

TECHNICAL NOTE

A6 MARR Year Five Post Opening M&E

SUBJECT

A6 MARR 2024 air quality
monitoring report

PROJECT NO.

5223510

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Client signoff

Client	Stockport Council		
Project	A6 MARR Year Five Post Opening M&E	Project No.	5223510
Client signature / date			

1. Introduction

AtkinsRéalis was commissioned to undertake a six-month monitoring survey to evaluate Year Five post-opening conditions at locations in the vicinity of the recently opened A6 to Manchester Airport Relief Road (A6 MARR), which runs from the B5166 Ringway Road near the airport to the A6 Buxton Road to the east of Hazel Grove. Since opening, the scheme has been referred to as the A555 and is signed as such. For the remainder of this report the scheme is referred to as the A555.

The study area is located mainly within the boundary of Stockport Metropolitan Borough Council (SMBC) area of Greater Manchester and also extends out to the southern section of the Manchester City Council (MCC) area and the northern section of Cheshire East Council (CEC) area.

The monitoring survey was undertaken using passive diffusion tubes to measure monthly concentrations of nitrogen dioxide (NO₂) to determine an average NO₂ concentration over the monitoring period at each location. Nitrogen dioxide is a key air pollutant associated with road traffic sources. Monitoring was undertaken for a period of six-months commencing on 8th January 2024 and ending on 2nd July 2024.

The monitoring reported in this technical note has been used to inform a comparison with the six-month pre-construction monitoring survey undertaken in 2014 and the six-month Year One post-opening monitoring survey undertaken in 2019/20. The monitoring was undertaken at the same locations that were used in the 2019/20 survey to allow for the differences between the current and previous studies to be readily observed. There were some changes in locations used in the Year One and Year Five post-opening surveys compared with the 2014 survey, where the original monitoring sites were no longer present due either to the A555 construction or to other local changes, with further details provided in this technical note.

In 2025, the full year of 2024 data from continuous monitoring sites was ratified in accordance with national QA/QC procedures. Following the publication of these annual results in April 2025, the data was used to update the annualisation and bias adjustment calculations. This enabled the determination of a robust, annualised and bias-adjusted mean for 2024. The updated 2024 data was then used to revise the indicative 2023 annual mean previously reported in version 1.0 of this report.

2. Air Quality Criteria

2.1 Nitrogen Dioxide

As noted above, the key air pollutant of concern is nitrogen dioxide (NO₂). NO₂ is a secondary pollutant produced by the oxidation of nitric oxide (NO). NO and NO₂ are collectively termed nitrogen oxides (NO_x). Road transport contributed 30 per cent of emissions of NO_x in 2022¹. Human exposure to elevated concentrations of NO₂ can cause inflammation of the airways and increase susceptibility to respiratory infections and to allergens. NO₂ can exacerbate the symptoms of those already suffering from lung or heart conditions.

2.2 UK Air Quality Legislation

Relevant air quality regulations that apply in England include:

- The Air Quality Standards Regulations (SI 2010 No.1001) which implemented the air quality limit values included in the EU Directive on ambient air quality and cleaner air for Europe (2008/50/EC), as amended (SI 2016 No. 1184)², and further amended by SI 2019 No.74 and SI 2020 No.1313 to account for EU withdrawal.
- Regulations implementing national air quality objectives: Air Quality (England) Regulations 2000 (SI 2000 No. 928), Air Quality (England) (Amendment) Regulations 2002 (SI 2002 No. 3043)^{3,4}

The relevant air quality criteria in the context of this assessment for the protection of human health for NO₂ are presented in Table 1 and apply in locations likely to have 'relevant exposure' i.e., where members of the public are exposed for periods equal to or exceeding the averaging periods set for the criteria.

Table 1 - Statutory Air Quality Criteria for Nitrogen Dioxide

Pollutant	Criteria
NO ₂	Limit value and objective 1-hour mean 200 µg/m ³ not to be exceeded more than 18 times a year. Annual mean concentration should not exceed 40µg/m ³ .

¹ [Emissions of air pollutants in the UK – Nitrogen oxides \(NO_x\) - GOV.UK](#), updated February 2024

² The Air Quality Standards (Amendment) Regulations 2016. Available at: [The Air Quality Standards \(Amendment\) Regulations 2016](#)

³ The Air Quality (England) Regulations 2000. Available at: <http://www.legislation.gov.uk/uk/si/2000/928/contents/made>

⁴ The Air Quality (England) (Amendment) Regulations 2002. Available at: <http://www.legislation.gov.uk/uk/si/2002/3043/contents/made>

3. Existing Conditions

The location of the monitoring survey covers three local authority areas: Stockport Metropolitan Borough Council (SMBC); Manchester City Council (MCC); and Cheshire East Council (CEC), with most of the monitoring sites being located within SMBC. SMBC and MCC are part of the Greater Manchester Combined Authority (GMCA).

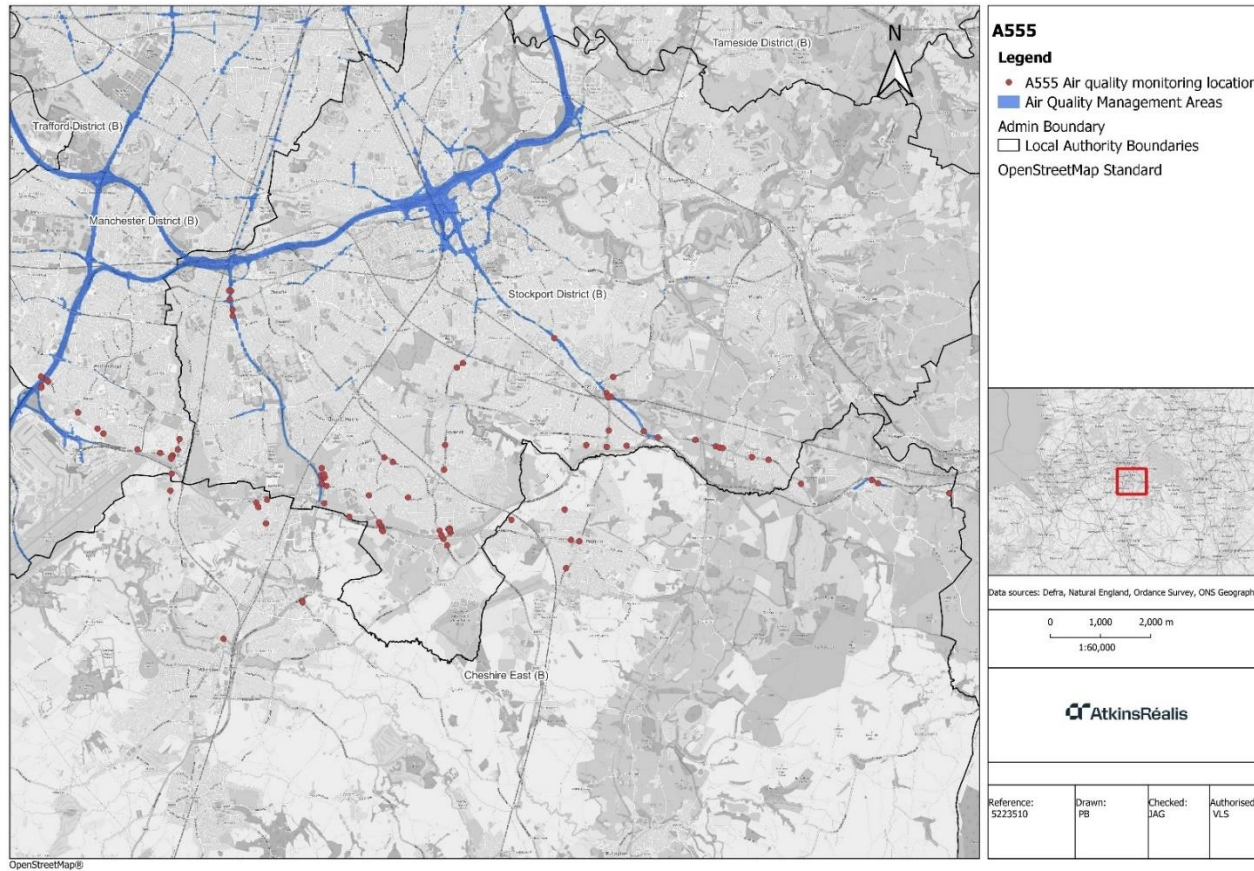
The existing air quality conditions within the surveyed area have been examined by reviewing publicly available data including local air quality management reports and the clean air Greater Manchester website⁵.

Figure 1 shows the extent of the Year Five post-opening monitoring survey locations and the Air Quality Management Areas (AQMA) located within the survey area.

⁵ [Home | Clean Air Greater Manchester](#)

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Figure 1 Map of Diffusion Tube Monitoring Locations



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3.1 Local Air Quality Management

Under Part IV of the Environment Act 1995, as amended by Schedule 11 of the Environment Act 2021⁶, all local authorities are responsible for Local Air Quality Management (LAQM), the mechanism by which the Government's air quality objectives are to be achieved. As part of this LAQM role, local authorities are required to periodically review air quality in their area and to assess existing air quality against the objectives defined in Regulations. Where an objective is breached within their area, they must designate an AQMA and develop an action plan to improve pollution levels and work towards achieving the objectives. Under the current LAQM regime, a local authority is responsible for regular review and assessment of local air quality, reports on which are published following public consultation and review by the Department for Environment, Food and Rural Affairs (DEFRA).

3.2 Air Quality Management Areas

GMCA declared a combined AQMA across all 10 local authority areas for exceedances of the annual mean NO₂ air quality objective, which was last amended in 2016. GMCA 2023 Air Quality Annual Status Report⁷, reports that there were no exceedances of the annual mean NO₂ concentrations recorded within SMBC in 2023, and only two exceedances in the MCC area, both of which were located over 9 km from the location of the monitoring survey.

CEC have declared 12 AQMA due to monitored exceedances of the annual mean NO₂ air quality objective. In their latest Air Quality Annual Status Report 2024, they proposed that 11 of these AQMAs should be revoked due to monitored concentrations being below the air quality objective, but one AQMA, located along the A6 in Disley, should be retained. This AQMA is within the survey area.

The most recent CEC Annual Status Report⁸ noted that there were no exceedances of the annual mean NO₂ air quality objective measured in 2023 at monitoring locations within the survey area.

The AQMA described above are shown in Figure 1.

3.3 Clean Air Plan

GCMA has been developing a Clean Air Plan (GMCAP) to address exceedances of the Air Quality Objective within the AQMA and to tackle exceedances of the annual mean NO₂ limit value at the roadside, which included the A34 between A555 and East Didsbury (west of Stockport town centre), in compliance with a government direction⁹. Work carried out with updated baseline assumptions in 2024 confirmed that the new GMCAP should deliver compliance in the shortest possible time and by 2026 at the latest, with an investment led package without the need to implement a Clean Air Zone. The GMCAP was approved by Government in January 2025.

⁶ Schedule 11 Environment Act 2021. Available from:
<https://www.legislation.gov.uk/ukpga/2021/30/schedule/11/enacted>

⁷ Greater Manchester Combined Authority (June 2024). 2023 Air Quality Annual Status Report. Available from [[GM Air Quality Annual Status Report 2023pdf.pdf \(ctfassets.net\)](#)]

⁸ Cheshire East Council – 2024 Air Quality Annual Status Report (ASR), June 2024, Available from [[Cheshire East 2024 Annual Status Report](#)]

⁹ [The Environment Act 1995 \(Greater Manchester\) Air Quality Direction 2022](#)

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The investment-led package includes:

- £51.1m towards bus investment, including 40 zero emission buses, 77 Euro VI standard buses and charging infrastructure
- £5m for local traffic management measures
- £8 million to support moving Greater Manchester's taxi fleet to cleaner vehicles

Up to £21.9m for administration, delivery, monitoring and other associated costs.

4. Monitoring Survey Methodology

To allow comparison and consistency with previous surveys, the equipment, locations and approach for the Year Five post-opening survey were the same as the Year One post-opening survey.

The locations of the 88 diffusion tube monitoring sites are shown in Figure 1, with further details provided in Appendix A and maps provided in Appendix G. The diffusion tubes were located predominantly on street furniture, such as lampposts, at roadside locations, at a height of around 1.5 to 2 m to represent human exposure whilst being out of reach to reduce risk of theft or vandalism. At some sites a different location was used for the pre-construction survey, completed in 2014, compared to the post opening surveys completed in 2019/20 and 2024, these sites have been identified in Table 4.

The diffusion tubes were prepared using a 20% triethanolamine (TEA) in water method and were supplied and analysed by Gradko International Ltd. Further details of the diffusion tube monitoring methodology, including quality assurance and quality control (QA/QC) procedures, are provided in Appendix B.

The Year Five post-opening monitoring survey was undertaken between January 2024 and June 2024. The diffusion tubes were changed every month, where possible in line with the dates in DEFRA's NO₂ Diffusion Tube Monitoring Calendar¹⁰, with duplicate tubes placed at each site to check for precision. The monthly results at each site were then averaged to provide an average for each site over the six-month monitoring period. Time weighted averages were calculated where diffusion tubes could not be changed in line with the DEFRA calendar. The raw monitoring data are presented in Appendix C.

This method of monitoring provides a useful and cost-effective means to provide average concentrations, however, as they are not an approved reference method, the data must be bias corrected based on local or national co-location studies with chemiluminescent analysers. For this study, the national bias adjustment factor of 0.84 for 2024 was applied. Further details are provided in Appendix D.

To take account of any seasonal variations over the monitoring period, annualisation was undertaken in accordance with LAQM.TG(22)¹¹ to derive indicative annual average concentrations at each monitoring site where the data capture rate over the year was between 25% and 75%. Data measured at four nearby CMS at background locations in DEFRA's Automatic Urban and Rural Network were used to derive the annualisation factors. Further details are provided in Appendix E.

¹⁰ <https://laqm.defra.gov.uk/air-quality/air-quality-assessment/diffusion-tube-monitoring-calendar/>

¹¹ LAQM Technical Guidance LAQM.TG22. Available at: <https://laqm.defra.gov.uk/air-quality/featured/uk-regions-exc-london-technical-guidance/>

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4.1 Data capture adjustment

The annualisation adjustment factor for sites with a full 6 months data capture during the survey period in 2024 was calculated to be 1.0363, as shown in the first row in Table 10, Appendix E. Where diffusion tubes had missing months of data, the annualisation factors were based on the comparisons between the means for the periods for which data were available and the 2024 annual means. The calculated average annualisation factors ranged from 0.8732 to 1.1462, depending on the availability of data at each diffusion tube site. Details of the adjustment factors are shown in Table 10.

5. Survey Results

5.1 Year Five Post-Opening Monitoring Survey Results

The raw diffusion tube data from the Year Five post-opening survey for the 88 sites surveyed are presented in Appendix C. In line with LAQM (TG22), an annual average concentration could not be estimated at two sites, MO28 and MO47, as both sites had a data capture rate of less than 25%. The bias adjusted and annualised 2024 NO₂ concentrations at the other 86 sites with sufficient data capture are presented below in Table 2.

The 2024 annual mean NO₂ concentrations at all 86 sites were below the air quality objective of 40 µg/m³.

The 2024 annual mean NO₂ concentrations are presented in Figure 2, and are colour coded to demonstrate the lowest and highest concentrations across the survey area. The figure demonstrates that the highest concentrations, above 30 µg/m³, were found at tubes located on the following roads:

- A34 near to the A560 Gatley Road junction at (sites MO62, 35.5 µg/m³, and MO59, 32.0 µg/m³).
- A6 Buxton Road near Macclesfield Road junction (site HG1, 33.0 µg/m³).
- A34 near to the Stanley Road junction (site STJ1, 31.0 µg/m³)

2024 annual mean NO₂ concentrations at all other locations were below 30 µg/m³, <75% of the air quality objective.

