R76	Unsworth Academy	6.55	6.58	0.02
R77	Residential - Plantation Grove	6.83	6.88	0.04

5.3.6 As indicated in Table 10.1.23, predicted annual mean PM_{2.5} concentrations were below the Concentration Target of 10µg/m³ at all sensitive receptors in both scenarios.

Predicted Effects

5.3.7 Predicted effects on annual mean NO₂ concentrations at the sensitive receptor locations are summarised in Table 10.1.30.

Table 10.1.30 Predicted Cumulative Effects - NO₂

Receptor		Receptor Sensitivity	Magnitude of Change	Effect Significance
R1	Residential - Bury New Road	Low	Negligible	Negligible
R2	Residential - Bury New Road	Low	Negligible	Negligible
R3	Residential - Willow Road	Low	Negligible	Negligible
R4	Cloughside College	Low	Negligible	Negligible
R5	Our Lady of Grace RC Primary School	Low	Negligible	Negligible
R6	Residential - Philips Park Road East	Medium	Negligible	Negligible
R7	Residential - Beech Avenue	Low	Negligible	Negligible
R8	Residential - Cross Avenue	Low	Negligible	Negligible
R9	Residential - Hardman's Road	High	Negligible	Negligible
R10	Residential - Bury New Road	Low	Negligible	Negligible
R11	Residential - Kensington Street	High	Negligible	Negligible

Receptor		Receptor Sensitivity	Magnitude of Change	Effect Significance
R12	Residential - Bury New Road	Low	Small	Negligible to Minor Adverse
R13	Regency Care Centre	Low	Small	Negligible to Minor Adverse
R14	The Bridge Day Nursery	Low	Small	Negligible to Minor Adverse
R15	Residential - Hollins Brow	Low	Small	Negligible to Minor Adverse
R16	Residential - Hollins Brow	Low	Medium	Minor Adverse
R17	Residential - Pilsworth Road	Low	Medium	Minor Adverse
R18	Jackson Fold Barn	Low	Medium	Minor Adverse
R19	Residential - Waterfold Lane	Low	Small	Negligible to Minor Adverse
R20	Residential - Rochdale Road	Low	Medium	Minor Adverse
R21	Residential - Wash Lane	Low	Medium	Minor Adverse
R22	Residential - Rochdale Road	Low	Medium	Minor Adverse
R23	Hazel Wood High School	Low	Small	Negligible to Minor Adverse
R24	Residential - Alder Avenue	Low	Small	Negligible to Minor Adverse
R25	Residential - Ferngrove	Low	Small	Negligible to Minor Adverse
R26	Residential - Bury New Road	Low	Small	Negligible to Minor Adverse
R27	Residential - Heap Brow	Low	Medium	Minor Adverse
R28	Residential - Moss Hall Road	Low	Medium	Minor Adverse
R29	Residential - Moss Hall Road	Low	Medium	Minor Adverse
R30	Residential - Bury Old Road	Low	Medium	Minor Adverse
R31	Residential - Bury New Road	Low	Small	Negligible to Minor Adverse
R32	Residential - Bury New Road	Low	Small	Negligible to Minor Adverse
R33	Residential - Bridge Street	Low	Medium	Minor Adverse
R34	Woodland Community Primary School	Low	Small	Negligible to Minor Adverse
R35	Residential - Pilsworth Road	Low	Medium	Minor Adverse
R36	Coal Pits Farm	Low	Large	Minor to Moderate
R37	Siddal Moor Farm	Low	Small	Negligible to Minor Adverse

Receptor		Receptor Sensitivity	Magnitude of Change	Effect Significance
R38	Residential - Manchester Road	Low	Small	Negligible to Minor Adverse
R39	Residential - Manchester Road	Low	Medium	Minor Adverse
R40	Residential - Manchester Road	Medium	Small	Minor Adverse
R41	Siddal Farm	Low	Negligible	Negligible
R42	Residential - Coronation Avenue	Low	Small	Negligible to Minor Adverse
R43	Residential - Coronation Avenue	Low	Small	Negligible to Minor Adverse
R44	Residential - Middleton Road	Low	Negligible	Negligible
R45	Residential - Manchester Road	Low	Negligible	Negligible
R46	Highfield Manor Care Home	Low	Negligible	Negligible
R47	Residential - Church Street	Low	Medium	Minor Adverse
R48	Residential - Rochdale Road	Low	Small	Negligible to Minor Adverse
R49	Residential - Rochdale Road	Low	Small	Negligible to Minor Adverse
R50	Residential - Market Place	Low	Small	Negligible to Minor Adverse
R51	Residential - Market Street	Low	Small	Negligible to Minor Adverse
R52	Residential - Coronation Avenue	Low	Small	Negligible to Minor Adverse
R53	Residential - Coronation Avenue	Low	Medium	Minor Adverse
R54	Residential - Middleton Road	Low	Medium	Minor Adverse
R55	Residential - Earl Street	Low	Small	Negligible to Minor Adverse
R56	Residential - Hollin Lane	Low	Small	Negligible to Minor Adverse
R57	Residential - Langley Lane	Low	Small	Negligible to Minor Adverse
R58	Residential - Langley Lane	Low	Medium	Minor Adverse
R59	Residential - Heywood Old Road	Low	Small	Negligible to Minor Adverse

Receptor		Receptor Sensitivity	Magnitude of Change	Effect Significance
R60	Residential - Whittle Lane	Low	Small	Negligible to Minor Adverse
R61	Whittle Fold Smallholding	Low	Small	Negligible to Minor Adverse
R62	Egypt Farm	Low	Small	Negligible to Minor Adverse
R63	Lower Droughts Farm	Low	Negligible	Negligible
R64	Cowgate Farm	Low	Small	Negligible to Minor Adverse
R65	Droughts Lane	Low	Medium	Minor Adverse
R66	Residential - Heywood Road	Low	Small	Negligible to Minor Adverse
R67	Heywood Farm	Low	Small	Negligible to Minor Adverse
R68	Residential - Baguley Crescent	Low	Small	Negligible to Minor Adverse
R69	Residential - Old Hall Lane	Low	Small	Negligible to Minor Adverse
R70	Residential - Old Hall Lane	Low	Small	Negligible to Minor Adverse
R71	Residential - Boothroyden Road	Low	Negligible	Negligible
R72	Residential - Middleton Road	Low	Small	Negligible to Minor Adverse
R73	Residential - Manchester Old Road	Low	Small	Negligible to Minor Adverse
R74	Residential - Heywood Old Road	Low	Small	Negligible to Minor Adverse
R75	Residential - Hills Lane	Low	Small	Negligible to Minor Adverse
R76	Unsworth Academy	Low	Small	Negligible to Minor Adverse
R77	Residential - Plantation Grove	Low	Small	Negligible to Minor Adverse

5.3.8 Predicted effects on annual mean PM₁₀ concentrations at the sensitive receptor locations are summarised in Table 10.1.31.

Table 10.1.31 Predicted Cumulative Effects - PM₁₀

Receptor		Receptor Sensitivity	Magnitude of Change	Effect Significance
R1	Residential - Bury New Road	Low	Negligible	Negligible
R2	Residential - Bury New Road	Low	Negligible	Negligible
R3	Residential - Willow Road	Low	Negligible	Negligible
R4	Cloughside College	Low	Negligible	Negligible
R5	Our Lady of Grace RC Primary School	Low	Negligible	Negligible
R6	Residential - Philips Park Road East	Low	Negligible	Negligible
R7	Residential - Beech Avenue	Low	Negligible	Negligible
R8	Residential - Cross Avenue	Low	Negligible	Negligible
R9	Residential - Hardman's Road	Low	Negligible	Negligible
R10	Residential - Bury New Road	Low	Negligible	Negligible
R11	Residential - Kensington Street	Low	Negligible	Negligible
R12	Residential - Bury New Road	Low	Negligible	Negligible
R13	Regency Care Centre	Low	Negligible	Negligible
R14	The Bridge Day Nursery	Low	Negligible	Negligible
R15	Residential - Hollins Brow	Low	Negligible	Negligible
R16	Residential - Hollins Brow	Low	Negligible	Negligible
R17	Residential - Pilsworth Road	Low	Negligible	Negligible
R18	Jackson Fold Barn	Low	Small	Negligible to Minor Adverse
R19	Residential - Waterfold Lane	Low	Negligible	Negligible
R20	Residential - Rochdale Road	Low	Negligible	Negligible
R21	Residential - Wash Lane	Low	Negligible	Negligible
R22	Residential - Rochdale Road	Low	Negligible	Negligible
R23	Hazel Wood High School	Low	Negligible	Negligible
R24	Residential - Alder Avenue	Low	Negligible	Negligible

Receptor		Receptor Sensitivity	Magnitude of Change	Effect Significance
R25	Residential - Ferngrove	Low	Negligible	Negligible
R26	Residential - Bury New Road	Low	Negligible	Negligible
R27	Residential - Heap Brow	Low	Negligible	Negligible
R28	Residential - Moss Hall Road	Low	Small	Negligible to Minor Adverse
R29	Residential - Moss Hall Road	Low	Small	Negligible to Minor Adverse
R30	Residential - Bury Old Road	Low	Negligible	Negligible
R31	Residential - Bury New Road	Low	Negligible	Negligible
R32	Residential - Bury New Road	Low	Negligible	Negligible
R33	Residential - Bridge Street	Low	Negligible	Negligible
R34	Woodland Community Primary School	Low	Negligible	Negligible
R35	Residential - Pilsworth Road	Low	Negligible	Negligible
R36	Coal Pits Farm	Low	Medium	Minor Adverse
R37	Siddal Moor Farm	Low	Negligible	Negligible
R38	Residential - Manchester Road	Low	Negligible	Negligible
R39	Residential - Manchester Road	Low	Negligible	Negligible
R40	Residential - Manchester Road	Low	Negligible	Negligible
R41	Siddal Farm	Low	Negligible	Negligible
R42	Residential - Coronation Avenue	Low	Negligible	Negligible
R43	Residential - Coronation Avenue	Low	Negligible	Negligible
R44	Residential - Middleton Road	Low	Negligible	Negligible
R45	Residential - Manchester Road	Low	Negligible	Negligible
R46	Highfield Manor Care Home	Low	Negligible	Negligible
R47	Residential - Church Street	Low	Negligible	Negligible
R48	Residential - Rochdale Road	Low	Negligible	Negligible
R49	Residential - Rochdale Road	Low	Negligible	Negligible

Receptor		Receptor Sensitivity	Magnitude of Change	Effect Significance
R50	Residential - Market Place	Low	Negligible	Negligible
R51	Residential - Market Street	Low	Negligible	Negligible
R52	Residential - Coronation Avenue	Low	Negligible	Negligible
R53	Residential - Coronation Avenue	Low	Small	Negligible to Minor Adverse
R54	Residential - Middleton Road	Low	Negligible	Negligible
R55	Residential - Earl Street	Low	Negligible	Negligible
R56	Residential - Hollin Lane	Low	Negligible	Negligible
R57	Residential - Langley Lane	Low	Negligible	Negligible
R58	Residential - Langley Lane	Low	Negligible	Negligible
R59	Residential - Heywood Old Road	Low	Negligible	Negligible
R60	Residential - Whittle Lane	Low	Negligible	Negligible
R61	Whittle Fold Smallholding	Low	Negligible	Negligible
R62	Egypt Farm	Low	Negligible	Negligible
R63	Lower Droughts Farm	Low	Negligible	Negligible
R64	Cowgate Farm	Low	Negligible	Negligible
R65	Droughts Lane	Low	Negligible	Negligible
R66	Residential - Heywood Road	Low	Negligible	Negligible
R67	Heywood Farm	Low	Negligible	Negligible
R68	Residential - Baguley Crescent	Low	Negligible	Negligible
R69	Residential - Old Hall Lane	Low	Negligible	Negligible
R70	Residential - Old Hall Lane	Low	Negligible	Negligible
R71	Residential - Boothroyden Road	Low	Negligible	Negligible
R72	Residential - Middleton Road	Low	Negligible	Negligible
R73	Residential - Manchester Old Road	Low	Negligible	Negligible
R74	Residential - Heywood Old Road	Low	Negligible	Negligible
R75	Residential - Hills Lane	Low	Negligible	Negligible

Receptor		Receptor Sensitivity	Magnitude of Change	Effect Significance
R76	Unsworth Academy	Low	Negligible	Negligible
R77	Residential - Plantation Grove	Low	Negligible	Negligible

5.3.9 Predicted effects on annual mean PM_{2.5} concentrations at the sensitive receptor locations are summarised in Table 10.1.32.

