GMCA GREATER MANCHESTER COMBINED AUTHORITY

2019 Air Quality Annual Status Report (ASR)

In fulfilment of Part IV of the Environment Act 1995 Local Air Quality Management

June 2020

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Executive Summary: Air Quality in Our Area

Air Quality in Greater Manchester has a significant effect on public health, and poor air quality is the largest environmental risk to public health in the UK. Costs to society are estimated at more than 20 billion pounds every year. Epidemiological studies have shown that long-term exposure to air pollution (over several years) reduces life expectancy, mainly due to cardiovascular and respiratory causes and from lung cancer.[1] The annual mortality burden of human-made air pollution in Greater Manchester is roughly equivalent to 4.6% of deaths which equates to approximately 1,107 deaths attributable to particulate air pollution.[2] Short-term exposure (over hours or days) to elevated levels of air pollution can also cause a range of effects including exacerbation of asthma, effects on lung function, increases in respiratory and cardiovascular hospital admissions and mortality.[3]

The Greater Manchester Air Quality Working Group, led by Transport for Greater Manchester (TfGM), represents the ten authorities that constitute the Greater Manchester Combined Authority (GMCA). These authorities are Bolton, Bury, Manchester, Oldham, Rochdale, Salford, Stockport, Tameside, Trafford, and Wigan. These are also the main members of the Association of Greater Manchester Authorities (AGMA). The Combined Authority shares the same statutory duties for Local Air Quality Management (LAQM) Sections 82 to 84 of the Environment Act 1995 as the Greater Manchester local authorities.

Greater Manchester has a population of over 2.7 million residents over an area of approximately 500 square miles. Within the conurbation there is a mix of high-density urban areas, suburbs, semi-rural and rural locations, and the area is characterised by the strong regional centre of Manchester, The Quays and Trafford Park.

Long term trends show that there has been an improvement in air quality, but areas still remain above the annual mean air quality objective for Nitrogen Dioxide (NO_2).

DEFRA have responded positively to GM's suggestion that the update of the Air Quality Action Plan should be postponed until the impact of the proposed GM-wide Clean Air Zone to address Roadside NO_2 has been understood. The GM Clean Air Plan is

[1] Public Health England (2018)
[2] Public Health Outcome Framework (PHOF) (2018)
[3] Public Health England (2018)

designed to bring about compliance with the legal limit for NO_2 in the shortest possible time. As a result of this decision further modelling regarding an AQMA will also be suspended. Local exceedances outside the current AQMA are being assessed and where appropriate local mitigation measures introduced.

Three automatic sites out of the 17 in Greater Manchester either exceeded or measured the NO_2 annual mean objective of 40µg/m^3 in 2019. These three sites were Salford M60, Manchester Oxford Road, and Tameside Mottram Moor. These three sites alone also exceeded the NO_2 annual mean objective in 2018. Bury Prestwich and Stockport Cheadle A34, which both exceeded legal limits in 2017, continued to monitor concentrations below the annual mean objective in 2019, of 39 µg/m^3 and 36 µg/m^3 respectively.

The NO_2 1-hour mean objective of 200µg/m^3 exceeded more than 18 times a year has not been breached at any of the 17 continuous monitoring sites across Greater Manchester. However it is noted that at the Bury Prestwich site the hourly mean has been exceeded on two occasions in 2019, the cause of which is uncertain and will be monitored over the next 12 months. The number of exceedances of the NO_2 1-hour mean (200µg/m^3) at the Manchester Oxford Road site reduced to 1 in 2019, from 2 in 2018 and a peak of 90 in 2016. An investigation concluded that this 2016 elevated number of exceedances were the result of an increase in buses being stationary on Oxford Road adjacent to the monitoring station because of significant roadworks and road closures causing diversions. During early 2017, TfGM implemented a £122m Bus Priority Package, which enables cross-city bus services to run directly through Manchester city centre. Oxford Road has had significant road layout alterations, and general traffic is now prohibited from travelling through new 'bus gates' that restrict access between 6am and 9pm, 7 days a-week. As a result of the road layout changes, traffic flow has improved past the monitoring site.

Measurements from Greater Manchester's diffusion tube network confirms there are locations that continue to be above the annual mean NO_2 air quality objective.

Real time monitoring data for PM_{10} (particulate matter - less than 10 microns) shows that annual average objectives (40 µg/m^3) are not exceeded. 3 sites have displayed small increases in annual mean concentrations, and no sites had more than 35 occurrences of the daily mean particulate objective, and therefore this objective is met.

$PM_{2.5}$ (particulate matter less than 2.5 microns) is measured at 5 automatic monitoring sites across Greater Manchester. The data shows that there have been no exceedances of the UK Air Quality Strategy annual mean objective of 25 µg/m^3, and concentrations have been gradually reducing. The highest annual mean $PM_{2.5}$ concentration measured in Greater Manchester in 2018 was 12 µg/m^3 at the Manchester Piccadilly monitoring site.

Sulphur dioxide monitoring was carried out at 2 sites, with no exceedances of the air quality objectives. Air quality monitoring and reporting of carbon monoxide and benzene has been discontinued at many sites, as previous assessments indicated no exceedances – however, benzene is still monitored at Manchester Piccadilly by Defra.

The Greater Manchester Low Emission Strategy (LES) and Air Quality Action Plan (AQAP) were published on the 16th December 2016 after going out to public consultation and being signed off by the Greater Manchester Combined Authority (GMCA). The LES & AQAP propose a range of measures to improve air quality and reduce ill-health across Greater Manchester, focusing on 'key priority areas' in urban centres and near major roads which currently fail to meet national air quality objectives and EU air quality limit values. The LES & AQAP are being led by TfGM on behalf of the GMCA and the 10 Greater Manchester local authorities and includes close working with Highways England, Public Health England, The Environment Agency, Greater Manchester Police, and charitable organisations to ensure the best outcome can be achieved.

In July 2019 Greater Manchester's 5 Year Environment Plan (5YEP) was published. The plan aims for Greater Manchester to be carbon neutral by 2038. This is a science-based target, that is aligned to international carbon reduction commitments needed if GM make its fair contribution to the Paris Agreement. In relation to transport the 5YEP identifies the need for phasing out the internal combustion engine vehicle in favour of Electric Vehicles. This in turn will have co-benefits in relation to air quality.

Actions to Improve Air Quality

The AQAP has been produced following a programme of consultation and workshops with key stakeholders, including the Greater Manchester local authorities, Public Health England, TfGM and Highways England, to obtain feedback on the new measures proposed.

Policies and actions were subsequently identified and divided into the following broad subjects, based on the area and type of effects that may be achieved:

- **Development management and planning regulation:** including standardisation of regulation and policy across the Greater Manchester region.
- **Freight and HGVs:** there are several opportunities to reduce emissions associated with the movement of freight and goods by road.
- **Buses:** Buses have a vital role to play in transporting the public and give opportunities to improve air quality. New legislative developments, the creation of the future Greater Manchester bus strategy and improvements to vehicle standards will all assist in ensuring that bus continues to play a vital role into the future, carrying the majority of public transport journeys made within the conurbation.
- **Cycling:** Existing strategies and initiatives encourage cycling.
- **Travel Choices:** Encouraging the public and businesses to make sustainable travel choices is essential in realising lasting air quality benefits.
- **Cars:** Measures to reduce emissions from cars and reduce the number of vehicle trips can deliver real improvements.
- **Information and resources:** Education and the provision of information to the public, businesses and policy makers is seen as vital in bringing air quality improvements.

In 2019, progress has been made on a number of actions in the Air Quality Action Plan. Highlights include:

- The first ‘Bee Network’ Routes opened for improved cycling and walking in Greater Manchester, supported by TfGM-led sustainable travel promotion schemes

GM Mayor Andy Burnham opening Bridgewater Canal Bee Network cycle route in Wigan, August 2019

- The 'Protecting Playgrounds' pilot involving the installation of green screens / tredges at four schools across Manchester was carried out.
- Manchester City Centre waste consolidation pilot developed, intending to reduce Refuse vehicles movements in a pilot area.
- TfGM appointed a new operator (Electric Vehicle Charging Infrastructure Service Operator (EVCISP)) to deliver a 7-year EVCI Contract. This contract involves the transition of the GMEV network to a new brand that will be launched in Spring/Summer 2020.
- For Clean Air Day 2019, a whole week was allocated for air quality awareness-raising activity, with participation from local councils, community groups, organisations and schools.

Mini PCSO campaign outside Webster Primary School, Clean Air Week

- The Clean Air GM website attracted 113,509 unique visitors in Greater Manchester.
- Anti-idling campaigns have taken place in schools across Greater Manchester
- The declaration of a Climate Emergency was made in Greater Manchester Councils, paving the way for increased action to be taken to reduce emissions.
- Construction of the 5.5km Trafford Park Line on Greater Manchester's Metrolink rapid transit network. This was opened on 22nd March 2020, providing a sustainable transport option for thousands of commuters, shoppers and tourists.
- Travel Plans, Air Quality Assessments, and EV charge points are among the tools increasingly being used by planning officers to mitigate the air quality impacts of new development

Since the Air Quality Action Plan was agreed a UK Plan for tackling roadside nitrogen dioxide concentrations (DEFRA, July 2017) has been published. It identified 29 local authorities, including seven in Greater Manchester (GM), with areas likely to exceed the statutory NO_2 annual mean EU Limit Value of 40 µg/m^3 beyond 2020. In March 2018, 33 more local authorities were defined as having "shorter-term NO_2 problems" - including Oldham in GM.. The UK Plan compels these local authorities to follow a specific process to undertake initial evidence development, 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'. UK Government guidance identifies charging Clean Air Zones (CAZ) as the benchmark measure for achieving compliance in the shortest possible time. After the submission of GM's Outline Business Case in March 2019 a further Direction was issued by the Secretary of State to all 10 GM authorities, to bring about compliance with the legal limit for NO_2 in the shortest possible time and in any case by 2024. In March 2020, a further ministerial direction and letter was received by Greater Manchester from Central Government. This set out an expectation to implement a Class C charging Clean Air Zone in 2021.