Table 2 – Annualised and Adjusted Monitored NO₂ concentrations (µg/m³) at Diffusion Tube Sites

Tube ID	08/01 - 05/02	05/02 - 19/03	19/03 - 04/04	04/04 - 30/04	30/04 - 05/06	05/06 - 02/07	Time Weighted Average	2024 Local Bias Adjustment Factor	2024 Annualisation Factor	2024 Annual Mean
A6-1	23.4	23.9	24.5	16.6	22.7	23.9	22.6	0.84	1.04	19.6
A6-2	20.7	N/A	20.0	17.9	17.5	13.3	17.7	0.84	1.15	17.0
A6-3	N/A	22.4	22.4	20.8	N/A	19.0	21.2	0.84	1.09	19.3

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Tube ID	08/01 - 05/02	05/02 - 19/03	19/03 - 04/04	04/04 - 30/04	30/04 - 05/06	05/06 - 02/07	Time Weighted Average	2024 Local Bias Adjustment Factor	2024 Annual isation Factor	2024 Annual Mean
D1	23.3	23.2	23.2	20.7	23.1	19.1	22.2	0.84	1.04	19.3
D2	27.8	27.3	25.1	25.5	24.8	26.8	26.3	0.84	1.04	22.9
HG1	37.7	N/A	36.8	38.1	37.5	N/A	37.6	0.84	1.05	33.0
HG2	26.3	25.2	24.6	21.7	22.0	23.1	23.8	0.84	1.04	20.7
HG3	30.5	33.6	33.9	31.2	32.8	N/A	32.4	0.84	0.96	26.0
HL1	28.9	29.2	29.8	31.2	33.6	37.0	31.6	0.84	1.04	27.5
HL2	15.7	14.2	13.8	12.6	14.6	11.2	13.8	0.84	1.04	12.0
MO1	25.8	24.9	20.9	21.6	N/A	N/A	23.8	0.84	0.87	17.5
MO2	26.1	25.4	20.0	20.3	19.4	20.7	22.3	0.84	1.04	19.4
MO3	27.8	24.0	22.3	22.1	23.3	N/A	24.0	0.84	0.96	19.3
MO4	27.5	25.4	20.1	N/A	19.3	19.2	22.6	0.84	1.00	19.0
MO5	25.8	32.0	27.2	N/A	N/A	15.1	25.8	0.84	0.92	20.0
MO6	26.4	29.2	26.5	20.6	21.0	16.1	23.6	0.84	1.04	20.5
MO7	31.4	31.0	25.1	25.0	25.4	26.2	27.8	0.84	1.04	24.2
MO8	23.4	20.6	16.7	15.0	14.8	N/A	18.3	0.84	0.96	14.7
MO9	26.2	21.9	16.7	14.3	15.2	15.5	18.6	0.84	1.04	16.2
MO10	26.4	26.3	N/A	17.5	20.0	19.1	22.3	0.84	1.05	19.6
MO11	23.1	21.1	N/A	14.2	14.3	14.5	17.7	0.84	1.05	15.6
MO12	23.7	21.8	N/A	15.3	15.4	14.1	18.3	0.84	1.05	16.1
MO13	23.7	20.9	N/A	14.1	15.5	14.6	18.0	0.84	1.05	15.9
MO14	21.6	18.1	15.6	N/A	14.5	13.7	16.8	0.84	1.00	14.1
MO15	N/A	18.1	17.4	N/A	15.4	14.1	16.3	0.84	1.10	15.1
MO16	25.1	20.8	16.7	13.8	14.8	14.4	17.9	0.84	1.04	15.6
MO17	24.6	22.1	16.3	14.7	14.9	16.3	18.5	0.84	1.04	16.1
MO18	27.4	22.8	20.8	18.7	21.5	N/A	22.4	0.84	0.96	18.0
MO19	22.7	19.1	15.7	14.6	13.9	16.8	17.3	0.84	1.04	15.0
MO20	25.4	25.2	22.0	18.7	21.7	19.6	22.4	0.84	1.04	19.5
MO21	18.4	16.0	12.1	12.0	13.1	13.1	14.4	0.84	1.04	12.5
MO22	17.7	15.3	12.9	11.3	12.0	11.1	13.6	0.84	1.04	11.8
MO24	19.4	18.8	14.6	13.0	N/A	N/A	17.0	0.84	0.87	12.5
MO25	21.2	21.2	18.5	16.2	16.9	14.6	18.3	0.84	1.04	16.0
MO26	23.7	22.8	19.6	18.3	20.6	18.3	20.8	0.84	1.04	18.1
MO27	17.6	16.3	12.5	10.2	11.1	10.9	13.4	0.84	1.04	11.6

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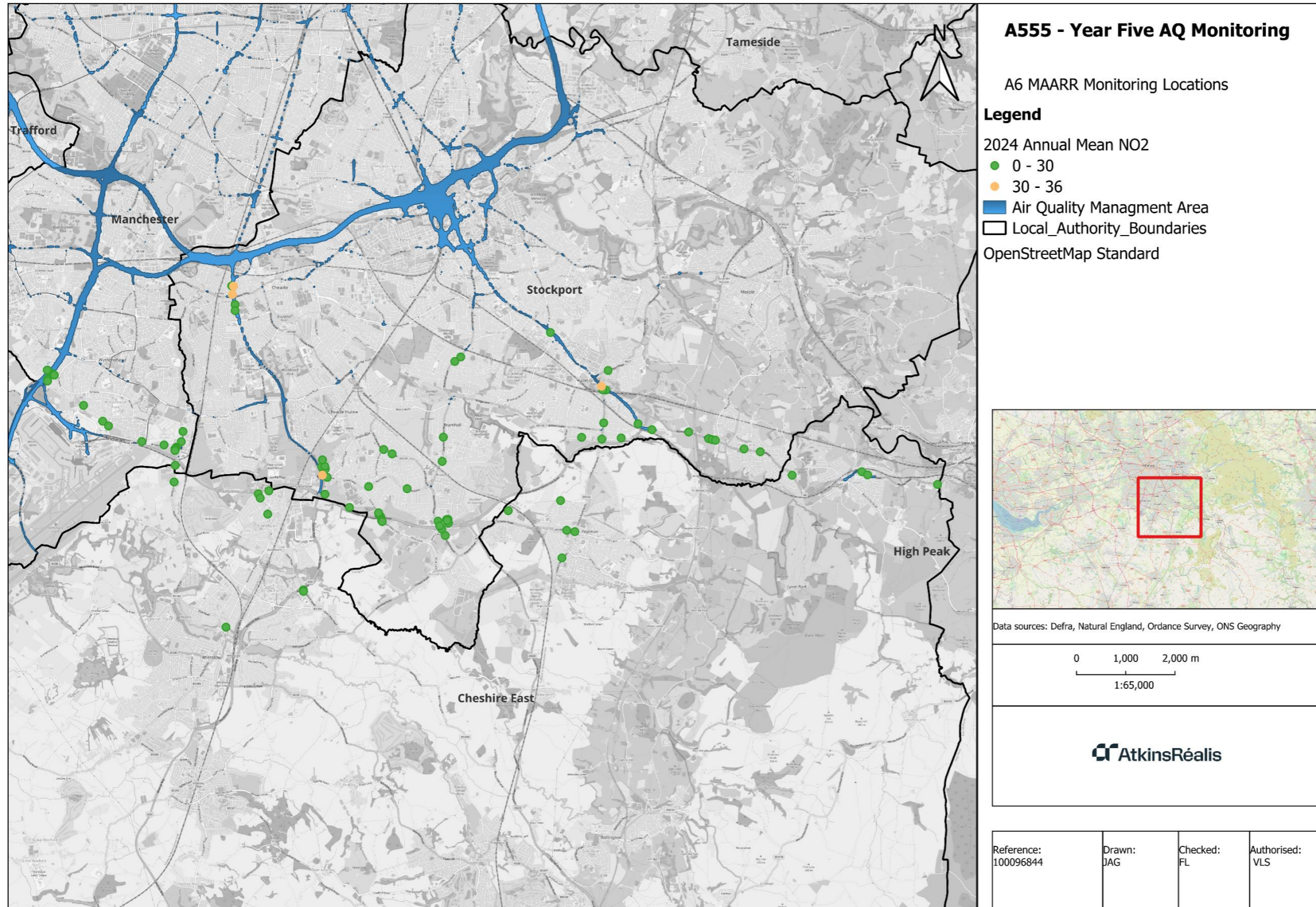
Tube ID	08/01 - 05/02	05/02 - 19/03	19/03 - 04/04	04/04 - 30/04	30/04 - 05/06	05/06 - 02/07	Time Weighted Average	2024 Local Bias Adjustment Factor	2024 Annual isation Factor	2024 Annual Mean
MO28	N/A	N/A	N/A	N/A	N/A	22.5	N/A	N/A	N/A	N/A
MO29	19.9	18.1	14.5	12.0	11.6	10.7	14.7	0.84	1.04	12.8
MO30	18.7	17.4	14.0	11.1	11.8	9.8	14.1	0.84	1.04	12.2
MO31	N/A	19.6	16.2	13.2	N/A	13.7	16.2	0.84	1.09	14.8
MO32	21.1	20.8	17.5	13.7	13.8	15.7	17.3	0.84	1.04	15.0
MO33	21.8	21.0	16.4	15.3	15.1	14.4	17.6	0.84	1.04	15.4
MO34	19.0	18.6	15.6	12.1	13.5	11.4	15.3	0.84	1.04	13.3
MO35	19.3	18.1	14.5	12.0	13.8	12.9	15.4	0.84	1.04	13.4
MO38	15.5	14.2	11.5	10.7	12.0	9.9	12.5	0.84	1.04	10.9
MO39	13.8	13.3	10.4	9.6	10.4	8.8	11.3	0.84	1.04	9.8
MO40	22.2	23.1	N/A	18.0	17.2	17.2	19.8	0.84	1.05	17.4
MO41	20.0	18.0	14.2	14.2	15.4	14.7	16.4	0.84	1.04	14.3
MO42	27.5	26.0	22.4	20.5	21.7	19.7	23.3	0.84	1.04	20.2
MO43	25.3	23.5	21.2	17.3	18.8	20.2	21.2	0.84	1.04	18.4
MO44	27.8	24.3	23.4	21.3	25.2	22.7	24.3	0.84	1.04	21.1
MO45	21.9	20.1	17.4	14.3	N/A	10.9	17.3	0.84	0.98	14.2
MO46	24.3	21.5	19.6	18.1	18.2	16.7	19.9	0.84	1.04	17.3
MO47	29.1	24.8	21.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A
MO48	17.8	16.5	12.6	9.9	11.7	10.1	13.4	0.84	1.04	11.7
MO49	15.3	14.4	10.8	9.5	N/A	9.2	12.3	0.84	0.98	10.1
MO50	15.1	14.2	10.5	9.3	8.8	8.1	11.2	0.84	1.04	9.8
MO51	23.7	24.6	20.1	19.3	19.9	19.1	21.5	0.84	1.04	18.7
MO52	24.6	23.6	19.8	19.1	17.8	N/A	21.2	0.84	0.96	17.0
MO53	13.8	12.4	10.7	N/A	10.0	8.6	11.2	0.84	1.00	9.4
MO54	15.3	15.5	13.4	N/A	N/A	9.7	13.8	0.84	0.92	10.7
MO55	N/A	13.8	11.6	8.8	11.7	9.0	11.3	0.84	1.13	10.8
MO56	26.3	27.6	28.0	19.9	24.1	N/A	25.2	0.84	0.96	20.2
MO57	23.6	N/A	28.3	24.0	28.2	21.9	25.1	0.84	1.15	24.2
MO58	23.4	27.9	22.6	23.2	22.9	23.6	24.3	0.84	1.04	21.2
MO59	39.8	38.0	36.1	36.9	32.9	37.3	36.8	0.84	1.04	32.0
MO60	36.5	32.8	31.0	30.0	27.8	33.0	31.8	0.84	1.04	27.7
MO61	26.9	25.7	26.2	23.7	24.2	17.3	24.0	0.84	1.04	20.9
MO62	N/A	38.0	N/A	N/A	39.1	32.6	37.0	0.84	1.14	35.5

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Tube ID	08/01 - 05/02	05/02 - 19/03	19/03 - 04/04	04/04 - 30/04	30/04 - 05/06	05/06 - 02/07	Time Weighted Average	2024 Local Bias Adjustment Factor	2024 Annual isation Factor	2024 Annual Mean
MO63	32.9	33.6	33.3	28.8	29.6	18.0	29.5	0.84	1.04	25.7
MO64	18.8	17.7	14.0	11.6	12.3	10.6	14.4	0.84	1.04	12.6
MO65	21.7	20.9	17.5	15.3	13.9	14.0	17.4	0.84	1.04	15.1
MO66	16.7	17.1	12.8	11.5	11.4	9.5	13.5	0.84	1.04	11.7
MO67	21.5	23.1	21.8	17.7	20.7	14.3	20.1	0.84	1.04	17.5
N1	33.3	33.4	35.4	31.7	N/A	N/A	33.3	0.84	0.87	24.4
P1	13.1	11.5	8.4	6.7	6.9	6.3	9.0	0.84	1.04	7.9
P2	19.2	17.6	16.1	14.2	17.3	13.0	16.4	0.84	1.04	14.3
P3	21.1	20.6	17.6	15.0	18.7	15.3	18.4	0.84	1.04	16.0
QPS1	17.4	14.8	11.7	9.2	10.4	9.6	12.4	0.84	1.04	10.8
QPS2	15.3	13.5	11.1	8.4	10.2	8.7	11.4	0.84	1.04	9.9
QPS3	15.5	14.1	10.4	8.7	9.8	8.9	11.5	0.84	1.04	10.0
STJ1	41.4	32.7	40.0	36.0	31.6	36.3	35.6	0.84	1.04	31.0
STJ2	28.8	28.9	26.2	N/A	26.0	28.1	27.8	0.84	1.00	23.3
STJ3	26.2	23.2	16.8	15.4	14.4	16.7	19.1	0.84	1.04	16.7
STJ4	24.6	24.0	16.0	14.6	12.2	N/A	18.8	0.84	0.96	15.1
STJ5	23.5	22.2	16.9	15.2	13.3	N/A	18.5	0.84	0.96	14.9
STJ6	21.3	19.4	14.1	12.4	11.1	12.8	15.5	0.84	1.04	13.5
STJ7	22.1	21.4	14.7	14.3	N/A	13.3	17.9	0.84	0.98	14.7

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Figure 2 - Map showing indicative 2023 annualised NO₂ concentrations across the survey area



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5.2 Comparison of Monitoring Survey Results

Annual mean NO₂ concentrations for the pre-construction and Year One post-opening monitoring surveys, as reported previously¹², have been compared with the latest Year Five post-opening results. These comparisons, along with commentary on the observed changes, are summarised in Table 4. The table also includes the absolute and percentage changes in concentrations between Year Five and both the pre-construction and Year One surveys for each monitoring location.

Where the location of the monitoring sites changed between the pre-construction and post-opening surveys, these sites have been identified in the table (^ after the Tube ID).

To assess the significance of changes in NO₂ concentrations, the IAQM/EPUK “planning for air quality guidance”¹³ has been applied. Table 3 presents the matrix used to determine impact descriptors, based on the long-term average concentration at each site in 2024 and its relationship to the Air Quality Objective (AQO) for NO₂ (40 µg/m³), combined with the percentage change in concentration relative to the AQO from earlier survey years.

Table 3 – IAQM Impact descriptors for individual receptors.

% Change in concentration relative to AQO	75% or less of AQO (<30µg/m ³)	76-94% of AQO (30–38 µg/m ³)	95-102% of AQO (38–41 µg/m ³)	103-109% of AQO (41–44 µg/m ³)	110% or more of AQO (>44 µg/m ³)
1% (0.4 µg/m ³)	Negligible	Negligible	Slight	Moderate	Moderate
2-5% (0.4 - 2 µg/m ³)	Negligible	Slight	Moderate	Moderate	Substantial
6-10% (2 - 4 µg/m ³)	Slight	Moderate	Moderate	Substantial	Substantial
>10% (> 4 µg/m ³)	Moderate	Moderate	Substantial	Substantial	Substantial

The matrix has been applied to the results presented in this survey as follows.

Sites with a change of less than 2 µg/m³, and an annual concentration of less than 30 µg/m³ can be considered to have a negligible change in accordance with the IAQM/EPUK impact descriptor matrix.

Sites with a change between 2 µg/m³ and 4 µg/m³, and an annual concentration of less than 30 µg/m³ can be considered to have a slight change.

Sites with a change greater than 4 µg/m³, and an annual concentration of less than 30 µg/m³ can be considered to have a moderate change.

Sites with a change between 0.4 µg/m³ and 2 µg/m³, and an annual concentration of 30 - 38 µg/m³ can be considered to have a slight change.

Sites with a change more than 2 µg/m³, and an annual concentration of 30 - 38 µg/m³ can be considered to have a moderate change.