Table 10.1.32 Predicted Cumulative Effects - PM_{2.5}

Receptor		Receptor Sensitivity	Magnitude of Change	Effect Significance
R1	Residential - Bury New Road	Low	Negligible	Negligible
R2	Residential - Bury New Road	Low	Negligible	Negligible
R3	Residential - Willow Road	Low	Negligible	Negligible
R4	Cloughside College	Low	Negligible	Negligible
R5	Our Lady of Grace RC Primary School	Low	Negligible	Negligible
R6	Residential - Philips Park Road East	Low	Negligible	Negligible
R7	Residential - Beech Avenue	Low	Negligible	Negligible
R8	Residential - Cross Avenue	Low	Negligible	Negligible
R9	Residential - Hardman's Road	Low	Negligible	Negligible
R10	Residential - Bury New Road	Low	Negligible	Negligible
R11	Residential - Kensington Street	Low	Negligible	Negligible
R12	Residential - Bury New Road	Low	Negligible	Negligible
R13	Regency Care Centre	Low	Negligible	Negligible
R14	The Bridge Day Nursery	Low	Small	Negligible to Minor Adverse
R15	Residential - Hollins Brow	Low	Negligible	Negligible
R16	Residential - Hollins Brow	Low	Small	Negligible to Minor Adverse
R17	Residential - Pilsworth Road	Low	Small	Negligible to Minor Adverse

Receptor		Receptor Sensitivity	Magnitude of Change	Effect Significance
R18	Jackson Fold Barn	Low	Medium	Minor Adverse
R19	Residential - Waterfold Lane	Low	Negligible	Negligible
R20	Residential - Rochdale Road	Low	Small	Negligible to Minor Adverse
R21	Residential - Wash Lane	Low	Small	Negligible to Minor Adverse
R22	Residential - Rochdale Road	Low	Small	Negligible to Minor Adverse
R23	Hazel Wood High School	Low	Negligible	Negligible
R24	Residential - Alder Avenue	Low	Negligible	Negligible
R25	Residential - Ferngrove	Low	Negligible	Negligible
R26	Residential - Bury New Road	Low	Negligible	Negligible
R27	Residential - Heap Brow	Low	Small	Negligible to Minor Adverse
R28	Residential - Moss Hall Road	Low	Medium	Minor Adverse
R29	Residential - Moss Hall Road	Low	Small	Negligible to Minor Adverse
R30	Residential - Bury Old Road	Low	Small	Negligible to Minor Adverse
R31	Residential - Bury New Road	Low	Negligible	Negligible
R32	Residential - Bury New Road	Low	Negligible	Negligible
R33	Residential - Bridge Street	Low	Small	Negligible to Minor Adverse
R34	Woodland Community Primary School	Low	Negligible	Negligible
R35	Residential - Pilsworth Road	Low	Small	Negligible to Minor Adverse
R36	Coal Pits Farm	Low	Large	Minor to Moderate Adverse
R37	Siddal Moor Farm	Low	Negligible	Negligible
R38	Residential - Manchester Road	Low	Negligible	Negligible
R39	Residential - Manchester Road	Low	Small	Negligible to Minor Adverse
R40	Residential - Manchester Road	Low	Small	Negligible to Minor Adverse
R41	Siddal Farm	Low	Negligible	Negligible

Receptor		Receptor Sensitivity	Magnitude of Change	Effect Significance
R42	Residential - Coronation Avenue	Low	Negligible	Negligible
R43	Residential - Coronation Avenue	Low	Negligible	Negligible
R44	Residential - Middleton Road	Low	Negligible	Negligible
R45	Residential - Manchester Road	Low	Negligible	Negligible
R46	Highfield Manor Care Home	Low	Negligible	Negligible
R47	Residential - Church Street	Low	Small	Negligible to Minor Adverse
R48	Residential - Rochdale Road	Low	Negligible	Negligible
R49	Residential - Rochdale Road	Low	Negligible	Negligible
R50	Residential - Market Place	Low	Negligible	Negligible
R51	Residential - Market Street	Low	Negligible	Negligible
R52	Residential - Coronation Avenue	Low	Negligible	Negligible
R53	Residential - Coronation Avenue	Low	Small	Negligible to Minor Adverse
R54	Residential - Middleton Road	Low	Small	Negligible to Minor Adverse
R55	Residential - Earl Street	Low	Negligible	Negligible
R56	Residential - Hollin Lane	Low	Negligible	Negligible
R57	Residential - Langley Lane	Low	Negligible	Negligible
R58	Residential - Langley Lane	Low	Small	Negligible to Minor Adverse
R59	Residential - Heywood Old Road	Low	Negligible	Negligible
R60	Residential - Whittle Lane	Low	Negligible	Negligible
R61	Whittle Fold Smallholding	Low	Negligible	Negligible
R62	Egypt Farm	Low	Negligible	Negligible
R63	Lower Droughts Farm	Low	Negligible	Negligible
R64	Cowgate Farm	Low	Negligible	Negligible

Receptor		Receptor Sensitivity	Magnitude of Change	Effect Significance
R65	Droughts Lane	Low	Small	Negligible to Minor Adverse
R66	Residential - Heywood Road	Low	Negligible	Negligible
R67	Heywood Farm	Low	Negligible	Negligible
R68	Residential - Baguley Crescent	Low	Small	Negligible to Minor Adverse
R69	Residential - Old Hall Lane	Low	Negligible	Negligible
R70	Residential - Old Hall Lane	Low	Negligible	Negligible
R71	Residential - Boothroyden Road	Low	Negligible	Negligible
R72	Residential - Middleton Road	Low	Small	Negligible to Minor Adverse
R73	Residential - Manchester Old Road	Low	Negligible	Negligible
R74	Residential - Heywood Old Road	Low	Negligible	Negligible
R75	Residential - Hills Lane	Low	Negligible	Negligible
R76	Unsworth Academy	Low	Negligible	Negligible
R77	Residential - Plantation Grove	Low	Negligible	Negligible

Summary

5.3.10 The predicted cumulative effects can be summarised as follows:

- Effects on annual mean NO₂ concentrations ranged from **negligible** to **minor to moderate adverse**;
- Effects on annual mean PM₁₀ concentrations ranged from **negligible** to **minor adverse**.
- Effects on annual mean PM_{2.5} concentrations ranged from **negligible** to **minor to moderate adverse**.

5.3.11 The assessment findings are discussed further in the main Environmental Statement Chapter.

5.4 Potential Exposure of Future Residents of the Project for Assessment to Elevated Pollutant Concentrations

- 5.4.1 The Project for Assessment includes residential land use and may therefore introduce new sensitive receptors into areas of poor air quality. As shown in Figure 4.1 of the ES, this use class is limited to Parcel FF, located within the western portion of the Project for Assessment. Receptors R75, R76 and R77 represent likely air quality conditions within this area due to their proximity to the M66, the dominant source of emissions in the local area. As shown previously, predicted annual mean NO₂, PM₁₀ and PM_{2.5} concentrations are below the relevant AQOs and Concentration Target at all of these locations. As such, it can be inferred that levels would also be below the relevant standards at Parcel FF. Future residents of the Project for Assessment are therefore not predicted to be exposed to pollutant concentrations in exceedence of the AQOs and Concentration Target.

6.0 ECOLOGICAL AIR QUALITY ASSESSMENT

6.1 Introduction

6.1.1 The Project for Assessment has the potential to impact on existing air quality at ecological receptors as a result of changes in traffic flows and associated road vehicle exhaust emissions during the operational stage. These were assessed in accordance with 'Natural England's approach to advising competent authorities on the assessment of road traffic emissions under the Habitats Regulations'²⁵. This provides a staged assessment methodology to provide consideration of potential air quality impacts from a development both alone and cumulatively with other developments.

6.2 Assessment Approach

6.2.1 The approach is summarised as follows. Please note that this has been adapted from the NE guidance for ease of reporting:

- Stage 1 - Undertake a baseline study to identify any ecological designations within 200m of a road link subject to changes in traffic flows as a result of the Project for Assessment alone. If there are any features within the relevant distance that are considered sensitive to changes in air quality then the assessment should proceed to Stage 2; and,
- Stage 2 - Determine the predicted change in AADT flow on the identified road links as a result of the Project for Assessment alone and in combination with other relevant plans or projects. If the change in AADT flow is above 1,000 then there is a risk of a significant effect and further assessment is required. If the change in AADT is below 1,000 then then it can be concluded that effects are not significant.

6.2.2 Should the change in vehicle movements exceed the screening criteria outlined above, further assessment is required to consider whether a likely significant effect could occur.

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

6.2.3 It is noted that a Habitats Regulations Assessment (HRA)²⁶ was undertaken by Ricardo Energy & Environment and The Greater Manchester Ecology Team in support of the Greater Manchester Combined Authority (GMCA) Places for Everyone (PfE) Plan²⁷. This included an Appropriate Assessment to determine the potential for air quality effects at the relevant ecological designations as a result of all PfE Plan allocations in-combination with other plans and projects. The NE and IAQM guidance documents^{28 29} state that for individual planning applications, where European designations are a consideration, it is acceptable to adopt the assessment, reasoning, and conclusions of the Local Plan HRA that considers said application. As such, the conclusions of the PfE Plan HRA were considered when determining the potential for air quality effects on the relevant sensitive ecological receptors as a result of the Project for Assessment.

6.2.4 The NE and IAQM guidance documents^{30 31} do not provide a methodology for determining receptor sensitivity, magnitude of change or level of effect for changes in pollutant concentrations at ecological receptors. This aligns with the requirements of the Habitats Regulations, which require a conclusion of whether a likely significant effect may occur as a result of a plan or project. This is a binary judgement of whether the level of effect is **Significant** or **Not Significant** and the conclusion has therefore been adopted when considering the effect of road vehicle exhaust emissions at ecological sites for the purpose of the EIA.

6.3 **Assessment**

6.3.1 The Project for Assessment has the potential to impact on existing air quality at ecological receptors as a result of changes in traffic flows and associated road vehicle exhaust emissions during the operational stage. Potential effects were therefore assessed. This is summarised in the following Sections.

²⁶ Habitats Regulations Assessment of the Places for Everyone Joint Development Plan, Ricardo Energy & Environment and The Greater Manchester Ecology Team, 2022.

²⁷ Places for Everyone Joint Development Plan Document for Bolton, Bury, Manchester, Oldham, Rochdale, Salford, Tameside, Trafford and Wigan, GMCA, 2024.

²⁸ Natural England's approach to advising competent authorities on the assessment of road traffic emissions under the Habitats Regulations, NE, 2018.

²⁹ A guide to the assessment of air quality impacts on designated nature conservation sites, IAQM, 2019.

³⁰ Natural England's approach to advising competent authorities on the assessment of road traffic emissions under the Habitats Regulations, NE, 2018.

³¹ A guide to the assessment of air quality impacts on designated nature conservation sites, IAQM, 2019.

Stage 1

6.3.2 Stage 1 required identification of ecological designations within 200m of a road where a change in traffic flow is predicted to occur as a result of the Project for Assessment. This indicated the following sites should be considered:

- Rochdale Canal Special Area of Conservation (SAC) and Site of Special Scientific Interest (SSSI);
- South Pennine Moors SAC;
- South Pennine Moors Special Protection Area (SPA);
- Manchester Mosses SAC;
- Holcroft Moss SSSI; and,
- Rixton Clay Pits SAC.

6.3.3 Information from the Air Pollution Information System (APIS) website indicated that all designations contain features sensitive to atmospheric pollution. As such, the assessment proceeded to Stage 2.