The Full Business Case of this feasibility study ultimately acts as the final GM Clean Air Plan and will include measures to achieve compliance as well as mitigation measures. Subject to approval and the necessary funding being obtained, the package of measures identified in the GM Clean Air Plan will then be implemented to deliver compliance with the EU Limit Value. TfGM has been coordinating the GM feasibility study on behalf of the GMCA and the ten GM local authorities, working closely with Districts, who remain legally responsible for compliance. For the most up-to-date information on the Greater Manchester Clean Air Plan visit www.CleanAirGM.com.

Conclusions and Priorities

The 2019 ASR covers in detail progress on all actions listed in the Air Quality Action Plan and includes information on the development of GM's Clean Air Plan.

Trends in Nitrogen Dioxide (NO_2) concentrations in Greater Manchester in 2019 are summarised as follows:

- The highest NO_2 annual mean concentration recorded at an automatic site in 2019 was 59 µg/m^3, down from 62 µg/m^3 in 2018 and 65 µg/m^3 in 2017, at Oxford Road, Manchester. This is still above the annual mean objective of 40 µg/m^3.

- In 2019, 10 of the 17 automatic air quality monitoring sites recorded increases in NO_2 annual mean concentrations of between 1 µg/m^3 and 3 µg/m^3.

- In 2019, 5 of the 17 automatic air quality monitoring sites have recorded reductions in NO_2 annual mean concentrations of between 1 µg/m^3 and 3 µg/m^3.

- There have been 3 exceedances of the NO_2 1-hour mean in 2019 across Greater Manchester, but not the objective which allows 18 times a year: 1 at Manchester Oxford Road, and 2 at Bury Whitefield.

- Of the 112 diffusion tube (non-automatic) sites operating inside the AQMA since 2011, 55 recorded lower concentrations in 2019 than 2018, while 57 recorded higher concentrations. Of the 63 diffusion tube sites operating outside of the AQMA across the same period, 19 have also recorded lower concentrations.

Exceedances of the annual mean objective (AMO) for NO_2 (40 µg/m^3) are continuing to be recorded at numerous sites within the AQMA across Greater Manchester. Outside of the AQMA, diffusion tube sites in Wigan (119, 129, 178, 180) have continued to show readings exceeding the AMO. After exceeding last year, Wigan 122 recorded a 2019 annual mean concentration of 38.2 µg/m^3 below the AMO. The majority of these sites are new, and there are discussions ongoing within Wigan Council with regard to local interventions to mitigate exposure. In Tameside, DTs outside the AQMA TA43, TA45 and TA46 all showed readings above the AMO. Exceedances at these sites are acknowledged, but in both cases and in agreement with Defra, the decision to declare an additional AQMA, or to expand the current AQMA, is being delayed until the outcome of the Clean Air Plan for Roadside Nitrogen Dioxide is realised.

Mixed results in annual mean PM_{10} and $PM_{2.5}$ concentrations were measured across Greater Manchester in 2019 compared to 2018. While annual mean concentrations remain below the legal limits, there were a number of small increases, as well as some small decreases. In 2018 increases on 2017 were thought to be due to the colder than average winter increasing the need for heating as well as a dry summer which increased re-suspended dust; and the Saddleworth Moor and Winter Hill fires, which continued for more than 3 weeks in June and July 2018, causing smoke to drift across Greater Manchester. Another fire on Marsden Moor in April 2019 is thought to be a significant contributor to the particulate concentrations.

Section 3.2 of this report contains detailed analysis of automatic and non-automatic monitoring in Greater Manchester, by individual district.

The Greater Manchester Clean Air Plan is projected to have the most significant impact on air quality in the city-region going forward, in addition to actions taken to meet the 2038 city region's carbon neutral target.

Local Engagement and How to get Involved

The Clean Air Greater Manchester website (https://cleanairgm.com) has been a key development in the local authorities' communication with the general public since its launch in 2018. Facebook (facebook.com/cleanairgm) and Twitter (@cleanairgm) have also been launched, with the conversation being tracked using the hashtag #cleanairgm.

The website www.CleanAirGM.com contains a wealth of information about local air quality, the GM Clean Air Plan, how to play a part and tips on reducing and avoiding air pollution. A Schools section is also included on the website that includes a free air quality toolkit for schools to download, and free online air quality game.

2019 saw GM's second Clean Air Week, which raised awareness and help people understand what they can do to improve their impact. Throughout the week there were events at schools, hospitals and workplaces.

Table of Contents

List of Tables

List of Figures

List of Additional Tables and Figures

1 Local Air Quality Management

This report provides an overview of air quality in Greater Manchester during 2019. Transport for Greater Manchester (TfGM) represents the ten authorities that constitute the Greater Manchester Combined Authority (GMCA). The ten authorities are:

- Bolton Metropolitan Borough Council (BoMBC)
- Bury Metropolitan Borough Council (BMBC)
- Manchester City Council (MCC)
- Oldham Metropolitan Borough Council (OMBC)
- Rochdale Metropolitan Borough Council (RMBC)
- Salford City Council (SCC)
- Stockport Metropolitan Borough Council (SMBC)
- Tameside Metropolitan Borough Council (TMBC)
- Trafford Borough Council (TBC)
- Wigan Metropolitan Borough Council (WMBC)

The report fulfils the requirements of Local Air Quality Management (LAQM) as set out in Part IV of the Environment Act (1995) and the relevant Policy and Technical Guidance documents.

The LAQM process places an obligation on all local authorities to regularly review and assess air quality in their areas, and to determine whether or not the air quality objectives are likely to be achieved. Where an exceedance is considered likely the local authority must declare an Air Quality Management Area (AQMA) and prepare an Air Quality Action Plan (AQAP) setting out the measures it intends to put in place in pursuit of the objectives. This Annual Status Report (ASR) is an annual requirement showing the strategies employed by the 10 Local Authorities of Greater Manchester to improve air quality and any progress that has been made.

DEFRA have confirmed that the Air Quality Action Plan should not be updated until the outcome of the implemented Clean Air Plan to address Roadside NO_2 has been determined. Consequently modelling of a renewed AQMA around sites of high pollution, and to closely observe the situation here has also been deferred.

The statutory air quality objectives applicable to LAQM in England can be found**Error! Reference source not found.** in Appendix E.

2 Actions to Improve Air Quality

2.1 Air Quality Management Areas

Air Quality Management Areas (AQMAs) are declared when there is an exceedance or likely exceedance of an air quality objective. After declaration, the authority must prepare an Air Quality Action Plan (AQAP) within 12-18 months setting out measures it intends to put in place in pursuit of compliance with the objectives.

A summary of AQMAs declared by Greater Manchester can be found in Table 2.1. Further information related to declared or revoked AQMAs, including maps of AQMA boundaries are available online at https://uk-air.defra.gov.uk/aqma/maps.The current AQMA was declared on the 1st May 2016 following a detailed assessment of air quality in 2014.

Table 2.1 – Declared Air Quality Management Areas

AQMA Name	Date of Declaration	Pollutants and Air Quality Objectives	City / Town	One Line Description	Is air quality in the AQMA influenced by roads controlled by Highways England?	Level of Exceedance (maximum monitored/modelled concentration at a location of relevant exposure)				Action Plan		
						At Declaration[4]		Now[5]		Name	Date of Publication	Link
AQMA Greater Manchester	Declared 01/05/2016	NO_2 annual mean	Greater Manchester	An Area covering the 10 districts of Greater Manchester, including arterial routes, district centres, and airport.	YES	58.7	µg/m3	52.3	µg/m3	Greater Manchester Air Quality Action Plan 2016-2021	16.12.2016	Air Quality Action Plan

☒ **Greater Manchester confirm the information on UK-Air regarding their AQMA(s) is up to date**

[4] Concentration has been Distance Corrected with DEFRA Background Map Data (2016). Annual mean concentration at the location of monitoring was 66 µg/m3 in 2016.
[5] Concentration has been Distance Corrected with DEFRA Background Map Data (2019). Annual mean concentration at the location of monitoring was 59 µg/m3 in 2019.

2.2 Progress and Impact of Measures to address Air Quality in Greater Manchester

Responses to ASR 2018

Defra's appraisal of last year's ASR and GM's responses are included below:

- **There are six exceedances outside of the AQMA, of which 5 are in Wigan Council's jurisdiction. The Council state that discussion is ongoing regarding the possibility of an AQMA in this area – this is encouraged and supported in order to ensure adequate resources are directed towards improving air quality in this area. The Council are advised to monitor this throughout 2019 and comment on any progress made in their 2019 ASR.**

  GM: Following discussions with DEFRA it has been agreed that the Air Quality Action Plan should not be updated until the Clean Air Plan to address Roadside NO_2 has been implemented and its effectiveness understood. The decision has been made to likewise suspend modelling of a renewed AQMA around these sites of high pollution in Wigan, but to closely observe the situation and introduce local mitigation measures where possible.

- **It is important that the AQAP include $PM_{2.5}$-specific measures. It is noted that a collaboration is planned between TfGM and the University of Manchester to explore options for greater $PM_{2.5}$ improvements in Manchester. Progress on this should be reported in next year's ASR. The AQAP could be updated to reflect planned initiatives, such as promotion of more environmentally friendly stoves.**

  GM: A bid was made for Air Quality Grant Funding in November 2019 aiming to deliver reductions in particulate matter emissions from domestic fuel burning as well as the burning of domestic and commercial waste. This bid was unsuccessful.

  TfGM collaborated with Global Action Plan, The Phillips Foundation and the University of Manchester in July 2019, recommending schools to be part of pilot scheme for indoor particulate emissions, for which one aim was to achieve higher standards of $PM_{2.5}$ in all classrooms using air purifiers. The consortium continues to progress with this project.

- **Annualisation has been carried out where appropriate, and example calculations have been provided. It would be appropriate in future reports to include details of all annualised sites for completion and represents good practice.**

  GM: All annualisation calculations have now been included.