¹² A6 Manchester Airport Relief Road – 1 Year Post-Development Air Quality Monitoring, published 31/03/21, AECOM

¹³ Land-use Planning & Development Control: Planning for Air Quality. v1.2. Environmental Protection UK and Institute of Air Quality Management, London, 2017 - Available at [air-quality-planning-guidance.pdf](https://www.air-quality-planning-guidance.pdf)

TECHNICAL NOTE

Table 4 - Comparison of annual mean NO₂ concentrations survey results, pre-construction and post-opening

Tube ID	Tube Description	2014 Annual Mean, µg/m ³	Change from 2014 to 2024		2019 Annual Mean, µg/m ³	Change from 2019 to 2024		2024 Annual Mean, µg/m ³	Comment on the changes between 2014 to 2024 and 2019 to 2024
			µg/m ³	percentage change		µg/m ³	percentage change		
A6-1 [^]	A6 Buxton Road west of High Lane - No.1	32.7	-13.1	-40%	29.0	-9.4	-32%	19.6	Change in location from pre-construction and moderate reduction from Year 1
A6-2 [^]	A6 Buxton Road west of High Lane - No.2	31.9	-14.9	-47%	23.4	-6.4	-27%	17.0	Change in location from pre-construction and moderate reduction from Year 1
A6-3	A6 Buxton Road west of High Lane - No.3	N/A			26.3	-7.0	-27%	19.3	No data pre-construction, moderate reduction compared with Year 1
D1	Disley (A6 Buxton Road) - No.1	33.8	-14.5	-43%	26.2	-6.9	-26%	19.3	Moderate reduction compared with pre-construction and Year 1
D2	Disley (A6 Buxton Road) - No.2	N/A			32.7	-9.8	-30%	22.9	No data pre-construction, moderate reduction compared with Year 1
HG1	Hazel Grove (A6 north of A6/Macclesfield Road junction) – No. 1	56.5	-23.5	-42%	42.1	-9.1	-22%	33.0	Moderate reduction compared with pre-construction and Year 1
HG2	Hazel Grove (A6 south of A6/Macclesfield Road junction) – No. 2	44.2	-23.5	-53%	32.1	-11.4	-36%	20.7	Moderate reduction compared with pre-construction and Year 1
HG3	Hazel Grove (Macclesfield Road south of A6 junction) – No. 3	48.0	-22.0	-46%	38.4	-12.4	-32%	26.0	Moderate reduction compared with pre-construction and Year 1

TECHNICAL NOTE

Tube ID	Tube Description	2014 Annual Mean, $\mu\text{g}/\text{m}^3$	Change from 2014 to 2024		2019 Annual Mean, $\mu\text{g}/\text{m}^3$	Change from 2019 to 2024		2024 Annual Mean, $\mu\text{g}/\text{m}^3$	Comment on the changes between 2014 to 2024 and 2019 to 2024
			$\mu\text{g}/\text{m}^3$	percentage change		$\mu\text{g}/\text{m}^3$	percentage change		
HL1 ^	High Lane centre (A6 Buxton Road)	49.9	-22.4	-45%	39.1	-11.6	-30%	27.5	Change in location from pre-construction and moderate reduction from Year 1
HL2	High Lane east (A6 Buxton Road)	21.7	-9.7	-45%	17.6	-5.6	-32%	12.0	Moderate reduction compared with pre-construction and Year 1
MO1 ^	Bleasdale Road (North) Near M56	26.8	-9.3	-35%	25.3	-7.8	-31%	17.5	Change in location from pre-construction and moderate reduction from Year 1
MO2 ^	Bleasdale Road (South) Near M56	24.5	-5.1	-21%	26.0	-6.6	-25%	19.4	Change in location from pre-construction and moderate reduction from Year 1
MO3	Cranham Road (West) Near M56	29.9	-10.6	-35%	27.8	-8.5	-31%	19.3	Moderate reduction compared with pre-construction and Year 1
MO4	Cranham Road (East) Near M56	27.6	-8.6	-31%	28.5	-9.5	-33%	19.0	Moderate reduction compared with pre-construction and Year 1
MO5	Hucklow Drive (East) Near M56	31.5	-11.5	-37%	29.4	-9.4	-32%	20.0	Moderate reduction compared with pre-construction and Year 1
MO6	Hucklow Drive (West) Near M56	26.2	-5.7	-22%	27.1	-6.6	-24%	20.5	Moderate reduction compared with pre-construction and Year 1
MO7	Selstead Road	29.9	-5.7	-19%	30.7	-6.5	-21%	24.2	Moderate reduction compared with pre-construction and Year 1
MO8	Roxholme Walk	20.3	-5.6	-28%	23.6	-8.9	-38%	14.7	Moderate reduction compared with pre-construction and Year 1

TECHNICAL NOTE

Tube ID	Tube Description	2014 Annual Mean, $\mu\text{g}/\text{m}^3$	Change from 2014 to 2024		2019 Annual Mean, $\mu\text{g}/\text{m}^3$	Change from 2019 to 2024		2024 Annual Mean, $\mu\text{g}/\text{m}^3$	Comment on the changes between 2014 to 2024 and 2019 to 2024
			$\mu\text{g}/\text{m}^3$	percentage change		$\mu\text{g}/\text{m}^3$	percentage change		
MO9	Woodhouse Road	21.5	-5.3	-25%	22.8	-6.6	-29%	16.2	Moderate reduction compared with pre-construction and Year 1
MO10	Swithin Road near A555	25.1	-5.5	-22%	25.9	-6.3	-24%	19.6	Moderate reduction compared with pre-construction and Year 1
MO11	Wynfield Avenue	29.0	-13.4	-46%	21.1	-5.5	-26%	15.6	Moderate reduction compared with pre-construction and Year 1
MO12	Tedder Drive Transect (South) 9m	27.0	-10.9	-40%	22.9	-6.8	-30%	16.1	Moderate reduction compared with pre-construction and Year 1
MO13 [^]	Tedder Drive Transect (South) 17m	24.5	-8.6	-35%	20.6	-4.7	-23%	15.9	Change in location from pre-construction and moderate reduction from Year 1
MO14 [^]	Tedder Drive Transect (South) 32m	23.0	-8.9	-39%	14.5	-0.4	-3%	14.1	Change in location from pre-construction, changes since Year 1 <2 $\mu\text{g}/\text{m}^3$
MO15 [^]	Tedder Drive Transect (South) 41m	22.0	-6.9	-31%	14.0	+1.1	+8%	15.1	Change in location from pre-construction, changes since Year 1 <2 $\mu\text{g}/\text{m}^3$
MO16	Emerald Road near Styal Road	22.1	-6.5	-29%	21.0	-5.4	-26%	15.6	Moderate reduction compared with pre-construction and Year 1
MO17	Cunningham Drive near Styal Road	23.0	-6.9	-30%	22.2	-6.1	-27%	16.1	Moderate reduction compared with pre-construction and Year 1
MO18 [^]	Styal Road (North) near A555 junction	26.0	-8.0	-31%	22.8	-4.8	-21%	18.0	Change in location from pre-construction and moderate reduction from Year 1

TECHNICAL NOTE

Tube ID	Tube Description	2014 Annual Mean, $\mu\text{g}/\text{m}^3$	Change from 2014 to 2024		2019 Annual Mean, $\mu\text{g}/\text{m}^3$	Change from 2019 to 2024		2024 Annual Mean, $\mu\text{g}/\text{m}^3$	Comment on the changes between 2014 to 2024 and 2019 to 2024
			$\mu\text{g}/\text{m}^3$	percentage change		$\mu\text{g}/\text{m}^3$	percentage change		
MO19	Styal Road (South)	23.1	-8.1	-35%	20.7	-5.7	-28%	15.0	Moderate reduction compared with pre-construction and Year 1
MO20	Manchester Road (steep hill)	30.7	-11.2	-36%	28.3	-8.8	-31%	19.5	Moderate reduction compared with pre-construction and Year 1
MO21	Handforth Road (South) Near A34 Sb	19.4	-6.9	-36%	19.9	-7.4	-37%	12.5	Moderate reduction compared with pre-construction and Year 1
MO22	Handforth Road (South) Near A34 Nb	19.4	-7.6	-39%	18.3	-6.5	-36%	11.8	Moderate reduction compared with pre-construction and Year 1
MO24	Wilmslow Road/Spath Lane	20.8	-8.3	-40%	21.3	-8.8	-41%	12.5	Moderate reduction compared with pre-construction and Year 1
MO25	Wilmslow Road junction with A555	19.9	-3.9	-20%	21.6	-5.6	-26%	16.0	Slight reduction compared with pre-construction and moderate reduction compared with Year 1
MO26	Wilmslow Road south of A555	25.2	-7.1	-28%	25.3	-7.2	-28%	18.1	Moderate reduction compared with pre-construction and Year 1
MO27 ^	Pickmere Road near A555	17.2	-5.6	-33%	17.1	-5.5	-32%	11.6	Change in location from pre-construction and moderate reduction from Year 1
MO28	Longsight Lane near A555 and A34	22.0			24.8			N/A	Data capture too low
MO29	Ack Lane West - (East)	20.8	-8.0	-38%	19.3	-6.5	-34%	12.8	Moderate reduction compared with pre-construction and Year 1
MO30	Ack Lane West - (West)	20.4	-8.2	-40%	18.4	-6.2	-34%	12.2	Moderate reduction compared with pre-construction and Year 1

TECHNICAL NOTE

Tube ID	Tube Description	2014 Annual Mean, $\mu\text{g}/\text{m}^3$	Change from 2014 to 2024		2019 Annual Mean, $\mu\text{g}/\text{m}^3$	Change from 2019 to 2024		2024 Annual Mean, $\mu\text{g}/\text{m}^3$	Comment on the changes between 2014 to 2024 and 2019 to 2024
			$\mu\text{g}/\text{m}^3$	percentage change		$\mu\text{g}/\text{m}^3$	percentage change		
MO31	Spath Lane East near A555	17.9	-3.1	-17%	20.2	-5.4	-27%	14.8	Slight reduction compared with pre-construction and moderate reduction compared with Year 1
MO32	Hall Moss Lane Transect (North) 21m	21.0	-6.0	-29%	22.3	-7.3	-33%	15.0	Moderate reduction compared with pre-construction and Year 1
MO33	Hall Moss Lane Transect (North) 36m	22.5	-7.1	-32%	22.2	-6.8	-31%	15.4	Moderate reduction compared with pre-construction and Year 1
MO34	Hall Moss Lane Transect (North) 68m	19.2	-5.9	-31%	18.9	-5.6	-30%	13.3	Moderate reduction compared with pre-construction and Year 1
MO35	Hall Moss Lane Transect (North) 105m	22.3	-8.9	-40%	18.5	-5.1	-28%	13.4	Moderate reduction compared with pre-construction and Year 1
MO38	Hall Moss Lane Transect (South) 57m	18.0	-7.1	-39%	15.2	-4.3	-28%	10.9	Moderate reduction compared with pre-construction and Year 1
MO39	Hall Moss Lane Transect (South) 75m	16.7	-6.9	-41%	14.0	-4.2	-30%	9.8	Moderate reduction compared with pre-construction and Year 1
MO40 [^]	Woodford Road South of A555 (North)	30.2	-12.8	-42%	22.4	-5.0	-22%	17.4	Change in location from pre-construction and moderate reduction from Year 1
MO41	Woodford Road South of A555 (South)	28.9	-14.6	-51%	20.5	-6.2	-30%	14.3	Moderate reduction compared with pre-construction and Year 1
MO42	Woodford Road North of A555 (North)	27.7	-7.5	-27%	29.8	-9.6	-32%	20.2	Moderate reduction compared with pre-construction and Year 1

TECHNICAL NOTE

Tube ID	Tube Description	2014 Annual Mean, $\mu\text{g}/\text{m}^3$	Change from 2014 to 2024		2019 Annual Mean, $\mu\text{g}/\text{m}^3$	Change from 2019 to 2024		2024 Annual Mean, $\mu\text{g}/\text{m}^3$	Comment on the changes between 2014 to 2024 and 2019 to 2024
			$\mu\text{g}/\text{m}^3$	percentage change		$\mu\text{g}/\text{m}^3$	percentage change		
MO43 [^]	Woodford Road North of A555 (South)	28.5	-10.1	-35%	26.1	-7.7	-30%	18.4	Change in location from pre-construction and moderate reduction from Year 1
MO44	Bramhall Lane South (South)	32.8	-11.7	-36%	31.6	-10.5	-33%	21.1	Moderate reduction compared with pre-construction and Year 1
MO45	Bramhall Lane South (North)	24.9	-10.7	-43%	19.9	-5.7	-29%	14.2	Moderate reduction compared with pre-construction and Year 1
MO46	Bramhall Lane (South)	25.9	-8.6	-33%	25.4	-8.1	-32%	17.3	Moderate reduction compared with pre-construction and Year 1
MO47	Bramhall Lane (North)	32.3			27.6			N/A	Data capture too low
MO48	Albany Road north of A555 (school parking nearby)	14.3	-2.6	-18%	16.7	-5.0	-30%	11.7	Slight reduction compared with pre-construction and moderate reduction compared with Year 1
MO49	Meadway Urban BG	14.9	-4.8	-32%	15.2	-5.1	-34%	10.1	Moderate reduction compared with pre-construction and Year 1
MO50	Longnor Road Urban BG	13.6	-3.8	-28%	14.5	-4.7	-32%	9.8	Slight reduction compared with pre-construction and moderate reduction compared with Year 1
MO51	Macclesfield Road (North)	29.0	-10.3	-36%	30.1	-11.4	-38%	18.7	Moderate reduction compared with pre-construction and Year 1
MO52	Macclesfield Road (South)	23.1	-6.1	-26%	27.4	-10.4	-38%	17.0	Moderate reduction compared with pre-construction and Year 1

TECHNICAL NOTE

Tube ID	Tube Description	2014 Annual Mean, $\mu\text{g}/\text{m}^3$	Change from 2014 to 2024		2019 Annual Mean, $\mu\text{g}/\text{m}^3$	Change from 2019 to 2024		2024 Annual Mean, $\mu\text{g}/\text{m}^3$	Comment on the changes between 2014 to 2024 and 2019 to 2024
			$\mu\text{g}/\text{m}^3$	percentage change		$\mu\text{g}/\text{m}^3$	percentage change		
MO53	Ashbourne Road near A555	13.0	-3.6	-28%	15.4	-6.0	-39%	9.4	Slight reduction compared with pre-construction and moderate reduction compared with Year 1
MO54	Buxton Road -Old Road (West)	35.9	-25.2	-70%	15.8	-5.1	-32%	10.7	Moderate reduction compared with pre-construction and Year 1
MO55	Buxton Road -Old Road (East)	31.0	-20.2	-65%	14.6	-3.8	-26%	10.8	Moderate reduction compared with pre-construction and slight reduction with Year 1
MO56	A6 Buxton Road, High Lane	34.1	-13.9	-41%	30.5	-10.3	-34%	20.2	Moderate reduction compared with pre-construction and Year 1
MO57 [^]	A6 Buxton Road, High Lane (West)	31.4	-7.2	-23%	32.5	-8.3	-26%	24.2	Change in location from pre-construction and moderate reduction from Year 1
MO58 [^]	A627 Torkington Road	27.4	-6.2	-23%	29.1	-7.9	-27%	21.2	Change in location from pre-construction and moderate reduction from Year 1
MO59	A34 SB (North)	47.1	-15.1	-32%	49.5	-17.5	-35%	32.0	Moderate reduction compared with pre-construction and Year 1
MO60	A34 SB (South)	41.5	-13.8	-33%	42.9	-15.2	-35%	27.7	Moderate reduction compared with pre-construction and Year 1
MO61	A34 NB (South)	31.0	-10.1	-33%	28.2	-7.3	-26%	20.9	Moderate reduction compared with pre-construction and Year 1
MO62	A34 NB (30m North)	50.6	-15.1	-30%	43.3	-7.8	-18%	35.5	Moderate reduction compared with pre-construction and Year 1