Stage 2

6.3.4 Predicted vehicle trip generation for the Project for Assessment was provided by Tetra Tech. A review of the traffic data for roads within 200m of the identified designations was undertaken. This indicated that the Project for Assessment alone is predicted to increase AADT flows in the vicinity of the following designation by more than 1,000:

- Rochdale Canal SAC.

6.3.5 The change in vehicle movements in the vicinity of the remaining ecological designations were below 1,000 AADT.

6.3.6 Predicted changes in AADT flows in 2039 as a result of the Project for Assessment, in combination with the committed developments included in the Development Log, were reviewed for roads within 200m of the identified ecological designations. This indicated an increase in the vicinity of the following designations by more than 1,000:

- Rochdale Canal SAC;

- South Pennine Moors SAC;
- South Pennine Moors SPA;
- Manchester Mosses SAC; and,
- Holcroft Moss SSSI.

6.3.7 It should be noted that the change in traffic flows as a result of the Project for Assessment, in-combination with committed developments included in the Development Log, did not exceed 1,000 AADT at Rixton Clay Pitts SAC. No further assessment of potential air quality effects on this designation as considered necessary.

6.3.8 Based on the above, a likely significant effect as a result of the Project for Assessment, in-combination with other plans and projects could not be ruled out at the identified designations and further assessment was required.

6.3.9 In order to further consider potential effects, review of the HRA³² produced in support of the PfE Plan³³ was undertaken. This included an Appropriate Assessment to determine the potential for air quality effects at the above ecological designations as a result of all PfE Plan allocations in-combination with other plans and projects.

6.3.10 The results of the Appropriate Assessment indicated that the PfE Plans alone would have no adverse effect on the integrity of any of the ecological designations. However, there was limited potential for in-combination effects on Holcroft Moss SSSI within Manchester Mosses SAC in relation to proposed strategic highways development, as well as plans being implemented by Warrington Borough Council (WBC). Mitigation in the form of the Draft Holcroft Moss Planning Obligations Joint Supplementary Planning Document (SPD)³⁴ was subsequently implemented by GMCA and WBC to address the identified in-combination impacts. Based on adoption and implementation of the SPD, a likely significant effect on all designations was ruled out. The implications of the SPD on the Project for Assessment are considered below.

³² Habitats Regulations Assessment of the Places for Everyone Joint Development Plan, Ricardo Energy & Environment and The Greater Manchester Ecology Team, 2022.

³³ Places for Everyone Joint Development Plan Document for Bolton, Bury, Manchester, Oldham, Rochdale, Salford, Tameside, Trafford and Wigan, GMCA, 2024.

³⁴ Holcroft Moss Planning Obligations Joint Supplementary Planning Document - Consultation Draft, Greater Manchester Combined Authority, 2024

6.4 Secondary Mitigation or Enhancement

- 6.4.1 The GMCA published the Draft Holcroft Moss Planning Obligations Joint SPD³⁵ in November 2024. This aims to provide guidance on, and facilitate the implementation of, mitigation in order to reduce potential road vehicle exhaust emission impacts on Holcroft Moss SSSI, within Manchester Mosses SAC, as a result of development.
- 6.4.2 The SPD provides a methodology to determine a financial contribution towards restoration measures at Holcroft Moss based on the scale and nature of a development. Subject to payment of the calculated amount, it can then be concluded the proposals would not have a likely significant effect on the designation, either alone or in-combination with other plans and projects.
- 6.4.3 In order to avoid a significant effect from the Project for Assessment or Proposed Scheme on Holcroft Moss SSSI and Manchester Mosses SAC, a Section 106 contribution calculated using the methodology outlined within the Holcroft Moss SPD¹⁸ should be attached to any forthcoming planning consent. Subject to this mitigation, predicted effects are **not significant**.

³⁵ Holcroft Moss Planning Obligations Joint Supplementary Planning Document - Consultation Draft, Greater Manchester Combined Authority, 2024

7.0 PM_{2.5} INTERIM GUIDANCE ASSESSMENT

7.1.1 Interim Planning Guidance³⁶ on the consideration of the PM_{2.5} targets identified in the Environment Act (2021) in planning decisions has been produced by DEFRA. This requires evidence that the key sources of air pollution within a development have been identified and appropriate action to minimise PM_{2.5} and its precursors as far as is reasonably practicable be provided in support of planning applications. To assist the process, two questions and associated considerations are provided. These are summarised in Table 10.1.33, along with the response for the Project for Assessment and the Proposed Scheme.

Table 10.1.33 Interim Planning Guidance Questions

Question	Response
How has exposure to PM_{2.5} been considered when selecting the development site? • Site proximity to people (particularly large populations and/or vulnerable groups, e.g. schools, hospitals, care homes, areas of deprivation) and the impact of the development on these • Site proximity to pollution sources and the impact of these on users of the development • Exposure and emissions during both construction and in-use	The Project for Assessment and Proposed Scheme are located in an area populated by industrial, commercial and residential units, as well as schools and medical facilities. However, the findings of the assessment, as presented in Chapter 10: Air Quality of the ES, indicate that subject to the implementation of the recommend mitigation measures, air quality impacts as a result of the Project for Assessment and the Proposed Scheme are not predicted to be significant at any sensitive receptor in the vicinity of the Sites. Further, any emissions associated with the construction phases will be mitigated through use of the measures outlined in Appendix 10.2 The proposed land use for the Proposed Scheme is not considered a location of relevant exposure for long-term pollutant exposure The Project for Assessment comprises residential land use. However, a large separation distance is present between these properties and road vehicle exhaust emissions associated with traffic travelling on the M66. As such, PM_{2.5} emissions are not considered to impact on future users of the Project for Assessment As outlined in Appendix 10.2, a number of mitigation measures will be used throughout the construction phases in order to reduce fugitive dust emissions as far as practicable. This will control potential exposure at off-site locations

³⁶ <https://uk-air.defra.gov.uk/pm25targets/planning>.

Question	Response
What actions and/or mitigations have been considered to reduce PM_{2.5} exposure for development users and nearby receptors (houses, hospitals, schools etc.) and to reduce emissions of PM_{2.5} and its precursors? • Site layout • The development's design • Technology used in the construction or installed for use in the development • Construction and future use of the development	A number of mitigation measures have been incorporated into the design of the Project for Assessment in order to reduce PM_{2.5} exposure for future residents. These include the following: • Designation of residential land use to areas where there is a sufficient separation distance between the road and associated vehicle exhaust emissions • Trees will be retained along eastern portion of the M66. This will provide screening from potential vehicle exhaust emissions In order to reduce emissions of PM_{2.5} with associated impacts at nearby receptors, a number of measures to encourage the use of sustainable transport modes to and from the site will be implemented. There are presented in Chapter 8: Transport and Access of the ES Further to the above, in order to reduce emissions during the construction phase, a number of mitigation measures will be used to minimise dust generation from associated activities

7.1.2 Based on the responses provided in Table 10.1.33 and the assessment results, it is considered that the development has identified key sources of air pollution and taken appropriate action to minimise emissions of PM_{2.5}.

8.0 SENSITIVITY ANALYSIS

8.1 Introduction

8.1.1 A Sensitivity Analysis has been undertaken to determine the potential for air quality impacts associated with the Project for Assessment against the existing 2024 baseline. The results of this exercise have subsequently been compared with the findings of Assessment 1 to identify any differences. This is provided in the following Sections.

8.2 Modelling Scenarios

8.2.1 Dispersion modelling was undertaken to inform the Sensitivity Analysis. This comprised the following specific modelling scenarios:

- DM2 - Traffic flows for 2024; and,
- DS2 - Traffic flows for 2024 should the Project for Assessment be completed.

8.3 Assessment Considerations

8.3.1 The following considerations were made as part of the assessment to ensure robust outputs:

- Changes in traffic flows associated with highways enhancements as a result of the South Heywood Road Link and Birch Services were not included. This does not allow for improvements in junction capacities and vehicle distribution on the local road network. As such, predicted concentrations can be consider robust; and,
- Traffic data representing the Project for Assessment rather than solely the Proposed Scheme was utilised. This ensured the maximum impact on the road network was considered.

8.4 Sensitive Receptors

8.4.1 The same sensitive receptors chosen for Assessment 1, as outlined in **Table 10.1.20**, were utilised in the Sensitivity Analysis. Reference should be made to **Figure 10.4** for a graphical representation of road vehicle exhaust emission sensitive receptor locations.

8.5 Dispersion Modelling Inputs

8.5.1 The inputs for the dispersion modelling were identical to those outlined in Section 3.5, with the exception of the following:

- Traffic data; and,
- Background concentrations.

8.5.2 These inputs are provided in the following Sections.

Traffic Data

8.5.3 Traffic data for use in the Sensitivity Analysis, including 24-hour AADT flows and fleet composition as HDV proportion, was provided by Tetra Tech. This is summarised in Table 10.1.34.

Table 10.1.34 Traffic Data

Link		24-hour AADT Flow		HDV Prop. of Fleet (%)	
		DM2	DS2	DM2	DS2
L1	M60 Southwest of Jct 17 - EB	83,003	85,230	13.47	13.79
L2	M60 Southwest of Jct 17 - WB	76,023	74,686	13.17	13.86
L3	M60 NB off slip road (Immediately west of Junction 17)	12,213	12,169	10.02	10.03
L4	M60 NB off slip road (Immediately west of Junction 17), SP	12,213	12,169	10.02	10.03
L5	M60 SWB on slip road (Immediately west of Junction 17)	12,291	13,479	14.42	13.35
L6	M60 Jct 17 - through roads NEB between slip roads	70,791	73,062	14.06	14.41
L7	M60 Jct 17 - through roads SWB between slip roads	63,730	61,202	12.93	13.98
L8	M60 NEB on slip road (Immediately east of Junction 17)	11,715	14,047	4.10	4.30
L9	M60 SB off slip road (Immediately east of Junction 17), SP	11,835	11,720	4.64	4.75

Link		24-hour AADT Flow		HDV Prop. of Fleet (%)	
		DM2	DS2	DM2	DS2
L10	M60 SB off slip road (Immediately east of Junction 17)	11,835	11,720	4.64	4.75
L11	M62 west of Jct 18 - NB	82,491	87,093	12.66	12.80
L11A	M62 west of Jct 18 - NB - Noise Barrier	82,491	87,093	12.66	12.80
L11B	M62 west of Jct 18 - Slip Road to M62 - NB	82,491	87,093	12.66	12.80
L12	M62 west of Jct 18 - SB	75,565	72,922	11.63	12.49
L13	A56 Bury New Road SB (Immediately south of Junction 17)	11,063	10,733	3.95	4.40
L14	A56 Bury New Road (Immediately south of Junction 17)	23,684	25,908	3.86	4.19
L15	A56 Bury New Road NB (Immediately south of Junction 17)	12,621	15,174	3.77	4.03
L16	A56 Bury New Road NB (Immediately south of Junction 17), SP	12,621	15,174	3.77	4.03
L17	A56 Bury New Road NB (Immediately north of Junction 17)	20,110	20,153	6.93	6.76
L18	A56 Bury New Road NB, SP	20,110	20,153	6.93	6.76
L18A	A56 Bury New Road NB	20,110	20,153	6.93	6.76
L19	A56 Bury New Road SB	18,506	19,342	9.92	9.59
L19A	A56 Bury New Road SB, SP	18,506	19,342	9.92	9.59
L20	A56 Bury New Road SB (Immediately north of Junction 17)	18,506	19,342	9.92	9.59
L21	A56 Bury New Road SB (Immediately north of Junction 17), SP	18,506	19,342	9.92	9.59
L22	M62 NB off slip (north of M62/M66 Jct 18)	35,416	38,148	10.73	11.10
L23	M62 NB off slip to roundabout (north of M62/M66 Jct 18), SP	17,708	19,074	10.73	11.10
L24	M62 NB off slip to M66 (north of M62/M66 Jct 18)	17,708	19,074	10.73	11.10
L25	M62 WB on slip (west of M62/M66 Jct 18)	30,014	26,599	8.15	10.39
L26	M62 WB on slip from roundabout (west of M62/M66 Jct 18)	15,007	13,299	8.15	10.39