- **The correct bias adjustment factor has been applied, however the report lacks supporting evidence. A screen capture of the national bias adjustment factor spreadsheet would be sufficient and represents good practice. The Council could also consider deriving a local adjustment factor in future years.**

  GM: This has been included in the ASR 2019 in Appendix C (Figure C2)

- **The Council are encouraged to develop $PM_{2.5}$ specific measures for inclusion within the AQAP, and also for possible implementation across all boroughs.**

  GM: Greater Manchester submitted a bid for Air Quality Grant funding in November 2019 aiming to deliver reductions in particulate matter emissions from domestic fuel burning as well as the burning of domestic and commercial waste. This bid was unsuccessful. Further work with the UoM to understand the origin of $PM_{2.5}$ within the city region and how it is affected by metrological conditions is planned for 2020, to better determine and target interventions.

- **More discussion is required. For a report that covers 10 local authorities, the report is surprisingly lacking in dialogue. Whilst it is understood that there is a large volume of data to discuss, it is important to accurately and concisely convey trends in annual mean NO_2 concentrations. The following comment from last year's appraisal is echoed: In order for a reader to understand trends, sites of concern, and other important aspects, they are required to interpret the data themselves. This must be addressed; given the seriousness of exceedances and their wide geographical spread there should be a proportional amount of discussion and reflection.**

GM: This has been addressed through further written discussion of continuous analyser and diffusion tube results across Greater Manchester, and through more thorough discussion of local activity.

Greater Manchester has taken forward a number of direct measures during the current reporting year of 2019 in pursuit of improving local air quality. Details of all measures completed, in progress or planned are set out in Table 2.2.

More detail on these measures can be found in the 2016-2021 Air Quality Action Plan, which is located at this link. This action plan is complimented by the 2016 Low Emission Strategy, which can be downloaded at this link.

2.2.2 Summary of Progress on Actions across Greater Manchester

The following section outlines activity that has taken place to improve air quality across Greater Manchester, often at a strategic scale, and is provided by TfGM. The subsequent section will look at activity taken place within each of the 10 districts.

Development Management and Planning Regulation

IAQM/EPUK guidance documents have continued to be referenced to varying degrees in development and construction planning processes, with some of the GM local authorities now referring to these documents as part of their application assessment procedure.

113 new businesses joined TfGM's Business Travel Network, with many accessing the Personalised Travel Planning service offered by the Sustainably Journeys team. Travel Action Plans were produced for 16 businesses. A programme of education, transition planning and sustainable travel training courses were offered to 10 schools across Greater Manchester by the Sustainable Journeys team, to encourage active / sustainable travel to school.

The 'Protecting Playgrounds' pilot involving the installation of green screens / tredges at four schools across Manchester was carried out. The partnership of Groundwork, Manchester City Council, Transport for Greater Manchester and Lancaster University also conducted air quality monitoring around schools. Results are still pending as of June 2020.

Ivy Green Screen: Before and After at Medlock Primary School, Manchester

Freight and Heavy Goods Vehicles

In 2019 a Delivery and Service Plan (DSP) assessment was undertaken in Rochdale's main council offices, with recommendations being implemented to reduce deliveries. These recommendations and other freight and alternative fuels actions are detailed by district below.

At the beginning of 2019 a feasibility report looking at the cost and impacts of a using a central distribution centre for NHS deliveries was produced and presented to NHS GMSCP. This report assessed the environmental and operational impacts that the use of a distribution centre would have. Interest in developing and trialling this proposal was high towards the end of the year and a steering group was formed. This however was put in abeyance when the Covid-19 response became a priority at the start of 2020. We are currently in the early stages of assessing the potential of implementing a mobility hub in GM. Stakeholders and funding are being sought to investigate the different operational models that could be applied in GM. This may include the use of Manchester's inland waterways and will certainly have a 'last-mile' distribution aspect.

During 2019 the Manchester City Centre Waste Consolidation pilot was developed. The principle behind this pilot was to reduce the amount of Refuse Collection Vehicle movements in the pilot area by encouraging businesses to sign up to a single provider that had been identified based on their environmental credentials. The preferred supplier also agreed to use an electric vehicle to collect the commercial waste in the pilot area. In the first two months of 2020, a marketing plan was produced with the

scheme being launched in February. Though some business engagement activities did take place after the launch, this has also been put on hold due to the virus pandemic.

'Manchester Waste Collective' waste consolidation pilot logo

Anti-idling messaging has been shared with communities and schools, especially around Clean Air Week in June, through press and on signage. Junior PCSO campaigns were run across the city-region, with children issuing 'fixed-penalty notices' to offending vehicles, encouraging a change in behaviour from drivers idling their vehicles (or parking inconsiderately outside the school gates).

TfGM has led local policy and is in the process of delivering programmes that will provide the infrastructure for alternative fuels. Examples of this include:

- A new contractor Amey-SWARCO has been appointed to manage and upgrade the existing network of EV chargers alongside delivering secured and future investment in the network
- Proposed EV Infrastructure - 300 charge posts (specifications to be determined). Site selection undertaken, 10x LAs engaged and site prioritised, ready for outline designs and costings.
- Clean air, early measures: 16 of contracted 25 charge posts with detailed designs and costings submitted to TfGM by Amey.
- Feasibility studies needed for remaining 8 private host sites. Scope of Feasibility study issued by Amey. One scheme (AJ Bell Stadium, Salford) now withdrawn from project leaving 24 x charge posts.
- Clean Taxi Charging being scoped to delivery circa 50 rapid charge posts

- OLEV Taxi funding secured to delivery 30 rapid chargers
- Promotion - Taxi 'Try before you Buy' proposal being scoped as part of Clean Taxi Fund part of the Clean Air Plan.

A refresh of the GM freight strategy is underway, due to be finalised in summer 2020. This work intends to understand the potential for modal shift of freight and changes in operations that will result in more sustainable movement of freight. The refresh will also scope out a follow on “GM roadmap to low emission freight” that will optioneer the technological, operational, infrastructure and policy changes (including alternative fuels) that will be required to meet GM carbon targets. Also included in the refreshed strategy will be guidance on access for freight to key economic centres and sub-regional freight facilities.

Buses

Priority at Traffic Signals – Initial introduction on A6 deemed successful and now being rolled out on other corridors where Stagecoach are the major operator. Work is ongoing to develop contacts with other operators in connection with the implementation of the Salford Bolton Network Improvements (SBNI) project.

TfGM through the CA has secured match funds under OLEV’s ULEBs (Ultra Low Emission Bus) programme for 23 electric replacement buses. TfGM has conducted a research exercise to understand the options available with regards to Battery Electric Buses and associated charging infrastructure. The options are now being reviewed to establish the optimum solution that aligns with the operational requirements and contractual arrangements for both service types.

The proposed CAP Clean bus fund focuses on delivering diesel retrofits, work is ongoing to assess if the proposal could involve an ask for electrification of some replacement buses.

The government have announced the "All electric bus town" funding with up to £50m available. TfGM are coordinating a high-level assessment of feasibility, as the fund is targeted at one town rather than CA wide, TfGM have been in touch with districts to understand interest in bidding.

TfGM has continued to encourage operators to invest in zero emission solutions to meet 5YEP objectives. 3 operators bid for ULEBs funding. Stagecoach have in March deployed first of 32 ADL Enviro 400 full EV double decks, these are operating on high frequency services. Work continues on TfGM's independent bid for Free bus and the Vantage services.

The Confederation of Passenger Transport which includes all the major GM bus operators have committed to only buying low or zero emission buses from 2025.

TfGM-owned fleet is being assessed in terms of retrofitting if appropriate or replacement with EV if this offers better overall value in relation to Clean Air benefits and carbon reductions.

Trials of EV vehicles are taking place for use in TfGM ancillary car/van fleet. The outcomes will inform the type of replacement suitable for use in the future fleet in 2020.

Cycling

TfGM are leading the development of the Bee Network, which will provide 1,800 miles of protected space for cycling and walking throughout Greater Manchester. Around 80 schemes have been submitted by the Districts to the Mayor's Challenge Fund programme to develop this network. The Sustainable Journeys Team are working with the Districts to ensure that appropriate Activation Plans are in place to ensure take up. More information can be found at the Bee Network website, and an interactive map can be viewed here.

The Sustainable Journeys Team also continues to offer a comprehensive cycle training programme to encourage and support cycling. This includes both skills and maintenance training at a range of levels, to give people the skills and confidence to consider cycling as a form of transport whether this is for commuting, utility or leisure trips. 2019 saw 2,584 attendees at these courses with the most popular being Learn to Ride. Feedback from attendees of these courses in 2019 showed 76% of attendees intended to cycle more after attending one of the courses.

We also provide Safe Urban Driver training to professional HGV drivers to make them aware of vulnerable road users.

TfGM also operates an Access to Employment programme which supported 13,319 people over the calendar year to access employment via sustainable travel options including free bikes and free and discounted tickets on the network. This scheme also supported 5,447 jobseekers with 1-day bus tickets to support them when travelling to interviews. 82% of those who received a free bike and 81% of those who received a 28-day ticket felt the offer was extremely important or very important in getting them to / from their new job

The Sustainable Journeys team has worked with a number of community groups to support their cycling and walking ambitions with a range of initiatives being developed. We have also supported the Sport England funded Local Pilot with regards its objective of increasing local cycling and walking.

Following Mobike's withdrawal from Greater Manchester in September 2018, the Cycling and Walking Commissioner gained approval to deliver a viable, operational model for a region-wide bike share scheme. The Vision is that Greater Manchester has a successful public cycle hire scheme that integrates with the wider "Our Network".

The GM Public Bike Share scheme was granted programme entry in Tranche 4 of the Mayor's Challenge Fund. This has been progressed through 2019 and an outline specification has been developed that will be taken to the bike hire/share market. The organisation intends to be going out to tender for a single provider to design, implement and operate a bike hire scheme with a view to appointing a partner and having bikes on the ground by Spring 2021. There is a strong vision for a Public Bike Hire scheme in Greater Manchester and this is being combined with a comprehensive understanding of how GM Bike Hire might contribute to COVID-19 recovery.