TECHNICAL NOTE

Tube ID	Tube Description	2014 Annual Mean, $\mu\text{g}/\text{m}^3$	Change from 2014 to 2024		2019 Annual Mean, $\mu\text{g}/\text{m}^3$	Change from 2019 to 2024		2024 Annual Mean, $\mu\text{g}/\text{m}^3$	Comment on the changes between 2014 to 2024 and 2019 to 2024
			$\mu\text{g}/\text{m}^3$	percentage change		$\mu\text{g}/\text{m}^3$	percentage change		
MO63	A34 NB (200m North)	35.3	-9.6	-27%	32.7	-7.0	-21%	25.7	Moderate reduction compared with pre-construction and Year 1
MO64	Acre Lane (East)	21.4	-8.8	-41%	19.6	-7.0	-36%	12.6	Moderate reduction compared with pre-construction and Year 1
MO65	Acre Lane (West)	25.0	-9.9	-40%	22.8	-7.7	-34%	15.1	Moderate reduction compared with pre-construction and Year 1
MO66	London Road South/Clifford Road. (Poynton)	20.9	-9.2	-44%	22.6	-10.9	-48%	11.7	Moderate reduction compared with pre-construction and Year 1
MO67	A6 Buxton Road -Stepping Hill CMS	24.9	-7.4	-30%	20.3	-2.8	-14%	17.5	Moderate reduction compared with pre-construction and slight reduction with Year 1
N1	Newtown (A6 Buxton Road)	48.7	-24.3	-50%	40.3	-15.9	-39%	24.4	Moderate reduction compared with pre-construction and Year 1
P1	Glastonbury Drive, Poynton	14.2	-6.3	-44%	13.5	-5.6	-41%	7.9	Moderate reduction compared with pre-construction and Year 1
P2	Chester Road (A5149), Poynton	34.0	-19.7	-58%	25.4	-11.1	-44%	14.3	Moderate reduction compared with pre-construction and Year 1
P3	London Road South, Poynton	32.3	-16.3	-50%	26.6	-10.6	-40%	16.0	Moderate reduction compared with pre-construction and Year 1
QPS1 [^]	Queensgate Primary School – No.1	14.1	-3.3	-23%	16.3	-5.5	-34%	10.8	Change in location from pre-construction and moderate reduction from Year 1

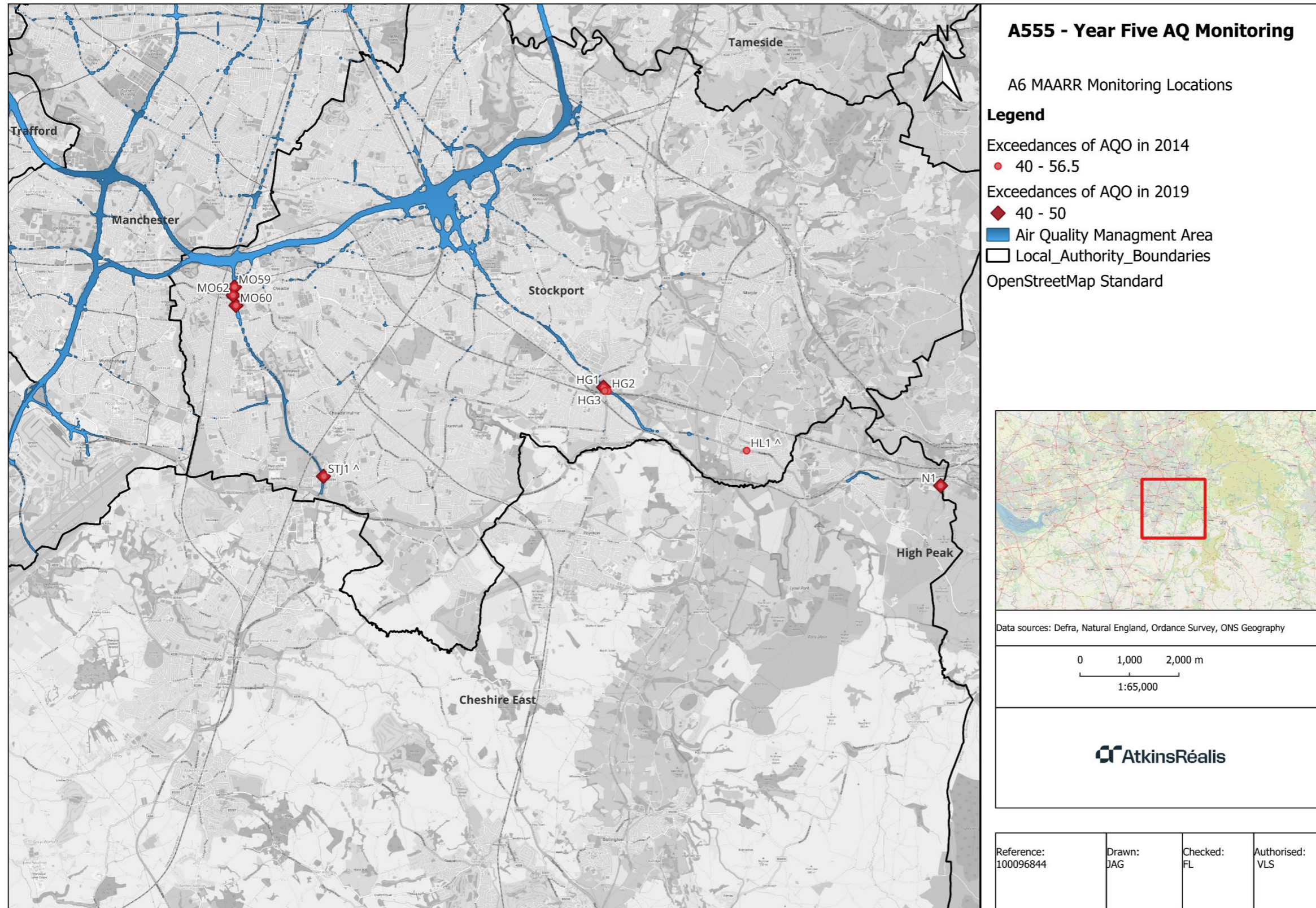
TECHNICAL NOTE

Tube ID	Tube Description	2014 Annual Mean, $\mu\text{g}/\text{m}^3$	Change from 2014 to 2024		2019 Annual Mean, $\mu\text{g}/\text{m}^3$	Change from 2019 to 2024		2024 Annual Mean, $\mu\text{g}/\text{m}^3$	Comment on the changes between 2014 to 2024 and 2019 to 2024
			$\mu\text{g}/\text{m}^3$	percentage change		$\mu\text{g}/\text{m}^3$	percentage change		
QPS2	Queensgate Primary School – No.2	13.4	-3.5	-26%	13.7	-3.8	-28%	9.9	Slight reduction compared with pre-construction and Year 1
QPS3	Queensgate Primary School – No.3	N/A			15.6	-5.6	-36%	10.0	No data pre-construction, moderate reduction compared with Year 1
STJ1 [^]	North of A34/Stanley Road junction	41.3	-10.3	-25%	46.4	-15.4	-33%	31.0	Change in location from pre-construction and moderate reduction from Year 1
STJ2 [^]	North of Stanley Road	36.1	-12.8	-35%	35.2	-11.9	-34%	23.3	Change in location from pre-construction and moderate reduction from Year 1
STJ3	St James' School – south entrance	22.8	-6.1	-27%	21.7	-5.0	-23%	16.7	Moderate reduction compared with pre-construction and Year 1
STJ4	St James' School – east access road	22.0	-6.9	-31%	22.4	-7.3	-33%	15.1	Moderate reduction compared with pre-construction and Year 1
STJ5	St James' School – western building façade	23.6	-8.7	-37%	24.5	-9.6	-39%	14.9	Moderate reduction compared with pre-construction and Year 1
STJ6	St James' School – eastern building façade	19.9	-6.4	-32%	14.5	-1.0	-7%	13.5	Moderate reduction since pre-construction, changes since Year 1 <2 $\mu\text{g}/\text{m}^3$
STJ7	St James' School – playing field northeast edge	22.9	-8.2	-36%	22.8	-8.1	-36%	14.7	Moderate reduction compared with pre-construction and Year 1

[^] This location changed with the post-opening surveys compared with 2014. Values in bold are above the annual mean NO₂ objective.

TECHNICAL NOTE

Figure 3 – Locations which exceed the annual mean NO₂ objective across the study area in 2014, 2019 and 2024



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5.2.1 Comparison of exceedances of the air quality objective

The annual mean NO₂ objective was exceeded at nine sites in 2014, six sites in 2019, and no sites in 2024. The sites with an exceedance in each survey year are shown in Figure 3, and summarised in Table 5 below.

At six of the sites with an exceedance in 2014, there was also an exceedance in 2019: HG1-on A6 north of junction with A532; MO59, MO60 and MO62 on the A34 around the junction with the A560; and STJ1 on the junction between the A34 and Stanley Road.

At two sites, HG2 and HG3, located on the A6 Buxton Road and Macclesfield Road respectively, near the junction between A6 and Macclesfield Road in Hazel Grove, there was an exceedance in 2014 but no exceedance in either 2019 or 2024.

Site N1 is currently located on the façade of a Childrens pre-school on the A6 Buxton Road, Newtown and not within an AQMA. The site was relocated between 2014 and 2019 however an exceedance was reported in 2014 and 2019. In 2024 the estimated annual mean concentration, 24.4 µg/m³ was below the objective.

Site HL1, is currently located 1 metre from a residential façade near High Lane Library on the A6. An exceedance was reported in 2014 of 49.9 µg/m³ but the site had to be relocated in 2019. The estimated annual mean concentration was 39.1 µg/m³ in 2019, just below the objective and in 2024 the estimated annual mean concentration was 27.5 µg/m³, well below (<75%) the objective.

Table 5 - Comparison of exceedances of the air quality objective, pre-construction and post-opening

Site	Description	Pre-Construction	Year One Post Opening	Year Five Post Opening
HG1	Hazel Grove (A6 north of A6/Macclesfield Road junction) – No. 1	56.5	42.1	33.0
HG2	Hazel Grove (A6 south of A6/Macclesfield Road junction) – No. 2	44.2	32.1	20.7
HG3	Hazel Grove (Macclesfield Road south of A6 junction) – No. 3	48.0	38.4	26.0
HL1 [^]	High Lane centre (A6 Buxton Road)	49.9	39.1	27.5
MO59	A34 SB (North)	47.1	49.5	32.0
MO60	A34 SB (South)	41.5	42.9	27.7
MO62	A34 NB (30m North)	50.6	43.3	35.5
N1	Newtown (A6 Buxton Road)	48.7	40.3	24.4
STJ1	North of A34/Stanley Road junction	41.3	46.4	31.0

[^] This location changed with the post-opening surveys compared with 2014.

TECHNICAL NOTE

5.2.2 Review of changes between annual mean NO₂ reported in 2019 and 2024

The changes in annual mean NO₂ concentrations have been reported above in Table 4 and presented in Figure 4 below. The figure shows the Year Five post-opening survey results using colour coding to demonstrate the lowest and highest concentrations across the survey area, as well as the changes in annual mean NO₂ concentrations measured between 2019 and 2024.

The comparison of the Year Five post-opening results with the post-opening survey results identified there are moderate reductions in annual mean NO₂ concentrations at 80 monitoring sites when compared with the 2019 survey, with slight reductions at 3 of the 88 monitoring sites. Noting that the results from the Year One post opening survey which took place over the 2019 to 2020 period are likely to have been affected by the impact of the global pandemic reducing normal traffic demand in 2020.

Three sites, MO14, MO15 on Tedder Drive and STJ6 on the eastern façade of St James School, had changes less than 2 µg/m³, with an annual concentration of less than 30 µg/m³, where changes are considered to have a negligible impact on air quality.

Data capture at MO28 and MO47 was too low to prepare an annualised annual mean concentration for 2024.

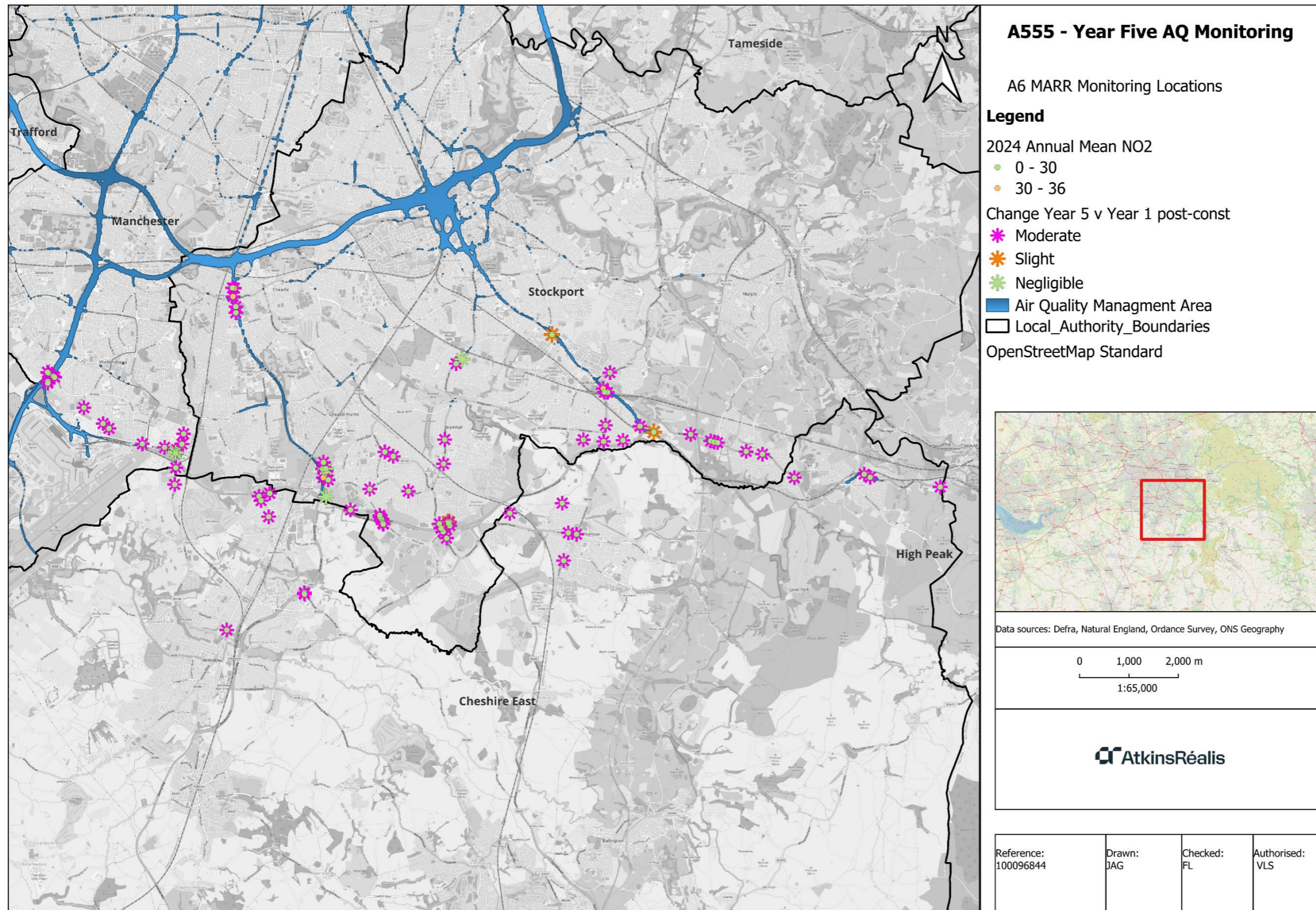
5.2.3 Review of changes between annual mean NO₂ reported in 2014 and 2024

The changes in annual mean NO₂ concentrations have been reported in Table 4 in the previous section.

The comparison of the Year Five post-opening results with the pre-construction survey results identified there are moderate reductions in annual mean NO₂ results at 60 monitoring sites and slight reductions at 6 monitoring sites. The location changed between 2014 and 2024 at 17 sites, 3 sites had no data for 2014, and 2 sites had no data for 2024, so these are not included in the comparisons. As the changes between 2014 and 2024 are reductions across the survey locations which are also observed in changes between 2019 and 2024, they have not been represented graphically in Figure 4.

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Figure 4 – Map highlighting changes in annual mean NO₂ reported between 2019 and 2024



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5.2.4 Discussion

There are many factors which affect the measured concentrations, and changes between one year and another, some of which are discussed below.

Changes in annual mean NO₂ concentrations at roadside locations can arise as a result of changes in traffic flows or speeds, or the realignment of a road bringing the source closer or further away from the monitoring point. Further discussion on the traffic changes has been provided below.

Total concentrations can also be affected by changes in other background sources, such as domestic sources or local industry, as well as regional emissions. A review of DEFRA's background mapping has been provided below.

In addition, measured concentrations can vary from one year to another as a result of meteorological factors affecting dispersion.

Over time, roadside NO₂ concentrations are generally also expected to decrease as a result of more stringent emissions controls on road vehicles. This is shown to be generally occurring across the UK¹⁴, however there may be local reasons as to why a decrease has not occurred, for example this may be as a result of increased congestion or an increase in diesel vehicles on certain roads, or an increase in traffic flows offsetting any potential reduction in emissions.

The 2019 survey was completed between December 2019 to March 2020 and then July to October 2020. The survey was interrupted by Covid restrictions in 2020 and the July to October period was affected by reduced traffic demand.

