

# Greater Manchester's Outline Business Case to Tackle Nitrogen Dioxide Exceedances at the Roadside

## Local Plan Air Quality Modelling Report (AQ3)



Salford City Council



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<b>Version Status:</b>	DRAFT FOR APPROVAL	<b>Prepared by:</b>	Transport for Greater Manchester on behalf of the 10 Local Authorities of Greater Manchester
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## 1 Introduction

- 1.1.1 The Greater Manchester Urban Area Zone is one of 37 zones across the UK where, based on the Department for the Environment, Food and Rural Affairs (Defra) modelling for 2015, annual mean nitrogen dioxide ( $\text{NO}_2$ ) concentrations exceeded the statutory Limit Values set by the European Union (EU) based on the World Health Organisation's air quality guidelines. Of the ten Local Authorities within Greater Manchester (GM), seven are predicted to include road links which exceed the EU limits beyond 2020.
- 1.1.2 In order to address these exceedances, Defra and the Department for Transport (DfT) has set out an approach to introduce targeted local measures to bring  $\text{NO}_2$  concentrations within legal limits, in their Clean Air Zone Framework and the National Plan. The Joint Air Quality Unit (JAQU), comprising teams from Defra and the DfT, has been set up specifically to deliver the National Plan to improve air quality and comply with the EU Limit Value (EU LV) and the equivalent UK Air Quality Objective (AQO). The JAQU guidance documents set out the assessment process and typical measures that an authority should consider to deliver compliance with the  $\text{NO}_2$  annual mean EU Limit Value of  $40 \mu\text{g}/\text{m}^3$ .
- 1.1.3 Many local authorities across the UK (including eight within GM) have been instructed by JAQU to undertake detailed feasibility studies and develop plans for the implementation of appropriate measures to deliver compliance with the EU Limit Value in the 'shortest possible time'. According to the Supreme Court ruling the feasibility study must consider all options which are 'technically feasible' to be delivered in the shortest possible time and at least as quickly as a charge-based Clean Air Zone (CAZ) could. Local authorities need to consider a range of measures, including a charge-based CAZ as required by Government and set out in the JAQU guidance. The charge-based CAZ scenario is to be used as the reference case in terms of timescales and cost, against which other alternative measures are considered. It is the Government's preference that a charge-based CAZ is only implemented if other measures cannot deliver compliance in similar timescales while providing the same value for money.
- 1.1.4 TfGM is acting on behalf of the Greater Manchester Combined Authority (GMCA) and the ten Greater Manchester Local Authorities to undertake the feasibility study and develop the Greater Manchester Clean Air Plan (GM CAP) to meet the air quality challenge.
- 1.1.5 As required by JAQU, this 'AQ3' document provides the air quality results and discussion of the GM CAP options that have been assessed. A summary of the methodology is set out in the Local Plan Air Quality Modelling Tracking Table (AQ1) and Local Plan Air Quality Modelling Methodology Report (AQ2), which underpins any air quality modelling for the baseline (2016) and the Do-Minimum (2021, 2023 and 2025) scenarios.

- 1.1.6 Details of the approach to model verification are provided in Appendix A. The full set of air quality modelling results are tabulated in Appendix B. Details of the Sensitivity Testing are reported in Appendix C.
- 1.1.7 Further information on the options development and the transport modelling are available in the Outline Business Case and supporting documents, and the equivalent transport modelling technical documentation (T1/T2/T3/T4).

## **2 Methodology Overview**

- 2.1 Based on Government guidance, the following local evidence was used to understand likely NO<sub>2</sub> concentrations in Greater Manchester beyond 2020:
  - Detailed Baseline Year (2016) and Future Years (2021, 2023 and 2025) transport model (actual and future demand on the road network);
  - Local vehicle fleet profiles (e.g. ages and types of vehicle) using Automatic Number Plate Recognition (ANPR) data;
  - Vehicle fleet licensing data for bus and taxi fleets;
  - Local background concentrations of NOx and NO<sub>2</sub>;
  - More detailed road network and junction data (e.g. alignment and width);
  - Representation of “air pollution” canyons (e.g. tall buildings);
  - Local air quality monitoring data from across Greater Manchester, which is described in AQ2 and presented in Figure 1; and
  - Confirmed future changes to the road network, and expected regional traffic growth and changes to the traffic fleet.
- 2.2 This local modelling was necessary to provide a more comprehensive understanding of the air quality across the entirety of Greater Manchester. The local modelling identified a larger number of locations which are expected to exceed the EU Limit Value, and higher concentrations of NO<sub>2</sub> in specific locations. This meant that all ten local authorities contained locations expected to be in exceedance of EU Limit Value for NO<sub>2</sub> after 2020. This reflected the fact that the local modelling used more detailed sources of data and more refined analytical tools. This resulted in three fundamental differences compared to the national modelling:
  - The vehicle fleet in Greater Manchester is older and more polluting than assumed in the national model;
  - In some areas vehicles are moving more slowly than assumed in the national model; and
  - The background concentrations from non-road vehicle emissions sources (for example, electricity production, industry, local heating etc.) is higher than expected and needed to be uplifted.

- 2.2.1 Modelling of air quality produces outputs at specific points along which predicts a concentration of NO<sub>2</sub>, but JAQU specify that these points should represent a worst case location along a more general length of road matching those used in the relatively coarse PCM model, which excludes locations close to junctions. Presenting point data provides more specific and spatially detailed information about air quality, as it allows an understanding of how concentrations of NO<sub>2</sub> vary at different locations along the road.
- 2.2.2 In order to compare local modelling results with the PCM model outputs, receptors were automatically generated using a GIS script at 4m from the modelled road edge at 2m elevation, at locations >25m from junctions (as per the parameters set out in the JAQU Evidence Guidance), on both sides of the road. These receptors were generated for every road link in the GM Saturn model. The GM Saturn model is more spatially detailed than the PCM model, and each PCM link can extend over many Saturn links. The maximum locally modelled receptor concentration adjacent to each PCM was selected for comparison with the PCM model prediction.
- 2.2.3 The OBC presents concentration and emissions information on the basis of point data, but the AQ3 document will also align these to key PCM links.
- 2.2.4 A range of sensitivity tests have been undertaken, based on the JAQU guidance. These are reported in Appendix C.

### **3 Without Scheme Results**

#### **Model Results and PCM Exceedance Link Comparison: Do Minimum 2021**

- 3.1.1 As part of the Target Determination process, the local modelling is compared against the national PCM model. The results for these locations, where the PCM model has predicted exceedances leading to authorities being included in the National Plan, are presented in Table 1.
- 3.1.2 The results of the modelling are subsequently presented for each local authority separately. This discussion reports the total number of assessed modelled locations in exceedance by road link. The maximum result for each PCM link is then also tabulated and along with information on background concentrations and vehicle type source apportionment.

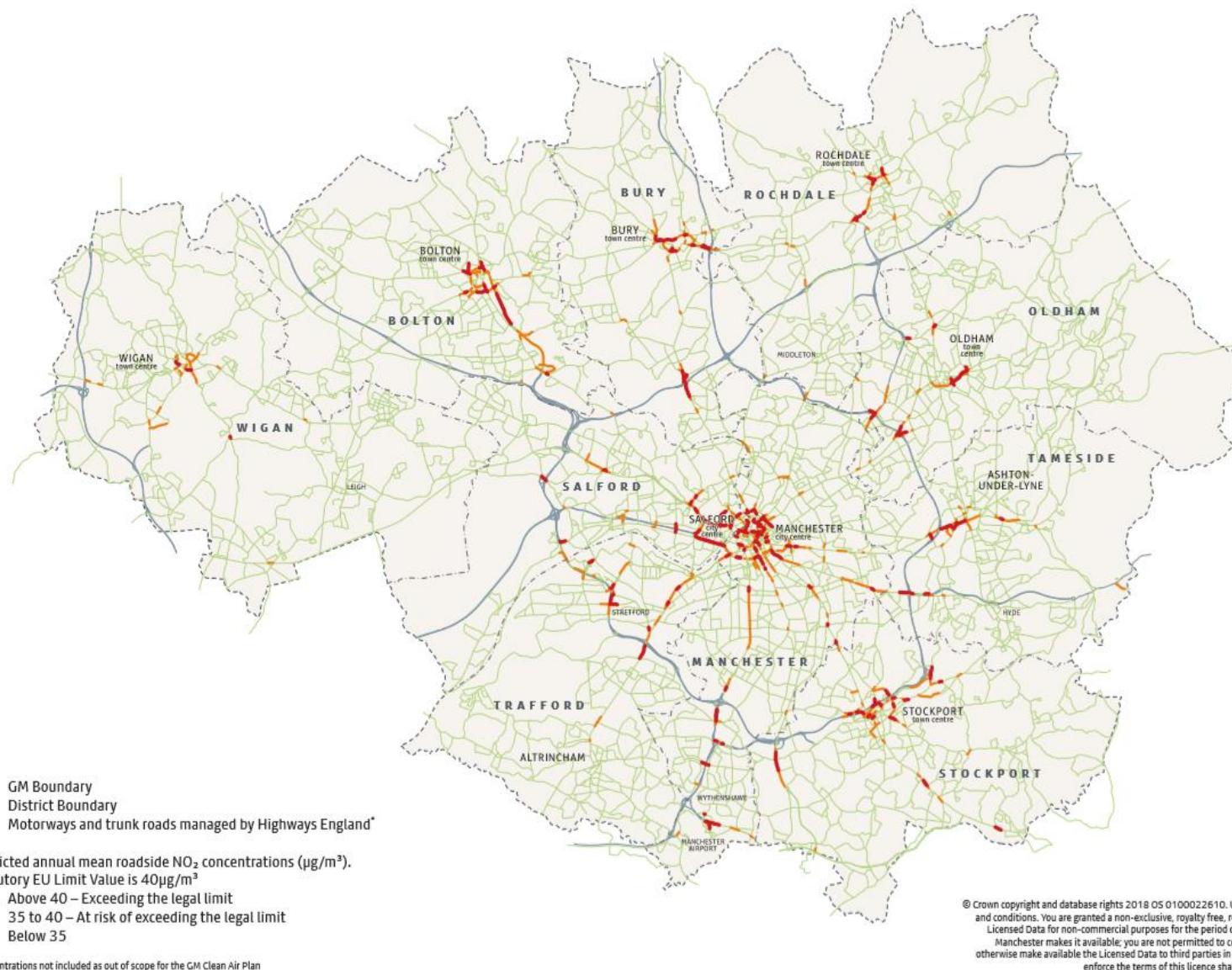
**Table 1: Model results and PCM Links leading to Districts being named in the National Plan – Do Minimum 2021**

Census ID	Road Name	Local authority	PCM NO <sub>2</sub> conc. (µg/m <sup>3</sup> )	Local Model Results (µg/m <sup>3</sup> )					Local Model : PCM
				Total NO <sub>2</sub>	BG NOx	BG NO <sub>2</sub>	Road NOx	Road NO <sub>2</sub>	
7431	A666	Bolton	40.6	44.9	26.5	18.4	55.2	26.5	110%
38354	A58	Bury	41.5	54.8	23.0	16.3	96.2	38.5	132%
37809	A5103	Manchester	41.2	40.4	16.8	12.3	58.2	28.1	98%
70273	A635	Manchester	40.4	38.4	32.5	21.7	38.3	16.7	95%
46068	A57M	Manchester	40.0	40.8	32.0	21.5	43.0	19.3	102%
36632	A62	Oldham	38.4	52.3	27.4	18.9	74.9	33.4	136%
56370	A57	Salford	41.5	37.9	26.5	18.4	44.1	19.6	91%
26352	A34	Stockport	40.3	46.0	20.5	14.7	66.9	31.3	114%
38735	A34	Stockport	40.6	42.9	20.5	14.7	59.6	28.2	106%
99618	A635	Tameside	42.2	48.8	26.9	18.5	70.2	30.3	116%
58022	A56	Trafford	38.5	39.2	16.8	12.3	55.7	26.9	102%

- 3.1.3 Comparison of the model results for 2021 show reasonable agreement between the PCM links predicted to be in exceedance and local model total NO<sub>2</sub> concentrations for the majority of road links assessed. Of the 11 links identified, the local model concentrations are typically greater, but only two sites (38354: A58 in Bury, 36632: A62 in Oldham) are greater than ±25%, and Bury is also the worst case location as identified in the local modelling. The local road network in the vicinity of these PCM links is complex so direct comparison is difficult. The Bury A58 concentration of 54.8 µg/m<sup>3</sup> is the maximum of any PCM receptor point on roads managed by local authorities.
- 3.1.4 The A635 in Tameside (Census ID:99618) has the highest PCM link concentration of 42.2 µg/m<sup>3</sup>, and is predicted to have a maximum concentration of 48.8 µg/m<sup>3</sup> in the detailed local modelling. Again, the local road network in the vicinity of this PCM link is complex so direct comparison between the models is difficult.
- 3.1.5 However, the local modelling also predicts exceedances at a number of additional PCM links across Greater Manchester in 2021. These include locations in districts that were not identified as non-compliant in the national modelling, i.e. Rochdale and Wigan. There are 150 stretches of road (road links) or 250 modelled points, where concentrations of NO<sub>2</sub> are forecast to exceed 40 µg/m<sup>3</sup> for NO<sub>2</sub> beyond 2020, across GM as a whole. 112 of these roads (or 207 modelled points) coincide with roads identified in the national PCM model. Typically, these roads have the greatest car use and heavy freight flows. The remaining 40 road link exceedances (or 43 modelled points) are on shorter stretches of local roads, primarily around town and city centres across Greater Manchester, which are not included in the national model but carry high volumes of traffic, including significant numbers of buses, taxis and Light Goods Vehicles (LGVs).
- 3.1.6 These results are summarised in the following section of this report, split by district. They are described based on the number of output points from the local network (rather the PCM network), and also include roads managed by the local authority excluded from the PCM network and separately those roads managed by Highways England (HE) - which include motorways and trunk roads.

3.1.7 Table 2 and Chart 1 show the exceedances identified by local modelling and upon which the proposed GM CAP is based. Exceedances are found in the town and city centres and on major roads, particularly those close to the motorway network. The greatest concentration of sites in exceedance of the EU Limit Value is found in Manchester city centre, and this is also where some of the highest annual mean concentrations are predicted. This reflects higher traffic volumes, congestion, high buildings which create air pollution 'canyons', and high background levels of pollution. The aim of the GM CAP is to deliver measures that deliver compliance at these locations as soon as possible, without redistributing the problem to other locations. The geographical spread of NO<sub>2</sub> exceedances throughout Greater Manchester is shown in Chart 1 for 2021 and clearly highlights the complexity of the air quality issues the Clean Air Plan is trying to address. The modelled Do Minimum scenario NO<sub>2</sub> concentrations and exceedances for each district are presented separately in Figures 2 to 11 for 2021, Figures 12 to 22 for 2023, and Figures 23 to 33 for 2025.

**Chart 1: Predicted NO<sub>2</sub> Exceedances in Greater Manchester in the Local Modelling in 2021**



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3.1.8 Table 2 shows the exceedances identified in the national modelling, using the PCM, and in the local modelling. The local modelling encompasses a wider road network than the PCM, including local and strategic roads. The primary spending objective of the GM CAP, as set out by JAQU, is to tackle exceedances identified by the local modelling on roads included within the PCM network.

**Table 2: Predicted NO<sub>2</sub> Exceedances in Greater Manchester in the PCM and Local Modelling in 2021**

Local authority	National (PCM) Model exceedances links	Local Model exceedances points on PCM links	Additional Local Model point exceedances on minor roads (non-PCM links)*	Total Local Model point exceedances
Bolton Metropolitan Borough Council	1	18	1	19
Bury Metropolitan Borough Council	1	19	4	23
Manchester City Council	3	70	18	88
Oldham Metropolitan Borough Council	0	13	2	15
Rochdale Metropolitan Borough Council	0	10	0	10
Salford City Council	1	30	6	36
Stockport Metropolitan Borough Council	2	24	6	30
Tameside Metropolitan Borough Council	1	16	0	16
Trafford Metropolitan Borough Council	1	5	5	10
Wigan Metropolitan Borough Council	0	2	1	3
<b>Total</b>	<b>10</b>	<b>207</b>	<b>43</b>	<b>250</b>

\*These are road links that are not included in the national PCM model but have been modelled locally.

- 3.1.9 Table 3 shows the distribution of non-compliant sites across Greater Manchester, both by spatial type and also in terms of how close they are to compliance. This shows that, whilst levels of NO<sub>2</sub> are below the EU Limit Value across much of the road network, in 2021 it is anticipated that 250 sites will remain non-compliant, of which 62 are predicted to experience annual mean concentrations between 45 µg/m<sup>3</sup> and 50 µg/m<sup>3</sup>, and 13 to experience annual mean concentrations over 50 µg/m<sup>3</sup> and as high as 55 µg/m<sup>3</sup>. A further 603 sites are compliant but experience annual mean concentrations close to the EU Limit Value and given modelling uncertainties, could be at risk of still exceeding in 2021.
- 3.1.10 Chart 1, Table 2 and Table 3, demonstrate the spatial diversity of predicted exceedances across GM, with predicted exceedances occurring both in urban centres, and close to heavily trafficked routes serving them (including those influenced by the motorway).
- 3.1.11 By 2023, the transition towards cleaner vehicles that would be expected without further action, as well as a reduction in background emissions, leads to a substantial reduction in the number of sites in exceedance of the EU Limit Value, from 250 in 2021 to 68 in 2023, and a reduction in the number of sites in compliance but close to the EU Limit Value from 603 in 2021 to 210 in 2023.
- 3.1.12 By 2025, the improvement in air quality expected without further action, leads to a very substantial reduction in the number of sites in exceedance of the EU Limit Value, from 250 in 2021 to 8 in 2025, and a reduction in the number of sites in compliance but close to EU Limit Value from 603 in 2021 to 58 in 2025. Nevertheless, this suggests that achieving compliance with the EU Limit Value will take more than seven years in Greater Manchester without further action.
- 3.1.13 Information on air quality performance for individual local authorities can be found in appendices supporting the OBC Strategic Case.
- 3.1.14 It should be noted that forecasts of improvements in air quality have been shown to be overly optimistic in the past; if this was the case then compliance may take longer to achieve and any intervention would be of greater value than presented in this OBC.

**Table 3: Predicted annual mean NO<sub>2</sub> concentrations at points on the Greater Manchester road network - 2021, 2023 and 2025 without further action ('Do Minimum')**

Road classification <sup>1</sup>	Compliant sites		Non-compliant sites			
	Very compliant (below 35 µg/m <sup>3</sup> )	Compliant but marginal (35 to 40 µg/m <sup>3</sup> )	Non-compliant (>40 to 45 µg/m <sup>3</sup> )	Very non-compliant (>45 to 50 µg/m <sup>3</sup> )	Extremely non-compliant (>50 µg/m <sup>3</sup> )	Total non-compliant (>40 µg/m <sup>3</sup> )
<b>2021</b>						
Inside Manchester-Salford Inner Relief Route (IRR)	475	73	34	19	5	<b>58</b>
Urban centres	465	66	17	4	0	<b>21</b>
Other locations	15,341	464	124	39	8	<b>171</b>
<b>Total</b>	<b>16,281</b>	<b>603</b>	<b>175</b>	<b>62</b>	<b>13</b>	<b>250</b>
<b>2023</b>						
Inside IRR	552	35	16	3	0	<b>19</b>
Urban centres	523	25	4	0	0	<b>4</b>
Other locations	15781	150	38	7	0	<b>45</b>
<b>Total</b>	<b>16,856</b>	<b>210</b>	<b>58</b>	<b>10</b>	<b>0</b>	<b>68</b>
<b>2025</b>						
Inside IRR	601	4	1	0	0	<b>1</b>
Urban centres	547	5	0	0	0	<b>0</b>
Other locations	15,920	49	7	0	0	<b>7</b>
<b>Total</b>	<b>17,068</b>	<b>58</b>	<b>8</b>	<b>0</b>	<b>0</b>	<b>8</b>

*Note: The total number of predicted points and distribution of those points changes between 2021 and 2023/2025 due to planned changes to the road network.*

<sup>1</sup> "Inside Inner Relief Route" is the area encircled by the Inner Relief Route. "Urban centres" are areas that met a definition used for the purposes of air quality modelling for Option 4 testing. "Other locations" are roads outside of Urban centres and the Inner Relief Route.

- 3.1.15 Based on extrapolation from the available transport model years, Greater Manchester is predicted to become fully compliant with the EU Limit Value for NO<sub>2</sub> in 2027.
- 3.1.16 In order to deliver compliance, emissions reductions equivalent to reducing traffic emissions by as much as 40-50% are required at some locations. This proposed GM CAP has assessed solutions that aim to deliver equivalent reductions in emissions in the shortest possible time and without limiting the ability to travel around the region or preventing successful business operations.

### **Influence of Highways England's Strategic Road Network**

- 3.1.17 While the maps and tables show a number of exceedances on local roads that are in close proximity to the Strategic Road Network (SRN), which is managed by Highways England (HE), it should be noted that the mapping and analysis does not include exceedances actually allocated to the SRN. This is because Highways England have not been required to act to reduce NO<sub>2</sub> under the same direction as local authorities. Nevertheless, at local roads close to the SRN, pollution caused by motorway traffic can be as much as 50% greater than that from the local road. Furthermore, there are properties in exceedance situated along the motorway where there is very little local road traffic and 100,000 vehicles passing per day on the SRN.
- 3.1.18 Highways England have eight links predicted to be non-compliant in the PCM network based on national modelling. Highways England is currently assessing sections of the SRN around Greater Manchester to explore potential Measures to reduce air quality impacts. The GM CAP is predicted to provide substantial improvements in air quality on the SRN in Greater Manchester as most of the traffic on that network enters or exits within the region, and is therefore in scope for the penalty charges. Information on modelled outputs of PCM equivalence points are provided in for HE managed roads in Appendix B. However, it should be noted that these points may not be representative of exposure and have not been checked against the criteria for 'qualifying features' agreed between JAQU and HE. Therefore, use of these results for interpretation of compliance of the SRN with the EU Limit Value is not appropriate.

### **Why is there a problem in Greater Manchester?**

- 3.1.19 As demonstrated by the scale of exceedances identified in the Government's PCM model and the local modelling, Greater Manchester suffers from some of the worst air quality in the UK. The reasons for this are complex and multi-faceted.
- 3.1.20 Vehicles travelling on the roads in Greater Manchester traffic are older and more polluting than the national average, and traffic speeds are slower than average. This means the options considered in Greater Manchester may need to be bolder.

- 3.1.21 The transport modelling has also been analysed to understand the origins and destinations of traffic, by vehicle type, on these links. This shows that whilst a large proportion of traffic is associated with accessing the urban centres, there is also a significant use of the local road network to access the motorway for trips spread around Greater Manchester and beyond. The analysis indicates that a range of measures will be necessary to tackle Greater Manchester's NO<sub>2</sub> concentrations due to the diverse spatial context and reasons for travel.
- 3.1.22 Vehicle travel in Greater Manchester has been changing over the past 20 years. Traffic volumes on Highways England controlled motorways have been increasing but elsewhere on the local road network traffic levels have been stable or falling.
- 3.1.23 Analysis of the pollution sources at each location of exceedance has been undertaken, and an estimate of the emissions reduction required from vehicle transport has been calculated to enable compliance with the EU Limit Value for NO<sub>2</sub>. This was utilised to inform the detail of measures required by the GM CAP.
- 3.1.24 The analysis shows that there are very diverse factors affecting vehicle emissions across Greater Manchester, with vehicle types and levels often differing between roads in close proximity to each other (see Chart 2). In many locations where there are significant exceedances, such as on roads in a city/town centre, the road network performs a variety of complex transport functions and therefore carries a diverse range of traffic, including cars, vans, Heavy Goods Vehicles (HGVs), buses and taxis.
- 3.1.25 The success of any potential scheme is determined by the removal of all predicted exceedances in the shortest possible time. The transport and emissions modelling process was developed based on the published JAQU guidance, and a range of indicative early schemes were tested to understand the likely scale of impact on NO<sub>2</sub> of charging CAZ schemes in 2021. This determined that compliance was not feasible in 2021, and therefore additional transport models were also constructed for 2023 and 2025 to understand the trajectory of NO<sub>2</sub> concentrations into the future.
- 3.1.26 Chart 2 shows 15 of the key points that would eventually come to define compliance within GM and each district. These sites have been selected based on the maximum predicted concentrations and last points of compliance in each district in the best performing options, plus where there are several points with high concentrations, those which display notably different source apportionment by vehicle type were added.

- 3.1.27 The air quality data and emissions source apportionment is provided in Table 4 for 2023, the year of full scheme opening. This table shows how each vehicle type contributes to the total road transport emissions on a given road link, and how variable they are across GM.
- 3.1.28 For example, buses are an insignificant fraction on the links in Bolton and several of the other districts, whilst on the links close to the IRR in Manchester and Salford, bus emissions account for 32-66% of total transport emissions. Emissions from goods vehicles (HGVs & LGVs) are often over 50% of emissions, with eight of the 15 sites having goods vehicle emissions >47%. Cars form a relatively consistent and substantial proportion of total emissions, but also comprise the vast majority of vehicle movements, usually >75%.
- 3.1.29 Full data for all modelled links, years and scenarios is presented in Appendix B.

Chart 2: Key Exceedance Points across Greater Manchester

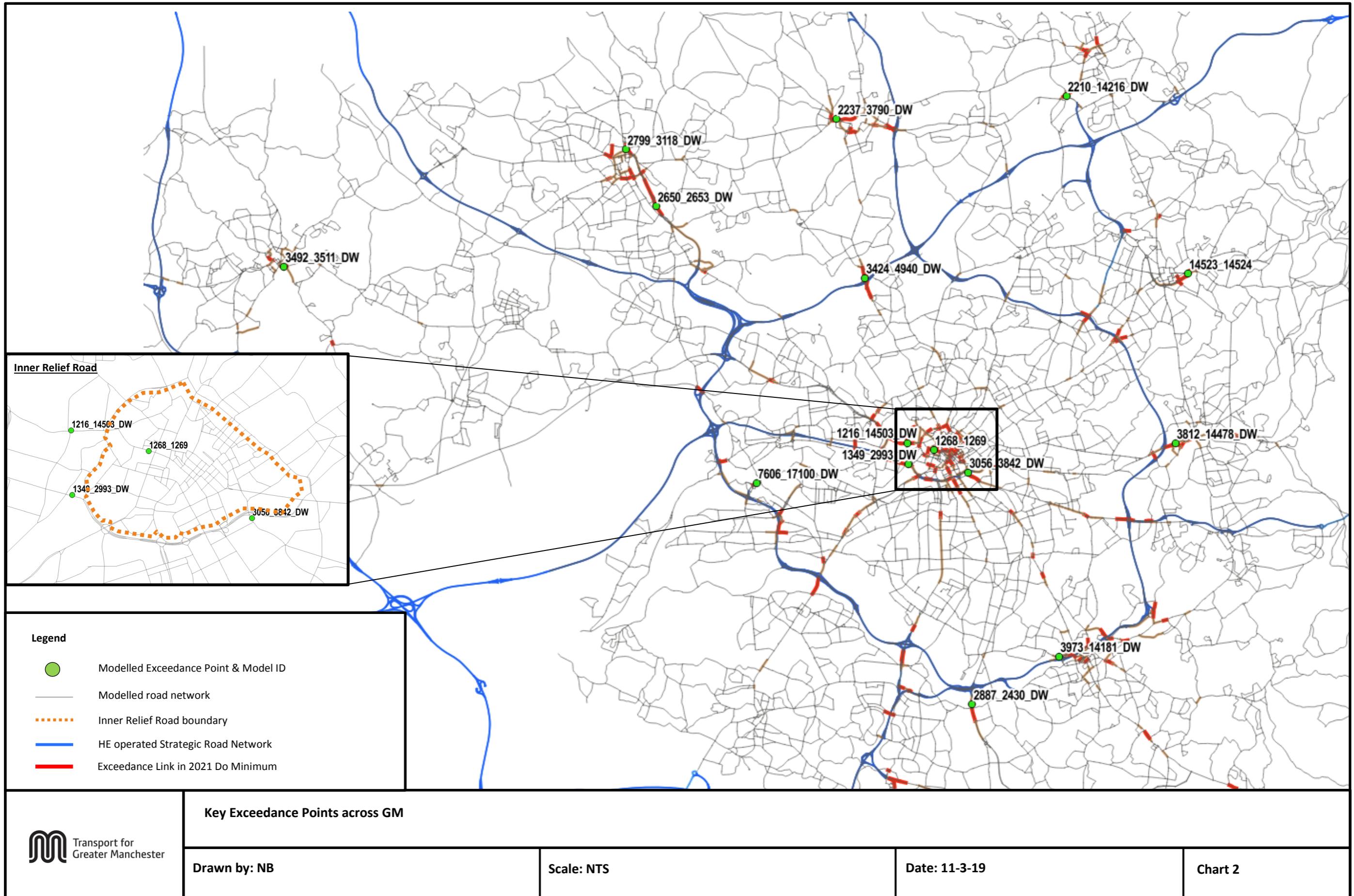


Table 4: Predicted annual mean NO<sub>2</sub> concentrations and source apportionment at key compliance points on the Greater Manchester road network - 2023 Do Minimum

Point ID	x	y	Census ID	Road name	Local Authority	PCM/ LA/ HE	PCM Total NO <sub>2</sub> conc (µg/m <sup>3</sup> )	Annual mean NO <sub>2</sub> conc (µg/m <sup>3</sup> )	BG NOx conc (µg/m <sup>3</sup> )	BG NO <sub>2</sub> conc (µg/m <sup>3</sup> )	Road NOx contrib (µg/m <sup>3</sup> )	Road NO <sub>2</sub> contrib (µg/m <sup>3</sup> )	Traffic Flow (veh per day)	NOx contribution by vehicle type (%)				
														Bus	Taxi	HGV	LGV	Car
2799_3118_DW	371751	409800	58048	A673	Bolton	PCM	23.8	40.5	26.0	18.1	50.3	22.4	27,875	0%	5%	32%	25%	38%
2650_2653_DW	372915	407622	7431	A666	Bolton	PCM	36.3	40.4	24.8	17.3	47.5	23.1	70,119	0%	6%	6%	44%	44%
2237_3790_DW	379830	410975	38354	A58	Bury	PCM	36.9	49.0	21.4	15.2	83.1	33.8	79,714	21%	5%	17%	21%	35%
3424_4940_DW	380920	404881	17924	A56	Bury	PCM	30.6	45.9	17.0	12.4	78.7	33.6	19,993	9%	5%	32%	20%	35%
3056_3842_DW	384880	397418	26157	A6	Manchester	PCM	30.4	46.6	32.2	21.6	58.9	25.1	38,937	19%	5%	15%	25%	36%
1268_1269	383558	398278	27974	A34	Manchester	PCM	23.3	44.9	35.6	23.4	65.7	21.5	9,347	66%	3%	4%	10%	18%
14523_14524	393320	405038	36632	A62	Oldham	PCM	34.4	46.4	25.7	17.8	62.5	28.5	53,611	0%	7%	14%	31%	47%
2210_14216_DW	388664	411856	17322	A664	Rochdale	PCM	28.0	44.0	17.9	13.0	74.9	31.0	34,521	0%	4%	43%	24%	29%
1349_2993_DW	382580	397716	73792	A57	Salford	PCM	33.2	46.9	24.7	17.2	67.0	29.6	57,674	3%	6%	20%	30%	42%
1216_14503_DW	382565	398546	17926	A6	Salford	PCM	25.0	43.2	25.2	17.6	63.8	25.6	31,661	32%	4%	21%	16%	27%
3973_14181_DW	388375	390354	58034	A5145	Stockport	PCM	28.6	42.6	20.9	14.9	61.5	27.7	26,401	11%	5%	21%	26%	37%
2887_2430_DW	385044	388518	26352	A34	Stockport	PCM	36.0	42.3	19.0	13.8	60.5	28.6	40,455	0%	6%	13%	27%	53%
3812_14478_DW	392847	398534	99618	A635	Tameside	PCM	37.6	42.7	25.5	17.7	55.4	25.0	41,293	4%	5%	23%	31%	36%
7606_17100_DW	376759	397007	N/A	B5214	Trafford	LA	N/A	39.1	19.6	14.1	60.1	25.0	29,051	26%	4%	25%	13%	31%
3492_3511_DW	358611	405310	8566	A577	Wigan	PCM	27.1	36.6	29.1	19.7	36.9	16.9	22,629	10%	5%	22%	25%	38%

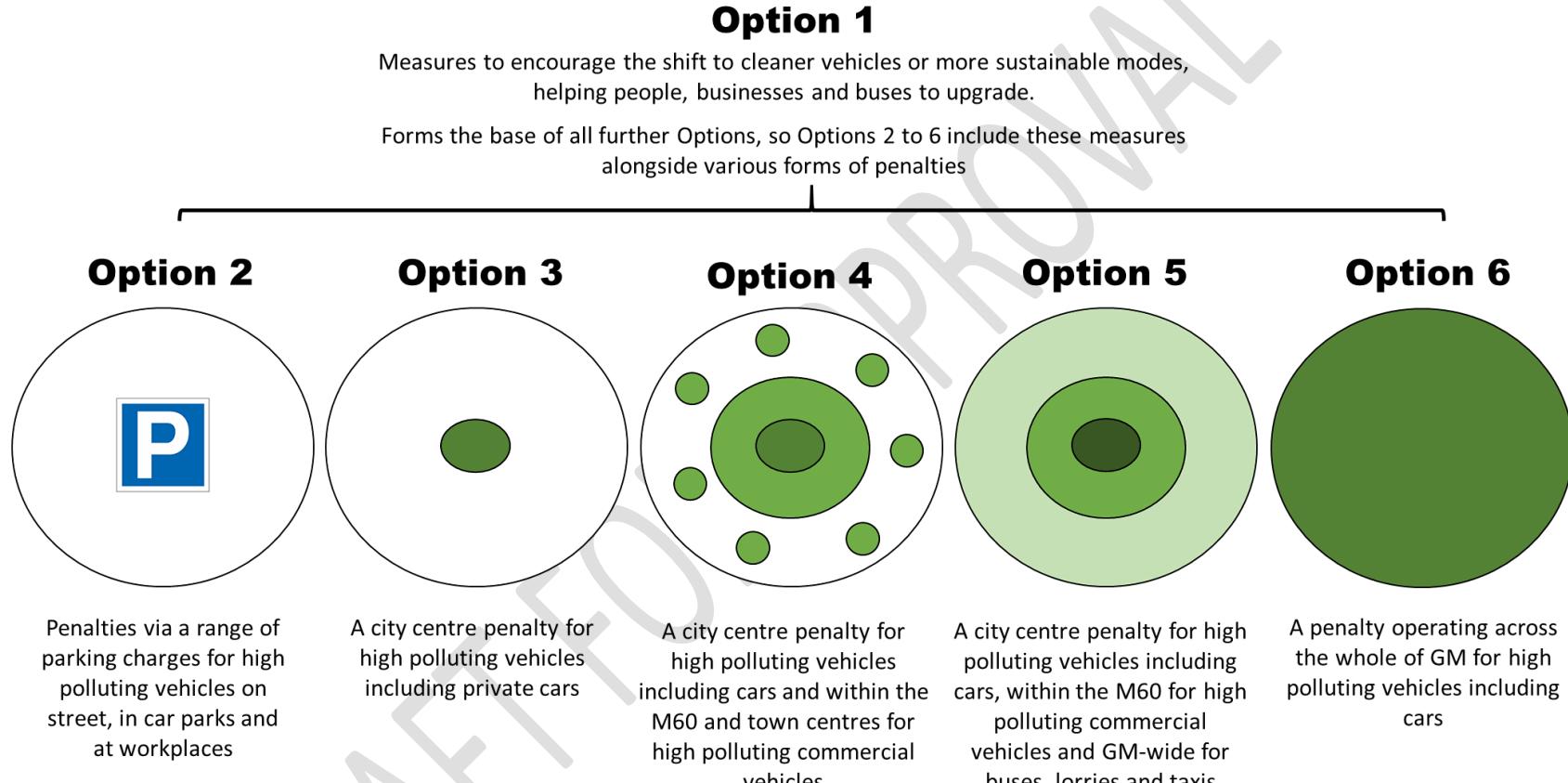
## 4 CAP Options

- 4.1.1 As previously described, local modelling has revealed the problem to be larger than that initially identified by Government. Local modelling predicts a greater spatial distribution of NO<sub>2</sub> exceedances across roads in Greater Manchester and generally higher concentrations of NO<sub>2</sub> in specific locations.
- 4.1.2 Given the spatially variable and complex causes of exceedances across Greater Manchester, and with each exceedance site differing, the scale of the challenge means that the solutions are inter-related. Localised solutions such as re-routing traffic or tackling local pinch points will clearly be insufficient to tackle the region-wide problem, and risk simply moving the problem elsewhere.
- 4.1.3 A series of six options, containing packages of Measures including CAZ schemes of different categories and sizes, were developed in response to the problem identified by local modelling.
- 4.1.4 The initial series of six options are presented below. The details of each measure and option can be found in the Transport Modelling Reports and the Optioneering Report.
- 4.1.5 The six options have been assessed against the UK Government's Primary Success Criteria:
  - **Reduction in NO<sub>2</sub> emissions:** the likelihood that the measure/option will contribute to a reduction in NO<sub>2</sub> concentrations in order to achieve compliance with the EU Limit Values.
  - **Feasibility:** the likelihood of the Measure being implemented in the shortest possible time to deliver the desired NO<sub>2</sub> reduction and achieve compliance. This should consider real-life factors that could delay implementation such as the ease of putting governance systems in place to facilitate local government cooperation and the local authorities having the jurisdiction to implement such Measures/options. It should also consider the likelihood of the Measure being effective.
- 4.1.6 The Options have been further assessed against a series of Secondary Success Criteria as set out in the SOC and agreed with JAQU, as follows:
  - Strategic fit with local strategies and plans
  - Value for money
  - Distributional impact
  - Deliverability
- 4.1.7 This process is described in more detail in the OBC Strategic Case.

- 4.1.8 Engagement with stakeholders, including freight, bus, taxi and private hire vehicles (PHV) as well as Local Enterprise Partnerships has helped to shape the options being considered within the GM CAP and has been used to raise awareness of the GM CAP.
- 4.1.9 A brief summary of the outcomes of the initial appraisal of these options is presented in Chart 3 and Table 5.

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**Chart 3: Summary of six Options for initial appraisal**



**Table 5: Outcome of initial appraisal of six Options**

Option	Evaluation	Outcome
<b>Option 1:</b> Measures to encourage the shift to cleaner vehicles or more sustainable modes, helping people, businesses and buses to upgrade.	 <p>Assessment of a range of measures suggests that:</p> <ol style="list-style-type: none"> <li>Some are not likely to be effective in tackling air quality, such as conversion from Gas to Liquid fuels or junction improvement schemes;</li> <li>Some could be effective but are not deliverable within the timescale, such as new public transport capacity; and</li> <li>Some could be effective with measures to deter the use of dirtier vehicles, such as incentives to upgrade &amp; scrap vehicles, promotion of electric vehicles, and measures to promote sustainable travel choices.</li> </ol>	<p>On its own, does not deliver compliance in the shortest possible time. Effective and feasible measures have been incorporated into the Best Performing Options for full evaluation.</p>
<b>Option 2:</b> Penalties via a range of parking charges for high polluting vehicles on street, in car parks and at workplaces	 <p>Parking measures have limited effect on the heaviest and dirtiest vehicles such as HGVs and buses and only affect those cars and vans that need to park in public places – so those with private off-street parking are not affected regardless of how dirty their vehicle is. In practice, would be expensive and slow to deliver due to existing contract restrictions.</p>	<p>Does not deliver compliance in the shortest possible time. Will not be progressed.</p>
<b>Option 3:</b> A city centre penalty for high polluting vehicles including private cars	 <p>A city centre penalty for high polluting vehicles would be effective in the city centre and have some effect on approach roads but would leave around 200 sites non-compliant across the remainder of GM, with non-compliance remaining in the city centre at some sites. Does not deliver compliance in the shortest possible time.</p>	<p>Does not deliver compliance in the shortest possible time. Will not be progressed.</p>
<b>Option 4:</b> A city centre penalty for high polluting vehicles including cars and within the M60 and town centres for high polluting commercial vehicles	 <p>Option 4 would reduce the number of non-compliant sites by around 80% in 2021. Concerns remain about whether customers would be able to understand and therefore respond to such a complex set of boundaries, and about the economic impact on town centres and deprived areas within the M60.</p>	<p>Initial evaluation suggests this Option may deliver compliance in the shortest possible time. A revised version of this Option, reflecting lessons learned, will be subject to a full evaluation as a Best Performing Option.</p>
<b>Option 5:</b> A city centre penalty for high polluting vehicles including cars, within the M60 for high polluting commercial vehicles and GM-wide for buses, lorries and taxis	 <p>Option 5 would reduce the number of non-compliant sites by around 80% in 2021. Concerns remain about the appropriateness of a boundary at the M60, given the distribution and cause of AQ hotspots in the area and the level of deprivation. Concerns also remain about the viability &amp; effectiveness of applying penalties to vans on a large scale given the limited availability/high cost of compliant vans in 2021.</p>	<p>Initial evaluation suggests this Option may deliver compliance in the shortest possible time. A revised version of this Option, reflecting lessons learned, will be subject to a full evaluation as a Best Performing Option.</p>
<b>Option 6:</b> A penalty operating across the whole of GM for high polluting vehicles including cars	 <p>A GM-wide penalty for high polluting vehicles does not deliver compliance in 2021, with more than 20 sites remaining non-compliant despite significant trips per day being subjected to a penalty. Furthermore, the modelling results are not considered credible as the method is not appropriate for a region-wide scheme for car drivers, and it is likely that behavioural responses have been over-estimated. Delivery of a scheme on this scale would be slow, complex and risky, and very considerable social and economic impacts would be likely and need mitigating.</p>	<p>Does not deliver compliance in the shortest possible time and risk that contravenes GM's wider statutory duties. Will not be progressed.</p>

## **Best performing options identified for appraisal from high level assessment process**

- 4.1.10 Following the initial appraisal of the six options, three options were developed as the ‘best performing’ options to be subject to a detailed appraisal process. These options are derived from Options 4 and 5 but have been adapted to reflect a deeper level of understanding of the issues that emerged throughout the initial options appraisal process. As such, they are considered more likely to deliver effective reductions in NOx emissions and greater compliance than the options as initially specified. The three developed options are Option 4, Option 5(i) and Option 5(ii) and are summarised in Chart 4. In particular, the following changes have been made:
- A revised package of non-CAZ Measures, developed from Option 1, has been developed and incorporated into the three new options; Options 4, 5(i) and 5(ii)<sup>2</sup>. This includes those Measures found in the initial assessment to be effective, and removes Measures found to be ineffective or not deliverable.
  - The initial appraisal suggested that the second-hand van market would not be sufficiently mature by 2021 to support a large-scale CAZ for vans – a lack of available affordable compliant vehicles could result in a higher than predicted proportion of vehicles ‘staying and paying’ rather than upgrading, and could create substantial risk of economic damage. Therefore, implementation of the city region schemes has been divided into two phases:
    - Phase 1, in 2021, would be a CAZ B encompassing buses, taxis and PHVs, HGVs and coaches
    - Phase 2, in 2023, would be a CAZ C including LGVs and minibuses
  - Finally, and related to the decision above, the M60 boundary in Option 5 has been abandoned, with the schemes reviewed for possible application within the Inner Relief Route (IRR) and would extend to Greater Manchester-wide instead. Applying an additional boundary adds cost and complexity to the scheme, and risks customer confusion. Further analysis showed that the M60 boundary does not reflect where the outstanding locations of non-compliance remain post-2021, many of which are outside this zone. Therefore, a CAZ C at the M60 boundary is not likely to deliver compliance in “the shortest possible time”. More work is planned to develop a better understanding of where non-compliance remains post-2021 and the sources of these emissions. It is anticipated that refinements may be made to the later phase proposals to better reflect the nature of the remaining problem and ensure compliance is delivered in the shortest possible time, and at the least cost to Greater Manchester.

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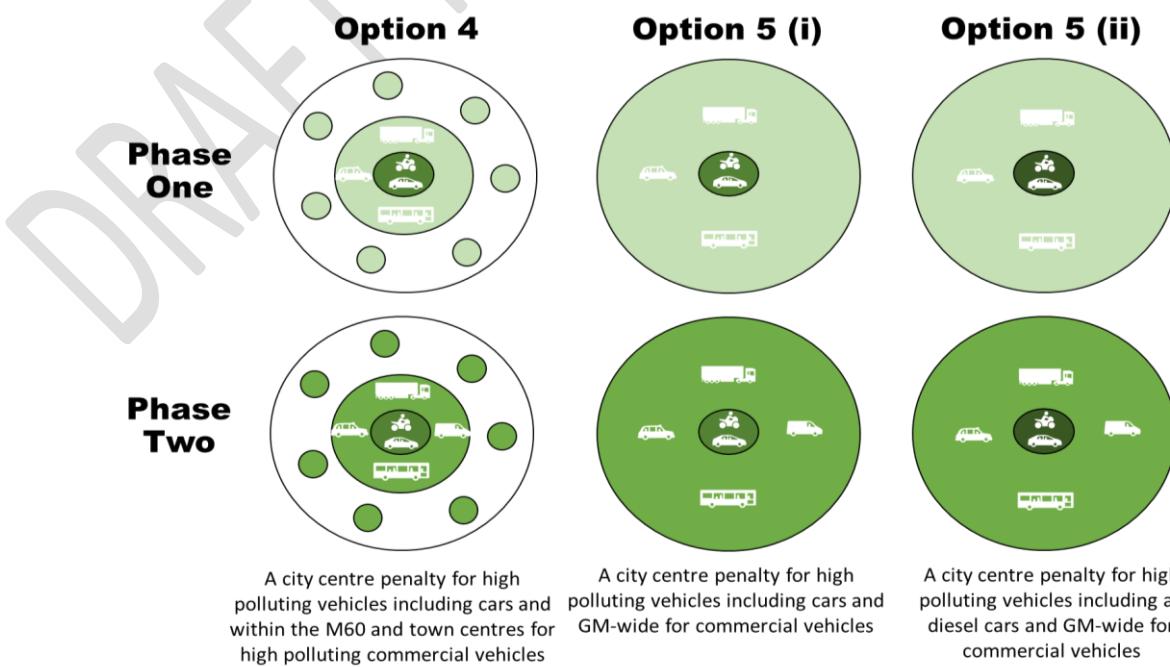
<sup>2</sup> 5 (i) and 5 (ii) are variations of the original option 5. Detail on them is presented below.

4.1.11 The Options that were progressed for full appraisal in autumn 2018 are described below:

- **Option 4:** A CAZ Category D within the Inner Relief Route (IRR) to be delivered in Phase 1 (in 2021) alongside a CAZ Category B within the M60 and satellite towns. In Phase 2 (in 2023), the CAZ within the M60 and satellite towns extends to a Category C. The CAZ proposals incorporate required Measures to communicate the message, promote cleaner vehicles and help people, businesses and bus operators upgrade.
- **Option 5(i):** A CAZ Category D within the IRR to be delivered in Phase 1 (in 2021) alongside a CAZ Category B across Greater Manchester. In Phase 2 (in 2023), the CAZ across Greater Manchester extends to a Category C. The CAZ proposals incorporate required Measures to communicate the message, promote cleaner vehicles and help people, businesses and bus operators upgrade.
- **Option 5(ii):** An enhanced CAZ Category D within the IRR such that all diesel cars and private hire vehicles would be subject to a penalty as well as non-compliant petrol vehicles and larger diesel vehicles older than Euro 6, reflecting that even compliant diesel cars have higher emissions affecting air quality than their petrol equivalents. To be delivered in Phase 1 (in 2021) alongside a CAZ Category B across Greater Manchester. In Phase 2 (in 2023), the CAZ across Greater Manchester extends to a Category C. The CAZ proposals incorporate required Measures to communicate the message, promote cleaner vehicles and help people, businesses and bus operators upgrade.

4.1.12 These are illustrated in Chart 4.

**Chart 4: Initial Best Performing Options**



### **Additional options identified after initial appraisal process**

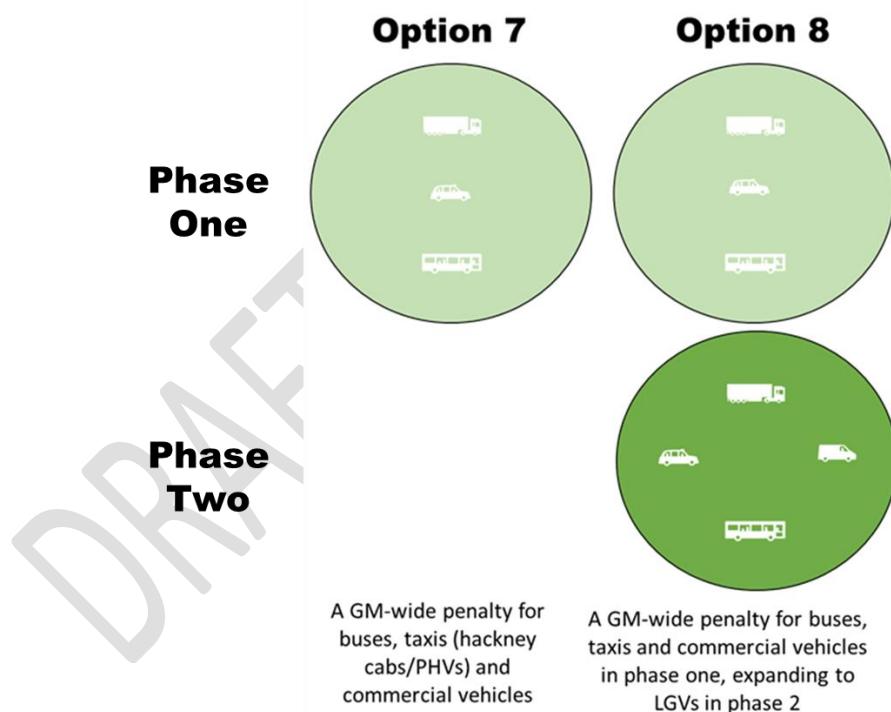
4.1.13 Following an initial evaluation in December 2018 by the ten local authorities of the appraisal results of the three options set out above, concerns were raised that there was insufficient information to allow a decision to be made.

4.1.14 As a result, two additional options were considered:

- **Option 7:** A CAZ Category B across Greater Manchester to be implemented in a single phase. The CAZ proposals incorporate required Measures to communicate the message, promote cleaner vehicles and help businesses and bus operators upgrade.
- **Option 8:** A CAZ Category B across Greater Manchester implemented as Phase 1. In Phase 2, the CAZ across Greater Manchester extends to a Category C. The CAZ proposals incorporate required Measures to communicate the message, promote cleaner vehicles and help businesses and bus operators upgrade.

4.1.15 These are illustrated in Chart 5 below.

**Chart 5: Further Options**



4.1.16 Option testing was undertaken using three different versions of the transport modelling tool which each had different assumptions within the tool as guidance and assumption refinement was progressed:

- Initial Version of the tool (Spring 2018) – This version of the tool used a coarser sector system and made high level assessments of scheme impact in line with the default figures in JAQU guidance and WebTAG suggested values for car elasticities. At this stage the tool was largely used to assess the potential scale of impact of measures and did not integrate with the GM SATURN model for option assessment.
- Second Version of the Tool (Early Summer 2018) – This version of the tool used a more disaggregated sector system and had updated responses modelled for car elasticities to give results more in line with expected results in JAQU's guidance. At this stage the tool was used to sift several options and started to produce outputs for use in SATURN for further option assessment.
- Third Version of the tool (August 2018) – This version further disaggregated the sector system and updated the responses to charging to make use of data from weighted Stated Preference work in Bristol, following updated advice from JAQU on the use of their default assumptions was provided. This version of the tool was used to undertake assessment of shortlisted options taken forward to the business case.
- Final Version of the model (January 2019) – This version updated the PHV responses to charging to what is believed to be more realistic and in keeping with how other areas have modelled PHV response. This tool was used to test Options 7 and 8 which were developed at a later date.

4.1.17 Option 6 was modelled as an early maximum theoretical test using the initial version of the transport modelling tool, recognising that the behavioural responses for cars at this regional scale were not considered robust, but to provide an indication of the efficacy of delivering compliance in 2021. The Strategic Case includes an explanation of why Option 6, despite potentially appearing to provide the best outcome in emissions terms, is actually not considered likely to deliver compliance in the shortest possible time. The headline exceedance results for the 2021 scenario have been provided.

4.1.18 Option 4 and 5(i & ii) were modelled using the third version of the tool. Based on the results for Option 4 and 5 at this phase of assessment, it was clear that Option 4 would not perform as effectively as some of the other potential options available. Therefore, it was not updated with the final version of the modelling, when Options 5i, 7 & 8 were remodelled. Results presented hereafter for Option 4 whilst appropriately comparable are not based on the same version of the model build.

- 4.1.19 Option 5(ii) defines all diesel cars as non-compliant, regardless of their age or Euro standard. There is no available research into how drivers would respond to this type of scheme, and also the transport modelling process would have had to have been totally reconstructed to represent this response. Therefore, an indicative screening approach was applied to the modelling process, accepting that if this option was taken forward, detailed project-specific research would need to be implemented during the next phase of the project, to provide robust information on the behavioural responses. This would have implications for the delivery programme of the scheme in terms of assessment and also risk of challenge. The modelling approach was to pivot off the Option 5(i) model, and assume that all of the compliant Euro 6 diesel cars entering the IRR chose to swap their diesel car for a petrol car, with no allowance for change mode or cancel trip. This was applied to all car movements inside the IRR, post Saturn modelling in the emissions calculations phase. However, this means that no benefit of this possible response by car drivers on the section of their trip outside of the IRR could be captured in the modelling in terms of reduced emissions per vehicle, and a greater number of re-mode or cancel removing private car trips both inside the IRR and on the approach routes. The assumptions will therefore lead to an underestimate of the true effect of this option on air quality particularly on major private car routes to the IRR. This approach was agreed with JAQU.
- 4.1.20 The GM-wide nature of the schemes means that re-routing to avoid the penalty charge zone, and thereby causing increases in traffic on alternative routes is not a very likely effect. Few routes would enter then leave GM without visiting (and therefore being in scope for a charge) unless on the Strategic Road Network. Additionally, the vast majority of bus, taxi, HGV and LGV movements are modelled as fixed trips within the modelling process, and therefore cannot avoid a charge by re-routing. Only cars could make this choice, and the IRR zone is relatively small and congested, and would not likely be used as a through route if a vehicle's origin or destination is not located within it. This effect could materially apply in Option 4 or Option 5(i or ii).

## 5 Summary Results for CAP Options

- 5.1.1 Table 6 shows the number of sites remaining in exceedance of legal limits in 2021, 2023 and 2025 under the Do Minimum scenario and with each of the Options by local authority. The results show:
- without action, there are predicted to be 250 non-compliant sites across Greater Manchester in 2021, 68 in 2023 and eight remaining in 2025, with compliance forecast to be achieved by 2027;
  - Option 4 and Option 7 are less effective in reducing the number of sites of exceedance in all modelled years;
  - Option 6, a theoretical GM-wide CAZ D does not deliver compliance in 2021;

- with action, two authorities (Wigan and Trafford) are forecast to become compliant in 2021 (with the exception of Option 4), with between 49 and 71 points of non-compliance remaining across the rest of the region depending upon which Option is taken; and
- with action, by 2023 nine authorities are forecast to be compliant (with the exception of Option 4 & 7), with between one and three non-compliant sites remaining in the City of Manchester (depending on which Option is taken).

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**Table 6: Number of sites remaining in exceedance of legal limits for NO<sub>2</sub> concentrations by year, Greater Manchester, by local authority for the range of modelled options**

	2021								2023								2024 (interpolated)				2025							
	Do Min	4	5(i)	5(ii)	6	7	8	Do Min	4	5(i)	5(ii)	7	8	4	5(i)	5(ii)	7	8	Do Min	4	5(i)	5(ii)	7	8				
Bolton	19	5	6	6	0	6	6	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
Bury	23	10	7	7	3	9	9	12	2	0	0	3	0	0	0	0	0	0	0	0	4	0	0	0	0	0		
Manchester	88	18	18	12	13	28	28	29	4	2	1	6	3	1	0	0	1	0	2	0	0	0	1	0	1	0		
Oldham	15	5	4	4	1	4	4	3	1	0	0	1	0	1	0	0	0	0	1	0	0	0	0	0	0	0		
Rochdale	10	2	2	2	1	2	2	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
Salford	36	10	10	10	1	11	11	10	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0		
Stockport	30	7	3	3	0	5	5	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
Tameside	16	6	5	5	2	6	6	5	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
Trafford	10	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
Wigan	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
<b>GM Total</b>	<b>250</b>	<b>64</b>	<b>55</b>	<b>49</b>	<b>21</b>	<b>71</b>	<b>71</b>	<b>68</b>	<b>9</b>	<b>2</b>	<b>1</b>	<b>12</b>	<b>3</b>	<b>2</b>	<b>0</b>	<b>0</b>	<b>1</b>	<b>0</b>	<b>8</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>1</b>	<b>0</b>				

Note: Calculation of 2024 was undertaken using linear interpolation between the 2023 and 2025 modelled NO<sub>2</sub> results for each model output point

5.1.2 Greater Manchester aims to deliver compliance in the shortest possible time in a way that takes into account the need to minimise human exposure. Table 7 demonstrates the benefits being delivered in each year in terms of reduced concentrations even at sites remaining in exceedance in that year. This also shows that the number of sites close to exceedance reduces considerably in each year as a result of the Plan. Health benefits continue to be delivered by reductions in NO<sub>2</sub> concentrations even below the EU Limit Values. In particular:

- All Options reduce to zero the number of sites that are extremely non-compliant (with concentrations over 50 µg/m<sup>3</sup>) in the first year; and substantially reduce the number that are very non-compliant (with concentrations between 45-50 µg/m<sup>3</sup>) in the same year.
- By 2023, all sites are at, or close to, compliance across Greater Manchester with all Options. Two sites are predicted to remain non-compliant in Option 5(i), one in Option 5(ii) and three in Option 8 but in all cases the predicted concentrations are close to 40 µg/m<sup>3</sup>. Option 4 and Option 7 are less effective with nine and 12 exceedances remaining, respectively.
- With action, compliance is achieved in all local authorities across Greater Manchester by 2024 for Options 5(i), 5(ii) and 8. With the vast majority of sites across the region are predicted to have concentrations less than 35 µg/m<sup>3</sup>. These options are therefore equally effective in terms of delivering compliance for GM.
- Option 4 and Option 7 are predicted to deliver compliance in 2025 and 2026, respectively, and because this is later than 2024 these options fail the Primary Critical Success Factor of the shortest possible time.