Link		24-hour AADT Flow		HDV Prop. of Fleet (%)	
		DM2	DS2	DM2	DS2
L27	M62 WB on slip from M60 (west of M62/M66 Jct 18)	15,007	13,299	8.15	10.39
L28	Jun 18 - M62 through roads EB between slip roads	47,076	48,945	14.12	14.12
L29	Jun 18 - M62 through roads EB between slip roads	45,522	46,528	13.98	13.73
L30	M62 EB on slip from roundabout (east of M62/M66 Jct 18)	9,533	7,716	7.03	7.18
L31	M62 EB on slip from M66 (east of M62/M66 Jct 18)	9,533	7,716	7.03	7.18
L32	M62 EB on slip (east of M62/M66 Jct 18)	19,065	15,431	7.03	7.18
L33	M62 SB off slip (east of M62/M66 Jct 18)	11,648	12,802	5.29	4.85
L34	M62 SB off slip to roundabout (east of M62/M66 Jct 18), SP	5,824	6,401	5.29	4.85
L35	M62 SB off slip to M60 (east of M62/M66 Jct 18)	5,824	6,401	5.29	4.85
L36	M62 between Jct 18 and Birch Services - EB	66,130	64,368	12.09	12.47
L36A	M62 between Birch Services Slip Road - EB	62,380	60,585	10.94	11.31
L36B	M62 between Birch Services and Jct 19 - EB	66,037	64,256	12.08	12.48
L37	M62 between Jct 18 and Birch Services - WB	57,170	59,330	12.21	11.81
L37A	M62 between Birch Services Slip Road - WB	53,395	55,517	11.12	10.74
L37B	M62 between Birch Services and Jct 19 - WB	57,226	59,354	12.36	11.96
L38	Jun 18 - M62 through roads SWB between slip roads	25,334	25,744	4.91	5.95
L39	Jun 18 - M62 through roads NEB between slip roads	25,764	28,256	5.83	6.38
L40	M60 NB on slip from roundabout (north of M62/M66 Jct 18)	9,375	9,951	9.16	10.34
L41	M60 NB on slip (north of M62/M66 Jct 18)	18,751	19,903	9.16	10.34
L42	M60 EB off slip to roundabout (north of M62/M66 Jct 18)	10,249	10,658	8.94	10.40
L43	M60 EB off slip (north of M62/M66 Jct 18)	20,498	21,316	8.94	10.40

Link		24-hour AADT Flow		HDV Prop. of Fleet (%)	
		DM2	DS2	DM2	DS2
L44	M66 between Jct 3 and M62 Jct 18 - NB	44,517	48,163	7.23	8.01
L45	M66 between Jct 3 and M62 Jct 18 - SB	45,832	47,059	6.71	7.97
L46	M60 SB on slip from roundabout (south of M62/M66 Jct 18)	3,425	3,495	4.87	4.81
L47	M60 SB on slip (south of M62/M66 Jct 18)	6,850	6,990	4.87	4.81
L48	M60 WB off slip to roundabout (south of M62/M66 Jct 18)	14,151	10,277	5.93	6.81
L49	M60 WB off slip (south of M62/M66 Jct 18)	28,303	20,555	5.93	6.81
L50	M60 between M62 Jct 18 and M60 jct 19 - EB	53,366	56,384	6.88	7.18
L51	M60 between M62 Jct 18 and M60 jct 19 - WB	54,066	48,810	5.88	6.56
L52	M60 SEB off slip (west of M60 Jct 19)	11,378	13,185	3.22	3.24
L53	M60 SEB off slip (west of M60 Jct 19), SP	11,378	13,185	3.22	3.24
L54	M60 NWB on slip (west of M60 Jct 19)	12,386	10,462	4.17	4.04
L55	M60 NWB on slip from roundabout (west of M60 Jct 19)	6,193	5,231	4.17	4.04
L56	M60 NWB on slip from A576 (west of M60 Jct 19)	6,193	5,231	4.17	4.04
L57	Jun 19 - M60 EB through road link	41,988	43,199	7.87	8.38
L58	Jun 19 - M60 WB through road link	41,684	38,353	6.38	7.24
L59	M60 SWB off slip to roundabout (east of M60 Jct 19), SP	9,253	10,133	3.50	3.48
L60	M60 SWB off slip (east of M60 Jct 19)	9,253	10,133	3.50	3.48
L61	M60 EB on slip from roundabout (east of M60 Jct 19)	5,001	5,030	2.92	2.76
L62	M60 EB on slip from Manchester Old Road (east of M60 Jct 19)	5,001	5,030	2.92	2.76
L63	M60 EB on slip (east of M60 Jct 19)	10,003	10,061	2.92	2.76
L64	M60 South of Jct 19 - EB	51,991	53,258	6.92	7.32
L65	M60 South of Jct 19 - WB	50,936	48,486	5.86	6.45

Link		24-hour AADT Flow		HDV Prop. of Fleet (%)	
		DM2	DS2	DM2	DS2
L66	A576 Middleton Road SWB (south of M60 Jct 19)	18,996	19,671	1.87	1.89
L67	A576 Middleton Road NWB to roundabout (south of M60 Jct 19)	11,004	9,954	2.18	1.94
L68	A576 Middleton Road NWB (south of M60 Jct 19)	22,008	19,908	2.18	1.94
L69	A576 WB (north of M60 Jct 19), SP	5,511	5,923	3.30	2.96
L70	A576 WB (north of M60 Jct 19)	11,022	11,846	3.30	2.96
L71	A576 NEB (north of M60 Jct 19), SP	12,275	14,866	3.02	3.01
L72	A576 NEB (north of M60 Jct 19)	12,275	14,866	3.02	3.01
L73	A576 Manchester Old Road (east of A6045/ A576 / Kelvin Avenue Jct), SP	15,256	16,239	3.34	3.38
L74	A576 Manchester Old Road (east of A6045/ A576 / Kelvin Avenue Jct)	15,256	16,239	3.34	3.38
L75	A576 Manchester Old Road (east of A6045/ A576 / Kelvin Avenue Jct) to Kemp Street, SP	15,256	16,239	3.34	3.38
L76	A576 Middleton Way, SEB	7,903	8,572	3.08	3.29
L77	A576 Middleton Way, NWB, SP	7,354	7,666	3.62	3.49
L78	A6045 Heywood Old Road (north of A6045/ A576 / Kelvin Avenue Jct), SP	11,059	13,405	2.79	2.48
L79	A6045 Heywood Old Road (north of A6045/ A576 / Kelvin Avenue Jct)	11,059	13,405	2.79	2.48
L80	A6045 Heywood Old Road (South of A6045/ Langley Lane Junction), SP	13,659	13,881	2.00	2.15
L81	A6045 Heywood Old Road (North of A6045/ Langley Lane Junction)	8,761	10,665	3.14	2.78
L82	A6045 Manchester Road (south of the A6045 Manchester Road/ Workers Way Jct), SP	4,792	6,424	3.43	3.17
L83	SHLR (A6045 to M62 J19) to Manchester Road, NB	4,264	4,762	2.81	2.15
L84	M62 NEB off slip (Junction 19)	5,461	5,689	7.91	11.19

Link		24-hour AADT Flow		HDV Prop. of Fleet (%)	
		DM2	DS2	DM2	DS2
L85	M62 NEB off slip to roundabout (Junction 19), SP	2,730	2,845	7.91	11.19
L86	QEII Way, WB (Immediately Northwest of Jct 19)	5,007	6,212	8.86	20.42
L87	M62 SWB on slip (Junction 19)	6,092	6,656	6.62	6.06
L88	Jun 19 - M62 through roads SWB between slip roads	60,576	58,567	12.46	12.60
L89	Jun 19 - M62 through roads NEB between slip roads	51,133	52,697	13.05	12.71
L90	M62 NEB on slip (Junction 19)	5,562	8,469	6.87	10.54
L91	M62 SWB off slip (Junction 19)	6,881	6,826	6.52	13.45
L92	M62 SWB off slip (Junction 19), SP	6,881	6,826	6.52	13.45
L93	M62 between Jct 19 and 20 - EB	66,136	67,035	11.99	12.34
L94	M62 between Jct 19 and 20 - WB	58,014	59,524	12.27	12.80
L95	A6046 Middleton Road NB (south of the A6046 Middleton Road/ Tangmere Avenue/ Lenten Grove Jct)	8,269	7,929	4.50	4.60
L96	A6046 Middleton Road SB (south of the A6046 Middleton Road/ Tangmere Avenue/ Lenten Grove Jct), SP	9,819	9,929	3.18	3.13
L97	A6046 Middleton Road (south of the A6046 Middleton Road/ Tangmere Avenue/ Lenten Grove Jct)	18,087	17,858	3.78	3.78
L98	A6046 Middleton Road (south of the A6046 Middleton Road/ Tangmere Avenue/ Lenten Grove Jct), SP	18,087	17,858	3.78	3.78
L99	A6046 Middleton Road (north of the A6046 Middleton Road/ Tangmere Avenue/ Lenten Grove Jct), SP	17,698	17,480	3.67	3.67
L100	A6046 Middleton Road (north of the A6046 Middleton Road/ Tangmere Avenue/ Lenten Grove Jct)	17,698	17,480	3.67	3.67
L101	A6046 Middleton Road (south of Coronation Avenue), SP	17,698	17,480	3.67	3.67
L102	Coronation Avenue (West of the Middleton Road/Coronation Avenue Junction), SP	5,877	5,855	8.92	8.85

Link		24-hour AADT Flow		HDV Prop. of Fleet (%)	
		DM2	DS2	DM2	DS2
L103	Coronation Avenue (West of the Middleton Road/Coronation Avenue Junction)	5,877	5,855	8.92	8.85
L104	Coronation Avenue (East of Manchester Road), SP	5,877	5,855	8.92	8.85
L105	A6046 Middleton Road NB (Immediately South of M62 J19), SP	7,257	8,802	3.06	4.23
L106	A6046 Middleton Road SB (Immediately South of M62 J19)	6,915	7,257	2.70	4.21
L107	A6046 Middleton Road (Immediately South of M62 J19)	14,172	16,059	2.88	4.22
L108	QEII Way SEB (Immediately Northwest of Jct 19), SP	2,427	5,279	15.29	18.86
L109	QEII Way SEB (Immediately Northwest of Jct 19)	2,427	5,279	15.29	18.86
L110	SHLR NWB (A6184 to A6184 north of Manchester Road), SP	5,007	6,212	8.86	20.42
L111	SHLR NWB (West of Junction with A6045 Manchester Road)	4,510	5,675	9.30	22.68
L112	SHLR SEB (West of Junction with A6045 Manchester Road)	2,493	4,670	13.98	20.68
L113	SHLR SEB to A6045 Manchester Road, SP	5,713	6,032	3.21	3.12
L114	SHLR SEB (West of Junction with A6045 Manchester Road) to A6184, SP	1,246	2,335	13.98	20.68
L115	SHLR (West of Junction with A6045 Manchester Road)	6,987	10,339	10.99	21.79
L116	A6045 Manchester Road (Immediately North-east of Junction with SHLR), SP	10,332	10,469	3.13	3.11
L117	A6045 Manchester Road (North-east of Junction with SHLR)	10,332	10,469	3.13	3.11
L118	A6045 Manchester Road (North of Junction with Coronation Avenue)	10,681	11,134	2.86	2.78
L119	A6046 Manchester Road (north of the A6046 Manchester/ A6045 Manchester/ Middleton Road Jct)	23,871	23,725	3.58	3.54
L120	Church Street WB	9,629	9,996	3.48	4.09