TfGM have worked with local industry partners to bid for funds intended to trial new models in cycle logistics. We continue to work with partners through the GM logistics forum.

Work to facilitate cycling (and therefore support cycle logistics) is set out in the walking and cycling commissioner's "made to move" plan. The Transforming Cities Fund will see additional infrastructure provided to enable more journeys by bike.

Development of the Made to Move agenda and Bee Network continued at pace and in January 2020 the Mayor of Greater Manchester and the Cycling and Walking Commissioner announced the publication of a new report, titled 'Change a Region to Change a Nation', to make the case for the government backing needed to deliver the wide-ranging plans. The report, jointly commissioned by Transport for Greater Manchester (TfGM), Greater Manchester Combined Authority (GMCA) and the Mayor, details the impact that Greater Manchester's cycling and walking network is projected to have over the next 10 years, including:

- A 350% increase in daily cycling trips, from 100,000 to 450,000
- An increase in daily walking trips by a third, from 1,480,000 to 2,050,000

They are calling on Government to back ground-breaking plans for the UK's largest walking and cycling network, cutting congestion and air pollution across the city-region and helping people make 2.5 million journeys every day on foot or by bike.

It is also projected that the change in travel culture will bring huge benefits to the city-region in several key areas, including:

- Air quality: Up to 130,000 fewer daily private car and taxi trips (735,000 less vehicle kilometres driven)
- Congestion: Reduce traffic by as much as 10% and improve some journey times by up to 50%
- Health: A £6.73 billion boost by improving the city-region's health and reducing the cost to the NHS

In January 2019 the "Right Mix vision for achieving against the 2040 strategy was first set out. This reviewed the baseline data and outlined seven steps to achieving the Right Mix. Another step was subsequently added in October 2019 to make eight steps in total.

The step that relates most closely to Cycling is step 5: Transformational cycling policies lead to a switch to cycle from other modes – reaching a 10% mode share for Regional Centre and Neighbourhood trips and a 5% mode share for Wider City Region trips by

2040. To achieve this the interventions that have been identified as needing to happen will include:

- Reallocation of road space towards cycling in appropriate locations as part of Greater Manchester's Streets for All approach
- Implementation of the Cycling and Walking Commissioner's proposed cycle network.
- Increases in capacity of the cycle network, especially in and around the Regional Centre and areas of high cycle demand elsewhere in Greater Manchester.

Travel Choices

Car Club options are being explored by some GM councils. Enterprise / Co-Wheels Car clubs continue to operate in some councils.

The VMS messaging system continues to frequently share clean air messages to the general public.

Cars

In December 2019, TfGM appointed a new operator (Electric Vehicle Charging Infrastructure Service Operator (EVCISP)) to deliver a 7-year EVCI Contract. This contract involves the transition of the GMEV network to a new brand network that will be launched in Spring/Summer 2020.

An announcement detailing the new operator will happen in Spring/Summer 2020. This will set out what is planned for GM's EVCI network in terms of expanding, upgrading and the transition to the future tariff arrangements.

The EVCI Contract will be delivered in two main phases at varying stages of maturity aimed at expanding and upgrading the network. This comprises of:

TfGM is engaging with all stakeholders (private and public) to suggest future charging locations that could be deployed by the new operator.

TfGM has also recently been successful in securing £1.8 million of funding from the Office of Low Emission Vehicles (OLEV) Taxi Infrastructure Fund. This will allow the delivery of up to 160 taxi and PHV charging infrastructure points across Greater Manchester.

The GMEV network currently comprises of 151 double headed fast (7kw) charge points and 3 rapid chargers (50kW). GMEV accounts for approx. 50% of total charge points in GM.

Improvements to the regions EV network will be delivered through the following phases:

Phase 1a) Early Measures Project -The project is funded following a successful bid to Government's Clean Air Plan 'early measures' fund. The successful application secured in £3m to expand the EV charging network; of which, £1.8m is funding 24 double headed rapid charging points to be installed in 2020.

Phases 1b) Network Upgrade – working with our new operator a review of the network is being undertaken to identify which charge points will be replaced and upgraded, and which should be decommissioned.

Phase 2) Growth of the GM EVCI network will be delivered through a range of projects delivered through a variety of public.

TfGM's Sustainable Journeys team continues to work with schools on sustainable travel, including around Clean Air Week. More progress around reducing dependency on private vehicles is included by individual district below.

Information and Resources

The Clean Air GM website in 2019 saw 114,052 users and 113,509 of those visitors were unique – showing the success the awareness raising activity had in getting new people onto the website to learn about the Clean Air plan in Greater Manchester.

The average session duration of visitors on the website was 3.47 minutes, which is higher than the benchmark of 3 minutes provided by databox. This shows that visitors to the website were highly engaged in the content as well choosing to stay on the website longer to read our content.

The bounce rate is the percentage of single-page visits on your site. Essentially, it tells us whether people that arrive on our website, choose to stay on the website. Most websites will see bounce rates fall somewhere between 26% and 70%. As a rule of thumb, a bounce rate in the range of 26 to 40 percent is excellent. 41 to 55 percent is roughly average. 56 to 70 percent is higher than average but may not be cause for alarm depending on the website. Anything over 70 percent is disappointing for everything outside of blogs, news, events, etc.

The bounce rate for the Clean air website is currently at 55.70% putting us squarely within the content website benchmark. This shows that we have been targeting the correct people, but also that the content and customer journey on the website is successful at engaging with our target audiences.

The largest source of traffic to the website has been via paid media promotion accounting for 32.24% of overall traffic. Facebook adverts have been highly successful at channelling people towards the website, seen by this format being the top four sources of traffic within the paid media category.

Website visits that arrive by entering the clean air website URL or using bookmarks was the second largest source of traffic, accounting for 24.39%. and organic search traffic was a close third accounting for 20.92%. This could be down to our Out of Home media (billboards and newspaper adverts) and PR.

The most visited page on the website was by far the homepage – 25.66% of pageviews were of the homepage and this will have been down to our organic and paid promotion directing people to this page.

The second most visited page was the forecast and alerts with 15.33% of all website pageviews, showing the demand for insights into current and future air pollution conditions. This is further supported by the average time on this page being 4.24 minutes, more than double the time spent on average on any other page on the website.

This is then followed by the Clean air plan page (8.69%) and the vehicle checker page (4.9%).

The forecasting and alert service had 217 subscribers across all 10 local authorities as of 16th April 2020. These are broken down by district below in Figure 2.1. Plans to promote this service in 2020 have been postponed due to the COVID-19 pandemic.

Figure 2.1. Air Quality Alert Number of Subscribers

Metropolitan Borough	Number of Subscribers (16/04/2020)
Bolton	17
Bury	5
Manchester	60
Oldham	6
Rochdale	41
Salford	10
Stockport	17
Tameside	6
Trafford	8
Wigan	47
Total:	217

Clean Air Day was held on 20th June 2019, where TfGM, GMCA and LAs ran a number of events across GM. The objective of these activities was to raise awareness of the health impacts of air pollution and the action GM is taking to address the problem, and to encourage beahviour change; particularly for shorter journeys.

Further than previous years, 2019 saw a range of events to cover the entire week 17-23 June, to create a Clean Air Week, coinciding with the end of the conversation/listening exercise on the Clean Air Plan.

Pollution Pods exhibition in MediaCity, Salford.

The 'Pollution Pods' art installation was on display at MediaCity throughout the week - a walk-through experience recreating air quality from different cities around the globe. The pods attracted over 4,000 visitors, who were taught about the causes of air pollution, and were made aware of some of the different types of air pollution which are the result of different activities. Among the visitors were six primary schools attending an education day set up by Professors from King College London. The Pollution pods received a lot of media coverage, and generated 122 social mentions.

An AQ toolkit for schools was developed in collaboration with Global Action Plan, and shared among local schools. A number of schools hosted 'mini PCSO' campaigns to raise awareness of anti-idling.

The first 'Cycling and Walking Commissioners summit' in Manchester was held in Manchester on Monday June 17th, with active travel and air quality among the main topics of discussion. Mayors Andy Burnham and Dan Jarvis (Sheffield City Region) joined together for the first time to make five policy asks to the government, and share their regional progress so far, along with future plans and aspirations. This event was attended by over 40 stakeholders, plus media.

Cycling and Walking Commissioners Summit

A number of other events were held across GM to encourage businesses and the wider community to consider sustainable travel, some of which are detailed by individual district below.

The second Greater Manchester Green Summit was held on 25th March 2019, launching the city-region's pathway to becoming carbon neutral. This event welcomed 1,700 attendees in Salford's Lowry Centre, and contained links to air quality.

2.2.3 Progress of actions in individual districts

Bolton Metropolitan Borough Council

Bolton Council has ambitious plans for the transformation of Bolton Town Centre. During 2019 planning applications were received and determined including Church Wharf (PA 05572/19) – a mixed use application for 352 dwellings, hotel, retail and

leisure uses, Trinity Street (PA 07369/19) – a mixed use development for 144 apartments, offices and a multi-storey car park , St. Georges Road/ Bark Street (PA 05673/19) – 258 residential units with 42 parking spaces, and Le Mans Crescent (PA 07365/19) – change of use from magistrates court to a hotel (no car parking).

As the sites are located in the Town Centre, they are very accessible and should reduce the need to travel. Air quality was considered as part of each of the applications (no air quality assessment was required for the Le Mans Crescent application) and relevant conditions were attached, including requirements for Construction Environmental Management Plans and electric vehicle charging points. Developers have also been asked to consider using freight consolidation points to reduce emissions during the construction phase of the developments. With the exception of the Trinity Street application, all the sites have very low levels of parking. The Trinity Street application does contain proposals for a multi-storey car park the intention is to reduce surface level car parking in the area and include links to the adjacent train station to improve accessibility across the wider area as well as at least 20 electric vehicle charging points.