**Table 7: Number of modelled sites by scale of NO<sub>2</sub> exceedance by year, Greater Manchester, best performing options**

Scheme Option	Compliant sites			Non-compliant sites		
	Very compliant (below 35 µg/m <sup>3</sup> )	Compliant but close (35 to 40 µg/m <sup>3</sup> )	Non-compliant (40 to 45 µg/m <sup>3</sup> )	Very non-compliant (45 to 50 µg/m <sup>3</sup> )	Extremely non-compliant (> 50 µg/m <sup>3</sup> )	Total non-compliant (> 40 µg/m <sup>3</sup> )
<b>2021</b>						
Do minimum	16,281	603	175	62	13	250
Option 4	16,820	250	56	8	0	34
Option 5(i)	16,879	200	50	5	0	55
Option 5(ii)	16,892	193	44	5	0	49
Option 7	16,830	233	61	10	0	71
Option 8	16,836	227	62	9	0	71
<b>2023</b>						
Do minimum	16,856	210	58	10	0	68
Option 4	17,056	69	9	0	0	9
Option 5(i)	17,081	51	2	0	0	2
Option 5(ii)	17,087	46	1	0	0	1
Option 7	17,037	85	12	0	0	12
Option 8	17,072	59	3	0	0	3
<b>2025</b>						
Do minimum	17,068	58	8	0	0	8
Do Something	Options 5(i), 5(ii) and 8 are fully compliant by 2024, Option 4 by 2025 and Option 7 by 2026.					

5.1.3 Table 8 shows the concentrations at the highest point of exceedance with each option in each year. This shows that, by 2023, the highest exceedances in Options 5, 7 & 8 are below 42 ug/m<sup>3</sup>, whereas in the Do Minimum the highest exceedance is nearer 50 ug/m<sup>3</sup> (at 49.0 ug/m<sup>3</sup>).

**Table 8: Maximum NO<sub>2</sub> concentration as forecast in each year, in µg/m<sup>3</sup>**

Scenario	2021	2023	2025
Do Minimum	54.8	49.0	43.2
Option 4	49.2	42.5	39.3
Option 5(i)	47.4	40.9	38.6
Option 5(ii)	47.4	40.8	37.9
Option 7	48.1	43.6	40.1
Option 8	48.0	41.7	38.8

### **Detailed Discussion of Transport and Air Quality Impacts for Options 5(i), 5(ii), 7 & 8**

- 5.1.4 The impacts of each scheme will be discussed further with reference to the key exceedance points identified earlier, examining details on the changes to traffic and emissions by vehicle type.

#### **Option 5(i)**

- 5.1.5 The air quality and source apportionment data for Option 5(i) in 2023 are provided in Table 9, whilst the impacts on the traffic flows are provided in Table 10.
- 5.1.6 With Option 5(i) in effect, there are predicted to be two exceedances remaining in 2023, both of which are located in Manchester. Both are only marginally above the Limit Value with the option, and are predicted to be compliant in 2024.
- 5.1.7 Of the sites which are still non-compliant, all are located within Manchester regional centre. The A6 (3056\_3842\_DW) is the maximum exceedance, and here reductions of -5.7 ug/m<sup>3</sup> are predicted due to the option, which is located just outside of the IRR CAZ D boundary. Of the total change in emissions due to the option, 35% of this NOx reduction was due to cars upgrading to become compliant (1,900 veh/day) in response to the CAZ penalty charge and the EV fleet upgrade measure, or cancelling the trip or changing mode. A further 35% of this NOx reduction came from LGVs upgrading to become compliant (1,900 veh/day).
- 5.1.8 The A34 (1268\_1269) in Manchester experiences reductions of -4.5 ug/m<sup>3</sup> due to the option, which is located inside the IRR CAZ D boundary. Of the total change in emissions due to the option, 52% of this NOx reduction related to the bus fleet, whilst 22% related to cars upgrading to become compliant (700 veh/day) in response to the CAZ penalty charge and the EV fleet upgrade measure, cancelling the trip or changing mode.

- 5.1.9 All sites experience significant reductions in NO<sub>2</sub> concentrations, with a site on the A58 in Bury having the greatest decrease of -9.1 µg/m<sup>3</sup>. Of the total change in emissions at the A58 (2237\_3790\_DW) due to the Option, 44% of this NOx reduction was related to the bus fleet, and 22% from LGVs upgrading to become compliant (3,500 veh/day).
- 5.1.10 The A57 (1349\_2993\_DW) in Salford becomes narrowly compliant, with a reduction of -7.6 ug/m<sup>3</sup> due to the option. Of the total change in emissions due to the option, 38% of this NOx reduction came from HGVs upgrading to become compliant (400 veh/day), and 29% from LGVs upgrading to become compliant (2,900 veh/day). Additionally, a further 22% came from car flows upgrading due to the CAZ penalty charge and the EV fleet upgrade measure, cancelling trips or changing mode (2,600 veh/day).
- 5.1.11 The A62 (14523\_14524) in Oldham also becomes narrowly compliant, with a reduction of -6.6 ug/m<sup>3</sup> due to the option. Of the total change in emissions due to the option, 38% of this NOx reduction came from LGVs upgrading to become compliant (2,800 veh/day), and 33% from HGVs upgrading to become compliant (250 veh/day). Additionally, a further 23% came from cars upgrading due to the CAZ penalty charge and the EV fleet upgrade measure, cancelling trips or changing mode (1,800 veh/day).
- 5.1.12 It should be noted, that the number of AADT flows responding as upgrading, is not directly comparable to the total number of unique vehicles affected, as some vehicles are likely to travel along the link more than once per day (e.g a return trip) or on multiple links along overall routes (e.g. from Oldham into Manchester regional centre).
- 5.1.13 There is also the likely effect that some vehicles have been reassigned onto these key routes from equivalent ‘rat-running’ routes, due to slight reductions in overall demand (and modelled trip delays or ‘congestion’) hence the gap between the reduced non-compliant flows and increased compliant flows, particularly for cars and LGVs, is relatively small.
- 5.1.14 The modelled Option 5i scenario NO<sub>2</sub> concentrations and exceedances for each district are presented separately in Figures 34 to 44 for 2021, Figures 45 to 55 for 2023, and Figure 56 for 2025.

Table 9: Predicted annual mean NO<sub>2</sub> concentrations and source apportionment at key compliance points on the Greater Manchester road network - Option 5(i) 2023

Point ID	Census ID	Road name	Local Authority	Annual mean NO <sub>2</sub> conc (µg/m <sup>3</sup> )	BG NOx conc (µg/m <sup>3</sup> )	BG NO <sub>2</sub> conc (µg/m <sup>3</sup> )	Road NOx contrib (µg/m <sup>3</sup> )	Road NO <sub>2</sub> contrib (µg/m <sup>3</sup> )	AADT	NOx contribution by vehicle type (%)					Change in Annual mean NO <sub>2</sub> conc (µg/m <sup>3</sup> )
										Bus	Taxi	HGV	LGV	Car	
2799_3118_DW	58048	A673	Bolton	35.0	26.0	18.1	36.7	16.9	27,688	0%	6%	28%	21%	45%	-5.5
2650_2653_DW	7431	A666	Bolton	35.3	24.8	17.3	36.3	17.9	69,263	0%	6%	3%	40%	51%	-5.1
2237_3790_DW	38354	A58	Bury	39.9	21.4	15.2	55.4	24.6	79,030	10%	6%	17%	20%	47%	-9.1
3424_4940_DW	17924	A56	Bury	37.4	17.0	12.4	54.2	25.0	19,758	3%	6%	24%	20%	46%	-8.5
3056_3842_DW	26157	A6	Manchester	40.9	32.2	21.6	45.0	19.3	38,054	23%	5%	13%	22%	37%	-5.7
1268_1269	27974	A34	Manchester	40.4	35.6	23.4	50.5	17.0	9,216	69%	3%	3%	9%	17%	-4.5
14523_14524	36632	A62	Oldham	39.8	25.7	17.8	46.5	22.0	52,914	0%	7%	8%	29%	56%	-6.6
2210_14216_DW	17322	A664	Rochdale	37.0	17.9	13.0	55.6	24.0	34,312	0%	4%	40%	21%	34%	-7.0
1349_2993_DW	73792	A57	Salford	39.3	24.7	17.2	47.4	22.1	57,005	1%	6%	12%	30%	50%	-7.6
1216_14503_DW	17926	A6	Salford	37.2	25.2	17.6	47.6	19.7	31,092	35%	4%	19%	14%	28%	-6.0
3973_14181_DW	58034	A5145	Stockport	36.7	20.9	14.9	47.2	21.8	26,190	14%	5%	18%	21%	42%	-5.9
2887_2430_DW	26352	A34	Stockport	36.5	19.0	13.8	46.9	22.8	40,065	0%	7%	8%	25%	61%	-5.8
3812_14478_DW	99618	A635	Tameside	36.8	25.5	17.7	40.9	19.2	41,126	4%	6%	17%	30%	43%	-5.9
7606_17100_DW	N/A	B5214	Trafford	33.0	19.6	14.1	42.4	18.8	28,805	27%	5%	16%	13%	38%	-6.1
3492_3511_DW	8566	A577	Wigan	31.5	29.1	19.7	24.3	11.8	22,266	3%	6%	15%	26%	50%	-5.1

Table 10: Predicted impact on traffic flows at key compliance points on the Greater Manchester road network - Option 5(i) 2023

Point ID	Local Authority	Do Min ; Total AADT Flows (no. veh per day)									Option 5(i) : Change in AADT Flows (no. veh per day)								
		All Vehicles	Taxi (comp)	Taxi (non-comp)	HGV (comp)	HGV (non-comp)	LGV (comp)	LGV (non-comp)	Car (comp)	Car (non-comp)	All Vehicles	Taxi (comp)	Taxi (non-comp)	HGV (comp)	HGV (non-comp)	LGV (comp)	LGV (non-comp)	Car (comp)	Car (non-comp)
2799_3118_DW	Bolton	27,875	1,187	331	763	166	3,169	1,497	17,597	3,008	-187	45	-234	140	-151	1,182	-1,351	1,123	-941
2650_2653_DW	Bolton	70,119	2,712	753	2,075	452	9,138	4,315	42,950	7,338	-857	94	-545	358	-373	3,398	-3,825	2,367	-2,328
2237_3790_DW	Bury	79,714	3,526	987	1,495	326	8,173	3,863	51,186	8,750	-684	153	-733	286	-293	3,249	-3,554	2,981	-2,772
3424_4940_DW	Bury	19,993	824	230	1,020	222	2,068	977	12,323	2,106	-236	26	-161	194	-202	768	-868	757	-750
3056_3842_DW	Manchester	38,937	1,666	465	553	120	4,532	2,141	24,145	4,127	-883	127	-380	99	-93	1,893	-1,925	1,872	-2,475
1268_1269	Manchester	9,347	372	104	122	27	847	401	5,275	902	-131	42	-86	32	-24	388	-362	670	-793
14523_14524	Oldham	53,611	2,208	617	1,320	288	6,647	3,142	33,376	5,705	-697	85	-454	255	-256	2,586	-2,860	1,765	-1,815
2210_14216_DW	Rochdale	34,521	1,387	386	1,930	420	4,384	2,071	20,292	3,467	-209	67	-291	396	-379	1,705	-1,864	1,274	-1,117
1349_2993_DW	Salford	57,674	2,306	642	2,203	480	7,178	3,390	35,108	5,999	-669	172	-513	411	-418	2,852	-2,989	2,483	-2,663
1216_14503_DW	Salford	31,661	1,378	386	889	194	3,181	1,504	19,246	3,290	-569	102	-308	219	-175	1,248	-1,389	1,735	-2,000
3973_14181_DW	Stockport	26,401	1,076	301	485	106	3,123	1,476	16,504	2,821	-212	43	-212	94	-96	1,235	-1,358	1,005	-922
2887_2430_DW	Stockport	40,455	1,534	427	927	202	4,107	1,941	26,544	4,537	-390	58	-308	170	-174	1,399	-1,587	1,422	-1,368
3812_14478_DW	Tameside	41,293	1,674	466	1,753	382	5,627	2,658	24,195	4,134	-167	95	-346	290	-300	2,212	-2,376	1,556	-1,298
7606_17100_DW	Trafford	29,051	1,209	338	1,788	390	2,293	1,084	17,905	3,061	-245	59	-235	347	-354	923	-992	969	-962
3492_3511_DW	Wigan	22,629	897	251	939	205	2,716	1,284	13,666	2,336	-363	34	-180	157	-166	1,010	-1,175	690	-732

### **Option 5(ii)**

- 5.1.15 In terms of modelling, Option 5(ii) only differs from the results presented for Option 5(i) at the A34 (3056\_3842\_DW) Manchester point, which is the only example key point used which is inside the IRR CAZ D boundary.
- 5.1.16 The modelling approach did not alter the modelled flows, but made the assumption that all diesel private cars inside the IRR where the 'no diesel car' zone was in effect, which had elected to upgrade as their behavioural response in Option 5(i), would instead elect to switch to a compliant petrol car. This means that no benefits of removal of diesel cars from the fleet using the surrounding road network to access the IRR could be taken into account, nor the impacts of increased re-mode or cancel trips. The impact of Option 5(ii) over Option 5(i) is therefore underestimated using the agreed methodology, and should be treated with caution.
- 5.1.17 This increases the effectiveness of the CAZ D on this point, and reduces the car contribution to total road NOx from 17% in Option 5(i) to 7% in Option 5(ii), because compliant petrol cars have significantly lower NOx emissions than compliant diesel cars.
- 5.1.18 The reduces the predicted concentration from 40.4 ug/m<sup>3</sup> in Option 5(i) to 38.4 ug/m<sup>3</sup> in Option 5(ii), in 2023.
- 5.1.19 With Option 5(ii) in effect, there is predicted to be one exceedance remaining in 2023, at the A34 Manchester. It should be noted that this site is outside the IRR and therefore it has not been possible to represent the impact of option 5(ii) on this last point of exceedance.
- 5.1.20 The modelled NO<sub>2</sub> results for Option 5ii are provided for Manchester only because the IRR region is the only change from the 5i set of figures. These are presented in Figure 57, 58 & 59 for each appraisal year, respectively.

### **Option 7**

- 5.1.21 Options 7 and 8 both effectively begin as GM-wide CAZ B schemes in 2021 in terms of the modelling methodology, but Option 7 does not progress to a CAZ C scheme in 2023, and therefore has less impact on NO<sub>2</sub> improvements later in its operation.
- 5.1.22 There are predicted to be 12 remaining sites exceeding 40 ug/m<sup>3</sup> in 2023 in Option 7, as opposed to 3 sites in Option 8.
- 5.1.23 Of the sites which are still non-compliant, six are located within Manchester regional centre. The additional sites in Manchester centre which still exceed in Option 7 but not Option 8 are all located within the IRR.

- 5.1.24 There are also predicted to be three exceedance points in Bury, one in Oldham and one in Tameside (although this location could potentially be designated as SRN, as the road configuration is complex).
- 5.1.25 The A6 (3056\_3842\_DW) Manchester is the maximum exceedance, and here reductions of -3.0 ug/m<sup>3</sup> are predicted due to the option, which is located outside just of the IRR. Of the total change in emissions due to the option, 34% of this NOx reduction came from the HGVs upgrading to become compliant (90 veh/day), whilst 36% came from the cars upgrading due to the EV fleet upgrade measure (1,500 veh/day).
- 5.1.26 The A34 (1268\_1269) in Manchester experiences reductions of -3.0 ug/m<sup>3</sup> due to the option, which is located inside the IRR. Of the total change in emissions due to the option, 70% of this NOx reduction came from the bus fleet.
- 5.1.27 All sites experience significant reductions in NO<sub>2</sub> concentration, with a site in Bury decreasing most by up to -6.6 µg/m<sup>3</sup>, but still remains in exceedance. Of the total change in emissions at the A58 (2237\_3790\_DW) due to the Option, 55% of this NOx reduction came from the bus fleet, and 21% from HGVs upgrading to become compliant (450 veh/day).
- 5.1.28 The A57 (1349\_2993\_DW) in Salford is not compliant in Option 7, despite a reduction of -4.7 ug/m<sup>3</sup> due to the option. Of the total change in emissions due to the option, 54% of this NOx reduction came from HGVs upgrading to become compliant (400 veh/day). Additionally, a further 24% came from car flows upgrading to become compliant due to the EV fleet upgrade measure (1,900 veh/day).
- 5.1.29 The A62 (14523\_14524) in Oldham is also not compliant in Option 7, with a reduction of -4.0 ug/m<sup>3</sup> due to the Option. Of the total change in emissions due to the Option, 49% of this NOx reduction came from HGVs upgrading to become compliant (250 veh/day). Additionally, a further 33% came from car flows upgrading to become compliant due to the EV fleet upgrade measure (1,700 veh/day).
- 5.1.30 The modelled Option 7 scenario NO<sub>2</sub> concentrations and exceedances for each district are presented separately in Figures 60 to 70 for 2021, Figures 71 to 81 for 2023, and Figure 82 for 2025.

Table 11: Predicted annual mean NO<sub>2</sub> concentrations and source apportionment at key compliance points on the Greater Manchester road network - Option 7 2023

Point ID	Census ID	Road name	Local Authority	Annual mean NO <sub>2</sub> conc (µg/m <sup>3</sup> )	BG NOx conc (µg/m <sup>3</sup> )	BG NO <sub>2</sub> conc (µg/m <sup>3</sup> )	Road NOx contrib (µg/m <sup>3</sup> )	Road NO <sub>2</sub> contrib (µg/m <sup>3</sup> )	AADT	NOx contribution by vehicle type (%)					Change in Annual mean NO <sub>2</sub> conc (µg/m <sup>3</sup> )
										Bus	Taxi	HGV	LGV	Car	
2799_3118_DW	58048	A673	Bolton	36.9	26.0	18.1	40.4	18.8	27,774	0%	5%	26%	29%	41%	-3.6
2650_2653_DW	7431	A666	Bolton	37.8	24.8	17.3	41.2	20.4	69,687	0%	5%	3%	47%	45%	-2.6
2237_3790_DW	38354	A58	Bury	42.4	21.4	15.2	60.8	27.2	79,330	9%	5%	16%	27%	43%	-6.6
3424_4940_DW	17924	A56	Bury	40.0	17.0	12.4	59.5	27.6	19,916	3%	5%	22%	26%	43%	-5.9
3056_3842_DW	26157	A6	Manchester	43.6	32.2	21.6	50.7	22.1	38,728	20%	5%	12%	27%	36%	-3.0
1268_1269	27974	A34	Manchester	41.9	35.6	23.4	54.0	18.5	9,330	65%	3%	3%	11%	19%	-3.0
14523_14524	36632	A62	Oldham	42.4	25.7	17.8	51.6	24.5	53,293	0%	6%	7%	36%	50%	-4.0
2210_14216_DW	17322	A664	Rochdale	39.6	17.9	13.0	61.0	26.6	34,412	0%	4%	36%	29%	31%	-4.4
1349_2993_DW	73792	A57	Salford	42.2	24.7	17.2	53.3	25.0	57,466	1%	6%	11%	36%	46%	-4.7
1216_14503_DW	17926	A6	Salford	39.4	25.2	17.6	52.1	21.9	31,451	32%	4%	17%	19%	28%	-3.8
3973_14181_DW	58034	A5145	Stockport	39.3	20.9	14.9	52.6	24.4	26,287	12%	5%	17%	29%	38%	-3.3
2887_2430_DW	26352	A34	Stockport	38.7	19.0	13.8	51.3	25.0	40,265	0%	6%	7%	31%	56%	-3.6
3812_14478_DW	99618	A635	Tameside	39.1	25.5	17.7	45.4	21.4	41,245	4%	5%	15%	37%	39%	-3.6
7606_17100_DW	N/A	B5214	Trafford	34.1	19.6	14.1	44.8	20.0	28,914	26%	5%	15%	17%	37%	-5.0
3492_3511_DW	8566	A577	Wigan	33.0	29.1	19.7	27.3	13.3	22,432	3%	6%	15%	32%	45%	-3.6

Table 12: Predicted impact on traffic flows at key compliance points on the Greater Manchester road network - Option 7 2023

Point ID	Local Authority	Do Min ; Total AADT Flows (no. veh per day)									Option 8 : Change in AADT Flows (no. veh per day)								
		All Vehicles	Taxi (comp)	Taxi (non-comp)	HGV (comp)	HGV (non-comp)	LGV (comp)	LGV (non-comp)	Car (comp)	Car (non-comp)	All Vehicles	Taxi (comp)	Taxi (non-comp)	HGV (comp)	HGV (non-comp)	LGV (comp)	LGV (non-comp)	Car (comp)	Car (non-comp)
2799_3118_DW	Bolton	27,875	1,187	331	763	166	3,169	1,497	17,597	3,008	-101	44	-234	145	-151	167	-146	993	-917
2650_2653_DW	Bolton	70,119	2,712	753	2,075	452	9,138	4,315	42,950	7,338	-432	92	-545	356	-373	444	-420	2,215	-2,199
2237_3790_DW	Bury	79,714	3,526	987	1,495	326	8,173	3,863	51,186	8,750	-384	146	-734	286	-293	453	-359	2,821	-2,702
3424_4940_DW	Bury	19,993	824	230	1,020	222	2,068	977	12,323	2,106	-77	25	-161	195	-202	99	-96	725	-662
3056_3842_DW	Manchester	38,937	1,666	465	553	120	4,532	2,141	24,145	4,127	-209	121	-381	93	-93	249	-219	1,345	-1,323
1268_1269	Manchester	9,347	372	104	122	27	847	401	5,275	902	-17	30	-86	28	-24	48	-38	304	-278
14523_14524	Oldham	53,611	2,208	617	1,320	288	6,647	3,142	33,376	5,705	-318	84	-455	251	-256	367	-301	1,717	-1,722
2210_14216_DW	Rochdale	34,521	1,387	386	1,930	420	4,384	2,071	20,292	3,467	-109	61	-292	383	-379	229	-205	1,171	-1,075
1349_2993_DW	Salford	57,674	2,306	642	2,203	480	7,178	3,390	35,108	5,999	-208	152	-514	406	-419	364	-323	1,975	-1,847
1216_14503_DW	Salford	31,661	1,378	386	889	194	3,181	1,504	19,246	3,290	-210	93	-309	195	-176	158	-153	997	-1,015
3973_14181_DW	Stockport	26,401	1,076	301	485	106	3,123	1,476	16,504	2,821	-114	33	-213	94	-96	181	-145	931	-898
2887_2430_DW	Stockport	40,455	1,534	427	927	202	4,107	1,941	26,544	4,537	-190	57	-308	169	-174	176	-186	1,365	-1,288
3812_14478_DW	Tameside	41,293	1,674	466	1,753	382	5,627	2,658	24,195	4,134	-48	82	-347	289	-300	307	-235	1,391	-1,235
7606_17100_DW	Trafford	29,051	1,209	338	1,788	390	2,293	1,084	17,905	3,061	-136	49	-236	347	-354	150	-92	937	-936
3492_3511_DW	Wigan	22,629	897	251	939	205	2,716	1,284	13,666	2,336	-197	34	-180	151	-166	127	-126	681	-716

## **Option 8**

- 5.1.31 The air quality and source apportionment data for Option 8 in 2023 are provided in Table 13, whilst the impacts on the traffic flows are provided in Table 14
- 5.1.32 With Option 8 in effect, there are predicted to be three exceedances remaining in 2023, all of which are located in Manchester. They are only marginally above the Limit Value with the option, and are predicted to be compliant in 2024.
- 5.1.33 Of the sites which are still non-compliant, as in Option 5(i) all are located within Manchester regional centre. The A6 (3056\_3842\_DW) is the maximum exceedance, and here reductions of -4.9 ug/m<sup>3</sup> are predicted due to the option, which is located outside just of the IRR. The A34 (1268\_1269) in Manchester experiences reductions of -3.8 ug/m<sup>3</sup> due to the option, which is located inside the IRR CAZ D boundary. The additional exceedance is located at a point where exposure is not considered relevant as an EU Limit Value compliance point under the JAQU guidance, but is under LAQM TG(16) guidance. This point (NonPCM\_207) is on the same section of the A34 as point '1268\_1269', but is less than 25m from the junction with the A56 Deansgate.
- 5.1.34 The effects of Option 8 are very similar to Option 5(i) in terms of buses, LGVs and HGVs, as for these vehicle types the two options are identical. Option 8 removes the IRR CAZ D aspect of Option 5(i), and therefore the charging aspects of the scheme do not apply to cars anywhere within GM.
- 5.1.35 Beyond the IRR area, the impacts of Option 8 are very close to those described for option 5(i), for all sites with the exception of Salford, where the IRR still has an influence on traffic travelling to the regional centre. Both of the two key points in Salford discussed show a lower level of NO<sub>2</sub> reduction due to the scheme, by about 0.6 ug/m<sup>3</sup>. The A57 (1349\_2993\_DW) in Salford becomes narrowly compliant (39.8 ug/m<sup>3</sup>), with a reduction of -7.1 ug/m<sup>3</sup> due to Option 8.
- 5.1.36 Compared with Option 7, the addition of LGVs in the scheme in 2023 typically reduces concentrations by a further -2.5 ug/m<sup>3</sup> at the key sites. This effect is smaller at the Manchester and Salford sites where there are higher bus flows and which typically have higher background concentrations; the reductions are between 1 to 2 ug/m<sup>3</sup>.
- 5.1.37 Modelled NO<sub>2</sub> concentrations for Option 8 and exceedances for each district are presented separately in Figures 83 to 93 for 2021, Figures 94 to 104 for 2023, and Figure 105 for 2025.

Table 13: Predicted annual mean NO<sub>2</sub> concentrations and source apportionment at key compliance points on the Greater Manchester road network - Option 8 2023

Point ID	Census ID	Road name	Local Authority	Annual mean NO <sub>2</sub> conc (µg/m <sup>3</sup> )	BG NOx conc (µg/m <sup>3</sup> )	BG NO <sub>2</sub> conc (µg/m <sup>3</sup> )	Road NOx contrib (µg/m <sup>3</sup> )	Road NO <sub>2</sub> contrib (µg/m <sup>3</sup> )	AADT	NOx contribution by vehicle type (%)					Change in Annual mean NO <sub>2</sub> conc (µg/m <sup>3</sup> )
										Bus	Taxi	HGV	LGV	Car	
2799_3118_DW	58048	A673	Bolton	35.1	26.0	18.1	36.8	17.0	27,699	0%	6%	28%	21%	45%	-5.4
2650_2653_DW	7431	A666	Bolton	35.3	24.8	17.3	36.4	18.0	69,278	0%	6%	3%	40%	51%	-5.1
2237_3790_DW	38354	A58	Bury	39.9	21.4	15.2	55.5	24.7	79,042	10%	6%	17%	20%	47%	-9.1
3424_4940_DW	17924	A56	Bury	37.6	17.0	12.4	54.5	25.2	19,809	3%	6%	24%	20%	46%	-8.3
3056_3842_DW	26157	A6	Manchester	41.7	32.2	21.6	46.5	20.1	38,564	22%	5%	13%	20%	40%	-4.9
1268_1269	27974	A34	Manchester	41.1	35.6	23.4	52.1	17.7	9,299	67%	3%	3%	8%	20%	-3.8
14523_14524	36632	A62	Oldham	39.9	25.7	17.8	46.6	22.1	52,947	0%	7%	8%	29%	56%	-6.5
2210_14216_DW	17322	A664	Rochdale	37.1	17.9	13.0	55.6	24.1	34,315	0%	4%	40%	21%	35%	-6.9
1349_2993_DW	73792	A57	Salford	39.8	24.7	17.2	48.4	22.6	57,265	1%	6%	12%	29%	51%	-7.1
1216_14503_DW	17926	A6	Salford	37.8	25.2	17.6	48.7	20.2	31,284	34%	4%	18%	13%	30%	-5.4
3973_14181_DW	58034	A5145	Stockport	36.8	20.9	14.9	47.4	21.9	26,204	14%	5%	18%	21%	42%	-5.8
2887_2430_DW	26352	A34	Stockport	36.6	19.0	13.8	47.1	22.9	40,110	0%	7%	8%	25%	61%	-5.7
3812_14478_DW	99618	A635	Tameside	36.9	25.5	17.7	41.1	19.2	41,141	4%	6%	17%	30%	44%	-5.8
7606_17100_DW	N/A	B5214	Trafford	33.0	19.6	14.1	42.5	18.9	28,825	27%	5%	16%	13%	39%	-6.1
3492_3511_DW	8566	A577	Wigan	31.5	29.1	19.7	24.3	11.8	22,257	3%	6%	15%	26%	50%	-5.1

Table 14: Predicted impact on traffic flows at key compliance points on the Greater Manchester road network - Option 8 2023

Point ID	Local Authority	Do Min ; Total AADT Flows (no. veh per day)									Option 8 : Change in AADT Flows (no. veh per day)								
		All Vehicles	Taxi (comp)	Taxi (non-comp)	HGV (comp)	HGV (non-comp)	LGV (comp)	LGV (non-comp)	Car (comp)	Car (non-comp)	All Vehicles	Taxi (comp)	Taxi (non-comp)	HGV (comp)	HGV (non-comp)	LGV (comp)	LGV (non-comp)	Car (comp)	Car (non-comp)
2799_3118_DW	Bolton	27,875	1,187	331	763	166	3,169	1,497	17,597	3,008	-176	50	-233	139	-151	1,195	-1,350	1,082	-908
2650_2653_DW	Bolton	70,119	2,712	753	2,075	452	9,138	4,315	42,950	7,338	-842	93	-545	357	-373	3,384	-3,825	2,263	-2,193
2237_3790_DW	Bury	79,714	3,526	987	1,495	326	8,173	3,863	51,186	8,750	-672	153	-733	288	-293	3,252	-3,554	2,908	-2,691
3424_4940_DW	Bury	19,993	824	230	1,020	222	2,068	977	12,323	2,106	-185	25	-161	195	-202	769	-867	719	-662
3056_3842_DW	Manchester	38,937	1,666	465	553	120	4,532	2,141	24,145	4,127	-373	123	-381	92	-93	1,794	-1,929	1,344	-1,322
1268_1269	Manchester	9,347	372	104	122	27	847	401	5,275	902	-48	28	-86	29	-24	329	-364	315	-277
14523_14524	Oldham	53,611	2,208	617	1,320	288	6,647	3,142	33,376	5,705	-663	89	-454	256	-256	2,586	-2,860	1,701	-1,723
2210_14216_DW	Rochdale	34,521	1,387	386	1,930	420	4,384	2,071	20,292	3,467	-206	65	-291	395	-379	1,698	-1,865	1,237	-1,066
1349_2993_DW	Salford	57,674	2,306	642	2,203	480	7,178	3,390	35,108	5,999	-409	155	-514	410	-419	2,752	-2,993	2,042	-1,842
1216_14503_DW	Salford	31,661	1,378	386	889	194	3,181	1,504	19,246	3,290	-377	91	-309	189	-176	1,224	-1,390	1,004	-1,012
3973_14181_DW	Stockport	26,401	1,076	301	485	106	3,123	1,476	16,504	2,821	-197	44	-212	94	-96	1,245	-1,357	980	-893
2887_2430_DW	Stockport	40,455	1,534	427	927	202	4,107	1,941	26,544	4,537	-345	61	-308	170	-174	1,392	-1,587	1,387	-1,284
3812_14478_DW	Tameside	41,293	1,674	466	1,753	382	5,627	2,658	24,195	4,134	-152	92	-346	295	-300	2,198	-2,375	1,506	-1,222
7606_17100_DW	Trafford	29,051	1,209	338	1,788	390	2,293	1,084	17,905	3,061	-226	57	-235	348	-354	920	-992	963	-933
3492_3511_DW	Wigan	22,629	897	251	939	205	2,716	1,284	13,666	2,336	-372	25	-181	163	-166	994	-1,175	683	-713

## Conclusions

- 5.1.38 Comparison of the NO<sub>2</sub> model results for 2021 show reasonable agreement between the national PCM model and local model concentrations, at the links predicted to be in exceedance for by national PCM modelling. However, the local modelling identified a larger number of locations which are expected to exceed the EU Limit Value, and higher concentrations of NO<sub>2</sub> in specific locations. Local modelling has shown that all ten local authorities contain locations expected to be in exceedance of EU Limit Value for annual mean NO<sub>2</sub> after 2020. This reflects that local modelling uses more detailed sources of data and more refined analytical tools.
- 5.1.39 Whilst levels of NO<sub>2</sub> are below the EU Limit Value across much of the road network, in 2021 it is anticipated that 250 sites will remain non-compliant, of which 62 are predicted to experience annual mean concentrations between 45 µg/m<sup>3</sup> and 50 µg/m<sup>3</sup>, and 13 to experience annual mean concentrations over 50 µg/m<sup>3</sup>, with a maximum of 55 µg/m<sup>3</sup>. By 2023, the transition towards cleaner vehicles that would be expected without further action, as well as a reduction in background concentrations, leads to a substantial reduction in the number of sites in exceedance of the EU Limit Value, from 250 in 2021 to 68 in 2023. The highest and longest lasting exceedances are predicted in central Manchester, but exceedances occur throughout Greater Manchester.
- 5.1.40 The air quality modelling indicates that compliance in GM with the NO<sub>2</sub> EU Limit Value is predicted to occur without a CAP intervention by 2027.
- 5.1.41 The analysis shows that there are very diverse factors affecting vehicle emissions across Greater Manchester, with vehicle types and levels often differing between roads in close proximity to each other. In many locations where there are significant exceedances, such as on roads in a city/town centre, the road network performs a variety of complex transport functions and therefore carries a diverse range of traffic, including cars, vans, Heavy Goods Vehicles (HGVs), buses and taxis.
- 5.1.42 A series of options, containing packages of Measures including CAZ schemes of different categories and sizes, were developed in response to the modelled and measured exceedances. These were further refined, with full modelling and assessment carried out on five options to enable a detailed appraisal process, across three model forecast year scenarios.
- 5.1.43 All options taken through the full appraisal process included a GM-wide charging CAZ, with the exception of Option 4 which contained a central CAZ inside the M60 and satellite zones around the other GM urban centres. The schemes were designed to open in 2021 effectively as a CAZ B, with a CAZ C coming into effect in 2023.

- 5.1.44 All of the assessed options bring forward the year of compliance. Options 5(i), 5(ii) and 8 all are projected to achieve compliance in the same year of 2024, with Option 4 by 2025 and Option 7 by 2026. By 2023, all sites are at, or close to, compliance across Greater Manchester with all Options. Two sites are predicted to remain non-compliant in Option 5(i), one in Option 5(ii) and three in Option 8 but in all cases the predicted concentrations are close to 40  $\mu\text{g}/\text{m}^3$ . Option 4 and Option 7 are less effective with nine and 12 exceedances remaining, respectively.
- 5.1.45 The best performing options 5(i), 5(ii) and 8 produce significant reductions in modelled concentrations, of up to -9  $\mu\text{g}/\text{m}^3$  in 2023 in Bury and by -4 to -6  $\mu\text{g}/\text{m}^3$  in central Manchester.
- 5.1.46 Comparing Option 8 with Option 7, the addition of LGVs to the scheme in 2023 typically reduces concentrations by a further -2.5  $\mu\text{g}/\text{m}^3$  at the key sites, although the effect is smaller at the Manchester and Salford sites where there are the highest bus flows and which typically have higher background concentrations; at these sites the reductions are between -1 to -2  $\mu\text{g}/\text{m}^3$ .
- 5.1.47 A wide range of sensitivity tests and analysis has been undertaken, based on guidance issued by JAQU. These indicate that the modelled concentrations could be over- or under-estimated, however this is unavoidable and a reasonable aspect of any predictive analysis.
- 5.1.48 Overall, it is concluded that there are a variety of assumptions that could act in combination either synergistically or antagonistically, to mean that future concentrations are higher or lower, and that the impacts of the scheme could be greater or lesser, than those predicted using the selected methodology in the OBC. However, the process applied is considered to be reasonable and appropriate, and the conclusions regarding the case for the scheme are robust.
- 5.1.49 Further refinement of key assumptions will be undertaken during the Full Business Case assessment process. The impact of potential exemptions and discounts would also need to be included once these are defined.

## **References**

1. Clean Air Zone Framework Principles for Setting Up Clean Air Zones in England, Defra & DfT, May 2017
2. Air quality plan for nitrogen dioxide (NO<sub>2</sub>) in UK (2017): UK plan for tackling roadside nitrogen dioxide concentrations, Detailed plan, Defra & DfT, July 2017
3. Local Air Quality Management Technical Guidance TG(16) <https://laqm.defra.gov.uk/technical-guidance/>, Defra, 2016
4. Supplementary Note on Sensitivity Testing, JAQU Guidance, October 2017

DRAFT FOR APPROVAL

## **Appendix A – Air Quality Model Verification**

- 6.1.1 A total of 314 monitoring sites were reviewed for the model verification process and of these a number of sites were discounted for a variety of reasons including low data capture, inappropriate location (e.g. bus stop), unidentified location, or co-location with a continuous analyser site. There were 194 sites used for the model verification, 147 for roadside predictions and 47 for background mapping adjustment. The monitoring data for all sites is provided in the files issued to JAQU with the AQ3 document. These files contain the model verification performance by site, including background concentrations and verification zone. Sites which were excluded from the verification process are detailed in Table 20.
- 6.1.2 Initially, the Defra background maps were compared with background monitoring sites. Of those sites reported as background type locations by the local authorities, only those sites with very low modelled road component NOx were used in the verification process. These monitoring sites were grouped as ‘Zone 2’, and the Defra background maps were found to under-estimate the measured Total NOx and Total NO<sub>2</sub> concentrations by a factor of 1.30. The background NOx and NO<sub>2</sub> maps were therefore uplifted by this adjustment factor, and used in the modelling process.
- 6.1.3 There are 13 continuous analyser sites in GM, of which nine were suitable for roadside verification and four for background verification. Where the diffusion tube data was used for verification, road NOx was back calculated using the Defra NOx to NO<sub>2</sub> calculator v6.1, with calculated f-NO<sub>2</sub> from the dispersion modelling input for each site.
- 6.1.4 The air quality modelling outputs were converted to NO<sub>2</sub> and then compared to the monitoring data. Only monitoring sites with data capture greater than 75% in the calendar year 2016 were used in the verification process.
- 6.1.5 The initial modelling applied the canyon module to the entire GM modelled road network. The results were then reviewed spatially for patterns of model performance, and each site checked locally. The canyon model input files were produced by CERC on behalf of TfGM. These initial model outputs were reviewed, and it was considered that the canyon module was performing poorly in areas which were not significantly built up, potentially due the relatively longer length of less homogenous road links, and additionally compromising model run times over the very large study area.

- 6.1.6 A zonal approach to model verification was considered necessary, to refine the spatial performance of the model, including application of the canyon module. The study area was split into three zones:
- the area of central Manchester inside the Inner Relief Road (IRR) where there is a predominance of tall buildings (Zone 5),
  - the A57 Hyde Road at Mottram (which is operated by Highways England) which is very narrow and congested (Zone 4); and
  - the remainder of GM (Zone 1).
- 6.1.7 The canyon module was used in Zone 4 and 5, but not in Zone 1. A total of 118 sites were used in the verification process for Zone 1 (remainder of GM outside the Manchester city centre Inner Ring Road). Twenty one sites were included for Zone 4 (A57 Mottram) and eight sites were included for Zone 5 (sites within the Manchester-Salford Inner Relief Road). These sites are presented in Figure 1.
- 6.1.8 The results for all monitoring sites prior to adjustment (but with the canyon module applied in Zone 4 and 5 locations) are presented in Table 15. These show that the study area showed a slight systematic bias of under prediction (fractional bias of 0.27) with an RMSE of 12.5  $\mu\text{g}/\text{m}^3$ . Analysis was undertaken to address the overall under prediction, and refine the model performance.
- 6.1.9 The verification process was applied following guidance in LAQM.TG(16) to adjust Road NO<sub>x</sub>, with a further adjustment applied to Road NO<sub>2</sub>, and the resulting model performance for the three zones considered are presented in Table 15.

**Table 15: Modelled verification results for roadside locations**

Annual mean conc. bands ( $\mu\text{g}/\text{m}^3$ )	No adjustm't: All roadside sites	No adjustm't: Zone 1	Zone 1	No adjustm't: Zone 4	Zone 4	No adjustm't: Zone 5	Zone 5
No. sites	147	118	118	21	21	8	8
Mod NO <sub>x</sub> Rd v Mon NO <sub>x</sub> Rd Factor	n/a	n/a	1.98	n/a	2.003	n/a	1.494
Mod NO <sub>2</sub> Rd v Mon NO <sub>2</sub> Rd Factor	n/a	n/a	1.002	n/a	0.981	n/a	0.936
RMSE	12.5	10.9	8.3	20.0	12.1	8.5	7.0
Fractional Bias	0.27	0.26	0.07	0.39	0.03	0.12	0.02
Correlation Coefficient	0.68	0.55	0.52	0.70	0.70	0.80	0.78
No. sites within $\pm 25\%$	78	64	94	7	17	7	7

Note: Zone 2 was used for background verification and Zone 3 was not used.

- 6.1.10 The results show that the RMSE is improved and the fractional bias reduced compared to the overall dataset for each of the three zones. The number of sites within  $\pm 25\%$  of monitored concentrations in each zone is improved or remains the same. Each outlier site was reviewed to determine whether it should be excluded, but it was considered these should remain to describe the spread of the data. These verification factors were applied to the model results.
- 6.1.11 The model performance at each monitoring site is provided below by verification zone in Table 17 to Table 19, and the modelled road NO<sub>x</sub> and total NO<sub>2</sub> (pre- and post- adjustment) are provided for each zone in Graph 1 to 9.

- 6.1.12 The continuous analysers were highly variable in their response, possibly relating to variations in f-NO<sub>2</sub>, amongst other factors. Therefore, the performance of continuous analysers was also considered separately to diffusion tubes. A separate approach, using just the continuous analyser data to produce the road NOx adjustment factor, and then both continuous analysers and diffusion tubes to produce the a total NO<sub>2</sub> adjustment factor was applied to Zone 1 (Zone 4 and 5 only contained one continuous analyser and this method was not considered appropriate). The model performance using this approach is summarised in Table 16.
- 6.1.13 Overall, the RMSE and number of outliers sites were poorer using this approach, whilst the Fractional Bias and Correlation Coefficient were slightly better. The test was not considered to significantly improve overall model performance, and therefore this approach has not been applied. This is discussed further in the sensitivity analysis in Appendix C.

**Table 16: Modelled verification results for roadside locations – Continuous Analyser for NOx Rd Adjustment Test**

Annual mean concentration bands ( $\mu\text{g}/\text{m}^3$ )	No adjustment: Zone 1	Zone 1
No. sites	CM: 7 DT: 111	118
Mod NO <sub>x</sub> Rd v Mon NO <sub>x</sub> Rd Factor	n/a	2.200
Mod Total NO <sub>2</sub> v Mon Total NO <sub>2</sub> Factor	n/a	0.984
RMSE	10.9	8.4
Fractional Bias	0.26	0.04
Correlation Coefficient	0.55	0.51
No. sites within $\pm 25\%$	64	92

Table 17: Verification Results: Zone 1

Ref.	X	Y	Measured NOx Conc	Measured NO <sub>2</sub> Conc	DC %	Md f- NO <sub>2</sub>	Background NOx	Background NO <sub>2</sub>	Mod Total NO <sub>2</sub>	Mon/Mod Total NO <sub>2</sub>	Mod Road NOx	Mon Road NOx	Mon/Mod Road NOx	Mod Road NO <sub>2</sub>	Mon Road NO <sub>2</sub>	Mon/Mod Road NO <sub>2</sub>	Adjusted Modelled NOx (Roads)	Adjusted Modelled NO <sub>2</sub> (Roads)	Adjusted Modelled NO <sub>2</sub> (Total)
SalfordSA33	372597	400725	55.3	31.5	100%	0.24	21.2	15.2	23.0	-27%	14.5	34.1	2.4	7.8	16.3	2.1	28.7	13.94	29.10
SalfordSA55	372850	400733	70.6	37.9	92%	0.25	21.2	15.2	26.0	-31%	18.3	49.4	2.7	10.8	22.7	2.1	36.2	17.25	32.41
Wigan 54	370612	400586	61.7	33.9	100%	0.24	20.2	14.5	19.2	-43%	10.2	41.5	4.1	4.7	19.4	4.1	20.2	10.05	24.52
MMLR_018_1215	399196	395942	45.5	26.5	100%	0.23	18.0	13.1	26.0	-2%	22.3	27.4	1.2	12.9	13.3	1.0	44.2	20.52	33.65
MMLR_020_1215	398451	396636	75.4	39.1	100%	0.24	18.1	13.2	29.5	-25%	23.2	57.3	2.5	16.4	26.0	1.6	45.9	21.47	34.63
MMLR_056_1215	399049	396280	22.3	15.2	100%	0.24	16.7	12.2	13.7	-10%	2.9	5.7	2.0	1.5	3.0	2.0	5.8	3.03	15.23
MMLR_065_1215	398825	396336	52.4	29.8	100%	0.25	18.1	13.2	21.7	-27%	17.5	34.3	2.0	8.5	16.7	2.0	34.6	16.83	29.99
MMLR_010_1215	398357	395315	46.6	27.4	100%	0.27	17.9	13.0	17.0	-38%	7.6	28.7	3.8	4.0	14.4	3.6	15.1	7.83	20.85
MMLR_021_1215	398147	396837	73.1	38.4	100%	0.25	18.1	13.2	24.2	-37%	21.3	55.0	2.6	11.1	25.2	2.3	42.2	20.05	33.20
MMLR_022_1215	397449	397210	54.8	31.3	83%	0.25	21.1	15.0	22.5	-28%	9.0	33.8	3.7	7.4	16.2	2.2	17.9	8.99	24.04
MMLR_006_1215	395369	395062	49.5	29.4	100%	0.24	26.3	18.2	21.8	-26%	11.1	23.2	2.1	3.6	11.2	3.1	22.0	10.63	28.84
TamesideT 20	394609	395102	79.8	41.8	100%	0.23	26.6	18.4	27.7	-34%	18.4	53.2	2.9	9.3	23.4	2.5	36.4	16.78	35.19
MMLR_003_1215	395526	395405	36.6	23.5	100%	0.27	26.3	18.2	22.7	-4%	7.5	10.4	1.4	4.5	5.3	1.2	14.9	7.63	25.84
MMLR_004_1215	394885	395408	45.4	27.7	100%	0.26	26.6	18.4	23.0	-17%	9.6	18.8	2.0	4.6	9.3	2.0	19.0	9.45	27.86
MMLR_005_1215	395127	395435	56.3	32.6	83%	0.25	26.3	18.2	23.0	-29%	7.1	30.0	4.2	4.8	14.4	3.0	14.1	7.05	25.26
MMLR_007_1215	395619	395230	48.5	29.3	92%	0.27	26.3	18.2	26.3	-10%	14.2	22.2	1.6	8.1	11.1	1.4	28.0	13.82	32.02
Wigan 14	366880	403255	66.4	36.4	100%	0.26	20.5	14.7	22.9	-37%	9.3	45.9	4.9	8.2	21.7	2.7	18.4	9.34	24.05
Wigan 28	366423	399893	73.4	38.6	92%	0.22	22.9	16.2	19.5	-50%	13.4	50.5	3.8	3.3	22.4	6.8	26.5	12.62	28.81
Wigan 61	364025	403080	64.7	35.5	100%	0.25	20.1	14.5	27.9	-21%	24.3	44.5	1.8	13.5	21.0	1.6	48.1	22.53	36.99
Wigan 71	368244	402562	67.8	36.9	100%	0.25	20.8	14.9	25.1	-32%	10.7	47.1	4.4	10.3	22.0	2.1	21.3	10.64	25.52
Wigan 114	365115	400259	71.3	40.1	100%	0.27	28.9	19.8	28.6	-29%	16.4	42.4	2.6	8.7	20.2	2.3	32.5	15.88	35.71
Trafford22	377054	390078	63.3	35.6	83%	0.26	23.8	16.8	29.5	-17%	19.3	39.5	2.0	12.7	18.7	1.5	38.3	18.22	35.06
Bolton41	366296	406568	85.2	43.4	92%	0.24	21.7	15.5	22.0	-49%	10.3	63.5	6.2	6.5	27.9	4.3	20.3	10.04	25.56
Bolton60	373288	405062	59.1	34.2	92%	0.25	28.1	19.4	26.7	-22%	12.1	31.0	2.6	7.4	14.8	2.0	23.9	11.62	31.01
Rochdale2A	388537	409942	61.5	33.3	92%	0.22	19.9	14.3	35.4	6%	47.7	41.6	0.9	21.1	19.0	0.9	94.4	37.38	51.70

Ref.	X	Y	Measured NOx Conc	Measured NO <sub>2</sub> Conc	DC %	Md f-NO <sub>2</sub>	Background NOx	Background NO <sub>2</sub>	Mod Total NO <sub>2</sub>	Mon/Mod Total NO <sub>2</sub>	Mod Road NOx	Mod Road NOx	Mon Road NOx	Mon/Mod Road NOx	Mod Road NO <sub>2</sub>	Mon Road NO <sub>2</sub>	Mon/Mod Road NO <sub>2</sub>	Adjusted Modelled NOx (Roads)	Adjusted Modelled NO <sub>2</sub> (Roads)	Adjusted Modelled NO <sub>2</sub> (Total)
Rochdale6A	385414	408319	91.8	44.6	100%	0.23	19.0	13.7	39.9	-10%	59.3	72.8	1.2	26.2	30.9	1.2	117.5	45.02	58.76	
BURY	380637	406972	59.0	30.0	94%	0.24	25.0	17.6	24.5	-18%	10.0	34.0	3.4	7.0	12.4	1.8	19.8	9.77	27.32	
BuryBU6	379658	410888	74.5	40.8	100%	0.25	29.1	20.0	37.2	-9%	28.2	45.4	1.6	17.2	20.8	1.2	55.8	24.99	44.97	
Rochdale12A	392072	415685	85.8	43.3	92%	0.24	19.5	14.1	23.7	-45%	18.7	66.3	3.6	9.6	29.3	3.0	37.0	17.61	31.67	
Rochdale11A	389969	413814	89.1	46.8	100%	0.24	35.9	23.7	35.6	-24%	26.1	53.2	2.0	11.9	23.2	1.9	51.7	22.63	46.31	
Wigan 35	357132	398669	73.5	39.0	92%	0.25	19.7	14.2	27.4	-30%	27.0	53.9	2.0	13.2	24.8	1.9	53.4	24.68	38.83	
Wigan 52	362138	396947	83.4	41.7	100%	0.23	18.5	13.4	26.2	-37%	20.3	64.9	3.2	12.8	28.3	2.2	40.1	18.76	32.15	
BUR1	378195	407477	64.0	28.0	95%	0.26	26.4	18.3	39.2	40%	28.2	37.6	1.3	20.9	9.7	0.5	55.8	25.33	43.65	
Bolton48	375402	407462	48.5	28.7	75%	0.23	24.2	17.1	23.6	-18%	12.7	24.3	1.9	6.5	11.7	1.8	25.1	12.05	29.13	
Bolton62	374193	405460	163.3	66.1	92%	0.21	25.0	17.5	33.0	-50%	17.8	138.3	7.8	15.5	48.5	3.1	35.3	16.04	33.57	
Wigan 115	353845	405360	58.9	32.6	75%	0.25	17.0	12.5	25.8	-21%	26.1	41.9	1.6	13.4	20.1	1.5	51.6	24.22	36.70	
Trafford24	379260	385811	52.4	30.7	92%	0.28	21.0	15.0	28.0	-9%	8.7	31.4	3.6	13.0	15.7	1.2	17.2	8.88	23.86	
STK5	391483	387636	58.0	25.0	99%	0.21	28.0	19.2	35.1	40%	23.8	30.0	1.3	15.9	5.8	0.4	47.1	20.45	39.67	
StockportSK 7	392063	386969	99.5	47.7	100%	0.22	23.5	16.6	22.3	-53%	23.6	76.0	3.2	5.8	31.1	5.4	46.6	20.74	37.29	
StockportSK28	385700	386220	86.3	43.7	100%	0.21	26.7	18.6	30.5	-30%	22.7	59.6	2.6	11.9	25.1	2.1	45.0	19.78	38.37	
BuryBU8	380753	412622	56.7	32.0	100%	0.21	24.3	17.2	27.5	-14%	16.2	32.4	2.0	10.3	14.9	1.4	32.1	14.73	31.88	
Wigan 53	353896	408519	62.7	33.9	92%	0.25	15.5	11.5	24.1	-29%	25.4	47.2	1.9	12.7	22.4	1.8	50.3	23.74	35.24	
Wigan 81	355979	410362	56.0	30.5	100%	0.24	14.7	10.9	13.0	-57%	7.0	41.3	5.9	2.1	19.6	9.3	13.8	7.10	18.00	
Bolton43	365500	409885	83.3	44.1	83%	0.26	27.0	18.5	26.0	-41%	12.4	56.4	4.6	7.4	25.5	3.4	24.5	12.02	30.55	
Wigan 43	356833	403150	70.5	37.1	100%	0.23	19.9	14.3	29.7	-20%	29.5	50.6	1.7	15.4	22.8	1.5	58.4	25.77	40.08	
Wigan 23	361835	404090	66.2	36.3	100%	0.26	20.3	14.5	17.2	-52%	14.8	45.9	3.1	2.7	21.7	8.1	29.4	14.50	29.04	
Wigan 33	359726	405534	79.3	41.8	92%	0.24	25.2	17.6	29.5	-29%	18.1	54.0	3.0	11.9	24.2	2.0	35.9	16.90	34.47	
Wigan 51	358787	405931	49.2	29.9	75%	0.23	39.0	25.0	33.6	12%	15.0	10.2	0.7	8.6	4.9	0.6	29.8	13.51	38.55	
StockportSK 4	396469	390800	22.5	15.7	100%	0.24	19.7	14.2	16.8	7%	6.6	2.8	0.4	2.6	1.5	0.6	13.1	6.67	20.89	
StockportSK25	395770	388655	54.4	30.6	100%	0.19	23.3	16.5	24.9	-19%	9.9	31.1	3.2	8.4	14.1	1.7	19.5	9.22	25.69	
TamesideT 18	391967	395521	97.3	49.3	100%	0.25	27.4	18.8	39.0	-21%	39.0	69.9	1.8	20.1	30.5	1.5	77.2	33.16	51.99	

Ref.	X	Y	Measured NOx Conc	Measured NO <sub>2</sub> Conc	DC %	Md f-NO <sub>2</sub>	Background NOx	Background NO <sub>2</sub>	Mod Total NO <sub>2</sub>	Mon/Mod Total NO <sub>2</sub>	Mod Road NOx	Mod Road NOx	Mon Road NOx	Mon/Mod Road NOx	Mod Road NO <sub>2</sub>	Mon Road NO <sub>2</sub>	Mon/Mod Road NO <sub>2</sub>	Adjusted Modelled NOx (Roads)	Adjusted Modelled NO <sub>2</sub> (Roads)	Adjusted Modelled NO <sub>2</sub> (Total)
TamesideT 19	392478	395505	73.8	39.5	75%	0.22	28.7	19.6	36.5	-7%	22.3	45.1	2.0	16.9	19.8	1.2	44.2	19.50	39.13	
TamesideT 24	390475	395621	72.3	39.3	100%	0.25	25.8	17.9	28.6	-27%	13.5	46.6	3.4	10.7	21.4	2.0	26.8	12.96	30.90	
TamesideT 48	392699	395741	49.5	30.1	92%	0.28	28.7	19.6	26.9	-11%	13.9	20.8	1.5	7.3	10.4	1.4	27.6	13.65	33.28	
TamesideT 10	392515	396749	78.4	41.4	100%	0.23	27.1	18.7	29.8	-28%	19.6	51.3	2.6	11.1	22.7	2.0	38.9	17.83	36.51	
MAN73	388604	396043	82.8	43.6	100%	0.23	31.6	21.4	39.5	-9%	17.5	51.2	2.9	18.1	22.2	1.2	34.6	15.76	37.14	
StockportSK19	389479	393464	79.9	42.5	100%	0.23	30.3	20.6	42.1	-1%	20.2	49.7	2.5	21.5	21.9	1.0	40.0	18.06	38.69	
Rochdale7A	388602	411924	67.9	36.7	100%	0.23	23.8	16.7	28.3	-23%	28.9	44.1	1.5	11.6	20.0	1.7	57.1	24.99	41.73	
Rochdale8A	388929	412091	106.6	51.2	92%	0.24	23.2	16.4	32.3	-37%	34.0	83.4	2.5	15.8	34.7	2.2	67.3	29.14	45.58	
Rochdale9A	389058	412214	88.2	45.2	100%	0.23	26.9	18.6	40.6	-10%	41.6	61.3	1.5	22.0	26.5	1.2	82.4	33.88	52.52	
Rochdale15A	392977	411907	60.7	32.8	75%	0.22	18.3	13.3	28.7	-13%	32.4	42.4	1.3	15.4	19.5	1.3	64.1	27.74	41.05	
BUR2	381651	403221	111.0	42.0	99%	0.23	24.7	17.3	30.4	-28%	18.7	86.3	4.6	13.1	24.7	1.9	37.1	17.12	34.42	
BuryBU5	380294	406411	62.1	35.5	92%	0.27	25.0	17.6	23.8	-33%	11.9	37.0	3.1	6.2	18.0	2.9	23.6	11.82	29.38	
M60	374810	400854	129.0	46.0	94%	0.24	20.2	14.5	36.3	-21%	47.6	108.8	2.3	21.8	31.5	1.4	94.1	38.36	52.88	
SalfordSA04	377451	401828	51.7	30.4	83%	0.21	28.5	19.6	22.8	-25%	7.8	23.2	3.0	3.2	10.8	3.4	15.5	7.42	27.02	
SalfordSA28	377289	401010	56.6	32.9	100%	0.24	28.5	19.6	27.7	-16%	19.7	28.1	1.4	8.1	13.3	1.6	39.0	17.96	37.56	
SalfordSA31	374024	401905	57.5	32.5	100%	0.25	20.8	14.9	29.6	-9%	23.9	36.7	1.5	14.6	17.6	1.2	47.2	22.06	36.98	
SalfordSA38	377788	403063	54.7	31.0	100%	0.23	21.5	15.3	20.4	-34%	11.1	33.2	3.0	5.1	15.7	3.1	21.9	10.71	25.99	
TamesideT 26	394948	401826	39.5	24.8	100%	0.28	23.9	16.8	20.0	-19%	5.6	15.6	2.8	3.2	8.0	2.5	11.2	5.80	22.62	
TamesideT 32	396970	402416	50.4	29.2	100%	0.25	20.0	14.4	25.0	-14%	7.7	30.4	3.9	10.6	14.8	1.4	15.3	7.77	22.17	
TamesideT 33	397011	402592	45.8	27.6	100%	0.26	23.1	16.3	18.7	-32%	5.0	22.6	4.5	2.4	11.3	4.7	9.9	5.13	21.47	
TamesideT 34	397066	402586	47.6	28.5	100%	0.26	23.1	16.3	22.9	-20%	10.0	24.5	2.5	6.5	12.1	1.9	19.7	9.92	26.26	
TamesideT 35	397068	402535	79.6	41.8	100%	0.25	23.1	16.3	22.0	-47%	8.1	56.4	7.0	5.7	25.5	4.5	16.0	8.05	24.39	
TamesideT 37	396727	402072	73.5	39.9	100%	0.28	20.0	14.4	24.0	-40%	10.9	53.5	4.9	9.6	25.5	2.7	21.6	11.06	25.46	
TamesideT SPEC	394193	399264	69.3	37.3	100%	0.16	33.7	22.6	28.0	-25%	16.5	35.6	2.2	5.5	14.7	2.7	32.6	13.61	36.17	
TamesideT 15	395403	398729	48.1	29.6	92%	0.26	34.9	23.1	29.9	1%	11.2	13.2	1.2	6.8	6.5	1.0	22.1	10.70	33.81	
TamesideT 27	396174	398218	51.4	31.1	100%	0.27	31.2	21.1	27.3	-12%	7.6	20.2	2.7	6.2	10.0	1.6	15.0	7.53	28.63	