Link		24-hour AADT Flow		HDV Prop. of Fleet (%)	
		DM2	DS2	DM2	DS2
L121	Rochdale Road	9,629	9,996	3.48	4.09
L122	Market Place to York Street	9,561	9,639	2.67	3.81
L123	Market Street	9,629	9,996	3.48	4.09
L124	Dawson Street to Market Place	9,561	9,639	2.67	3.81
L125	Dawson Street	9,561	9,639	2.67	3.81
L126	A58 Bury Street (East of A58 Bury Street/ Pilsworth Jct)	19,191	19,635	3.08	3.95
L127	A58 Bury Street (west of A58 Bury Street/ Pilsworth Jct)	14,534	14,357	4.76	4.81
L128	A58 Bury Street (west of A58 Bury Street/ Pilsworth Jct), SP	15,188	15,322	3.00	3.01
L129	A58 Bury Street (East of A58 Bury Street/ Pilsworth Jct), SP	19,191	19,635	3.08	3.95
L130	A58 Bury Street (Between Pilsworth Jct and Bury Old Road)	15,188	15,322	3.00	3.01
L131	Market Place	19,191	19,635	3.08	3.95
L132	Church Street to Market Place	9,629	9,996	3.48	4.09
L133	York Street	9,561	9,639	2.67	3.81
L134	York Street to Rochdale Road E	19,191	19,635	3.08	3.95
L135	A58 Bury New Road (west of the A58 Bury New Road/ Heap Brow Jct)	20,675	22,145	3.89	7.17
L136	A58 Bury New Road from roundabout (west of the A58 Bury New Road/ Heap Brow Jct)	9,385	9,774	3.94	6.83
L137	A58 Bury New Road to roundabout (west of the A58 Bury New Road/ Heap Brow Jct)	11,290	12,372	3.85	7.45
L138	A58 Rochdale Road from roundabout (east of the B6221 Wash Lane/A58 Rochdale Road Jct)	23,772	26,626	3.32	4.86
L139	A58 Rochdale Road to roundabout (east of the B6221 Wash Lane/A58 Rochdale Road Jct)	21,444	23,172	3.37	4.53
L140	A58 Rochdale Road (west of the B6221 Wash Lane/ A58 Rochdale Road Jct)	25,858	30,110	3.64	4.87

Link		24-hour AADT Flow		HDV Prop. of Fleet (%)	
		DM2	DS2	DM2	DS2
L141	A58 Rochdale Road to Derby Way	25,858	30,110	3.64	4.87
L142	B6221 Wash Lane (immediately north of the B6221 Wash Lane/A58 Rochdale Road Jct)	19,082	19,255	2.99	4.46
L143	B6221 Wash Lane (north of the B6221 Wash Lane/A58 Rochdale Road Jct)	19,082	19,255	2.99	4.46
L144	M66 NB on slip (north of M66 Jct 2)	4,722	4,453	3.88	3.92
L145	M66 SB off slip (north of M66 Jct 2)	6,006	5,065	3.70	3.27
L146	M66 SB off slip to roundabout (north of M66 Jct 2)	6,006	5,065	3.70	3.27
L147	M66 north of Jct 2 - NB	31,472	33,217	6.37	6.26
L148	M66 north of Jct 2 - SB	33,755	34,231	6.06	6.10
L149	M66 NB off slip to roundabout (south of M66 Jct 2)	16,434	18,686	4.83	4.44
L150	M66 NB off slip (south of M66 Jct 2)	16,434	18,686	4.83	4.44
L151	M66 SB on slip (south of M66 Jct 2)	16,676	17,787	4.62	4.26
L152	Jun 2 - M66 through roads NB between slip roads	26,751	28,764	6.81	6.62
L153	Jun 2 - M66 through roads SB between slip roads	27,750	29,166	6.58	6.59
L154	M66 between Jct 2 and Jct 3 - NB	43,184	47,449	6.06	5.77
L155	M66 between Jct 2 and Jct 3 - SB	44,427	46,955	5.84	5.70
L156	M66 NB on slip (north of M66 Jct 3)	5,326	6,983	3.76	3.88
L157	M66 SB off slip (north of M66 Jct 3)	4,773	7,294	2.77	3.34
L158	M66 SB off slip to roundabout (north of M66 Jct 3)	4,773	7,294	2.77	3.34
L159	M66 NB off slip to roundabout (south of M66 Jct 3)	6,655	7,694	12.05	18.12
L160	M66 NB off slip (south of M66 Jct 3)	6,655	7,694	12.05	18.12
L161	M66 SB on slip (south of M66 Jct 3)	6,178	7,402	9.92	17.73
L162	Jun 3 - M66 through roads NB between slip roads	37,862	40,469	6.38	6.09

Link		24-hour AADT Flow		HDV Prop. of Fleet (%)	
		DM2	DS2	DM2	DS2
L163	Jun 3 - M66 through roads SB between slip roads	39,654	39,662	6.21	6.14
L164	Pilsworth Road (Immediately West of M66 J3)	23,680	25,671	3.31	4.75
L165	Pilsworth Road (SW of the Pilsworth Road/ Pilsworth Way Jct)	23,680	25,671	3.31	4.75
L166	Hollins Brow to Manchester Road	14,366	15,324	1.94	4.12
L167	M66 J3 Connector Road (East of Junction with Pilsworth Road)	17,423	20,499	5.92	10.46
L168	Pilsworth Road (west of the Pilsworth Road / Viridor Haul Road Jct)	10,903	21,913	11.35	15.41
L169	Pilsworth Road (East of M66 Jct 3)	10,903	21,913	11.35	15.41
L170	Langley Lane to Heywood Old Road (East of Junction with A6045)	7,453	6,501	0.60	0.74
L171	Langley Lane (East of Junction with A6045)	7,453	6,501	0.60	0.74
L172	Whittle Lane (South of site centre)	4,632	6,366	0.00	0.00
L173	Whittle Lane (North of site centre)	5,008	19,235	6.60	23.82
L174	Moss Hall Road (Immediately North of 3-Arrows Junction)	12,969	25,670	9.51	16.62
L175	Moss Hall Road (North of Junction with Pilsworth Road)	6,056	7,700	2.87	12.97
L176	Heap Brow (north of the Heap Brow/ Bury Old Road/ Moss Hall Road Jct)	7,273	8,419	2.34	11.37
L177	Bury Old Road (east of the Heap Brow/ Bury Old Road/ Moss Hall Road Jct)	5,381	5,595	1.83	2.19
L178	Pilsworth Road (Between Plot 3 Access to 3-Arrows)	9,855	13,293	11.09	17.83
L179	Pilsworth Road (Immediately North of Junction with SHLR)	7,849	9,091	5.15	7.14
L180	Pilsworth Road (South of A58 Bury Street/ Pilsworth Jct)	8,831	9,749	2.56	4.41
L181	A56 Manchester Road (south of A56 Manchester Road/ Hollins Brow Jct)	20,604	21,477	2.19	2.28

Link		24-hour AADT Flow		HDV Prop. of Fleet (%)	
		DM2	DS2	DM2	DS2
L182	A56 Manchester Road immediately south of Hollins Brow	20,604	21,477	2.19	2.28
L183	A56 Manchester Road immediately north of Hollins Brow	26,609	28,456	1.43	2.52
L184	A56 Manchester Road (north of A56 Manchester Road/ Hollins Brow Jct)	26,609	28,456	1.43	2.52
L185	A6046 Hollin Lane (south of Hollin Lane/ Langley Lane Jct)	17,252	18,111	2.48	3.84
L186	Middleton Road (southeast of the A6046 Manchester/ A6045 Manchester/ Middleton Road Jct)	12,313	12,334	0.98	0.95
L187	Middleton Road (North of the Middleton Road/Coronation Avenue Junction)	12,313	12,334	0.98	0.95
L188	Middleton Road (immediately north of the Middleton Road/Coronation Avenue Junction)	12,313	12,334	0.98	0.95
R1	M60 Jct 17 Roundabout	12,428	13,068	8.33	8.23
R2	M60 Jct 18 Roundabout	20,725	9,938	9.63	11.44
R3	M60 Jct 19 Roundabout	13,872	14,690	2.71	2.72
R4	M62 Jct 19 Roundabout	13,058	14,549	5.44	7.97
R5	M66 Jct 2 Roundabout	13,716	14,742	3.91	4.97
R6	Middleton Way Roundabout	7,628	8,119	3.34	3.38

8.5.4 Reference should be made to **Figure 10.1** for a graphical representation of the road link locations.

Background Concentrations

8.5.5 The annual mean NO₂ concentration for 2024 was calculated from the DT11 - Seathwaite Close monitor using a projection factor in accordance with the DEFRA guidance³⁷.

³⁷ Local Air Quality Management Technical Guidance (TG22), DEFRA, 2022.

8.5.6 Monitoring of annual mean PM₁₀ and PM_{2.5} concentrations is not undertaken at a background location within the modelling extents. As such, predictions for these species were derived by averaging levels for all DEFRA mapping grid squares containing the Assessment Boundary.

8.5.7 The background concentrations used in the assessment are shown in **Table 10.1.35**.

Table 10.1.35 Background Pollutant Concentrations - Sensitivity Analysis Modelling

Pollutant	Annual Mean 2024 Background Concentration (µg/m ³)
NO ₂	14.42
PM ₁₀	13.11
PM _{2.5}	6.87

8.6 Results

8.6.1 The Sensitivity Analysis results are summarised in the following Sections.

Predicted Concentrations

8.6.2 Annual mean NO₂ concentrations were predicted at the sensitive receptor locations for the DM2 and DS2 scenarios. These are summarised in Table 10.1.36. Exceedences of the AQO are shown in **bold**.

Table 10.1.36 Sensitivity Analysis: Predicted Annual Mean NO₂ Concentrations

Receptor		Predicted Annual Mean NO ₂ Concentration (µg/m ³)		
		DM	DS	Change
R1	Residential - Bury New Road	20.70	21.20	0.50
R2	Residential - Bury New Road	22.42	22.93	0.51
R3	Residential - Willow Road	22.63	23.02	0.39
R4	Cloughside College	20.63	20.72	0.09
R5	Our Lady of Grace RC Primary School	20.31	20.44	0.13
R6	Residential - Philips Park Road East	40.92	41.05	0.13

Receptor		Predicted Annual Mean NO ₂ Concentration (µg/m ³)		
		DM	DS	Change
R7	Residential - Beech Avenue	36.05	36.29	0.24
R8	Residential - Cross Avenue	28.74	28.92	0.18
R9	Residential - Hardman's Road	45.28	45.82	0.54
R10	Residential - Bury New Road	34.40	34.61	0.21
R11	Residential - Kensington Street	51.34	51.82	0.48
R12	Residential - Bury New Road	34.54	34.90	0.36
R13	Regency Care Centre	20.50	20.73	0.23
R14	The Bridge Day Nursery	23.41	24.19	0.78
R15	Residential - Hollins Brow	19.81	20.23	0.42
R16	Residential - Hollins Brow	23.56	24.52	0.96
R17	Residential - Pilsworth Road	22.73	23.61	0.88
R18	Jackson Fold Barn	19.62	21.96	2.34
R19	Residential - Waterfold Lane	19.94	20.38	0.44
R20	Residential - Rochdale Road	26.58	27.70	1.12
R21	Residential - Wash Lane	25.96	27.01	1.05
R22	Residential - Rochdale Road	26.53	28.35	1.82
R23	Hazel Wood High School	22.06	22.61	0.55
R24	Residential - Alder Avenue	30.94	31.62	0.68
R25	Residential - Ferngrove	32.10	32.63	0.53
R26	Residential - Bury New Road	20.59	21.30	0.71
R27	Residential - Heap Brow	19.89	21.31	1.42
R28	Residential - Moss Hall Road	19.53	21.47	1.94
R29	Residential - Moss Hall Road	18.91	20.01	1.10
R30	Residential - Bury Old Road	18.63	18.91	0.28
R31	Residential - Bury New Road	24.99	25.12	0.13
R32	Residential - Bury New Road	19.07	19.24	0.17