Bolton Council has recently undertaken a fleet audit with the Energy Savings Trust. The audit has identified that good progress has been made in purchasing Euro VI / 6 vehicles, which would be Clean Air Zone compliant and that there are plans for replacement for CAZ non-compliant vehicles. The audit has also identified opportunities for further improvements, including fuel management and environmentally friendly driving techniques, changes to essential car user allowances, purchasing more electric vehicles – including EV pool cars and provision of EV charging infrastructure. The recommendations will be considered further once the Council's responsibilities for the work in relation to the Coronavirus emergency reduces. The Council has already replaced several diesel Green Machines with glutten pedestrian electric vehicle litter suckers and is replacing the diesel Mayoral car with a petrol/diesel hybrid.

During 2019 the Council participated in Clean Air Week and awareness raising in relation to the GM Clean Air Plan proposals. These included two consultation events in the Town Centre to provide information to the public as well as social media publicity.

All schools were contacted to let them know about resources that are available to raise awareness of air pollution and two schools, Bolton School and Beaumont Primary got excellent local press coverage of some of the work their pupils had been doing to raise awareness of pollution.

Bury Metropolitan Borough Council

Grey Fleet

- Energy Saving Trust to carry out a review of our council fleet.
- Bury have joined the NHS travel board for joint working to reduce emissions form work place and commuter travel (AQAP5.1 and AQAP6.2).
- £10 million provided in council budget in 2010/21 to upgrade the fleet to electric and Euro 6 vehicles

Electric Vehicles

- Planning conditions requiring EV charge points being recommended for new residential.
- Town centre sites to have rapid chargers installed using “Early Measures” funding

- Reviewing options with Planning Policy for a supplementary planning documents to address climate emergency and air quality issues (provision of EV).
- Producing specification for a pilot scheme for on-street charging in residential area.
- TfGM Plugged in places - list of potential sites for EV charge points on Council Car Parks submitted to GMEV contractor (AQAP6.1).

Active Travel

- Meeting with TfGM sustainable travel team to develop a co-ordinated approach to active travel in schools to address persistent NO_2 exceedance areas . (AQAP6.4).
- Clean Air Day - Display of E bikes and Electric cargo bike at The Rock, Bury. Bike mechanic and information on CAZ proposals and travel choices.

- Pool Bike Scheme launched (4 Bromptons). 12 members of staff have received 'road ready' training.
- Bike to Work Week - Bikers breakfast, Dr Bike (maintenance of staff bikes) and promoted the pool bike scheme.
- Bee Network – Funding for 1 new shared crossing, 2 new and 3 upgraded signalised junction with pedestrian and cycle facilities. Further neighbourhood schemes proposed for next round of funding.

Awareness Raising / anti-idling

- Carried out AQ lesson to whole Primary school

Manchester City Council

(AQAP 1.2) Manchester City Centre (MCC) continued with Planning Development requirements including air quality impact and exposure assessments, and mitigation such as electric vehicle charge points (EVC), boiler emissions standards and travel plans.

(AQAP 1.2) Summary EVC requirements produced as a working document for Planning and Environmental Protection officers, and MCC are working to consolidate this with the Institute of Air Quality Management/Environmental Protection UK Development and Construction Guidance in order to publish online as a guidance document for developers.

(AQAP 1.3) MCC submitted monthly reports to TfGM for the Planning Development cumulative impact database.

(AQAP 1.7) Work continued to improve taxi emissions; a consultation exercise on proposals to standardise conditions across GM was planned for June 2020 and this includes measures to address engine idling. Further details are available online at https://democracy.manchester.gov.uk/mgAi.aspx?ID=4595.

(AQAP 1.8):

- Protecting Playgrounds Green Infrastructure project - planting was completed for the Manchester schools and results are awaited.
- Birmingham University GI project - MCC is part of the GMCA group supporting Birmingham University in its development of a tool to use GI to reduce exposure to air pollution.
- Northern Gateway Initiative - This is a landscape led approach to prospectively one of the largest housing development schemes in the north west over recent years. Long term, over 15,000 new properties will be built in the Lower Irk Valley. An Initial Housing investment Fund commitment of £51 million will see the creation over the next five years of a new City River park - a network of high quality well managed greenspaces along the River Irk.
- Grow Green - This exciting new project sees the collaboration of 22 European partners and the city of Wuhan in China on a major environmental programme managed by Manchester. The five-year project funded by the European Commission will research how Nature Based Solutions (NBS) can work towards providing a climate friendly, water resilient and liveable city. In Manchester our demonstration project will be in West Gorton where a new park incorporating elements of NBS has been built in the heart of the community transforming the area and creating a place for both people and nature to thrive.
- IGNITION project - This project commenced through a successful Greater Manchester bid for £5million from the Urban Innovative Action fund, which MCC was instrumental in winning. The project will establish innovative funding mechanisms and a pipeline of projects with the aim of increasing urban-green infrastructure across Greater Manchester by 10%.
- My Wild City Biodiversity Consultation - Over 2,000 citizens took part in this interactive consultation around Nature in the City, which will help shape a new long term biodiversity strategy for Manchester. The project is being delivered in partnership with MCC and Wildlife Trusts.
- Manchester Festival of Nature - In June 2019 over 7,000 people attended the first Manchester Festival of Nature (MFoN) in Heaton Park, taking part in activities led by 22 environmental and related organisations. MFoN is a partnership between the Wildlife Trust, MCC, the RSPB, City of Trees and many others. Its aim is to create a united approach to the conservation of nature in

Manchester and to engage people young and old in celebrating and saving our wildlife.

- Tree Planting - During 2019/20 5,604 trees were planted on known schemes, including 2,812 hedge trees.

(AQAP 2.1) Delivery and Servicing Plan work and implementation continued; deliveries during off-peak times, load consolidation, and personal deliveries not allowed.

(AQAP 2.7) Anti-idling actions continued; school engagement projects undertaken by Council neighbourhood teams and compliance work carried out by resolving isolated idling incidents informally in accordance with the Council's Enforcement Policy.

(AQAP 6.1) MCC involved in TfGM consultation over locations for new EVC points.

(AQAP 6.2) MCC's review of essential car users several years ago resulted in a significant reduction in allowances. Council policy was updated during 2018 to promote flexible working, working from home and locations which result in reduced travel time. Several teams have fleet EVs and this number is increasing when vehicle lease contracts end.

(AQAP 6.3) City centre car parks assessment commenced.

(AQAP 6.4) Continued to work with schools over sustainable travel.

(AQAP 7.9) Continued to promote air quality issues and sustainable travel over staff communications, via schools engagement and Manchester University student projects, and to the public via our webpages. MCC also actively participated in 2019's Clean Air Day/Week, which included promoting awareness of air pollution and measures the public can take to reduce their own exposure and impacts.

Oldham Metropolitan Borough Council

(AQAP1.1) Construction Management Guidance and (AQAP1.2)- Development Planning Guidance: Oldham Council (OC) continue to promote the use of the latest Institute of Air Quality Management (IAQM) guidance on the assessment of dust on

demolition and construction sites and the IAQM latest Air Quality planning guidance to ensure that appropriate conditions are placed on planning applications to control the effects new developments have on Air Quality both at the construction and operational phase. OC are seeing many planning applications submitted with management construction plans and air quality reports based on these documents. This has been helped by the introduction of a pre-planning application advice scheme to help developers submit the correct information with their planning applications and to encourage them to consider Air Quality at a very early stage of the formation of a planning application. Environmental Health are increasingly attending preapplication meetings with planning and developers. When in discussions with Air Quality consultants and developers in relation to Air Quality assessments, Environmental Health have been encouraging them to incorporate EV charge points as mitigation for developments. Internal discussions are being held about conditioning all new housing developments to have EV charge points.

(AQAP1.6) Encouraging Travel Planning: OC continue to encourage developers to incorporate Travel Planning into major planning applications. In 2019, 9 travel plans have been secured as a condition of planning permission. One of the objectives of The Local Development Plan will be "…..to promote sustainable development in the borough by reducing the need to travel and encouraging walking, cycling and the use of public transport.". OC continued to engage with the Transport for Greater Manchester's Sustainable Journeys Team to promote the active travel and travel choice programmes across Oldham.

(AQAP1.7) Taxi and Private Hire Quality Controls to Prioritise Low Emission Vehicles: The Licensing Team have been encouraging Private Hire Vehicles and Hackney Carriage drivers to only purchase vehicles that will at least meet the Greater Manchester Clean Air Plan criteria when changing their vehicle. They have been doing this through trade meetings and trade publications. They have also been reminding drivers that they could be fined for leaving engines to idle unnecessarily. Electric Blue carried out a project with the Licensing Team to see if Electric vehicles are an option for licenced drivers in Oldham. Over 30 licenced vehicles were fitted with trackers to monitor movements and reports done for drivers showing how much they could save over 2 to 3 years by converting to all electric. Drivers responded positively but raised

the issue of costs of initial purchase being too great and the lack of charge points in the Borough as many of them don't have a driveway or garage to park a vehicle overnight.

(AQAP5.1) Car Clubs: There are currently no car clubs in Oldham, however OC continue to promote CareShare GM.

(AQAP6.2) Car Use Allowances: OC have continued with our car use allowances policy that regularly reviews roles to see if an allowance is still required or if alternatives would be more appropriate, e.g. could the employee use several of our electric pool vehicles for business journeys. Where these vehicles are available staff must use these vehicles rather than their private car for business use. As part of the Councils travel plan to encourage the responsible use of bicycles for work as an alternative to driving, the Council pays above the approved amount for mileage allowance payments (MAPs) published by the HM Revenue and Customs. Car mileage is not paid for journeys from Oldham Town Centre to Manchester, Rochdale, Ashton, Failsworth or Royton unless there are special circumstances (e.g. travel at night / transporting equipment) as OCs expectation is for staff to use public transport instead.