Ref.	X	Y	Measured NOx Conc	Measured NO <sub>2</sub> Conc	DC %	Md f-NO <sub>2</sub>	Background NOx	Background NO <sub>2</sub>	Mod Total NO <sub>2</sub>	Mon/Mod Total NO <sub>2</sub>	Mod Road NOx	Mod Road NOx	Mon Road NOx	Mon/Mod Road NOx	Mod Road NO <sub>2</sub>	Mon Road NO <sub>2</sub>	Mon/Mod Road NO <sub>2</sub>	Adjusted Modelled NOx (Roads)	Adjusted Modelled NO <sub>2</sub> (Roads)	Adjusted Modelled NO <sub>2</sub> (Total)
TamesideT 40	394063	399307	65.2	36.6	100%	0.21	33.7	22.6	26.4	-28%	8.0	31.4	3.9	3.9	14.0	3.6	15.9	7.44	30.01	
TamesideT 41	394117	399259	62.1	34.7	100%	0.17	33.7	22.6	26.5	-24%	12.4	28.4	2.3	4.0	12.2	3.1	24.6	10.66	33.23	
TamesideT 42	394494	399011	55.5	33.1	100%	0.26	33.7	22.6	27.1	-18%	11.0	21.8	2.0	4.6	10.5	2.3	21.9	10.57	33.14	
TamesideT 43	394210	398926	86.2	46.4	100%	0.27	36.1	23.7	32.7	-30%	16.4	50.1	3.1	9.0	22.7	2.5	32.4	15.34	39.01	
TamesideT 14	393697	398794	72.5	40.6	100%	0.26	34.7	22.9	33.8	-17%	22.0	37.9	1.7	10.9	17.7	1.6	43.6	20.08	43.02	
Bolton3	370747	407923	95.0	49.1	92%	0.26	29.7	20.3	33.9	-31%	12.1	65.3	5.4	13.6	28.8	2.1	23.9	11.65	31.95	
Bolton66	371441	411600	75.8	40.4	92%	0.24	25.9	18.1	32.2	-20%	19.3	49.9	2.6	14.2	22.3	1.6	38.3	17.69	35.79	
StockportSK16	391569	391226	48.3	28.9	100%	0.23	26.7	18.5	29.0	0%	13.2	21.6	1.6	10.5	10.4	1.0	26.0	12.38	30.91	
StockportSK11	391082	387936	82.6	43.4	83%	0.24	28.0	19.2	40.4	-7%	20.6	54.6	2.6	21.1	24.2	1.1	40.9	18.79	38.01	
StockportSK15	389886	388961	65.3	37.0	100%	0.26	29.7	20.2	29.4	-20%	14.1	35.6	2.5	9.2	16.8	1.8	28.0	13.45	33.70	
MAN87A	387019	396563	65.4	37.1	100%	0.26	30.4	20.6	29.2	-21%	17.5	35.1	2.0	8.6	16.4	1.9	34.6	16.29	36.92	
MAN75	387363	394618	107.3	51.5	100%	0.21	33.4	22.4	40.8	-21%	23.8	73.9	3.1	18.4	29.2	1.6	47.1	20.07	42.43	
TRF2	379411	394013	76.0	33.0	98%	0.27	27.4	18.9	31.5	-5%	27.0	48.6	1.8	12.6	14.1	1.1	53.5	24.66	43.56	
BuryBU1	384376	404918	63.0	35.2	92%	0.26	22.3	15.9	31.4	-11%	33.5	40.7	1.2	15.5	19.4	1.2	66.4	29.77	45.64	
TamesideT 13	392583	398433	79.2	42.9	100%	0.25	33.6	22.3	38.5	-10%	35.6	45.7	1.3	16.2	20.6	1.3	70.4	30.04	52.33	
TamesideT 16	391421	397973	89.0	46.1	100%	0.25	27.1	18.7	26.7	-42%	14.4	61.9	4.3	8.0	27.4	3.4	28.5	13.74	32.44	
TamesideT 17	389069	398245	64.3	36.2	100%	0.24	29.1	19.9	30.0	-17%	12.2	35.2	2.9	10.2	16.3	1.6	24.2	11.61	31.47	
TamesideT 25	393051	401037	52.2	30.4	100%	0.24	24.0	16.9	25.0	-18%	11.8	28.2	2.4	8.1	13.5	1.7	23.3	11.36	28.23	
TamesideT 30	393419	399691	75.6	41.6	100%	0.25	33.3	22.2	28.6	-31%	13.4	42.3	3.2	6.4	19.4	3.0	26.4	12.62	34.82	
MAN37	382828	391491	89.0	46.3	100%	0.28	21.7	15.5	32.4	-30%	24.3	67.3	2.8	16.9	30.8	1.8	48.1	22.97	38.44	
OldhamOL11	393783	405097	57.8	34.1	92%	0.25	34.4	22.9	27.7	-19%	14.9	23.4	1.6	4.8	11.2	2.3	29.6	13.91	36.80	
CW	393884	409183	79.0	34.0	94%	0.26	23.2	16.4	23.5	-31%	10.7	55.8	5.2	7.0	17.6	2.5	21.3	10.65	27.08	
SalfordSA34	375362	397800	90.6	45.6	100%	0.25	21.3	15.2	37.6	-18%	49.0	69.3	1.4	22.4	30.4	1.4	97.0	40.11	55.32	
SalfordSA42	374697	399854	75.1	39.1	100%	0.24	18.8	13.6	40.5	4%	62.0	56.3	0.9	26.9	25.4	0.9	122.8	47.80	61.41	
SalfordSA50	375396	397805	84.7	43.7	100%	0.25	21.3	15.2	26.7	-39%	26.0	63.4	2.4	11.5	28.5	2.5	51.5	23.85	39.06	
SalfordSA51	375213	397661	71.9	37.7	100%	0.22	21.3	15.2	39.2	4%	38.4	50.6	1.3	24.0	22.5	0.9	76.1	31.58	46.79	

Ref.	X	Y	Measured NOx Conc	Measured NO <sub>2</sub> Conc	DC %	Md f-NO <sub>2</sub>	Background NOx	Background NO <sub>2</sub>	Mod Total NO <sub>2</sub>	Mon/Mod Total NO <sub>2</sub>	Mod Road NOx	Mon Road NOx	Mon/Mod Road NOx	Mod Road NO <sub>2</sub>	Mon Road NO <sub>2</sub>	Mon/Mod Road NO <sub>2</sub>	Adjusted Modelled NOx (Roads)	Adjusted Modelled NO <sub>2</sub> (Roads)	Adjusted Modelled NO <sub>2</sub> (Total)
SalfordSA52	375148	397588	65.6	35.2	100%	0.22	21.3	15.2	31.0	-12%	26.2	44.3	1.7	15.8	20.0	1.3	51.8	22.93	38.14
SalfordSA53	374757	399891	68.6	36.5	100%	0.24	18.8	13.6	25.7	-30%	24.8	49.8	2.0	12.1	22.9	1.9	49.2	22.66	36.27
StockportSK20	386921	389529	90.9	47.9	100%	0.28	24.7	17.3	34.4	-28%	33.0	66.1	2.0	17.1	30.6	1.8	65.2	30.28	47.59
MAN74	385401	390096	67.1	38.0	100%	0.28	27.3	18.8	28.4	-25%	14.6	39.9	2.7	9.6	19.2	2.0	28.9	14.27	33.07
StockportSK12	385031	388288	110.2	54.5	100%	0.26	26.5	18.4	38.1	-30%	24.9	83.7	3.4	19.6	36.0	1.8	49.3	22.93	41.37
SalfordSA14	382833	401035	61.6	35.5	100%	0.28	26.9	18.6	25.3	-29%	12.7	34.7	2.7	6.6	16.9	2.5	25.2	12.55	31.19
SalfordSA17	380741	400863	68.8	38.1	100%	0.24	28.8	19.7	21.2	-44%	2.6	40.0	15.1	1.6	18.4	11.9	5.2	2.66	22.34
SalfordSA25	381304	398014	57.4	33.6	100%	0.25	32.8	21.9	30.1	-10%	15.3	24.5	1.6	8.2	11.7	1.4	30.3	14.26	36.16
SalfordSA44	380412	398439	71.9	40.7	100%	0.28	35.5	23.4	34.1	-16%	24.5	36.5	1.5	10.7	17.4	1.6	48.5	22.52	45.88
Oldham OL24	389720	403629	87.1	44.9	92%	0.23	29.0	19.8	35.0	-22%	30.7	58.0	1.9	15.2	25.1	1.7	60.7	26.12	45.95
MAN28	387960	397429	77.0	41.0	100%	0.21	33.8	22.5	39.0	-5%	16.3	43.2	2.7	16.5	18.5	1.1	32.2	14.30	36.76
MAN86A	387161	396850	64.3	36.7	100%	0.27	30.4	20.6	27.9	-24%	12.2	33.9	2.8	7.3	16.1	2.2	24.2	11.79	32.42
MAN36	385199	399743	74.9	40.1	92%	0.20	34.0	22.6	31.4	-22%	16.5	40.9	2.5	8.8	17.5	2.0	32.7	14.35	36.96
MAN88A	386535	396700	104.2	52.7	100%	0.26	32.6	21.8	31.0	-41%	18.5	71.6	3.9	9.2	30.8	3.4	36.6	17.11	38.95
MAN89A	386717	396829	62.0	35.7	100%	0.25	32.6	21.8	25.7	-28%	7.6	29.4	3.9	3.9	13.9	3.6	15.0	7.38	29.22

Table 18: Verification Results: Zone 4

Ref.	X	Y	Measured NOx Conc	Measured NO <sub>2</sub> Conc	DC %	Md f-NO <sub>2</sub>	Background NOx	Background NO <sub>2</sub>	Mod Total NO <sub>2</sub>	Mon/Mod Total NO <sub>2</sub>	Mod Road NOx	Mon Road NOx	Mon/Mod Road NOx	Mod Road NO <sub>2</sub>	Mon Road NO <sub>2</sub>	Mon/Mod Road NO <sub>2</sub>	Adjusted Modelled NOx (Roads)	Adjusted Modelled NO <sub>2</sub> (Roads)	Adjusted Modelled NO <sub>2</sub> (Total)
MMLR_026_1215	400948	395800	89.3	45.1	75%	0.27	16.2	11.9	21.7	-52%	19.0	73.2	3.8	9.8	33.3	3.4	38.1	18.40	30.27
TamesideT 11	400416	396062	174.8	62.8	100%	0.18	17.1	12.5	33.8	-46%	50.1	157.8	3.1	21.3	50.4	2.4	100.4	35.85	48.31
TamesideT 21	400430	395961	123.9	56.1	100%	0.25	16.2	11.9	31.0	-45%	39.8	107.7	2.7	19.1	44.3	2.3	79.7	34.06	45.93
MMLR_024_1215	400102	395940	110.5	48.7	100%	0.21	16.2	11.9	38.3	-21%	61.9	94.4	1.5	26.4	36.8	1.4	124.1	44.15	56.02
MMLR_025_1215	400364	396006	139.2	59.6	92%	0.23	17.1	12.5	33.3	-44%	44.9	122.2	2.7	20.9	47.2	2.3	90.0	36.49	48.95
MMLR_036_1215	400622	395977	33.5	20.6	83%	0.23	16.2	11.9	14.0	-32%	4.0	17.3	4.3	2.1	8.7	4.2	8.0	4.07	15.94
MMLR_044_1215	400490	396118	103.7	46.5	100%	0.20	17.1	12.5	32.2	-31%	44.5	86.7	1.9	19.8	34.0	1.7	89.1	33.99	46.45

MMLR_051_1215	400493	395915	97.4	47.3	92%	0.25	16.2	11.9	31.6	-33%	41.1	81.2	2.0	19.8	35.5	1.8	82.3	35.14	47.01
MMLR_054_1215	400022	395909	102.1	46.1	100%	0.21	16.2	11.9	38.1	-17%	61.4	86.0	1.4	26.2	34.3	1.3	123.0	43.86	55.73
MMLR_057_1215	399876	395861	91.6	43.3	100%	0.21	18.0	13.1	47.0	9%	85.6	73.6	0.9	33.9	30.2	0.9	171.5	55.42	68.56
MMLR_067_1215	400701	395902	28.8	18.4	100%	0.24	16.2	11.9	14.0	-24%	4.0	12.6	3.2	2.1	6.5	3.1	8.0	4.12	15.99
TAM1	399719	395805	162.0	49.0	95%	0.21	18.0	13.1	34.2	-30%	47.6	144.0	3.0	21.0	35.9	1.7	95.3	36.06	49.19
MMLR_012_1215	398901	395501	96.2	47.5	100%	0.26	17.9	13.0	27.7	-42%	29.6	78.3	2.6	14.7	34.4	2.3	59.4	26.75	39.77
MMLR_013_1215	399291	395634	153.5	58.9	100%	0.19	18.0	13.1	46.4	-21%	87.5	135.5	1.5	33.3	45.7	1.4	175.4	53.51	66.64
MMLR_014_1215	399315	395639	297.2	89.5	92%	0.19	18.0	13.1	51.8	-42%	106.8	279.1	2.6	38.7	76.4	2.0	214.0	61.79	74.92
MMLR_015_1215	399305	395625	201.8	69.9	100%	0.19	18.0	13.1	35.3	-49%	52.2	183.7	3.5	22.2	56.8	2.6	104.7	37.32	50.45
MMLR_016_1215	399300	395652	89.8	42.6	92%	0.20	18.0	13.1	26.4	-38%	28.3	71.8	2.5	13.3	29.4	2.2	56.8	23.82	36.95
MMLR_019_1215	399691	395821	84.9	41.0	100%	0.20	18.0	13.1	45.6	11%	80.9	66.8	0.8	32.4	27.9	0.9	162.0	53.19	66.32
MMLR_050_1215	400744	395786	72.1	37.9	100%	0.25	16.2	11.9	30.9	-19%	39.2	55.9	1.4	19.0	26.0	1.4	78.5	33.97	45.84
MMLR_064_1215	399413	395738	231.2	75.7	100%	0.19	18.0	13.1	44.1	-42%	79.8	213.1	2.7	31.0	62.6	2.0	159.8	50.08	63.21
MMLR_069A_1215	399718	395804	126.3	53.7	83%	0.20	18.0	13.1	36.8	-31%	54.7	108.2	2.0	23.7	40.5	1.7	109.6	40.04	53.17

Table 19: Verification Results: Zone 5

Ref.	X	Y	Measured NOx Conc	Measured NO <sub>2</sub> Conc	DC %	Md f-NO <sub>2</sub>	Background NO <sub>x</sub>	Background NO <sub>2</sub>	Mod Total NO <sub>2</sub>	Mon/Mod Total NO <sub>2</sub>	Mod Road NOx	Mon Road NOx	Mon/Mod Road NOx	Mod Road NO <sub>2</sub>	Mon Road NO <sub>2</sub>	Mon/Mod Road NO <sub>2</sub>	Adjusted Modelled NOx (Roads)	Adjusted Modelled NO <sub>2</sub> (Roads)	Adjusted Modelled NO <sub>2</sub> (Total)
SalfordSA39	383041	398555	88.4	46.8	100%	0.22	50.5	30.9	47.1	1%	38.7	37.9	1.0	16.2	15.9	1.0	57.9	21.43	52.32
SalfordSA27	383080	398743	70.2	39.8	92%	0.24	50.5	30.9	38.3	-4%	16.1	19.7	1.2	7.4	8.9	1.2	24.0	10.08	40.96
MAN1	384238	397278	232.0	66.0	78%	0.15	47.2	29.4	53.1	-20%	70.9	184.8	2.6	23.7	36.6	1.5	105.9	29.59	58.96
MAN9A/B	384602	398304	103.3	51.9	100%	0.20	50.8	31.2	35.7	-31%	10.0	52.5	5.3	4.5	20.7	4.6	14.9	6.19	37.35
MAN24	383958	398058	86.4	45.3	100%	0.18	50.5	30.9	49.2	9%	47.8	35.9	0.8	18.3	14.4	0.8	71.5	23.70	54.58
MAN29A	384120	397501	184.2	66.2	100%	0.13	47.2	29.4	60.6	-9%	111.5	137.0	1.2	31.2	36.8	1.2	166.5	37.88	67.24
MAN72	384760	397383	70.6	40.0	100%	0.24	47.2	29.4	34.5	-14%	11.0	23.4	2.1	5.2	10.6	2.1	16.4	7.11	36.48
MAN82	384239	397278	154.7	61.9	100%	0.15	47.2	29.4	53.7	-13%	73.8	107.5	1.5	24.4	32.6	1.3	110.3	30.38	59.75

**Table 20: Excluded Sites**

Reference	Reason to exclude
MAN8	
Oldham OL31	
SalfordSA59	No data
SalfordSA60	
OldhamOL14	
M60J18_009_1215	
M60J18_010_1215	
M60J18_011_1215	
M60J18_017_1215	
M60J18_020c_1215	
M60J18_012_1215	
M60J18_021_1215	
M60J18_013_1215	
M60J18_014_1215	
M62J20J25_015_0116	
M62J20J25_016_0116	
M62J20J25_017_0116	Only 6 months of data
M62J20J25_018_0116	
M62J20J25_019_0116	
M62J20J25_020_0116	
M62J20J25_021_0116	
M62J20J25_022_0116	
M62J20J25_023_0116	
M62J20J25_024_0116	
M62J20J25_033_0116	
M60J18_001_1215	
M60J18_002_1215	

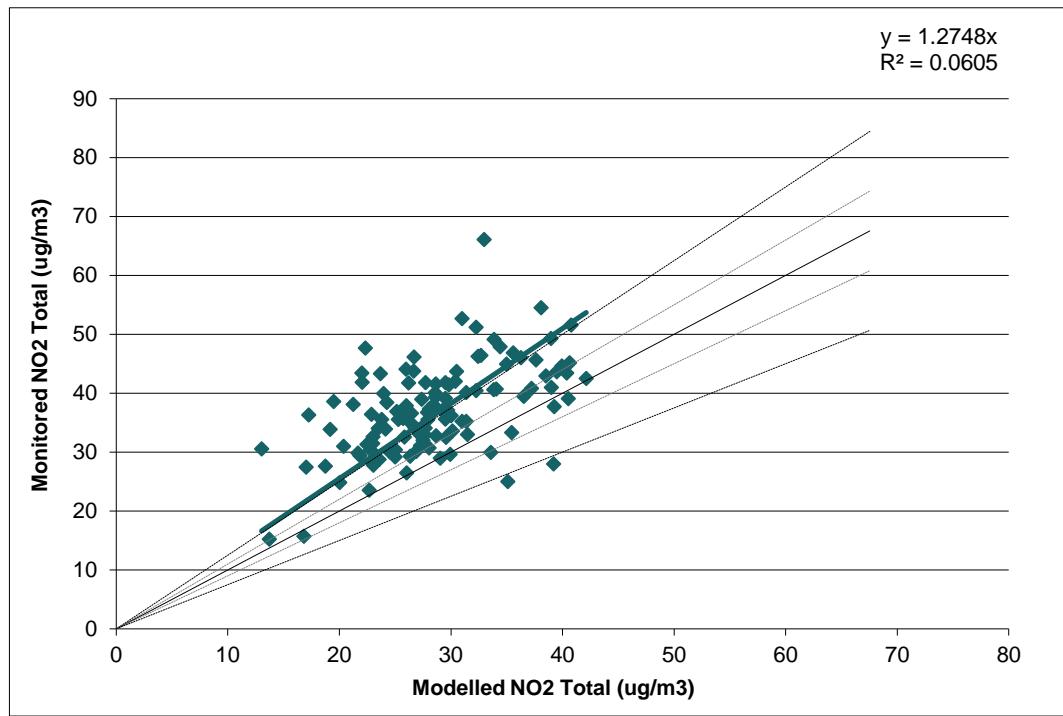
<b>Reference</b>	<b>Reason to exclude</b>
M60J18_003_1215	
M60J18_004_1215	
M60J18_005_1215	
M60J18_007_1215	
M60J18_008_1215	
M60J18_016_1215	
M60J18_018_1215	
M60J18_006_1215	
M60J18_015_1215	
M60J18_019_1215	
M62J20J25_035a_0116	
MAN59	
MAN59	
MAN59	Co-located with a CM
MAN82	
MAN83	
MAN84	
MAN90	
MAN91	
MAN92	
OldhamOL20	
OldhamOL21	
Oldham OL22	Co-located with a CM
SalfordSA20	
SalfordSA21	
SalfordSA22	
SalfordSA23	
SalfordSA24	

<b>Reference</b>	<b>Reason to exclude</b>
SalfordSA29	
StockportSK22	
StockportSK22	
StockportSK22	
TamesideT 9	
TamesideT 12	
TamesideT 45	
TamesideT 46	
TamesideT 47	
Trafford19	
Trafford 19a	
Trafford20	
Trafford 20a	
Trafford 25	
Trafford 25A	
Wigan 47	
Wigan 48	
Wigan 49	
MAN77	BG site - in narrow canyon with local combustion sources nearby
TamesideT 1	
Bolton14	
Trafford 15	Location could not be identified
Trafford18	
Trafford23	
MMLR_002_1215	
MMLR_063_1215	BG sites that include a road contribution and not used in the Defra map comparison process
Wigan 116	

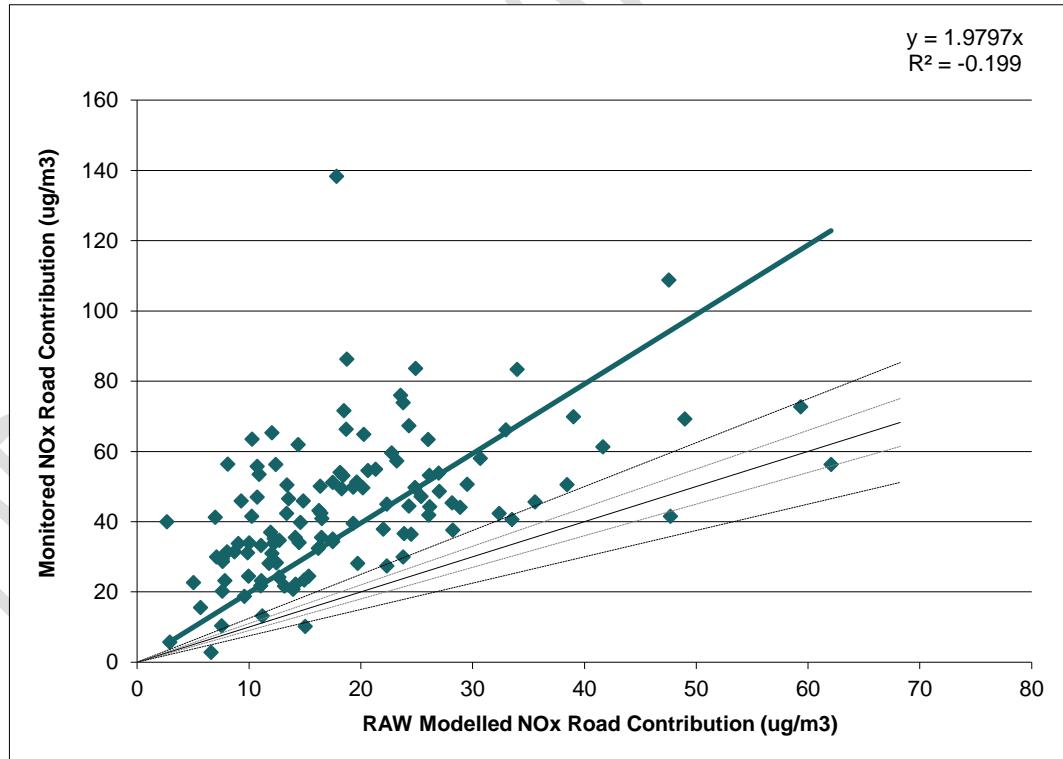
<b>Reference</b>	<b>Reason to exclude</b>
Bolton63	
SalfordSA02	
SalfordSA01	
TamesideT 3	
TamesideT 23	
Bolton16	
Bolton65	
StockportSK29	
StockportSK 1	
StockportSK18	
MAN79	
MAN80	
MAN81	
StockportSK 3	
TRAF	
Trafford5	
Trafford9	BG sites that include a road contribution and not used in the Defra map comparison process
Trafford19	
Trafford13	
Trafford21	
Rochdale4A	
Rochdale5A	
OldhamOL10	
TamesideT 22	
TamesideT 29	
ECCL	
SalfordSA23	
SalfordSA54	

<b>Reference</b>	<b>Reason to exclude</b>
StockportSK17	
StockportSK21	
StockportSK27	
StockportSK 6	
MAN77	
SalfordSA13	
SalfordSA26	
SalfordSA37	
OldhamOL17	
Oldham OL23	
MAN14	
MAN26A/B	
MAN78	
MAN3	
MAN71	Behind ADMS canyon wall in city centre
MAN88	

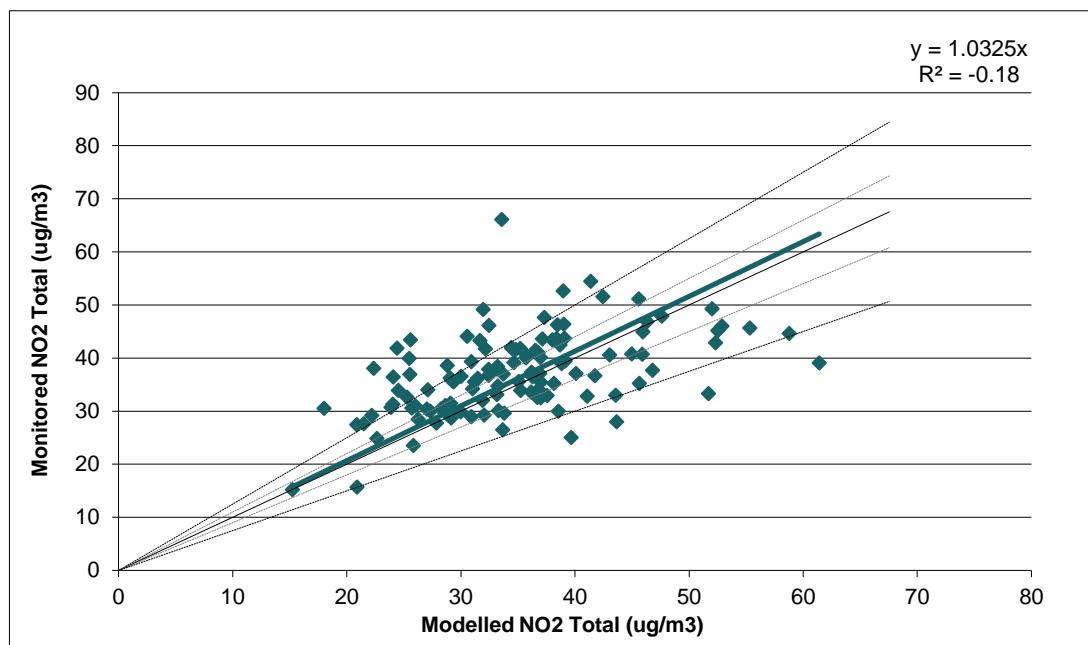
**Graph 1: Modelled vs Monitored Total NO<sub>2</sub> for Zone 1 (Unadjusted)**



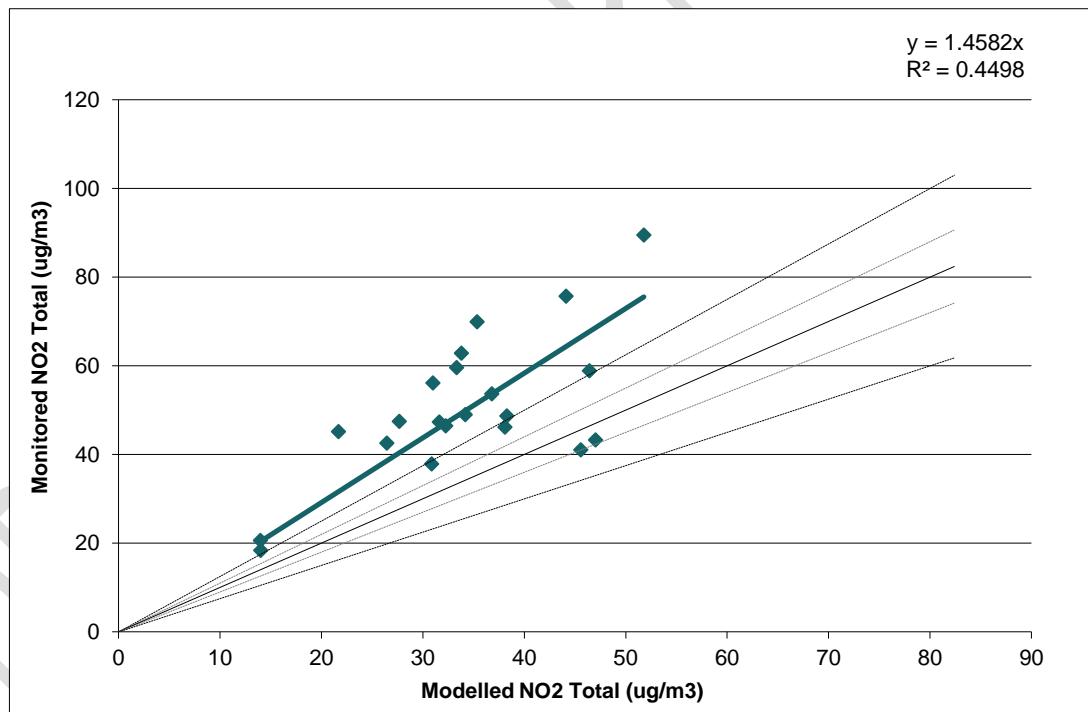
**Graph 2: Modelled vs Monitored Road NOx for Zone 1 (Unadjusted)**



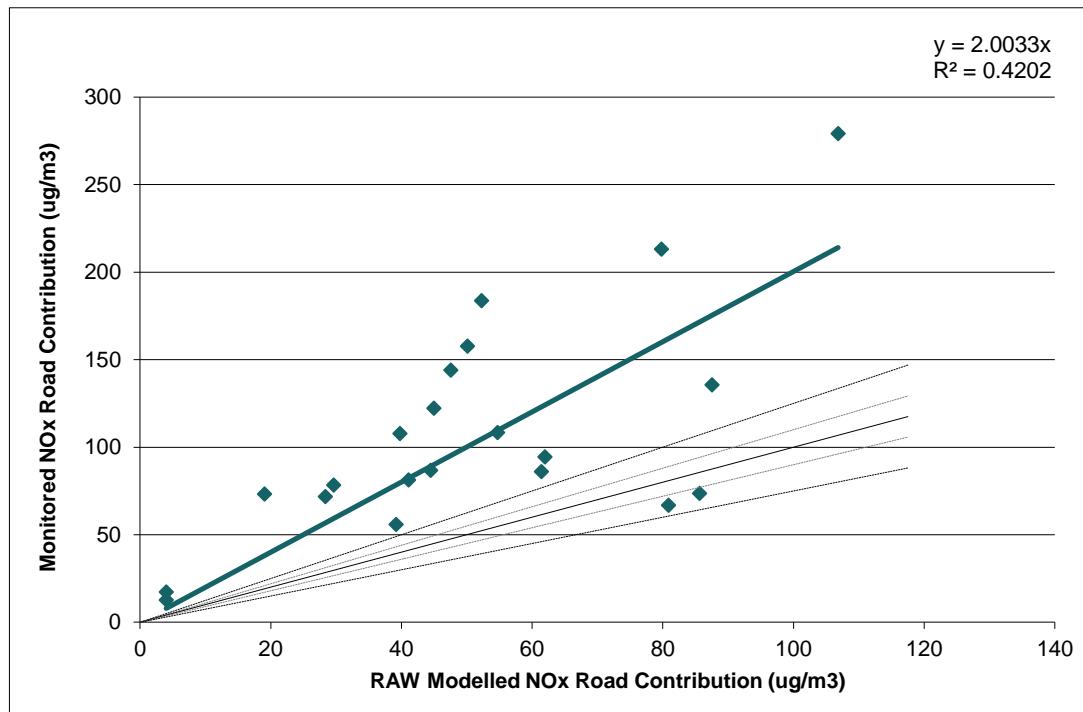
**Graph 3: Modelled vs Monitored Total NO<sub>2</sub> for Zone 1 (Adjusted)**



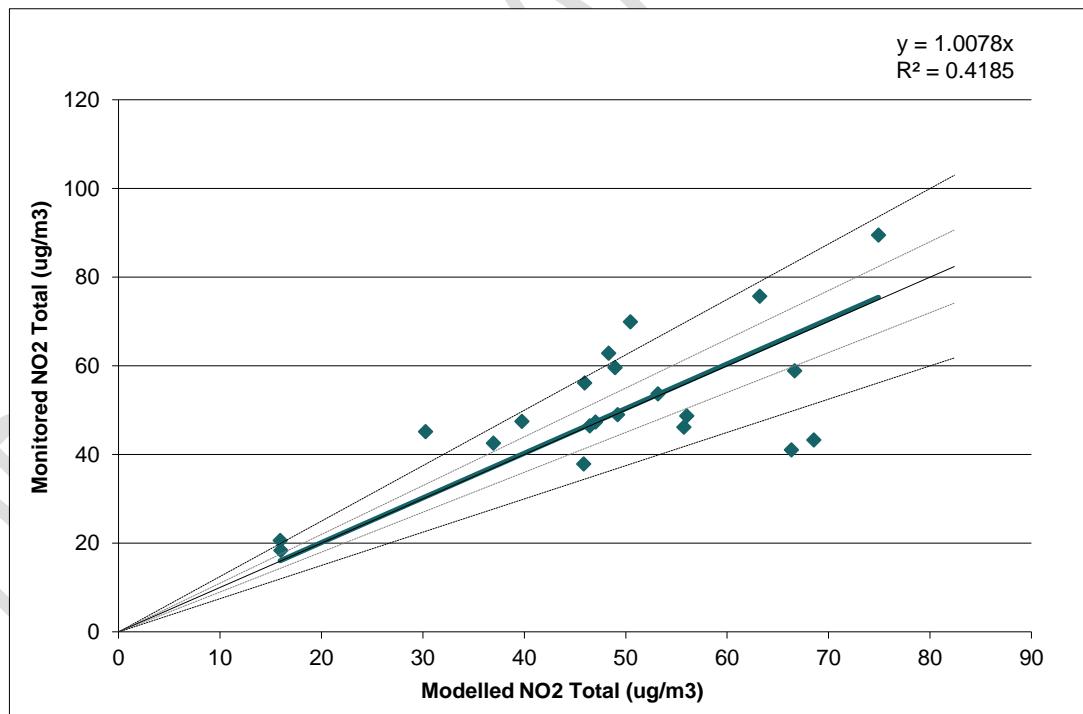
**Graph 4: Modelled vs Monitored Total NO<sub>2</sub> for Zone 4 (Unadjusted)**



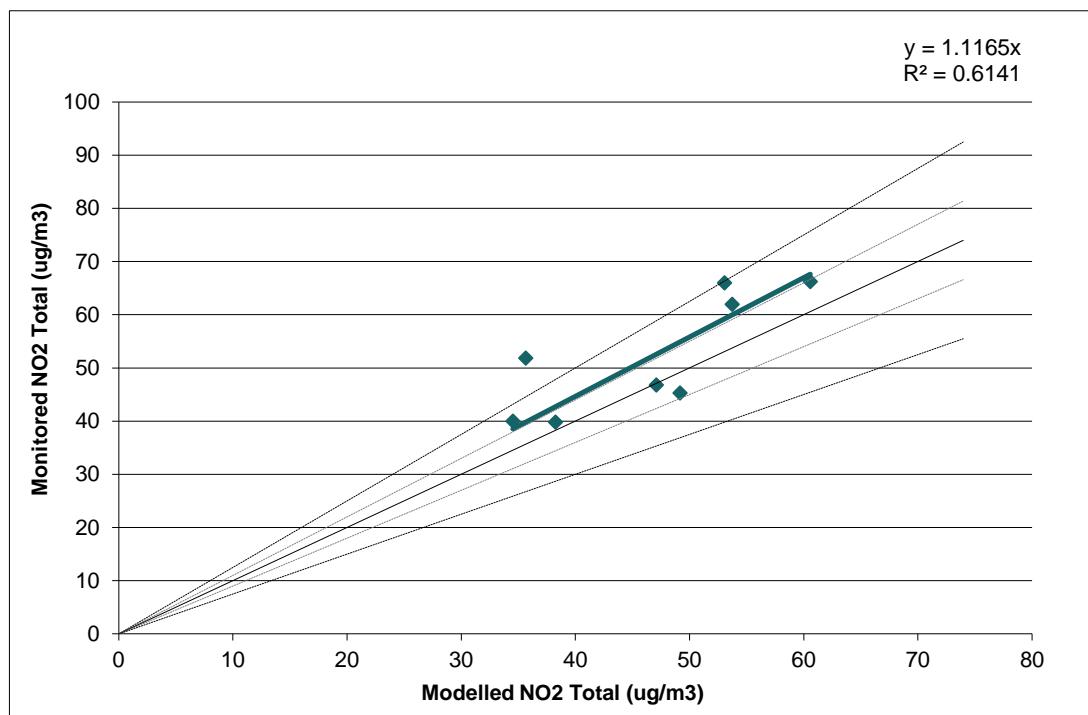
**Graph 5: Modelled vs Monitored Road NOx for Zone 4 (Unadjusted)**



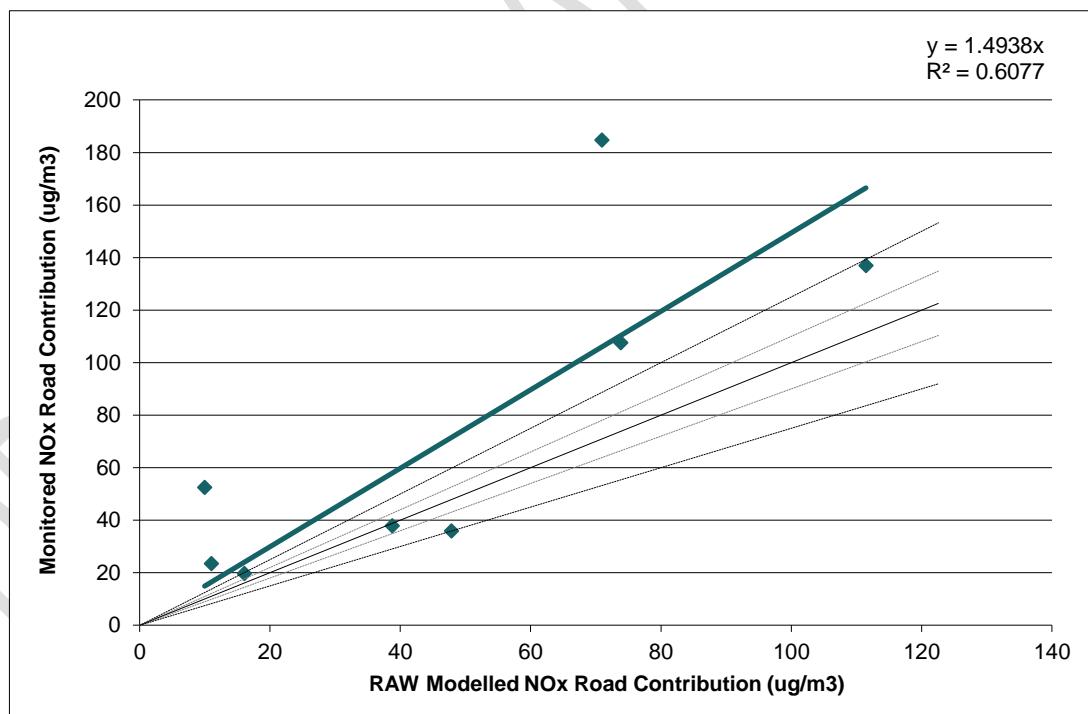
**Graph 6: Modelled vs Monitored Total NO<sub>2</sub> for Zone 4 (Adjusted)**



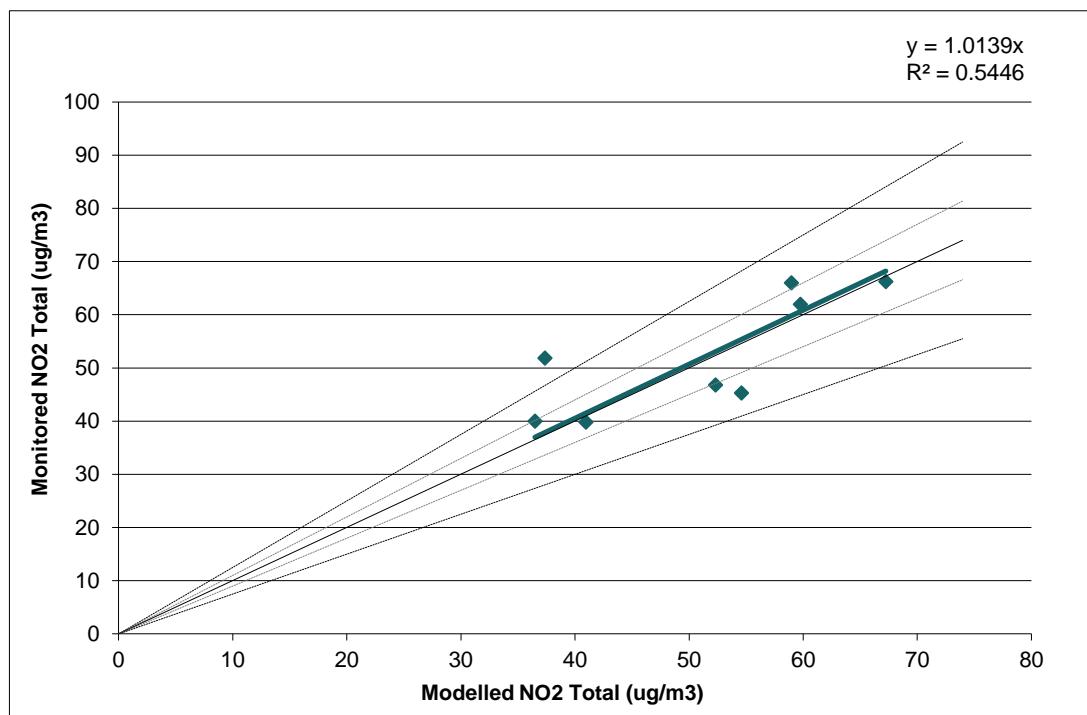
**Graph 7: Modelled vs Monitored Total NO<sub>2</sub> for Zone 5 (Unadjusted)**



**Graph 8: Modelled vs Monitored Road NOx for Zone 5 (Unadjusted)**



**Graph 9: Modelled vs Monitored Total NO<sub>2</sub> for Zone 5 (Adjusted)**



## **Appendix B – Model Results**

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**Table B-1: Predicted annual mean NO<sub>2</sub> concentrations and source apportionment at exceedance links on the Greater Manchester road network - Do Minimum – 2021**

Point ID	Rd Link ID	x	y	Census ID	Road name	Local Authority	PCM Total NO <sub>2</sub> conc (µg/m <sup>3</sup> )	Annual mean NO <sub>2</sub> conc (µg/m <sup>3</sup> )	BG NO <sub>x</sub> conc (µg/m <sup>3</sup> )	BG NO <sub>2</sub> conc (µg/m <sup>3</sup> )	Road NO <sub>x</sub> contrib (µg/m <sup>3</sup> )	Road NO <sub>2</sub> contrib (µg/m <sup>3</sup> )	AADT	NOx contribution by vehicle type (%)					Change NO <sub>2</sub> conc (µg/m <sup>3</sup> )
														Bus	Taxi	HGV	LGV	Car	
2799_3118_DW	2799_3118	371751	409800	58048	A673	Bolton	PCM	45.4	28.2	19.5	59.3	25.9	27,146	0%	5%	32%	25%	37%	na
2648_6404_DW	2648_6404	372355	408934	47988	A579	Bolton	PCM	45.3	25.0	17.5	60.3	27.8	34,344	7%	5%	15%	34%	39%	na
2650_2653_DW	2653_2650	372915	407622	7431	A666	Bolton	PCM	44.9	26.5	18.4	55.2	26.5	66,033	0%	5%	8%	44%	42%	na
2799_3775_DW	2799_3775	371869	409735	8030	A666	Bolton	PCM	44.2	28.2	19.5	53.4	24.7	21,153	0%	6%	13%	33%	48%	na
2119_2564_DW	2119_2564	371207	409524	17905	A673	Bolton	PCM	44.0	28.2	19.5	56.7	24.5	27,150	31%	6%	8%	19%	36%	na
2407_6761_DW	2407_6761	374740	405143	73087	A667	Bolton	PCM	42.7	18.9	13.7	65.7	29.0	38,570	10%	5%	26%	20%	39%	na
2061_2119_DW	2061_2119	371060	409589	47469	A673	Bolton	PCM	42.0	28.2	19.5	52.5	22.6	23,824	34%	5%	10%	16%	34%	na
3064_15148_DW	3064_15148	371642	408705	7921	A579	Bolton	PCM	41.9	28.4	19.5	51.4	22.4	26,318	29%	5%	12%	18%	36%	na
1986_2053_DW	1986_2053	372038	408749	74518	A575	Bolton	PCM	41.5	25.0	17.5	55.0	24.0	21,715	30%	5%	13%	20%	33%	na
2053_3067_DW	2053_3067	371895	408742	27946	A579	Bolton	PCM	41.3	28.4	19.5	49.5	21.8	24,192	20%	5%	17%	22%	37%	na
2662_14424_DW	2662_14424	371075	408696	28245	A676	Bolton	PCM	40.6	28.4	19.5	46.8	21.1	24,235	12%	6%	24%	20%	38%	na
2799_7832_DW	2799_7832	371805	409910	38542	A666	Bolton	PCM	40.3	28.2	19.5	44.4	20.8	28,986	0%	6%	19%	26%	48%	na
2237_3790_DW	3790_2237	379830	410975	38354	A58	Bury	PCM	54.8	23.0	16.3	96.2	38.5	78,826	19%	5%	18%	21%	37%	na
3424_4940_DW	3424_4940	380920	404881	17924	A56	Bury	PCM	52.7	18.1	13.2	96.9	39.5	19,987	8%	5%	35%	18%	34%	na
2244_4913_DW	2244_4913	381968	410627	73198	A58	Bury	PCM	49.6	22.9	16.3	78.5	33.3	24,021	8%	6%	23%	24%	40%	na
1742_9011_DW	1742_9011	381149	404182	46572	A56	Bury	PCM	46.5	21.8	15.5	76.4	31.0	37,169	18%	4%	29%	18%	31%	na
2243_4639_DW	2243_4639	381310	410749	16556	A58	Bury	PCM	43.3	22.9	16.3	61.1	27.1	28,072	19%	4%	15%	30%	32%	na
3791_3976_DW	3791_3976	380284	410974	26563	A56	Bury	PCM	41.0	24.6	17.3	50.5	23.7	40,495	0%	8%	15%	24%	54%	na
2231_3083_DW	2231_3083	380413	410490	8575	A58	Bury	PCM	40.8	24.6	17.3	57.4	23.5	18,767	58%	3%	2%	17%	21%	na
3056_3842_DW	3056_3842	384880	397418	26157	A6	Manchester	PCM	53.7	34.9	23.1	76.9	30.6	37,828	29%	5%	13%	22%	32%	na
8546_14050	8546_14050	384384	398801	57427	A664	Manchester	PCM	51.9	38.8	25.3	94.1	26.6	8,041	80%	2%	3%	3%	13%	na
1268_1269	1268_1269	383558	398278	27974	A34	Manchester	PCM	50.7	38.5	25.0	82.2	25.7	9,769	65%	3%	4%	10%	18%	na
2283_8544_DW	2283_8544	383791	398603	27992	A56	Manchester	PCM	50.3	38.5	25.0	90.7	25.3	4,317	84%	1%	4%	7%	5%	na
1267_1985	1267_1985	383672	398364	16536	A56	Manchester	PCM	49.4	38.5	25.0	71.5	24.4	8,652	49%	4%	9%	14%	24%	na
1322_3273	1322_3273	383249	398058	27975	A34	Manchester	PCM	49.4	38.5	25.0	57.4	24.4	15,677	0%	8%	11%	25%	56%	na
1242_1243	1242_1243	384483	398343	70154	A62	Manchester	PCM	49.4	38.8	25.3	96.8	24.2	1,413	100%	0%	0%	0%	0%	na
1307_1317	1307_1317	383757	398717	36551	A6	Manchester	PCM	48.7	38.5	25.0	84.5	23.7	4,434	89%	1%	2%	4%	3%	na
2289_12835	2289_12835	384282	398507	70153	A6	Manchester	PCM	48.4	38.8	25.3	77.7	23.2	9,279	83%	1%	1%	4%	11%	na
1268_46301	1268_46301	383702	398229	7947	A34	Manchester	PCM	48.1	38.5	25.0	72.2	23.0	8,687	60%	2%	13%	12%	13%	na
1341_2939_DW	1341_2939	385618	397656	75239	A635	Manchester	PCM	47.7	32.5	21.7	63.8	25.9	24,692	8%	3%	41%	20%	27%	na
2847_2855_DW	2855_2847	382389	390376	7701	A5103	Manchester	PCM	47.6	19.5	14.1	73.4	33.5	127,981	2%	6%	14%	28%	49%	na
1846_2423_DW	1846_2423	381865	388177	26047	M56	Manchester	PCM	47.3	20.5	14.8	69.3	32.5	13,899	6%	7%	7%	30%	51%	na
1336_16404	1336_16404	384137	397465	17929	A34	Manchester	PCM	47.1	34.9	23.1	81.4	24.0	5,781	93%	1%	1%	4%	4%	na
2006_3292	2006_3292	384110	397858	56529	A5103	Manchester	PCM	45.6	34.9	23.1	73.7	22.5	6,246	90%	1%	1%	4%	3%	na
1302_8546	1302_8546	384428	398838	75248	A664	Manchester	PCM	45.3	38.8	25.3	62.5	20.0	8,092	71%	1%	14%	5%	9%	na
3016_6022_DW	3016_6022	384639	397855	46165	A6	Manchester	PCM	43.7	34.9	23.1	59.4	20.6	7,269	63%	3%	5%	8%	21%	na
1312_5801_DW	1312_5801	383778	399163	36577															

Point ID	Rd Link ID	x	y	Census ID	Road name	Local Authority	PCM Total NO <sub>2</sub> conc (µg/m <sup>3</sup> )	Annual mean NO <sub>2</sub> conc (µg/m <sup>3</sup> )	BG NO <sub>x</sub> conc (µg/m <sup>3</sup> )	BG NO <sub>2</sub> conc (µg/m <sup>3</sup> )	Road NO <sub>x</sub> contrib (µg/m <sup>3</sup> )	Road NO <sub>2</sub> contrib (µg/m <sup>3</sup> )	AADT	NOx contribution by vehicle type (%)					Change NO <sub>2</sub> conc (µg/m <sup>3</sup> )
														Bus	Taxi	HGV	LGV	Car	
2291_3923	2291_3923	384010	399185	17822	A6042	Manchester	PCM	41.3	28.6	19.6	54.0	21.8	25,603	18%	6%	20%	18%	39%	na
3293_1285_DW	3293_1285	384280	397739	28486	A34	Manchester	PCM	40.9	34.9	23.1	54.1	17.9	6,777	89%	1%	1%	3%	6%	na
3959_2890_DW	3960_2891	383358	397172	46068	A57M	Manchester	PCM	40.8	32.0	21.5	43.0	19.3	83,550	0%	6%	10%	34%	50%	na
3619_3629	3619_3629	383357	398985	73787	A6042	Manchester	PCM	40.8	38.5	25.0	36.6	15.8	23,049	0%	6%	20%	29%	44%	na
1469_3669_DW	1469_3669	386578	395884	28695	A6	Manchester	PCM	40.8	26.4	18.3	49.7	22.5	27,872	24%	6%	7%	20%	44%	na
1300_7282	1300_7282	384829	398513	47457	A665	Manchester	PCM	40.7	38.8	25.3	38.3	15.5	23,195	21%	4%	21%	21%	33%	na
1356_14504_DW	1356_14504	383011	398485	73790	A34	Manchester	PCM	40.6	38.5	25.0	35.7	15.6	36,435	0%	7%	14%	28%	50%	na
3042_15348	3042_15348	382773	391447	37809	A5103	Manchester	PCM	40.4	16.8	12.3	58.2	28.1	81,395	4%	7%	6%	29%	54%	na
1685_1686_DW	1685_1686	387382	394221	73778	A6	Manchester	PCM	40.4	25.5	17.8	52.0	22.6	27,675	29%	5%	15%	18%	33%	na
1435_4314_DW	1435_4314	383838	395773	80940	A5103	Manchester	PCM	40.2	25.1	17.6	48.5	22.6	40,617	13%	7%	9%	25%	46%	na
14523_14524	14523_14524	393320	405038	36632	A62	Oldham	PCM	52.3	27.4	18.9	74.9	33.4	52,509	0%	6%	16%	31%	47%	na
1295_1703	1295_1703	390482	402513	77008	A62	Oldham	PCM	43.4	23.7	16.6	58.3	26.8	36,775	2%	6%	22%	30%	40%	na
3914_5661	3914_5661	390627	402753	6606	A62	Oldham	PCM	43.0	23.7	16.6	57.7	26.3	37,113	1%	5%	29%	31%	34%	na
3911_4112	3911_4112	389383	403282	99617	A663	Oldham	PCM	42.8	22.8	16.1	57.8	26.7	41,104	6%	6%	15%	25%	48%	na
4629_5567_DW	4629_5567	390741	402566	27823	A6104	Oldham	PCM	40.5	23.7	16.6	50.1	23.9	14,999	2%	6%	15%	36%	41%	na
2210_14216_DW	2210_14216	388664	411856	17322	A664	Rochdale	PCM	49.7	19.0	13.8	89.6	35.9	34,420	0%	4%	43%	24%	29%	na
2210_4463_DW	2210_4463	388729	411971	26586	A58	Rochdale	PCM	49.1	19.0	13.8	90.9	35.3	45,437	10%	4%	40%	19%	27%	na
2202_2205_DW	2202_2205	389446	413627	27469	A680	Rochdale	PCM	42.6	28.9	19.8	50.2	22.9	23,753	11%	5%	19%	27%	38%	na
2202_2538	2202_2538	389424	413513	56600	A58	Rochdale	PCM	41.6	28.9	19.8	46.4	21.8	39,005	6%	7%	11%	26%	49%	na
3132_7573_DW	3132_7573	389842	413925	38048	A671	Rochdale	PCM	41.0	28.9	19.8	45.6	21.3	25,377	16%	6%	7%	25%	46%	na
2210_7536_DW	2210_7536	388580	411886	38543	A58	Rochdale	PCM	40.2	19.0	13.8	59.3	26.4	39,917	16%	6%	17%	23%	39%	na
1349_2993_DW	1349_2993	382580	397716	73792	A57	Salford	PCM	51.2	26.5	18.4	75.4	32.8	52,994	2%	6%	22%	29%	41%	na
1216_14503_DW	1216_14503	382565	398546	17926	A6	Salford	PCM	49.7	27.1	18.7	81.6	31.0	32,122	35%	4%	21%	15%	25%	na
1867_4574_DW	1867_4574	382129	397840	36585	A57	Salford	PCM	49.1	26.5	18.4	70.8	30.8	49,192	1%	5%	27%	27%	40%	na
14311_2299_DW	2299_14311	381488	399165	6161	A6	Salford	PCM	48.2	26.2	18.1	69.7	30.0	51,080	14%	6%	15%	19%	46%	na
1232_12945_DW	1232_12945	381825	398784	56160	A6	Salford	PCM	48.0	25.0	17.4	77.7	30.6	35,898	33%	4%	21%	15%	27%	na
1349_1867_DW	1349_1867	382371	397772	48023	A57	Salford	PCM	47.3	26.5	18.4	65.2	28.9	46,250	2%	6%	24%	28%	41%	na
3964_4732_DW	3964_4732	382871	397244	99516	A56	Salford	PCM	47.3	26.5	18.4	67.4	28.9	35,485	9%	5%	26%	25%	35%	na
3969_6612_DW	3969_6612	381512	398031	6562	A57	Salford	PCM	47.2	25.0	17.4	67.1	29.8	51,090	4%	5%	22%	29%	40%	na
5179_5182_DW	5179_5182	374598	400597	74618	A572	Salford	PCM	46.5	15.8	11.6	76.6	34.9	33,559	5%	6%	15%	28%	46%	na
1579_17017_DW	1579_17017	377344	400951	37363	A580	Salford	PCM	42.9	19.2	13.9	65.0	29.0	37,986	3%	5%	26%	25%	40%	na
1364_1366	1364_1366	381428	399804	17245	A576	Salford	PCM	42.7	26.2	18.1	57.1	24.6	30,716	20%	5%	21%	15%	39%	na
1345_1346_DW	1345_1346	380555	398426	56535	A5186	Salford	PCM	42.7	27.6	18.9	52.6	23.7	13,860	17%	5%	26%	20%	33%	na
3786_1233_DW	3968_1233	381517	398259	27751	A5063	Salford	PCM	41.7	25.0	17.4	53.1	24.3	33,605	5%	6%	20%	22%	46%	na
5249_7952	5249_7952	381205	399532	58028	A576	Salford	PCM	41.7	26.2	18.1	52.5	23.6	34,039	13%	6%	18%	19%	44%	na
3620_5931_DW	3620_5931	390351	390720	37920	A626	Stockport	PCM	47.7	25.9	18.0	70.5	29.7	32,338	0%	4%	39%	25%	32%	na
3973_14181_DW	3973_14181	388375	390354	58034	A5145	Stockport	PCM												