Receptor		Predicted Annual Mean NO ₂ Concentration (µg/m ³)		
		DM	DS	Change
R33	Residential - Bridge Street	24.28	25.16	0.88
R34	Woodland Community Primary School	16.96	17.20	0.24
R35	Residential - Pilsworth Road	20.87	21.93	1.06
R36	Coal Pits Farm	19.60	30.41	10.81
R37	Siddal Moor Farm	18.10	18.48	0.38
R38	Residential - Manchester Road	22.83	23.25	0.42
R39	Residential - Manchester Road	22.40	23.07	0.67
R40	Residential - Manchester Road	39.06	39.41	0.35
R41	Siddal Farm	23.36	23.49	0.13
R42	Residential - Coronation Avenue	21.43	21.60	0.17
R43	Residential - Coronation Avenue	20.99	21.14	0.15
R44	Residential - Middleton Road	22.44	22.57	0.13
R45	Residential - Manchester Road	23.63	23.83	0.20
R46	Highfield Manor Care Home	20.31	20.40	0.09
R47	Residential - Church Street	23.37	23.75	0.38
R48	Residential - Rochdale Road	21.79	22.10	0.31
R49	Residential - Rochdale Road	20.21	20.47	0.26
R50	Residential - Market Place	20.49	20.83	0.34
R51	Residential - Market Street	19.58	19.88	0.30
R52	Residential - Coronation Avenue	26.16	26.36	0.20
R53	Residential - Coronation Avenue	34.12	35.03	0.91
R54	Residential - Middleton Road	23.80	24.67	0.87
R55	Residential - Earl Street	24.53	24.73	0.20
R56	Residential - Hollin Lane	21.02	21.53	0.51
R57	Residential - Langleys Lane	18.66	18.81	0.15
R58	Residential - Langleys Lane	23.61	23.77	0.16

Receptor		Predicted Annual Mean NO ₂ Concentration (µg/m ³)		
		DM	DS	Change
R59	Residential - Heywood Old Road	19.35	19.79	0.44
R60	Residential - Whittle Lane	30.75	30.96	0.21
R61	Whittle Fold Smallholding	33.12	33.18	0.06
R62	Egypt Farm	33.75	33.76	0.01
R63	Lower Droughts Farm	24.88	24.93	0.05
R64	Cowgate Farm	26.70	26.93	0.23
R65	Droughts Lane	32.90	31.19	-1.71
R66	Residential - Heywood Road	24.65	24.27	-0.38
R67	Heywood Farm	25.96	25.82	-0.14
R68	Residential - Baguley Crescent	32.00	32.42	0.42
R69	Residential - Old Hall Lane	25.07	24.74	-0.33
R70	Residential - Old Hall Lane	23.21	22.99	-0.22
R71	Residential - Boothroyden Road	22.97	22.88	-0.09
R72	Residential - Middleton Road	25.30	26.04	0.74
R73	Residential - Manchester Old Road	22.51	22.74	0.23
R74	Residential - Heywood Old Road	19.71	20.31	0.60
R75	Residential - Hills Lane	23.00	23.28	0.28
R76	Unsworth Academy	20.95	21.22	0.27
R77	Residential - Plantation Grove	25.32	25.85	0.53

8.6.3 As indicated in Table 10.1.36, predicted annual mean NO₂ concentrations were above the AQO of 40µg/m³ at three receptors and below at 74 positions in the DM2 and DS2 scenarios. It should be noted that there were no new exceedences of the AQO in the DS2 scenario when compared with the DM2.

8.6.4 Annual mean PM₁₀ concentrations were predicted at the sensitive receptor locations for the DM and DS scenarios. These are summarised in Table 10.1.37.

Table 10.1.37 Sensitivity Analysis: Predicted Annual Mean PM₁₀ Concentrations

Receptor		Predicted Annual Mean PM ₁₀ Concentration (µg/m ³)		
		DM	DS	Change
R1	Residential - Bury New Road	14.01	14.10	0.09
R2	Residential - Bury New Road	14.29	14.38	0.09
R3	Residential - Willow Road	14.11	14.18	0.07
R4	Cloughside College	13.65	13.67	0.02
R5	Our Lady of Grace RC Primary School	13.66	13.69	0.03
R6	Residential - Philips Park Road East	16.21	16.27	0.06
R7	Residential - Beech Avenue	15.93	16.00	0.07
R8	Residential - Cross Avenue	14.77	14.82	0.05
R9	Residential - Hardman's Road	17.66	17.82	0.16
R10	Residential - Bury New Road	16.18	16.24	0.06
R11	Residential - Kensington Street	17.50	17.63	0.13
R12	Residential - Bury New Road	16.57	16.65	0.09
R13	Regency Care Centre	13.95	13.99	0.04
R14	The Bridge Day Nursery	14.51	14.65	0.14
R15	Residential - Hollins Brow	13.80	13.86	0.07
R16	Residential - Hollins Brow	14.52	14.70	0.17
R17	Residential - Pilsworth Road	14.33	14.49	0.16
R18	Jackson Fold Barn	13.64	14.04	0.40
R19	Residential - Waterfold Lane	13.52	13.57	0.05
R20	Residential - Rochdale Road	14.58	14.75	0.17
R21	Residential - Wash Lane	14.67	14.84	0.16
R22	Residential - Rochdale Road	15.05	15.40	0.36
R23	Hazel Wood High School	13.83	13.90	0.07
R24	Residential - Alder Avenue	14.51	14.59	0.08
R25	Residential - Ferngrove	14.56	14.62	0.06

Receptor		Predicted Annual Mean PM ₁₀ Concentration (µg/m ³)		
		DM	DS	Change
R26	Residential - Bury New Road	13.83	13.93	0.11
R27	Residential - Heap Brow	13.79	14.01	0.22
R28	Residential - Moss Hall Road	13.74	14.05	0.31
R29	Residential - Moss Hall Road	13.62	13.80	0.17
R30	Residential - Bury Old Road	13.62	13.66	0.05
R31	Residential - Bury New Road	14.83	14.85	0.02
R32	Residential - Bury New Road	13.69	13.71	0.03
R33	Residential - Bridge Street	14.49	14.62	0.13
R34	Woodland Community Primary School	13.31	13.35	0.04
R35	Residential - Pilsworth Road	14.01	14.19	0.19
R36	Coal Pits Farm	13.72	15.69	1.97
R37	Siddal Moor Farm	13.39	13.46	0.07
R38	Residential - Manchester Road	14.20	14.28	0.07
R39	Residential - Manchester Road	13.99	14.11	0.13
R40	Residential - Manchester Road	15.84	15.95	0.10
R41	Siddal Farm	13.86	13.88	0.02
R42	Residential - Coronation Avenue	13.99	14.02	0.03
R43	Residential - Coronation Avenue	13.85	13.88	0.02
R44	Residential - Middleton Road	14.23	14.25	0.02
R45	Residential - Manchester Road	14.44	14.48	0.04
R46	Highfield Manor Care Home	13.88	13.89	0.02
R47	Residential - Church Street	14.45	14.52	0.06
R48	Residential - Rochdale Road	14.20	14.25	0.05
R49	Residential - Rochdale Road	13.92	13.96	0.04
R50	Residential - Market Place	13.85	13.89	0.04
R51	Residential - Market Street	13.70	13.74	0.04

Receptor		Predicted Annual Mean PM ₁₀ Concentration (µg/m ³)		
		DM	DS	Change
R52	Residential - Coronation Avenue	14.61	14.64	0.03
R53	Residential - Coronation Avenue	15.71	15.89	0.18
R54	Residential - Middleton Road	14.22	14.37	0.14
R55	Residential - Earl Street	13.94	13.98	0.03
R56	Residential - Hollin Lane	14.11	14.20	0.09
R57	Residential - Langley Lane	13.67	13.69	0.02
R58	Residential - Langley Lane	14.49	14.52	0.03
R59	Residential - Heywood Old Road	13.69	13.78	0.08
R60	Residential - Whittle Lane	14.65	14.69	0.05
R61	Whittle Fold Smallholding	14.88	14.90	0.01
R62	Egypt Farm	14.97	14.97	0.00
R63	Lower Droughts Farm	13.99	13.99	0.01
R64	Cowgate Farm	14.33	14.36	0.03
R65	Droughts Lane	15.39	15.02	-0.37
R66	Residential - Heywood Road	14.02	13.96	-0.05
R67	Heywood Farm	13.98	13.98	0.00
R68	Residential - Baguley Crescent	15.23	15.36	0.13
R69	Residential - Old Hall Lane	14.10	14.08	-0.03
R70	Residential - Old Hall Lane	14.18	14.15	-0.03
R71	Residential - Boothroyden Road	13.71	13.71	0.00
R72	Residential - Middleton Road	14.47	14.62	0.15
R73	Residential - Manchester Old Road	14.08	14.13	0.05
R74	Residential - Heywood Old Road	13.77	13.88	0.11
R75	Residential - Hills Lane	13.76	13.80	0.04
R76	Unsworth Academy	13.57	13.60	0.04
R77	Residential - Plantation Grove	13.94	14.01	0.07

8.6.5 As indicated in Table 10.1.37, predicted annual mean PM₁₀ concentrations were below the AQO of 40µg/m³ at all sensitive receptors in both scenarios.

8.6.6 Annual mean PM_{2.5} concentrations were predicted at the sensitive receptor locations for the DM2 and DS2 scenarios. These are summarised in Table 10.1.38.

Table 10.1.38 Sensitivity Analysis: Predicted Annual Mean PM_{2.5} Concentrations

Receptor		Predicted Annual Mean PM _{2.5} Concentration (µg/m ³)		
		DM	DS	Change
R1	Residential - Bury New Road	7.36	7.41	0.05
R2	Residential - Bury New Road	7.51	7.56	0.05
R3	Residential - Willow Road	7.44	7.47	0.04
R4	Cloughside College	7.21	7.22	0.01
R5	Our Lady of Grace RC Primary School	7.20	7.22	0.01
R6	Residential - Philips Park Road East	8.79	8.83	0.04
R7	Residential - Beech Avenue	8.52	8.56	0.04
R8	Residential - Cross Avenue	7.84	7.87	0.03
R9	Residential - Hardman's Road	9.48	9.57	0.09
R10	Residential - Bury New Road	8.58	8.62	0.03
R11	Residential - Kensington Street	9.64	9.72	0.08
R12	Residential - Bury New Road	8.76	8.80	0.05
R13	Regency Care Centre	7.33	7.35	0.02
R14	The Bridge Day Nursery	7.62	7.70	0.08
R15	Residential - Hollins Brow	7.25	7.28	0.04
R16	Residential - Hollins Brow	7.63	7.73	0.10
R17	Residential - Pilsworth Road	7.54	7.62	0.09
R18	Jackson Fold Barn	7.18	7.39	0.22
R19	Residential - Waterfold Lane	7.13	7.16	0.03
R20	Residential - Rochdale Road	7.70	7.80	0.10

Receptor		Predicted Annual Mean PM _{2.5} Concentration (µg/m ³)		
		DM	DS	Change
R21	Residential - Wash Lane	7.73	7.82	0.09
R22	Residential - Rochdale Road	7.92	8.11	0.19
R23	Hazel Wood High School	7.30	7.34	0.04
R24	Residential - Alder Avenue	7.75	7.79	0.05
R25	Residential - Ferngrove	7.79	7.82	0.04
R26	Residential - Bury New Road	7.27	7.34	0.06
R27	Residential - Heap Brow	7.25	7.37	0.13
R28	Residential - Moss Hall Road	7.22	7.39	0.17
R29	Residential - Moss Hall Road	7.16	7.26	0.10
R30	Residential - Bury Old Road	7.15	7.18	0.02
R31	Residential - Bury New Road	7.80	7.81	0.01
R32	Residential - Bury New Road	7.19	7.20	0.01
R33	Residential - Bridge Street	7.62	7.69	0.07
R34	Woodland Community Primary School	6.99	7.01	0.02
R35	Residential - Pilsworth Road	7.36	7.46	0.10
R36	Coal Pits Farm	7.22	8.30	1.08
R37	Siddal Moor Farm	7.05	7.08	0.04
R38	Residential - Manchester Road	7.48	7.52	0.04
R39	Residential - Manchester Road	7.38	7.45	0.07
R40	Residential - Manchester Road	8.55	8.61	0.05
R41	Siddal Farm	7.34	7.35	0.01
R42	Residential - Coronation Avenue	7.36	7.38	0.02
R43	Residential - Coronation Avenue	7.29	7.31	0.01
R44	Residential - Middleton Road	7.49	7.50	0.01
R45	Residential - Manchester Road	7.60	7.62	0.02
R46	Highfield Manor Care Home	7.29	7.30	0.01