Rochdale Metropolitan Borough Council

(AQAP1.1-1.2) Rochdale BC have been requiring EV charge points at all new residential and non-residential properties in line with the consultation document from Defra where we are consulted for air quality. We are working on local policy to require the same conditions on small developments that fit within the same scope of the consultation. Masterplans have been completed promoting higher density development around railway stations at Rochdale and Castleton. Looking to continue this theme with the production of a promotional document promoting development opportunities around stations and convenient and more affordable alternative to access Manchester City Centre. Development opportunities used as a basis to justify longer more modern trains and more frequent rail services to meet growing passenger demand.

(AQAP1.4) Ongoing work on the Clean Air Zone looking at the locations of cameras within the borough and supporting the working group to engage with those impacted by the proposals.

(AQAP1.7) Rochdale BC have undertaken a review of the EV charging network following completion of the Electric Blue taxi project. This was a project to establish whether the strategic locating of EV charge points would encourage the taxi and private hire sector would be more likely to move towards EV's if charge points were located in strategic places.

(AQAP2.1) DSP toolkit – a review of the deliveries taking place into the main council offices in the centre of Rochdale has been completed and the actions have been implemented where appropriate reducing some deliveries into the town centre.

(AQAP2.7) Providing information to schools to support and promote the anti-idling message.

(AQAP3.1) Work ongoing on the Bee Network opening up areas of the borough to encourage and promote cycling routes and improve safety for cyclists on the network. Scheme for Castleton due to be completed in 2020/21; next phase of extending to Rochdale Town centre currently being developed.

(AQAP5.1) Reviewing the current grey fleet (personal vehicles) and options to promote sustainable travel with staff using personal vehicles for work functions. Looking at bus/ tram passes with support from TfGM, we are also looking into the possibility of having a car club with low/zero emission vehicles available for staff to use.

(AQAP6.1) Reviewing the location of charging points in the borough with a view to increase the number available for public use.

(AQAP6.2 & 6.3) Council staff do not receive car allowance and the Local Authority does not provide any car parking for staff or visitors (there are limited car parking spaces available for disabled visitors). The council is looking at the feasibility of a car club to further discourage use of private vehicles. With the completion of phase 1 of

Rochdale Riverside development Rochdale Council no longer offers permit parking for staff, there are no longer any discounts available for parking in the town centre. Previously undeveloped land was used for staff parking prior to the development starting works. There has been an increase in numbers of trains serving Rochdale, increasing to 6 per hour direct into Manchester Victoria, this alongside the connecting tram service to Rochdale Town centre this has seen a decrease in car usage. The Council is also developing a corporate policy for flexible working to encourage staff to work more flexibly, work from home or a shift in working patterns. This is aiming to reduce numbers of trips into the Town centre at peak times.

(AQAP7.1) Work is ongoing to promote AQ internally with information available for staff/ training sessions. Information posters have been displayed both in the public and staff areas signposting to further information. Promotion of cycle routes and walking routes available in the borough via both paper copies of maps being made available and signposting to electronic copies. Promotional work for the Clean Air Zone conversation in which over 400 businesses were contacted providing details about the proposals and air quality in general. Part of this included information sharing into ways they can help improve air quality in general and signposting to the cleanairgm.com website.

(AQAP7.9) Rochdale hosted several events to promote Clean Air Day/ Week. On Clean Air Day Rochdale council had a stand in the main Council offices which are also the main library and public information point. This promoted the message of the Clean Air Plan and provided information as to how residents could help improve AQ in the borough, providing leaflets and information and speaking directly with the community to get ideas and opinions on current AQ issues. Rochdale also hosted an electric vehicle event in the town centre, encouraging members of the public and staff to view EV's. The Bike Doctor was also at the event helping members of the public fix any bicycle problems. Rochdale also hosted an EV event at Kingsway on behalf of Rochdale MBC and Oldham MBC to show EV's to local businesses; information was also provided on the Clean Air Plan.

Work has been undertaken to promote the smoke Control zone within Rochdale and encourage members of the public to use compliant appliances/fuels to help improve AQ and reduce nuisance complaints.

Rochdale council declared a Climate Emergency in July 2019 and have committed to making the borough carbon-neutral by 2038.

Salford City Council

(AQAP 1.1 and 1.2): Current Salford planning policies require developments that may be significantly polluting to be assessed and include mitigation measures where appropriate. Therefore, current policies are aligned to the latest EPUK/IAQM guidance on the Assessment of Dust from Demolition and Construction and Land-Use Planning & Development Control: Planning for Air Quality.

A new Local Plan is being developed and is currently in draft form. Draft Local Plan Policy PH1 aligns with these actions. The Revised Draft Local Plan was published for consultation from 25 January 2019 to 22 March 2019. Comments received during this consultation and evidence available is being taken into account in developing the Publication Local Plan. Before it can be adopted, the Publication Local Plan will be subject to a further period of consultation and then it will be submitted to the Secretary of State for independent examination. It is anticipated that adoption will take place in 2021.

The Salford City Council environmental consultant team recommend that baseline good design standards from the IAQM / EPUK guidance should be adopted for major developments. Conditions are applied to new developments where appropriate regarding travel planning, electric vehicle charging and dust control to planning applications. IAQM guidance is being incorporated into planning decisions. For very large developments e.g. large housing estates, developers are asked to submit damage costs using the Defra damage cost calculator tool, and then to provide a costed mitigation package approved by the local authority to offset damage costs.

(AQAP 1.6): Travel plans for certain developments are required to be submitted as part of the application process, as specified by the Salford City Council planning application

Validation Checklist to show commitment to providing sustainable travel options with a view to reducing unsustainable modes of transport. The validation checklist is currently being reviewed and updated.

(AQAP 2.1): Actions from 2018 DSP report continue to be implemented:

- Swinton Hall Rd depot: adjusted standard delivery times to avoid peak time deliveries;
- Turnpike depot: assessed whether any non-urgent, peak time deliveries could be re-scheduled so that they occur outside of peak times;
- Civic Centre waste collections: Mostly occur in peak hours, but are part of a larger collection round. Therefore moving individual collections (from the Civic) would just move to a nearby location and so unlikely environmental benefit;
- Civic Centre post room: Identified that there are many peak time deliveries and multiple courier drops during the day – may be potential to consolidate deliveries/ collections and courier activities.
- Procurement team: A new e-procurement system is being developed with ICT to allow better management of orders and delivery schedules with contractors. This should reduce numbers of purchases from ad hoc organisations that may use couriers for delivering goods, and therefore should result in fewer deliveries. The system is currently being trialled. A Greater Manchester wide stationary contract has been reviewed, part of this was to look at consolidation of orders and reduction of deliveries.

(AQAP 2.8): The Energy Savings Trust (EST) have conducted a review of the City Council operational and car club vehicles. The data from this review is currently being analysed.

TfGM held a series of electric vehicle (EV) experience events across GM during 2019, promoting EVs to businesses and the public. The launch event for these was held in January 2019 at Salford MediaCityUK to initially engage with businesses. The events have been successful in promoting EVs to fleets and Local Authorities.

(AQAP 5.1): The Salford car club covers 13 sites across the city with a total of 39 vehicles including 8 fully electric Nissan Leafs (20% of the total fleet). Tenders for a new car club provider have been received and these are currently being assessed. It is expected that the new operator will be appointed in May 2020. The new scheme has made a number of improvements based on learning from the initial scheme that include targets of effective utilisation, options to increase the proportion of electric vehicle (EV's) in the fleet and improve the take up and usage of EV's by users.

Data for the Salford City Council car club has been collected and shared with TfGM. Data includes mileage, time of trip data, fleet make up data etc. TfGM are also represented on the tendering panel for the new scheme.

An analysis of car club usage was undertaken by a company called Electric Blue in March 2019. The data from this has been used to inform the specification of the new tender in order that the scheme works efficiently. This includes the integration of Salford's Travel Hierarchy within its vehicle booking system to reduce the need for travel but where it is still needed to nudge behaviour change to more sustainable travel methods.

(AQAP 6.1): Conditions are applied to all planning applications where an air quality assessment is necessary, requiring type 2 charging facilities on all properties with dedicated off-road parking, and a proportion of spaces (to be agreed) for apartments / high rise. Planning conditions are applied requiring FAST or RAPID charging for retail floorspace in accordance with IAQM/EPUK Planning for Air Quality guidance. Revised Draft Local Plan Policy A10 aligns with this action and is broadly consistent with IAQM/EPUK guidance. It is anticipated that adoption of the Local Plan will take place in 2021.

Salford City Council has been working closely with TfGM to identify suitable sites within Salford for the early measures fund programme. Amey have been appointed as the lead operator AND supplier / installer for EV equipment in Greater Manchester and will run the GMEV scheme on behalf of TfGM. As part of this arrangement Amey will bring their own investment to GM and provide additional on street charging, as well as upgrading the existing 7kw charging infrastructure to the latest standard.

In spring 2019 the City Council worked with the Private Hire and Hackney trades to promote the use of EVs within these fleets (with a company called Electric Blue). Surveys of trip patterns on approximately 75 vehicles were undertaken during March / April 2019 to assess where the likely demand for EV charging will be. Drivers have been provided with bespoke costs / benefit analysis for their trips, to inform their decision making on moving towards EVs, when considering replacement vehicles. Following this survey 1 x Electric Taxi Cab has been licensed in Salford.

(AQAP 6.2): A business travel hierarchy and guidance is in place, which has been co-designed by managers and staff. The travel hierarchy alongside the new co-designed guidance, allow managers and employees to make informed decisions on the most efficient and effective ways to travel for business and ensure that all forms of travel should be considered in a flexible hierarchy:

1. Walking and cycling - A pedal cycle allowance is payable to designated car users who choose to use a pedal cycle to transport them in carrying out their duties, payable on a monthly basis;
2. Public transport – day tickets for certain bus routes in Salford are available from office managers, therefore avoiding the need for staff to claim back expenses;
3. Car share;
4. Car club;
5. Car rental/taxi;
6. Private vehicle (grey fleet) - Mileage claims will only be allowed in exceptional circumstances

The development of an integrated manager dashboard to understand how employees are traveling and to highlight areas where more sustainable travel methods can be used. This gives leadership live reports that clearly show current travel trends and behaviours as well as identify employees who are not using the hierarchy correctly and/or are using the car club vehicle assets wastefully.