Point ID	Rd Link ID	x	y	Census ID	Road name	Local Authority	PCM Total NO <sub>2</sub> conc (µg/m <sup>3</sup> )	Annual mean NO <sub>2</sub> conc (µg/m <sup>3</sup> )	BG NO <sub>x</sub> conc (µg/m <sup>3</sup> )	BG NO <sub>2</sub> conc (µg/m <sup>3</sup> )	Road NO <sub>x</sub> contrib (µg/m <sup>3</sup> )	Road NO <sub>2</sub> contrib (µg/m <sup>3</sup> )	AADT	NOx contribution by vehicle type (%)					Change NO <sub>2</sub> conc (µg/m <sup>3</sup> )
														Bus	Taxi	HGV	LGV	Car	
3813_3812_DW	3813_3812	392978	398478	74561	A6017	Tameside	PCM	44.1	26.9	18.5	56.2	25.6	33,002	9%	6%	15%	29%	41%	na
2941_5978_DW	7638_5978	393398	398690	37451	A635	Tameside	PCM	43.6	27.3	18.8	52.9	24.8	52,915	0%	6%	16%	32%	46%	na
5655_5656_DW	5655_5656	392042	398069	76074	A6140	Tameside	PCM	43.5	26.9	18.5	56.9	25.0	20,998	0%	4%	43%	25%	29%	na
3761_5653_DW	3761_5653	390802	395630	99512	A57	Tameside	PCM	41.6	20.0	14.4	60.3	27.3	19,787	7%	5%	27%	28%	34%	na
1954_4640_DW	1954_4640	395215	398833	7391	A635	Tameside	PCM	41.3	27.2	18.7	48.4	22.5	36,562	9%	7%	13%	25%	46%	na
4969_12851	4969_12851	377669	395881	27755	A5081	Trafford	PCM	41.5	20.7	14.8	58.4	26.6	28,539	0%	6%	23%	28%	43%	na
1382_3622_DW	1382_3622	380628	395827	56499	A56	Trafford	PCM	41.0	31.1	20.9	42.6	20.1	34,859	10%	7%	9%	25%	48%	na
2305_5949_DW	2305_5949	380182	395145	36578	A56	Trafford	PCM	40.9	31.1	20.9	42.5	20.1	30,534	13%	7%	12%	22%	47%	na
2309_3788_DW	2309_3788	379330	394059	17904	A5181	Trafford	PCM	40.4	21.2	15.1	57.2	25.3	24,237	0%	5%	43%	20%	32%	na
3492_3511_DW	3492_3511	358611	405310	8566	A577	Wigan	PCM	41.2	31.0	20.8	45.1	20.4	23,614	8%	5%	23%	25%	39%	na
2579_2605_DW	2579_2605	360480	402382	80619	A573	Wigan	PCM	40.1	16.4	12.0	64.3	28.0	26,237	11%	5%	29%	19%	35%	na

**Table B-2: Predicted annual mean NO<sub>2</sub> concentrations and source apportionment at exceedance links on the Greater Manchester road network – Option 5(i) – 2021**

Point ID	Rd Link ID	x	y	Census ID	Road name	Local Authority	PCM Total NO <sub>2</sub> conc (µg/m <sup>3</sup> )	Annual mean NO <sub>2</sub> conc (µg/m <sup>3</sup> )	BG NO <sub>x</sub> conc (µg/m <sup>3</sup> )	BG NO <sub>2</sub> conc (µg/m <sup>3</sup> )	Road NO <sub>x</sub> contrib (µg/m <sup>3</sup> )	Road NO <sub>2</sub> contrib (µg/m <sup>3</sup> )	AADT	NOx contribution by vehicle type (%)					Change NO <sub>2</sub> conc (µg/m <sup>3</sup> )
														Bus	Taxi	HGV	LGV	Car	
2799_3118_DW	2799_3118	371751	409800	58048	A673	Bolton	PCM	40.9	28.2	19.5	46.0	21.4	27,055	0%	5%	22%	30%	43%	-4.5
2648_6404_DW	2648_6404	372355	408934	47988	A579	Bolton	PCM	41.1	25.0	17.5	48.2	23.5	34,319	1%	5%	6%	41%	45%	-4.2
2650_2653_DW	2653_2650	372915	407622	7431	A666	Bolton	PCM	41.8	26.5	18.4	47.4	23.4	65,872	0%	5%	3%	48%	44%	-3.1
2799_3775_DW	2799_3775	371869	409735	8030	A666	Bolton	PCM	40.3	28.2	19.5	42.9	20.8	21,013	0%	6%	5%	38%	52%	-3.9
2119_2564_DW	2119_2564	371207	409524	17905	A673	Bolton	PCM	38.0	28.2	19.5	38.8	18.5	26,921	14%	6%	4%	27%	49%	-6.0
2407_6761_DW	2407_6761	374740	405143	73087	A667	Bolton	PCM	37.1	18.9	13.7	48.8	23.3	38,259	8%	6%	13%	26%	48%	-5.6
2061_2119_DW	2061_2119	371060	409589	47469	A673	Bolton	PCM	36.7	28.2	19.5	37.1	17.3	23,586	22%	6%	7%	22%	43%	-5.3
3064_15148_DW	3064_15148	371642	408705	7921	A579	Bolton	PCM	37.2	28.4	19.5	38.2	17.8	26,141	22%	5%	6%	23%	44%	-4.7
1986_2053_DW	1986_2053	372038	408749	74518	A575	Bolton	PCM	36.3	25.0	17.5	39.9	18.8	21,540	22%	5%	7%	26%	41%	-5.2
2053_3067_DW	2053_3067	371895	408742	27946	A579	Bolton	PCM	36.7	28.4	19.5	36.5	17.2	24,079	15%	6%	8%	28%	44%	-4.6
2662_14424_DW	2662_14424	371075	408696	28245	A676	Bolton	PCM	36.7	28.4	19.5	36.3	17.2	24,136	8%	6%	18%	24%	44%	-3.9
2799_7832_DW	2799_7832	371805	409910	38542	A666	Bolton	PCM	36.9	28.2	19.5	35.6	17.4	28,853	0%	6%	11%	31%	53%	-3.4
2237_3790_DW	3790_2237	379830	410975	38354	A58	Bury	PCM	47.4	23.0	16.3	70.1	31.2	78,475	8%	6%	14%	27%	45%	-7.4
3424_4940_DW	3424_4940	380920	404881	17924	A56	Bury	PCM	44.9	18.1	13.2	69.2	31.7	19,717	3%	6%	21%	26%	45%	-7.8
2244_4913_DW	2244_4913	381968	410627	73198	A58	Bury	PCM	42.8	22.9	16.3	56.0	26.5	23,909	2%	6%	10%	32%	50%	-6.8
1742_9011_DW	1742_9011	381149	404182	46572	A56	Bury	PCM	39.4	21.8	15.5	53.6	23.9	36,637	10%	5%	24%	23%	38%	-7.1
2243_4639_DW	2243_4639	381310	410749	16556	A58	Bury	PCM	38.1	22.9	16.3	45.7	21.9	27,826	11%	4%	8%	39%	38%	-5.2
3791_3976_DW	3791_3976	380284	410974	26563	A56	Bury	PCM	36.9	24.6	17.3	39.6	19.6	40,359	0%	8%	6%	28%	59%	-4.1
2231_3083_DW	2231_3083	380413	410490	8575	A58	Bury	PCM	30.9	24.6	17.3	27.3	13.6	18,666	16%	5%	1%	37%	41%	-9.9
3056_3842_DW	3056_3842	384880	397418	26157	A6	Manchester	PCM	46.2	34.9	23.1	53.7	23.1	37,201	20%	6%	12%	27%	36%	-7.5
8546_14050	8546_14050	384384	398801	57427	A664	Manchester	PCM	40.7	38.8	25.3	45.9	15.5	7,615	73%	3%	2%	5%	17%	-11.2
1268_1269	1268_1269	383558	398278	27974	A34	Manchester	PCM	43.4	38.5	25.0	54.8	18.4	9,516	64%	3%	3%	11%	19%	-7.3
2283_8544_DW	2283_8544	383791	398603	27992	A56	Manchester	PCM	40.4	38.5	25.0	46.8	15.4	4,264	78%	2%	3%	10%	7%	-9.9
1267_1985	1267_1985	383672	398364	16536	A56	Manchester	PCM	38.0	38.5	25.0	31.4	13.0	8,365	22%	7%	7%	25%	39%	-11.4
1322_3273	1322_3273	383249	398058	27975	A34	Manchester	PCM	41.2	38.5	25.0	37.2	16.2	14,805	0%	11%	5%	27%	56%	-8.2
1242_1243	1242_1243	384483	398343	70154	A62	Manchester	PCM	40.5	38.8	25.3	51.8	15.2	1,417	100%	0%	0%	0%	0%	-8.9
1307_1317	1307_1317	383757	398717	36551	A6	Manchester	PCM	38.0	38.5	25.0	38.4	13.0	4,381	84%	1%	1%	8%	5%	-10.7
2289_12835	2289_12835	384282	398507	70153	A6	Manchester	PCM	38.9	38.8	25.3	39.7	13.7	9,457	76%	3%	1%	6%	15%	-9.5
1268_46301	1268_46301	383702	398229	7947	A34	Manchester	PCM	41.6	38.5	25.0	48.9	16.6	8,618	59%	3%	12%	12%	14%	-6.5
1341_2939_DW	1341_2939	385618	397656	75239	A635	Manchester	PCM	40.3	32.5	21.7	40.8	18.6	24,266	3%	5%	25%	31%	37%	-7.4
2847_2855_DW	2855_2847	382389	390376	7701	A5103	Manchester	PCM	42.3	19.5	14.1	58.7	28.2	126,758	0%	6%	6%	33%	54%	-5.3
1846_2423_DW	1846_2423	381865	388177	26047	M56	Manchester	PCM	43.2	20.5	14.8	58.5	28.4	13,681	2%	7%	2%	34%	55%	-4.1
1336_16404	1336_16404	384137	397465	17929	A34	Manchester	PCM	32.9	34.9	23.1	26.0	9.8	5,512	85%	2%	1%	3%	9%	-14.2
2006_3292	2006_3292	384110	397858	56529	A5103	Manchester	PCM	31.4	34.9	23.1	21.3	8.3	5,791	77%	2%	2%	10%	8%	-14.2
1302_8546	1302_8546	384428	398838	75248	A664	Manchester	PCM	37.0	38.8	25.3	32.8	11.8	7,614	62%	2%	17%	7%	11%	-8.3
3016_6022_DW	3016_6022	384639	397855	46165	A6	Manchester	PCM	36.8	34.9	23.1	37.0	13.8	6,982	60%	4%	5%	8%	24%	-6

Point ID	Rd Link ID	x	y	Census ID	Road name	Local Authority	PCM Total NO <sub>2</sub> conc (µg/m <sup>3</sup> )	Annual mean NO <sub>2</sub> conc (µg/m <sup>3</sup> )	BG NO <sub>x</sub> conc (µg/m <sup>3</sup> )	BG NO <sub>2</sub> conc (µg/m <sup>3</sup> )	Road NO <sub>x</sub> contrib (µg/m <sup>3</sup> )	Road NO <sub>2</sub> contrib (µg/m <sup>3</sup> )	AADT	NOx contribution by vehicle type (%)					Change NO <sub>2</sub> conc (µg/m <sup>3</sup> )
														Bus	Taxi	HGV	LGV	Car	
2291_3923	2291_3923	384010	399185	17822	A6042	Manchester	PCM	35.1	28.6	19.6	35.8	15.5	25,219	13%	7%	10%	24%	45%	-6.2
3293_1285_DW	3293_1285	384280	397739	28486	A34	Manchester	PCM	34.4	34.9	23.1	31.6	11.3	6,656	87%	1%	1%	4%	6%	-6.5
3959_2890_DW	3960_2891	383358	397172	46068	A57M	Manchester	PCM	37.5	32.0	21.5	34.8	16.0	82,649	0%	6%	3%	38%	53%	-3.3
3619_3629	3619_3629	383357	398985	73787	A6042	Manchester	PCM	37.0	38.5	25.0	26.5	11.9	22,945	0%	7%	8%	36%	49%	-3.8
1469_3669_DW	1469_3669	386578	395884	28695	A6	Manchester	PCM	36.3	26.4	18.3	38.2	17.9	27,342	20%	7%	3%	23%	47%	-4.5
1300_7282	1300_7282	384829	398513	47457	A665	Manchester	PCM	36.0	38.8	25.3	24.7	10.7	22,645	13%	6%	12%	29%	41%	-4.7
1356_14504_DW	1356_14504	383011	398485	73790	A34	Manchester	PCM	37.0	38.5	25.0	26.7	11.9	35,733	0%	8%	8%	32%	52%	-3.6
3042_15348	3042_15348	382773	391447	37809	A5103	Manchester	PCM	35.9	16.8	12.3	47.3	23.6	80,395	1%	7%	2%	32%	58%	-4.5
1685_1686_DW	1685_1686	387382	394221	73778	A6	Manchester	PCM	35.5	25.5	17.8	38.7	17.7	27,403	23%	6%	10%	22%	39%	-4.9
1435_4314_DW	1435_4314	383838	395773	80940	A5103	Manchester	PCM	35.2	25.1	17.6	36.6	17.6	40,480	9%	8%	6%	28%	50%	-5.0
14523_14524	14523_14524	393320	405038	36632	A62	Oldham	PCM	47.4	27.4	18.9	60.4	28.5	52,122	0%	6%	7%	36%	51%	-4.9
1295_1703	1295_1703	390482	402513	77008	A62	Oldham	PCM	38.9	23.7	16.6	45.7	22.2	36,501	2%	6%	10%	36%	46%	-4.5
3914_5661	3914_5661	390627	402753	6606	A62	Oldham	PCM	37.9	23.7	16.6	43.4	21.3	36,825	1%	5%	12%	40%	41%	-5.1
3911_4112	3911_4112	389383	403282	99617	A663	Oldham	PCM	38.4	22.8	16.1	45.6	22.2	40,848	3%	6%	6%	30%	54%	-4.4
4629_5567_DW	4629_5567	390741	402566	27823	A6104	Oldham	PCM	37.0	23.7	16.6	40.8	20.3	14,903	2%	6%	5%	42%	45%	-3.5
2210_14216_DW	2210_14216	388664	411856	17322	A664	Rochdale	PCM	43.9	19.0	13.8	69.2	30.1	34,312	0%	4%	33%	29%	34%	-5.8
2210_4463_DW	2210_4463	388729	411971	26586	A58	Rochdale	PCM	42.7	19.0	13.8	67.7	29.0	45,259	5%	4%	32%	25%	33%	-6.4
2202_2205_DW	2202_2205	389446	413627	27469	A680	Rochdale	PCM	38.7	28.9	19.8	39.5	18.9	23,636	5%	5%	14%	32%	43%	-3.9
2202_2538	2202_2538	389424	413513	56600	A58	Rochdale	PCM	37.8	28.9	19.8	36.5	18.1	38,877	1%	7%	5%	32%	56%	-3.8
3132_7573_DW	3132_7573	389842	413925	38048	A671	Rochdale	PCM	37.3	28.9	19.8	35.7	17.5	25,181	7%	6%	3%	30%	53%	-3.7
2210_7536_DW	2210_7536	388580	411886	38543	A58	Rochdale	PCM	35.4	19.0	13.8	45.6	21.6	39,645	9%	6%	13%	28%	45%	-4.8
1349_2993_DW	1349_2993	382580	397716	73792	A57	Salford	PCM	44.2	26.5	18.4	55.1	25.8	52,806	0%	6%	10%	36%	47%	-7.0
1216_14503_DW	1216_14503	382565	398546	17926	A6	Salford	PCM	41.9	27.1	18.7	55.9	23.2	31,524	31%	5%	17%	19%	29%	-7.8
1867_4574_DW	1867_4574	382129	397840	36585	A57	Salford	PCM	42.6	26.5	18.4	51.8	24.3	48,899	0%	6%	14%	34%	47%	-6.5
14311_2299_DW	2299_14311	381488	399165	6161	A6	Salford	PCM	41.4	26.2	18.1	50.2	23.2	50,230	10%	8%	6%	24%	53%	-6.8
1232_12945_DW	1232_12945	381825	398784	56160	A6	Salford	PCM	41.1	25.0	17.4	55.4	23.6	35,383	29%	5%	17%	18%	30%	-6.9
1349_1867_DW	1349_1867	382371	397772	48023	A57	Salford	PCM	41.0	26.5	18.4	47.7	22.7	46,047	0%	6%	11%	34%	48%	-6.3
3964_4732_DW	3964_4732	382871	397244	99516	A56	Salford	PCM	40.5	26.5	18.4	48.9	22.1	34,727	7%	6%	21%	29%	38%	-6.8
3969_6612_DW	3969_6612	381512	398031	6562	A57	Salford	PCM	41.0	25.0	17.4	49.7	23.6	50,846	1%	6%	11%	35%	47%	-6.2
5179_5182_DW	5179_5182	374598	400597	74618	A572	Salford	PCM	41.7	15.8	11.6	62.4	30.1	33,338	1%	6%	6%	34%	53%	-4.8
1579_17017_DW	1579_17017	377344	400951	37363	A580	Salford	PCM	37.1	19.2	13.9	48.4	23.2	37,440	2%	6%	13%	32%	47%	-5.8
1364_1366	1364_1366	381428	399804	17245	A576	Salford	PCM	37.7	26.2	18.1	42.4	19.6	30,633	12%	6%	16%	19%	47%	-5.0
1345_1346_DW	1345_1346	380555	398426	56535	A5186	Salford	PCM	37.4	27.6	18.9	38.1	18.5	13,745	7%	5%	14%	29%	44%	-5.3
3786_1233_DW	3786_1233	381517	398259	27751	A5063	Salford	PCM	36.7	25.0	17.4	39.3	19.2	33,438	1%	7%	8%	28%	55%	-5.0
5249_7952	5249_7952	381205	399532	58028	A576	Salford	PCM	36.3	26.2	18.1	37.4	18.2	33,917	3%	7%	8%	25%	56%	-5.4
3620_5931_DW	3620_5931	390351	390720	37920	A626	Stockport	PCM	43.2	25.9	18.0	56.4	25.2	32,268	0%	4%	31%	30%	36%	-4.5
3973_14181_DW	3973_14181																		

Point ID	Rd Link ID	x	y	Census ID	Road name	Local Authority	PCM Total NO <sub>2</sub> conc (µg/m <sup>3</sup> )	Annual mean NO <sub>2</sub> conc (µg/m <sup>3</sup> )	BG NO <sub>x</sub> conc (µg/m <sup>3</sup> )	BG NO <sub>2</sub> conc (µg/m <sup>3</sup> )	Road NO <sub>x</sub> contrib (µg/m <sup>3</sup> )	Road NO <sub>2</sub> contrib (µg/m <sup>3</sup> )	AADT	NOx contribution by vehicle type (%)					Change NO <sub>2</sub> conc (µg/m <sup>3</sup> )
														Bus	Taxi	HGV	LGV	Car	
3813_3812_DW	3813_3812	392978	398478	74561	A6017	Tameside	PCM	39.4	26.9	18.5	42.9	20.9	32,902	2%	6%	7%	36%	49%	-4.7
2941_5978_DW	7638_5978	393398	398690	37451	A635	Tameside	PCM	40.0	27.3	18.8	43.3	21.2	52,792	0%	6%	7%	37%	50%	-3.6
5655_5656_DW	5655_5656	392042	398069	76074	A6140	Tameside	PCM	38.4	26.9	18.5	42.0	19.9	20,721	0%	4%	27%	33%	36%	-5.1
3761_5653_DW	3761_5653	390802	395630	99512	A57	Tameside	PCM	35.7	20.0	14.4	43.6	21.4	19,678	2%	6%	14%	37%	42%	-5.9
1954_4640_DW	1954_4640	395215	398833	7391	A635	Tameside	PCM	37.6	27.2	18.7	38.7	18.9	36,381	3%	6%	8%	30%	51%	-3.7
4969_12851	4969_12851	377669	395881	27755	A5081	Trafford	PCM	36.2	20.7	14.8	43.4	21.3	28,289	0%	6%	8%	36%	50%	-5.3
1382_3622_DW	1382_3622	380628	395827	56499	A56	Trafford	PCM	36.7	31.1	20.9	32.0	15.8	34,480	3%	8%	4%	31%	55%	-4.3
2305_5949_DW	2305_5949	380182	395145	36578	A56	Trafford	PCM	36.9	31.1	20.9	32.6	16.0	30,236	5%	8%	5%	27%	55%	-4.0
2309_3788_DW	2309_3788	379330	394059	17904	A5181	Trafford	PCM	35.9	21.2	15.1	44.4	20.8	24,156	0%	5%	33%	25%	38%	-4.5
3492_3511_DW	3492_3511	358611	405310	8566	A577	Wigan	PCM	36.9	31.0	20.8	33.2	16.1	23,500	2%	6%	12%	32%	47%	-4.3
2579_2605_DW	2579_2605	360480	402382	80619	A573	Wigan	PCM	35.2	16.4	12.0	49.8	23.2	26,266	7%	5%	22%	24%	42%	-4.9

**Table B-3: Predicted annual mean NO<sub>2</sub> concentrations and source apportionment at exceedance links on the Greater Manchester road network – Option 5(ii) – 2021**

Point ID	Rd Link ID	x	y	Census ID	Road name	Local Authority	PCM Total NO <sub>2</sub> conc (µg/m <sup>3</sup> )	Annual mean NO <sub>2</sub> conc (µg/m <sup>3</sup> )	BG NO <sub>x</sub> conc (µg/m <sup>3</sup> )	BG NO <sub>2</sub> conc (µg/m <sup>3</sup> )	Road NO <sub>x</sub> contrib (µg/m <sup>3</sup> )	Road NO <sub>2</sub> contrib (µg/m <sup>3</sup> )	AADT	NOx contribution by vehicle type (%)					Change NO <sub>2</sub> conc (µg/m <sup>3</sup> )
														Bus	Taxi	HGV	LGV	Car	
2799_3118_DW	2799_3118	371751	409800	58048	A673	Bolton	PCM	40.9	28.2	19.5	46.1	21.4	27,055	0%	5%	23%	30%	43%	-4.5
2648_6404_DW	2648_6404	372355	408934	47988	A579	Bolton	PCM	40.8	25.0	17.5	47.6	23.2	34,319	2%	5%	6%	42%	45%	-4.5
2650_2653_DW	2653_2650	372915	407622	7431	A666	Bolton	PCM	41.7	26.5	18.4	47.2	23.3	65,872	0%	5%	3%	48%	44%	-3.2
2799_3775_DW	2799_3775	371869	409735	8030	A666	Bolton	PCM	40.3	28.2	19.5	43.0	20.8	21,013	0%	5%	6%	38%	52%	-3.9
2119_2564_DW	2119_2564	371207	409524	17905	A673	Bolton	PCM	37.9	28.2	19.5	38.7	18.4	26,921	14%	6%	4%	27%	49%	-6.1
2407_6761_DW	2407_6761	374740	405143	73087	A667	Bolton	PCM	36.9	18.9	13.7	48.3	23.1	38,259	7%	5%	13%	26%	49%	-5.8
2061_2119_DW	2061_2119	371060	409589	47469	A673	Bolton	PCM	36.7	28.2	19.5	37.0	17.2	23,586	22%	5%	7%	22%	44%	-5.3
3064_15148_DW	3064_15148	371642	408705	7921	A579	Bolton	PCM	37.2	28.4	19.5	38.0	17.7	26,141	22%	5%	6%	23%	44%	-4.7
1986_2053_DW	1986_2053	372038	408749	74518	A575	Bolton	PCM	36.2	25.0	17.5	39.7	18.7	21,540	22%	5%	7%	26%	41%	-5.3
2053_3067_DW	2053_3067	371895	408742	27946	A579	Bolton	PCM	36.7	28.4	19.5	36.5	17.2	24,079	15%	5%	8%	28%	44%	-4.6
2662_14424_DW	2662_14424	371075	408696	28245	A676	Bolton	PCM	36.7	28.4	19.5	36.3	17.2	24,136	8%	5%	19%	24%	44%	-3.9
2799_7832_DW	2799_7832	371805	409910	38542	A666	Bolton	PCM	36.9	28.2	19.5	35.8	17.5	28,853	0%	5%	12%	30%	53%	-3.4
2237_3790_DW	3790_2237	379830	410975	38354	A58	Bury	PCM	47.4	23.0	16.3	70.1	31.1	78,475	8%	5%	15%	27%	45%	-7.4
3424_4940_DW	3424_4940	380920	404881	17924	A56	Bury	PCM	44.8	18.1	13.2	69.3	31.7	19,717	3%	5%	21%	26%	45%	-7.9
2244_4913_DW	2244_4913	381968	410627	73198	A58	Bury	PCM	42.8	22.9	16.3	56.3	26.6	23,909	2%	6%	11%	32%	50%	-6.8
1742_9011_DW	1742_9011	381149	404182	46572	A56	Bury	PCM	39.4	21.8	15.5	53.5	23.8	36,637	10%	4%	24%	23%	38%	-7.1
2243_4639_DW	2243_4639	381310	410749	16556	A58	Bury	PCM	38.0	22.9	16.3	45.5	21.8	27,826	11%	4%	8%	39%	38%	-5.3
3791_3976_DW	3791_3976	380284	410974	26563	A56	Bury	PCM	36.9	24.6	17.3	39.7	19.6	40,359	0%	7%	6%	28%	59%	-4.1
2231_3083_DW	2231_3083	380413	410490	8575	A58	Bury	PCM	30.8	24.6	17.3	27.2	13.5	18,666	16%	5%	1%	37%	41%	-10.0
3056_3842_DW	3056_3842	384880	397418	26157	A6	Manchester	PCM	46.0	34.9	23.1	53.2	22.9	37,201	20%	5%	12%	27%	36%	-7.7
8546_14050	8546_14050	384384	398801	57427	A664	Manchester	PCM	38.8	38.8	25.3	41.1	13.5	7,615	82%	3%	2%	6%	7%	-13.1
1268_1269	1268_1269	383558	398278	27974	A34	Manchester	PCM	40.8	38.5	25.0	48.3	15.8	9,516	73%	4%	3%	12%	8%	-9.9
2283_8544_DW	2283_8544	383791	398603	27992	A56	Manchester	PCM	39.5	38.5	25.0	44.6	14.5	4,264	82%	2%	4%	10%	3%	-10.8
1267_1985	1267_1985	383672	398364	16536	A56	Manchester	PCM	34.7	38.5	25.0	24.0	9.7	8,365	29%	9%	10%	34%	19%	-14.7
1322_3273	1322_3273	383249	398058	27975	A34	Manchester	PCM	35.6	38.5	25.0	24.9	10.6	14,805	0%	16%	9%	43%	32%	-13.8
1242_1243	1242_1243	384483	398343	70154	A62	Manchester	PCM	40.3	38.8	25.3	51.4	15.1	1,417	100%	0%	0%	0%	0%	-9.1
1307_1317	1307_1317	383757	398717	36551	A6	Manchester	PCM	37.3	38.5	25.0	36.8	12.3	4,381	87%	1%	2%	8%	2%	-11.4
2289_12835	2289_12835	384282	398507	70153	A6	Manchester	PCM	37.4	38.8	25.3	36.0	12.1	9,457	83%	3%	1%	6%	6%	-11.0
1268_46301	1268_46301	383702	398229	7947	A34	Manchester	PCM	39.8	38.5	25.0	44.5	14.8	8,618	64%	3%	13%	14%	6%	-8.3
1341_2939_DW	1341_2939	385618	397656	75239	A635	Manchester	PCM	40.2	32.5	21.7	40.8	18.5	24,266	3%	4%	26%	31%	37%	-7.5
2847_2855_DW	2855_2847	382389	390376	7701	A5103	Manchester	PCM	42.4	19.5	14.1	59.2	28.3	126,758	0%	6%	8%	32%	54%	-5.2
1846_2423_DW	1846_2423	381865	388177	26047	M56	Manchester	PCM	43.3	20.5	14.8	58.8	28.5	13,681	2%	6%	2%	35%	55%	-4.0
1336_16404	1336_16404	384137	397465	17929	A34	Manchester	PCM	32.1	34.9	23.1	24.4	9.1	5,512	91%	1%	1%	3%	4%	-15.0
2006_3292	2006_3292	384110	397858	56529	A5103	Manchester	PCM	30.7	34.9	23.1	19.9	7.7	5,791	82%	2%	2%	11%	3%	-14.9
1302_8546	1302_8546	384428	398838	75248	A664	Manchester	PCM	36.1	38.8	25.3	30.5	10.8	7,614	67%	3%	18%	8%	4%	-9.2
3016_6022_DW	3016_6022	384639	397855	46165	A6	Manchester	PCM	34.6	34.9	23.1	31.7	11.5	6,982	71%	4%	6%	9%	10%	-9.

Point ID	Rd Link ID	x	y	Census ID	Road name	Local Authority	PCM Total NO <sub>2</sub> conc (µg/m <sup>3</sup> )	Annual mean NO <sub>2</sub> conc (µg/m <sup>3</sup> )	BG NO <sub>x</sub> conc (µg/m <sup>3</sup> )	BG NO <sub>2</sub> conc (µg/m <sup>3</sup> )	Road NO <sub>x</sub> contrib (µg/m <sup>3</sup> )	Road NO <sub>2</sub> contrib (µg/m <sup>3</sup> )	AADT	NOx contribution by vehicle type (%)					Change NO <sub>2</sub> conc (µg/m <sup>3</sup> )
														Bus	Taxi	HGV	LGV	Car	
2291_3923	2291_3923	384010	399185	17822	A6042	Manchester	PCM	35.0	28.6	19.6	35.5	15.4	25,219	13%	7%	11%	24%	45%	-6.3
3293_1285_DW	3293_1285	384280	397739	28486	A34	Manchester	PCM	33.7	34.9	23.1	30.0	10.6	6,656	91%	1%	1%	4%	2%	-7.2
3959_2890_DW	3960_2891	383358	397172	46068	A57M	Manchester	PCM	37.4	32.0	21.5	34.5	15.9	82,649	0%	6%	4%	38%	53%	-3.4
3619_3629	3619_3629	383357	398985	73787	A6042	Manchester	PCM	36.8	38.5	25.0	26.1	11.8	22,945	0%	7%	8%	36%	49%	-4.0
1469_3669_DW	1469_3669	386578	395884	28695	A6	Manchester	PCM	36.1	26.4	18.3	38.0	17.8	27,342	20%	6%	3%	23%	48%	-4.7
1300_7282	1300_7282	384829	398513	47457	A665	Manchester	PCM	35.8	38.8	25.3	24.2	10.5	22,645	13%	5%	12%	29%	41%	-4.9
1356_14504_DW	1356_14504	383011	398485	73790	A34	Manchester	PCM	36.8	38.5	25.0	26.2	11.7	35,733	0%	8%	8%	33%	52%	-3.8
3042_15348	3042_15348	382773	391447	37809	A5103	Manchester	PCM	35.8	16.8	12.3	47.1	23.5	80,395	1%	7%	2%	32%	58%	-4.6
1685_1686_DW	1685_1686	387382	394221	73778	A6	Manchester	PCM	35.4	25.5	17.8	38.5	17.7	27,403	23%	5%	11%	22%	39%	-5.0
1435_4314_DW	1435_4314	383838	395773	80940	A5103	Manchester	PCM	35.1	25.1	17.6	36.5	17.5	40,480	9%	7%	6%	28%	50%	-5.1
14523_14524	14523_14524	393320	405038	36632	A62	Oldham	PCM	47.4	27.4	18.9	60.5	28.5	52,122	0%	6%	7%	36%	51%	-4.9
1295_1703	1295_1703	390482	402513	77008	A62	Oldham	PCM	39.0	23.7	16.6	46.1	22.3	36,501	2%	5%	11%	36%	46%	-4.4
3914_5661	3914_5661	390627	402753	6606	A62	Oldham	PCM	38.0	23.7	16.6	43.8	21.4	36,825	1%	5%	13%	40%	41%	-5.0
3911_4112	3911_4112	389383	403282	99617	A663	Oldham	PCM	38.3	22.8	16.1	45.5	22.2	40,848	3%	6%	31%	54%	-4.5	
4629_5567_DW	4629_5567	390741	402566	27823	A6104	Oldham	PCM	37.1	23.7	16.6	41.2	20.4	14,903	2%	5%	7%	41%	44%	-3.4
2210_14216_DW	2210_14216	388664	411856	17322	A664	Rochdale	PCM	43.9	19.0	13.8	69.5	30.2	34,312	0%	4%	33%	29%	34%	-5.8
2210_4463_DW	2210_4463	388729	411971	26586	A58	Rochdale	PCM	42.7	19.0	13.8	67.7	28.9	45,259	5%	4%	33%	25%	33%	-6.4
2202_2205_DW	2202_2205	389446	413627	27469	A680	Rochdale	PCM	38.7	28.9	19.8	39.7	19.0	23,636	5%	5%	15%	32%	43%	-3.9
2202_2538	2202_2538	389424	413513	56600	A58	Rochdale	PCM	37.8	28.9	19.8	36.4	18.0	38,877	1%	6%	5%	32%	56%	-3.8
3132_7573_DW	3132_7573	389842	413925	38048	A671	Rochdale	PCM	37.2	28.9	19.8	35.7	17.5	25,181	7%	6%	4%	30%	53%	-3.8
2210_7536_DW	2210_7536	388580	411886	38543	A58	Rochdale	PCM	35.3	19.0	13.8	45.4	21.5	39,645	9%	5%	13%	28%	45%	-4.9
1349_2993_DW	1349_2993	382580	397716	73792	A57	Salford	PCM	44.1	26.5	18.4	55.0	25.7	52,806	0%	6%	11%	36%	47%	-7.1
1216_14503_DW	1216_14503	382565	398546	17926	A6	Salford	PCM	41.8	27.1	18.7	55.6	23.1	31,524	31%	4%	17%	19%	29%	-7.9
1867_4574_DW	1867_4574	382129	397840	36585	A57	Salford	PCM	42.6	26.5	18.4	51.9	24.3	48,899	0%	5%	14%	34%	47%	-6.5
14311_2299_DW	2299_14311	381488	399165	6161	A6	Salford	PCM	41.2	26.2	18.1	49.9	23.1	50,230	10%	7%	6%	24%	53%	-7.0
1232_12945_DW	1232_12945	381825	398784	56160	A6	Salford	PCM	41.0	25.0	17.4	55.2	23.5	35,383	29%	4%	18%	18%	31%	-7.0
1349_1867_DW	1349_1867	382371	397772	48023	A57	Salford	PCM	41.0	26.5	18.4	47.7	22.6	46,047	0%	6%	12%	34%	48%	-6.3
3964_4732_DW	3964_4732	382871	397244	99516	A56	Salford	PCM	40.3	26.5	18.4	48.5	22.0	34,727	7%	6%	21%	29%	38%	-7.0
3969_6612_DW	3969_6612	381512	398031	6562	A57	Salford	PCM	41.0	25.0	17.4	49.6	23.5	50,846	1%	6%	11%	35%	47%	-6.2
5179_5182_DW	5179_5182	374598	400597	74618	A572	Salford	PCM	41.8	15.8	11.6	62.8	30.1	33,338	1%	6%	6%	34%	53%	-4.7
1579_17017_DW	1579_17017	377344	400951	37363	A580	Salford	PCM	36.9	19.2	13.9	48.1	23.0	37,440	2%	5%	14%	32%	47%	-6.0
1364_1366	1364_1366	381428	399804	17245	A576	Salford	PCM	37.7	26.2	18.1	42.3	19.5	30,633	12%	5%	16%	19%	47%	-5.0
1345_1346_DW	1345_1346	380555	398426	56535	A5186	Salford	PCM	37.3	27.6	18.9	37.8	18.4	13,745	8%	5%	13%	29%	45%	-5.4
3786_1233_DW	3968_1233	381517	398259	27751	A5063	Salford	PCM	36.6	25.0	17.4	39.1	19.1	33,438	1%	6%	8%	29%	56%	-5.1
5249_7952	5249_7952	381205	399532	58028	A576	Salford	PCM	36.3	26.2	18.1	37.2	18.1	33,917	3%	6%	8%	25%	57%	-5.4
3620_5931_DW	3620_5931	390351	390720	37920	A626	Stockport	PCM	43.4	25.9	18.0	57.0	25.4	32,268	0%	4%	32%	29%	35%	-4.3
3973_14181_DW	3973_14181	38837																	

Point ID	Rd Link ID	x	y	Census ID	Road name	Local Authority	PCM Total NO <sub>2</sub> conc (µg/m <sup>3</sup> )	Annual mean NO <sub>2</sub> conc (µg/m <sup>3</sup> )	BG NO <sub>x</sub> conc (µg/m <sup>3</sup> )	BG NO <sub>2</sub> conc (µg/m <sup>3</sup> )	Road NO <sub>x</sub> contrib (µg/m <sup>3</sup> )	Road NO <sub>2</sub> contrib (µg/m <sup>3</sup> )	AADT	NOx contribution by vehicle type (%)					Change NO <sub>2</sub> conc (µg/m <sup>3</sup> )
														Bus	Taxi	HGV	LGV	Car	
3813_3812_DW	3813_3812	392978	398478	74561	A6017	Tameside	PCM	39.4	26.9	18.5	42.9	20.9	32,902	2%	5%	8%	36%	49%	-4.7
2941_5978_DW	7638_5978	393398	398690	37451	A635	Tameside	PCM	40.0	27.3	18.8	43.5	21.2	52,792	0%	6%	8%	36%	50%	-3.6
5655_5656_DW	5655_5656	392042	398069	76074	A6140	Tameside	PCM	38.7	26.9	18.5	42.8	20.2	20,721	0%	4%	29%	32%	35%	-4.8
3761_5653_DW	3761_5653	390802	395630	99512	A57	Tameside	PCM	35.7	20.0	14.4	43.5	21.3	19,678	2%	5%	14%	37%	42%	-5.9
1954_4640_DW	1954_4640	395215	398833	7391	A635	Tameside	PCM	37.6	27.2	18.7	38.9	18.9	36,381	3%	6%	9%	30%	51%	-3.7
4969_12851	4969_12851	377669	395881	27755	A5081	Trafford	PCM	36.1	20.7	14.8	43.3	21.2	28,289	0%	5%	8%	36%	51%	-5.4
1382_3622_DW	1382_3622	380628	395827	56499	A56	Trafford	PCM	36.6	31.1	20.9	31.8	15.7	34,480	3%	7%	4%	31%	55%	-4.4
2305_5949_DW	2305_5949	380182	395145	36578	A56	Trafford	PCM	36.8	31.1	20.9	32.4	15.9	30,236	5%	7%	5%	27%	55%	-4.1
2309_3788_DW	2309_3788	379330	394059	17904	A5181	Trafford	PCM	35.8	21.2	15.1	44.2	20.7	24,156	0%	4%	33%	25%	38%	-4.6
3492_3511_DW	3492_3511	358611	405310	8566	A577	Wigan	PCM	37.2	31.0	20.8	34.0	16.4	23,500	2%	5%	15%	32%	46%	-4.0
2579_2605_DW	2579_2605	360480	402382	80619	A573	Wigan	PCM	36.0	16.4	12.0	52.2	24.0	26,266	7%	5%	26%	22%	40%	-4.1

**Table B-4: Predicted annual mean NO<sub>2</sub> concentrations and source apportionment at exceedance links on the Greater Manchester road network – Option 7 – 2021**

Point ID	Rd Link ID	x	y	Census ID	Road name	Local Authority	PCM Total NO <sub>2</sub> conc (µg/m <sup>3</sup> )	Annual mean NO <sub>2</sub> conc (µg/m <sup>3</sup> )	BG NO <sub>x</sub> conc (µg/m <sup>3</sup> )	BG NO <sub>2</sub> conc (µg/m <sup>3</sup> )	Road NO <sub>x</sub> contrib (µg/m <sup>3</sup> )	Road NO <sub>2</sub> contrib (µg/m <sup>3</sup> )	AADT	NOx contribution by vehicle type (%)					Change NO <sub>2</sub> conc (µg/m <sup>3</sup> )
														Bus	Taxi	HGV	LGV	Car	
2799_3118_DW	2799_3118	371751	409800	58048	A673	Bolton	PCM	41.1	28.2	19.5	46.4	21.6	27,063	0%	5%	22%	30%	42%	-4.3
2648_6404_DW	2648_6404	372355	408934	47988	A579	Bolton	PCM	40.9	25.0	17.5	47.9	23.4	34,125	2%	5%	6%	42%	45%	-4.4
2650_2653_DW	2653_2650	372915	407622	7431	A666	Bolton	PCM	41.9	26.5	18.4	47.7	23.5	65,671	0%	5%	3%	49%	44%	-3.0
2799_3775_DW	2799_3775	371869	409735	8030	A666	Bolton	PCM	40.5	28.2	19.5	43.3	21.0	21,019	0%	6%	5%	38%	51%	-3.7
2119_2564_DW	2119_2564	371207	409524	17905	A673	Bolton	PCM	38.1	28.2	19.5	39.0	18.6	26,954	13%	6%	4%	27%	49%	-5.9
2407_6761_DW	2407_6761	374740	405143	73087	A667	Bolton	PCM	37.2	18.9	13.7	49.0	23.5	38,263	8%	6%	13%	26%	48%	-5.5
2061_2119_DW	2061_2119	371060	409589	47469	A673	Bolton	PCM	36.9	28.2	19.5	37.3	17.4	23,619	22%	6%	7%	22%	44%	-5.1
3064_15148_DW	3064_15148	371642	408705	7921	A579	Bolton	PCM	37.4	28.4	19.5	38.4	17.9	26,169	22%	5%	6%	23%	43%	-4.5
1986_2053_DW	1986_2053	372038	408749	74518	A575	Bolton	PCM	36.4	25.0	17.5	40.1	18.9	21,538	22%	5%	7%	26%	41%	-5.1
2053_3067_DW	2053_3067	371895	408742	27946	A579	Bolton	PCM	36.8	28.4	19.5	36.7	17.4	24,096	15%	6%	8%	28%	44%	-4.5
2662_14424_DW	2662_14424	371075	408696	28245	A676	Bolton	PCM	36.8	28.4	19.5	36.5	17.3	24,150	8%	6%	18%	25%	44%	-3.8
2799_7832_DW	2799_7832	371805	409910	38542	A666	Bolton	PCM	37.0	28.2	19.5	35.8	17.5	28,809	0%	6%	10%	30%	53%	-3.3
2237_3790_DW	3790_2237	379830	410975	38354	A58	Bury	PCM	47.6	23.0	16.3	70.4	31.3	78,461	8%	6%	14%	28%	45%	-7.2
3424_4940_DW	3424_4940	380920	404881	17924	A56	Bury	PCM	45.2	18.1	13.2	69.8	32.0	19,785	3%	5%	21%	26%	45%	-7.5
2244_4913_DW	2244_4913	381968	410627	73198	A58	Bury	PCM	43.0	22.9	16.3	56.3	26.7	23,886	2%	6%	10%	32%	50%	-6.6
1742_9011_DW	1742_9011	381149	404182	46572	A56	Bury	PCM	40.1	21.8	15.5	55.0	24.6	36,911	10%	5%	23%	24%	39%	-6.4
2243_4639_DW	2243_4639	381310	410749	16556	A58	Bury	PCM	38.2	22.9	16.3	45.9	22.0	27,793	11%	4%	8%	39%	38%	-5.1
3791_3976_DW	3791_3976	380284	410974	26563	A56	Bury	PCM	37.0	24.6	17.3	39.7	19.7	40,349	0%	8%	6%	28%	59%	-4.0
2231_3083_DW	2231_3083	380413	410490	8575	A58	Bury	PCM	30.9	24.6	17.3	27.5	13.6	18,645	16%	5%	1%	37%	41%	-9.9
3056_3842_DW	3056_3842	384880	397418	26157	A6	Manchester	PCM	48.1	34.9	23.1	57.6	25.0	37,571	18%	5%	10%	28%	38%	-5.6
8546_14050	8546_14050	384384	398801	57427	A664	Manchester	PCM	42.3	38.8	25.3	49.6	17.0	7,856	67%	3%	3%	6%	22%	-9.6
1268_1269	1268_1269	383558	398278	27974	A34	Manchester	PCM	45.5	38.5	25.0	59.4	20.5	9,723	59%	3%	2%	13%	22%	-5.2
2283_8544_DW	2283_8544	383791	398603	27992	A56	Manchester	PCM	41.5	38.5	25.0	49.2	16.5	4,309	75%	2%	3%	12%	8%	-8.8
1267_1985	1267_1985	383672	398364	16536	A56	Manchester	PCM	43.8	38.5	25.0	49.1	18.8	8,716	40%	4%	4%	19%	32%	-5.6
1322_3273	1322_3273	383249	398058	27975	A34	Manchester	PCM	46.2	38.5	25.0	48.1	21.2	15,621	0%	8%	4%	28%	59%	-3.2
1242_1243	1242_1243	384483	398343	70154	A62	Manchester	PCM	40.6	38.8	25.3	52.1	15.4	1,413	100%	0%	0%	0%	0%	-8.8
1307_1317	1307_1317	383757	398717	36551	A6	Manchester	PCM	38.8	38.5	25.0	40.1	13.8	4,427	81%	1%	1%	10%	7%	-9.9
2289_12835	2289_12835	384282	398507	70153	A6	Manchester	PCM	39.6	38.8	25.3	41.0	14.3	9,302	74%	3%	1%	7%	16%	-8.8
1268_46301	1268_46301	383702	398229	7947	A34	Manchester	PCM	43.3	38.5	25.0	52.4	18.3	8,700	55%	3%	10%	16%	17%	-4.8
1341_2939_DW	1341_2939	385618	397656	75239	A635	Manchester	PCM	41.2	32.5	21.7	42.6	19.5	24,549	3%	4%	24%	31%	38%	-6.5
2847_2855_DW	2855_2847	382389	390376	7701	A5103	Manchester	PCM	42.9	19.5	14.1	59.9	28.8	127,077	0%	6%	6%	33%	54%	-4.7
1846_2423_DW	1846_2423	381865	388177	26047	M56	Manchester	PCM	43.6	20.5	14.8	59.2	28.8	13,689	2%	7%	2%	34%	55%	-3.7
1336_16404	1336_16404	384137	397465	17929	A34	Manchester	PCM	33.6	34.9	23.1	27.6	10.5	5,766	81%	2%	1%	3%	13%	-13.5
2006_3292	2006_3292	384110	397858	56529	A5103	Manchester	PCM	32.4	34.9	23.1	23.4	9.3	6,175	70%	3%	2%	15%	11%	-13.2
1302_8546	1302_8546	384428	398838	75248	A664	Manchester	PCM	38.1	38.8	25.3	34.9	12.8	7,892	58%	2%	15%	9%	15%	-7.2
3016_6022_DW	3016_6022	384639	397855	46165	A6	Manchester	PCM	38.7	34.9	23.1	41.1	15.6	7,139	54%	4%	5%	10%	28%	-5.

Point ID	Rd Link ID	x	y	Census ID	Road name	Local Authority	PCM Total NO <sub>2</sub> conc (µg/m <sup>3</sup> )	Annual mean NO <sub>2</sub> conc (µg/m <sup>3</sup> )	BG NO <sub>x</sub> conc (µg/m <sup>3</sup> )	BG NO <sub>2</sub> conc (µg/m <sup>3</sup> )	Road NO <sub>x</sub> contrib (µg/m <sup>3</sup> )	Road NO <sub>2</sub> contrib (µg/m <sup>3</sup> )	AADT	NOx contribution by vehicle type (%)					Change NO <sub>2</sub> conc (µg/m <sup>3</sup> )
														Bus	Taxi	HGV	LGV	Car	
2291_3923	2291_3923	384010	399185	17822	A6042	Manchester	PCM	36.4	28.6	19.6	38.6	16.8	25,437	12%	7%	10%	24%	47%	-4.9
3293_1285_DW	3293_1285	384280	397739	28486	A34	Manchester	PCM	35.0	34.9	23.1	32.9	11.9	6,691	84%	1%	1%	5%	9%	-5.9
3959_2890_DW	3960_2891	383358	397172	46068	A57M	Manchester	PCM	38.3	32.0	21.5	36.4	16.8	83,131	0%	6%	3%	38%	53%	-2.5
3619_3629	3619_3629	383357	398985	73787	A6042	Manchester	PCM	37.8	38.5	25.0	28.2	12.8	22,941	0%	7%	8%	35%	50%	-3.0
1469_3669_DW	1469_3669	386578	395884	28695	A6	Manchester	PCM	37.2	26.4	18.3	40.0	18.9	27,645	19%	6%	3%	23%	48%	-3.6
1300_7282	1300_7282	384829	398513	47457	A665	Manchester	PCM	36.7	38.8	25.3	25.9	11.4	22,964	11%	5%	11%	30%	43%	-4.0
1356_14504_DW	1356_14504	383011	398485	73790	A34	Manchester	PCM	38.2	38.5	25.0	29.1	13.2	36,140	0%	7%	7%	32%	53%	-2.4
3042_15348	3042_15348	382773	391447	37809	A5103	Manchester	PCM	36.8	16.8	12.3	49.1	24.5	80,722	1%	7%	2%	32%	58%	-3.6
1685_1686_DW	1685_1686	387382	394221	73778	A6	Manchester	PCM	36.2	25.5	17.8	40.1	18.4	27,607	23%	5%	10%	23%	39%	-4.2
1435_4314_DW	1435_4314	383838	395773	80940	A5103	Manchester	PCM	36.7	25.1	17.6	39.5	19.1	40,589	8%	7%	6%	29%	51%	-3.5
14523_14524	14523_14524	393320	405038	36632	A62	Oldham	PCM	47.6	27.4	18.9	60.8	28.7	52,114	0%	6%	7%	36%	51%	-4.7
1295_1703	1295_1703	390482	402513	77008	A62	Oldham	PCM	39.1	23.7	16.6	46.2	22.5	36,541	2%	6%	10%	36%	46%	-4.3
3914_5661	3914_5661	390627	402753	6606	A62	Oldham	PCM	38.1	23.7	16.6	43.8	21.5	36,862	1%	5%	12%	40%	41%	-4.9
3911_4112	3911_4112	389383	403282	99617	A663	Oldham	PCM	38.6	22.8	16.1	46.1	22.5	40,911	3%	6%	6%	30%	54%	-4.2
4629_5567_DW	4629_5567	390741	402566	27823	A6104	Oldham	PCM	37.2	23.7	16.6	41.2	20.5	14,899	2%	5%	5%	42%	45%	-3.3
2210_14216_DW	2210_14216	388664	411856	17322	A664	Rochdale	PCM	44.1	19.0	13.8	69.6	30.3	34,320	0%	4%	32%	29%	34%	-5.6
2210_4463_DW	2210_4463	388729	411971	26586	A58	Rochdale	PCM	42.9	19.0	13.8	68.0	29.1	45,240	5%	4%	32%	25%	33%	-6.2
2202_2205_DW	2202_2205	389446	413627	27469	A680	Rochdale	PCM	38.8	28.9	19.8	39.7	19.0	23,609	5%	5%	14%	33%	43%	-3.8
2202_2538	2202_2538	389424	413513	56600	A58	Rochdale	PCM	37.9	28.9	19.8	36.7	18.1	38,846	1%	7%	5%	32%	56%	-3.7
3132_7573_DW	3132_7573	389842	413925	38048	A671	Rochdale	PCM	37.4	28.9	19.8	35.9	17.6	25,194	7%	6%	3%	30%	53%	-3.6
2210_7536_DW	2210_7536	388580	411886	38543	A58	Rochdale	PCM	35.5	19.0	13.8	45.8	21.7	39,617	9%	6%	12%	28%	45%	-4.7
1349_2993_DW	1349_2993	382580	397716	73792	A57	Salford	PCM	45.9	26.5	18.4	58.6	27.5	52,892	0%	6%	10%	36%	47%	-5.3
1216_14503_DW	1216_14503	382565	398546	17926	A6	Salford	PCM	43.6	27.1	18.7	59.5	24.9	31,866	29%	4%	16%	20%	31%	-6.1
1867_4574_DW	1867_4574	382129	397840	36585	A57	Salford	PCM	43.9	26.5	18.4	54.3	25.5	49,051	0%	6%	13%	34%	47%	-5.2
14311_2299_DW	2299_14311	381488	399165	6161	A6	Salford	PCM	42.9	26.2	18.1	53.2	24.7	50,810	9%	7%	6%	24%	54%	-5.3
1232_12945_DW	1232_12945	381825	398784	56160	A6	Salford	PCM	42.4	25.0	17.4	58.3	25.0	35,669	28%	4%	17%	19%	32%	-5.6
1349_1867_DW	1349_1867	382371	397772	48023	A57	Salford	PCM	42.3	26.5	18.4	50.1	23.9	46,200	0%	6%	11%	35%	48%	-5.0
3964_4732_DW	3964_4732	382871	397244	99516	A56	Salford	PCM	42.7	26.5	18.4	53.2	24.3	35,367	6%	5%	19%	30%	40%	-4.6
3969_6612_DW	3969_6612	381512	398031	6562	A57	Salford	PCM	42.2	25.0	17.4	52.0	24.8	50,948	1%	6%	10%	36%	47%	-5.0
5179_5182_DW	5179_5182	374598	400597	74618	A572	Salford	PCM	41.9	15.8	11.6	62.9	30.3	33,363	1%	6%	6%	34%	53%	-4.6
1579_17017_DW	1579_17017	377344	400951	37363	A580	Salford	PCM	37.8	19.2	13.9	49.7	23.9	37,682	2%	6%	13%	32%	47%	-5.1
1364_1366	1364_1366	381428	399804	17245	A576	Salford	PCM	37.8	26.2	18.1	42.6	19.7	30,716	12%	6%	16%	19%	47%	-4.9
1345_1346_DW	1345_1346	380555	398426	56535	A5186	Salford	PCM	37.9	27.6	18.9	39.0	19.0	13,779	7%	5%	14%	29%	44%	-4.8
3786_1233_DW	3786_1233	381517	398259	27751	A5063	Salford	PCM	37.0	25.0	17.4	40.0	19.6	33,538	1%	7%	8%	28%	55%	-4.7
5249_7952	5249_7952	381205	399532	58028	A576	Salford	PCM	36.6	26.2	18.1	37.9	18.5	33,983	3%	7%	8%	25%	56%	-5.1
3620_5931_DW	3620_5931	390351	390720	37920	A626	Stockport	PCM	43.4	25.9	18.0	56.7	25.4	32,258	0%	4%	30%	30%	36%	-4.3
3973_14181_DW	3973_14181																		

Point ID	Rd Link ID	x	y	Census ID	Road name	Local Authority	PCM Total NO <sub>2</sub> conc (µg/m <sup>3</sup> )	Annual mean NO <sub>2</sub> conc (µg/m <sup>3</sup> )	BG NO <sub>x</sub> conc (µg/m <sup>3</sup> )	BG NO <sub>2</sub> conc (µg/m <sup>3</sup> )	Road NO <sub>x</sub> contrib (µg/m <sup>3</sup> )	Road NO <sub>2</sub> contrib (µg/m <sup>3</sup> )	AADT	NOx contribution by vehicle type (%)					Change NO <sub>2</sub> conc (µg/m <sup>3</sup> )
														Bus	Taxi	HGV	LGV	Car	
3813_3812_DW	3813_3812	392978	398478	74561	A6017	Tameside	PCM	39.6	26.9	18.5	43.2	21.0	32,916	2%	6%	7%	37%	49%	-4.5
2941_5978_DW	7638_5978	393398	398690	37451	A635	Tameside	PCM	40.1	27.3	18.8	43.6	21.3	52,840	0%	6%	7%	37%	50%	-3.5
5655_5656_DW	5655_5656	392042	398069	76074	A6140	Tameside	PCM	38.6	26.9	18.5	42.3	20.1	20,752	0%	4%	26%	33%	36%	-4.9
3761_5653_DW	3761_5653	390802	395630	99512	A57	Tameside	PCM	36.4	20.0	14.4	44.8	22.0	19,755	2%	5%	13%	37%	43%	-5.2
1954_4640_DW	1954_4640	395215	398833	7391	A635	Tameside	PCM	37.7	27.2	18.7	38.9	19.0	36,356	3%	6%	8%	30%	51%	-3.6
4969_12851	4969_12851	377669	395881	27755	A5081	Trafford	PCM	36.3	20.7	14.8	43.7	21.5	28,347	0%	6%	8%	36%	51%	-5.2
1382_3622_DW	1382_3622	380628	395827	56499	A56	Trafford	PCM	37.5	31.1	20.9	33.5	16.6	34,729	2%	8%	4%	31%	56%	-3.5
2305_5949_DW	2305_5949	380182	395145	36578	A56	Trafford	PCM	37.5	31.1	20.9	33.7	16.6	30,413	5%	8%	5%	27%	56%	-3.4
2309_3788_DW	2309_3788	379330	394059	17904	A5181	Trafford	PCM	36.1	21.2	15.1	44.7	21.0	24,142	0%	5%	33%	25%	38%	-4.3
3492_3511_DW	3492_3511	358611	405310	8566	A577	Wigan	PCM	37.0	31.0	20.8	33.3	16.2	23,472	2%	6%	12%	32%	47%	-4.2
2579_2605_DW	2579_2605	360480	402382	80619	A573	Wigan	PCM	35.1	16.4	12.0	49.2	23.0	26,118	7%	5%	22%	24%	42%	-5.0

**Table B-5: Predicted annual mean NO<sub>2</sub> concentrations and source apportionment at exceedance links on the Greater Manchester road network – Option 8 – 2021**