Additionally, it should be noted that all the surveys were carried out over a short-term period of less than a year, and as such have needed to be annualised. There is hence uncertainty associated with the factors for annualisation which can vary from one year to another, which can potentially lead to over or underestimates in the annual mean concentrations estimated at the diffusion tube sites. The variation in annual adjustment factors for 2014, 2019 and 2024 surveys are presented in Table 9, in Appendix E.

5.2.5 Review of DEFRA's estimated background NO_x mapping

Evaluation of DEFRA's estimated background NO_x mapping (with a 2021 reference year in 2024 and a 2018 reference year in 2019)¹⁵ in the survey area shows an overall decrease in Motorway and Trunk Road source sectors and a reduction in Total Background NO₂ and Total Background NO_x between 2019 and 2024. As detailed in Appendix F.

5.2.6 Review of reported traffic changes

The Year Five Report – Draft Traffic and Journey Times Summary, June 2024¹⁶, identified that:

- there had been a slight increase in background traffic (i.e. covering a wider area than just the air quality monitoring surveyed area) between 2014 and 2023 as reflected in the vehicle kilometres travelled across the wider local road network, with changes in traffic volumes likely to be arising from land use changes between 2014 and 2023 rather than as a direct result of the A555 scheme.

¹⁴ [Nitrogen dioxide \(NO2\) - GOV.UK](#)

¹⁵ [Background Mapping data for local authorities - Defra, UK](#)

¹⁶ A6 TO MANCHESTER AIRPORT RELIEF ROAD, Year Five Report – Draft Traffic and Journey Times Summary, June 2024

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- Across the survey area, the Year Five traffic surveys indicated that traffic volumes have increased by just over 15% since the 2014 baseline traffic surveys, and by approximately 9% since Year One.
- The increases in traffic volumes along the A555 between Years One and Five are amongst the highest changes observed across the roads in the survey area.
- The A34 Kingsway, south of the A560, has experienced a significant increase between Year One and Year Five flows however Year Five flows on the A34 north of the A555 are consistent with Year One flows, and south of the A555 flows are moderately increased in Year Five.
- The A6 Buxton Road through High Lane has recorded increases of 30% in AADT since Year One.
- Decreases in flows were observed between pre-construction, Year One and Year Five at the A6 east of the Hazel Grove Park and Ride site and at A5149 Chester Road south of A555.
- Decreases of 40% compared to Baseline AADT were observed at A5102 Woodford Road, south of A555. The traffic report also identifies a change to the road network between Year One and Year Five with the opening of the A523 Roy Chadwick Way (Poynton Relief Road-PRR) which connects the A555 via a gyratory junction south of Bramhall with the A523 south of Poynton. The following changes in traffic have been reported at locations with reported changes in air quality survey results.
- Decreases in AADT of 40% on London Road South.
- Decreases of 60% compared to Baseline on Clifford Road, Poynton.

Table 6 – Comparison of traffic changes with representative monitoring results

Road	Increase/ Decrease in AADT	Monitoring site near road	Increase/ decrease in NO ₂ ?
A555 (site 47+48, 80, 88)	Increase between 2019 and 2023	MO10, MO25, MO31, MO48	Moderate or slight decrease since pre-construction results with moderate reduction since Year One
A34 Kingsway at junction with A560 (sites 1 & 2)	Increase between 2019 and 2023	MO60 SB, MO61 NB	Moderate reduction compared with pre-construction and Year One
A6 Buxton Road through High Lane (site 55)	Increase between 2019 and 2023	A6-2, A6-3, MO57	Moderate reduction compared with Year One (no comparison with pre-construction)
A6 east of Hazel Grove Park and Ride (site 6)	Decrease between 2014 and 2023	HG2 (located west of P&R)	Moderate reduction compared with pre-construction and Year One
A5149 Chester Road south of A555 (site 19)	Decrease AADT between 2014 and 2023 but increase in PM period	P2, P3	Moderate reduction compared with pre-construction and Year One
A5102 Woodford Road south of A555 (site 16)	Decrease AADT between 2014 and 2023	MO41	Moderate reduction compared with pre-construction and Year One

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B5092 London Road South (site 8)	Decrease between 2019 and 2023	MO66, P3	Moderate reduction compared with pre-construction and Year One
Clifford Road, Poynton (site 34)	Decrease between 2019 and 2023	MO66	Moderate reduction compared with pre-construction and Year One

5.2.7 Adjustment Factors

The 2019 survey results are likely to have been affected both by reduced traffic demand as a result of Covid restrictions during the second half of the survey period between June and October 2020 and also by the comparison of monthly results in 2020 to the annual monitoring reported in 2019 which may have had a different seasonal variation than that recorded during 2020.

This final report of the 2024 survey results, are annualised against CMS data recorded in 2024, to allow annualisation adjustment factors to be used for the whole of 2024 in which the survey was undertaken.

6. Summary

An air quality monitoring survey of annual mean NO₂ concentrations was carried out before construction work started in spring 2014 at key locations across the air quality study area. A follow up survey for the Year One post opening period of the A555 commenced in winter 2019 but was interrupted during Covid restrictions.

This report summarises the results from the Year Five post opening survey which was carried out between January and July 2024. The results were processed for precision, annualised and bias adjusted following the latest guidance, as detailed in Appendix B to Appendix E. The raw 2024 tube results have been annualised and bias adjusted using CMS data collected in 2024. Data at two sites, MO28 Longsight Lane and MO47 Bramhall Lane North, could not be annualised, as data capture rates were too low.

The final results in 2024 identified no locations where results exceeded the annual mean air quality objective for NO₂ of 40 µg/m³.

Table 4 compared the annual mean NO₂ concentrations reported in 2024 with results reported for previous surveys in 2014 and 2019. The results at 82 out of the 86 sites with sufficient data capture rates were well below the air quality objective i.e. below 30 µg/m³.

Comparison of the air quality survey results identified decreases in annual mean NO₂ concentrations between Year One and Year Five results at all the monitoring locations across the survey area.

The air quality survey identified decreases in annual mean NO₂ concentrations between pre-construction and Year Five results at 66 of the monitoring locations across the survey area, where comparable data was available.

Continual improvement of air quality is expected as a result of more stringent vehicle emissions controls, therefore it is not possible to attribute the decreases in concentrations observed between the survey years to the effects of traffic changes resulting from the implementation of the A555.

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Appendices

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Appendix A. Monitoring Locations

A.1 2024 Diffusion tube monitoring locations

The monitoring locations selected during the 2024 Year Five post-construction survey were located at the same sites as those used for the Year One post-operation 2019/20 survey as detailed in the monitoring report¹² published in 2021. Several of the locations changed between the 2014 pre-construction survey and 2019/20 and these sites are highlighted with the symbol ^ next to the Tube ID.

Table 7 – Diffusion Tube NO₂ Monitoring Locations in 2014, 2019/20 and 2024

Tube ID	Name	Description	X	Y	Inside AQMA?	Detailed Map
A6-1 ^	A6 Buxton Road west of High Lane - No.1	A6, Lamp post 88 by junction with Threaphurst Lane	394288	385618	No	Area 1
A6-2 ^	A6 Buxton Road west of High Lane - No.2	A6, Lamp post 102, outside Oaklea	394694	385484	No	Area 1
A6-3	A6 Buxton Road west of High Lane - No.3	A6, Lamp post 104, "Welcome to High Lane Village" opp Royal Oak	394765	385463	No	Area 1
D1	Disley (A6 Buxton Road) - No.1	A6, Lamp post outside James Allen House	397805	384812	Yes	Area 1
D2	Disley (A6 Buxton Road) - No.2	A6, Lamp post opposite House 97	397924	384749	Yes	Area 1
HG1	Hazel Grove (A6 north of A6/Macclesfield Road junction) – No. 1	outside no54, Lamp post 54	392518	386547	Yes	Area 1
HG2	Hazel Grove (A6 south of A6/Macclesfield Road junction) – No. 2	Outside no8, Lamp post 2	392605	386470	Yes	Area 1
HG3	Hazel Grove (Macclesfield Road south of A6 junction) – No. 3	Outside Rising Sun PH, Lamp post 14	392544	386474	Yes	Area 1

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Tube ID	Name	Description	X	Y	Inside AQMA?	Detailed Map
HL1 ^	High Lane centre (A6 Buxton Road)	Lamp post 129	395413	385272	No	Area 1
HL2	High Lane east (A6 Buxton Road)	On Give Way sign	396391	384741	No	Area 1
MO1 ^	Bleasdale Road (NORTH) near M56	Lamp post opposite number 44	381264	386687	No	Area 5
MO2 ^	Bleasdale Road (SOUTH) near M56	Lamp post 10	381264	386653	No	Area 5
MO3	Cranham Road (WEST) near M56	Outside no. 34. Lamp post 8	381379	386795	No	Area 5
MO4	Cranham Road (EAST) near M56	Outside no. 40. Lamp post 9	381402	386773	No	Area 5
MO5	Hucklow Drive (EAST) near M56	Lamp post 4	381279	386860	No	Area 5
MO6	Hucklow Drive (WEST) near M57	Lamp post 5	381259	386875	No	Area 5
MO7	Selstead Road	Outside no. 77. Lamp post 11	381996	386158	No	Area 5
MO8	Roxholme Walk	Outside no. 6. Lamp post 2	382385	385836	No	Area 5
MO9	Woodhouse Road	Lamp post 7	382504	385739	No	Area 5
MO10	Swithin Road near A555	Outside no.45, Lamp post 9	383180	385425	No	Area 5
MO11	Wynfield Avenue	Telegraph pole outside no. 38	383632	385355	No	Area 5
MO12	Tedder Drive Transect (SOUTH) 9m	Sign post	383877	385308	No	Area 5
MO13 ^	Tedder Drive Transect (SOUTH) 17m	Tedder Drive, 2nd on the left	383873	385287	No	Area 5
MO14 ^	Tedder Drive Transect (SOUTH) 32m	Tedder Drive, 3rd on the right	383853	385275	No	Area 5

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Tube ID	Name	Description	X	Y	Inside AQMA?	Detailed Map
MO15 ^	Tedder Drive Transect (SOUTH) 41m	Tedder Drive, 4th on the right	383853	385242	No	Area 5
MO16	Emerald Road near Styal Road	Lamp post 3 outside no. 5	383982	385422	No	Area 5
MO17	Cunningham Drive near Styal Road	SP outside electricity substation	384016	385629	No	Area 5
MO18 ^	Styal Road (NORTH) near A555 junction	Lamp post 88, outside number 2	383859	384942	No	Area 5
MO19	Styal Road (SOUTH)	Lamp post 47	383836	384604	No	Area 5
MO20	Manchester Road (steep hill)	Lamp post 16	384890	381657	No	Area 4
MO21	Handforth Road (SOUTH) near A34 SB	Lamp post 17 outside Dalebrook	386462	382413	No	Area 4
MO22	Handforth Road (SOUTH) near A34 NB	Post outside no. 1 Budworth Walk	386465	382384	No	Area 4
MO24	Wilmslow Road/Spath Lane	Lamp post 17 opposite vets	385738	383951	No	Area 4
MO25	Wilmslow Road junction with A555	Cyclists Dismount sign	385545	384363	No	Area 4
MO26	Wilmslow Road south of A555	Lamp post 26 outside no. 199	385586	384277	No	Area 4
MO27 ^	Pickmere Road near A555	Tarvin way, outside number 2	385761	384424	No	Area 4
MO28	Longsight Lane near A555 and A34	Telegraph pole on track	386900	384355	No	Area 3
MO29	Ack Lane West - (EAST)	Lamp post 15 outside no. 74	388093	385263	No	Area 3
MO30	Ack Lane West – (WEST)	Lamp post 21 outside no. 98	388264	385174	No	Area 3
MO31	Spath Lane East near A555	Caravan Park Lamp post	387398	384087	No	Area 3
MO32	Hall Moss Lane Transect (NORTH) 21m	Fence post	388036	383895	No	Area 3

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Tube ID	Name	Description	X	Y	Inside AQMA?	Detailed Map
MO33	Hall Moss Lane Transect (NORTH) 36m	Lamp post 6 outside no. 27	388024	383910	No	Area 3
MO34	Hall Moss Lane Transect (NORTH) 68m	Lamp post 5 opp. No. 23	387997	383941	No	Area 3
MO35	Hall Moss Lane Transect (NORTH) 105m	Lamp post 4 outside no. 15	387989	383979	No	Area 3
MO38	Hall Moss Lane Transect (SOUTH) 57m	Lamp post 9 opposite Hall Moss Farm	388052	383818	No	Area 3
MO39	Hall Moss Lane Transect (SOUTH) 75m	Lamp post 10	388063	383800	No	Area 3
MO40 ^	Woodford Road South of A555 (NORTH)	Lamp post 399	389273	383647	No	Area 2
MO41	Woodford Road South of A555 (SOUTH)	Lamp post 36 outside no. 171	389344	383517	No	Area 2
MO42	Woodford Road North of A555 (NORTH)	Lamp post 53 outside no. 127	389197	383808	No	Area 2
MO43 ^	Woodford Road North of A555 (SOUTH)	Lamp post 333	389233	383714	No	Area 2
MO44	Bramhall Lane South (SOUTH)	Lamp post 88 outside no94	389282	385021	No	Area 2
MO45	Bramhall Lane South (NORTH)	TP opp. Penn House Close	389305	385513	No	Area 2
MO46	Bramhall Lane (SOUTH)	Lamp post 12 outside no. 318	389538	387049	No	Area 2
MO47	Bramhall Lane (NORTH)	Lamp post 7 outside no336	389659	387141	No	Area 2
MO48	Albany Road north of A555 (school parking nearby)	Lamp post 17 outside no. 80	389409	383770	No	Area 2
MO49	Meadway Urban BG	Lamp post 2 outside no. 10	390625	384021	No	Area 2
MO50	Longnor Road Urban BG	Lamp post 2 outside no. 5	392114	385510	No	Area 2

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Tube ID	Name	Description	X	Y	Inside AQMA?	Detailed Map
MO51	Macclesfield Road (NORTH)	Lamp post 26 outside no. 63	392563	385802	No	Area 2
MO52	Macclesfield Road (SOUTH)	Lamp post 38 outside no. 121	392525	385474	No	Area 2
MO53	Ashbourne Road near A555	Lamp post 10 outside no. 44	392918	385497	No	Area 2
MO54	Buxton Road -Old Road (WEST)	Lamp post 41 outside no. 170	393261	385784	Yes	Area 1
MO55	Buxton Road -Old Road (EAST)	Lamp post 51 outside no. 211	393542	385665	No	Area 1
MO56	A6 Buxton Road, High Lane	Telegraph pole outside no. 167	395744	385217	No	Area 1
MO57 ^	A6 Buxton Road, High Lane (WEST)	Lamp post 106	394834	385451	No	Area 1
MO58 ^	A627 Torkington Road	Lamp post 13	392653	386867	No	Area 1
MO59	A34 SB (NORTH)	Lamp post 48 outside no. 177	385044	388577	Yes	Area 4
MO60	A34 SB (SOUTH)	Lamp post outside cricket club	385074	388204	Yes	Area 4
MO61	A34 NB (SOUTH)	Solar panel outside no. 234	385075	388081	Yes	Area 4
MO62	A34 NB (30m NORTH)	Lamp post 59 outside no. 200	385017	388409	Yes	Area 4
MO63	A34 NB (200m NORTH)	Lamp post 2 outside no. 182	385007	388583	Yes	Area 4
MO64	Acre Lane (EAST)	Lamp post 34 outside no. 143	388570	384467	No	Area 3
MO65	Acre Lane (WEST)	Lamp post 6 outside no. 20	387788	384511	No	Area 3
MO66	London Road South/Clifford Road. (Poynton)	Continuous Monitoring site (ceased operating)	391715	383063	No	Area 2
MO67	A6 Buxton Road -Stepping Hill CMS	Continuous Monitoring site	391480	387637	Yes	Area 1
N1	Newtown (A6 Buxton Road)	Lamp post 119 outside bike shop	399344	384554	No	Area 1
P1	Glastonbury Drive, Poynton	Lamp post 19	391686	384226	No	Area 2

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Tube ID	Name	Description	X	Y	Inside AQMA?	Detailed Map
P2	Chester Road (A5149), Poynton	Opp no24 Lamp post 7	391811	383624	No	Area 2
P3	London Road South, Poynton	Lamp post outside hairdresser	391976	383596	No	Area 2
QPS1 ^	Queensgate Primary School – No.1	Fred Perry Way Sign	389400	383847	No	Area 2
QPS2	Queensgate Primary School – No.2	Heating pipe on north side	389371	383841	No	Area 2
QPS3	Queensgate Primary School – No.3	Left side of the school	389384	383820	No	Area 2
STJ1 ^	North of A34/Stanley Road junction	Lamp post 194	386847	384743	Yes	Area 3
STJ2 ^	North of Stanley Road	Lamp post 198	386946	384698	No	Area 3
STJ3	St James' School – south entrance	Bus stop sign post	386873	384850	No	Area 3
STJ4	St James' School – east access road	Lamp post	386907	384868	No	Area 3
STJ5	St James' School – western building façade	Lamp post	386833	384917	No	Area 3
STJ6	St James' School – eastern building façade	Lamp post	386897	384925	No	Area 3
STJ7	St James' School – playing field northeast edge	Flood light facing playing pitches	386850	385053	No	Area 3

^ tube relocated between pre-construction survey and post-operation surveys

Appendix B. Survey Methodology

B.1 Tube preparation, analysis and laboratory QA/QC

The diffusion tubes were supplied and analysed by Gradko International Ltd using a preparation method of 20% triethanolamine (TEA) in water. The lab participates in the AIR Proficiency Testing (PT) scheme for diffusion tubes, operated by LGC Standards and supported by the Health and Safety Laboratory (HSL), which provides a Quality Assurance / Quality Control (QA/QC) framework for diffusion tube monitoring. The percentage of results submitted by Gradko International Ltd that were determined to be satisfactory was 100% for all tests in the AIR-PT (rounds 50-63) from May 2022 – June 2024¹⁷.