Receptor		Predicted Annual Mean PM _{2.5} Concentration (µg/m ³)		
		DM	DS	Change
R47	Residential - Church Street	7.59	7.63	0.03
R48	Residential - Rochdale Road	7.46	7.49	0.03
R49	Residential - Rochdale Road	7.31	7.33	0.02
R50	Residential - Market Place	7.27	7.30	0.02
R51	Residential - Market Street	7.20	7.22	0.02
R52	Residential - Coronation Avenue	7.72	7.74	0.02
R53	Residential - Coronation Avenue	8.36	8.46	0.10
R54	Residential - Middleton Road	7.51	7.58	0.08
R55	Residential - Earl Street	7.40	7.42	0.02
R56	Residential - Hollin Lane	7.41	7.46	0.05
R57	Residential - Langley Lane	7.18	7.19	0.01
R58	Residential - Langley Lane	7.62	7.64	0.02
R59	Residential - Heywood Old Road	7.20	7.24	0.04
R60	Residential - Whittle Lane	7.83	7.86	0.03
R61	Whittle Fold Smallholding	7.99	8.00	0.01
R62	Egypt Farm	8.04	8.04	0.00
R63	Lower Droughts Farm	7.43	7.43	0.00
R64	Cowgate Farm	7.61	7.63	0.02
R65	Droughts Lane	8.19	8.00	-0.19
R66	Residential - Heywood Road	7.43	7.40	-0.03
R67	Heywood Farm	7.42	7.42	0.00
R68	Residential - Baguley Crescent	8.09	8.16	0.07
R69	Residential - Old Hall Lane	7.47	7.45	-0.02
R70	Residential - Old Hall Lane	7.48	7.46	-0.02
R71	Residential - Boothroyden Road	7.25	7.25	0.00
R72	Residential - Middleton Road	7.63	7.71	0.08

Receptor		Predicted Annual Mean PM _{2.5} Concentration (µg/m ³)		
		DM	DS	Change
R73	Residential - Manchester Old Road	7.42	7.45	0.03
R74	Residential - Heywood Old Road	7.23	7.29	0.06
R75	Residential - Hills Lane	7.28	7.31	0.02
R76	Unsworth Academy	7.16	7.19	0.02
R77	Residential - Plantation Grove	7.40	7.44	0.05

8.6.7 As indicated in Table 10.1.38, predicted annual mean PM_{2.5} concentrations were below the Concentration Target of 10µg/m³ at all sensitive receptors in both scenarios.

Predicted Effects

8.6.8 Predicted effects on annual mean NO₂ concentrations at the sensitive receptor locations are summarised in Table 10.1.39.

Table 10.1.39 Sensitivity Analysis: Predicted Effects - NO₂

Receptor		Receptor Sensitivity	Magnitude of Change	Effect Significance
R1	Residential - Bury New Road	Low	Small	Negligible to Minor
R2	Residential - Bury New Road	Low	Small	Negligible to Minor
R3	Residential - Willow Road	Low	Small	Negligible to Minor
R4	Cloughside College	Low	Negligible	Negligible
R5	Our Lady of Grace RC Primary School	Low	Negligible	Negligible
R6	Residential - Philips Park Road East	High	Negligible	Negligible
R7	Residential - Beech Avenue	Low	Small	Negligible to Minor
R8	Residential - Cross Avenue	Low	Negligible	Negligible
R9	Residential - Hardman's Road	High	Small	Minor to Moderate
R10	Residential - Bury New Road	Low	Small	Negligible to Minor

Receptor		Receptor Sensitivity	Magnitude of Change	Effect Significance
R11	Residential - Kensington Street	High	Small	Minor to Moderate
R12	Residential - Bury New Road	Low	Small	Negligible to Minor
R13	Regency Care Centre	Low	Small	Negligible to Minor
R14	The Bridge Day Nursery	Low	Medium	Minor
R15	Residential - Hollins Brow	Low	Small	Negligible to Minor
R16	Residential - Hollins Brow	Low	Medium	Minor
R17	Residential - Pilsworth Road	Low	Medium	Minor
R18	Jackson Fold Barn	Low	Large	Minor to Moderate
R19	Residential - Waterfold Lane	Low	Small	Negligible to Minor
R20	Residential - Rochdale Road	Low	Medium	Minor
R21	Residential - Wash Lane	Low	Medium	Minor
R22	Residential - Rochdale Road	Low	Medium	Minor
R23	Hazel Wood High School	Low	Small	Negligible to Minor
R24	Residential - Alder Avenue	Low	Medium	Minor
R25	Residential - Ferngrove	Low	Small	Negligible to Minor
R26	Residential - Bury New Road	Low	Medium	Minor
R27	Residential - Heap Brow	Low	Medium	Minor
R28	Residential - Moss Hall Road	Low	Medium	Minor
R29	Residential - Moss Hall Road	Low	Medium	Minor
R30	Residential - Bury Old Road	Low	Small	Negligible to Minor
R31	Residential - Bury New Road	Low	Negligible	Negligible
R32	Residential - Bury New Road	Low	Negligible	Negligible
R33	Residential - Bridge Street	Low	Medium	Minor
R34	Woodland Community Primary School	Low	Small	Negligible to Minor
R35	Residential - Pilsworth Road	Low	Medium	Minor
R36	Coal Pits Farm	Low	Large	Minor to Moderate

Receptor		Receptor Sensitivity	Magnitude of Change	Effect Significance
R37	Siddal Moor Farm	Low	Small	Negligible to Minor
R38	Residential - Manchester Road	Low	Small	Negligible to Minor
R39	Residential - Manchester Road	Low	Medium	Minor
R40	Residential - Manchester Road	Medium	Small	Minor
R41	Siddal Farm	Low	Negligible	Negligible
R42	Residential - Coronation Avenue	Low	Negligible	Negligible
R43	Residential - Coronation Avenue	Low	Negligible	Negligible
R44	Residential - Middleton Road	Low	Negligible	Negligible
R45	Residential - Manchester Road	Low	Small	Negligible to Minor
R46	Highfield Manor Care Home	Low	Negligible	Negligible
R47	Residential - Church Street	Low	Small	Negligible to Minor
R48	Residential - Rochdale Road	Low	Small	Negligible to Minor
R49	Residential - Rochdale Road	Low	Small	Negligible to Minor
R50	Residential - Market Place	Low	Small	Negligible to Minor
R51	Residential - Market Street	Low	Small	Negligible to Minor
R52	Residential - Coronation Avenue	Low	Small	Negligible to Minor
R53	Residential - Coronation Avenue	Low	Medium	Minor
R54	Residential - Middleton Road	Low	Medium	Minor
R55	Residential - Earl Street	Low	Small	Negligible to Minor
R56	Residential - Hollin Lane	Low	Small	Negligible to Minor
R57	Residential - Langley Lane	Low	Negligible	Negligible
R58	Residential - Langley Lane	Low	Negligible	Negligible
R59	Residential - Heywood Old Road	Low	Small	Negligible to Minor
R60	Residential - Whittle Lane	Low	Small	Negligible to Minor

Receptor		Receptor Sensitivity	Magnitude of Change	Effect Significance
R61	Whittle Fold Smallholding	Low	Negligible	Negligible
R62	Egypt Farm	Low	Negligible	Negligible
R63	Lower Droughts Farm	Low	Negligible	Negligible
R64	Cowgate Farm	Low	Small	Negligible to Minor
R65	Droughts Lane	Low	Medium	Minor
R66	Residential - Heywood Road	Low	Small	Negligible to Minor
R67	Heywood Farm	Low	Negligible	Negligible
R68	Residential - Baguley Crescent	Low	Small	Negligible to Minor
R69	Residential - Old Hall Lane	Low	Small	Negligible to Minor
R70	Residential - Old Hall Lane	Low	Small	Negligible to Minor
R71	Residential - Boothroyden Road	Low	Negligible	Negligible
R72	Residential - Middleton Road	Low	Medium	Minor
R73	Residential - Manchester Old Road	Low	Small	Negligible to Minor
R74	Residential - Heywood Old Road	Low	Medium	Minor
R75	Residential - Hills Lane	Low	Small	Negligible to Minor
R76	Unsworth Academy	Low	Small	Negligible to Minor
R77	Residential - Plantation Grove	Low	Small	Negligible to Minor

8.6.9 Predicted effects on annual mean PM₁₀ concentrations at the sensitive receptor locations are summarised in Table 10.1.40.

Table 10.1.40 Sensitivity Analysis: Predicted Effects - PM₁₀

Receptor		Receptor Sensitivity	Magnitude of Change	Effect Significance
R1	Residential - Bury New Road	Low	Negligible	Negligible
R2	Residential - Bury New Road	Low	Negligible	Negligible

Receptor		Receptor Sensitivity	Magnitude of Change	Effect Significance
R3	Residential - Willow Road	Low	Negligible	Negligible
R4	Cloughside College	Low	Negligible	Negligible
R5	Our Lady of Grace RC Primary School	Low	Negligible	Negligible
R6	Residential - Philips Park Road East	Low	Negligible	Negligible
R7	Residential - Beech Avenue	Low	Negligible	Negligible
R8	Residential - Cross Avenue	Low	Negligible	Negligible
R9	Residential - Hardman's Road	Low	Negligible	Negligible
R10	Residential - Bury New Road	Low	Negligible	Negligible
R11	Residential - Kensington Street	Low	Negligible	Negligible
R12	Residential - Bury New Road	Low	Negligible	Negligible
R13	Regency Care Centre	Low	Negligible	Negligible
R14	The Bridge Day Nursery	Low	Negligible	Negligible
R15	Residential - Hollins Brow	Low	Negligible	Negligible
R16	Residential - Hollins Brow	Low	Negligible	Negligible
R17	Residential - Pilsworth Road	Low	Negligible	Negligible
R18	Jackson Fold Barn	Low	Small	Negligible to Minor
R19	Residential - Waterfold Lane	Low	Negligible	Negligible
R20	Residential - Rochdale Road	Low	Negligible	Negligible
R21	Residential - Wash Lane	Low	Negligible	Negligible
R22	Residential - Rochdale Road	Low	Small	Negligible to Minor
R23	Hazel Wood High School	Low	Negligible	Negligible
R24	Residential - Alder Avenue	Low	Negligible	Negligible
R25	Residential - Ferngrove	Low	Negligible	Negligible
R26	Residential - Bury New Road	Low	Negligible	Negligible
R27	Residential - Heap Brow	Low	Small	Negligible to Minor
R28	Residential - Moss Hall Road	Low	Small	Negligible to Minor

Receptor		Receptor Sensitivity	Magnitude of Change	Effect Significance
R29	Residential - Moss Hall Road	Low	Negligible	Negligible
R30	Residential - Bury Old Road	Low	Negligible	Negligible
R31	Residential - Bury New Road	Low	Negligible	Negligible
R32	Residential - Bury New Road	Low	Negligible	Negligible
R33	Residential - Bridge Street	Low	Negligible	Negligible
R34	Woodland Community Primary School	Low	Negligible	Negligible
R35	Residential - Pilsworth Road	Low	Negligible	Negligible
R36	Coal Pits Farm	Low	Medium	Minor
R37	Siddal Moor Farm	Low	Negligible	Negligible
R38	Residential - Manchester Road	Low	Negligible	Negligible
R39	Residential - Manchester Road	Low	Negligible	Negligible
R40	Residential - Manchester Road	Low	Negligible	Negligible
R41	Siddal Farm	Low	Negligible	Negligible
R42	Residential - Coronation Avenue	Low	Negligible	Negligible
R43	Residential - Coronation Avenue	Low	Negligible	Negligible
R44	Residential - Middleton Road	Low	Negligible	Negligible
R45	Residential - Manchester Road	Low	Negligible	Negligible
R46	Highfield Manor Care Home	Low	Negligible	Negligible
R47	Residential - Church Street	Low	Negligible	Negligible
R48	Residential - Rochdale Road	Low	Negligible	Negligible
R49	Residential - Rochdale Road	Low	Negligible	Negligible
R50	Residential - Market Place	Low	Negligible	Negligible
R51	Residential - Market Street	Low	Negligible	Negligible
R52	Residential - Coronation Avenue	Low	Negligible	Negligible
R53	Residential - Coronation Avenue	Low	Negligible	Negligible
R54	Residential - Middleton Road	Low	Negligible	Negligible

Receptor		Receptor Sensitivity	Magnitude of Change	Effect Significance
R55	Residential - Earl Street	Low	Negligible	Negligible
R56	Residential - Hollin Lane	Low	Negligible	Negligible
R57	Residential - Langley Lane	Low	Negligible	Negligible
R58	Residential - Langley Lane	Low	Negligible	Negligible
R59	Residential - Heywood Old Road	Low	Negligible	Negligible
R60	Residential - Whittle Lane	Low	Negligible	Negligible
R61	Whittle Fold Smallholding	Low	Negligible	Negligible
R62	Egypt Farm	Low	Negligible	Negligible
R63	Lower Droughts Farm	Low	Negligible	Negligible
R64	Cowgate Farm	Low	Negligible	Negligible
R65	Droughts Lane	Low	Medium	Minor
R66	Residential - Heywood Road	Low	Negligible	Negligible
R67	Heywood Farm	Low	Negligible	Negligible
R68	Residential - Baguley Crescent	Low	Negligible	Negligible
R69	Residential - Old Hall Lane	Low	Negligible	Negligible
R70	Residential - Old Hall Lane	Low	Negligible	Negligible
R71	Residential - Boothroyden Road	Low	Negligible	Negligible
R72	Residential - Middleton Road	Low	Negligible	Negligible
R73	Residential - Manchester Old Road	Low	Negligible	Negligible
R74	Residential - Heywood Old Road	Low	Negligible	Negligible
R75	Residential - Hills Lane	Low	Negligible	Negligible
R76	Unsworth Academy	Low	Negligible	Negligible
R77	Residential - Plantation Grove	Low	Negligible	Negligible

8.6.10 Predicted effects on annual mean PM_{2.5} concentrations at the sensitive receptor locations are summarised in Table 10.1.41.