Point ID	Rd Link ID	x	y	Census ID	Road name	Local Authority	PCM Total NO <sub>2</sub> conc (µg/m <sup>3</sup> )	Annual mean NO <sub>2</sub> conc (µg/m <sup>3</sup> )	BG NO <sub>x</sub> conc (µg/m <sup>3</sup> )	BG NO <sub>2</sub> conc (µg/m <sup>3</sup> )	Road NO <sub>x</sub> contrib (µg/m <sup>3</sup> )	Road NO <sub>2</sub> contrib (µg/m <sup>3</sup> )	AADT	NOx contribution by vehicle type (%)					Change NO <sub>2</sub> conc (µg/m <sup>3</sup> )
														Bus	Taxi	HGV	LGV	Car	
2799_3118_DW	2799_3118	371751	409800	58048	A673	Bolton	PCM	41.0	28.2	19.5	46.2	21.5	27,047	0%	5%	22%	30%	43%	-4.4
2648_6404_DW	2648_6404	372355	408934	47988	A579	Bolton	PCM	41.1	25.0	17.5	48.4	23.6	34,379	1%	5%	6%	41%	46%	-4.2
2650_2653_DW	2653_2650	372915	407622	7431	A666	Bolton	PCM	41.9	26.5	18.4	47.7	23.5	65,936	0%	5%	3%	48%	44%	-3.0
2799_3775_DW	2799_3775	371869	409735	8030	A666	Bolton	PCM	40.4	28.2	19.5	43.1	20.9	21,015	0%	6%	5%	38%	52%	-3.8
2119_2564_DW	2119_2564	371207	409524	17905	A673	Bolton	PCM	38.1	28.2	19.5	39.0	18.6	26,943	13%	6%	4%	27%	49%	-5.9
2407_6761_DW	2407_6761	374740	405143	73087	A667	Bolton	PCM	37.1	18.9	13.7	48.9	23.4	38,284	8%	6%	12%	26%	48%	-5.6
2061_2119_DW	2061_2119	371060	409589	47469	A673	Bolton	PCM	36.8	28.2	19.5	37.2	17.3	23,574	22%	6%	7%	22%	44%	-5.2
3064_15148_DW	3064_15148	371642	408705	7921	A579	Bolton	PCM	37.3	28.4	19.5	38.3	17.8	26,147	22%	5%	6%	23%	44%	-4.6
1986_2053_DW	1986_2053	372038	408749	74518	A575	Bolton	PCM	36.4	25.0	17.5	40.1	18.9	21,548	22%	5%	7%	26%	41%	-5.1
2053_3067_DW	2053_3067	371895	408742	27946	A579	Bolton	PCM	36.8	28.4	19.5	36.6	17.3	24,083	15%	6%	8%	28%	44%	-4.5
2662_14424_DW	2662_14424	371075	408696	28245	A676	Bolton	PCM	36.8	28.4	19.5	36.4	17.3	24,144	8%	6%	18%	24%	44%	-3.8
2799_7832_DW	2799_7832	371805	409910	38542	A666	Bolton	PCM	37.0	28.2	19.5	35.8	17.5	28,873	0%	6%	10%	31%	53%	-3.3
2237_3790_DW	3790_2237	379830	410975	38354	A58	Bury	PCM	46.3	23.0	16.3	65.6	30.0	78,487	8%	6%	7%	29%	50%	-8.5
3424_4940_DW	3424_4940	380920	404881	17924	A56	Bury	PCM	45.2	18.1	13.2	70.0	32.1	19,814	3%	5%	21%	26%	45%	-7.5
2244_4913_DW	2244_4913	381968	410627	73198	A58	Bury	PCM	42.9	22.9	16.3	56.2	26.6	23,908	2%	6%	10%	32%	50%	-6.7
1742_9011_DW	1742_9011	381149	404182	46572	A56	Bury	PCM	40.1	21.8	15.5	54.8	24.5	36,952	10%	5%	23%	24%	39%	-6.4
2243_4639_DW	2243_4639	381310	410749	16556	A58	Bury	PCM	38.2	22.9	16.3	45.8	21.9	27,834	11%	4%	8%	39%	38%	-5.1
3791_3976_DW	3791_3976	380284	410974	26563	A56	Bury	PCM	36.9	24.6	17.3	39.6	19.6	40,371	0%	8%	6%	27%	59%	-4.1
2231_3083_DW	2231_3083	380413	410490	8575	A58	Bury	PCM	30.9	24.6	17.3	27.4	13.6	18,648	16%	5%	1%	37%	41%	-9.9
3056_3842_DW	3056_3842	384880	397418	26157	A6	Manchester	PCM	48.0	34.9	23.1	57.5	25.0	37,691	18%	5%	11%	27%	38%	-5.7
8546_14050	8546_14050	384384	398801	57427	A664	Manchester	PCM	42.3	38.8	25.3	49.7	17.0	7,985	67%	2%	3%	6%	21%	-9.6
1268_1269	1268_1269	383558	398278	27974	A34	Manchester	PCM	45.4	38.5	25.0	59.3	20.4	9,689	59%	3%	2%	13%	22%	-5.3
2283_8544_DW	2283_8544	383791	398603	27992	A56	Manchester	PCM	41.4	38.5	25.0	48.9	16.4	4,297	75%	2%	3%	12%	8%	-8.9
1267_1985	1267_1985	383672	398364	16536	A56	Manchester	PCM	43.7	38.5	25.0	49.0	18.7	8,652	40%	4%	4%	19%	32%	-5.7
1322_3273	1322_3273	383249	398058	27975	A34	Manchester	PCM	46.2	38.5	25.0	48.1	21.1	15,763	0%	8%	4%	28%	60%	-3.2
1242_1243	1242_1243	384483	398343	70154	A62	Manchester	PCM	40.6	38.8	25.3	52.1	15.4	1,412	100%	0%	0%	0%	0%	-8.8
1307_1317	1307_1317	383757	398717	36551	A6	Manchester	PCM	38.7	38.5	25.0	39.9	13.7	4,414	81%	1%	1%	9%	7%	-10.0
2289_12835	2289_12835	384282	398507	70153	A6	Manchester	PCM	39.6	38.8	25.3	40.9	14.3	9,293	74%	3%	1%	7%	16%	-8.8
1268_46301	1268_46301	383702	398229	7947	A34	Manchester	PCM	43.2	38.5	25.0	52.3	18.2	8,681	55%	3%	10%	16%	17%	-4.9
1341_2939_DW	1341_2939	385618	397656	75239	A635	Manchester	PCM	41.2	32.5	21.7	42.5	19.4	24,618	3%	4%	24%	30%	38%	-6.5
2847_2855_DW	2847_2847	382389	390376	7701	A5103	Manchester	PCM	42.8	19.5	14.1	59.7	28.7	127,210	0%	6%	6%	33%	55%	-4.8
1846_2423_DW	1846_2423	381865	388177	26047	M56	Manchester	PCM	43.5	20.5	14.8	59.1	28.7	13,707	2%	7%	2%	34%	55%	-3.8
1336_16404	1336_16404	384137	397465	17929	A34	Manchester	PCM	33.6	34.9	23.1	27.6	10.5	5,846	81%	2%	1%	3%	13%	-13.5
2006_3292	2006_3292	384110	397858	56529	A5103	Manchester	PCM	32.3	34.9	23.1	23.3	9.3	6,269	70%	2%	2%	14%	12%	-13.3
1302_8546	1302_8546	384428	398838	75248	A664	Manchester	PCM	38.0	38.8	25.3	34.9	12.8	8,081	58%	2%	15%	9%	15%	-7.3
3016_6022_DW	3016_6022	384639	397855	46165	A6	Manchester	PCM	38.7	34.9	23.1	41.2	15.6	7,260	54%	4%	4%	11%	27%	-5.0

Point ID	Rd Link ID	x	y	Census ID	Road name	Local Authority	PCM Total NO <sub>2</sub> conc (µg/m <sup>3</sup> )	Annual mean NO <sub>2</sub> conc (µg/m <sup>3</sup> )	BG NO <sub>x</sub> conc (µg/m <sup>3</sup> )	BG NO <sub>2</sub> conc (µg/m <sup>3</sup> )	Road NO <sub>x</sub> contrib (µg/m <sup>3</sup> )	Road NO <sub>2</sub> contrib (µg/m <sup>3</sup> )	AADT	NOx contribution by vehicle type (%)					Change NO <sub>2</sub> conc (µg/m <sup>3</sup> )
														Bus	Taxi	HGV	LGV	Car	
2291_3923	2291_3923	384010	399185	17822	A6042	Manchester	PCM	36.4	28.6	19.6	38.5	16.8	25,444	12%	7%	10%	24%	47%	-4.9
3293_1285_DW	3293_1285	384280	397739	28486	A34	Manchester	PCM	35.0	34.9	23.1	32.9	11.9	6,863	85%	1%	1%	5%	9%	-5.9
3959_2890_DW	3960_2891	383358	397172	46068	A57M	Manchester	PCM	38.3	32.0	21.5	36.3	16.8	83,420	0%	6%	3%	38%	53%	-2.5
3619_3629	3619_3629	383357	398985	73787	A6042	Manchester	PCM	37.8	38.5	25.0	28.2	12.8	22,980	0%	7%	7%	35%	50%	-3.0
1469_3669_DW	1469_3669	386578	395884	28695	A6	Manchester	PCM	37.2	26.4	18.3	40.0	18.8	27,727	19%	6%	3%	23%	48%	-3.6
1300_7282	1300_7282	384829	398513	47457	A665	Manchester	PCM	36.6	38.8	25.3	25.9	11.4	23,051	11%	5%	11%	29%	43%	-4.1
1356_14504_DW	1356_14504	383011	398485	73790	A34	Manchester	PCM	38.1	38.5	25.0	29.1	13.1	36,355	0%	7%	7%	32%	54%	-2.5
3042_15348	3042_15348	382773	391447	37809	A5103	Manchester	PCM	36.8	16.8	12.3	49.0	24.4	80,913	1%	7%	2%	32%	58%	-3.6
1685_1686_DW	1685_1686	387382	394221	73778	A6	Manchester	PCM	36.2	25.5	17.8	40.0	18.4	27,628	23%	5%	10%	23%	39%	-4.2
1435_4314_DW	1435_4314	383838	395773	80940	A5103	Manchester	PCM	36.7	25.1	17.6	39.4	19.1	40,567	8%	7%	6%	29%	51%	-3.5
14523_14524	14523_14524	393320	405038	36632	A62	Oldham	PCM	47.5	27.4	18.9	60.6	28.7	52,161	0%	6%	7%	36%	51%	-4.8
1295_1703	1295_1703	390482	402513	77008	A62	Oldham	PCM	39.0	23.7	16.6	46.1	22.4	36,593	2%	6%	10%	36%	46%	-4.4
3914_5661	3914_5661	390627	402753	6606	A62	Oldham	PCM	38.0	23.7	16.6	43.7	21.4	36,890	1%	5%	12%	40%	41%	-5.0
3911_4112	3911_4112	389383	403282	99617	A663	Oldham	PCM	38.6	22.8	16.1	46.1	22.5	40,968	3%	6%	6%	30%	54%	-4.2
4629_5567_DW	4629_5567	390741	402566	27823	A6104	Oldham	PCM	37.1	23.7	16.6	41.1	20.5	14,927	2%	5%	5%	42%	45%	-3.4
2210_14216_DW	2210_14216	388664	411856	17322	A664	Rochdale	PCM	44.0	19.0	13.8	69.4	30.2	34,322	0%	4%	33%	29%	34%	-5.7
2210_4463_DW	2210_4463	388729	411971	26586	A58	Rochdale	PCM	42.8	19.0	13.8	67.8	29.0	45,267	5%	4%	32%	25%	33%	-6.3
2202_2205_DW	2202_2205	389446	413627	27469	A680	Rochdale	PCM	38.7	28.9	19.8	39.6	19.0	23,603	5%	5%	14%	32%	43%	-3.9
2202_2538	2202_2538	389424	413513	56600	A58	Rochdale	PCM	37.8	28.9	19.8	36.5	18.1	38,820	1%	7%	5%	32%	56%	-3.8
3132_7573_DW	3132_7573	389842	413925	38048	A671	Rochdale	PCM	37.3	28.9	19.8	35.8	17.6	25,234	7%	6%	3%	30%	53%	-3.7
2210_7536_DW	2210_7536	388580	411886	38543	A58	Rochdale	PCM	35.4	19.0	13.8	45.7	21.7	39,665	9%	6%	13%	28%	45%	-4.8
1349_2993_DW	1349_2993	382580	397716	73792	A57	Salford	PCM	45.8	26.5	18.4	58.5	27.4	53,021	0%	6%	10%	36%	47%	-5.4
1216_14503_DW	1216_14503	382565	398546	17926	A6	Salford	PCM	43.5	27.1	18.7	59.2	24.9	31,930	29%	4%	15%	20%	31%	-6.2
1867_4574_DW	1867_4574	382129	397840	36585	A57	Salford	PCM	43.8	26.5	18.4	54.1	25.4	49,170	0%	6%	13%	34%	47%	-5.3
14311_2299_DW	2299_14311	381488	399165	6161	A6	Salford	PCM	42.8	26.2	18.1	53.1	24.7	50,895	9%	7%	6%	24%	54%	-5.4
1232_12945_DW	1232_12945	381825	398784	56160	A6	Salford	PCM	42.3	25.0	17.4	58.0	24.9	35,674	28%	5%	17%	19%	32%	-5.7
1349_1867_DW	1349_1867	382371	397772	48023	A57	Salford	PCM	42.3	26.5	18.4	50.0	23.9	46,320	0%	6%	11%	35%	48%	-5.0
3964_4732_DW	3964_4732	382871	397244	99516	A56	Salford	PCM	42.6	26.5	18.4	53.1	24.2	35,388	6%	5%	19%	30%	40%	-4.7
3969_6612_DW	3969_6612	381512	398031	6562	A57	Salford	PCM	42.1	25.0	17.4	51.8	24.7	51,069	1%	6%	10%	36%	47%	-5.1
5179_5182_DW	5179_5182	374598	400597	74618	A572	Salford	PCM	41.8	15.8	11.6	62.7	30.2	33,375	1%	6%	6%	34%	53%	-4.7
1579_17017_DW	1579_17017	377344	400951	37363	A580	Salford	PCM	37.7	19.2	13.9	49.7	23.8	37,716	2%	6%	13%	32%	48%	-5.2
1364_1366	1364_1366	381428	399804	17245	A576	Salford	PCM	37.8	26.2	18.1	42.6	19.7	30,691	12%	6%	16%	19%	47%	-4.9
1345_1346_DW	1345_1346	380555	398426	56535	A5186	Salford	PCM	37.8	27.6	18.9	38.6	18.9	13,755	6%	5%	14%	29%	46%	-4.9
3786_1233_DW	3786_1233	381517	398259	27751	A5063	Salford	PCM	37.0	25.0	17.4	39.9	19.6	33,556	1%	7%	9%	28%	56%	-4.7
5249_7952	5249_7952	381205	399532	58028	A576	Salford	PCM	36.6	26.2	18.1	37.9	18.5	34,007	3%	7%	8%	25%	56%	-5.1
3620_5931_DW	3620_5931	390351	390720	37920	A626	Stockport	PCM	43.3	25.9	18.0	56.6	25.3	32,302	0%	4%	30%	30%	36%	-4.4
3973_14181_DW	3973_14181																		

Point ID	Rd Link ID	x	y	Census ID	Road name	Local Authority	PCM Total NO <sub>2</sub> conc (µg/m <sup>3</sup> )	Annual mean NO <sub>2</sub> conc (µg/m <sup>3</sup> )	BG NO <sub>x</sub> conc (µg/m <sup>3</sup> )	BG NO <sub>2</sub> conc (µg/m <sup>3</sup> )	Road NO <sub>x</sub> contrib (µg/m <sup>3</sup> )	Road NO <sub>2</sub> contrib (µg/m <sup>3</sup> )	AADT	NOx contribution by vehicle type (%)					Change NO <sub>2</sub> conc (µg/m <sup>3</sup> )
														Bus	Taxi	HGV	LGV	Car	
3813_3812_DW	3813_3812	392978	398478	74561	A6017	Tameside	PCM	39.5	26.9	18.5	43.1	21.0	32,923	2%	6%	7%	36%	49%	-4.6
2941_5978_DW	7638_5978	393398	398690	37451	A635	Tameside	PCM	40.1	27.3	18.8	43.5	21.3	52,827	0%	6%	7%	37%	50%	-3.5
5655_5656_DW	5655_5656	392042	398069	76074	A6140	Tameside	PCM	38.5	26.9	18.5	42.2	20.0	20,777	0%	4%	27%	33%	36%	-5.0
3761_5653_DW	3761_5653	390802	395630	99512	A57	Tameside	PCM	36.3	20.0	14.4	44.6	21.9	19,764	2%	5%	13%	37%	43%	-5.3
1954_4640_DW	1954_4640	395215	398833	7391	A635	Tameside	PCM	37.7	27.2	18.7	38.9	18.9	36,380	3%	6%	8%	30%	51%	-3.6
4969_12851	4969_12851	377669	395881	27755	A5081	Trafford	PCM	36.3	20.7	14.8	43.6	21.4	28,366	0%	6%	8%	36%	51%	-5.2
1382_3622_DW	1382_3622	380628	395827	56499	A56	Trafford	PCM	37.4	31.1	20.9	33.4	16.6	34,745	2%	8%	4%	31%	56%	-3.6
2305_5949_DW	2305_5949	380182	395145	36578	A56	Trafford	PCM	37.5	31.1	20.9	33.6	16.6	30,440	5%	8%	5%	27%	56%	-3.4
2309_3788_DW	2309_3788	379330	394059	17904	A5181	Trafford	PCM	36.1	21.2	15.1	44.7	20.9	24,157	0%	5%	33%	25%	38%	-4.3
3492_3511_DW	3492_3511	358611	405310	8566	A577	Wigan	PCM	37.0	31.0	20.8	33.3	16.2	23,522	2%	6%	12%	32%	47%	-4.2
2579_2605_DW	2579_2605	360480	402382	80619	A573	Wigan	PCM	35.0	16.4	12.0	49.1	23.0	26,296	7%	5%	21%	24%	43%	-5.1

**Table B-6: Predicted annual mean NO<sub>2</sub> concentrations and source apportionment at exceedance links on the Greater Manchester road network - Do Minimum – 2023**

Point ID	Rd Link ID	x	y	Census ID	Road name	Local Authority	PCM Total NO <sub>2</sub> conc (µg/m <sup>3</sup> )	Annual mean NO <sub>2</sub> conc (µg/m <sup>3</sup> )	BG NO <sub>x</sub> conc (µg/m <sup>3</sup> )	BG NO <sub>2</sub> conc (µg/m <sup>3</sup> )	Road NO <sub>x</sub> contrib (µg/m <sup>3</sup> )	Road NO <sub>2</sub> contrib (µg/m <sup>3</sup> )	AADT	NOx contribution by vehicle type (%)					Change NO <sub>2</sub> conc (µg/m <sup>3</sup> )
														Bus	Taxi	HGV	LGV	Car	
2799_3118_DW	2799_3118	371751	409800	58048	A673	Bolton	PCM	40.5	26.0	18.1	50.3	22.4	27,875	0%	5%	32%	25%	38%	na
2648_6404_DW	2648_6404	372355	408934	47988	A579	Bolton	PCM	39.0	23.4	16.5	47.7	22.6	32,255	6%	5%	14%	35%	40%	na
2650_2653_DW	2653_2650	372915	407622	7431	A666	Bolton	PCM	40.4	24.8	17.3	47.5	23.1	70,119	0%	6%	6%	44%	44%	na
2799_3775_DW	2799_3775	371869	409735	8030	A666	Bolton	PCM	39.5	26.0	18.1	45.4	21.4	22,056	0%	6%	11%	34%	49%	na
2119_2564_DW	2119_2564	371207	409524	17905	A673	Bolton	PCM	38.1	26.0	18.1	44.1	20.0	27,960	23%	6%	8%	21%	41%	na
2407_6761_DW	2407_6761	374740	405143	73087	A667	Bolton	PCM	39.8	17.6	12.8	63.7	27.0	37,014	8%	4%	40%	18%	30%	na
2061_2119_DW	2061_2119	371060	409589	47469	A673	Bolton	PCM	36.4	26.0	18.1	40.8	18.3	24,433	28%	6%	11%	17%	38%	na
3064_15148_DW	3064_15148	371642	408705	7921	A579	Bolton	PCM	37.1	26.6	18.4	42.0	18.7	26,332	29%	5%	11%	19%	36%	na
1986_2053_DW	1986_2053	372038	408749	74518	A575	Bolton	PCM	36.7	23.4	16.5	45.1	20.2	21,760	31%	5%	12%	20%	33%	na
2053_3067_DW	2053_3067	371895	408742	27946	A579	Bolton	PCM	36.0	26.6	18.4	38.5	17.6	24,294	15%	6%	15%	24%	40%	na
2662_14424_DW	2662_14424	371075	408696	28245	A676	Bolton	PCM	36.6	26.6	18.4	39.9	18.2	24,305	14%	6%	24%	21%	36%	na
2799_7832_DW	2799_7832	371805	409910	38542	A666	Bolton	PCM	36.0	26.0	18.1	37.5	17.9	30,178	0%	6%	17%	27%	49%	na
2237_3790_DW	3790_2237	379830	410975	38354	A58	Bury	PCM	49.0	21.4	15.2	83.1	33.8	79,714	21%	5%	17%	21%	35%	na
3424_4940_DW	3424_4940	380920	404881	17924	A56	Bury	PCM	45.9	17.0	12.4	78.7	33.6	19,993	9%	5%	32%	20%	35%	na
2244_4913_DW	2244_4913	381968	410627	73198	A58	Bury	PCM	43.4	21.1	15.1	64.0	28.3	24,327	7%	6%	21%	26%	41%	na
1742_9011_DW	1742_9011	381149	404182	46572	A56	Bury	PCM	42.0	20.4	14.6	66.8	27.4	37,762	20%	4%	29%	17%	29%	na
2243_4639_DW	2243_4639	381310	410749	16556	A58	Bury	PCM	38.0	21.1	15.1	50.2	22.9	28,728	17%	4%	14%	32%	33%	na
3791_3976_DW	3791_3976	380284	410974	26563	A56	Bury	PCM	36.2	22.9	16.2	41.9	20.0	40,887	0%	8%	13%	25%	54%	na
2231_3083_DW	2231_3083	380413	410490	8575	A58	Bury	PCM	36.6	22.9	16.2	48.9	20.4	19,029	59%	3%	1%	17%	20%	na
3056_3842_DW	3056_3842	384880	397418	26157	A6	Manchester	PCM	46.6	32.2	21.6	58.9	25.1	38,937	19%	5%	15%	25%	36%	na
8546_14050	8546_14050	384384	398801	57427	A664	Manchester	PCM	46.2	35.8	23.6	74.7	22.6	8,051	78%	2%	3%	4%	13%	na
1268_1269	1268_1269	383558	398278	27974	A34	Manchester	PCM	44.9	35.6	23.4	65.7	21.5	9,347	66%	3%	4%	10%	18%	na
2283_8544_DW	2283_8544	383791	398603	27992	A56	Manchester	PCM	45.1	35.6	23.4	73.2	21.7	4,315	83%	1%	4%	7%	5%	na
1267_1985	1267_1985	383672	398364	16536	A56	Manchester	PCM	45.5	35.6	23.4	64.0	22.1	8,922	53%	3%	7%	14%	23%	na
1322_3273	1322_3273	383249	398058	27975	A34	Manchester	PCM	43.0	35.6	23.4	45.0	19.6	15,308	0%	8%	10%	24%	58%	na
1242_1243	1242_1243	384483	398343	70154	A62	Manchester	PCM	44.0	35.8	23.6	75.7	20.5	1,409	100%	0%	0%	0%	0%	na
1307_1317	1307_1317	383757	398717	36551	A6	Manchester	PCM	44.3	35.6	23.4	70.9	20.8	4,432	90%	1%	2%	5%	3%	na
2289_12835	2289_12835	384282	398507	70153	A6	Manchester	PCM	43.9	35.8	23.6	65.4	20.3	9,210	84%	1%	1%	4%	10%	na
1268_46301	1268_46301	383702	398229	7947	A34	Manchester	PCM	43.4	35.6	23.4	60.3	20.0	8,669	60%	2%	13%	12%	13%	na
1341_2939_DW	1341_2939	385618	397656	75239	A635	Manchester	PCM	41.6	30.3	20.5	49.3	21.1	25,155	3%	4%	41%	23%	30%	na
2847_2855_DW	2847_2847	382389	390376	7701	A5103	Manchester	PCM	42.0	17.8	13.0	62.0	29.0	131,525	2%	6%	13%	28%	51%	na
1846_2423_DW	1846_2423	381865	388177	26047	M56	Manchester	PCM	43.0	18.9	13.7	61.2	29.2	14,247	6%	7%	6%	30%	51%	na
1336_16404	1336_16404	384137	397465	17929	A34	Manchester	PCM	37.7	32.2	21.6	46.3	16.1	5,830	89%	1%	1%	2%	7%	na
2006_3292	2006_3292	384110	397858	56529	A5103	Manchester	PCM	36.5	32.2	21.6	41.6	14.9	6,358	84%	1%	2%	8%	5%	na
1302_8546	1302_8546	384428	398838	75248	A664	Manchester	PCM	40.3	35.8	23.6	49.7	16.8	8,422	66%	1%	16%	6%	10%	na
3016_6022_DW	3016_6022	384639	397855	46165	A6	Manchester	PCM	37.4	32.2	21.6	42.0	15.8	7,298	55%	4%	6%	10%	25%	na
1312_5801_DW	1312_5801	383778	399163	36577															

Point ID	Rd Link ID	x	y	Census ID	Road name	Local Authority	PCM Total NO <sub>2</sub> conc (µg/m <sup>3</sup> )	Annual mean NO <sub>2</sub> conc (µg/m <sup>3</sup> )	BG NO <sub>x</sub> conc (µg/m <sup>3</sup> )	BG NO <sub>2</sub> conc (µg/m <sup>3</sup> )	Road NO <sub>x</sub> contrib (µg/m <sup>3</sup> )	Road NO <sub>2</sub> contrib (µg/m <sup>3</sup> )	AADT	NOx contribution by vehicle type (%)					Change NO <sub>2</sub> conc (µg/m <sup>3</sup> )
														Bus	Taxi	HGV	LGV	Car	
2291_3923	2291_3923	384010	399185	17822	A6042	Manchester	PCM	36.9	26.5	18.3	45.4	18.6	25,662	22%	5%	17%	18%	37%	na
3293_1285_DW	3293_1285	384280	397739	28486	A34	Manchester	PCM	34.7	32.2	21.6	36.7	13.2	6,845	87%	1%	1%	4%	7%	na
3959_2890_DW	3960_2891	383358	397172	46068	A57M	Manchester	PCM	37.8	29.6	20.1	38.9	17.7	89,946	0%	6%	8%	36%	51%	na
3619_3629	3619_3629	383357	398985	73787	A6042	Manchester	PCM	36.5	35.6	23.4	29.7	13.1	23,277	0%	7%	17%	31%	45%	na
1469_3669_DW	1469_3669	386578	395884	28695	A6	Manchester	PCM	36.0	24.5	17.1	41.0	18.9	27,737	23%	6%	7%	20%	43%	na
1300_7282	1300_7282	384829	398513	47457	A665	Manchester	PCM	34.3	35.8	23.6	24.4	10.8	23,820	4%	6%	18%	27%	46%	na
1356_14504_DW	1356_14504	383011	398485	73790	A34	Manchester	PCM	37.6	35.6	23.4	32.7	14.2	37,849	0%	6%	21%	28%	45%	na
3042_15348	3042_15348	382773	391447	37809	A5103	Manchester	PCM	35.8	15.5	11.5	49.5	24.3	84,468	2%	7%	5%	30%	55%	na
1685_1686_DW	1685_1686	387382	394221	73778	A6	Manchester	PCM	35.1	23.4	16.5	41.5	18.6	27,437	27%	5%	14%	19%	34%	na
1435_4314_DW	1435_4314	383838	395773	80940	A5103	Manchester	PCM	34.9	22.9	16.2	39.1	18.7	41,104	8%	7%	10%	27%	48%	na
14523_14524	14523_14524	393320	405038	36632	A62	Oldham	PCM	46.4	25.7	17.8	62.5	28.5	53,611	0%	7%	14%	31%	47%	na
1295_1703	1295_1703	390482	402513	77008	A62	Oldham	PCM	38.6	22.3	15.8	48.8	22.9	37,560	4%	6%	19%	30%	41%	na
3914_5661	3914_5661	390627	402753	6606	A62	Oldham	PCM	38.2	22.3	15.8	47.7	22.4	38,300	1%	5%	25%	33%	35%	na
3911_4112	3911_4112	389383	403282	99617	A663	Oldham	PCM	37.8	21.4	15.2	47.8	22.6	41,523	6%	6%	13%	25%	49%	na
4629_5567_DW	4629_5567	390741	402566	27823	A6104	Oldham	PCM	36.4	22.3	15.8	42.3	20.6	15,414	3%	6%	12%	38%	42%	na
2210_14216_DW	2210_14216	388664	411856	17322	A664	Rochdale	PCM	44.0	17.9	13.0	74.9	31.0	34,521	0%	4%	43%	24%	29%	na
2210_4463_DW	2210_4463	388729	411971	26586	A58	Rochdale	PCM	43.1	17.9	13.0	74.2	30.1	45,618	7%	4%	41%	20%	28%	na
2202_2205_DW	2202_2205	389446	413627	27469	A680	Rochdale	PCM	38.7	27.0	18.6	44.1	20.1	24,159	15%	5%	19%	26%	36%	na
2202_2538	2202_2538	389424	413513	56600	A58	Rochdale	PCM	37.3	27.0	18.6	39.4	18.7	39,384	8%	7%	9%	27%	49%	na
3132_7573_DW	3132_7573	389842	413925	38048	A671	Rochdale	PCM	37.5	27.0	18.6	40.7	18.9	25,899	20%	6%	6%	24%	43%	na
2210_7536_DW	2210_7536	388580	411886	38543	A58	Rochdale	PCM	35.0	17.9	13.0	47.9	22.0	40,107	12%	6%	17%	25%	40%	na
1349_2993_DW	1349_2993	382580	397716	73792	A57	Salford	PCM	46.9	24.7	17.2	67.0	29.6	57,674	3%	6%	20%	30%	42%	na
1216_14503_DW	1216_14503	382565	398546	17926	A6	Salford	PCM	43.2	25.2	17.6	63.8	25.6	31,661	32%	4%	21%	16%	27%	na
1867_4574_DW	1867_4574	382129	397840	36585	A57	Salford	PCM	43.3	24.7	17.2	58.3	26.1	51,915	1%	5%	25%	29%	40%	na
14311_2299_DW	2299_14311	381488	399165	6161	A6	Salford	PCM	42.1	24.5	17.1	56.0	25.0	50,778	12%	7%	14%	20%	47%	na
1232_12945_DW	1232_12945	381825	398784	56160	A6	Salford	PCM	41.8	23.4	16.4	61.3	25.4	35,628	31%	4%	21%	16%	28%	na
1349_1867_DW	1349_1867	382371	397772	48023	A57	Salford	PCM	44.4	24.7	17.2	61.4	27.1	48,089	1%	5%	26%	27%	40%	na
3964_4732_DW	3964_4732	382871	397244	99516	A56	Salford	PCM	41.2	24.7	17.2	51.7	24.0	42,821	4%	6%	15%	29%	45%	na
3969_6612_DW	3969_6612	381512	398031	6562	A57	Salford	PCM	43.1	23.4	16.4	59.2	26.6	53,199	4%	5%	21%	30%	40%	na
5179_5182_DW	5179_5182	374598	400597	74618	A572	Salford	PCM	41.5	14.7	10.9	65.6	30.6	34,924	5%	6%	15%	29%	45%	na
1579_17017_DW	1579_17017	377344	400951	37363	A580	Salford	PCM	38.2	17.8	13.0	55.2	25.2	39,791	3%	6%	24%	26%	41%	na
1364_1366	1364_1366	381428	399804	17245	A576	Salford	PCM	38.3	24.5	17.1	48.5	21.2	30,849	20%	5%	22%	15%	37%	na
1345_1346_DW	1345_1346	380555	398426	56535	A5186	Salford	PCM	37.2	25.8	17.9	41.0	19.3	13,707	9%	5%	26%	23%	36%	na
3786_1233_DW	3786_1233	381517	398259	27751	A5063	Salford	PCM	36.3	23.4	16.4	42.2	19.9	33,106	5%	7%	17%	24%	48%	na
5249_7952	5249_7952	381205	399532	58028	A576	Salford	PCM	36.7	24.5	17.1	42.5	19.6	34,405	13%	6%	17%	20%	45%	na
3620_5931_DW	3620_5931	390351	390720	37920	A626	Stockport	PCM	39.8	24.2	16.9	49.1	22.9	34,070	0%	6%	21%	32%	40%	na
3973_14181_DW	3973_14181	388375	390354	58034	A5145	Stockport	PCM	42.6											

Point ID	Rd Link ID	x	y	Census ID	Road name	Local Authority	PCM Total NO <sub>2</sub> conc (µg/m <sup>3</sup> )	Annual mean NO <sub>2</sub> conc (µg/m <sup>3</sup> )	BG NO <sub>x</sub> conc (µg/m <sup>3</sup> )	BG NO <sub>2</sub> conc (µg/m <sup>3</sup> )	Road NO <sub>x</sub> contrib (µg/m <sup>3</sup> )	Road NO <sub>2</sub> contrib (µg/m <sup>3</sup> )	AADT	NOx contribution by vehicle type (%)					Change NO <sub>2</sub> conc (µg/m <sup>3</sup> )
														Bus	Taxi	HGV	LGV	Car	
2941_5978_DW	7638_5978	393398	398690	37451	A635	Tameside	PCM	39.2	25.8	17.9	44.6	21.3	53,283	0%	6%	14%	33%	47%	na
5655_5656_DW	5655_5656	392042	398069	76074	A6140	Tameside	PCM	39.2	25.5	17.7	47.8	21.5	21,775	0%	4%	42%	25%	29%	na
3761_5653_DW	3761_5653	390802	395630	99512	A57	Tameside	PCM	36.1	18.6	13.5	48.0	22.6	20,022	3%	5%	26%	31%	36%	na
1954_4640_DW	1954_4640	395215	398833	7391	A635	Tameside	PCM	36.7	25.6	17.8	40.0	19.0	37,025	8%	7%	12%	26%	47%	na
4969_12851	4969_12851	377669	395881	27755	A5081	Trafford	PCM	37.0	19.0	13.7	49.7	23.2	29,938	0%	6%	19%	29%	46%	na
1382_3622_DW	1382_3622	380628	395827	56499	A56	Trafford	PCM	36.8	29.3	19.8	35.1	16.9	35,572	7%	7%	9%	27%	50%	na
2305_5949_DW	2305_5949	380182	395145	36578	A56	Trafford	PCM	36.5	29.3	19.8	34.6	16.6	31,312	9%	7%	11%	23%	49%	na
2309_3788_DW	2309_3788	379330	394059	17904	A5181	Trafford	PCM	35.8	19.6	14.1	47.9	21.6	24,517	0%	5%	43%	20%	32%	na
3492_3511_DW	3492_3511	358611	405310	8566	A577	Wigan	PCM	36.6	29.1	19.7	36.9	16.9	22,629	10%	5%	22%	25%	38%	na
2579_2605_DW	2579_2605	360480	402382	80619	A573	Wigan	PCM	36.1	15.4	11.3	56.3	24.7	26,522	14%	5%	29%	19%	33%	na

**Table B-7: Predicted annual mean NO<sub>2</sub> concentrations and source apportionment at exceedance links on the Greater Manchester road network – Option 5(i) – 2023**

Point ID	Rd Link ID	x	y	Census ID	Road name	Local Authority	PCM Total NO <sub>2</sub> conc (µg/m <sup>3</sup> )	Annual mean NO <sub>2</sub> conc (µg/m <sup>3</sup> )	BG NO <sub>x</sub> conc (µg/m <sup>3</sup> )	BG NO <sub>2</sub> conc (µg/m <sup>3</sup> )	Road NO <sub>x</sub> contrib (µg/m <sup>3</sup> )	Road NO <sub>2</sub> contrib (µg/m <sup>3</sup> )	AADT	NOx contribution by vehicle type (%)					Change NO <sub>2</sub> conc (µg/m <sup>3</sup> )
														Bus	Taxi	HGV	LGV	Car	
2799_3118_DW	2799_3118	371751	409800	58048	A673	Bolton	PCM	35.0	26.0	18.1	36.7	16.9	27,688	0%	6%	28%	21%	45%	-5.5
2648_6404_DW	2648_6404	372355	408934	47988	A579	Bolton	PCM	33.2	23.4	16.5	34.2	16.8	31,729	2%	6%	8%	34%	50%	-5.8
2650_2653_DW	2653_2650	372915	407622	7431	A666	Bolton	PCM	35.3	24.8	17.3	36.3	17.9	69,263	0%	6%	3%	40%	51%	-5.1
2799_3775_DW	2799_3775	371869	409735	8030	A666	Bolton	PCM	34.5	26.0	18.1	33.9	16.4	21,850	0%	7%	6%	31%	56%	-5.0
2119_2564_DW	2119_2564	371207	409524	17905	A673	Bolton	PCM	33.0	26.0	18.1	31.5	14.9	27,540	16%	7%	5%	20%	51%	-5.1
2407_6761_DW	2407_6761	374740	405143	73087	A667	Bolton	PCM	33.8	17.6	12.8	47.7	21.0	36,484	8%	4%	37%	15%	35%	-6.0
2061_2119_DW	2061_2119	371060	409589	47469	A673	Bolton	PCM	32.1	26.0	18.1	30.4	14.0	24,020	27%	6%	8%	16%	44%	-4.3
3064_15148_DW	3064_15148	371642	408705	7921	A579	Bolton	PCM	32.6	26.6	18.4	30.9	14.2	26,001	28%	5%	7%	17%	43%	-4.5
1986_2053_DW	1986_2053	372038	408749	74518	A575	Bolton	PCM	31.1	23.4	16.5	31.2	14.7	21,420	24%	5%	8%	20%	42%	-5.6
2053_3067_DW	2053_3067	371895	408742	27946	A579	Bolton	PCM	32.0	26.6	18.4	28.9	13.6	24,066	19%	6%	9%	21%	45%	-4.0
2662_14424_DW	2662_14424	371075	408696	28245	A676	Bolton	PCM	32.1	26.6	18.4	29.1	13.7	24,279	10%	6%	23%	18%	44%	-4.5
2799_7832_DW	2799_7832	371805	409910	38542	A666	Bolton	PCM	31.9	26.0	18.1	28.2	13.8	29,975	0%	7%	12%	25%	56%	-4.1
2237_3790_DW	3790_2237	379830	410975	38354	A58	Bury	PCM	39.9	21.4	15.2	55.4	24.6	79,030	10%	6%	17%	20%	47%	-9.1
3424_4940_DW	3424_4940	380920	404881	17924	A56	Bury	PCM	37.4	17.0	12.4	54.2	25.0	19,758	3%	6%	24%	20%	46%	-8.5
2244_4913_DW	2244_4913	381968	410627	73198	A58	Bury	PCM	35.7	21.1	15.1	43.5	20.6	24,187	2%	7%	12%	26%	53%	-7.7
1742_9011_DW	1742_9011	381149	404182	46572	A56	Bury	PCM	34.5	20.4	14.6	44.9	19.9	37,160	12%	5%	28%	17%	38%	-7.5
2243_4639_DW	2243_4639	381310	410749	16556	A58	Bury	PCM	32.0	21.1	15.1	35.5	16.9	28,326	14%	5%	10%	30%	41%	-6.0
3791_3976_DW	3791_3976	380284	410974	26563	A56	Bury	PCM	31.4	22.9	16.2	30.6	15.2	40,636	0%	8%	7%	23%	63%	-4.8
2231_3083_DW	2231_3083	380413	410490	8575	A58	Bury	PCM	26.6	22.9	16.2	21.2	10.4	18,801	20%	6%	1%	29%	44%	-10.0
3056_3842_DW	3056_3842	384880	397418	26157	A6	Manchester	PCM	40.9	32.2	21.6	45.0	19.3	38,054	23%	5%	13%	22%	37%	-5.7
8546_14050	8546_14050	384384	398801	57427	A664	Manchester	PCM	38.2	35.8	23.6	43.4	14.7	7,645	76%	2%	2%	4%	15%	-8.0
1268_1269	1268_1269	383558	398278	27974	A34	Manchester	PCM	40.4	35.6	23.4	50.5	17.0	9,216	69%	3%	3%	9%	17%	-4.5
2283_8544_DW	2283_8544	383791	398603	27992	A56	Manchester	PCM	38.1	35.6	23.4	44.7	14.7	4,249	81%	1%	4%	8%	5%	-7.0
1267_1985	1267_1985	383672	398364	16536	A56	Manchester	PCM	38.3	35.6	23.4	39.7	14.8	8,643	49%	4%	5%	15%	26%	-7.2
1322_3273	1322_3273	383249	398058	27975	A34	Manchester	PCM	36.6	35.6	23.4	29.8	13.1	14,430	0%	9%	6%	25%	59%	-6.4
1242_1243	1242_1243	384483	398343	70154	A62	Manchester	PCM	38.7	35.8	23.6	51.1	15.1	1,414	100%	0%	0%	0%	0%	-5.3
1307_1317	1307_1317	383757	398717	36551	A6	Manchester	PCM	35.9	35.6	23.4	36.7	12.5	4,366	86%	1%	2%	7%	5%	-8.4
2289_12835	2289_12835	384282	398507	70153	A6	Manchester	PCM	36.5	35.8	23.6	37.5	12.9	9,424	79%	2%	1%	5%	13%	-7.4
1268_46301	1268_46301	383702	398229	7947	A34	Manchester	PCM	38.9	35.6	23.4	45.6	15.5	8,618	62%	2%	12%	10%	13%	-4.5
1341_2939_DW	1341_2939	385618	397656	75239	A635	Manchester	PCM	35.4	30.3	20.5	32.9	14.9	24,708	4%	5%	30%	24%	38%	-6.2
2847_2855_DW	2855_2847	382389	390376	7701	A5103	Manchester	PCM	35.7	17.8	13.0	46.9	22.7	129,967	1%	7%	7%	27%	58%	-6.3
1846_2423_DW	1846_2423	381865	388177	26047	M56	Manchester	PCM	37.1	18.9	13.7	47.6	23.4	13,926	2%	7%	3%	28%	59%	-5.9
1336_16404	1336_16404	384137	397465	17929	A34	Manchester	PCM	30.8	32.2	21.6	24.6	9.2	5,577	87%	1%	1%	2%	8%	-6.9
2006_3292	2006_3292	384110	397858	56529	A5103	Manchester	PCM	29.3	32.2	21.6	19.9	7.7	5,899	79%	2%	2%	9%	8%	-7.2
1302_8546	1302_8546	384428	398838	75248	A664	Manchester	PCM	34.7	35.8	23.6	31.0	11.1	7,823	63%	2%	18%	6%	11%	-5.6
3016_6022_DW	3016_6022	384639	397855	46165	A6	Manchester	PCM	34.5	32.2	21.6	34.7	12.9	7,086	63%	3%	5%	7%	21%	-2.9

Point ID	Rd Link ID	x	y	Census ID	Road name	Local Authority	PCM Total NO <sub>2</sub> conc (µg/m <sup>3</sup> )	Annual mean NO <sub>2</sub> conc (µg/m <sup>3</sup> )	BG NO <sub>x</sub> conc (µg/m <sup>3</sup> )	BG NO <sub>2</sub> conc (µg/m <sup>3</sup> )	Road NO <sub>x</sub> contrib (µg/m <sup>3</sup> )	Road NO <sub>2</sub> contrib (µg/m <sup>3</sup> )	AADT	NOx contribution by vehicle type (%)					Change NO <sub>2</sub> conc (µg/m <sup>3</sup> )
														Bus	Taxi	HGV	LGV	Car	
2291_3923	2291_3923	384010	399185	17822	A6042	Manchester	PCM	31.1	26.5	18.3	29.5	12.7	25,238	16%	7%	12%	19%	46%	-5.8
3293_1285_DW	3293_1285	384280	397739	28486	A34	Manchester	PCM	32.3	32.2	21.6	30.1	10.8	6,561	90%	1%	1%	3%	6%	-2.4
3959_2890_DW	3960_2891	383358	397172	46068	A57M	Manchester	PCM	33.6	29.6	20.1	29.2	13.5	88,204	0%	6%	4%	32%	58%	-4.2
3619_3629	3619_3629	383357	398985	73787	A6042	Manchester	PCM	32.7	35.6	23.4	20.6	9.3	23,032	0%	7%	9%	30%	53%	-3.8
1469_3669_DW	1469_3669	386578	395884	28695	A6	Manchester	PCM	31.7	24.5	17.1	31.1	14.5	27,135	25%	6%	4%	18%	47%	-4.3
1300_7282	1300_7282	384829	398513	47457	A665	Manchester	PCM	31.2	35.8	23.6	17.0	7.6	23,172	4%	7%	11%	27%	51%	-3.1
1356_14504_DW	1356_14504	383011	398485	73790	A34	Manchester	PCM	33.8	35.6	23.4	23.7	10.4	37,132	0%	7%	18%	25%	49%	-3.8
3042_15348	3042_15348	382773	391447	37809	A5103	Manchester	PCM	30.6	15.5	11.5	38.2	19.1	83,244	1%	8%	2%	28%	61%	-5.2
1685_1686_DW	1685_1686	387382	394221	73778	A6	Manchester	PCM	30.7	23.4	16.5	30.9	14.2	27,114	26%	5%	13%	17%	39%	-4.4
1435_4314_DW	1435_4314	383838	395773	80940	A5103	Manchester	PCM	30.8	22.9	16.2	30.3	14.6	40,748	11%	7%	9%	24%	50%	-4.1
14523_14524	14523_14524	393320	405038	36632	A62	Oldham	PCM	39.8	25.7	17.8	46.5	22.0	52,914	0%	7%	8%	29%	56%	-6.6
1295_1703	1295_1703	390482	402513	77008	A62	Oldham	PCM	32.9	22.3	15.8	35.2	17.1	36,966	3%	7%	12%	29%	50%	-5.7
3914_5661	3914_5661	390627	402753	6606	A62	Oldham	PCM	32.4	22.3	15.8	33.9	16.6	37,761	2%	6%	15%	33%	45%	-5.8
3911_4112	3911_4112	389383	403282	99617	A663	Oldham	PCM	32.4	21.4	15.2	35.3	17.2	41,115	4%	7%	8%	24%	57%	-5.4
4629_5567_DW	4629_5567	390741	402566	27823	A6104	Oldham	PCM	31.5	22.3	15.8	31.5	15.7	15,223	3%	6%	6%	35%	50%	-4.9
2210_14216_DW	2210_14216	388664	411856	17322	A664	Rochdale	PCM	37.0	17.9	13.0	55.6	24.0	34,312	0%	4%	40%	21%	34%	-7.0
2210_4463_DW	2210_4463	388729	411971	26586	A58	Rochdale	PCM	36.5	17.9	13.0	55.4	23.5	45,274	6%	4%	39%	18%	33%	-6.6
2202_2205_DW	2202_2205	389446	413627	27469	A680	Rochdale	PCM	33.3	27.0	18.6	30.9	14.7	23,903	6%	6%	19%	24%	45%	-5.4
2202_2538	2202_2538	389424	413513	56600	A58	Rochdale	PCM	32.4	27.0	18.6	27.9	13.8	39,023	1%	8%	6%	26%	60%	-4.9
3132_7573_DW	3132_7573	389842	413925	38048	A671	Rochdale	PCM	32.2	27.0	18.6	27.9	13.6	25,386	9%	7%	4%	24%	55%	-5.3
2210_7536_DW	2210_7536	388580	411886	38543	A58	Rochdale	PCM	30.0	17.9	13.0	35.9	16.9	39,720	11%	6%	16%	21%	47%	-5.0
1349_2993_DW	1349_2993	382580	397716	73792	A57	Salford	PCM	39.3	24.7	17.2	47.4	22.1	57,005	1%	6%	12%	30%	50%	-7.6
1216_14503_DW	1216_14503	382565	398546	17926	A6	Salford	PCM	37.2	25.2	17.6	47.6	19.7	31,092	35%	4%	19%	14%	28%	-6.0
1867_4574_DW	1867_4574	382129	397840	36585	A57	Salford	PCM	36.2	24.7	17.2	40.2	19.0	51,182	0%	6%	15%	30%	49%	-7.1
14311_2299_DW	2299_14311	381488	399165	6161	A6	Salford	PCM	36.0	24.5	17.1	40.9	18.9	50,045	12%	7%	8%	19%	53%	-6.1
1232_12945_DW	1232_12945	381825	398784	56160	A6	Salford	PCM	36.2	23.4	16.4	46.6	19.8	35,178	33%	4%	20%	13%	29%	-5.6
1349_1867_DW	1349_1867	382371	397772	48023	A57	Salford	PCM	37.2	24.7	17.2	42.6	19.9	47,481	0%	6%	17%	28%	48%	-7.2
3964_4732_DW	3964_4732	382871	397244	99516	A56	Salford	PCM	34.9	24.7	17.2	37.0	17.7	42,062	3%	7%	10%	28%	52%	-6.3
3969_6612_DW	3969_6612	381512	398031	6562	A57	Salford	PCM	36.1	23.4	16.4	41.7	19.7	52,505	1%	6%	14%	30%	48%	-7.0
5179_5182_DW	5179_5182	374598	400597	74618	A572	Salford	PCM	34.9	14.7	10.9	49.5	24.0	34,443	2%	7%	8%	28%	55%	-6.6
1579_17017_DW	1579_17017	377344	400951	37363	A580	Salford	PCM	31.8	17.8	13.0	39.5	18.9	39,023	2%	6%	17%	26%	49%	-6.4
1364_1366	1364_1366	381428	399804	17245	A576	Salford	PCM	33.0	24.5	17.1	34.8	15.9	30,732	15%	6%	20%	13%	46%	-5.3
1345_1346_DW	1345_1346	380555	398426	56535	A5186	Salford	PCM	32.3	25.8	17.9	29.6	14.4	13,465	10%	6%	16%	23%	45%	-4.9
3786_1233_DW	3968_1233	381517	398259	27751	A5063	Salford	PCM	31.3	23.4	16.4	30.3	14.8	32,729	2%	7%	10%	23%	59%	-5.0
5249_7952	5249_7952	381205	399532	58028	A576	Salford	PCM	31.4	24.5	17.1	29.5	14.3	34,207	4%	7%	10%	20%	58%	-5.3
3620_5931_DW	3620_5931	390351	390720	37920	A626	Stockport	PCM	34.5	24.2	16.9	36.4	17.6	33,948	0%	6%	14%	31%	48%	-5.3
3973_14181_DW	3973_14181</																		

Point ID	Rd Link ID	x	y	Census ID	Road name	Local Authority	PCM Total NO <sub>2</sub> conc (µg/m <sup>3</sup> )	Annual mean NO <sub>2</sub> conc (µg/m <sup>3</sup> )	BG NO <sub>x</sub> conc (µg/m <sup>3</sup> )	BG NO <sub>2</sub> conc (µg/m <sup>3</sup> )	Road NO <sub>x</sub> contrib (µg/m <sup>3</sup> )	Road NO <sub>2</sub> contrib (µg/m <sup>3</sup> )	AADT	NOx contribution by vehicle type (%)					Change NO <sub>2</sub> conc (µg/m <sup>3</sup> )
														Bus	Taxi	HGV	LGV	Car	
2941_5978_DW	7638_5978	393398	398690	37451	A635	Tameside	PCM	34.0	25.8	17.9	33.0	16.2	52,969	0%	7%	8%	31%	54%	-5.2
5655_5656_DW	5655_5656	392042	398069	76074	A6140	Tameside	PCM	33.5	25.5	17.7	33.5	15.8	21,340	0%	5%	33%	25%	37%	-5.7
3761_5653_DW	3761_5653	390802	395630	99512	A57	Tameside	PCM	30.2	18.6	13.5	34.1	16.7	19,942	2%	6%	16%	32%	44%	-5.9
1954_4640_DW	1954_4640	395215	398833	7391	A635	Tameside	PCM	32.4	25.6	17.8	29.9	14.6	36,663	4%	7%	9%	25%	55%	-4.3
4969_12851	4969_12851	377669	395881	27755	A5081	Trafford	PCM	31.0	19.0	13.7	35.2	17.3	29,671	0%	6%	9%	28%	56%	-6.0
1382_3622_DW	1382_3622	380628	395827	56499	A56	Trafford	PCM	32.3	29.3	19.8	25.2	12.4	35,065	3%	8%	5%	26%	58%	-4.5
2305_5949_DW	2305_5949	380182	395145	36578	A56	Trafford	PCM	32.4	29.3	19.8	25.6	12.6	30,867	6%	8%	6%	23%	58%	-4.1
2309_3788_DW	2309_3788	379330	394059	17904	A5181	Trafford	PCM	30.8	19.6	14.1	35.9	16.7	24,439	0%	5%	39%	18%	38%	-5.0
3492_3511_DW	3492_3511	358611	405310	8566	A577	Wigan	PCM	31.5	29.1	19.7	24.3	11.8	22,266	3%	6%	15%	26%	50%	-5.1
2579_2605_DW	2579_2605	360480	402382	80619	A573	Wigan	PCM	30.2	15.4	11.3	40.8	18.8	26,368	9%	5%	28%	17%	41%	-5.9

**Table B-8: Predicted annual mean NO<sub>2</sub> concentrations and source apportionment at exceedance links on the Greater Manchester road network – Option 5(ii) – 2023**

Point ID	Rd Link ID	x	y	Census ID	Road name	Local Authority	PCM Total NO <sub>2</sub> conc (µg/m <sup>3</sup> )	Annual mean NO <sub>2</sub> conc (µg/m <sup>3</sup> )	BG NO <sub>x</sub> conc (µg/m <sup>3</sup> )	BG NO <sub>2</sub> conc (µg/m <sup>3</sup> )	Road NO <sub>x</sub> contrib (µg/m <sup>3</sup> )	Road NO <sub>2</sub> contrib (µg/m <sup>3</sup> )	AADT	NOx contribution by vehicle type (%)					Change NO <sub>2</sub> conc (µg/m <sup>3</sup> )
														Bus	Taxi	HGV	LGV	Car	
2799_3118_DW	2799_3118	371751	409800	58048	A673	Bolton	PCM	35.0	26.0	18.1	36.6	16.9	27,688	0%	6%	28%	21%	45%	-5.5
2648_6404_DW	2648_6404	372355	408934	47988	A579	Bolton	PCM	33.2	23.4	16.5	34.2	16.7	31,729	2%	6%	8%	34%	50%	-5.8
2650_2653_DW	2653_2650	372915	407622	7431	A666	Bolton	PCM	35.2	24.8	17.3	36.3	17.9	69,263	0%	6%	3%	40%	51%	-5.2
2799_3775_DW	2799_3775	371869	409735	8030	A666	Bolton	PCM	34.5	26.0	18.1	33.8	16.4	21,850	0%	6%	6%	31%	57%	-5.0
2119_2564_DW	2119_2564	371207	409524	17905	A673	Bolton	PCM	32.8	26.0	18.1	31.0	14.7	27,540	17%	7%	5%	20%	51%	-5.3
2407_6761_DW	2407_6761	374740	405143	73087	A667	Bolton	PCM	33.8	17.6	12.8	47.6	21.0	36,484	8%	4%	37%	15%	36%	-6.0
2061_2119_DW	2061_2119	371060	409589	47469	A673	Bolton	PCM	32.1	26.0	18.1	30.4	14.0	24,020	27%	6%	8%	16%	44%	-4.3
3064_15148_DW	3064_15148	371642	408705	7921	A579	Bolton	PCM	32.6	26.6	18.4	30.9	14.2	26,001	28%	5%	7%	17%	43%	-4.5
1986_2053_DW	1986_2053	372038	408749	74518	A575	Bolton	PCM	31.1	23.4	16.5	31.1	14.6	21,420	24%	5%	8%	20%	42%	-5.6
2053_3067_DW	2053_3067	371895	408742	27946	A579	Bolton	PCM	31.9	26.6	18.4	28.9	13.6	24,066	19%	6%	9%	21%	45%	-4.1
2662_14424_DW	2662_14424	371075	408696	28245	A676	Bolton	PCM	32.0	26.6	18.4	29.0	13.6	24,279	10%	6%	23%	17%	44%	-4.6
2799_7832_DW	2799_7832	371805	409910	38542	A666	Bolton	PCM	31.9	26.0	18.1	28.2	13.7	29,975	0%	6%	12%	25%	57%	-4.1
2237_3790_DW	3790_2237	379830	410975	38354	A58	Bury	PCM	39.8	21.4	15.2	55.4	24.6	79,030	10%	6%	17%	20%	47%	-9.2
3424_4940_DW	3424_4940	380920	404881	17924	A56	Bury	PCM	37.4	17.0	12.4	54.1	25.0	19,758	3%	6%	24%	21%	46%	-8.5
2244_4913_DW	2244_4913	381968	410627	73198	A58	Bury	PCM	35.8	21.1	15.1	43.7	20.7	24,187	2%	6%	12%	26%	53%	-7.6
1742_9011_DW	1742_9011	381149	404182	46572	A56	Bury	PCM	34.4	20.4	14.6	44.8	19.8	37,160	12%	5%	28%	17%	38%	-7.6
2243_4639_DW	2243_4639	381310	410749	16556	A58	Bury	PCM	32.0	21.1	15.1	35.5	16.9	28,326	14%	5%	10%	30%	41%	-6.0
3791_3976_DW	3791_3976	380284	410974	26563	A56	Bury	PCM	31.3	22.9	16.2	30.5	15.1	40,636	0%	8%	7%	23%	63%	-4.9
2231_3083_DW	2231_3083	380413	410490	8575	A58	Bury	PCM	26.6	22.9	16.2	21.2	10.4	18,801	20%	5%	1%	29%	44%	-10.0
3056_3842_DW	3056_3842	384880	397418	26157	A6	Manchester	PCM	40.8	32.2	21.6	44.7	19.2	38,054	23%	5%	14%	21%	37%	-5.8
8546_14050	8546_14050	384384	398801	57427	A664	Manchester	PCM	36.5	35.8	23.6	39.3	13.0	7,645	84%	3%	2%	5%	6%	-9.7
1268_1269	1268_1269	383558	398278	27974	A34	Manchester	PCM	38.2	35.6	23.4	45.1	14.8	9,216	77%	3%	3%	10%	7%	-6.7
2283_8544_DW	2283_8544	383791	398603	27992	A56	Manchester	PCM	37.4	35.6	23.4	42.9	13.9	4,249	84%	1%	4%	9%	2%	-7.7
1267_1985	1267_1985	383672	398364	16536	A56	Manchester	PCM	35.4	35.6	23.4	33.1	12.0	8,643	59%	5%	7%	18%	11%	-10.1
1322_3273	1322_3273	383249	398058	27975	A34	Manchester	PCM	31.8	35.6	23.4	19.6	8.4	14,430	0%	15%	10%	41%	34%	-11.2
1242_1243	1242_1243	384483	398343	70154	A62	Manchester	PCM	38.5	35.8	23.6	50.7	15.0	1,414	100%	0%	0%	0%	0%	-5.5
1307_1317	1307_1317	383757	398717	36551	A6	Manchester	PCM	35.3	35.6	23.4	35.4	11.9	4,366	89%	1%	2%	7%	2%	-9.0
2289_12835	2289_12835	384282	398507	70153	A6	Manchester	PCM	35.1	35.8	23.6	34.3	11.6	9,424	86%	2%	1%	5%	5%	-8.8
1268_46301	1268_46301	383702	398229	7947	A34	Manchester	PCM	37.3	35.6	23.4	41.8	13.9	8,618	68%	2%	14%	11%	5%	-6.1
1341_2939_DW	1341_2939	385618	397656	75239	A635	Manchester	PCM	35.3	30.3	20.5	32.7	14.8	24,708	4%	5%	30%	24%	38%	-6.3
2847_2855_DW	2847_2847	382389	390376	7701	A5103	Manchester	PCM	35.6	17.8	13.0	46.8	22.6	129,967	1%	7%	7%	27%	59%	-6.4
1846_2423_DW	1846_2423	381865	388177	26047	M56	Manchester	PCM	37.0	18.9	13.7	47.5	23.3	13,926	2%	7%	3%	28%	60%	-6.0
1336_16404	1336_16404	384137	397465	17929	A34	Manchester	PCM	30.2	32.2	21.6	23.1	8.6	5,577	92%	1%	1%	3%	3%	-7.5
2006_3292	2006_3292	384110	397858	56529	A5103	Manchester	PCM	28.8	32.2	21.6	18.7	7.2	5,899	84%	2%	2%	10%	3%	-7.7
1302_8546	1302_8546	384428	398838	75248	A664	Manchester	PCM	33.8	35.8	23.6	29.0	10.2	7,823	68%	2%	20%	6%	4%	-6.5
3016_6022_DW	3016_6022	384639	397855	46165	A6	Manchester	PCM	32.4	32.2	21.6	30.0	10.8	7,086	73%	4%	6%	8%	9%	-5.0