B.2 Survey procedures

All diffusion tubes used in the survey were stored in a refrigerator prior to deployment and after collection to reduce the possibility of degradation of the chemicals involved. Tubes subject to contamination (e.g. spider webs, foreign bodies, etc.) or vandalised have also been excluded from the final dataset.

B.3 Factors affecting diffusion tube performance

Diffusion tubes are an indicative monitoring technique, as they do not offer the same accuracy as the reference method for NO₂, the automatic chemiluminescent analyser. NO₂ diffusion tubes are affected by several factors, which may cause them to exhibit bias relative to the reference technique.

Over-estimation may be attributed to one of the following three interfering factors:

- The shortening of the diffusive path length caused by the wind,
- The blocking of UV light resulting in reduced NO₂ photolysis in the tube,
- The interference effects of peroxyacetyl nitrate (PAN).

Under-estimation can be caused by the following factors:

- Increasing exposure period, and is thought to be due to degradation of the absorbed nitrate with time,
- Insufficient extraction of nitrite from the meshes,
- The photochemical degradation of the TEA-nitrite complex by light, although this is minimised using opaque end-caps,
- The solution used, for example, 50% solution of TEA in water has been reported to lead to comparatively reduced NO₂ uptake.

¹⁷ Summary of Laboratory Performance in AIR NO₂ Proficiency Testing Scheme. Available at: [WASP – Annual Performance Criteria for NO₂ Diffusion Tube](#)

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There are several additional factors that may also affect diffusion tube performance including time of the year, the exposure setting (i.e. sheltered or open sites), the proximity to roads, the preparation method and analytical laboratory used, the exposure concentration and the ratio of NO₂ to NO_x.

B.4 Quality assurance and quality control

The laboratory reserved a set of diffusion tubes for use as laboratory blanks for each dispatched set of tubes. These were kept in sealed containers in a refrigerator and analysed with the exposed tubes to provide a measure of nitrite concentration on unexposed tubes.

One field blank was taken to site during each changeover. These tubes accompanied the user during tubes changeover but were not exposed. The purpose of these tubes was to identify possible contamination of the tubes during transportation or in storage by the user.

Laboratory and field blanks were screened by AtkinsRéalis to ensure quality of data. Neither the laboratory blanks nor the travel blank results were subtracted from the results of exposed tubes, in accordance with DEFRA's Local Air Quality Management Technical Guidance, LAQM.TG(22)¹¹ and the Diffusion Tube Practical Guidance¹⁸.

Diffusion tube results obtained for each month were checked to meet the following criteria for inclusion in the final dataset:

- Correct calculation of exposure hours
- Rejection of tubes with concentrations less than 3 µg/m³ as these concentrations are unlikely to occur at these sites
- Assessment of high concentrations at the high end. These were not routinely rejected unless good evidence was shown to prove they were spurious results
- Review of exposure records for possible explanation of any unusual results (e.g. foreign objects, bonfires, pollution episodes, construction works, tampering, etc.)
- Exclusion of diffusion tubes that exhibit poor precision (>20%) compared to the co-located tube as assessed using the Precision and Accuracy Bias assessment tool¹⁹ from DEFRA's Local Air Quality Assessment website.

¹⁸ [Practical Guidance: NO2 Diffusion Tubes for LAQM | LAQM](#)

¹⁹ Defra – Diffusion Tube Precision Accuracy Bias Spreadsheet, Feb 2011. Available at [AEA_DifTPAB_v04.xls](#)

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Appendix C.Raw Monitoring Data

The unadjusted raw results are presented below for each exposed pair of diffusion tubes. Where no number is shown this indicates that one or both tubes were lost during the month.

In accordance with LAQM.TG(22)¹¹, a result can only be annualised where the data capture over the year is between 25% and 75%. Sites where less than 3 months data have been collected cannot be used and the time weighted average is described as N/A.

Table 8 – Diffusion Tube NO₂ Raw Monitoring Results in 2024

Tube ID	08/01/2024 - 05/02/2024	05/02/2024 - 19/03/2024	19/03/2024 - 04/04/2024	04/04/2024 - 30/04/2024	30/04/2024 - 05/06/2024	05/06/2024 - 02/07/2024	Time weighted average for 6- month period	Annual Data Capture % (i.e. number of days monitoring data available / 366)
A6-1	23.3 / 23.5	23.2 / 24.6	23.7 / 25.3	17.1 / 16.1	22.5 / 22.9	23.7 / 24	22.6	48%
A6-2	21 / 20.3		20 / 20.1	18 / 17.8	17.6 / 17.4	13.5 / 13.1	17.7	36%
A6-3		22.8 / 22.1	20.9 / 23.9	21.2 / 20.5		19.2 / 18.7	21.2	31%
D1	23.6 / 22.9	23 / 23.4	24.3 / 22.1	20.6 / 20.8	23.7 / 22.5	18.8 / 19.3	22.2	48%
D2	27.9 / 27.7	26.2 / 28.4	25.4 / 24.7	25.5 / 25.4	24.8 / 24.8	26.7 / 26.9	26.3	48%
HG1	36.4 / 39		36.3 / 37.4	38.7 / 37.4	37.1 / 37.9		37.6	29%
HG2	26.6 / 26.1	24.9 / 25.6	24.8 / 24.4	21.8 / 21.6	22.3 / 21.8	22.9 / 23.3	23.8	48%
HG3	30.7 / 30.3	33.7 / 33.6	33.2 / 34.6	30.7 / 31.8	33.2 / 32.3		32.4	41%
HL1	27.1 / 30.7	28.6 / 29.7	29 / 30.5	31.1 / 31.3	34.3 / 32.9	34.5 / 39.5	31.6	48%
HL2	15.6 / 15.9	14.5 / 13.8	14.2 / 13.4	12.2 / 13	14.6 / 14.6	11.3 / 11.1	13.8	48%
MO1	25.4 / 26.3	24.7 / 25.2	20.4 / 21.4	22.1 / 21.1			23.8	31%
MO2	24.9 / 27.3	26.7 / 24.1	19.6 / 20.4	20.1 / 20.5	19.7 / 19.1	20.8 / 20.5	22.3	48%

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Tube ID	08/01/2024 - 05/02/2024	05/02/2024 - 19/03/2024	19/03/2024 - 04/04/2024	04/04/2024 - 30/04/2024	30/04/2024 - 05/06/2024	05/06/2024 - 02/07/2024	Time weighted average for 6- month period	Annual Data Capture % (i.e. number of days monitoring data available / 366)
MO3	28.4 / 27.1	25.4 / 22.6	22.6 / 21.9	21.6 / 22.6	23.5 / 23		24.0	41%
MO4	27.8 / 27.1	25.5 / 25.2	19.8 / 20.3		19.3 / 19.3	19.6 / 18.7	22.6	41%
MO5	25.9 / 25.6	32.4 / 31.7	26.8 / 27.6			15.9 / 14.4	25.8	31%
MO6	26.8 / 26.1	30.5 / 27.9	26.1 / 27	20.6 / 20.6	21.2 / 20.9	16.2 / 16	23.6	48%
MO7	33.2 / 29.5	30.7 / 31.2	24.8 / 25.3	25 / 25	24.6 / 26.3	25.5 / 27	27.8	48%
MO8	24.5 / 22.2	20.6 / 20.6	16.7 / 16.7	14.9 / 15	14.7 / 14.9		18.3	41%
MO9	26.5 / 26	21.9 / 21.9	16.3 / 17.2	14 / 14.5	14.5 / 15.9	16 / 14.9	18.6	48%
MO10	28.7 / 24.1	26.4 / 26.2		17.5 / 17.6	19.3 / 20.7	20.8 / 17.4	22.3	44%
MO11	23.8 / 22.5	21.6 / 20.5		14.3 / 14.1	14 / 14.7	15.4 / 13.5	17.7	44%
MO12	24.2 / 23.2	21.9 / 21.6		15.1 / 15.4	15.1 / 15.7	14.4 / 13.9	18.3	44%
MO13	23.6 / 23.8	20.9 / 20.9		14.2 / 14	15.2 / 15.8	14.5 / 14.8	18.0	44%
MO14	21.8 / 21.4	17.9 / 18.2	15.7 / 15.5		14.6 / 14.4	14.2 / 13.2	16.8	41%
MO15		17.6 / 18.5	17.4 / 17.4		15.4 / 15.4	13.6 / 14.6	16.3	33%
MO16	24.8 / 25.4	20.5 / 21.2	16.4 / 17	14.6 / 12.9	13.9 / 15.7	15 / 13.9	17.9	48%
MO17	24 / 25.2	21.9 / 22.2	17.3 / 15.2	14.8 / 14.6	14 / 15.7	16.5 / 16	18.5	48%
MO18	27.4 / 27.4	23.1 / 22.5	20.5 / 21.1	19.2 / 18.3	21.4 / 21.5		22.4	41%
MO19	23.8 / 21.6	18.8 / 19.3	15.3 / 16.2	15.8 / 13.4	14.6 / 13.3	17 / 16.6	17.3	48%
MO20	26.4 / 24.3	25.3 / 25	21.9 / 22.1	19.1 / 18.3	21.8 / 21.6	20.2 / 19	22.4	48%
MO21	17.9 / 18.9	16.4 / 15.6	12.4 / 11.9	12.2 / 11.8	13.1 / 13.2	13 / 13.1	14.4	48%
MO22	17.6 / 17.8	15.3 / 15.3	13.3 / 12.6	10.6 / 12	11.8 / 12.1	11.2 / 10.9	13.6	48%
MO24	18.3 / 20.6	19.6 / 18	14.5 / 14.8	12.3 / 13.7			17.0	31%

TECHNICAL NOTE

Tube ID	08/01/2024 - 05/02/2024	05/02/2024 - 19/03/2024	19/03/2024 - 04/04/2024	04/04/2024 - 30/04/2024	30/04/2024 - 05/06/2024	05/06/2024 - 02/07/2024	Time weighted average for 6- month period	Annual Data Capture % (i.e. number of days monitoring data available / 366)
MO25	20.6 / 21.8	22.9 / 19.6	19.7 / 17.3	16.5 / 15.9	16.5 / 17.3	14.4 / 14.7	18.3	48%
MO26	24.6 / 22.8	22.2 / 23.3	18.2 / 21	17.5 / 19.1	19.9 / 21.3	18 / 18.6	20.8	48%
MO27	16.5 / 18.7	15.5 / 17.1	12.6 / 12.5	10.7 / 9.7	11 / 11.3	10.9 / 10.9	13.4	48%
MO28						22.2 / 22.8	N/A	7%
MO29	20.1 / 19.7	18.1 / 18	14.2 / 14.7	11.5 / 12.6	11.3 / 11.9	10 / 11.3	14.7	48%
MO30	18.3 / 19	17.4 / 17.4	14.2 / 13.8	10.9 / 11.3	11.7 / 11.9	9.5 / 10	14.1	48%
MO31		20.7 / 18.5	16.5 / 15.8	13.1 / 13.2		13.6 / 13.7	16.2	31%
MO32	20.7 / 21.5	20.4 / 21.3	17.1 / 17.8	13.8 / 13.5	15.1 / 12.5	15.3 / 16	17.3	48%
MO33	21.3 / 22.2	21.5 / 20.6	16.5 / 16.3	15.3 / 15.3	15.4 / 14.8	14.2 / 14.6	17.6	48%
MO34	18.7 / 19.3	18.5 / 18.7	15.6 / 15.5	12.3 / 11.9	13.2 / 13.8	11.5 / 11.3	15.3	48%
MO35	18.5 / 20	17.6 / 18.5	14.9 / 14.1	11.8 / 12.1	13.9 / 13.7	12.6 / 13.2	15.4	48%
MO38	15.5 / 15.6	14 / 14.3	11.3 / 11.7	11 / 10.4	12.2 / 11.8	9.7 / 10.1	12.5	48%
MO39	14 / 13.7	13.3 / 13.2	11.4 / 9.3	9.3 / 9.9	10 / 10.9	8.5 / 9.1	11.3	48%
MO40	21.8 / 22.6	22.1 / 24.1		18.3 / 17.7	17.5 / 16.8	17.2 / 17.3	19.8	44%
MO41	19.3 / 20.7	17.3 / 18.7	15.2 / 13.3	14.2 / 14.2	15.3 / 15.4	14.8 / 14.6	16.4	48%
MO42	24.7 / 30.4	25.4 / 26.6	23.4 / 21.4	20.2 / 20.7	21.1 / 22.3	20.7 / 18.7	23.3	48%
MO43	24.2 / 26.4	24 / 23	20.9 / 21.5	17.5 / 17.1	19 / 18.6	20 / 20.3	21.2	48%
MO44	27.6 / 28	24 / 24.6	23.2 / 23.6	21.4 / 21.3	25.4 / 24.9	21.9 / 23.4	24.3	48%
MO45	21.4 / 22.3	20 / 20.3	17.7 / 17	14.7 / 13.9		10.4 / 11.4	17.3	38%
MO46	23.7 / 24.9	21.2 / 21.7	19.7 / 19.5	18.2 / 18.1	18.4 / 18	16.2 / 17.1	19.9	48%
MO47	28.2 / 30.1	24.7 / 24.9	19.7 / 22.3				N/A	24%

TECHNICAL NOTE

Tube ID	08/01/2024 - 05/02/2024	05/02/2024 - 19/03/2024	19/03/2024 - 04/04/2024	04/04/2024 - 30/04/2024	30/04/2024 - 05/06/2024	05/06/2024 - 02/07/2024	Time weighted average for 6- month period	Annual Data Capture % (i.e. number of days monitoring data available / 366)
MO48	18.1 / 17.4	16.7 / 16.3	12.2 / 13	10.1 / 9.7	11.8 / 11.6	9.8 / 10.4	13.4	48%
MO49	14.9 / 15.7	14.4 / 14.4	10.7 / 11	9.7 / 9.3		9.2 / 9.2	12.3	38%
MO50	15.1 / 15.1	14.4 / 14	10.7 / 10.3	9.3 / 9.2	9.1 / 8.5	8.1 / 8	11.2	48%
MO51	23.4 / 23.9	24.6 / 24.6	20.3 / 19.9	20.1 / 18.5	19.8 / 20.1	18.8 / 19.4	21.5	48%
MO52	25.3 / 23.8	23 / 24.2	19.6 / 20	18.6 / 19.6	17.5 / 18.1		21.2	41%
MO53	13.8 / 13.9	12.5 / 12.2	10.7 / 10.7		10.4 / 9.5	8.4 / 8.9	11.2	41%
MO54	14.7 / 15.9	15.4 / 15.6	14.3 / 12.5			9.9 / 9.6	13.8	31%
MO55		14.2 / 13.3	11.4 / 11.7	8.7 / 8.9	11.8 / 11.7	9.4 / 8.7	11.3	41%
MO56	26 / 26.7	28.8 / 26.5	27.9 / 28.1	21.7 / 18.2	22.7 / 25.6		25.2	41%
MO57	21.9 / 25.3		29.5 / 27.1	23.6 / 24.4	27.9 / 28.6	21.7 / 22	25.1	36%
MO58	25.7 / 21.2	27.8 / 28	22.9 / 22.4	23.1 / 23.2	23.5 / 22.3	24.1 / 23.2	24.3	48%
MO59	40.7 / 39	38.1 / 37.8	37.2 / 34.9	36.2 / 37.6	33.2 / 32.5	37.1 / 37.5	36.8	48%
MO60	35.6 / 37.4	35.2 / 30.4	28 / 34	28.7 / 31.3	27.3 / 28.3	33.2 / 32.9	31.8	48%
MO61	27 / 26.9	26.2 / 25.2	25.6 / 26.9	23.8 / 23.5	24.8 / 23.6	17.7 / 16.9	24.0	48%
MO62		39 / 37			40.4 / 37.8	33.3 / 31.9	37.0	29%
MO63	32.1 / 33.7	34.1 / 33.1	33.7 / 32.9	29.1 / 28.6	28.9 / 30.2	18 / 17.9	29.5	48%
MO64	18.9 / 18.7	17.3 / 18.1	13.3 / 14.6	11.7 / 11.5	12.3 / 12.3	10.4 / 10.8	14.4	48%
MO65	21.4 / 22	19.7 / 22.1	17.4 / 17.7	15.2 / 15.5	13.9 / 13.8	13.2 / 14.8	17.4	48%
MO66	15.9 / 17.5	16.9 / 17.3	12.6 / 13.1	11.5 / 11.5	11.1 / 11.7	9.7 / 9.4	13.5	48%
MO67	20.3 / 22.7	21.4 / 24.8	23.9 / 19.7	17.1 / 18.4	21.3 / 20.1	13.4 / 15.2	20.1	48%
N1	33.4 / 33.1	33.8 / 32.9	36.7 / 34	30.6 / 32.7			33.3	31%