The Salford City Council 'My Work' programme is rolling out – Allowing staff to work in different ways or from different locations, supported by a standardised suite of ICT hardware and software e.g. laptops, Microsoft Teams software etc. It is everyone's personal responsibility to consider the most efficient and effective way to complete work to achieve the best outcomes in terms of environment, costs and time.

Agile desk spaces have been set up in several locations across the city to reduce staff travel need.

(AQAP 6.3): A car parking permit scheme is currently in place at principal City Council office/ depot locations. Monthly salary deductions charged at 1% of employee annual salary enable employees to utilise any free spaces on the car park. Specific parking spaces allocated for pool vehicles, electric vehicles and car share vehicles at Salford Civic Centre to encourage their use. Car parks are regularly patrolled by Parking Wardens – there is a fixed penalty fee in place of up to £70 for not displaying a permit.

A car parking review has been completed to highlight potential alternative management options that would encourage and support more sustainable travel by staff. Future operations will be considered by senior management as part of a wider Civic Centre campus review, as this is developed. In the interim an additional disabled parking area has recently been provided for staff, and the restrictions and timings have been amended to improve accessibility and turnover of the disabled parking spaces.

(AQAP 6.4): Salford City Council have secured membership to Modeshift, which is a national organisation and software that allows users to engage with schools on a larger scale and schools can receive awards and accreditation for their Travel Plan work. Currently 7 schools in Salford have been signed up. Work is on-going to engage with these schools and contact other schools to get more signed up.

Salford City Council work with Living Streets and other organisations to promote active travel and reduce journeys by car to schools. There are currently 14 schools signed up to Living Streets' WOW (Walk Once a Week) scheme.

A travel survey to capture vehicle mode and travel behaviours was carried out by a University of Salford MSc student to calculate CO_2 emissions of school run during summer 2019. Consideration currently being given to repeat the survey to improve response rate.

Engagement with schools to educate pupils on air quality issues and positive actions that can be taken to reduce air pollution carried out as part of Clean Air Day 2017, 2018 & 2019 events.

(AQAP 7.9): Salford City Council took part in Clean Air Day events during June 2019. A Clean Air Week was project managed by TFGM with input from Greater Manchester local authorities. The focus was on schools and businesses to promote active travel. Various activities took place in Salford to raise awareness of the event e.g. a Health Walk from Civic Centre, Anti idling awareness raising activities, Anti idling campaigns undertaken at 2 x Salford schools, Workplace event in Civic Centre reception, and a Pollution Pods event at Salford Media City.

The City Council website air quality and smoke control pages had a major update in April 2019, to improve dissemination of local air quality information, and will be reviewed and updated periodically.

Engagement activities with businesses and residents took place as part of GM Clean Air Plan conversation period (between 13th May and 30th June 2019) - 19 events were held across Salford to engage with the community.

Stockport Metropolitan Borough Council (SMBC)

(AQAP 1.6) Travel Choices and Stockport ICT continued working together to offer online personalised travel planning to residents changing their address for council tax purposes online. As part of the Town Centre Access Plan work in the Town Centre Stockport is providing personalised travel planning for all Businesses. The Council has been taking part in the trial of the online Planning Toolkit for Travel Plans;

(AQAP 4.1) Stockport has been very proactive when working with TfGM in the development of Walking and Cycling Route bids for the Mayoral Challenge Fund this has included a large amount of input from the local community in the form of WalkRide Groups. These routes will further develop the growing network of route for sustainable journeys that has been developed over time in the borough. Most recently the development of the network of routes has included the shared use routes on the A555; St Marys way and the A5145.

(AQAP 5.1) All casual car users are being offered access to the Enterprise Car Club for trips. Stockport's Staff Travel Plan and Guidance on Car Club usage are based on a hierarchy of travel types at which SOV use is the last option. Two public cars are available in Stockport Town Centre for public use; this is on top of the 4 cars that are for use by Council staff during the day. Data is being collated for this and it will support the extension of the scheme in the future;

(AQAP 6.2) See above regarding car clubs. The council offers salary sacrifice options for bus and rail season tickets. Currently the Car Parks in the Town Centre are all charged for via permits and the cost of these permits increased when salary sacrifice for this stopped. Staff with less need for their car for work purpose are also moved out to less accessible parking. The Council also offers pool cycle use as an alternative to personal cars or club cars.

(AQAP 6.3) See 6.2 The Council offers permits for Low and No Emission vehicles to park more cheaply across the borough to encourage uptake of these technologies; The Council has also hosted events to enable the public and business to see and learn about Electric Vehicles.

(AQAP 6.4) The Road Safety Team work with schools to address their travel planning and hearts and minds work regarding how children travel to school. Every development application from schools requires a new travel plan is produced as well as an ongoing update programme taking place; Education Department involve Transport Strategy in their work to enable travel planning to be considered early in decision making process.

(AQAP 7.9) The Council took part in Clean Air Day and encouraged Schools and businesses to do the same. There was an event in the town centre to encourage people to use sustainable modes.

Tameside Metropolitan Borough Council

(AQAP 2.8) The council has added nine electric vans to its fleet this year. Six new workplace charging points have been installed across three sites (Tame Street Stalybridge x2, Ashton Library x2, Stalybridge Library x2). In addition to this the groundwork for a further seven charging points at Tame Street and an additional three charging points at Dukinfield Cemetery have been completed and we are awaiting connection by ENW to allow us to bring these points into service

The provision of EV charging points on new commercial and residential development is to be addressed on a site by site basis through the planning process;

(AQAP 6.1) Working alongside TfGM a list of priority council owned sites (including the potential number and type of charging points (fast / rapid)) has been prepared as part of the Plugged in Places initiative;

(AQAP 6.2) Review of Essential / Casual car user allowances has been undertaken with the majority of staff removed from essential user status. Additional pool bicycles are on order for use by council staff across the borough;

(AQAP 6.4) Anti-idling campaigns have been run at four primary schools across the borough this year, with the children at each school working with PCSOs to address the issues of inconsiderate parking and idling vehicles being caused at drop off / pick up times;

(AQAP 7.9) Whole school assemblies delivered on air quality and the impact of travel choices in getting to and from school to four primary schools as part of the Our Streets initiative;

Clean Air Day information events were held at Tameside General Hospital and Ashton Library. In addition to these the Greater Manchester Cycling and Walking Commissioner Chris Boardman visited children at Gorse Hall Primary school in Stalybridge to talk about the benefits of cycling and walking to and from school. Street closures were put in place around Russell Scott Primary School, Denton where the

children held a “Mad Hatters Tea Party” to celebrate the work they had done in promoting and policing their school’s anti-idling campaign.

An electric vehicle event was run in conjunction with Rochdale MBC to promote and give advice on the range of vehicles available to businesses and taxi drivers interested in switching to electric vehicles.

Presentations on the proposals for the Greater Manchester Clean Air Plan were delivered to elected members and all four Tameside Neighbourhood Forums. A presentation and workshop on the same subject was also delivered to the Tameside Partnership Engagement Network.

Trafford Metropolitan Borough Council

Trafford Council have been implementing the GM Air Quality Action plan to ensure that areas of concern around air quality are protected, maintained and improved wherever possible.

Trafford Council promote the wider uptake of improved practices and technology through planning policies and conditions relating to new developments, the installation of electrical charging points in new commercial and residential developments.

The Council has an in-house air quality group which meets on a regular basis to achieve compliance with the actions contained within the Greater Manchester Air Quality Action Plan, but also to look at additional measures to improve air quality in Trafford. In 2019 actions completed were:

- An anti-engine idling campaign competition that was run through each primary school within the Trafford.
- Widening of the air quality monitoring network in Trafford to include several new locations.
- Work with Transport for Greater Manchester to develop ‘car club’ availability in Trafford.
- Increase in provision of EV charging points in public places across Trafford.

In 2019 there have been two significant applications for new developments which required scrutiny in relation to the impact on levels of nitrogen dioxide in and adjacent to the Council’s Air Quality Management Area. These have included the Therme

leisure complex, adjacent to the Trafford Centre which is forecast to have visitor numbers in excess of 500,000, a new supermarket close by to J10 of the M60 and residential locations and the re-locating of the Event City exhibition centre to a site adjacent to J10 of the M60.

For each of these planning applications the Council required and scrutinised air quality assessments for each development which included cumulative impacts. The Council ensures that air quality effects were fully understood to prevent adverse impacts on levels of nitrogen dioxide at nearby residential receptors and the Council's air quality management area. It has also been required to establish the impacts of the new developments would not compromise the Council meeting the requirements the UK National Nitrogen Plan.

Wigan Metropolitan Borough Council

(AQAP 1.6) Travel Plan required by Development Management for certain higher impact developments;

(AQAP 2.7) Anti-idling campaign currently being planned;

(AQAP 6.2) New planning guidance, the revised AQ SPD, is being drafted which will include measures aimed at improving air quality such as requiring all new built housing to have electric vehicle charging points.

(AQAP 6.4) Ongoing Mode Shift Stars program; anti-idling campaign undertaken which included school engagement; Crucial Crew Air Quality event undertaken; presented to 1800 pupils from 47 schools.

(AQAP 7.9) Have held two ULEV awareness days, including one coinciding with clean air week. Two events held for Clean Air Week 2019 in Wigan and Leigh town centres.

(AQAP 9.3) New cycle infrastructure has been installed at Saddle Junction allowing improved access for cycling through the junction.

Additionally, new particulate matter and NO_2 analysers have been installed at Wigan centre and a new automatic station is being installed in Leigh town centre that will monitor NO_2, PM_{10} and $PM_{2.5}$.