Table 10.1.41 Sensitivity Analysis: Predicted Effects - PM_{2.5}

Receptor		Receptor Sensitivity	Magnitude of Change	Effect Significance
R1	Residential - Bury New Road	Low	Small	Negligible to Minor
R2	Residential - Bury New Road	Low	Negligible	Negligible
R3	Residential - Willow Road	Low	Negligible	Negligible
R4	Cloughside College	Low	Negligible	Negligible
R5	Our Lady of Grace RC Primary School	Low	Negligible	Negligible
R6	Residential - Philips Park Road East	Low	Negligible	Negligible
R7	Residential - Beech Avenue	Low	Negligible	Negligible
R8	Residential - Cross Avenue	Low	Negligible	Negligible
R9	Residential - Hardman's Road	Medium	Small	Minor
R10	Residential - Bury New Road	Low	Negligible	Negligible
R11	Residential - Kensington Street	Medium	Small	Minor
R12	Residential - Bury New Road	Low	Negligible	Negligible
R13	Regency Care Centre	Low	Negligible	Negligible
R14	The Bridge Day Nursery	Low	Small	Negligible to Minor
R15	Residential - Hollins Brow	Low	Negligible	Negligible
R16	Residential - Hollins Brow	Low	Small	Negligible to Minor
R17	Residential - Pilsworth Road	Low	Small	Negligible to Minor
R18	Jackson Fold Barn	Low	Medium	Minor
R19	Residential - Waterfold Lane	Low	Negligible	Negligible
R20	Residential - Rochdale Road	Low	Small	Negligible to Minor
R21	Residential - Wash Lane	Low	Small	Negligible to Minor
R22	Residential - Rochdale Road	Low	Medium	Minor
R23	Hazel Wood High School	Low	Negligible	Negligible
R24	Residential - Alder Avenue	Low	Negligible	Negligible

Receptor		Receptor Sensitivity	Magnitude of Change	Effect Significance
R25	Residential - Ferngrove	Low	Negligible	Negligible
R26	Residential - Bury New Road	Low	Small	Negligible to Minor
R27	Residential - Heap Brow	Low	Small	Negligible to Minor
R28	Residential - Moss Hall Road	Low	Medium	Minor
R29	Residential - Moss Hall Road	Low	Small	Negligible to Minor
R30	Residential - Bury Old Road	Low	Negligible	Negligible
R31	Residential - Bury New Road	Low	Negligible	Negligible
R32	Residential - Bury New Road	Low	Negligible	Negligible
R33	Residential - Bridge Street	Low	Small	Negligible to Minor
R34	Woodland Community Primary School	Low	Negligible	Negligible
R35	Residential - Pilsworth Road	Low	Small	Negligible to Minor
R36	Coal Pits Farm	Low	Large	Minor to Moderate
R37	Siddal Moor Farm	Low	Negligible	Negligible
R38	Residential - Manchester Road	Low	Negligible	Negligible
R39	Residential - Manchester Road	Low	Small	Negligible to Minor
R40	Residential - Manchester Road	Low	Small	Negligible to Minor
R41	Siddal Farm	Low	Negligible	Negligible
R42	Residential - Coronation Avenue	Low	Negligible	Negligible
R43	Residential - Coronation Avenue	Low	Negligible	Negligible
R44	Residential - Middleton Road	Low	Negligible	Negligible
R45	Residential - Manchester Road	Low	Negligible	Negligible
R46	Highfield Manor Care Home	Low	Negligible	Negligible
R47	Residential - Church Street	Low	Negligible	Negligible
R48	Residential - Rochdale Road	Low	Negligible	Negligible
R49	Residential - Rochdale Road	Low	Negligible	Negligible

Receptor		Receptor Sensitivity	Magnitude of Change	Effect Significance
R50	Residential - Market Place	Low	Negligible	Negligible
R51	Residential - Market Street	Low	Negligible	Negligible
R52	Residential - Coronation Avenue	Low	Negligible	Negligible
R53	Residential - Coronation Avenue	Low	Small	Negligible to Minor
R54	Residential - Middleton Road	Low	Small	Negligible to Minor
R55	Residential - Earl Street	Low	Negligible	Negligible
R56	Residential - Hollin Lane	Low	Negligible	Negligible
R57	Residential - Langley Lane	Low	Negligible	Negligible
R58	Residential - Langley Lane	Low	Negligible	Negligible
R59	Residential - Heywood Old Road	Low	Negligible	Negligible
R60	Residential - Whittle Lane	Low	Negligible	Negligible
R61	Whittle Fold Smallholding	Low	Negligible	Negligible
R62	Egypt Farm	Low	Negligible	Negligible
R63	Lower Droughts Farm	Low	Negligible	Negligible
R64	Cowgate Farm	Low	Negligible	Negligible
R65	Droughts Lane	Low	Medium	Minor
R66	Residential - Heywood Road	Low	Negligible	Negligible
R67	Heywood Farm	Low	Negligible	Negligible
R68	Residential - Baguley Crescent	Low	Small	Negligible to Minor
R69	Residential - Old Hall Lane	Low	Negligible	Negligible
R70	Residential - Old Hall Lane	Low	Negligible	Negligible
R71	Residential - Boothroyden Road	Low	Negligible	Negligible
R72	Residential - Middleton Road	Low	Small	Negligible to Minor
R73	Residential - Manchester Old Road	Low	Negligible	Negligible

Receptor		Receptor Sensitivity	Magnitude of Change	Effect Significance
R74	Residential - Heywood Old Road	Low	Small	Negligible to Minor
R75	Residential - Hills Lane	Low	Negligible	Negligible
R76	Unsworth Academy	Low	Negligible	Negligible
R77	Residential - Plantation Grove	Low	Negligible	Negligible

Evaluation of Effect - NO₂

8.6.11 The predicted effects on annual mean NO₂ concentrations as a result of the Project for Assessment, based on the Sensitivity Analysis results, can be summarised as follows:

- **Negligible** at 18 receptors;
- **Minor adverse** at 55 receptors; and,
- **Moderate adverse** at four receptors. These were R9, R11, R18 and R36.

8.6.12 The findings are discussed in the Comparison of Scenarios Section.

Evaluation of Effect - PM₁₀

8.6.13 The predicted effects on annual mean PM₁₀ concentrations as a result of the Project for Assessment, based on the Sensitivity Analysis results, can be summarised as follows:

- **Negligible** at 71 receptors; and,
- **Minor adverse** at six receptors.

8.6.14 The findings are discussed in the Comparison of Scenarios Section.

Evaluation of Effect - PM_{2.5}

8.6.15 The predicted effects on annual mean PM_{2.5} concentrations as a result of the Project for Assessment, based on the Sensitivity Analysis results, can be summarised as follows:

- **Negligible** at 52 receptors;

- **Minor adverse** at 24 receptors; and,
- **Moderate adverse** at one receptor. This effect was identified at R36, a residential property adjacent to Moss Hall Lane.

8.6.16 The findings are discussed in the Comparison of Scenarios Section.

8.7 Comparison of Scenarios

Introduction

8.7.1 A Sensitivity Analysis has been undertaken in order to determine the potential for air quality impacts associated with the Project for Assessment against the existing 2024 baseline. The findings have been considered in the context of the results of Assessment 1. This is provided in the following Sections.

Comparison of Effects

8.7.2 The predicted effects as a result of the Project for Assessment for both Assessment 1 and the Sensitivity Analysis were as follows:

- Effects on annual mean NO₂ concentrations ranged from **negligible** to **minor to moderate adverse**;
- Effects on annual mean PM₁₀ concentrations ranged from **negligible** to **minor adverse**; and,
- Effects on annual mean PM_{2.5} concentrations ranged from **negligible** to **minor to moderate adverse**.

8.7.3 **Minor to moderate adverse** effects on annual mean NO₂ concentrations were identified at receptor R36 in Assessment 1 and positions R9, R11, R18 and R36 in the Sensitivity Analysis.

8.7.4 Within the Sensitivity Analysis, highways infrastructure improvements at Junction 18 of the M60 were not included in DM2 but were in DS2. This may have contributed to the increase in the level of effect at receptors R9, R11 and R18 in the Sensitivity Analysis when compared with Assessment 1.

8.7.5 It should be noted that the highways improvements are anticipated to be completed by 2029, prior to the completion of the Project for Assessment³⁸. As such, vehicle flows and distribution are likely to be more representative of the data utilised for Assessment 1 at the time of project commencement. The change in annual mean NO₂ concentrations at sensitive receptors for the Sensitivity Analysis are therefore considered an overestimation and predicted effects identified from Assessment 1 are considered to be most representative of the Project for Assessment.

8.7.6 Effects on annual mean PM₁₀ and PM_{2.5} concentrations as a result of the Project for Assessment are consistent between Assessment 1 and the Sensitivity Analysis.

³⁸ For traffic related effects the 2039 scenario assumes full completion of the Project for Assessment.

9.0 **ABBREVIATIONS**

AADT	Annual Average Daily Traffic
ADM	Atmospheric Dispersion Modelling
APIS	Air Pollution Information System
AQLV	Air Quality Limit Value
AQMA	Air Quality Management Area
AQO	Air Quality Objective
AQS	Air Quality Strategy
BC	Bury Council
CAP	Clean Air Plan
CERC	Cambridge Environmental Research Consultants
DEFRA	Department for Environment, Food and Rural Affairs
DM	Do-Minimum
DMRB	Design Manual for Roads and Bridges
DS	Do-Something
EB	Eastbound
GMCA	Greater Manchester Combined Authority
HDV	Heavy Duty Vehicle
HRA	Habitats Regulations Assessment
LA	Local Authority
LAQM	Local Air Quality Management
NB	Northbound
NE	Natural England
NEB	North-eastbound
NGR	National Grid Reference
NO ₂	Nitrogen dioxide
NO _x	Oxides of nitrogen
PfE	Place for Everyone
PM ₁₀	Particulate matter with an aerodynamic diameter of less than 10µm
PM _{2.5}	Particulate matter with an aerodynamic diameter of less than 2.5µm
RBC	Rochdale Borough Council
PfE	Places for Everyone
SAC	Special Area of Conservation
SB	Southbound
SP	Slow Phase

SPA	Special Protection Area
SSSI	Site of Special Scientific Interest
SWB	South-westbound
TEA	Triethanolamine
TGN	Technical Guidance Note
WB	Westbound
WBC	Warrington Borough Council
Z ₀	Roughness Length