TECHNICAL NOTE

Tube ID	08/01/2024 - 05/02/2024	05/02/2024 - 19/03/2024	19/03/2024 - 04/04/2024	04/04/2024 - 30/04/2024	30/04/2024 - 05/06/2024	05/06/2024 - 02/07/2024	Time weighted average for 6- month period	Annual Data Capture % (i.e. number of days monitoring data available / 366)
P1	12.5 / 13.8	11 / 12	7.8 / 8.9	6.6 / 6.8	7 / 6.8	6.2 / 6.4	9.0	48%
P2	19 / 19.3	16.1 / 19	15.8 / 16.4	14.5 / 14	16.7 / 17.9	14.7 / 11.3	16.4	48%
P3	20.2 / 22.1	20.4 / 20.8	17.3 / 17.8	14.5 / 15.6	18.5 / 19	14.6 / 16	18.4	48%
QPS1	17.4 / 17.5	15.1 / 14.5	11.9 / 11.6	9.5 / 9	9.9 / 10.9	9.6 / 9.5	12.4	48%
QPS2	14.8 / 15.8	13.1 / 13.8	11 / 11.2	8.5 / 8.4	10.5 / 9.9	8.7 / 8.7	11.4	48%
QPS3	15.5 / 15.5	13.7 / 14.5	10.4 / 10.5	8.8 / 8.6	9.9 / 9.7	8.7 / 9	11.5	48%
STJ1	41.6 / 41.2	34.6 / 30.8	38.6 / 41.4	36.5 / 35.4	32.1 / 31.1	34.9 / 37.6	35.6	48%
STJ2	29.5 / 28.2	29.2 / 28.6	26.5 / 26		26.8 / 25.1	29 / 27.2	27.8	41%
STJ3	27.7 / 24.6	23.1 / 23.3	17.7 / 15.9	15.6 / 15.3	14.3 / 14.5	16.9 / 16.4	19.1	48%
STJ4	24.8 / 24.5	23.4 / 24.6	16.5 / 15.5	14.9 / 14.3	11.8 / 12.6		18.8	41%
STJ5	23 / 24.1	22.5 / 21.8	17.1 / 16.7	15.2 / 15.3	13.2 / 13.3		18.5	41%
STJ6	21.7 / 20.8	19.6 / 19.2	14.4 / 13.8	12.1 / 12.7	10.6 / 11.7	12.6 / 13	15.5	48%
STJ7	21.7 / 22.4	21.2 / 21.7	15.2 / 14.2	14.3 / 14.3		14 / 12.5	17.9	38%

MO28 and MO47 are below the data capture threshold of 25% for annualisation.

TECHNICAL NOTE

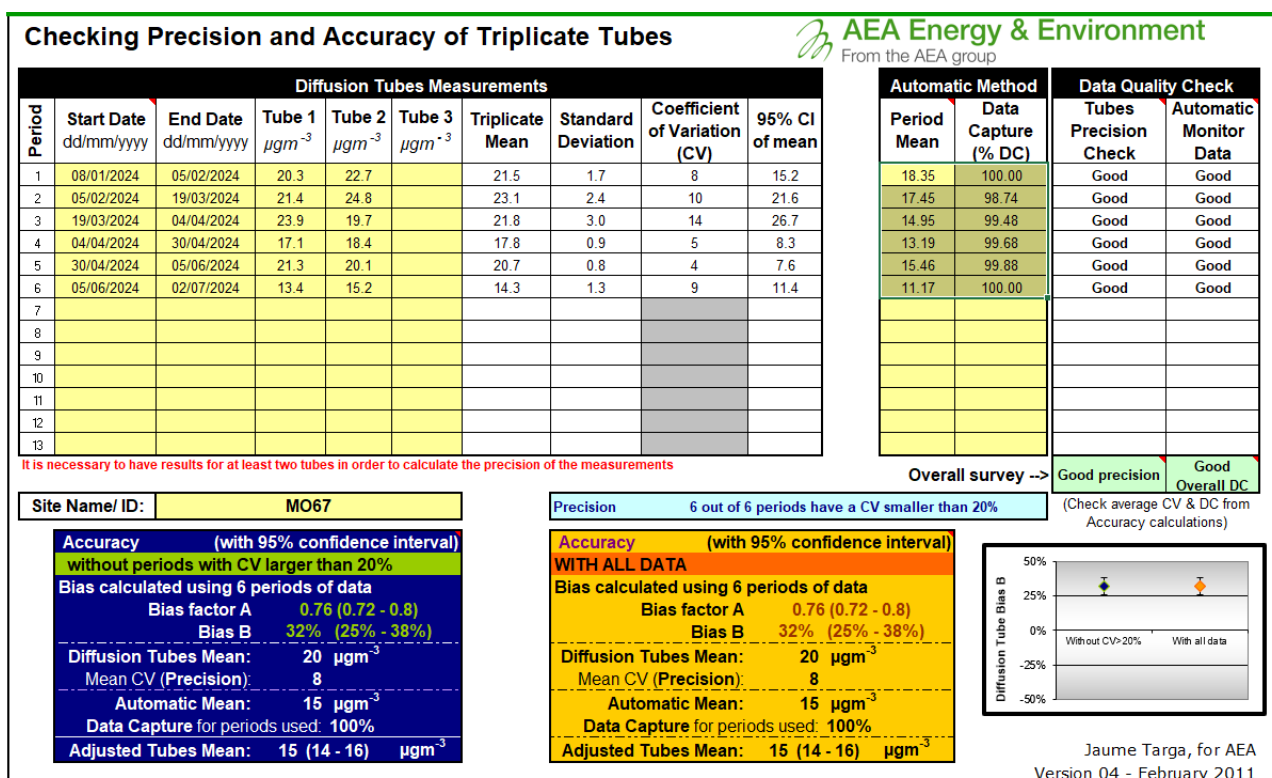
Appendix D. Diffusion Tube Bias Adjustment

D.1 Local Bias Adjustment Factor

A local bias adjustment factor was derived in accordance with the methodology defined in LAQM.TG(22).

Paired tubes were co-located next to the roadside CMS operated by Stockport Metropolitan Borough Council on the A6 London Road, near Stepping Hill Hospital. The results from the diffusion tubes exposed between 8th January 2024 and 2nd July 2024 were compared with the publicly available ratified CMS results²⁰ over the same time period. The local bias adjustment factor was calculated using the Precision and Accuracy Bias assessment tool (v4 dated February 2011). The local bias adjustment factor from the study was calculated to be 0.76.

Figure 5 - Local Diffusion Tube Bias Adjustment Factor Spreadsheet



If you have any enquiries about this spreadsheet please contact the LAQM Helpdesk at:

LAQMHelpdesk@uk.bureauveritas.com

²⁰ Stockport Hazel Grove continuous monitoring data published by Air Quality England, Available at [Stockport Hazel Grove Data Download - Air Quality monitoring service](#)

TECHNICAL NOTE

D.2 National Bias Adjustment Factor

Bias adjustment involves applying a factor to annual (or annualised) diffusion tube results to account for any systemic over reading by the diffusion tubes. The DEFRA National Diffusion Tube Bias Adjustment Spreadsheet contains the results from a number of co-location studies for each laboratory and diffusion tube preparation method.

Local authorities from across the UK, provide co-location diffusion tube and CMS data to DEFRA for inclusion in the National Diffusion Tube Bias Adjustment Spreadsheet. The previously estimated bias adjustment factor for Gradko using 20% TEA in water diffusion tubes for 2024 has now been finalised considering 31 co-location studies, the finalised factor is 0.84 as reported in the latest (2025) national bias adjustment factor spreadsheet (version 06/25)²¹.

Figure 6 - National Diffusion Tube Bias Adjustment Factor Spreadsheet

National Diffusion Tube Bias Adjustment Factor Spreadsheet							Spreadsheet Version Number: 06/25				
Follow the steps below in the correct order to show the results of relevant co-location studies							This spreadsheet will be updated at the end of September 2025				
Data only apply to tubes exposed monthly and are not suitable for correcting individual short-term monitoring periods							LAQM Helpdesk Website				
Whenever presenting adjusted data, you should state the adjustment factor used and the version of the spreadsheet							Spreadsheet maintained by the National Physical Laboratory. Original compiled by Air Quality Consultants Ltd.				
This spreadsheet will be updated every few months: the factors may therefore be subject to change. This should not discourage their immediate use.											
The LAQM Helpdesk is operated on behalf of Defra and the Devolved Administrations by Bureau Veritas, in conjunction with contract partners AECOM and the National Physical Laboratory.											
Step 1:	Step 2:	Step 3:	Step 4:								
Select the Laboratory that Analyses Your Tubes from the Drop-Down List	Select a Preparation Method from the Drop-Down List	Select a Year from the Drop-Down List	Where there is only one study for a chosen combination, you should use the adjustment factor shown with caution. Where there is more than one study, use the overall factor ² shown in blue at the foot of the final column.								
If a laboratory is not shown, we have no data for this laboratory.	If a preparation method is not shown, we have no data for this method at this laboratory.	If a year is not shown, we have no data ³ .	If you have your own co-location study then see footnote ⁴ . If uncertain what to do then contact the Local Air Quality Management Helpdesk at LAQMHelpdesk@bureauveritas.com or 0800 0327953								
Analysed By	Method	Year	Site Type	Local Authority	Length of Study (months)	Diffusion Tube Mean Conc. (Dm) (µg/m ³)	Automatic Monitor Mean Conc. (Cm) (µg/m ³)	Bias (B)	Tube Precision	Bias Adjustment Factor (A) (Cm/Dm)	
Gradko	20% TEA in water	2024	UV	Belfast City Council	10	24	20	19.9%	G	0.83	
Gradko	20% TEA in water	2024	R	Belfast City Council	12	43	34	28.8%	G	0.78	
Gradko	20% TEA in water	2024	R	Belfast City Council	12	24	21	13.9%	G	0.88	
Gradko	20% TEA in water	2024	R	Belfast City Council	12	34	27	25.5%	G	0.80	
Gradko	20% TEA in water	2024	R	Blackburn With Darwen Bc	12	22	17	32.9%	G	0.75	
Gradko	20% TEA in water	2024	R	Bath & North East Somerset	12	25	20	22.6%	G	0.82	
Gradko	20% TEA in water	2024	R	Cambridge City Council	12	19	15	28.5%	G	0.78	
Gradko	20% TEA in water	2024	UB	Plymouth City Council	12	16	14	13.8%	G	0.88	
Gradko	20% TEA in water	2024	R	Plymouth City Council	12	31	23	33.4%	S	0.75	
Gradko	20% TEA in water	2024	R	Monmouthshire County Council	12	29	24	19.4%	G	0.84	
Gradko	20% TEA in water	2024	KS	Marleybone Road Intercomparison	11	41	36	16.1%	G	0.86	
Gradko	20% TEA in water	2024	R	Lisburn & Castlereagh City Council	12	24	19	27.8%	G	0.78	
Gradko	20% TEA in water	2024	R	Ards And North Down Borough Council	11	28	20	44.5%	G	0.69	
Gradko	20% TEA in water	2024	R	Eastleigh Borough Council	12	29	24	20.3%	G	0.83	
Gradko	20% TEA in water	2024	UB	Eastleigh Borough Council	12	19	17	12.4%	G	0.89	
Gradko	20% TEA in water	2024	R	Eastleigh Borough Council	12	19	17	12.0%	G	0.89	
Gradko	20% TEA in water	2024	R	Gateshead Council	12	20	18	13.9%	G	0.88	
Gradko	20% TEA in water	2024	R	Gateshead Council	11	20	17	19.7%	G	0.84	
Gradko	20% TEA in water	2024	R	Gateshead Council	12	24	20	21.7%	G	0.82	
Gradko	20% TEA in water	2024	R	Gateshead Council	12	27	23	19.0%	G	0.84	
Gradko	20% TEA in water	2024	R	Gateshead Council	12	28	30	-6.0%	G	1.06	
Gradko	20% TEA in water	2024	R	Brighton & Hove City Council	11	34	27	26.3%	G	0.79	
Gradko	20% TEA in water	2024	R	Liverpool City Council	12	34	25	35.7%	G	0.74	
Gradko	20% TEA in water	2024	KS	Liverpool City Council	10	52	47	10.2%	G	0.91	
Gradko	20% TEA in water	2024	R	Nottingham City Council	10	29	26	12.2%	G	0.89	
Gradko	20% TEA in water	2024	R	Wychevon District Council	10	29	26	14.7%	G	0.87	
Gradko	20% TEA in water	2024	R	Worcestershire	12	12	12	-3.4%	G	1.04	
Gradko	20% TEA in water	2024	R	Cheshire West And Chester	12	33	27	21.7%	G	0.82	
Gradko	20% TEA in water	2024	R	Cheshire West And Chester	11	30	27	12.9%	G	0.89	
Gradko	20% TEA in water	2024	R	The Highland Council	12	19	18	6.9%	G	0.94	
Gradko	20% TEA in water	2024	R	The Highland Council	11	15	11	35.3%	G	0.74	
Gradko	20% TEA in water	2024		Overall Factor² (31 studies)				Use		0.84	

As the national bias adjustment factor is slightly higher than the local bias adjustment factor, resulting in slightly higher annual mean NO₂ concentrations, this has been used as a conservative assumption. The national bias adjustment factor of 0.84 has been applied to the annualised bias adjusted NO₂ concentrations presented in Table 2.

²¹ Defra, Diffusion Tube Bias Adjustment Factors Spreadsheet, available from [https://laqm.defra.gov.uk/wp-content/uploads/2025/06/Database_Diffusion_Tube_Bias_Factors_v06_25.xlsx]

Appendix E. Annualisation adjustment

The Diffusion Tube Data Processing Tool v5.4 issued by DEFRA has been used to annualise the 6 months diffusion tube survey data in accordance with guidance detailed in LAQM.TG22.

LAQM.TG22 advice for annualisation confirms the use of two to four nearby, long-term, continuous monitoring sites, ideally those forming part of the national network. The data capture for each of these sites should be at least 85%. These sites should be background (Urban Background, Suburban or Rural) sites to avoid any very local effects that may occur at Urban Centre, Roadside or Kerbside sites, and should, wherever possible lie within a radius of about 50 miles

The hourly air quality measurement data were obtained for the calendar year of 2024 from four DEFRA Automatic Urban and Rural Network (AURN) background CMS in the Greater Manchester area including:

- Glazebury – a rural background site located at a farm near Glazebury village west of Greater Manchester, more than 2 km from the nearest busy road and 800 m from a rail line.
- Manchester Piccadilly - an urban background site located in a pedestrianised area in the west-end of central Manchester, 200 m from the A5103.
- Salford Eccles – an urban background site located 250 m from the M602 and 200 m from A56/A567.
- Wigan - an urban background site located adjacent to the hockey turf at Deanery High School. The inlet manifold is approximately 180 metres from the nearest minor roads, Frog Lane to the south and Parson's walk to the east. The surrounding area is predominantly residential with industrial and commercial areas to the south.
- Ladybower - a rural background site was used in the annualisation published in 2024, however data capture at this site was below 85% in 2024 so it could not be used for the updated 2024 final results and was replaced by Wigan.