Point ID	Rd Link ID	x	y	Census ID	Road name	Local Authority	PCM Total NO <sub>2</sub> conc (µg/m <sup>3</sup> )	Annual mean NO <sub>2</sub> conc (µg/m <sup>3</sup> )	BG NO <sub>x</sub> conc (µg/m <sup>3</sup> )	BG NO <sub>2</sub> conc (µg/m <sup>3</sup> )	Road NO <sub>x</sub> contrib (µg/m <sup>3</sup> )	Road NO <sub>2</sub> contrib (µg/m <sup>3</sup> )	AADT	NOx contribution by vehicle type (%)					Change NO <sub>2</sub> conc (µg/m <sup>3</sup> )
														Bus	Taxi	HGV	LGV	Car	
2291_3923	2291_3923	384010	399185	17822	A6042	Manchester	PCM	31.0	26.5	18.3	29.3	12.7	25,238	16%	7%	12%	19%	46%	-5.9
3293_1285_DW	3293_1285	384280	397739	28486	A34	Manchester	PCM	31.7	32.2	21.6	28.7	10.1	6,561	93%	1%	1%	3%	2%	-3.0
3959_2890_DW	3960_2891	383358	397172	46068	A57M	Manchester	PCM	33.5	29.6	20.1	29.0	13.4	88,204	0%	6%	4%	32%	59%	-4.3
3619_3629	3619_3629	383357	398985	73787	A6042	Manchester	PCM	32.6	35.6	23.4	20.3	9.2	23,032	0%	7%	9%	30%	53%	-3.9
1469_3669_DW	1469_3669	386578	395884	28695	A6	Manchester	PCM	31.6	24.5	17.1	31.0	14.5	27,135	25%	6%	4%	18%	47%	-4.4
1300_7282	1300_7282	384829	398513	47457	A665	Manchester	PCM	31.0	35.8	23.6	16.6	7.4	23,172	4%	7%	11%	27%	51%	-3.3
1356_14504_DW	1356_14504	383011	398485	73790	A34	Manchester	PCM	33.7	35.6	23.4	23.4	10.2	37,132	0%	7%	18%	26%	50%	-3.9
3042_15348	3042_15348	382773	391447	37809	A5103	Manchester	PCM	30.6	15.5	11.5	38.1	19.1	83,244	1%	7%	2%	28%	61%	-5.2
1685_1686_DW	1685_1686	387382	394221	73778	A6	Manchester	PCM	30.7	23.4	16.5	30.8	14.2	27,114	26%	5%	13%	17%	39%	-4.4
1435_4314_DW	1435_4314	383838	395773	80940	A5103	Manchester	PCM	30.8	22.9	16.2	30.2	14.5	40,748	11%	7%	8%	24%	50%	-4.1
14523_14524	14523_14524	393320	405038	36632	A62	Oldham	PCM	39.8	25.7	17.8	46.4	22.0	52,914	0%	7%	8%	29%	56%	-6.6
1295_1703	1295_1703	390482	402513	77008	A62	Oldham	PCM	32.9	22.3	15.8	35.1	17.1	36,966	3%	6%	12%	29%	50%	-5.7
3914_5661	3914_5661	390627	402753	6606	A62	Oldham	PCM	32.3	22.3	15.8	33.9	16.5	37,761	2%	6%	15%	33%	45%	-5.9
3911_4112	3911_4112	389383	403282	99617	A663	Oldham	PCM	32.4	21.4	15.2	35.3	17.2	41,115	4%	7%	7%	24%	58%	-5.4
4629_5567_DW	4629_5567	390741	402566	27823	A6104	Oldham	PCM	31.4	22.3	15.8	31.4	15.7	15,223	3%	6%	6%	35%	50%	-5.0
2210_14216_DW	2210_14216	388664	411856	17322	A664	Rochdale	PCM	37.0	17.9	13.0	55.5	24.0	34,312	0%	4%	40%	21%	34%	-7.0
2210_4463_DW	2210_4463	388729	411971	26586	A58	Rochdale	PCM	36.5	17.9	13.0	55.3	23.5	45,274	6%	4%	39%	18%	33%	-6.6
2202_2205_DW	2202_2205	389446	413627	27469	A680	Rochdale	PCM	33.2	27.0	18.6	30.8	14.6	23,903	6%	6%	19%	24%	45%	-5.5
2202_2538	2202_2538	389424	413513	56600	A58	Rochdale	PCM	32.4	27.0	18.6	27.8	13.7	39,023	1%	8%	6%	26%	60%	-4.9
3132_7573_DW	3132_7573	389842	413925	38048	A671	Rochdale	PCM	32.2	27.0	18.6	27.9	13.6	25,386	9%	7%	4%	24%	55%	-5.3
2210_7536_DW	2210_7536	388580	411886	38543	A58	Rochdale	PCM	29.9	17.9	13.0	35.9	16.9	39,720	11%	6%	16%	21%	47%	-5.1
1349_2993_DW	1349_2993	382580	397716	73792	A57	Salford	PCM	39.2	24.7	17.2	47.2	22.0	57,005	1%	6%	12%	30%	50%	-7.7
1216_14503_DW	1216_14503	382565	398546	17926	A6	Salford	PCM	37.1	25.2	17.6	47.4	19.6	31,092	35%	4%	19%	14%	28%	-6.1
1867_4574_DW	1867_4574	382129	397840	36585	A57	Salford	PCM	36.2	24.7	17.2	40.1	18.9	51,182	0%	6%	15%	30%	49%	-7.1
14311_2299_DW	2299_14311	381488	399165	6161	A6	Salford	PCM	35.9	24.5	17.1	40.8	18.8	50,045	12%	7%	8%	19%	53%	-6.2
1232_12945_DW	1232_12945	381825	398784	56160	A6	Salford	PCM	36.2	23.4	16.4	46.5	19.7	35,178	34%	4%	20%	13%	29%	-5.6
1349_1867_DW	1349_1867	382371	397772	48023	A57	Salford	PCM	37.1	24.7	17.2	42.4	19.8	47,481	0%	6%	17%	28%	48%	-7.3
3964_4732_DW	3964_4732	382871	397244	99516	A56	Salford	PCM	34.8	24.7	17.2	36.8	17.6	42,062	3%	7%	10%	28%	52%	-6.4
3969_6612_DW	3969_6612	381512	398031	6562	A57	Salford	PCM	36.1	23.4	16.4	41.6	19.7	52,505	1%	6%	14%	30%	49%	-7.0
5179_5182_DW	5179_5182	374598	400597	74618	A572	Salford	PCM	34.9	14.7	10.9	49.5	24.0	34,443	2%	7%	8%	28%	55%	-6.6
1579_17017_DW	1579_17017	377344	400951	37363	A580	Salford	PCM	31.8	17.8	13.0	39.4	18.8	39,023	2%	6%	17%	26%	49%	-6.4
1364_1366	1364_1366	381428	399804	17245	A576	Salford	PCM	33.0	24.5	17.1	34.7	15.9	30,732	15%	6%	20%	13%	46%	-5.3
1345_1346_DW	1345_1346	380555	398426	56535	A5186	Salford	PCM	32.3	25.8	17.9	29.6	14.4	13,465	10%	5%	16%	23%	45%	-4.9
3786_1233_DW	3968_1233	381517	398259	27751	A5063	Salford	PCM	31.3	23.4	16.4	30.2	14.8	32,729	2%	7%	10%	23%	59%	-5.0
5249_7952	5249_7952	381205	399532	58028	A576	Salford	PCM	31.4	24.5	17.1	29.4	14.3	34,207	4%	7%	10%	20%	58%	-5.3
3620_5931_DW	3620_5931	390351	390720	37920	A626	Stockport	PCM	34.5	24.2	16.9	36.4	17.5	33,948	0%	6%	14%	31%	48%	-5.3
3973_14181_DW	3973_14181</																		

Point ID	Rd Link ID	x	y	Census ID	Road name	Local Authority	PCM Total NO <sub>2</sub> conc (µg/m <sup>3</sup> )	Annual mean NO <sub>2</sub> conc (µg/m <sup>3</sup> )	BG NO <sub>x</sub> conc (µg/m <sup>3</sup> )	BG NO <sub>2</sub> conc (µg/m <sup>3</sup> )	Road NO <sub>x</sub> contrib (µg/m <sup>3</sup> )	Road NO <sub>2</sub> contrib (µg/m <sup>3</sup> )	AADT	NOx contribution by vehicle type (%)					Change NO <sub>2</sub> conc (µg/m <sup>3</sup> )
														Bus	Taxi	HGV	LGV	Car	
2941_5978_DW	7638_5978	393398	398690	37451	A635	Tameside	PCM	34.0	25.8	17.9	32.9	16.1	52,969	0%	6%	8%	31%	55%	-5.2
5655_5656_DW	5655_5656	392042	398069	76074	A6140	Tameside	PCM	33.4	25.5	17.7	33.5	15.7	21,340	0%	4%	33%	25%	37%	-5.8
3761_5653_DW	3761_5653	390802	395630	99512	A57	Tameside	PCM	30.1	18.6	13.5	34.0	16.7	19,942	2%	6%	16%	32%	44%	-6.0
1954_4640_DW	1954_4640	395215	398833	7391	A635	Tameside	PCM	32.3	25.6	17.8	29.8	14.5	36,663	4%	7%	9%	25%	55%	-4.4
4969_12851	4969_12851	377669	395881	27755	A5081	Trafford	PCM	31.0	19.0	13.7	35.1	17.2	29,671	0%	6%	9%	28%	56%	-6.0
1382_3622_DW	1382_3622	380628	395827	56499	A56	Trafford	PCM	32.3	29.3	19.8	25.2	12.4	35,065	3%	8%	5%	26%	58%	-4.5
2305_5949_DW	2305_5949	380182	395145	36578	A56	Trafford	PCM	32.4	29.3	19.8	25.6	12.6	30,867	6%	8%	6%	23%	58%	-4.1
2309_3788_DW	2309_3788	379330	394059	17904	A5181	Trafford	PCM	30.8	19.6	14.1	35.8	16.7	24,439	0%	5%	39%	18%	38%	-5.0
3492_3511_DW	3492_3511	358611	405310	8566	A577	Wigan	PCM	31.5	29.1	19.7	24.3	11.8	22,266	3%	6%	15%	26%	50%	-5.1
2579_2605_DW	2579_2605	360480	402382	80619	A573	Wigan	PCM	30.1	15.4	11.3	40.7	18.8	26,368	9%	5%	28%	17%	41%	-6.0

**Table B-9: Predicted annual mean NO<sub>2</sub> concentrations and source apportionment at exceedance links on the Greater Manchester road network – Option 7 – 2023**

Point ID	Rd Link ID	x	y	Census ID	Road name	Local Authority	PCM Total NO <sub>2</sub> conc (µg/m <sup>3</sup> )	Annual mean NO <sub>2</sub> conc (µg/m <sup>3</sup> )	BG NO <sub>x</sub> conc (µg/m <sup>3</sup> )	BG NO <sub>2</sub> conc (µg/m <sup>3</sup> )	Road NO <sub>x</sub> contrib (µg/m <sup>3</sup> )	Road NO <sub>2</sub> contrib (µg/m <sup>3</sup> )	AADT	NOx contribution by vehicle type (%)					Change NO <sub>2</sub> conc (µg/m <sup>3</sup> )
														Bus	Taxi	HGV	LGV	Car	
2799_3118_DW	2799_3118	371751	409800	58048	A673	Bolton	PCM	36.9	26.0	18.1	40.4	18.8	27,774	0%	5%	26%	29%	41%	-3.6
2648_6404_DW	2648_6404	372355	408934	47988	A579	Bolton	PCM	35.5	23.4	16.5	38.7	19.0	32,020	2%	5%	7%	42%	44%	-3.5
2650_2653_DW	2653_2650	372915	407622	7431	A666	Bolton	PCM	37.8	24.8	17.3	41.2	20.4	69,687	0%	5%	3%	47%	45%	-2.6
2799_3775_DW	2799_3775	371869	409735	8030	A666	Bolton	PCM	36.3	26.0	18.1	37.4	18.2	21,952	0%	6%	5%	38%	51%	-3.2
2119_2564_DW	2119_2564	371207	409524	17905	A673	Bolton	PCM	34.4	26.0	18.1	34.1	16.3	27,770	15%	6%	5%	26%	47%	-3.7
2407_6761_DW	2407_6761	374740	405143	73087	A667	Bolton	PCM	35.7	17.6	12.8	51.6	22.9	36,715	8%	4%	34%	21%	33%	-4.1
2061_2119_DW	2061_2119	371060	409589	47469	A673	Bolton	PCM	33.2	26.0	18.1	32.6	15.1	24,205	25%	6%	8%	21%	41%	-3.2
3064_15148_DW	3064_15148	371642	408705	7921	A579	Bolton	PCM	33.8	26.6	18.4	33.1	15.4	26,145	26%	5%	6%	22%	40%	-3.3
1986_2053_DW	1986_2053	372038	408749	74518	A575	Bolton	PCM	32.5	23.4	16.5	33.9	16.0	21,575	22%	5%	7%	26%	39%	-4.2
2053_3067_DW	2053_3067	371895	408742	27946	A579	Bolton	PCM	33.2	26.6	18.4	31.4	14.8	24,197	17%	5%	8%	27%	42%	-2.8
2662_14424_DW	2662_14424	371075	408696	28245	A676	Bolton	PCM	33.4	26.6	18.4	31.8	15.0	24,286	9%	6%	21%	25%	40%	-3.2
2799_7832_DW	2799_7832	371805	409910	38542	A666	Bolton	PCM	33.2	26.0	18.1	30.8	15.1	30,034	0%	6%	11%	31%	52%	-2.8
2237_3790_DW	3790_2237	379830	410975	38354	A58	Bury	PCM	42.4	21.4	15.2	60.8	27.2	79,330	9%	5%	16%	27%	43%	-6.6
3424_4940_DW	3424_4940	380920	404881	17924	A56	Bury	PCM	40.0	17.0	12.4	59.5	27.6	19,916	3%	5%	22%	26%	43%	-5.9
2244_4913_DW	2244_4913	381968	410627	73198	A58	Bury	PCM	38.3	21.1	15.1	48.7	23.2	24,267	2%	6%	11%	32%	48%	-5.1
1742_9011_DW	1742_9011	381149	404182	46572	A56	Bury	PCM	36.4	20.4	14.6	48.9	21.8	37,548	11%	4%	26%	23%	36%	-5.6
2243_4639_DW	2243_4639	381310	410749	16556	A58	Bury	PCM	34.1	21.1	15.1	39.7	19.0	28,543	12%	4%	9%	38%	36%	-3.9
3791_3976_DW	3791_3976	380284	410974	26563	A56	Bury	PCM	32.8	22.9	16.2	33.3	16.6	40,788	0%	7%	6%	29%	58%	-3.4
2231_3083_DW	2231_3083	380413	410490	8575	A58	Bury	PCM	27.8	22.9	16.2	23.4	11.6	18,871	18%	5%	1%	36%	40%	-8.8
3056_3842_DW	3056_3842	384880	397418	26157	A6	Manchester	PCM	43.6	32.2	21.6	50.7	22.1	38,728	20%	5%	12%	27%	36%	-3.0
8546_14050	8546_14050	384384	398801	57427	A664	Manchester	PCM	39.3	35.8	23.6	45.9	15.7	7,991	72%	2%	2%	5%	19%	-6.9
1268_1269	1268_1269	383558	398278	27974	A34	Manchester	PCM	41.9	35.6	23.4	54.0	18.5	9,330	65%	3%	3%	11%	19%	-3.0
2283_8544_DW	2283_8544	383791	398603	27992	A56	Manchester	PCM	39.0	35.6	23.4	46.7	15.6	4,303	78%	1%	3%	11%	7%	-6.1
1267_1985	1267_1985	383672	398364	16536	A56	Manchester	PCM	40.3	35.6	23.4	44.1	16.8	8,831	44%	4%	4%	18%	29%	-5.2
1322_3273	1322_3273	383249	398058	27975	A34	Manchester	PCM	40.1	35.6	23.4	37.5	16.7	15,178	0%	7%	5%	27%	60%	-2.9
1242_1243	1242_1243	384483	398343	70154	A62	Manchester	PCM	38.8	35.8	23.6	51.4	15.3	1,410	100%	0%	0%	0%	0%	-5.2
1307_1317	1307_1317	383757	398717	36551	A6	Manchester	PCM	36.5	35.6	23.4	38.1	13.1	4,420	84%	1%	1%	8%	6%	-7.8
2289_12835	2289_12835	384282	398507	70153	A6	Manchester	PCM	37.0	35.8	23.6	38.4	13.4	9,231	78%	2%	1%	6%	14%	-6.9
1268_46301	1268_46301	383702	398229	7947	A34	Manchester	PCM	40.3	35.6	23.4	48.4	16.8	8,654	59%	2%	11%	14%	15%	-3.1
1341_2939_DW	1341_2939	385618	397656	75239	A635	Manchester	PCM	37.3	30.3	20.5	36.7	16.8	25,037	3%	4%	26%	30%	36%	-4.3
2847_2855_DW	2855_2847	382389	390376	7701	A5103	Manchester	PCM	38.0	17.8	13.0	51.6	25.0	130,690	1%	6%	7%	32%	54%	-4.0
1846_2423_DW	1846_2423	381865	388177	26047	M56	Manchester	PCM	39.7	18.9	13.7	53.0	26.0	14,062	2%	7%	3%	35%	54%	-3.3
1336_16404	1336_16404	384137	397465	17929	A34	Manchester	PCM	31.4	32.2	21.6	25.8	9.8	5,799	84%	1%	1%	3%	11%	-6.3
2006_3292	2006_3292	384110	397858	56529	A5103	Manchester	PCM	30.3	32.2	21.6	21.9	8.7	6,270	72%	2%	2%	16%	9%	-6.2
1302_8546	1302_8546	384428	398838	75248	A664	Manchester	PCM	35.7	35.8	23.6	33.3	12.1	8,333	60%	2%	17%	8%	13%	-4.6
3016_6022_DW	3016_6022	384639	397855	46165	A6	Manchester	PCM	35.9	32.2	21.6	37.8	14.3	7,263	58%	3%	5%	10%	24%	-1.5

Point ID	Rd Link ID	x	y	Census ID	Road name	Local Authority	PCM Total NO <sub>2</sub> conc (µg/m <sup>3</sup> )	Annual mean NO <sub>2</sub> conc (µg/m <sup>3</sup> )	BG NO <sub>x</sub> conc (µg/m <sup>3</sup> )	BG NO <sub>2</sub> conc (µg/m <sup>3</sup> )	Road NO <sub>x</sub> contrib (µg/m <sup>3</sup> )	Road NO <sub>2</sub> contrib (µg/m <sup>3</sup> )	AADT	NOx contribution by vehicle type (%)					Change NO <sub>2</sub> conc (µg/m <sup>3</sup> )
														Bus	Taxi	HGV	LGV	Car	
1472_1511_DW	1472_1511	385939	397630	27403	A635	Manchester	PCM	33.6	30.3	20.5	27.1	13.1	27,905	2%	5%	14%	41%	38%	-3.3
1324_8570	1324_8570	383385	397701	7922	A6143	Manchester	PCM	33.9	29.6	20.1	31.0	13.8	13,044	1%	5%	18%	33%	43%	-2.5
2291_3923	2291_3923	384010	399185	17822	A6042	Manchester	PCM	32.7	26.5	18.3	32.9	14.4	25,621	14%	6%	11%	23%	45%	-4.2
3293_1285_DW	3293_1285	384280	397739	28486	A34	Manchester	PCM	32.9	32.2	21.6	31.4	11.4	6,827	87%	1%	1%	4%	7%	-1.8
3959_2890_DW	3960_2891	383358	397172	46068	A57M	Manchester	PCM	35.7	29.6	20.1	33.6	15.6	89,383	0%	5%	3%	39%	53%	-2.1
3619_3629	3619_3629	383357	398985	73787	A6042	Manchester	PCM	34.2	35.6	23.4	23.7	10.8	23,223	0%	6%	8%	36%	49%	-2.3
1469_3669_DW	1469_3669	386578	395884	28695	A6	Manchester	PCM	33.2	24.5	17.1	34.1	16.1	27,552	23%	6%	4%	23%	46%	-2.8
1300_7282	1300_7282	384829	398513	47457	A665	Manchester	PCM	32.4	35.8	23.6	19.4	8.8	23,639	4%	6%	9%	32%	49%	-1.9
1356_14504_DW	1356_14504	383011	398485	73790	A34	Manchester	PCM	35.6	35.6	23.4	27.4	12.2	37,733	0%	6%	16%	32%	47%	-2.0
3042_15348	3042_15348	382773	391447	37809	A5103	Manchester	PCM	32.7	15.5	11.5	42.4	21.2	83,875	1%	7%	2%	33%	57%	-3.1
1685_1686_DW	1685_1686	387382	394221	73778	A6	Manchester	PCM	32.2	23.4	16.5	33.8	15.7	27,329	24%	5%	11%	23%	37%	-2.9
1435_4314_DW	1435_4314	383838	395773	80940	A5103	Manchester	PCM	32.7	22.9	16.2	34.0	16.5	40,899	9%	6%	7%	29%	48%	-2.2
14523_14524	14523_14524	393320	405038	36632	A62	Oldham	PCM	42.4	25.7	17.8	51.6	24.5	53,293	0%	6%	7%	36%	50%	-4.0
1295_1703	1295_1703	390482	402513	77008	A62	Oldham	PCM	35.3	22.3	15.8	40.1	19.5	37,312	5%	6%	10%	35%	44%	-3.3
3914_5661	3914_5661	390627	402753	6606	A62	Oldham	PCM	34.5	22.3	15.8	38.2	18.8	38,047	1%	5%	13%	40%	40%	-3.7
3911_4112	3911_4112	389383	403282	99617	A663	Oldham	PCM	34.3	21.4	15.2	38.9	19.1	41,321	4%	6%	7%	30%	53%	-3.5
4629_5567_DW	4629_5567	390741	402566	27823	A6104	Oldham	PCM	33.7	22.3	15.8	35.7	17.9	15,320	3%	6%	5%	43%	44%	-2.7
2210_14216_DW	2210_14216	388664	411856	17322	A664	Rochdale	PCM	39.6	17.9	13.0	61.0	26.6	34,412	0%	4%	36%	29%	31%	-4.4
2210_4463_DW	2210_4463	388729	411971	26586	A58	Rochdale	PCM	38.7	17.9	13.0	59.9	25.6	45,455	6%	4%	36%	24%	31%	-4.4
2202_2205_DW	2202_2205	389446	413627	27469	A680	Rochdale	PCM	35.0	27.0	18.6	34.2	16.4	24,018	5%	5%	17%	32%	41%	-3.7
2202_2538	2202_2538	389424	413513	56600	A58	Rochdale	PCM	33.8	27.0	18.6	30.6	15.2	39,182	1%	7%	5%	32%	55%	-3.5
3132_7573_DW	3132_7573	389842	413925	38048	A671	Rochdale	PCM	33.6	27.0	18.6	30.6	15.0	25,580	8%	6%	4%	31%	51%	-3.9
2210_7536_DW	2210_7536	388580	411886	38543	A58	Rochdale	PCM	31.8	17.9	13.0	39.6	18.8	39,899	10%	5%	14%	28%	42%	-3.2
1349_2993_DW	1349_2993	382580	397716	73792	A57	Salford	PCM	42.2	24.7	17.2	53.3	25.0	57,466	1%	6%	11%	36%	46%	-4.7
1216_14503_DW	1216_14503	382565	398546	17926	A6	Salford	PCM	39.4	25.2	17.6	52.1	21.9	31,451	32%	4%	17%	19%	28%	-3.8
1867_4574_DW	1867_4574	382129	397840	36585	A57	Salford	PCM	39.0	24.7	17.2	46.1	21.8	51,714	0%	5%	15%	35%	45%	-4.3
14311_2299_DW	2299_14311	381488	399165	6161	A6	Salford	PCM	38.1	24.5	17.1	45.2	21.0	50,590	11%	6%	7%	24%	51%	-4.0
1232_12945_DW	1232_12945	381825	398784	56160	A6	Salford	PCM	38.4	23.4	16.4	51.1	21.9	35,481	31%	4%	18%	18%	29%	-3.4
1349_1867_DW	1349_1867	382371	397772	48023	A57	Salford	PCM	39.8	24.7	17.2	47.9	22.5	47,954	0%	5%	15%	34%	45%	-4.6
3964_4732_DW	3964_4732	382871	397244	99516	A56	Salford	PCM	37.7	24.7	17.2	42.7	20.5	42,627	4%	6%	9%	33%	48%	-3.5
3969_6612_DW	3969_6612	381512	398031	6562	A57	Salford	PCM	38.7	23.4	16.4	46.9	22.3	53,013	1%	5%	13%	36%	45%	-4.4
5179_5182_DW	5179_5182	374598	400597	74618	A572	Salford	PCM	37.5	14.7	10.9	54.8	26.6	34,671	2%	6%	7%	34%	50%	-4.0
1579_17017_DW	1579_17017	377344	400951	37363	A580	Salford	PCM	34.0	17.8	13.0	43.8	21.0	39,476	2%	6%	15%	32%	46%	-4.2
1364_1366	1364_1366	381428	399804	17245	A576	Salford	PCM	34.2	24.5	17.1	37.2	17.2	30,806	14%	5%	18%	19%	44%	-4.1
1345_1346_DW	1345_1346	380555	398426	56535	A5186	Salford	PCM	34.1	25.8	17.9	33.2	16.2	13,612	9%	5%	15%	29%	42%	-3.1
3786_1233_DW	3786_1233	381517	398259	27751	A5063	Salford	PCM	32.8	23.4	16.4	33.1	16.3	32,926	1%	7%	9%	29%	54%	-3.5
5249_7952	5249_7952	381205																	

Point ID	Rd Link ID	x	y	Census ID	Road name	Local Authority	PCM Total NO <sub>2</sub> conc (µg/m <sup>3</sup> )	Annual mean NO <sub>2</sub> conc (µg/m <sup>3</sup> )	BG NO <sub>x</sub> conc (µg/m <sup>3</sup> )	BG NO <sub>2</sub> conc (µg/m <sup>3</sup> )	Road NO <sub>x</sub> contrib (µg/m <sup>3</sup> )	Road NO <sub>2</sub> contrib (µg/m <sup>3</sup> )	AADT	NOx contribution by vehicle type (%)					Change NO <sub>2</sub> conc (µg/m <sup>3</sup> )
														Bus	Taxi	HGV	LGV	Car	
5159_8877_DW	5159_8877	392064	392281	73972	A6017	Stockport	PCM	33.4	24.7	17.2	33.0	16.2	36,962	0%	5%	14%	38%	43%	-3.3
5654_5163_DW	5163_5654	391156	395592	27854	M67	Tameside	PCM	40.7	20.5	14.6	55.0	26.1	66,508	0%	4%	12%	35%	49%	-3.7
3812_14478_DW	3812_14478	392847	398534	99618	A635	Tameside	PCM	39.1	25.5	17.7	45.4	21.4	41,245	4%	5%	15%	37%	39%	-3.6
3813_3812_DW	3813_3812	392978	398478	74561	A6017	Tameside	PCM	35.6	25.5	17.7	36.5	17.9	33,284	2%	6%	7%	38%	47%	-2.9
2941_5978_DW	7638_5978	393398	398690	37451	A635	Tameside	PCM	35.9	25.8	17.9	36.7	18.1	53,070	0%	6%	7%	38%	49%	-3.3
5655_5656_DW	5655_5656	392042	398069	76074	A6140	Tameside	PCM	35.4	25.5	17.7	37.4	17.7	21,544	0%	4%	30%	32%	34%	-3.8
3761_5653_DW	3761_5653	390802	395630	99512	A57	Tameside	PCM	32.4	18.6	13.5	38.3	18.9	19,988	2%	5%	14%	38%	41%	-3.7
1954_4640_DW	1954_4640	395215	398833	7391	A635	Tameside	PCM	33.8	25.6	17.8	32.7	16.0	36,846	4%	7%	8%	31%	50%	-2.9
4969_12851	4969_12851	377669	395881	27755	A5081	Trafford	PCM	32.9	19.0	13.7	38.8	19.1	29,793	0%	6%	8%	35%	51%	-4.1
1382_3622_DW	1382_3622	380628	395827	56499	A56	Trafford	PCM	34.1	29.3	19.8	28.7	14.2	35,406	3%	7%	4%	31%	54%	-2.7
2305_5949_DW	2305_5949	380182	395145	36578	A56	Trafford	PCM	33.7	29.3	19.8	28.1	13.9	31,146	5%	7%	6%	28%	54%	-2.8
2309_3788_DW	2309_3788	379330	394059	17904	A5181	Trafford	PCM	32.4	19.6	14.1	39.0	18.3	24,500	0%	4%	36%	24%	35%	-3.4
3492_3511_DW	3492_3511	358611	405310	8566	A577	Wigan	PCM	33.0	29.1	19.7	27.3	13.3	22,432	3%	6%	15%	32%	45%	-3.6
2579_2605_DW	2579_2605	360480	402382	80619	A573	Wigan	PCM	31.8	15.4	11.3	43.9	20.4	26,432	8%	5%	26%	23%	38%	-4.3

**Table B-10: Predicted annual mean NO<sub>2</sub> concentrations and source apportionment at exceedance links on the Greater Manchester road network – Option 8 – 2023**

Point ID	Rd Link ID	x	y	Census ID	Road name	Local Authority	PCM Total NO <sub>2</sub> conc (µg/m <sup>3</sup> )	Annual mean NO <sub>2</sub> conc (µg/m <sup>3</sup> )	BG NO <sub>x</sub> conc (µg/m <sup>3</sup> )	BG NO <sub>2</sub> conc (µg/m <sup>3</sup> )	Road NO <sub>x</sub> contrib (µg/m <sup>3</sup> )	Road NO <sub>2</sub> contrib (µg/m <sup>3</sup> )	AADT	NOx contribution by vehicle type (%)					Change NO <sub>2</sub> conc (µg/m <sup>3</sup> )
														Bus	Taxi	HGV	LGV	Car	
2799_3118_DW	2799_3118	371751	409800	58048	A673	Bolton	PCM	35.1	26.0	18.1	36.8	17.0	27,699	0%	6%	28%	21%	45%	-5.4
2648_6404_DW	2648_6404	372355	408934	47988	A579	Bolton	PCM	33.3	23.4	16.5	34.3	16.8	31,737	2%	6%	8%	34%	50%	-5.7
2650_2653_DW	2653_2650	372915	407622	7431	A666	Bolton	PCM	35.3	24.8	17.3	36.4	18.0	69,278	0%	6%	3%	40%	51%	-5.1
2799_3775_DW	2799_3775	371869	409735	8030	A666	Bolton	PCM	34.6	26.0	18.1	34.0	16.5	21,861	0%	7%	6%	31%	57%	-4.9
2119_2564_DW	2119_2564	371207	409524	17905	A673	Bolton	PCM	32.9	26.0	18.1	31.1	14.8	27,571	17%	7%	5%	20%	51%	-5.2
2407_6761_DW	2407_6761	374740	405143	73087	A667	Bolton	PCM	33.9	17.6	12.8	47.9	21.1	36,608	8%	4%	36%	15%	36%	-5.9
2061_2119_DW	2061_2119	371060	409589	47469	A673	Bolton	PCM	32.2	26.0	18.1	30.5	14.1	24,065	26%	6%	8%	16%	44%	-4.2
3064_15148_DW	3064_15148	371642	408705	7921	A579	Bolton	PCM	32.7	26.6	18.4	31.0	14.3	26,052	27%	5%	7%	17%	43%	-4.4
1986_2053_DW	1986_2053	372038	408749	74518	A575	Bolton	PCM	31.1	23.4	16.5	31.2	14.7	21,401	24%	5%	8%	20%	42%	-5.6
2053_3067_DW	2053_3067	371895	408742	27946	A579	Bolton	PCM	32.0	26.6	18.4	29.0	13.6	24,108	19%	6%	9%	21%	45%	-4.0
2662_14424_DW	2662_14424	371075	408696	28245	A676	Bolton	PCM	32.0	26.6	18.4	29.1	13.6	24,270	10%	6%	23%	17%	44%	-4.6
2799_7832_DW	2799_7832	371805	409910	38542	A666	Bolton	PCM	31.9	26.0	18.1	28.3	13.8	29,931	0%	7%	12%	25%	57%	-4.1
2237_3790_DW	3790_2237	379830	410975	38354	A58	Bury	PCM	39.9	21.4	15.2	55.5	24.7	79,042	10%	6%	17%	20%	47%	-9.1
3424_4940_DW	3424_4940	380920	404881	17924	A56	Bury	PCM	37.6	17.0	12.4	54.5	25.2	19,809	3%	6%	24%	20%	46%	-8.3
2244_4913_DW	2244_4913	381968	410627	73198	A58	Bury	PCM	35.9	21.1	15.1	43.9	20.8	24,200	2%	7%	12%	26%	53%	-7.5
1742_9011_DW	1742_9011	381149	404182	46572	A56	Bury	PCM	34.7	20.4	14.6	45.4	20.1	37,353	12%	5%	28%	17%	38%	-7.3
2243_4639_DW	2243_4639	381310	410749	16556	A58	Bury	PCM	32.1	21.1	15.1	35.6	16.9	28,335	14%	5%	10%	30%	41%	-5.9
3791_3976_DW	3791_3976	380284	410974	26563	A56	Bury	PCM	31.4	22.9	16.2	30.7	15.2	40,666	0%	8%	7%	23%	63%	-4.8
2231_3083_DW	2231_3083	380413	410490	8575	A58	Bury	PCM	26.6	22.9	16.2	21.2	10.4	18,786	20%	6%	1%	29%	44%	-10.0
3056_3842_DW	3056_3842	384880	397418	26157	A6	Manchester	PCM	41.7	32.2	21.6	46.5	20.1	38,564	22%	5%	13%	20%	40%	-4.9
8546_14050	8546_14050	384384	398801	57427	A664	Manchester	PCM	39.1	35.8	23.6	45.6	15.5	7,995	72%	2%	3%	4%	19%	-7.1
1268_1269	1268_1269	383558	398278	27974	A34	Manchester	PCM	41.1	35.6	23.4	52.1	17.7	9,299	67%	3%	3%	8%	20%	-3.8
2283_8544_DW	2283_8544	383791	398603	27992	A56	Manchester	PCM	38.3	35.6	23.4	45.1	14.9	4,276	80%	1%	4%	8%	7%	-6.8
1267_1985	1267_1985	383672	398364	16536	A56	Manchester	PCM	39.2	35.6	23.4	41.8	15.8	8,793	47%	4%	5%	14%	31%	-6.3
1322_3273	1322_3273	383249	398058	27975	A34	Manchester	PCM	38.6	35.6	23.4	34.0	15.1	15,118	0%	8%	5%	22%	65%	-4.4
1242_1243	1242_1243	384483	398343	70154	A62	Manchester	PCM	38.7	35.8	23.6	51.1	15.2	1,410	100%	0%	0%	0%	0%	-5.3
1307_1317	1307_1317	383757	398717	36551	A6	Manchester	PCM	36.1	35.6	23.4	37.0	12.6	4,393	86%	1%	1%	6%	6%	-8.2
2289_12835	2289_12835	384282	398507	70153	A6	Manchester	PCM	36.6	35.8	23.6	37.6	13.1	9,219	79%	2%	1%	5%	14%	-7.3
1268_46301	1268_46301	383702	398229	7947	A34	Manchester	PCM	39.3	35.6	23.4	46.3	15.9	8,639	61%	2%	11%	10%	15%	-4.1
1341_2939_DW	1341_2939	385618	397656	75239	A635	Manchester	PCM	35.7	30.3	20.5	33.7	15.3	24,899	3%	5%	29%	24%	40%	-5.9
2847_2855_DW	2855_2847	382389	390376	7701	A5103	Manchester	PCM	35.9	17.8	13.0	47.3	22.9	130,203	1%	7%	7%	27%	59%	-6.1
1846_2423_DW	1846_2423	381865	388177	26047	M56	Manchester	PCM	37.2	18.9	13.7	47.8	23.5	13,939	2%	7%	3%	28%	60%	-5.8
1336_16404	1336_16404	384137	397465	17929	A34	Manchester	PCM	31.1	32.2	21.6	25.2	9.5	5,775	84%	1%	1%	2%	11%	-6.6
2006_3292	2006_3292	384110	397858	56529	A5103	Manchester	PCM	29.7	32.2	21.6	20.8	8.2	6,213	76%	2%	2%	12%	10%	-6.8
1302_8546	1302_8546	384428	398838	75248	A664	Manchester	PCM	35.2	35.8	23.6	32.1	11.6	8,271	61%	2%	18%	6%	13%	-5.1
3016_6022_DW	3016_6022	384639	397855	46165	A6	Manchester	PCM	35.2	32.2	21.6	36.2	13.6	7,235	60%	3%	5%	6%	25%	-2.2</

Point ID	Rd Link ID	x	y	Census ID	Road name	Local Authority	PCM Total NO <sub>2</sub> conc (µg/m <sup>3</sup> )	Annual mean NO <sub>2</sub> conc (µg/m <sup>3</sup> )	BG NO <sub>x</sub> conc (µg/m <sup>3</sup> )	BG NO <sub>2</sub> conc (µg/m <sup>3</sup> )	Road NO <sub>x</sub> contrib (µg/m <sup>3</sup> )	Road NO <sub>2</sub> contrib (µg/m <sup>3</sup> )	AADT	NOx contribution by vehicle type (%)					Change NO <sub>2</sub> conc (µg/m <sup>3</sup> )
														Bus	Taxi	HGV	LGV	Car	
2291_3923	2291_3923	384010	399185	17822	A6042	Manchester	PCM	31.6	26.5	18.3	30.7	13.3	25,478	15%	6%	12%	18%	48%	-5.3
3293_1285_DW	3293_1285	384280	397739	28486	A34	Manchester	PCM	32.6	32.2	21.6	30.7	11.0	6,801	88%	1%	1%	3%	7%	-2.1
3959_2890_DW	3960_2891	383358	397172	46068	A57M	Manchester	PCM	33.9	29.6	20.1	29.9	13.8	88,862	0%	6%	4%	31%	59%	-3.9
3619_3629	3619_3629	383357	398985	73787	A6042	Manchester	PCM	33.1	35.6	23.4	21.4	9.7	23,124	0%	7%	9%	29%	55%	-3.4
1469_3669_DW	1469_3669	386578	395884	28695	A6	Manchester	PCM	32.0	24.5	17.1	31.8	14.9	27,414	24%	6%	4%	17%	49%	-4.0
1300_7282	1300_7282	384829	398513	47457	A665	Manchester	PCM	31.6	35.8	23.6	17.7	8.0	23,484	4%	6%	10%	26%	54%	-2.7
1356_14504_DW	1356_14504	383011	398485	73790	A34	Manchester	PCM	34.4	35.6	23.4	25.0	11.0	37,647	0%	6%	18%	24%	52%	-3.2
3042_15348	3042_15348	382773	391447	37809	A5103	Manchester	PCM	30.9	15.5	11.5	38.9	19.5	83,502	1%	7%	2%	27%	62%	-4.9
1685_1686_DW	1685_1686	387382	394221	73778	A6	Manchester	PCM	30.9	23.4	16.5	31.4	14.4	27,267	26%	5%	12%	16%	40%	-4.2
1435_4314_DW	1435_4314	383838	395773	80940	A5103	Manchester	PCM	31.3	22.9	16.2	31.3	15.1	40,907	10%	7%	8%	23%	52%	-3.6
14523_14524	14523_14524	393320	405038	36632	A62	Oldham	PCM	39.9	25.7	17.8	46.6	22.1	52,947	0%	7%	8%	29%	56%	-6.5
1295_1703	1295_1703	390482	402513	77008	A62	Oldham	PCM	33.0	22.3	15.8	35.4	17.2	37,075	3%	7%	12%	29%	50%	-5.6
3914_5661	3914_5661	390627	402753	6606	A62	Oldham	PCM	32.4	22.3	15.8	34.0	16.6	37,803	2%	6%	15%	33%	45%	-5.8
3911_4112	3911_4112	389383	403282	99617	A663	Oldham	PCM	32.5	21.4	15.2	35.5	17.3	41,178	4%	7%	7%	24%	58%	-5.3
4629_5567_DW	4629_5567	390741	402566	27823	A6104	Oldham	PCM	31.5	22.3	15.8	31.5	15.7	15,245	3%	6%	6%	35%	50%	-4.9
2210_14216_DW	2210_14216	388664	411856	17322	A664	Rochdale	PCM	37.1	17.9	13.0	55.6	24.1	34,315	0%	4%	40%	21%	35%	-6.9
2210_4463_DW	2210_4463	388729	411971	26586	A58	Rochdale	PCM	36.6	17.9	13.0	55.4	23.5	45,290	6%	4%	39%	18%	33%	-6.5
2202_2205_DW	2202_2205	389446	413627	27469	A680	Rochdale	PCM	33.3	27.0	18.6	30.9	14.7	23,904	6%	6%	19%	24%	45%	-5.4
2202_2538	2202_2538	389424	413513	56600	A58	Rochdale	PCM	32.4	27.0	18.6	27.9	13.8	38,999	1%	8%	6%	26%	60%	-4.9
3132_7573_DW	3132_7573	389842	413925	38048	A671	Rochdale	PCM	32.2	27.0	18.6	28.0	13.6	25,388	9%	7%	4%	24%	56%	-5.3
2210_7536_DW	2210_7536	388580	411886	38543	A58	Rochdale	PCM	30.0	17.9	13.0	36.0	17.0	39,720	11%	6%	16%	21%	47%	-5.0
1349_2993_DW	1349_2993	382580	397716	73792	A57	Salford	PCM	39.8	24.7	17.2	48.4	22.6	57,265	1%	6%	12%	29%	51%	-7.1
1216_14503_DW	1216_14503	382565	398546	17926	A6	Salford	PCM	37.8	25.2	17.6	48.7	20.2	31,284	34%	4%	18%	13%	30%	-5.4
1867_4574_DW	1867_4574	382129	397840	36585	A57	Salford	PCM	36.9	24.7	17.2	41.9	19.7	51,490	0%	6%	16%	29%	49%	-6.4
14311_2299_DW	2299_14311	381488	399165	6161	A6	Salford	PCM	36.6	24.5	17.1	42.2	19.5	50,376	12%	7%	8%	18%	55%	-5.5
1232_12945_DW	1232_12945	381825	398784	56160	A6	Salford	PCM	36.7	23.4	16.4	47.6	20.3	35,368	33%	4%	19%	13%	31%	-5.1
1349_1867_DW	1349_1867	382371	397772	48023	A57	Salford	PCM	37.7	24.7	17.2	43.8	20.5	47,799	0%	6%	17%	27%	49%	-6.7
3964_4732_DW	3964_4732	382871	397244	99516	A56	Salford	PCM	35.7	24.7	17.2	38.8	18.5	42,427	4%	7%	10%	26%	53%	-5.5
3969_6612_DW	3969_6612	381512	398031	6562	A57	Salford	PCM	36.5	23.4	16.4	42.4	20.1	52,802	1%	6%	14%	29%	50%	-6.6
5179_5182_DW	5179_5182	374598	400597	74618	A572	Salford	PCM	35.0	14.7	10.9	49.7	24.1	34,477	2%	7%	8%	28%	55%	-6.5
1579_17017_DW	1579_17017	377344	400951	37363	A580	Salford	PCM	32.1	17.8	13.0	39.9	19.1	39,205	2%	6%	16%	25%	50%	-6.1
1364_1366	1364_1366	381428	399804	17245	A576	Salford	PCM	33.1	24.5	17.1	34.9	16.0	30,777	15%	6%	20%	13%	46%	-5.2
1345_1346_DW	1345_1346	380555	398426	56535	A5186	Salford	PCM	32.4	25.8	17.9	29.9	14.5	13,553	10%	6%	16%	23%	46%	-4.8
3786_1233_DW	3968_1233	381517	398259	27751	A5063	Salford	PCM	31.4	23.4	16.4	30.6	15.0	32,816	2%	7%	9%	23%	59%	-4.9
5249_7952	5249_7952	381205	399532	58028	A576	Salford	PCM	31.6	24.5	17.1	29.8	14.5	34,286	4%	7%	10%	20%	58%	-5.1
3620_5931_DW	3620_5931	390351	390720	37920	A626	Stockport	PCM	34.6	24.2	16.9	36.6	17.6	34,007	0%	6%	14%	31%	48%	-5.2
3973_14181_DW	3973_14181</td																		

Point ID	Rd Link ID	x	y	Census ID	Road name	Local Authority	PCM Total NO <sub>2</sub> conc (µg/m <sup>3</sup> )	Annual mean NO <sub>2</sub> conc (µg/m <sup>3</sup> )	BG NO <sub>x</sub> conc (µg/m <sup>3</sup> )	BG NO <sub>2</sub> conc (µg/m <sup>3</sup> )	Road NO <sub>x</sub> contrib (µg/m <sup>3</sup> )	Road NO <sub>2</sub> contrib (µg/m <sup>3</sup> )	AADT	NOx contribution by vehicle type (%)					Change NO <sub>2</sub> conc (µg/m <sup>3</sup> )
														Bus	Taxi	HGV	LGV	Car	
2941_5978_DW	7638_5978	393398	398690	37451	A635	Tameside	PCM	34.1	25.8	17.9	33.1	16.2	52,981	0%	7%	8%	31%	55%	-5.1
5655_5656_DW	5655_5656	392042	398069	76074	A6140	Tameside	PCM	33.5	25.5	17.7	33.7	15.8	21,374	0%	5%	33%	25%	37%	-5.7
3761_5653_DW	3761_5653	390802	395630	99512	A57	Tameside	PCM	30.4	18.6	13.5	34.5	16.9	19,967	2%	6%	16%	31%	45%	-5.7
1954_4640_DW	1954_4640	395215	398833	7391	A635	Tameside	PCM	32.4	25.6	17.8	30.1	14.6	36,717	4%	7%	9%	25%	55%	-4.3
4969_12851	4969_12851	377669	395881	27755	A5081	Trafford	PCM	31.1	19.0	13.7	35.4	17.4	29,692	0%	6%	9%	28%	57%	-5.9
1382_3622_DW	1382_3622	380628	395827	56499	A56	Trafford	PCM	32.6	29.3	19.8	25.8	12.8	35,263	3%	8%	5%	25%	59%	-4.2
2305_5949_DW	2305_5949	380182	395145	36578	A56	Trafford	PCM	32.7	29.3	19.8	26.1	12.8	31,028	6%	8%	6%	22%	59%	-3.8
2309_3788_DW	2309_3788	379330	394059	17904	A5181	Trafford	PCM	30.9	19.6	14.1	36.0	16.8	24,429	0%	5%	39%	18%	38%	-4.9
3492_3511_DW	3492_3511	358611	405310	8566	A577	Wigan	PCM	31.5	29.1	19.7	24.3	11.8	22,257	3%	6%	15%	26%	50%	-5.1
2579_2605_DW	2579_2605	360480	402382	80619	A573	Wigan	PCM	30.3	15.4	11.3	41.2	18.9	26,366	9%	5%	29%	17%	41%	-5.8

**Table B-11: Predicted annual mean NO<sub>2</sub> concentrations and source apportionment at exceedance links on the Greater Manchester road network - Do Minimum – 2025**

Point ID	Rd Link ID	x	y	Census ID	Road name	Local Authority	PCM Total NO <sub>2</sub> conc (µg/m <sup>3</sup> )	Annual mean NO <sub>2</sub> conc (µg/m <sup>3</sup> )	BG NO <sub>x</sub> conc (µg/m <sup>3</sup> )	BG NO <sub>2</sub> conc (µg/m <sup>3</sup> )	Road NO <sub>x</sub> contrib (µg/m <sup>3</sup> )	Road NO <sub>2</sub> contrib (µg/m <sup>3</sup> )	AADT	NOx contribution by vehicle type (%)					Change NO <sub>2</sub> conc (µg/m <sup>3</sup> )
														Bus	Taxi	HGV	LGV	Car	
2799_3118_DW	2799_3118	371751	409800	58048	A673	Bolton	PCM	35.9	24.3	17.0	41.5	18.9	28,104	0%	5%	31%	25%	38%	na
2648_6404_DW	2648_6404	372355	408934	47988	A579	Bolton	PCM	34.6	22.0	15.6	39.5	19.0	32,661	6%	5%	11%	36%	41%	na
2650_2653_DW	2653_2650	372915	407622	7431	A666	Bolton	PCM	36.4	23.5	16.5	40.6	19.9	71,974	0%	5%	5%	45%	45%	na
2799_3775_DW	2799_3775	371869	409735	8030	A666	Bolton	PCM	35.1	24.3	17.0	37.7	18.1	22,486	0%	6%	8%	36%	49%	na
2119_2564_DW	2119_2564	371207	409524	17905	A673	Bolton	PCM	34.1	24.3	17.0	37.1	17.1	28,423	24%	6%	7%	22%	42%	na
2407_6761_DW	2407_6761	374740	405143	73087	A667	Bolton	PCM	35.3	16.5	12.1	53.3	23.2	37,856	9%	4%	38%	19%	31%	na
2061_2119_DW	2061_2119	371060	409589	47469	A673	Bolton	PCM	32.7	24.3	17.0	34.6	15.7	24,787	30%	5%	9%	18%	37%	na
3064_15148_DW	3064_15148	371642	408705	7921	A579	Bolton	PCM	33.6	25.2	17.5	35.6	16.0	26,720	31%	5%	9%	19%	36%	na
1986_2053_DW	1986_2053	372038	408749	74518	A575	Bolton	PCM	32.8	22.0	15.6	37.9	17.2	22,112	32%	4%	10%	20%	33%	na
2053_3067_DW	2053_3067	371895	408742	27946	A579	Bolton	PCM	32.5	25.2	17.5	32.3	14.9	24,506	18%	5%	13%	25%	39%	na
2662_14424_DW	2662_14424	371075	408696	28245	A676	Bolton	PCM	32.8	25.2	17.5	33.2	15.3	24,311	14%	5%	24%	22%	36%	na
2799_7832_DW	2799_7832	371805	409910	38542	A666	Bolton	PCM	32.0	24.3	17.0	31.1	15.0	30,500	0%	6%	15%	29%	50%	na
2237_3790_DW	3790_2237	379830	410975	38354	A58	Bury	PCM	43.2	20.1	14.4	68.4	28.8	80,557	20%	5%	17%	22%	36%	na
3424_4940_DW	3424_4940	380920	404881	17924	A56	Bury	PCM	40.1	16.0	11.7	64.0	28.4	20,010	9%	5%	29%	22%	36%	na
2244_4913_DW	2244_4913	381968	410627	73198	A58	Bury	PCM	37.9	19.7	14.2	51.8	23.7	24,726	6%	6%	17%	28%	43%	na
1742_9011_DW	1742_9011	381149	404182	46572	A56	Bury	PCM	37.3	19.2	13.8	55.5	23.5	38,251	20%	4%	29%	18%	29%	na
2243_4639_DW	2243_4639	381310	410749	16556	A58	Bury	PCM	33.7	19.7	14.2	42.1	19.5	29,517	18%	4%	12%	32%	34%	na
3791_3976_DW	3791_3976	380284	410974	26563	A56	Bury	PCM	32.0	21.5	15.3	34.2	16.7	41,211	0%	8%	10%	27%	55%	na
2231_3083_DW	2231_3083	380413	410490	8575	A58	Bury	PCM	31.6	21.5	15.3	37.2	16.3	19,290	54%	3%	1%	19%	23%	na
3056_3842_DW	3056_3842	384880	397418	26157	A6	Manchester	PCM	42.5	30.0	20.3	51.8	22.2	39,336	21%	5%	14%	25%	36%	na
8546_14050	8546_14050	384384	398801	57427	A664	Manchester	PCM	31.6	33.2	22.1	24.8	9.4	8,089	79%	2%	3%	4%	12%	na
1268_1269	1268_1269	383558	398278	27974	A34	Manchester	PCM	41.5	33.2	22.1	58.5	19.5	9,412	68%	2%	3%	9%	17%	na
2283_8544_DW	2283_8544	383791	398603	27992	A56	Manchester	PCM	30.1	33.2	22.1	20.7	8.0	4,314	84%	1%	4%	7%	5%	na
1267_1985	1267_1985	383672	398364	16536	A56	Manchester	PCM	30.5	33.2	22.1	20.6	8.5	9,054	52%	3%	6%	15%	24%	na
1322_3273	1322_3273	383249	398058	27975	A34	Manchester	PCM	38.6	33.2	22.1	37.5	16.5	15,424	0%	8%	9%	25%	59%	na
1242_1243	1242_1243	384483	398343	70154	A62	Manchester	PCM	33.3	33.2	22.1	32.0	11.1	1,408	100%	0%	0%	0%	0%	na
1307_1317	1307_1317	383757	398717	36551	A6	Manchester	PCM	30.0	33.2	22.1	20.7	7.9	4,431	90%	1%	1%	5%	3%	na
2289_12835	2289_12835	384282	398507	70153	A6	Manchester	PCM	30.1	33.2	22.1	20.5	8.0	9,173	84%	1%	1%	4%	10%	na
1268_46301	1268_46301	383702	398229	7947	A34	Manchester	PCM	29.4	33.2	22.1	18.1	7.3	8,754	62%	2%	12%	11%	13%	na
1341_2939_DW	1341_2939	385618	397656	75239	A635	Manchester	PCM	37.3	28.5	19.4	40.9	17.9	25,544	7%	4%	35%	24%	30%	na
2847_2855_DW	2847_2847	382389	390376	7701	A5103	Manchester	PCM	37.2	16.5	12.1	52.8	25.1	135,455	2%	6%	11%	29%	52%	na
1846_2423_DW	1846_2423	381865	388177	26047	M56	Manchester	PCM	37.8	17.6	12.8	51.4	25.0	14,647	5%	7%	5%	32%	52%	na
1336_16404	1336_16404	384137	397465	17929	A34	Manchester	PCM	31.1	30.0	20.3	28.7	10.7	6,002	94%	0%	1%	1%	3%	na
2006_3292	2006_3292	384110	397858	56529	A5103	Manchester	PCM	30.6	30.0	20.3	26.9	10.3	6,501	86%	1%	1%	7%	5%	na
1302_8546	1302_8546	384428	398838	75248	A664	Manchester	PCM	31.7	33.2	22.1	24.7	9.5	8,523	67%	1%	16%	6%	9%	na
3016_6022_DW	3016_6022	384639	397855	46165	A6	Manchester	PCM	29.4	30.0	20.3	22.1	9.1	7,366	59%	3%	6%	9%	23%	na
1312_5801_DW	1312_5801	383778	399163	36577	A56	Manchester</													