Data from the four background CMS were averaged for the same exposure periods as the diffusion tubes, to allow periodic means to be calculated for each CMS. The ratio of the 2024 annual means to the periodic means was calculated for each CMS and reported in Table 9. The ratios were then averaged to provide one adjustment factor.

The annualisation factors used for the two previous surveys are provided below in Table 9, for comparison purposes.

E.1 Comparison of annualisation factors

Table 9 demonstrates there is a large difference between the average annualisation factors of the surveys carried out in 2014, 2019, and 2024, of 0.8630, 1.2811 and 1.0363, respectively, which may reflect some of the differences in the survey timings or meteorological variation.

TECHNICAL NOTE

Table 9 - Comparison of Annualisation Factor as Calculated by the Annualisation Tool

Long term CMS site	Annualisation Factor Glazebury	Annualisation Factor Manchester South	Annualisation Factor Stoke-on-Trent	Annualisation Factor Wigan	Annualisation Factor Ladybower	Annualisation Factor Manchester Piccadilly	Annualisation Factor Salford Eccles	Average Annualisation Factor
Annualisation Factor for 2014	0.8035	0.8833	0.8892	0.8760	-	-	-	0.8630
Annualisation Factor for 2019	1.2920	-	1.2308	1.1829	1.4186	-	-	1.2811
Annualisation Factor for 2024	0.9278	-	(1.0417)*	1.1466	<85% data capture	1.0356	1.0353	1.0363

CMS data obtained from: <http://uk-air.defra.gov.uk/interactive-map?network=aur>

Data represented in brackets with an asterisk are for comparison with AURN sites selected in 2019 annualisation calculation.

TECHNICAL NOTE

Table 10 - Annualisation factors from periodic means to 2024 annual mean for each CMS

Diffusion Tube ID	Annualisation Factor Glazebury	Annualisation Factor Ladybower	Annualisation Factor Manchester Piccadilly	Annualisation Factor Salford Eccles	Average Annualisation Factor	Other Diffusion Tube IDs at which Annualisation factor applied
A6-1	0.9278	1.0356	1.1466	1.0353	1.0363	D1, D2, HG2, HL1, HL2, MO2, MO6, MO7, MO9, MO16, MO17, MO19-MO22, MO25-MO27, MO29, MO30, MO32-MO35, MO38, MO39, MO41-MO44, MO46, MO48, MO50, MO51, MO58-MO61, MO63-MO67, P1-P3, QPS1-QPS3, STJ1, STJ3, STJ6
A6-2	1.1279	1.1281	1.1786	1.1503	1.1462	MO57
A6-3	0.9089	1.0441	1.3207	1.0661	1.085	MO31
HG1	0.9976	1.0735	1.0557	1.0542	1.0453	
HG3	0.8368	0.9922	1.0317	0.9616	0.9556	MO3, MO8, MO18, MO52, MO56, STJ4, STJ5
MO1	0.7317	0.9307	0.9272	0.9032	0.8732	MO24, N1
MO4	0.8814	1.001	1.1052	1.0022	0.9975	MO14, MO53, STJ2
MO5	0.7797	0.9351	1.0166	0.951	0.9206	MO54
MO10	0.945	1.0363	1.1771	1.0339	1.0481	MO11, MO12, MO13, MO40
MO15	0.956	1.057	1.3248	1.0662	1.101	
MO45	0.8436	0.9886	1.0864	0.9983	0.9792	MO49, STJ7
MO55	1.0072	1.0913	1.336	1.0983	1.1332	
MO62	0.9884	1.062	1.452	1.0689	1.1428	

TECHNICAL NOTE

Appendix F. DEFRA's estimated background NOx mapping

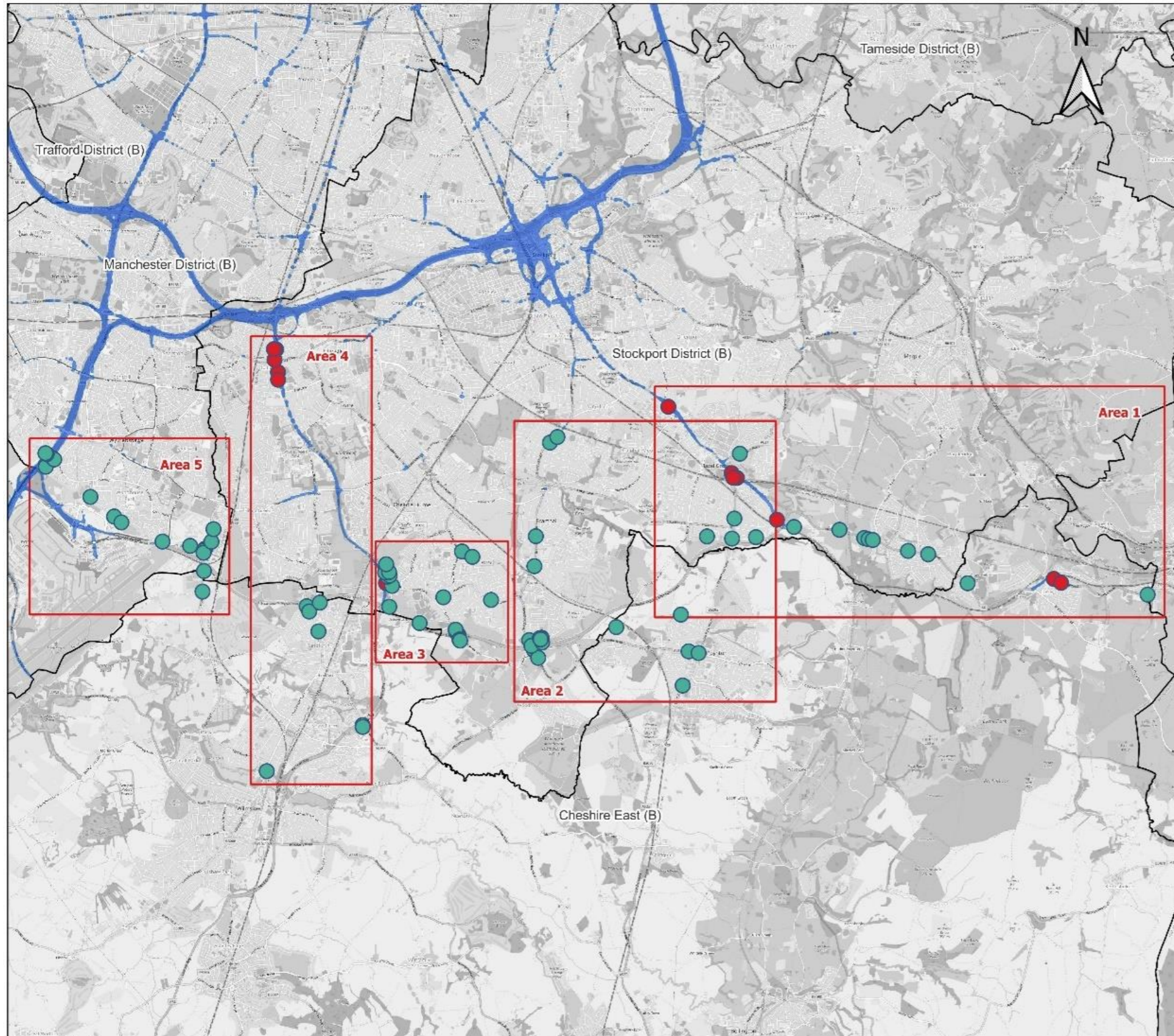
Table 11 – DEFRA's Change in Estimated Background Air Pollution Maps 2024 – 2019 Result, For Each 1km Grid Square in Survey Area

Grid Square (x, y)	Change in Background concentration (µg/m ³)												
	Total NO ₂	Total NOx	Motorway	Trunk_A_Road	Primary_A_Road	Minor Road +Cold Start	Industry	Domestic	Aircraft	Rail	Other	Point Sources	Rural
For grid square coverage from (381500, 381500) to (399500, 388500)													
Minimum Change	-8.87	-15.24	-9.93	-0.10	-3.12	-0.89	-0.08	-0.91	-3.50	-0.71	-5.66	-0.68	-1.46
Maximum Change	-0.67	-0.93	-0.07	0.00	0.31	0.12	0.48	1.30	0.35	0.11	-0.07	0.22	-1.32
Average Change	-3.02	-4.73	-0.77	-0.02	-0.85	-0.24	0.03	-0.27	-0.21	-0.12	-0.61	-0.36	-1.43
DEFRA's 2021 reference year background maps are based on monitoring and meteorological data for 2021. Available from Background Mapping data for local authorities - 2021 - DEFRA UK Air - GOV.UK And DEFRA's 2018 reference year available from Background Mapping data for local authorities - 2018 - DEFRA UK Air - GOV.UK													

Appendix G. Monitoring location figures

Figure 7 - Air Quality Monitoring Locations

TECHNICAL NOTE



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A555

Legend

Monitoring Site Locations

- Site inside an AQMA
- Site outside an AQMA
- Air Quality Management Areas
- Detailed Area

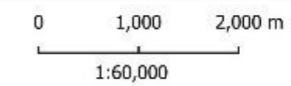
Admin Boundary

- Local Authority Boundaries

OpenStreetMap Standard



Data sources: Defra, Natural England, Ordnance Survey, ONS Geography



Reference: 5223510	Drawn: PB	Checked: JAG	Authorised: VLS
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**TECHNICAL
NOTE**



OpenStreetMap®

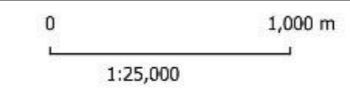
A555 - Area 1

Legend

- Monitoring Site Locations
 - Site inside an AQMA
 - Site outside an AQMA
- Air Quality Management Areas
- Admin Boundary
 - Local Authority Boundaries
- OpenStreetMap Standard



Data sources: Defra, Natural England, Ordnance Survey, ONS Geography



Reference: 5223510	Drawn: PB	Checked: JAG	Authorised: VLS
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TECHNICAL NOTE



OpenStreetMap®

A555 - Area 2

Legend

- Monitoring Site Locations
 - Site inside an AQMA
 - Site outside an AQMA
- Air Quality Management Areas
- Admin Boundary
 - Local Authority Boundaries
- OpenStreetMap Standard



Data sources: Defra, Natural England, Ordnance Survey, ONS Geography



Reference: 5223510	Drawn: PB	Checked: JAG	Authorised: VLS
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TECHNICAL NOTE



OpenStreetMap®

A555 - Area 3

Legend

Monitoring Site Locations

● Site inside an AQMA

● Site outside an AQMA

■ Air Quality Management Areas

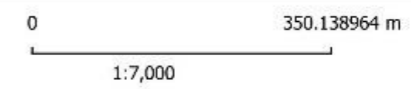
Admin Boundary

□ Local Authority Boundaries

OpenStreetMap Standard



Data sources: Defra, Natural England, Ordnance Survey, ONS Geography



AtkinsRéalis

Reference: 5223510	Drawn: PB	Checked: JAG	Authorised: VLS
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TECHNICAL NOTE



OpenStreetMap®

A555 - Area 4

Legend

- Monitoring Site Locations
 - Site inside an AQMA
 - Site outside an AQMA
- Air Quality Management Areas
- Admin Boundary
- Local Authority Boundaries
- OpenStreetMap Standard

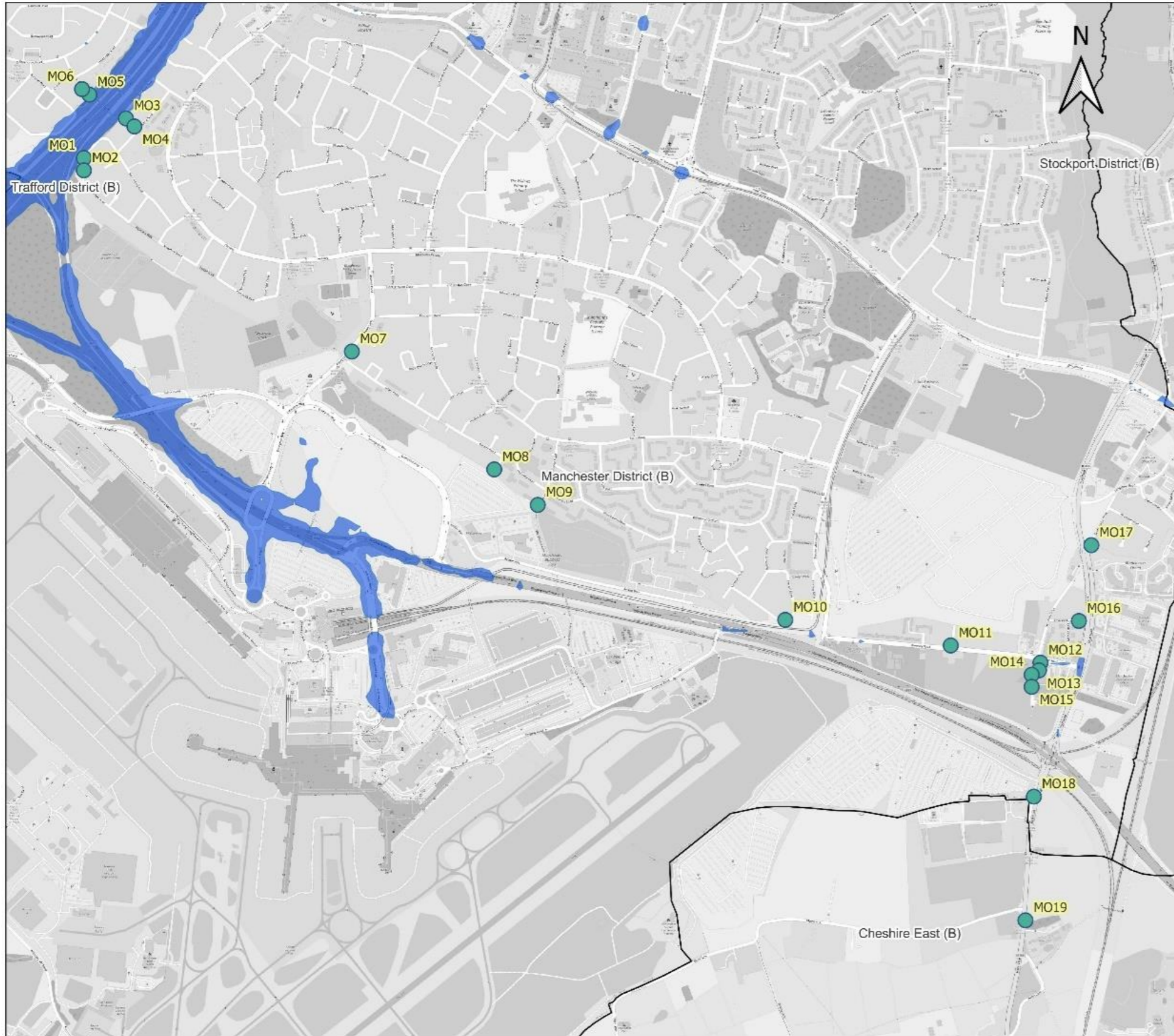


Data sources: Defra, Natural England, Ordnance Survey, ONS Geography



Reference: 5223510	Drawn: PB	Checked: JAG	Authorised: VLS
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TECHNICAL NOTE

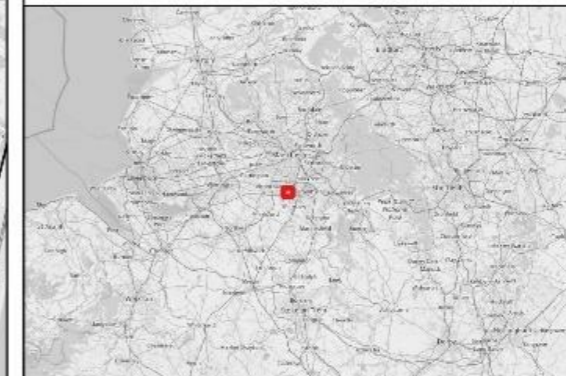


OpenStreetMap®

A555 - Area 5

Legend

- Monitoring Site Locations
- Site outside an AQMA
- Air Quality Management Areas
- Admin Boundary
- Local Authority Boundaries
- OpenStreetMap Standard



Data sources: Defra, Natural England, Ordnance Survey, ONS Geography



Reference: 5223510	Drawn: PB	Checked: JAG	Authorised: VLS
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