Point ID	Rd Link ID	x	y	Census ID	Road name	Local Authority	PCM Total NO <sub>2</sub> conc (µg/m <sup>3</sup> )	Annual mean NO <sub>2</sub> conc (µg/m <sup>3</sup> )	BG NO <sub>x</sub> conc (µg/m <sup>3</sup> )	BG NO <sub>2</sub> conc (µg/m <sup>3</sup> )	Road NO <sub>x</sub> contrib (µg/m <sup>3</sup> )	Road NO <sub>2</sub> contrib (µg/m <sup>3</sup> )	AADT	NOx contribution by vehicle type (%)					Change NO <sub>2</sub> conc (µg/m <sup>3</sup> )
														Bus	Taxi	HGV	LGV	Car	
2291_3923	2291_3923	384010	399185	17822	A6042	Manchester	PCM	32.8	24.8	17.3	36.8	15.5	25,821	22%	5%	15%	19%	39%	na
3293_1285_DW	3293_1285	384280	397739	28486	A34	Manchester	PCM	36.1	30.0	20.3	46.9	15.8	6,817	90%	1%	1%	3%	6%	na
3959_2890_DW	3960_2891	383358	397172	46068	A57M	Manchester	PCM	34.0	27.6	18.9	32.7	15.1	91,610	0%	5%	6%	36%	53%	na
3619_3629	3619_3629	383357	398985	73787	A6042	Manchester	PCM	32.9	33.2	22.1	24.2	10.8	23,362	0%	6%	14%	33%	47%	na
1469_3669_DW	1469_3669	386578	395884	28695	A6	Manchester	PCM	32.4	22.9	16.1	35.0	16.2	28,000	26%	6%	6%	20%	42%	na
1300_7282	1300_7282	384829	398513	47457	A665	Manchester	PCM	28.3	33.2	22.1	13.6	6.1	24,139	4%	6%	15%	28%	47%	na
1356_14504_DW	1356_14504	383011	398485	73790	A34	Manchester	PCM	34.2	33.2	22.1	27.6	12.1	38,051	0%	6%	21%	29%	44%	na
3042_15348	3042_15348	382773	391447	37809	A5103	Manchester	PCM	31.8	14.5	10.8	42.3	21.0	86,815	2%	7%	4%	31%	56%	na
1685_1686_DW	1685_1686	387382	394221	73778	A6	Manchester	PCM	31.6	21.8	15.5	35.7	16.1	27,599	29%	5%	14%	19%	33%	na
1435_4314_DW	1435_4314	383838	395773	80940	A5103	Manchester	PCM	31.4	21.2	15.1	34.0	16.3	41,379	10%	6%	12%	27%	45%	na
14523_14524	14523_14524	393320	405038	36632	A62	Oldham	PCM	41.1	24.4	17.0	51.7	24.1	54,539	0%	6%	12%	33%	49%	na
1295_1703	1295_1703	390482	402513	77008	A62	Oldham	PCM	34.4	21.2	15.1	40.4	19.3	38,214	5%	6%	16%	32%	41%	na
3914_5661	3914_5661	390627	402753	6606	A62	Oldham	PCM	33.8	21.2	15.1	39.0	18.7	39,122	2%	5%	21%	35%	37%	na
3911_4112	3911_4112	389383	403282	99617	A663	Oldham	PCM	33.4	20.2	14.5	39.4	18.9	42,037	6%	6%	11%	26%	50%	na
4629_5567_DW	4629_5567	390741	402566	27823	A6104	Oldham	PCM	32.5	21.2	15.1	35.2	17.4	15,824	3%	6%	9%	39%	43%	na
2210_14216_DW	2210_14216	388664	411856	17322	A664	Rochdale	PCM	38.9	17.0	12.4	62.0	26.4	34,744	0%	4%	41%	25%	29%	na
2210_4463_DW	2210_4463	388729	411971	26586	A58	Rochdale	PCM	38.3	17.0	12.4	62.1	25.9	45,946	8%	4%	40%	21%	28%	na
2202_2205_DW	2202_2205	389446	413627	27469	A680	Rochdale	PCM	34.6	25.4	17.7	36.5	16.9	24,473	13%	5%	19%	27%	36%	na
2202_2538	2202_2538	389424	413513	56600	A58	Rochdale	PCM	33.3	25.4	17.7	32.5	15.7	39,726	6%	7%	8%	28%	51%	na
3132_7573_DW	3132_7573	389842	413925	38048	A671	Rochdale	PCM	33.4	25.4	17.7	33.2	15.7	26,394	18%	6%	6%	26%	45%	na
2210_7536_DW	2210_7536	388580	411886	38543	A58	Rochdale	PCM	31.1	17.0	12.4	40.2	18.7	40,399	13%	5%	17%	26%	40%	na
1349_2993_DW	1349_2993	382580	397716	73792	A57	Salford	PCM	42.8	23.2	16.3	59.0	26.5	58,165	2%	5%	20%	32%	41%	na
1216_14503_DW	1216_14503	382565	398546	17926	A6	Salford	PCM	39.0	23.7	16.6	54.8	22.4	32,133	35%	4%	20%	16%	26%	na
1867_4574_DW	1867_4574	382129	397840	36585	A57	Salford	PCM	38.2	23.2	16.3	47.6	21.9	52,469	1%	5%	21%	32%	41%	na
14311_2299_DW	2299_14311	381488	399165	6161	A6	Salford	PCM	37.4	23.1	16.2	46.7	21.2	51,196	13%	6%	12%	22%	47%	na
1232_12945_DW	1232_12945	381825	398784	56160	A6	Salford	PCM	37.8	22.1	15.6	52.8	22.2	35,963	33%	4%	21%	16%	27%	na
1349_1867_DW	1349_1867	382371	397772	48023	A57	Salford	PCM	38.9	23.2	16.3	49.5	22.6	48,356	1%	5%	22%	30%	41%	na
3964_4732_DW	3964_4732	382871	397244	99516	A56	Salford	PCM	36.6	23.2	16.3	43.0	20.3	43,455	5%	6%	13%	30%	46%	na
3969_6612_DW	3969_6612	381512	398031	6562	A57	Salford	PCM	38.0	22.1	15.6	48.4	22.4	53,700	3%	5%	18%	32%	41%	na
5179_5182_DW	5179_5182	374598	400597	74618	A572	Salford	PCM	36.1	13.8	10.3	54.0	25.9	35,544	5%	6%	13%	30%	46%	na
1579_17017_DW	1579_17017	377344	400951	37363	A580	Salford	PCM	33.7	16.7	12.2	46.0	21.5	40,969	3%	5%	22%	28%	42%	na
1364_1366	1364_1366	381428	399804	17245	A576	Salford	PCM	34.1	23.1	16.2	40.2	17.9	30,860	21%	5%	21%	15%	37%	na
1345_1346_DW	1345_1346	380555	398426	56535	A5186	Salford	PCM	33.3	24.4	17.0	34.0	16.3	13,845	10%	5%	23%	26%	37%	na
3786_1233_DW	3786_1233	381517	398259	27751	A5063	Salford	PCM	32.2	22.1	15.6	34.5	16.6	33,380	5%	7%	14%	25%	50%	na
5249_7952	5249_7952	381205	399532	58028	A576	Salford	PCM	33.3	23.1	16.2	36.6	17.1	34,436	11%	6%	17%	20%	45%	na
3620_5931_DW	3620_5931	390351	390720	37920	A626	Stockport	PCM	35.7	22.9	16.1	41.7	19.6	34,473	0%	5%	22%	33%	40%	na
3973_14181_DW	3973_14181	388375	390354	58034	A5145	Stockport	PCM	37.9											

Point ID	Rd Link ID	x	y	Census ID	Road name	Local Authority	PCM Total NO <sub>2</sub> conc (µg/m <sup>3</sup> )	Annual mean NO <sub>2</sub> conc (µg/m <sup>3</sup> )	BG NO <sub>x</sub> conc (µg/m <sup>3</sup> )	BG NO <sub>2</sub> conc (µg/m <sup>3</sup> )	Road NO <sub>x</sub> contrib (µg/m <sup>3</sup> )	Road NO <sub>2</sub> contrib (µg/m <sup>3</sup> )	AADT	NOx contribution by vehicle type (%)					Change NO <sub>2</sub> conc (µg/m <sup>3</sup> )
														Bus	Taxi	HGV	LGV	Car	
2941_5978_DW	7638_5978	393398	398690	37451	A635	Tameside	PCM	35.0	24.6	17.1	36.8	17.9	53,752	0%	6%	11%	35%	47%	na
5655_5656_DW	5655_5656	392042	398069	76074	A6140	Tameside	PCM	35.1	24.5	17.0	39.3	18.1	22,495	0%	4%	37%	28%	31%	na
3761_5653_DW	3761_5653	390802	395630	99512	A57	Tameside	PCM	32.1	17.4	12.7	40.6	19.4	20,231	3%	5%	23%	32%	37%	na
1954_4640_DW	1954_4640	395215	398833	7391	A635	Tameside	PCM	32.9	24.4	17.0	32.9	15.9	37,476	8%	7%	10%	28%	48%	na
4969_12851	4969_12851	377669	395881	27755	A5081	Trafford	PCM	32.3	17.7	12.9	40.4	19.4	30,427	0%	5%	15%	31%	48%	na
1382_3622_DW	1382_3622	380628	395827	56499	A56	Trafford	PCM	33.1	27.9	19.0	29.0	14.2	36,023	6%	7%	7%	29%	51%	na
2305_5949_DW	2305_5949	380182	395145	36578	A56	Trafford	PCM	32.9	27.9	19.0	28.5	13.9	31,691	9%	7%	9%	25%	50%	na
2309_3788_DW	2309_3788	379330	394059	17904	A5181	Trafford	PCM	31.6	18.3	13.3	39.9	18.4	24,546	0%	4%	43%	21%	32%	na
3492_3511_DW	3492_3511	358611	405310	8566	A577	Wigan	PCM	32.7	27.5	18.8	29.7	14.0	23,095	8%	5%	19%	28%	40%	na
2579_2605_DW	2579_2605	360480	402382	80619	A573	Wigan	PCM	31.8	14.5	10.8	46.7	21.0	26,814	13%	4%	28%	20%	34%	na

**Table B-12: Predicted annual mean NO<sub>2</sub> concentrations and source apportionment at exceedance links on the Greater Manchester road network – Option 5(i) – 2025**

Point ID	Rd Link ID	x	y	Census ID	Road name	Local Authority	PCM Total NO <sub>2</sub> conc (µg/m <sup>3</sup> )	Annual mean NO <sub>2</sub> conc (µg/m <sup>3</sup> )	BG NO <sub>x</sub> conc (µg/m <sup>3</sup> )	BG NO <sub>2</sub> conc (µg/m <sup>3</sup> )	Road NO <sub>x</sub> contrib (µg/m <sup>3</sup> )	Road NO <sub>2</sub> contrib (µg/m <sup>3</sup> )	AADT	NOx contribution by vehicle type (%)					Change NO <sub>2</sub> conc (µg/m <sup>3</sup> )
														Bus	Taxi	HGV	LGV	Car	
2799_3118_DW	2799_3118	371751	409800	58048	A673	Bolton	PCM	32.0	24.3	17.0	32.4	15.0	28,008	0%	6%	31%	21%	41%	-3.9
2648_6404_DW	2648_6404	372355	408934	47988	A579	Bolton	PCM	30.3	22.0	15.6	29.9	14.7	32,415	2%	7%	8%	35%	48%	-4.3
2650_2653_DW	2653_2650	372915	407622	7431	A666	Bolton	PCM	32.3	23.5	16.5	31.9	15.8	71,462	0%	6%	3%	42%	49%	-4.1
2799_3775_DW	2799_3775	371869	409735	8030	A666	Bolton	PCM	31.3	24.3	17.0	29.5	14.3	22,345	0%	7%	6%	33%	54%	-3.8
2119_2564_DW	2119_2564	371207	409524	17905	A673	Bolton	PCM	30.3	24.3	17.0	28.1	13.3	28,292	19%	7%	5%	21%	47%	-3.8
2407_6761_DW	2407_6761	374740	405143	73087	A667	Bolton	PCM	31.3	16.5	12.1	43.6	19.2	37,503	9%	4%	39%	16%	32%	-4.0
2061_2119_DW	2061_2119	371060	409589	47469	A673	Bolton	PCM	29.6	24.3	17.0	27.4	12.6	24,666	29%	6%	9%	16%	40%	-3.1
3064_15148_DW	3064_15148	371642	408705	7921	A579	Bolton	PCM	30.2	25.2	17.5	27.7	12.7	26,546	31%	6%	7%	17%	39%	-3.4
1986_2053_DW	1986_2053	372038	408749	74518	A575	Bolton	PCM	28.7	22.0	15.6	27.9	13.1	21,908	27%	6%	9%	20%	39%	-4.1
2053_3067_DW	2053_3067	371895	408742	27946	A579	Bolton	PCM	29.5	25.2	17.5	25.7	12.0	24,440	21%	6%	10%	22%	42%	-3.0
2662_14424_DW	2662_14424	371075	408696	28245	A676	Bolton	PCM	29.6	25.2	17.5	25.8	12.1	24,324	11%	6%	25%	19%	39%	-3.2
2799_7832_DW	2799_7832	371805	409910	38542	A666	Bolton	PCM	29.0	24.3	17.0	24.4	12.0	30,537	0%	7%	12%	27%	54%	-3.0
2237_3790_DW	3790_2237	379830	410975	38354	A58	Bury	PCM	36.3	20.1	14.4	49.1	21.9	80,220	11%	6%	19%	21%	43%	-6.9
3424_4940_DW	3424_4940	380920	404881	17924	A56	Bury	PCM	34.0	16.0	11.7	47.9	22.3	20,033	4%	6%	27%	21%	43%	-6.1
2244_4913_DW	2244_4913	381968	410627	73198	A58	Bury	PCM	32.5	19.7	14.2	38.4	18.3	24,625	3%	7%	13%	27%	50%	-5.4
1742_9011_DW	1742_9011	381149	404182	46572	A56	Bury	PCM	31.9	19.2	13.8	41.0	18.1	38,027	13%	5%	31%	17%	34%	-5.4
2243_4639_DW	2243_4639	381310	410749	16556	A58	Bury	PCM	29.3	19.7	14.2	31.7	15.1	29,227	16%	5%	11%	30%	38%	-4.4
3791_3976_DW	3791_3976	380284	410974	26563	A56	Bury	PCM	28.3	21.5	15.3	26.2	13.0	41,050	0%	9%	7%	24%	60%	-3.7
2231_3083_DW	2231_3083	380413	410490	8575	A58	Bury	PCM	24.5	21.5	15.3	18.8	9.2	19,234	22%	6%	1%	29%	41%	-7.1
3056_3842_DW	3056_3842	384880	397418	26157	A6	Manchester	PCM	38.0	30.0	20.3	41.0	17.7	38,893	25%	6%	14%	21%	35%	-4.5
8546_14050	8546_14050	384384	398801	57427	A664	Manchester	PCM	36.6	33.2	22.1	42.5	14.4	7,935	77%	2%	2%	4%	15%	5.0
1268_1269	1268_1269	383558	398278	27974	A34	Manchester	PCM	38.6	33.2	22.1	48.9	16.5	9,398	71%	3%	3%	8%	16%	-2.9
2283_8544_DW	2283_8544	383791	398603	27992	A56	Manchester	PCM	36.5	33.2	22.1	43.6	14.4	4,285	82%	1%	4%	7%	5%	6.4
1267_1985	1267_1985	383672	398364	16536	A56	Manchester	PCM	36.4	33.2	22.1	38.0	14.3	8,876	51%	4%	5%	14%	25%	5.9
1322_3273	1322_3273	383249	398058	27975	A34	Manchester	PCM	34.6	33.2	22.1	28.1	12.5	14,990	0%	10%	6%	24%	60%	-4.0
1242_1243	1242_1243	384483	398343	70154	A62	Manchester	PCM	37.3	33.2	22.1	50.6	15.1	1,410	100%	0%	0%	0%	0%	4.0
1307_1317	1307_1317	383757	398717	36551	A6	Manchester	PCM	34.3	33.2	22.1	35.9	12.2	4,402	87%	1%	1%	6%	4%	4.3
2289_12835	2289_12835	384282	398507	70153	A6	Manchester	PCM	34.7	33.2	22.1	36.3	12.6	9,201	81%	2%	0%	5%	12%	4.6
1268_46301	1268_46301	383702	398229	7947	A34	Manchester	PCM	37.1	33.2	22.1	43.8	15.0	8,696	64%	2%	12%	9%	12%	7.7
1341_2939_DW	1341_2939	385618	397656	75239	A635	Manchester	PCM	33.3	28.5	19.4	30.9	13.8	25,287	9%	5%	29%	23%	34%	-4.0
2847_2855_DW	2847_2847	382389	390376	7701	A5103	Manchester	PCM	32.4	16.5	12.1	41.7	20.2	134,546	1%	7%	8%	27%	57%	-4.8
1846_2423_DW	1846_2423	381865	388177	26047	M56	Manchester	PCM	33.3	17.6	12.8	41.4	20.5	14,490	3%	8%	3%	29%	57%	-4.5
1336_16404	1336_16404	384137	397465	17929	A34	Manchester	PCM	29.4	30.0	20.3	24.0	9.1	5,829	87%	1%	1%	2%	8%	-1.7
2006_3292	2006_3292	384110	397858	56529	A5103	Manchester	PCM	27.9	30.0	20.3	19.5	7.6	6,197	79%	2%	2%	10%	8%	-2.7
1302_8546	1302_8546	384428	398838	75248	A664	Manchester	PCM	33.1	33.2	22.1	30.5	11.0	8,220	64%	2%	19%	5%	10%	1.4
3016_6022_DW	3016_6022	384639	397855	46165	A6	Manchester	PCM	32.8	30.0	20.3	33.4	12.4	7,233	65%	3%	5%	6%	20%	3.4</

Point ID	Rd Link ID	x	y	Census ID	Road name	Local Authority	PCM Total NO <sub>2</sub> conc (µg/m <sup>3</sup> )	Annual mean NO <sub>2</sub> conc (µg/m <sup>3</sup> )	BG NO <sub>x</sub> conc (µg/m <sup>3</sup> )	BG NO <sub>2</sub> conc (µg/m <sup>3</sup> )	Road NO <sub>x</sub> contrib (µg/m <sup>3</sup> )	Road NO <sub>2</sub> contrib (µg/m <sup>3</sup> )	AADT	NOx contribution by vehicle type (%)					Change NO <sub>2</sub> conc (µg/m <sup>3</sup> )
														Bus	Taxi	HGV	LGV	Car	
2291_3923	2291_3923	384010	399185	17822	A6042	Manchester	PCM	28.9	24.8	17.3	26.7	11.6	25,637	17%	7%	13%	19%	44%	-3.9
3293_1285_DW	3293_1285	384280	397739	28486	A34	Manchester	PCM	30.9	30.0	20.3	29.5	10.6	6,745	90%	1%	1%	3%	5%	-5.2
3959_2890_DW	3960_2891	383358	397172	46068	A57M	Manchester	PCM	31.0	27.6	18.9	25.9	12.0	90,601	0%	6%	4%	32%	58%	-3.0
3619_3629	3619_3629	383357	398985	73787	A6042	Manchester	PCM	30.3	33.2	22.1	18.3	8.3	23,270	0%	8%	10%	31%	51%	-2.6
1469_3669_DW	1469_3669	386578	395884	28695	A6	Manchester	PCM	29.2	22.9	16.1	28.0	13.1	27,779	27%	7%	4%	18%	44%	-3.2
1300_7282	1300_7282	384829	398513	47457	A665	Manchester	PCM	29.0	33.2	22.1	15.3	6.9	23,845	5%	7%	11%	28%	49%	0.7
1356_14504_DW	1356_14504	383011	398485	73790	A34	Manchester	PCM	31.5	33.2	22.1	21.5	9.4	37,680	0%	7%	21%	25%	47%	-2.7
3042_15348	3042_15348	382773	391447	37809	A5103	Manchester	PCM	27.7	14.5	10.8	33.7	16.9	86,022	1%	8%	2%	29%	60%	-4.1
1685_1686_DW	1685_1686	387382	394221	73778	A6	Manchester	PCM	28.3	21.8	15.5	27.9	12.8	27,439	28%	6%	14%	17%	36%	-3.3
1435_4314_DW	1435_4314	383838	395773	80940	A5103	Manchester	PCM	28.3	21.2	15.1	27.5	13.2	41,245	12%	7%	11%	23%	47%	-3.1
14523_14524	14523_14524	393320	405038	36632	A62	Oldham	PCM	36.2	24.4	17.0	40.4	19.2	54,224	0%	7%	9%	30%	54%	-4.9
1295_1703	1295_1703	390482	402513	77008	A62	Oldham	PCM	30.4	21.2	15.1	31.7	15.3	37,928	7%	7%	12%	29%	45%	-4.0
3914_5661	3914_5661	390627	402753	6606	A62	Oldham	PCM	29.7	21.2	15.1	29.9	14.6	38,891	2%	6%	15%	34%	43%	-4.1
3911_4112	3911_4112	389383	403282	99617	A663	Oldham	PCM	29.5	20.2	14.5	30.8	15.0	41,859	5%	7%	8%	24%	55%	-3.9
4629_5567_DW	4629_5567	390741	402566	27823	A6104	Oldham	PCM	28.9	21.2	15.1	27.7	13.8	15,685	3%	7%	6%	37%	47%	-3.6
2210_14216_DW	2210_14216	388664	411856	17322	A664	Rochdale	PCM	34.0	17.0	12.4	49.8	21.6	34,630	0%	5%	43%	21%	31%	-4.9
2210_4463_DW	2210_4463	388729	411971	26586	A58	Rochdale	PCM	33.6	17.0	12.4	49.8	21.2	45,685	7%	4%	41%	17%	30%	-4.7
2202_2205_DW	2202_2205	389446	413627	27469	A680	Rochdale	PCM	30.6	25.4	17.7	27.2	12.9	24,410	7%	6%	21%	24%	42%	-4.0
2202_2538	2202_2538	389424	413513	56600	A58	Rochdale	PCM	29.5	25.4	17.7	24.0	11.9	39,573	1%	8%	6%	27%	57%	-3.8
3132_7573_DW	3132_7573	389842	413925	38048	A671	Rochdale	PCM	29.6	25.4	17.7	24.6	12.0	26,190	11%	7%	5%	25%	52%	-3.8
2210_7536_DW	2210_7536	388580	411886	38543	A58	Rochdale	PCM	27.4	17.0	12.4	31.9	15.0	40,213	12%	6%	17%	21%	43%	-3.7
1349_2993_DW	1349_2993	382580	397716	73792	A57	Salford	PCM	37.1	23.2	16.3	45.0	20.8	57,848	1%	7%	16%	31%	46%	-5.7
1216_14503_DW	1216_14503	382565	398546	17926	A6	Salford	PCM	35.0	23.7	16.6	44.5	18.4	31,776	37%	4%	20%	13%	26%	-4.0
1867_4574_DW	1867_4574	382129	397840	36585	A57	Salford	PCM	33.4	23.2	16.3	36.2	17.1	52,095	0%	6%	18%	30%	46%	-4.8
14311_2299_DW	2299_14311	381488	399165	6161	A6	Salford	PCM	33.1	23.1	16.2	36.5	16.9	50,929	14%	7%	9%	20%	50%	-4.3
1232_12945_DW	1232_12945	381825	398784	56160	A6	Salford	PCM	34.0	22.1	15.6	43.3	18.3	35,706	36%	4%	21%	12%	27%	-3.8
1349_1867_DW	1349_1867	382371	397772	48023	A57	Salford	PCM	33.9	23.2	16.3	37.5	17.6	48,059	0%	7%	18%	29%	46%	-5.0
3964_4732_DW	3964_4732	382871	397244	99516	A56	Salford	PCM	32.3	23.2	16.3	33.4	16.0	43,129	5%	7%	11%	28%	49%	-4.3
3969_6612_DW	3969_6612	381512	398031	6562	A57	Salford	PCM	33.0	22.1	15.6	36.6	17.4	53,357	1%	6%	15%	31%	46%	-5.0
5179_5182_DW	5179_5182	374598	400597	74618	A572	Salford	PCM	31.0	13.8	10.3	42.1	20.7	35,418	1%	7%	8%	29%	53%	-5.1
1579_17017_DW	1579_17017	377344	400951	37363	A580	Salford	PCM	29.1	16.7	12.2	35.3	16.9	40,462	2%	7%	18%	26%	47%	-4.6
1364_1366	1364_1366	381428	399804	17245	A576	Salford	PCM	30.3	23.1	16.2	30.9	14.1	30,865	16%	6%	22%	14%	42%	-3.8
1345_1346_DW	1345_1346	380555	398426	56535	A5186	Salford	PCM	29.8	24.4	17.0	26.2	12.8	13,779	11%	6%	17%	24%	42%	-3.5
3786_1233_DW	3786_1233	381517	398259	27751	A5063	Salford	PCM	28.5	22.1	15.6	26.3	12.9	33,236	2%	8%	10%	24%	56%	-3.7
5249_7952	5249_7952	381205	399532	58028	A576	Salford	PCM	28.7	23.1	16.2	25.7	12.5	34,447	5%	8%	11%	21%	55%	-4.6
3620_5931_DW	3620_5931	390351	390720	37920	A626	Stockport	PCM	31.8	22.9	16.1	32.7	15.7	34,365	0%	6%	19%	31%	43%	-3.9
3973_14181_DW	3973_1418																		

Point ID	Rd Link ID	x	y	Census ID	Road name	Local Authority	PCM Total NO <sub>2</sub> conc (µg/m <sup>3</sup> )	Annual mean NO <sub>2</sub> conc (µg/m <sup>3</sup> )	BG NO <sub>x</sub> conc (µg/m <sup>3</sup> )	BG NO <sub>2</sub> conc (µg/m <sup>3</sup> )	Road NO <sub>x</sub> contrib (µg/m <sup>3</sup> )	Road NO <sub>2</sub> contrib (µg/m <sup>3</sup> )	AADT	NOx contribution by vehicle type (%)					Change NO <sub>2</sub> conc (µg/m <sup>3</sup> )
														Bus	Taxi	HGV	LGV	Car	
2941_5978_DW	7638_5978	393398	398690	37451	A635	Tameside	PCM	31.4	24.6	17.1	29.1	14.3	53,568	0%	7%	8%	33%	52%	-3.6
5655_5656_DW	5655_5656	392042	398069	76074	A6140	Tameside	PCM	31.2	24.5	17.0	30.1	14.2	22,251	0%	5%	34%	26%	35%	-3.9
3761_5653_DW	3761_5653	390802	395630	99512	A57	Tameside	PCM	27.8	17.4	12.7	30.9	15.1	20,173	3%	6%	18%	31%	42%	-4.3
1954_4640_DW	1954_4640	395215	398833	7391	A635	Tameside	PCM	29.6	24.4	17.0	25.7	12.6	37,299	5%	8%	9%	26%	52%	-3.3
4969_12851	4969_12851	377669	395881	27755	A5081	Trafford	PCM	28.1	17.7	12.9	31.0	15.3	30,290	0%	6%	10%	30%	54%	-4.2
1382_3622_DW	1382_3622	380628	395827	56499	A56	Trafford	PCM	30.1	27.9	19.0	22.4	11.1	35,769	4%	8%	5%	27%	56%	-3.0
2305_5949_DW	2305_5949	380182	395145	36578	A56	Trafford	PCM	30.0	27.9	19.0	22.3	11.0	31,542	7%	8%	7%	24%	55%	-2.9
2309_3788_DW	2309_3788	379330	394059	17904	A5181	Trafford	PCM	28.2	18.3	13.3	32.0	14.9	24,507	0%	5%	43%	18%	34%	-3.4
3492_3511_DW	3492_3511	358611	405310	8566	A577	Wigan	PCM	29.3	27.5	18.8	21.7	10.5	22,958	3%	6%	16%	27%	47%	-3.4
2579_2605_DW	2579_2605	360480	402382	80619	A573	Wigan	PCM	27.5	14.5	10.8	36.3	16.8	26,713	10%	5%	30%	18%	38%	-4.3

**Table B-13: Predicted annual mean NO<sub>2</sub> concentrations and source apportionment at exceedance links on the Greater Manchester road network – Option 5(ii) – 2025**

Point ID	Rd Link ID	x	y	Census ID	Road name	Local Authority	PCM Total NO <sub>2</sub> conc (µg/m <sup>3</sup> )	Annual mean NO <sub>2</sub> conc (µg/m <sup>3</sup> )	BG NO <sub>x</sub> conc (µg/m <sup>3</sup> )	BG NO <sub>2</sub> conc (µg/m <sup>3</sup> )	Road NO <sub>x</sub> contrib (µg/m <sup>3</sup> )	Road NO <sub>2</sub> contrib (µg/m <sup>3</sup> )	AADT	NOx contribution by vehicle type (%)					Change NO <sub>2</sub> conc (µg/m <sup>3</sup> )
														Bus	Taxi	HGV	LGV	Car	
2799_3118_DW	2799_3118	371751	409800	58048	A673	Bolton	PCM	32.1	24.3	17.0	32.6	15.0	28,008	0%	6%	31%	22%	41%	-3.8
2648_6404_DW	2648_6404	372355	408934	47988	A579	Bolton	PCM	30.4	22.0	15.6	30.2	14.8	32,415	2%	6%	9%	35%	47%	-4.2
2650_2653_DW	2653_2650	372915	407622	7431	A666	Bolton	PCM	32.4	23.5	16.5	32.1	15.9	71,462	0%	6%	3%	42%	49%	-4.0
2799_3775_DW	2799_3775	371869	409735	8030	A666	Bolton	PCM	31.4	24.3	17.0	29.6	14.4	22,345	0%	7%	6%	33%	54%	-3.7
2119_2564_DW	2119_2564	371207	409524	17905	A673	Bolton	PCM	30.3	24.3	17.0	28.2	13.3	28,292	19%	7%	6%	21%	47%	-3.8
2407_6761_DW	2407_6761	374740	405143	73087	A667	Bolton	PCM	31.3	16.5	12.1	43.7	19.2	37,503	9%	4%	39%	16%	32%	-4.0
2061_2119_DW	2061_2119	371060	409589	47469	A673	Bolton	PCM	29.6	24.3	17.0	27.4	12.6	24,666	29%	6%	9%	16%	40%	-3.1
3064_15148_DW	3064_15148	371642	408705	7921	A579	Bolton	PCM	30.3	25.2	17.5	27.8	12.8	26,546	30%	6%	7%	18%	39%	-3.3
1986_2053_DW	1986_2053	372038	408749	74518	A575	Bolton	PCM	28.7	22.0	15.6	27.9	13.1	21,908	27%	6%	9%	20%	39%	-4.1
2053_3067_DW	2053_3067	371895	408742	27946	A579	Bolton	PCM	29.6	25.2	17.5	25.7	12.1	24,440	21%	6%	10%	22%	41%	-2.9
2662_14424_DW	2662_14424	371075	408696	28245	A676	Bolton	PCM	29.6	25.2	17.5	25.9	12.1	24,324	11%	6%	25%	19%	39%	-3.2
2799_7832_DW	2799_7832	371805	409910	38542	A666	Bolton	PCM	29.0	24.3	17.0	24.5	12.0	30,537	0%	7%	13%	28%	54%	-3.0
2237_3790_DW	3790_2237	379830	410975	38354	A58	Bury	PCM	36.5	20.1	14.4	49.5	22.1	80,220	11%	6%	19%	21%	43%	-6.7
3424_4940_DW	3424_4940	380920	404881	17924	A56	Bury	PCM	34.0	16.0	11.7	47.8	22.3	20,033	4%	6%	27%	21%	42%	-6.1
2244_4913_DW	2244_4913	381968	410627	73198	A58	Bury	PCM	32.7	19.7	14.2	38.9	18.5	24,625	3%	7%	13%	27%	50%	-5.2
1742_9011_DW	1742_9011	381149	404182	46572	A56	Bury	PCM	31.9	19.2	13.8	41.1	18.1	38,027	13%	5%	31%	18%	34%	-5.4
2243_4639_DW	2243_4639	381310	410749	16556	A58	Bury	PCM	29.4	19.7	14.2	32.0	15.2	29,227	15%	5%	11%	31%	38%	-4.3
3791_3976_DW	3791_3976	380284	410974	26563	A56	Bury	PCM	28.5	21.5	15.3	26.5	13.1	41,050	0%	9%	7%	25%	59%	-3.5
2231_3083_DW	2231_3083	380413	410490	8575	A58	Bury	PCM	24.6	21.5	15.3	18.9	9.3	19,234	22%	6%	1%	30%	41%	-7.0
3056_3842_DW	3056_3842	384880	397418	26157	A6	Manchester	PCM	37.9	30.0	20.3	40.7	17.6	38,893	25%	5%	14%	21%	35%	-4.6
8546_14050	8546_14050	384384	398801	57427	A664	Manchester	PCM	34.8	33.2	22.1	38.4	12.7	7,935	86%	2%	2%	4%	5%	3.2
1268_1269	1268_1269	383558	398278	27974	A34	Manchester	PCM	36.4	33.2	22.1	43.6	14.3	9,398	79%	3%	3%	9%	6%	-5.1
2283_8544_DW	2283_8544	383791	398603	27992	A56	Manchester	PCM	35.8	33.2	22.1	41.9	13.7	4,285	85%	1%	4%	8%	2%	5.7
1267_1985	1267_1985	383672	398364	16536	A56	Manchester	PCM	33.6	33.2	22.1	31.6	11.5	8,876	62%	5%	6%	18%	10%	3.1
1322_3273	1322_3273	383249	398058	27975	A34	Manchester	PCM	29.6	33.2	22.1	17.5	7.5	14,990	0%	16%	10%	40%	34%	-9.0
1242_1243	1242_1243	384483	398343	70154	A62	Manchester	PCM	37.1	33.2	22.1	50.3	15.0	1,410	100%	0%	0%	0%	0%	3.8
1307_1317	1307_1317	383757	398717	36551	A6	Manchester	PCM	33.8	33.2	22.1	34.6	11.7	4,402	90%	1%	2%	6%	1%	3.8
2289_12835	2289_12835	384282	398507	70153	A6	Manchester	PCM	33.5	33.2	22.1	33.4	11.3	9,201	88%	2%	1%	5%	5%	3.4
1268_46301	1268_46301	383702	398229	7947	A34	Manchester	PCM	35.5	33.2	22.1	40.2	13.5	8,696	70%	2%	13%	10%	5%	6.1
1341_2939_DW	1341_2939	385618	397656	75239	A635	Manchester	PCM	32.9	28.5	19.4	29.6	13.4	25,287	4%	5%	31%	25%	35%	-4.4
2847_2855_DW	2847_2847	382389	390376	7701	A5103	Manchester	PCM	32.6	16.5	12.1	42.3	20.5	134,546	1%	7%	8%	27%	56%	-4.6
1846_2423_DW	1846_2423	381865	388177	26047	M56	Manchester	PCM	33.6	17.6	12.8	42.0	20.7	14,490	3%	8%	3%	29%	57%	-4.2
1336_16404	1336_16404	384137	397465	17929	A34	Manchester	PCM	28.7	30.0	20.3	22.6	8.4	5,829	92%	2%	1%	3%	3%	-2.4
2006_3292	2006_3292	384110	397858	56529	A5103	Manchester	PCM	27.4	30.0	20.3	18.3	7.1	6,197	83%	2%	2%	11%	3%	-3.2
1302_8546	1302_8546	384428	398838	75248	A664	Manchester	PCM	32.2	33.2	22.1	28.5	10.1	8,220	68%	2%	20%	6%	4%	0.5
3016_6022_DW	3016_6022	384639	397855	46165	A6	Manchester	PCM	30.8	30.0	20.3	28.9	10.5	7,233	75%	4%	6%	7%	8%	1.4

Point ID	Rd Link ID	x	y	Census ID	Road name	Local Authority	PCM Total NO <sub>2</sub> conc (µg/m <sup>3</sup> )	Annual mean NO <sub>2</sub> conc (µg/m <sup>3</sup> )	BG NO <sub>x</sub> conc (µg/m <sup>3</sup> )	BG NO <sub>2</sub> conc (µg/m <sup>3</sup> )	Road NO <sub>x</sub> contrib (µg/m <sup>3</sup> )	Road NO <sub>2</sub> contrib (µg/m <sup>3</sup> )	AADT	NOx contribution by vehicle type (%)					Change NO <sub>2</sub> conc (µg/m <sup>3</sup> )
														Bus	Taxi	HGV	LGV	Car	
2291_3923	2291_3923	384010	399185	17822	A6042	Manchester	PCM	28.8	24.8	17.3	26.5	11.5	25,637	17%	7%	13%	19%	44%	-4.0
3293_1285_DW	3293_1285	384280	397739	28486	A34	Manchester	PCM	30.3	30.0	20.3	28.2	10.0	6,745	94%	1%	1%	3%	2%	-5.8
3959_2890_DW	3960_2891	383358	397172	46068	A57M	Manchester	PCM	30.9	27.6	18.9	25.8	12.0	90,601	0%	6%	4%	32%	58%	-3.1
3619_3629	3619_3629	383357	398985	73787	A6042	Manchester	PCM	30.2	33.2	22.1	18.0	8.1	23,270	0%	8%	10%	31%	51%	-2.7
1469_3669_DW	1469_3669	386578	395884	28695	A6	Manchester	PCM	29.2	22.9	16.1	28.0	13.1	27,779	27%	6%	4%	18%	44%	-3.2
1300_7282	1300_7282	384829	398513	47457	A665	Manchester	PCM	28.9	33.2	22.1	15.0	6.7	23,845	5%	7%	11%	28%	49%	0.6
1356_14504_DW	1356_14504	383011	398485	73790	A34	Manchester	PCM	31.4	33.2	22.1	21.3	9.3	37,680	0%	7%	21%	25%	47%	-2.8
3042_15348	3042_15348	382773	391447	37809	A5103	Manchester	PCM	27.8	14.5	10.8	33.9	17.0	86,022	1%	8%	2%	29%	59%	-4.0
1685_1686_DW	1685_1686	387382	394221	73778	A6	Manchester	PCM	28.3	21.8	15.5	28.0	12.8	27,439	28%	6%	14%	17%	36%	-3.3
1435_4314_DW	1435_4314	383838	395773	80940	A5103	Manchester	PCM	28.1	21.2	15.1	26.9	13.0	41,245	12%	7%	9%	24%	48%	-3.3
14523_14524	14523_14524	393320	405038	36632	A62	Oldham	PCM	36.3	24.4	17.0	40.6	19.3	54,224	0%	7%	9%	30%	53%	-4.8
1295_1703	1295_1703	390482	402513	77008	A62	Oldham	PCM	30.5	21.2	15.1	32.0	15.4	37,928	6%	6%	13%	29%	45%	-3.9
3914_5661	3914_5661	390627	402753	6606	A62	Oldham	PCM	29.9	21.2	15.1	30.2	14.8	38,891	2%	6%	16%	34%	42%	-3.9
3911_4112	3911_4112	389383	403282	99617	A663	Oldham	PCM	29.5	20.2	14.5	30.8	15.1	41,859	5%	7%	8%	24%	55%	-3.9
4629_5567_DW	4629_5567	390741	402566	27823	A6104	Oldham	PCM	29.1	21.2	15.1	28.1	14.0	15,685	3%	7%	7%	37%	46%	-3.4
2210_14216_DW	2210_14216	388664	411856	17322	A664	Rochdale	PCM	34.1	17.0	12.4	50.1	21.7	34,630	0%	4%	43%	21%	31%	-4.8
2210_4463_DW	2210_4463	388729	411971	26586	A58	Rochdale	PCM	33.6	17.0	12.4	49.9	21.2	45,685	7%	4%	41%	18%	30%	-4.7
2202_2205_DW	2202_2205	389446	413627	27469	A680	Rochdale	PCM	30.7	25.4	17.7	27.5	13.0	24,410	7%	6%	21%	25%	41%	-3.9
2202_2538	2202_2538	389424	413513	56600	A58	Rochdale	PCM	29.8	25.4	17.7	24.6	12.1	39,573	1%	8%	6%	27%	57%	-3.5
3132_7573_DW	3132_7573	389842	413925	38048	A671	Rochdale	PCM	29.7	25.4	17.7	24.7	12.1	26,190	10%	7%	5%	26%	52%	-3.7
2210_7536_DW	2210_7536	388580	411886	38543	A58	Rochdale	PCM	27.5	17.0	12.4	31.9	15.0	40,213	12%	6%	17%	22%	43%	-3.6
1349_2993_DW	1349_2993	382580	397716	73792	A57	Salford	PCM	37.1	23.2	16.3	45.0	20.8	57,848	1%	7%	16%	31%	46%	-5.7
1216_14503_DW	1216_14503	382565	398546	17926	A6	Salford	PCM	34.9	23.7	16.6	44.3	18.3	31,776	37%	4%	20%	13%	26%	-4.1
1867_4574_DW	1867_4574	382129	397840	36585	A57	Salford	PCM	33.4	23.2	16.3	36.3	17.1	52,095	0%	6%	18%	30%	46%	-4.8
14311_2299_DW	2299_14311	381488	399165	6161	A6	Salford	PCM	33.1	23.1	16.2	36.5	16.9	50,929	14%	7%	9%	20%	50%	-4.3
1232_12945_DW	1232_12945	381825	398784	56160	A6	Salford	PCM	33.9	22.1	15.6	43.2	18.3	35,706	36%	4%	21%	13%	27%	-3.9
1349_1867_DW	1349_1867	382371	397772	48023	A57	Salford	PCM	34.0	23.2	16.3	37.6	17.7	48,059	0%	6%	18%	29%	46%	-4.9
3964_4732_DW	3964_4732	382871	397244	99516	A56	Salford	PCM	32.2	23.2	16.3	33.3	15.9	43,129	5%	7%	11%	28%	49%	-4.4
3969_6612_DW	3969_6612	381512	398031	6562	A57	Salford	PCM	33.1	22.1	15.6	36.7	17.4	53,357	1%	6%	15%	31%	46%	-4.9
5179_5182_DW	5179_5182	374598	400597	74618	A572	Salford	PCM	31.5	13.8	10.3	43.4	21.2	35,418	2%	7%	9%	29%	52%	-4.6
1579_17017_DW	1579_17017	377344	400951	37363	A580	Salford	PCM	29.2	16.7	12.2	35.4	16.9	40,462	2%	6%	18%	27%	47%	-4.5
1364_1366	1364_1366	381428	399804	17245	A576	Salford	PCM	30.3	23.1	16.2	30.8	14.1	30,865	17%	6%	22%	14%	42%	-3.8
1345_1346_DW	1345_1346	380555	398426	56535	A5186	Salford	PCM	29.8	24.4	17.0	26.2	12.8	13,779	11%	6%	17%	24%	42%	-3.5
3786_1233_DW	3968_1233	381517	398259	27751	A5063	Salford	PCM	28.5	22.1	15.6	26.2	12.9	33,236	2%	8%	10%	24%	56%	-3.7
5249_7952	5249_7952	381205	399532	58028	A576	Salford	PCM	28.7	23.1	16.2	25.7	12.5	34,447	5%	8%	11%	21%	55%	-4.6
3620_5931_DW	3620_5931	390351	390720	37920	A626	Stockport	PCM	31.9	22.9	16.1	33.2	15.8	34,365	0%	6%	20%	31%	43%	-3.8
3973_14181_DW	3973_14181																		

Point ID	Rd Link ID	x	y	Census ID	Road name	Local Authority	PCM Total NO <sub>2</sub> conc (µg/m <sup>3</sup> )	Annual mean NO <sub>2</sub> conc (µg/m <sup>3</sup> )	BG NO <sub>x</sub> conc (µg/m <sup>3</sup> )	BG NO <sub>2</sub> conc (µg/m <sup>3</sup> )	Road NO <sub>x</sub> contrib (µg/m <sup>3</sup> )	Road NO <sub>2</sub> contrib (µg/m <sup>3</sup> )	AADT	NOx contribution by vehicle type (%)					Change NO <sub>2</sub> conc (µg/m <sup>3</sup> )
														Bus	Taxi	HGV	LGV	Car	
2941_5978_DW	7638_5978	393398	398690	37451	A635	Tameside	PCM	31.6	24.6	17.1	29.5	14.4	53,568	0%	7%	9%	33%	51%	-3.4
5655_5656_DW	5655_5656	392042	398069	76074	A6140	Tameside	PCM	31.4	24.5	17.0	30.5	14.3	22,251	0%	5%	35%	26%	34%	-3.7
3761_5653_DW	3761_5653	390802	395630	99512	A57	Tameside	PCM	27.9	17.4	12.7	30.9	15.2	20,173	3%	6%	18%	32%	42%	-4.2
1954_4640_DW	1954_4640	395215	398833	7391	A635	Tameside	PCM	29.7	24.4	17.0	26.1	12.7	37,299	5%	7%	9%	27%	52%	-3.2
4969_12851	4969_12851	377669	395881	27755	A5081	Trafford	PCM	28.2	17.7	12.9	31.2	15.3	30,290	0%	6%	10%	30%	54%	-4.1
1382_3622_DW	1382_3622	380628	395827	56499	A56	Trafford	PCM	30.1	27.9	19.0	22.5	11.1	35,769	4%	8%	5%	27%	56%	-3.0
2305_5949_DW	2305_5949	380182	395145	36578	A56	Trafford	PCM	30.0	27.9	19.0	22.3	11.0	31,542	7%	8%	7%	24%	55%	-2.9
2309_3788_DW	2309_3788	379330	394059	17904	A5181	Trafford	PCM	28.2	18.3	13.3	32.0	14.9	24,507	0%	5%	43%	18%	34%	-3.4
3492_3511_DW	3492_3511	358611	405310	8566	A577	Wigan	PCM	29.5	27.5	18.8	22.2	10.7	22,958	3%	6%	18%	27%	46%	-3.2
2579_2605_DW	2579_2605	360480	402382	80619	A573	Wigan	PCM	28.7	14.5	10.8	39.5	17.9	26,713	12%	5%	31%	17%	35%	-3.1

**Table B-14: Predicted annual mean NO<sub>2</sub> concentrations and source apportionment at exceedance links on the Greater Manchester road network – Option 7 – 2025**

Point ID	Rd Link ID	x	y	Census ID	Road name	Local Authority	PCM Total NO <sub>2</sub> conc (µg/m <sup>3</sup> )	Annual mean NO <sub>2</sub> conc (µg/m <sup>3</sup> )	BG NO <sub>x</sub> conc (µg/m <sup>3</sup> )	BG NO <sub>2</sub> conc (µg/m <sup>3</sup> )	Road NO <sub>x</sub> contrib (µg/m <sup>3</sup> )	Road NO <sub>2</sub> contrib (µg/m <sup>3</sup> )	AADT	NOx contribution by vehicle type (%)					Change NO <sub>2</sub> conc (µg/m <sup>3</sup> )
														Bus	Taxi	HGV	LGV	Car	
2799_3118_DW	2799_3118	371751	409800	58048	A673	Bolton	PCM	33.3	24.3	17.0	35.1	16.3	28,096	0%	5%	29%	27%	38%	-2.6
2648_6404_DW	2648_6404	372355	408934	47988	A579	Bolton	PCM	32.0	22.0	15.6	33.2	16.4	32,612	2%	6%	8%	41%	43%	-2.6
2650_2653_DW	2653_2650	372915	407622	7431	A666	Bolton	PCM	34.2	23.5	16.5	35.7	17.7	71,858	0%	6%	3%	48%	44%	-2.2
2799_3775_DW	2799_3775	371869	409735	8030	A666	Bolton	PCM	32.7	24.3	17.0	32.1	15.7	22,455	0%	6%	5%	39%	49%	-2.4
2119_2564_DW	2119_2564	371207	409524	17905	A673	Bolton	PCM	31.3	24.3	17.0	30.0	14.2	28,376	18%	7%	5%	26%	45%	-2.8
2407_6761_DW	2407_6761	374740	405143	73087	A667	Bolton	PCM	32.6	16.5	12.1	46.2	20.5	37,777	9%	4%	36%	21%	30%	-2.7
2061_2119_DW	2061_2119	371060	409589	47469	A673	Bolton	PCM	30.4	24.3	17.0	28.9	13.4	24,770	28%	6%	8%	20%	38%	-2.3
3064_15148_DW	3064_15148	371642	408705	7921	A579	Bolton	PCM	31.1	25.2	17.5	29.4	13.6	26,670	29%	5%	7%	22%	37%	-2.5
1986_2053_DW	1986_2053	372038	408749	74518	A575	Bolton	PCM	29.7	22.0	15.6	29.9	14.1	22,084	25%	5%	8%	25%	37%	-3.1
2053_3067_DW	2053_3067	371895	408742	27946	A579	Bolton	PCM	30.4	25.2	17.5	27.5	12.9	24,490	20%	6%	9%	27%	39%	-2.1
2662_14424_DW	2662_14424	371075	408696	28245	A676	Bolton	PCM	30.6	25.2	17.5	27.7	13.1	24,355	10%	6%	23%	24%	37%	-2.2
2799_7832_DW	2799_7832	371805	409910	38542	A666	Bolton	PCM	30.0	24.3	17.0	26.4	13.0	30,541	0%	6%	12%	32%	50%	-2.0
2237_3790_DW	3790_2237	379830	410975	38354	A58	Bury	PCM	38.1	20.1	14.4	53.0	23.7	80,457	10%	6%	18%	27%	40%	-5.1
3424_4940_DW	3424_4940	380920	404881	17924	A56	Bury	PCM	35.8	16.0	11.7	51.6	24.1	19,995	3%	6%	25%	26%	40%	-4.3
2244_4913_DW	2244_4913	381968	410627	73198	A58	Bury	PCM	34.2	19.7	14.2	42.0	20.0	24,705	2%	7%	12%	33%	46%	-3.7
1742_9011_DW	1742_9011	381149	404182	46572	A56	Bury	PCM	33.2	19.2	13.8	43.7	19.4	38,197	12%	5%	29%	22%	32%	-4.1
2243_4639_DW	2243_4639	381310	410749	16556	A58	Bury	PCM	30.8	19.7	14.2	34.8	16.6	29,423	14%	5%	10%	36%	35%	-2.9
3791_3976_DW	3791_3976	380284	410974	26563	A56	Bury	PCM	29.4	21.5	15.3	28.2	14.1	41,138	0%	8%	7%	30%	55%	-2.6
2231_3083_DW	2231_3083	380413	410490	8575	A58	Bury	PCM	25.3	21.5	15.3	20.3	10.0	19,293	21%	5%	1%	34%	38%	-6.3
3056_3842_DW	3056_3842	384880	397418	26157	A6	Manchester	PCM	40.1	30.0	20.3	45.5	19.8	39,310	22%	5%	12%	26%	34%	-2.4
8546_14050	8546_14050	384384	398801	57427	A664	Manchester	PCM	37.2	33.2	22.1	44.2	15.1	8,087	74%	2%	3%	5%	16%	5.6
1268_1269	1268_1269	383558	398278	27974	A34	Manchester	PCM	39.3	33.2	22.1	50.6	17.2	9,413	69%	2%	3%	10%	17%	-2.2
2283_8544_DW	2283_8544	383791	398603	27992	A56	Manchester	PCM	37.1	33.2	22.1	45.0	15.0	4,334	80%	1%	4%	10%	5%	7.0
1267_1985	1267_1985	383672	398364	16536	A56	Manchester	PCM	38.3	33.2	22.1	43.8	16.2	9,063	50%	3%	6%	17%	24%	7.8
1322_3273	1322_3273	383249	398058	27975	A34	Manchester	PCM	36.4	33.2	22.1	32.1	14.3	15,424	0%	8%	6%	28%	58%	-2.2
1242_1243	1242_1243	384483	398343	70154	A62	Manchester	PCM	37.4	33.2	22.1	50.8	15.2	1,408	100%	0%	0%	0%	0%	4.1
1307_1317	1307_1317	383757	398717	36551	A6	Manchester	PCM	35.5	33.2	22.1	39.9	13.4	4,451	87%	1%	1%	7%	4%	5.5
2289_12835	2289_12835	384282	398507	70153	A6	Manchester	PCM	34.9	33.2	22.1	36.6	12.8	9,211	81%	2%	0%	6%	11%	4.8
1268_46301	1268_46301	383702	398229	7947	A34	Manchester	PCM	37.9	33.2	22.1	45.8	15.8	8,755	62%	2%	11%	12%	13%	8.5
1341_2939_DW	1341_2939	385618	397656	75239	A635	Manchester	PCM	34.5	28.5	19.4	33.4	15.1	25,509	8%	4%	27%	28%	32%	-2.8
2847_2855_DW	2847_2847	382389	390376	7701	A5103	Manchester	PCM	34.1	16.5	12.1	45.2	21.9	135,293	1%	7%	7%	32%	53%	-3.1
1846_2423_DW	1846_2423	381865	388177	26047	M56	Manchester	PCM	35.2	17.6	12.8	45.2	22.3	14,601	2%	7%	3%	35%	53%	-2.6
1336_16404	1336_16404	384137	397465	17929	A34	Manchester	PCM	36.5	30.0	20.3	51.1	16.2	6,001	93%	1%	1%	2%	4%	5.4
2006_3292	2006_3292	384110	397858	56529	A5103	Manchester	PCM	28.6	30.0	20.3	20.9	8.3	6,515	74%	2%	2%	15%	8%	-2.0
1302_8546	1302_8546	384428	398838	75248	A664	Manchester	PCM	33.7	33.2	22.1	31.8	11.5	8,519	62%	2%	18%	8%	11%	2.0
3016_6022_DW	3016_6022	384639	397855	46165	A6	Manchester	PCM	33.5	30.0	20.3	35.0	13.2	7,362	62%	3%	5%	9%	21%	4.1</

Point ID	Rd Link ID	x	y	Census ID	Road name	Local Authority	PCM Total NO <sub>2</sub> conc (µg/m <sup>3</sup> )	Annual mean NO <sub>2</sub> conc (µg/m <sup>3</sup> )	BG NO <sub>x</sub> conc (µg/m <sup>3</sup> )	BG NO <sub>2</sub> conc (µg/m <sup>3</sup> )	Road NO <sub>x</sub> contrib (µg/m <sup>3</sup> )	Road NO <sub>2</sub> contrib (µg/m <sup>3</sup> )	AADT	NOx contribution by vehicle type (%)					Change NO <sub>2</sub> conc (µg/m <sup>3</sup> )
														Bus	Taxi	HGV	LGV	Car	
2291_3923	2291_3923	384010	399185	17822	A6042	Manchester	PCM	29.8	24.8	17.3	28.7	12.5	25,735	16%	6%	12%	24%	42%	-3.0
3293_1285_DW	3293_1285	384280	397739	28486	A34	Manchester	PCM	31.2	30.0	20.3	30.3	10.9	6,831	89%	1%	1%	4%	6%	-4.9
3959_2890_DW	3960_2891	383358	397172	46068	A57M	Manchester	PCM	32.3	27.6	18.9	28.7	13.4	91,419	0%	6%	3%	38%	53%	-1.7
3619_3629	3619_3629	383357	398985	73787	A6042	Manchester	PCM	31.2	33.2	22.1	20.1	9.1	23,314	0%	7%	9%	37%	47%	-1.7
1469_3669_DW	1469_3669	386578	395884	28695	A6	Manchester	PCM	30.2	22.9	16.1	29.9	14.1	27,974	25%	6%	4%	22%	42%	-2.2
1300_7282	1300_7282	384829	398513	47457	A665	Manchester	PCM	29.7	33.2	22.1	16.8	7.6	24,113	4%	7%	10%	32%	47%	1.4
1356_14504_DW	1356_14504	383011	398485	73790	A34	Manchester	PCM	32.7	33.2	22.1	24.0	10.6	38,045	0%	6%	20%	31%	43%	-1.5
3042_15348	3042_15348	382773	391447	37809	A5103	Manchester	PCM	29.2	14.5	10.8	36.8	18.5	86,684	1%	7%	2%	34%	56%	-2.6
1685_1686_DW	1685_1686	387382	394221	73778	A6	Manchester	PCM	29.3	21.8	15.5	29.9	13.8	27,599	27%	5%	13%	22%	34%	-2.3
1435_4314_DW	1435_4314	383838	395773	80940	A5103	Manchester	PCM	29.5	21.2	15.1	29.9	14.4	41,355	11%	7%	10%	28%	44%	-1.9
14523_14524	14523_14524	393320	405038	36632	A62	Oldham	PCM	38.0	24.4	17.0	44.0	21.0	54,417	0%	7%	8%	36%	49%	-3.1
1295_1703	1295_1703	390482	402513	77008	A62	Oldham	PCM	31.9	21.2	15.1	34.7	16.8	38,138	6%	6%	11%	35%	41%	-2.5
3914_5661	3914_5661	390627	402753	6606	A62	Oldham	PCM	31.3	21.2	15.1	32.9	16.2	39,059	2%	6%	14%	40%	39%	-2.5
3911_4112	3911_4112	389383	403282	99617	A663	Oldham	PCM	30.8	20.2	14.5	33.3	16.3	41,969	5%	7%	8%	29%	52%	-2.6
4629_5567_DW	4629_5567	390741	402566	27823	A6104	Oldham	PCM	30.5	21.2	15.1	30.7	15.4	15,787	3%	6%	6%	43%	42%	-2.0
2210_14216_DW	2210_14216	388664	411856	17322	A664	Rochdale	PCM	35.8	17.0	12.4	53.5	23.4	34,733	0%	4%	39%	27%	29%	-3.1
2210_4463_DW	2210_4463	388729	411971	26586	A58	Rochdale	PCM	35.2	17.0	12.4	53.1	22.7	45,893	7%	4%	38%	23%	28%	-3.1
2202_2205_DW	2202_2205	389446	413627	27469	A680	Rochdale	PCM	31.9	25.4	17.7	29.8	14.2	24,462	6%	6%	19%	31%	38%	-2.7
2202_2538	2202_2538	389424	413513	56600	A58	Rochdale	PCM	30.8	25.4	17.7	26.5	13.1	39,702	1%	8%	6%	32%	53%	-2.5
3132_7573_DW	3132_7573	389842	413925	38048	A671	Rochdale	PCM	30.7	25.4	17.7	26.6	13.0	26,358	10%	7%	4%	31%	49%	-2.7
2210_7536_DW	2210_7536	388580	411886	38543	A58	Rochdale	PCM	28.8	17.0	12.4	34.5	16.3	40,344	11%	6%	16%	28%	40%	-2.3
1349_2993_DW	1349_2993	382580	397716	73792	A57	Salford	PCM	39.2	23.2	16.3	49.3	22.9	58,154	1%	6%	15%	36%	43%	-3.6
1216_14503_DW	1216_14503	382565	398546	17926	A6	Salford	PCM	36.3	23.7	16.6	47.2	19.7	32,091	35%	4%	18%	17%	25%	-2.7
1867_4574_DW	1867_4574	382129	397840	36585	A57	Salford	PCM	35.1	23.2	16.3	39.7	18.8	52,447	0%	6%	16%	36%	42%	-3.1
14311_2299_DW	2299_14311	381488	399165	6161	A6	Salford	PCM	34.5	23.1	16.2	39.5	18.3	51,169	13%	7%	8%	24%	48%	-2.9
1232_12945_DW	1232_12945	381825	398784	56160	A6	Salford	PCM	35.2	22.1	15.6	45.8	19.6	35,899	34%	4%	19%	17%	26%	-2.6
1349_1867_DW	1349_1867	382371	397772	48023	A57	Salford	PCM	35.7	23.2	16.3	41.0	19.3	48,352	0%	6%	17%	34%	43%	-3.2
3964_4732_DW	3964_4732	382871	397244	99516	A56	Salford	PCM	34.0	23.2	16.3	36.8	17.7	43,460	4%	7%	10%	33%	46%	-2.6
3969_6612_DW	3969_6612	381512	398031	6562	A57	Salford	PCM	34.8	22.1	15.6	40.3	19.2	53,675	1%	6%	14%	37%	43%	-3.2
5179_5182_DW	5179_5182	374598	400597	74618	A572	Salford	PCM	33.1	13.8	10.3	46.6	22.9	35,526	2%	7%	8%	34%	48%	-3.0
1579_17017_DW	1579_17017	377344	400951	37363	A580	Salford	PCM	30.7	16.7	12.2	38.6	18.5	40,905	2%	6%	17%	32%	43%	-3.0
1364_1366	1364_1366	381428	399804	17245	A576	Salford	PCM	31.2	23.1	16.2	32.5	14.9	30,892	16%	6%	21%	18%	40%	-2.9
1345_1346_DW	1345_1346	380555	398426	56535	A5186	Salford	PCM	31.0	24.4	17.0	28.6	14.0	13,818	8%	5%	17%	30%	40%	-2.3
3786_1233_DW	3968_1233	381517	398259	27751	A5063	Salford	PCM	29.6	22.1	15.6	28.4	14.0	33,399	2%	7%	10%	29%	52%	-2.6
5249_7952	5249_7952	381205	399532	58028	A576	Salford	PCM	29.7	23.1	16.2	27.5	13.4	34,459	5%	7%	10%	25%	52%	-3.6
3620_5931_DW	3620_5931	390351	390720	37920	A626	Stockport	PCM	33.2	22.9	16.1	35.7	17.1	34,429	0%	6%	18%	37%	40%	-2.5
3973_14181_DW	3973_14181																		

Point ID	Rd Link ID	x	y	Census ID	Road name	Local Authority	PCM Total NO <sub>2</sub> conc (µg/m <sup>3</sup> )	Annual mean NO <sub>2</sub> conc (µg/m <sup>3</sup> )	BG NO <sub>x</sub> conc (µg/m <sup>3</sup> )	BG NO <sub>2</sub> conc (µg/m <sup>3</sup> )	Road NO <sub>x</sub> contrib (µg/m <sup>3</sup> )	Road NO <sub>2</sub> contrib (µg/m <sup>3</sup> )	AADT	NOx contribution by vehicle type (%)					Change NO <sub>2</sub> conc (µg/m <sup>3</sup> )
														Bus	Taxi	HGV	LGV	Car	
2941_5978_DW	7638_5978	393398	398690	37451	A635	Tameside	PCM	32.8	24.6	17.1	31.8	15.7	53,754	0%	7%	8%	39%	47%	-2.2
5655_5656_DW	5655_5656	392042	398069	76074	A6140	Tameside	PCM	32.6	24.5	17.0	33.0	15.6	22,442	0%	4%	32%	32%	32%	-2.5
3761_5653_DW	3761_5653	390802	395630	99512	A57	Tameside	PCM	29.4	17.4	12.7	33.9	16.7	20,219	2%	5%	16%	37%	39%	-2.7
1954_4640_DW	1954_4640	395215	398833	7391	A635	Tameside	PCM	30.6	24.4	17.0	27.7	13.6	37,416	5%	7%	8%	31%	49%	-2.3
4969_12851	4969_12851	377669	395881	27755	A5081	Trafford	PCM	29.4	17.7	12.9	33.6	16.6	30,384	0%	6%	9%	35%	50%	-2.9
1382_3622_DW	1382_3622	380628	395827	56499	A56	Trafford	PCM	31.1	27.9	19.0	24.4	12.1	35,969	3%	8%	5%	32%	52%	-2.0
2305_5949_DW	2305_5949	380182	395145	36578	A56	Trafford	PCM	30.8	27.9	19.0	24.0	11.9	31,682	6%	8%	6%	28%	52%	-2.1
2309_3788_DW	2309_3788	379330	394059	17904	A5181	Trafford	PCM	29.3	18.3	13.3	34.2	16.0	24,530	0%	5%	40%	23%	32%	-2.3
3492_3511_DW	3492_3511	358611	405310	8566	A577	Wigan	PCM	30.3	27.5	18.8	23.6	11.5	23,058	3%	6%	15%	33%	43%	-2.4
2579_2605_DW	2579_2605	360480	402382	80619	A573	Wigan	PCM	29.1	14.5	10.8	39.9	18.3	26,805	12%	5%	27%	22%	34%	-2.7

**Table B-15: Predicted annual mean NO<sub>2</sub> concentrations and source apportionment at exceedance links on the Greater Manchester road network – Option 8 – 2025**

Point ID	Rd Link ID	x	y	Census ID	Road name	Local Authority	PCM Total NO <sub>2</sub> conc (µg/m <sup>3</sup> )	Annual mean NO <sub>2</sub> conc (µg/m <sup>3</sup> )	BG NO <sub>x</sub> conc (µg/m <sup>3</sup> )	BG NO <sub>2</sub> conc (µg/m <sup>3</sup> )	Road NO <sub>x</sub> contrib (µg/m <sup>3</sup> )	Road NO <sub>2</sub> contrib (µg/m <sup>3</sup> )	AADT	NOx contribution by vehicle type (%)					Change NO <sub>2</sub> conc (µg/m <sup>3</sup> )
														Bus	Taxi	HGV	LGV	Car	
2799_3118_DW	2799_3118	371751	409800	58048	A673	Bolton	PCM	32.0	24.3	17.0	32.5	15.0	28,022	0%	6%	31%	22%	42%	-3.9
2648_6404_DW	2648_6404	372355	408934	47988	A579	Bolton	PCM	30.4	22.0	15.6	30.0	14.7	32,442	2%	7%	8%	35%	48%	-4.2
2650_2653_DW	2653_2650	372915	407622	7431	A666	Bolton	PCM	32.3	23.5	16.5	31.9	15.8	71,487	0%	6%	3%	42%	49%	-4.1
2799_3775_DW	2799_3775	371869	409735	8030	A666	Bolton	PCM	31.4	24.3	17.0	29.5	14.4	22,339	0%	7%	6%	33%	54%	-3.7
2119_2564_DW	2119_2564	371207	409524	17905	A673	Bolton	PCM	30.3	24.3	17.0	28.1	13.3	28,251	19%	7%	5%	21%	47%	-3.8
2407_6761_DW	2407_6761	374740	405143	73087	A667	Bolton	PCM	31.3	16.5	12.1	43.6	19.2	37,504	9%	4%	39%	16%	32%	-4.0
2061_2119_DW	2061_2119	371060	409589	47469	A673	Bolton	PCM	29.6	24.3	17.0	27.4	12.6	24,671	29%	6%	9%	16%	40%	-3.1
3064_15148_DW	3064_15148	371642	408705	7921	A579	Bolton	PCM	30.3	25.2	17.5	27.8	12.8	26,561	30%	6%	7%	17%	40%	-3.3
1986_2053_DW	1986_2053	372038	408749	74518	A575	Bolton	PCM	28.7	22.0	15.6	27.9	13.1	21,940	27%	6%	9%	20%	39%	-4.1
2053_3067_DW	2053_3067	371895	408742	27946	A579	Bolton	PCM	29.5	25.2	17.5	25.7	12.0	24,421	21%	6%	10%	22%	42%	-3.0
2662_14424_DW	2662_14424	371075	408696	28245	A676	Bolton	PCM	29.6	25.2	17.5	25.9	12.1	24,339	11%	6%	25%	19%	40%	-3.2
2799_7832_DW	2799_7832	371805	409910	38542	A666	Bolton	PCM	29.0	24.3	17.0	24.4	12.0	30,407	0%	7%	12%	26%	54%	-3.0
2237_3790_DW	3790_2237	379830	410975	38354	A58	Bury	PCM	36.3	20.1	14.4	49.1	21.9	80,232	11%	6%	19%	21%	43%	-6.9
3424_4940_DW	3424_4940	380920	404881	17924	A56	Bury	PCM	34.1	16.0	11.7	48.1	22.4	20,044	4%	6%	27%	21%	43%	-6.0
2244_4913_DW	2244_4913	381968	410627	73198	A58	Bury	PCM	32.5	19.7	14.2	38.5	18.3	24,599	3%	7%	13%	27%	50%	-5.4
1742_9011_DW	1742_9011	381149	404182	46572	A56	Bury	PCM	32.0	19.2	13.8	41.2	18.2	38,101	13%	5%	31%	17%	34%	-5.3
2243_4639_DW	2243_4639	381310	410749	16556	A58	Bury	PCM	29.3	19.7	14.2	31.7	15.1	29,168	16%	5%	11%	30%	38%	-4.4
3791_3976_DW	3791_3976	380284	410974	26563	A56	Bury	PCM	28.4	21.5	15.3	26.3	13.1	41,043	0%	9%	7%	24%	60%	-3.6
2231_3083_DW	2231_3083	380413	410490	8575	A58	Bury	PCM	24.5	21.5	15.3	18.8	9.2	19,218	23%	6%	1%	29%	42%	-7.1
3056_3842_DW	3056_3842	384880	397418	26157	A6	Manchester	PCM	38.3	30.0	20.3	41.5	18.0	39,200	25%	5%	14%	20%	36%	-4.2
8546_14050	8546_14050	384384	398801	57427	A664	Manchester	PCM	36.9	33.2	22.1	43.4	14.8	8,085	75%	2%	3%	4%	16%	5.3
1268_1269	1268_1269	383558	398278	27974	A34	Manchester	PCM	38.8	33.2	22.1	49.3	16.7	9,400	70%	3%	3%	8%	17%	-2.7
2283_8544_DW	2283_8544	383791	398603	27992	A56	Manchester	PCM	36.6	33.2	22.1	43.7	14.5	4,300	82%	1%	4%	7%	6%	6.5
1267_1985	1267_1985	383672	398364	16536	A56	Manchester	PCM	36.7	33.2	22.1	38.7	14.6	8,967	50%	4%	5%	14%	27%	6.2
1322_3273	1322_3273	383249	398058	27975	A34	Manchester	PCM	35.3	33.2	22.1	29.7	13.2	15,372	0%	9%	6%	23%	62%	-3.3
1242_1243	1242_1243	384483	398343	70154	A62	Manchester	PCM	37.3	33.2	22.1	50.7	15.1	1,408	100%	0%	0%	0%	0%	4.0
1307_1317	1307_1317	383757	398717	36551	A6	Manchester	PCM	34.4	33.2	22.1	36.0	12.3	4,416	87%	1%	1%	6%	5%	4.4
2289_12835	2289_12835	384282	398507	70153	A6	Manchester	PCM	34.7	33.2	22.1	36.1	12.5	9,226	81%	2%	0%	5%	12%	4.6
1268_46301	1268_46301	383702	398229	7947	A34	Manchester	PCM	37.2	33.2	22.1	44.1	15.1	8,726	64%	2%	12%	9%	13%	7.8
1341_2939_DW	1341_2939	385618	397656	75239	A635	Manchester	PCM	33.4	28.5	19.4	31.1	14.0	25,381	9%	4%	29%	23%	34%	-3.9
2847_2855_DW	2847_2847	382389	390376	7701	A5103	Manchester	PCM	32.5	16.5	12.1	41.9	20.3	134,745	1%	7%	8%	27%	57%	-4.7
1846_2423_DW	1846_2423	381865	388177	26047	M56	Manchester	PCM	33.4	17.6	12.8	41.6	20.5	14,487	3%	8%	3%	29%	57%	-4.4
1336_16404	1336_16404	384137	397465	17929	A34	Manchester	PCM	36.2	30.0	20.3	50.6	15.9	5,937	94%	1%	1%	1%	4%	5.1
2006_3292	2006_3292	384110	397858	56529	A5103	Manchester	PCM	28.1	30.0	20.3	20.0	7.8	6,371	77%	2%	2%	11%	8%	-2.5
1302_8546	1302_8546	384428	398838	75248	A664	Manchester	PCM	33.3	33.2	22.1	30.9	11.2	8,470	63%	2%	18%	6%	11%	1.6
3016_6022_DW	3016_6022	384639	397855	46165	A6	Manchester	PCM	33.0	30.0	20.3	33.9	12.7	7,322	64%	3%	5%	6%	22%	3.6

Point ID	Rd Link ID	x	y	Census ID	Road name	Local Authority	PCM Total NO <sub>2</sub> conc (µg/m <sup>3</sup> )	Annual mean NO <sub>2</sub> conc (µg/m <sup>3</sup> )	BG NO <sub>x</sub> conc (µg/m <sup>3</sup> )	BG NO <sub>2</sub> conc (µg/m <sup>3</sup> )	Road NO <sub>x</sub> contrib (µg/m <sup>3</sup> )	Road NO <sub>2</sub> contrib (µg/m <sup>3</sup> )	AADT	NOx contribution by vehicle type (%)					Change NO <sub>2</sub> conc (µg/m <sup>3</sup> )
														Bus	Taxi	HGV	LGV	Car	
2291_3923	2291_3923	384010	399185	17822	A6042	Manchester	PCM	29.0	24.8	17.3	27.0	11.7	25,693	17%	7%	13%	19%	45%	-3.8
3293_1285_DW	3293_1285	384280	397739	28486	A34	Manchester	PCM	31.0	30.0	20.3	29.8	10.7	6,831	90%	1%	1%	3%	6%	-5.1
3959_2890_DW	3960_2891	383358	397172	46068	A57M	Manchester	PCM	31.1	27.6	18.9	26.2	12.2	91,072	0%	6%	4%	32%	58%	-2.9
3619_3629	3619_3629	383357	398985	73787	A6042	Manchester	PCM	30.5	33.2	22.1	18.5	8.4	23,308	0%	8%	10%	30%	52%	-2.4
1469_3669_DW	1469_3669	386578	395884	28695	A6	Manchester	PCM	29.4	22.9	16.1	28.3	13.2	27,907	27%	6%	4%	18%	45%	-3.0
1300_7282	1300_7282	384829	398513	47457	A665	Manchester	PCM	29.1	33.2	22.1	15.6	7.0	23,957	5%	7%	11%	27%	51%	0.8
1356_14504_DW	1356_14504	383011	398485	73790	A34	Manchester	PCM	31.7	33.2	22.1	22.0	9.6	37,951	0%	7%	21%	25%	47%	-2.5
3042_15348	3042_15348	382773	391447	37809	A5103	Manchester	PCM	27.8	14.5	10.8	34.0	17.1	86,249	1%	8%	2%	29%	60%	-4.0
1685_1686_DW	1685_1686	387382	394221	73778	A6	Manchester	PCM	28.4	21.8	15.5	28.1	12.9	27,541	28%	6%	14%	17%	36%	-3.2
1435_4314_DW	1435_4314	383838	395773	80940	A5103	Manchester	PCM	28.3	21.2	15.1	27.2	13.2	41,226	12%	7%	9%	23%	49%	-3.1
14523_14524	14523_14524	393320	405038	36632	A62	Oldham	PCM	36.3	24.4	17.0	40.5	19.3	54,192	0%	7%	9%	30%	54%	-4.8
1295_1703	1295_1703	390482	402513	77008	A62	Oldham	PCM	30.4	21.2	15.1	31.8	15.4	37,930	7%	7%	12%	29%	45%	-4.0
3914_5661	3914_5661	390627	402753	6606	A62	Oldham	PCM	29.8	21.2	15.1	29.9	14.7	38,895	2%	6%	15%	34%	43%	-4.0
3911_4112	3911_4112	389383	403282	99617	A663	Oldham	PCM	29.6	20.2	14.5	30.9	15.1	41,884	5%	7%	8%	24%	55%	-3.8
4629_5567_DW	4629_5567	390741	402566	27823	A6104	Oldham	PCM	29.0	21.2	15.1	27.8	13.9	15,693	3%	7%	6%	37%	47%	-3.5
2210_14216_DW	2210_14216	388664	411856	17322	A664	Rochdale	PCM	34.0	17.0	12.4	49.9	21.6	34,628	0%	5%	43%	21%	31%	-4.9
2210_4463_DW	2210_4463	388729	411971	26586	A58	Rochdale	PCM	33.6	17.0	12.4	49.9	21.2	45,697	7%	4%	41%	17%	30%	-4.7
2202_2205_DW	2202_2205	389446	413627	27469	A680	Rochdale	PCM	30.6	25.4	17.7	27.3	13.0	24,403	7%	6%	21%	24%	42%	-4.0
2202_2538	2202_2538	389424	413513	56600	A58	Rochdale	PCM	29.6	25.4	17.7	24.1	11.9	39,607	1%	8%	6%	27%	58%	-3.7
3132_7573_DW	3132_7573	389842	413925	38048	A671	Rochdale	PCM	29.7	25.4	17.7	24.6	12.0	26,210	11%	7%	5%	25%	52%	-3.7
2210_7536_DW	2210_7536	388580	411886	38543	A58	Rochdale	PCM	27.5	17.0	12.4	31.9	15.0	40,212	12%	6%	17%	21%	43%	-3.6
1349_2993_DW	1349_2993	382580	397716	73792	A57	Salford	PCM	37.3	23.2	16.3	45.4	21.0	58,011	1%	7%	16%	30%	47%	-5.5
1216_14503_DW	1216_14503	382565	398546	17926	A6	Salford	PCM	35.2	23.7	16.6	44.7	18.5	31,866	37%	4%	19%	13%	27%	-3.8
1867_4574_DW	1867_4574	382129	397840	36585	A57	Salford	PCM	33.5	23.2	16.3	36.5	17.2	52,261	0%	6%	18%	30%	46%	-4.7
14311_2299_DW	2299_14311	381488	399165	6161	A6	Salford	PCM	33.5	23.1	16.2	37.2	17.2	51,090	13%	7%	9%	19%	51%	-3.9
1232_12945_DW	1232_12945	381825	398784	56160	A6	Salford	PCM	34.1	22.1	15.6	43.5	18.5	35,756	36%	4%	20%	12%	27%	-3.7
1349_1867_DW	1349_1867	382371	397772	48023	A57	Salford	PCM	34.1	23.2	16.3	37.9	17.8	48,244	0%	6%	18%	29%	47%	-4.8
3964_4732_DW	3964_4732	382871	397244	99516	A56	Salford	PCM	32.5	23.2	16.3	33.9	16.2	43,312	5%	7%	11%	27%	50%	-4.1
3969_6612_DW	3969_6612	381512	398031	6562	A57	Salford	PCM	33.2	22.1	15.6	36.9	17.6	53,506	1%	6%	15%	31%	47%	-4.8
5179_5182_DW	5179_5182	374598	400597	74618	A572	Salford	PCM	31.0	13.8	10.3	42.2	20.8	35,404	1%	7%	8%	29%	53%	-5.1
1579_17017_DW	1579_17017	377344	400951	37363	A580	Salford	PCM	29.2	16.7	12.2	35.5	17.0	40,588	2%	7%	18%	26%	47%	-4.5
1364_1366	1364_1366	381428	399804	17245	A576	Salford	PCM	30.4	23.1	16.2	30.9	14.1	30,873	16%	6%	22%	14%	42%	-3.7
1345_1346_DW	1345_1346	380555	398426	56535	A5186	Salford	PCM	29.9	24.4	17.0	26.5	12.9	13,802	11%	6%	18%	24%	42%	-3.4
3786_1233_DW	3968_1233	381517	398259	27751	A5063	Salford	PCM	28.6	22.1	15.6	26.4	13.0	33,287	2%	8%	10%	24%	56%	-3.6
5249_7952	5249_7952	381205	399532	58028	A576	Salford	PCM	28.8	23.1	16.2	25.9	12.6	34,464	5%	8%	11%	21%	55%	-4.5
3620_5931_DW	3620_5931	390351	390720	37920	A626	Stockport	PCM	31.8	22.9	16.1	32.9	15.7	34,439	0%	6%	19%	31%	44%	-3.9
3973_14181_DW	3973_14181																		

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														Bus	Taxi	HGV	LGV	Car	
2941_5978_DW	7638_5978	393398	398690	37451	A635	Tameside	PCM	31.4	24.6	17.1	29.1	14.3	53,595	0%	7%	8%	33%	52%	-3.6
5655_5656_DW	5655_5656	392042	398069	76074	A6140	Tameside	PCM	31.2	24.5	17.0	30.2	14.2	22,279	0%	5%	34%	26%	35%	-3.9
3761_5653_DW	3761_5653	390802	395630	99512	A57	Tameside	PCM	27.9	17.4	12.7	31.0	15.2	20,192	3%	6%	18%	31%	42%	-4.2
1954_4640_DW	1954_4640	395215	398833	7391	A635	Tameside	PCM	29.6	24.4	17.0	25.8	12.6	37,318	5%	8%	9%	26%	53%	-3.3
4969_12851	4969_12851	377669	395881	27755	A5081	Trafford	PCM	28.2	17.7	12.9	31.1	15.3	30,301	0%	6%	10%	29%	55%	-4.1
1382_3622_DW	1382_3622	380628	395827	56499	A56	Trafford	PCM	30.2	27.9	19.0	22.7	11.2	35,903	4%	8%	5%	27%	56%	-2.9
2305_5949_DW	2305_5949	380182	395145	36578	A56	Trafford	PCM	30.1	27.9	19.0	22.5	11.1	31,611	6%	8%	7%	23%	55%	-2.8
2309_3788_DW	2309_3788	379330	394059	17904	A5181	Trafford	PCM	28.2	18.3	13.3	32.0	14.9	24,494	0%	5%	43%	18%	34%	-3.4
3492_3511_DW	3492_3511	358611	405310	8566	A577	Wigan	PCM	29.3	27.5	18.8	21.8	10.5	22,923	3%	6%	16%	28%	47%	-3.4
2579_2605_DW	2579_2605	360480	402382	80619	A573	Wigan	PCM	27.6	14.5	10.8	36.4	16.8	26,737	10%	5%	30%	18%	38%	-4.2

## **Appendix C – Sensitivity Testing**

### **Overview**

- 6.1.14 This appendix presents the results of the sensitivity tests for the Greater Manchester Clean Air Plan Project. This forms part of a suite of documents that have been produced to describe the transport and air quality modelling deliverables for the study. Other documents in the series include:
- Local Plan Transport Model Validation Report (T2), which explains how the road traffic model was validated against real-world data;
  - Local Plan Transport Modeling Methodology Report (T3), which describes the approach taken to forecast traffic;
  - Local Plan Transport Model Forecasting Report (T4), which presents the baseline transport and emissions modelling results for the study, and includes an appendix containing a summary of the results of the sensitivity testing related to the transport modelling; and
  - Local Plan Air Quality Modelling Methodology Report (AQ2), which provides an overview of the air quality modelling process.
- 6.1.15 The purpose of this report is to assess the extent to which changes to the assumptions made in the CAP analysis could affect the conclusions of the OBC and specifically the delivery of compliance in the shortest possible time. This is particularly important for those assumptions which are subject to consultation (such as charge levels), and for those assumptions that will require refinement as new evidence becomes available at FBC (such as bus and taxi compliance).
- 6.1.16 The purpose of the analysis is to help understand which aspects of the modelling the results are most sensitive to and ultimately to help answer the questions:
- Is the preferred option the right proposal?
  - Is it likely to be sufficient to meet the legal duty?
  - Is it excessive, so that the costs outweigh the benefits?
- 6.1.17 Even where it is shown that the conclusions are insensitive to any given assumption, more work may be required at FBC to meet other analytical objectives. For example, to demonstrate to stakeholders that the scheme is proportionate and necessary.
- 6.1.18 The sensitivity testing will feed into:
- The development of the FBC data, evidence and modelling work streams, to determine the work required to improve the assumptions; and

- Monitoring and evaluation plans, to ensure that the proposals reflect emerging trends and real-world conditions.

### Range of Sensitivity Tests

- 6.1.19 The sensitivity tests have been carried out for a forecast year of 2023, focusing on the do-minimum and with scenario forecasts for Option 8. Tests relating to the transport modelling, which have been taken through to the air quality process, have focused on the following areas of uncertainty:
- Charge Levels (JAQU test 5.1.2)
  - Fleet Age (JAQU test 5.2.3)
  - Emissions at Low Speeds (JAQU test 6.2.1)
- 6.1.20 Additional tests relating to air quality specific processes have included:
- Projections of f-NO<sub>2</sub> (JAQU test 6.1.2)
  - Zonal vs full model domain verification (JAQU test 6.2.2) & Canyon effects (JAQU test 6.2.7)
  - f-NO<sub>2</sub> and verification (JAQU test 6.2.4)
  - Meteorology (JAQU test 6.2.6)
- 6.1.21 Other air quality tests which have not been assessed quantitatively at this stage include:
- Surface roughness length (JAQU test 6.2.5)
  - Future emissions standards (JAQU test 6.1.1)
  - Gradient based emission factors (JAQU test 6.1.3)
  - Background NO<sub>2</sub> calibration (JAQU test 6.2.3)
- 6.1.22 Other tests will, however, be included as part of the development of the FBC, to help fill gaps in the analysis and to provide confidence in the results. For information describing the transport modelling impacts of each test refer to Transport Modelling report T4.

## Test Descriptions and Results

### Charge Levels (ST03)

- 6.1.23 JAQU's guidance on sensitivity testing does not specify a method to test the response of CAZ charges. The approach used has applied a high and low charge within a reasonable range based on other cities' reported indicative values.
- 6.1.24 The with scheme model runs for Option 8 were undertaken based on daily charge levels of £7.50 for non-compliant LGVs and Taxis and £100 for non-compliant HGVs and buses. The impacts of the CAZ charge levels have been investigated by running a high and low charge test for Car, LGV, HGV, Taxi and Bus trips. The test was carried out by coding the new charges into the demand sifting tool for Option 8 and using the output change matrices to create new do-something inputs for the Saturn model. The assumed charges are shown below in Table 21. Only the high charge test has been used on the air quality modelling.

**Table 21: Charge Level Sensitivity Test of Non-Compliant Vehicle Charges (£'s, 2010 Prices)**

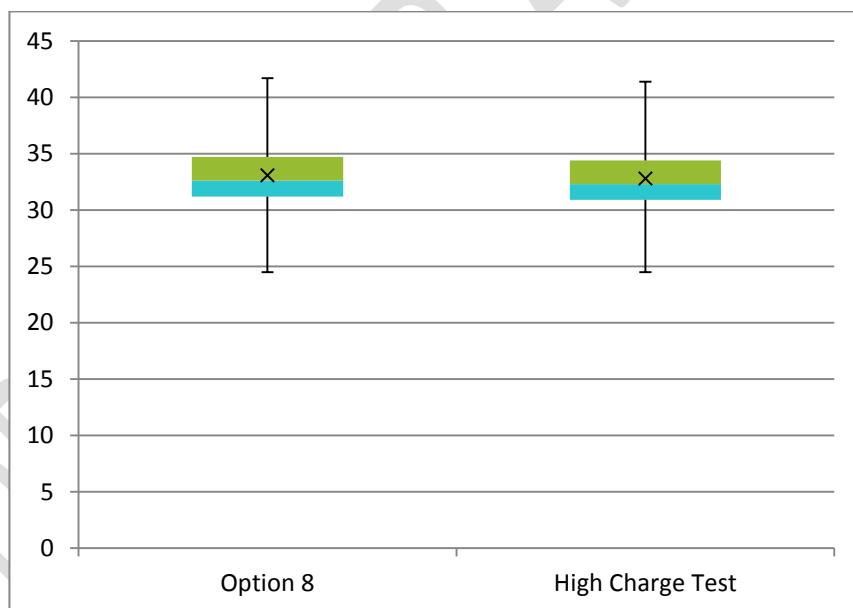
Model/Test	Car	LGV	HGV	Bus	Taxi
Option 8 Do-Something	NA	£7.50	£100.00	£100.00	£7.50
High Charge Test	NA	£12.50	£200.00	£200.00	£12.50
Low Charge Test	NA	£2.50	£50.00	£50.00	£2.50
Notes: Non-compliant cars are not charged for Option 8					

- 6.1.25 Table 22 and Chart 6 provide the summary statistics requested in JAQU's 'Supplementary Note on Sensitivity Testing' and the relative compliance status for each scenario. This sensitivity test demonstrates that the potential effect of increasing the charge is not an important aspect of the scheme.
- 6.1.26 There is still predicted to be an exceedance in Option 8, with the last point of compliance only reducing by 0.3 ug/m<sup>3</sup> as a result of the change in charge level.

**Table 22: Simple Summary NO<sub>2</sub> Statistics for Sensitivity Testing of Charge Level (ug/m<sup>3</sup>)**

Statistic	Test Results	
	Option 8	High Charge
Mean	33.1	32.8
Median	32.6	32.3
Maximum	41.7	41.4
Minimum	24.5	24.5
Upper Quartile	41.7	41.4
Lower Quartile	31.2	30.9
Standard Deviation	2.8	2.8
Range	17.2	16.9
No. of Non-Compliant Receptors	2	1

**Chart 6: Distribution of NO<sub>2</sub> Concentrations for Sensitivity Testing of Charge Level Test (ug/m<sup>3</sup>)**



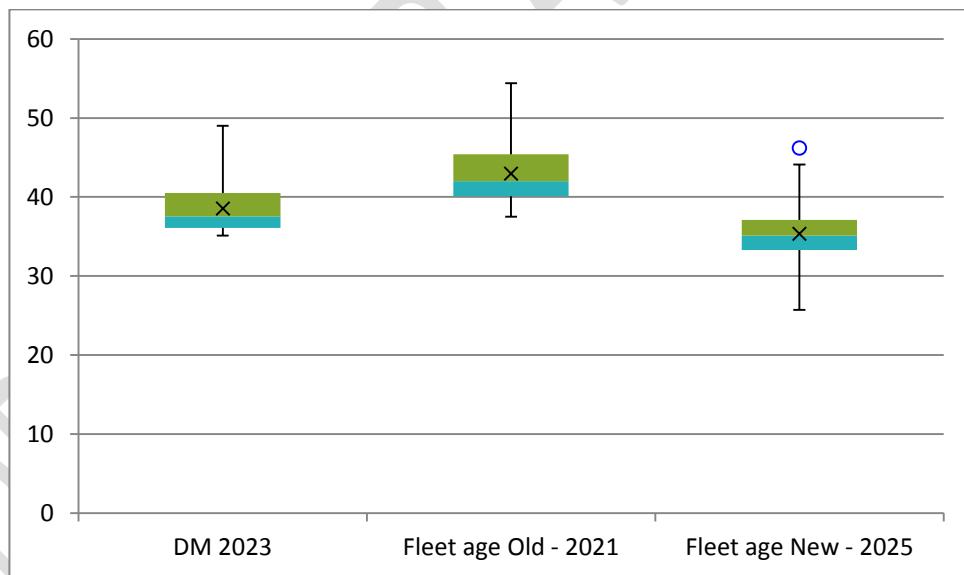
## Fleet Age (ST05)

- 6.1.27 The impacts of assumptions around the change in fleet age over time have been investigated by re-running the 2023 do-minimum Saturn and EMIGMA models using the 2021 and 2025 fleet age profiles. This provided a simple test of plausible alternative scenarios where the fleet is ‘older’ and ‘younger’ in the projected year, reflecting the impacts of vehicle owners choosing to either hold onto vehicles for longer or replace them more frequently than has been forecast in the core test.
- 6.1.28 Recent information on car sales especially has noted a slowing of overall sales, especially diesel with a relative increase in petrol or hybrid/full electric powered cars. This effect is potentially complex, as slowing fleet replenishment would increase future year NOx emissions, whilst a like-for-like switch from new diesel (Euro 6c/d) car to petrol or hybrid/full electric would decrease emissions.
- 6.1.29 Table 23 and Chart 7 provide the summary statistics and the relative compliance status for each scenario. This sensitivity test demonstrates that the potential effect of how vehicle fleet age is projected to forecast years is a very important aspect of the modelling process, with future year NO<sub>2</sub> concentrations highly sensitive to the assumptions applied.
- 6.1.30 The number of non-compliant points is predicted to approximately increase or decrease by a factor of three with the Old or New fleet assumption, respectively. The maximum predicted concentration, which is likely to be the last point of compliance and therefore informs the preferred option, is ~5 ug/m<sup>3</sup> greater, equivalent to an estimated 2-3 year delay in natural compliance date as is consistent to the approach in fleet mix testing.
- 6.1.31 Note that in the event of an older than forecast fleet, more vehicles would be in scope for a charge. In these circumstances, the proportion of drivers able to access support would be lower, and the access in the market to compliant vehicles is likely to be more restricted. It may be that sensitivity to charge levels would be more significant in this scenario. However, the impact of a scheme option could also be greater as the number of vehicles required to change, including from the earlier more polluting vehicles, would be greater.
- 6.1.32 Consideration should also be given to reviewing the fleet mix projections for the full business case submission, and data from a project specific ANPR survey undertaken in January 2019 will be available to inform the validity of assumptions used to date.

**Table 23: Simple Summary NO<sub>2</sub> Statistics for Sensitivity Testing of Fleet Age (ug/m<sup>3</sup>)**

Statistic	Test Results		
	Do Min. 2023	Fleet age Old - 2021	Fleet age New - 2025
Mean	38.5	43.0	35.4
Median	37.6	42.0	35.1
Maximum	49.0	54.4	46.2
Minimum	35.1	37.5	25.7
Upper Quartile	49.0	54.4	46.2
Lower Quartile	36.1	40.1	33.3
Standard Deviation	3.1	3.6	3.3
Range	13.9	16.9	20.5
No. of Non-Compliant Receptors	68	190	23

**Chart 7: Distribution of NO<sub>2</sub> Concentrations for Sensitivity Testing of Fleet Age (ug/m<sup>3</sup>)**



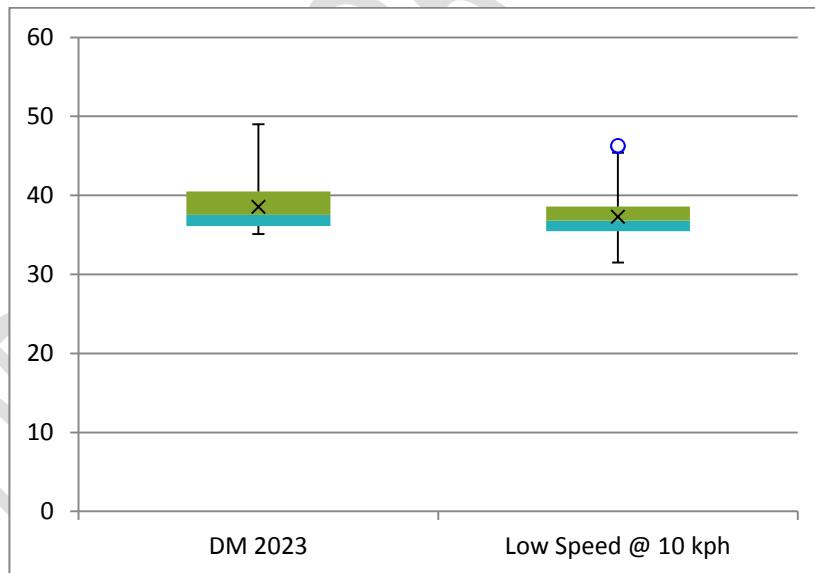
## Emissions at Low Speeds (ST06)

- 6.1.33 JAQU's guidance on sensitivity testing notes that road traffic emission estimates on roads with low speeds are likely to be much more uncertain than roads with higher speeds. This is partly due to a lack of available drive cycle testing data around emissions at low speeds, but is also due to greater variability in traffic behaviour, with more stop-start driving and uncertainty about emissions estimated using emission rates based on average speed models such as Copert and Saturn. There will also be greater uncertainty around average speeds from the traffic model for roads with stop-starting driving, as this is difficult to represent in conventional highway assignment models such as Saturn.
- 6.1.34 Uncertainty surrounding emissions at low speeds has been investigated by running a 'low emissions' sensitivity test which involved re-running the 2023 do-minimum EMIGMA model with a minimum speed cut-off of 10kph. (The core model runs have assumed that the EFT emission factors can be used for modelled speeds down to 5kph for links where the model predicts very low speeds, so they effectively represent 'high emission' forecasts for roads with low modelled speeds).
- 6.1.35 The low speeds test has not been applied into the Base 2016 modelling methodology, or the AQ model verification process. Decreasing emissions in the Base model would have the effect of increasing Rd NOx adjustment factors, and therefore reduce the future year predictions if applied to the results presented in this test. This test therefore provides an indication of sensitivity to the modelling approach to changing the assumptions around speed and emissions, but the future year NO<sub>2</sub> concentrations should not be treated as a reliable alternative forecast of exceedance. Also, the effects would likely apply equally in the 'without' and 'with scheme' option scenarios, rather than being highly sensitive to the scheme options behavioural responses themselves.
- 6.1.36 Table 24 and Chart 8 provide the summary statistics and the relative compliance status for each scenario. This sensitivity test demonstrates that the potential effect of modelled emissions from vehicles at low speeds is a sensitive parameter. However, consistent application of this test into the Base year verification would be necessary to draw meaningful conclusions on the overall effect on the predicted year of compliance.
- 6.1.37 Consideration should also be given to improving the modelling of slow speeds for the full business case submission.

**Table 24: Simple Summary NO<sub>2</sub> Statistics for Sensitivity Testing of Emissions at Low Speeds (ug/m<sup>3</sup>)**

Statistic	Test Results	
	Do Min. 2023	Lower Emissions – Min. Speeds for EFT @ 10kph
Mean	38.5	37.3
Median	37.6	36.8
Maximum	49.0	46.3
Minimum	35.1	31.5
Upper Quartile	49.0	46.3
Lower Quartile	36.1	35.5
Standard Deviation	3.1	2.8
Range	13.9	14.8
No. of Non-Compliant Receptors	68	43

**Chart 8: Distribution of NO<sub>2</sub> Concentrations for Sensitivity Testing of Emissions at Low Speeds (ug/m<sup>3</sup>)**



## Projections of f-NO<sub>2</sub>

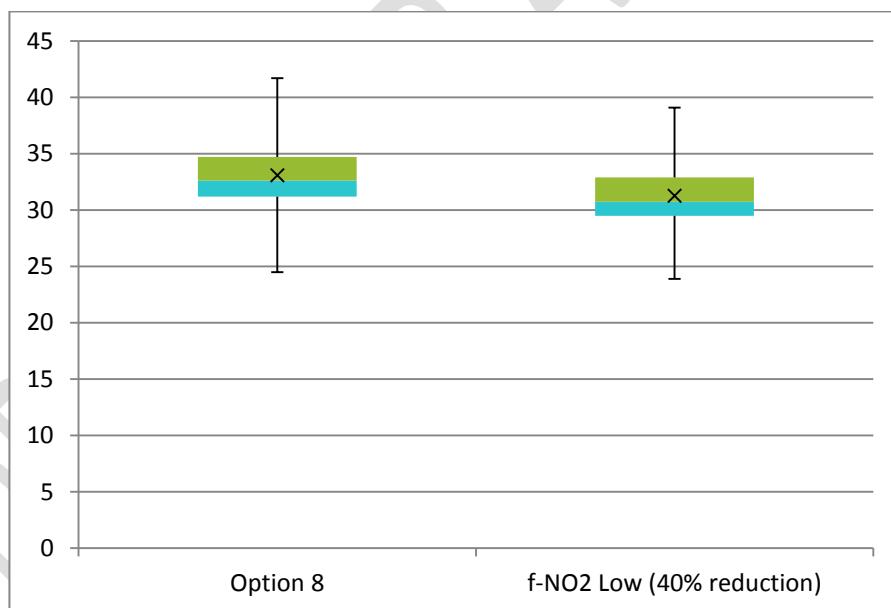
- 6.1.38 There is emerging evidence that the average primary NO<sub>2</sub> fraction (f-NO<sub>2</sub>) in exhaust emissions from road vehicles has begun to decrease in recent years<sup>3</sup>. This is not taken into account within the Copert or that EFT, as used for the air quality modelling. To account for this, JAQU suggest that a sensitivity test be carried out whereby the f-NO<sub>2</sub> values are reduced by 40% in the future projected year. Following the JAQU guidance, the f-NO<sub>2</sub> values have been reduced by this percentage and the NO<sub>2</sub> concentrations re-calculated (in Defra's NOx to NO<sub>2</sub> Calculator) using these reduced f-NO<sub>2</sub> values. The results from this 'Low' scenario have then been compared to the NO<sub>2</sub> concentrations for Option 8.
- 6.1.39 Table 25 and Chart 9 provide the summary statistics and the relative compliance status for each scenario. This sensitivity test demonstrates that the modelled f-NO<sub>2</sub> is a sensitive parameter. However, consistent application of this test into the Base year verification would be necessary to draw meaningful conclusions on the overall effect on the predicted year of compliance, but there is also the limited potential for a differential impact between scheme options because the f-NO<sub>2</sub> emissions vary between vehicle types, Euro standards and fuels.
- 6.1.40 It is likely that applying this methodology for f-NO<sub>2</sub> would decrease forecast year concentrations. Given that with this revised f-NO<sub>2</sub> assumption, Option 8 is predicted to be only marginally compliant in 2023 this would not materially alter the need for the scheme. It is expected that Defra will provide revised guidance if the trends in f-NO<sub>2</sub> provided in the EFT are considered to unrepresentative and this becomes a material factor before the scheme opens.

<sup>3</sup> Grange S. et al., (2017) Lower vehicular primary emissions of NO<sub>2</sub> in Europe than assumed in policy projections, Nature Geoscience, pp 914-920, ISSN 1752-0908, <https://doi.org/10.1038/s41561-017-0009-0>

**Table 25: Simple Summary NO<sub>2</sub> Statistics for Sensitivity Testing of the Projection of f-NO<sub>2</sub>**

Statistic	Test Results	
	Option 8	f-NO <sub>2</sub> Low (40% reduction)
Mean	33.1	31.3
Median	32.6	30.8
Maximum	41.7	39.1
Minimum	24.5	23.9
Upper Quartile	41.7	39.1
Lower Quartile	31.2	29.5
Standard Deviation	2.8	2.7
Range	17.2	15.2
No. of Non-Compliant Receptors	2	0

**Chart 9: Distribution of NO<sub>2</sub> Concentrations for Sensitivity Testing of the Projection of f-NO<sub>2</sub> (ug/m<sup>3</sup>)**



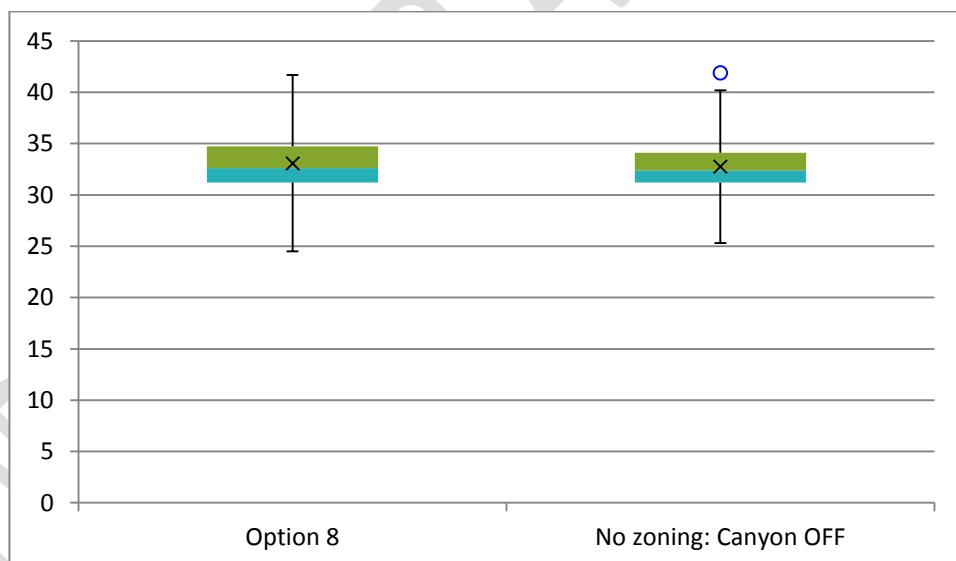
## Zonal vs Full Model Domain Verification including Canyon Effects

- 6.1.41 Local authorities are expected to verify their models in the base year with respect to measured NO<sub>x</sub> and NO<sub>2</sub> concentrations in their local area. However, different methodologies can be followed to achieve this verification. In particular, authorities can use either a full model domain verification (i.e. applying an average verification factor across the model domain) or a zonal calibration (i.e. applying different verification factors in different areas of the model domain). There are advantages and disadvantages to both methodologies. A zonal verification may account more effectively for effects specific to certain road links in the model domain (e.g. canyon effects) but could lead to a small number of monitoring sites being used to verify particular zones, decreasing the reliability of the verification factors derived with respect to a full model domain verification.
- 6.1.42 JAQU suggest that authorities run a sensitivity test around this by verifying the base year across the full model domain if a zonal verification was used in the ‘central’ modelling or verifying in an appropriate zonal fashion if a full model domain calibration was used in the ‘central’ modelling. This approach was applied in the model testing and development phase. The model verification is explained in detail in Appendix A, where a comparison of the model performance using the selected zonal approach versus the full domain is discussed, showing improved model performance for the zonal approach.
- 6.1.43 This full domain ‘no zoning’ approach has then been applied to Option 8, where all monitoring data has been included, with the canyon module off.
- 6.1.44 Table 26 and Chart 10 provide the summary statistics and the relative compliance status for each scenario. This sensitivity test demonstrates that the potential effect of the application of zonal adjustment, including accommodation canyons, is not an important aspect of the scheme.
- 6.1.45 There is still predicted to be an exceedance in Option 8, with the last point of compliant increasing by 0.2 ug/m<sup>3</sup> as a result of the change in no-zonal approach. However, it is recognized that there are a limited number of monitoring locations to inform the AQ verification process in the IRR, where the canyon module has been applied.
- 6.1.46 Overall, it is considered likely that there is considerable variation of modelled concentrations in central Manchester due to the presence of canyons. The assessment has applied a robust approach to representing model predictions in the vicinity of canyons for the programme and tools available. Further monitoring is planned, as suggested in the JAQU sensitivity testing guidance.

**Table 26: Simple Summary NO<sub>2</sub> Statistics for Sensitivity Testing of Zonal Verification including Canyons (ug/m<sup>3</sup>)**

Statistic	Test Results	
	Option 8	No Zoning
Mean	33.1	32.8
Median	32.6	32.4
Maximum	41.7	41.9
Minimum	24.5	24.7
Upper Quartile	41.7	41.9
Lower Quartile	31.2	31.2
Standard Deviation	2.8	2.6
Range	17.2	17.2
No. of Non-Compliant Receptors	2	3

**Chart 10: Distribution of NO<sub>2</sub> Concentrations for Sensitivity Testing of Zonal Verification including Canyons (ug/m<sup>3</sup>)**



## f-NO<sub>2</sub> and Verification

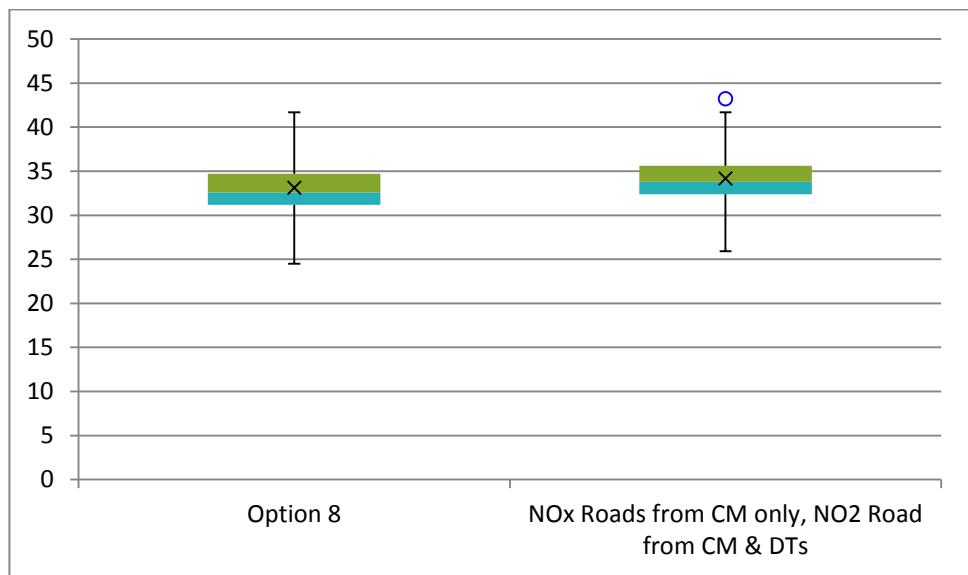
- 6.1.47 The fraction of primary NO<sub>2</sub> (f-NO<sub>2</sub>) is a significant source of uncertainty in roadside air quality modelling (see the comments of the uncertainty panel convened to support the 2017 NO<sub>2</sub> Plan). It is used in two stages in the modelling process:
1. To 'back-calculate' NOx concentrations from NO<sub>2</sub> concentrations measured using diffusion tubes. These NOx concentrations are used to calibrate the NOx concentrations outputted from the dispersion model.
  2. To calculate NO<sub>2</sub> concentrations from calibrated NOx concentrations.
- 6.1.48 As f-NO<sub>2</sub> is applied twice in the process, once to 'back-calculate' NOx and once to 'forward-calculate' NO<sub>2</sub>, the final NO<sub>2</sub> concentration outputs are relatively independent of f-NO<sub>2</sub>. JAQU has confirmed this through a study looking into the impact of varying f-NO<sub>2</sub> on calibrated roadside NO<sub>2</sub> concentrations. The distribution of NO<sub>2</sub> concentrations is relatively unaffected by changing f-NO<sub>2</sub> (even to extreme levels, as reflected in the negligible variation in the mean) although the maximum NO<sub>2</sub> shows a fairly strong positive correlation with f-NO<sub>2</sub>.
- 6.1.49 This effect is a limitation in the modelling process, although unavoidable given that limited data is available from roadside chemiluminescence monitors. The effect will not drive a systematic error in NO<sub>2</sub> concentrations in the base year but could lead to errors on particular road links. This is because, for example, two road links with identical NOx emissions rates and background concentrations but different f-NO<sub>2</sub> values could produce the same NO<sub>2</sub> concentration within the modelling process (although in reality the concentrations should be different).
- 6.1.50 However, where there are sufficient chemiluminescence monitors plus many additional diffusion tubes, the Road NOx component can be verified against the chemiluminescent monitors and then the predicted total NO<sub>2</sub> verified against all the chemiluminescence monitoring and diffusion tube monitoring sites. This test was undertaken as part of the model verification process reported in Appendix A. Overall, the RMSE and number of outliers sites were poorer using this approach, whilst the Fractional Bias and Correlation Coefficient were slightly better. The test was not considered to significantly improve overall model performance, and therefore this approach has not been applied.
- 6.1.51 As part of the sensitivity analysis, the results of that approach to verification and model adjustment have been applied to the Option 8 scenario.

- 6.1.52 Table 27 and Chart 11 provide the summary statistics and the relative compliance status for each scenario. This sensitivity test demonstrates that there is a potential effect of the application of f-NO<sub>2</sub> / Road NOx adjustment based purely on chemiluminescence monitoring with the final NO<sub>2</sub> using all the chemiluminescence and diffusion tube data.
- 6.1.53 There is still predicted to be an exceedance in Option 8, but with the last point of compliant increasing by 1.5 ug/m<sup>3</sup> as a result of the change in verification approach. This result also does not fully support the predictive assumption of lower f-NO<sub>2</sub> applied in the earlier JAQU test which reduced that final NO<sub>2</sub> concentrations. This may be due to the consistent application of the approach into the Base 2016 and Forecast 2023 year, rather than a simple systematic reduction in the 2023 year alone.

**Table 27: Simple Summary NO<sub>2</sub> Statistics for Sensitivity Testing of f-NO<sub>2</sub> and Verification (ug/m<sup>3</sup>)**

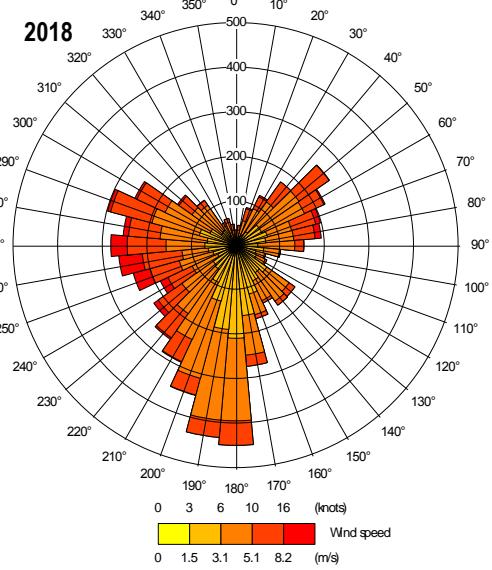
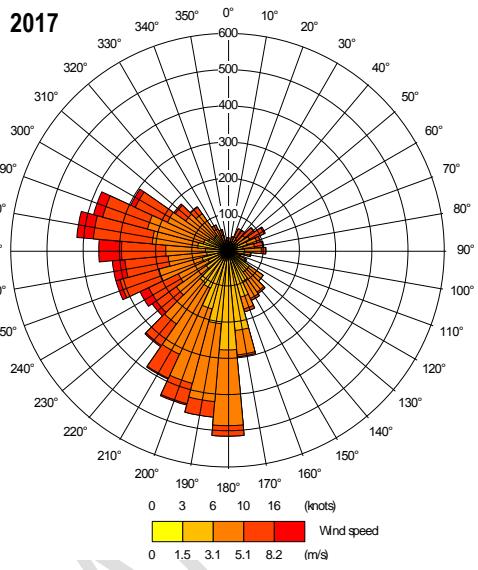
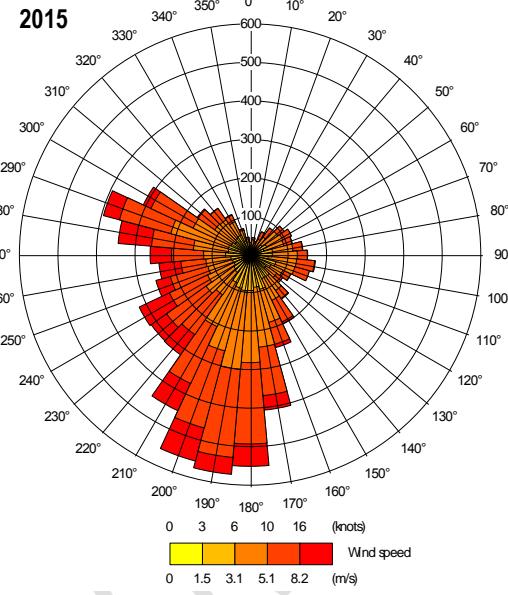
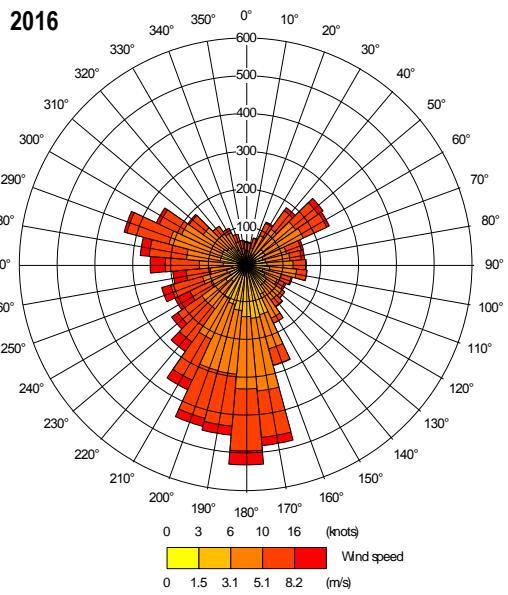
Statistic	Test Results	
	Option 8	NOx Roads from CM, NO2 Road from CM & DTs
Mean	33.1	34.2
Median	32.6	33.8
Maximum	41.7	43.2
Minimum	24.5	25.2
Upper Quartile	41.7	43.2
Lower Quartile	31.2	32.4
Standard Deviation	2.8	2.9
Range	17.2	18.0
No. of Non-Compliant Receptors	2	5

**Chart 11: Distribution of NO<sub>2</sub> Concentrations for Sensitivity Testing of f-NO<sub>2</sub> and Verification (ug/m<sup>3</sup>)**



## Meteorology

- 6.1.54 Meteorological data is a key input in any dispersion modelling process which has the potential to impact on the ‘compliance gap’ and the choice of measures. The fact that the same meteorology has been assumed in the projected year as in the base year may be causing an over or under estimation of NO<sub>2</sub> concentrations in the projected year. It is a well-established fact that inter-annual variability in meteorology can have a significant impact on NO<sub>2</sub> concentrations (though potentially less significant at the roadside where variations in vehicle emissions is likely to be the key driver of inter-annual differences in NO<sub>2</sub> concentration).
- 6.1.55 The modelling has used a 2016 base year meteorological dataset, for all Base and Forecast years. Meteorological data from the same station has been used for 2015, 2017 and 2018 to understand the variability this produces in Option 8 NO<sub>2</sub> concentrations.
- 6.1.56 It should be noted that part of the model verification process is accounting for the simplification of meteorological data (which includes uncertainty in the measurement themselves) for a dispersion model, along with any systematic effects that all model input parameters create in the final outputs. The predicted model response in NO<sub>2</sub> is a function of all of these parameters, and the inter-year variability is in part due to model uncertainty itself and not simply how meteorological conditions themselves vary according to purely the meteorological data inputs. The windroses for 2016 and the alternative test years are provided below.

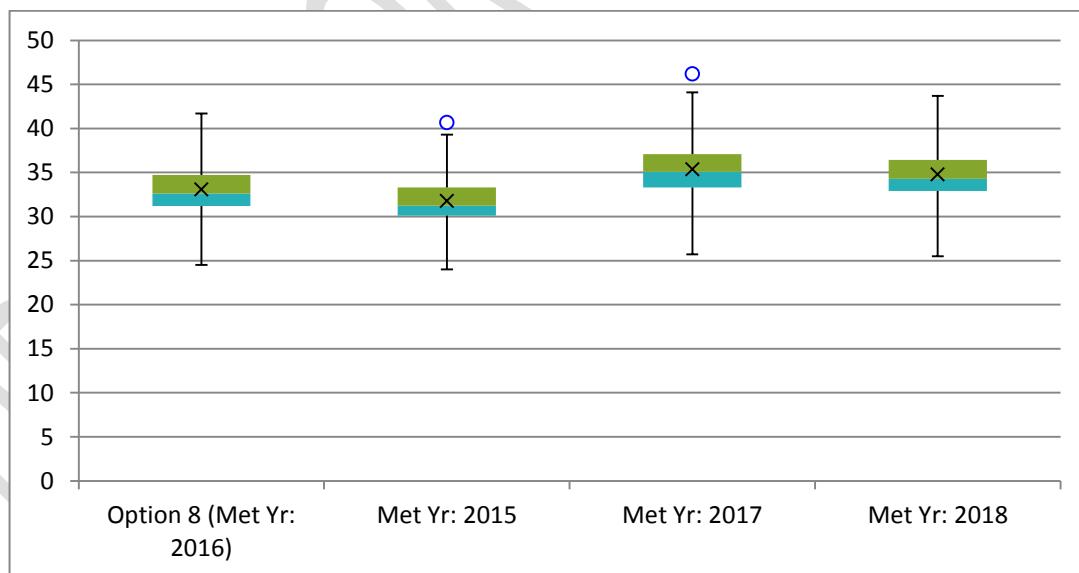


6.1.57 Table 28 and Chart 12 provide the summary statistics and the relative compliance status for each scenario. This sensitivity test demonstrates that there is a potential effect of the use of meteorology from different years. The inter-annual changes in meteorology may not have a large impact on the overall distribution of roadside NO<sub>2</sub> concentrations in a local area but can have a significant impact for particular road links (as reflected in the considerably higher maximum concentration in 2017 vs 2016). This is consistent with the testing undertaken by JAQU in their guidance.

**Table 28: Simple Summary NO<sub>2</sub> Statistics for Sensitivity Testing of Meteorology (ug/m<sup>3</sup>)**

Statistic	Test Results			
	Option 8 (Met yr: 2016)	Met yr: 2015	Met yr: 2017	Met yr: 2018
Mean	33.1	31.8	35.4	34.8
Median	32.6	31.3	35.1	34.3
Maximum	41.7	40.7	46.2	43.7
Minimum	24.5	24.0	25.7	25.5
Upper Quartile	41.7	40.7	46.2	43.7
Lower Quartile	31.2	30.1	33.3	32.9
Standard Deviation	2.8	2.8	3.3	3.0
Range	17.2	16.7	20.5	18.2
No. of Non-Compliant Receptors	2	1	23	15

**Chart 12: Distribution of NO<sub>2</sub> Concentrations for Sensitivity Testing of Meteorology (ug/m<sup>3</sup>)**



## **Conclusions from the Sensitivity Tests**

- 6.1.58 A wide range of sensitivity tests and analysis has been undertaken, based on guidance issued by JAQU. These indicate that the modelled concentrations could be over- or under-estimated, however this is unavoidable and a reasonable aspect of any predictive analysis.
- 6.1.59 The testing of the behavioural responses demonstrates that the Greater Manchester methodology is potentially sensitive to model input assumptions and that these assumptions could alter the predicted date of compliance. However, all of the methodologies indicate that an Option 8 type scheme is necessary because under none of the methodological changes was compliance predicted in 2023.
- 6.1.60 Overall, it is concluded that there are a variety of assumptions that could act in combination either synergistically or antagonistically, to mean that future concentrations are higher or lower, and that the impacts of the scheme could be greater or lesser, than those predicted using the selected methodology in the OBC. However, the process applied is considered to be reasonable and appropriate, and the conclusions regarding the case for the scheme are robust.