Table 2.2 – Progress on Measures to Improve Air Quality

Measure No.	Measure	EU Category	EU Classification	Date Measure Introduced	Organisations involved	Funding Source	Key Performance Indicator	Reduction in Pollutant / Emission from Measure	Progress to Date	Estimated / Actual Completion Date	Comments / Barriers to implementation
1	(AQAP1.1) Construction Management Guidance;	Policy Guidance and Development Control	Air Quality Planning and Policy Guidance	May-17	10 LA's	LA - BAU Activity	Reduce Traffic; Increase Efficiency; Improve Fleet	N/A	This construction management guidance is now referred to by many of the local authority environmental management teams. Progress is described by district in the accompanying ASR report.	On - going	Some district planning teams use alternative controls
2	(AQAP1.2) Development Planning Guidance;	Policy Guidance and Development Control	Air Quality Planning and Policy Guidance	May-17	10 LA's	LA - BAU Activity	Reduce Traffic; Increase Efficiency; Improve Fleet	N/A	This construction management guidance is now referred to by many of the local authority environmental management teams. Progress is described by district in the accompanying ASR report.	On-going	Some district planning teams use alternative controls
3	(AQAP1.3) Cumulative Development Database;	Policy Guidance and Development Control	Air Quality Planning and Policy Guidance	Mar-17	TfGM	TfGM - BAU Activity	Reduce Traffic; Increase Efficiency; Improve Fleet	N/A	Database developed and updated continuously. Cumulative development across borders can now be acknowledged by neighbouring local authorities.	May-17	N/A
4	(AQAP1.4) Clean Air Zone feasibility study;	Traffic Management	UTC, Congestion management, traffic reduction	Sep-17	TfGM, 10 LAs	JAQU	Reduce Traffic; Increase Efficiency; Improve Fleet	N/A	As stated in 2019 ASR this action is now covered by the Clean Air Plan work being conducted by TfGM in partnership with the 10 Local Authorities.	2021 - 2023	N/A
5	(AQAP1.5) 20mph Zones;	Traffic Management	Reduction of speed limits, 20mph zones	2018	TfGM	N/A	Increase Efficiency	N/A	However, the work conducted has fed into Streets for All work programme, which, with its promotion of sustainable transport, further supports AQAP objectives.	2018	Now considered to be an ineffective intervention
6	(AQAP1.6) Encouraging Travel Planning;	Promoting Travel Alternatives	Personalised Travel Planning	Jan-17	TfGM	TfGM - BAU Activity	Reduce Traffic; Increase Efficiency; Improve Fleet	N/A	In 2019 the Sustainable Journeys team continued to support circa. 600 businesses that make up the Business Travel Network. Over the course of the year 113 new business joined the network of which 16 were supported to complete Travel Action Plans for their business. For new businesses joining the network and for businesses who are on the network and relocating offices we offered a Personalised Travel Plan of which 1,791 were produced. A review was conducted of the PTP tool in 2019 and PTP was paused whilst the recommendations from the review are considered. The team launched a flexible working campaign in July 2019 to encourage businesses to offer their employees more flexibility in when they work and where they work which a view to reducing congestion pressures during peak times. A trial was conducted with Stockport Council	Ongoing	N/A

									offering PTP support to those moving home within Stockport with a view that people might be more likely to change their behaviour when they are going through a period of change. This had limited success due to the complexity of working across three different organisations: Stockport Homes, Stockport Council and TfGM. Sustainable Journeys also worked with 10 primary schools supporting them to deliver sustainable transport measures to encourage modal shift from non-sustainable travel modes to sustainable. Part of this support included education on the importance of sustainable travel and training courses on cycling and scooting safely. The programme offers a transition planning lesson for those in year six who are progressing to secondary school to support them to plan for their new journey.		
7	(AQAP1.7) Taxi and Private Hire Quality Controls to Prioritise Low-Emission Vehicles	Promoting Low Emission Transport	Taxi Licensing conditions	TBC	LA's	LA - BAU Activity	Reduce Traffic; Increase Efficiency	N/A	Progress is also described by district in the accompanying ASR report. GM Local Authorities are currently undertaking a process to develop and establish a set of minimum taxi and private hire driver, vehicle and operator licensing standards that will ensure high standards for all GM licensed taxi and private hire services and help address the current challenge of having older high emission fleet circulating around GM.	2021	N/A
8	(AQAP1.8) Green Infrastructure;	Transport Planning and Infrastructure	Other	TBC	TfGM	TfGM - BAU Activity	Increase Efficiency	N/A	Collaborative project between Groundwork Trust, Lancaster University, Manchester City Council and Transport for Greater Manchester, researching the use of vegetation in green barriers to trap and filter airborne pollution particles before they reach school playgrounds and classrooms. Different green barriers trialled at three schools. Monitoring has now ended, research is now being written up.	2019-2020	Funding barrier now resolved.
9	(AQAP2.1) Delivery and Servicing Plan Toolkit;	Freight and Delivery Management	Delivery and Service plans	Jan-17	TfGM	TfGM - BAU Activity	Reduce Traffic; Increase Efficiency; Improve Fleet	N/A	DSP resources established in TfGM Logistics & Environment Team. More information relating to each district's progress on this action is contained in the ASR main report.	Ongoing	LA resources for data-collection
10	(AQAP2.2) Urban Distribution Centres;	Freight and Delivery Management	Freight Consolidation Centre	TBC	TfGM	TfGM - BAU Activity	Reduce Traffic; Increase Efficiency; Improve Fleet	N/A	At the beginning of 2019 a feasibility report looking at the cost and impacts of a using a central distribution centre for NHS deliveries was produced and presented to NHS GMSCP. We are currently in the early stages of assessing the potential of implementing a mobility hub in GM.	TBC	Market-dependant factors
11	(AQAP2.3) Urban Consolidation;	Freight and Delivery Management	Other	TBC	TfGM	TfGM - BAU Activity	Reduce Traffic; Increase Efficiency; Improve Fleet	N/A	Manchester City Centre Waste consolidation pilot developed, intending to reduce RCV movements in pilot area through encouraging businesses to sign up to a single provider. Opportunity for EV RCV. Scheme launched February 2020.	TBC	Market-dependent factors
12	(AQAP2.4) Access for Freight to Key Economic	Promoting Travel Alternatives	Promote use of rail and inland waterways	Jan-18	TfGM	TfGM - BAU Activity	Reduce Traffic; Increase Efficiency	N/A	Refreshing the Greater Manchester Freight Strategy will provide guidance of this at a strategic, multi-modal level (relating to both potential and progress). This is due to be finalised summer 2020. TfGM have also recently completed a	TBC	Market-dependant factors

	Centres and Sub-regional Freight Facilities;								detailed rail routing study, with associated schematic maps, looking at these important issues.		
13	(AQAP2.5) Freight Information Channels;	Freight and Delivery Management	Other	May-17	TfGM	TfGM - BAU Activity	Reduce Traffic; Increase Efficiency	TBC	Initiating waste procurement projects looking at reducing HGV mileage in urban areas. Freight forum continuing. This is to be developed further during the refresh of the GM Freight Strategy.Travel Demand Team now well established at TfGM. Post-COVID lockdown, will continue to work on best methods for sharing information to a freight specific audience. CLOCS event held at Manchester University to encourage the uptake of CLOCS programme in private and public sector. Air Quality impacts are among the problems CLOCS seeks to resolve in construction traffic.	on-going	N/A
14	(AQAP2.6) Diesel Transport Refrigeration Units (TRUs);	Freight and Delivery Management	Other	Mar-17	TfGM	TfGM - BAU Activity	Increase Efficiency; Improve Fleet	N/A	Issues related to vehicle types are covered within the GM Clean Air Plan.	TBC	This topic is not at the forefront of current freight debates.
15	(AQAP2.7) Engine Idling;	Promoting Low Emission Transport	Other	Oct-17	TfGM & LA's	TfGM & LA's - BAU Activity	Increase Efficiency	N/A	TfGM working alongside all 10 districts has held a Clean Air Day/Week each year since 2018. Anti-idling has been a key feature and objective of the campaign and has featured in press and on signage. The lead up to Clean Air Day has also involved programmes with schools, specifically around idling on surrounding roads. Engaging schools has been a particularly successful way of educating the wider community and moving them to action. Junior PCSO campaigns were run across the city-region, where children issue false FPNs to parents idling outside the school gates. Advice has been provided to Local Authorities on their statutory powers to enforce against idling vehicles. This was in response to enquiries about specific scenarios where there had been complaints or ongoing issues with idling. Progress is also described by district in the accompanying ASR report.	on-going	N/A
16	(AQAP2.8) Alternative Fuels;	Promoting Low Emission Transport	Other	May-17	TfGM	TfGM - BAU Activity	Increase Efficiency; Improve Fleet	N/A	TfGM has led local policy and is in the process of delivering programmes that will provide the infrastructure for alternative fuels. Examples of this include: • A new contractor Amey-SWARCO has been appointed on a longer contract to manage and upgrade the existing network of chargers alongside delivering secured and future investment in the network • Proposed EV Infrastructure - 300 charge posts (specifications to be determined). Site selection undertaken, 10x LAs engaged and site prioritised, ready for outline designs and costings.	on-going	Conflicting agendas on alternative fuels within public and private sector. Manufacturer Warranties

									• Clean air, early measures: 16 of contracted 25 charge posts with detailed designs and costings submitted to TfGM by Amey. • Feasibility studies needed for remaining 8 private host sites. Scope of Feasibility study issued by Amey. One scheme (AJ Bell Stadium, Salford) now withdrawn from project leaving 24 x charge posts. • Clean Taxi Charging being scoped to delivery circa 50 rapid charge posts • OLEV Taxi funding secured to delivery 30 rapid charger • Promotion - Taxi 'Try before you Buy' proposal being scoped as part of Clean Taxi Fund. • A refresh of the GM freight strategy is underway, this work intends to understand the potential for modal shift of freight and changes in operations that will result in more sustainable movement of freight. The refresh will also scope out a follow on “GM roadmap to low emission freight” that will optioneer the technological, operational, infrastructure and policy changes (including alternative fuels) that will be required to meet GM carbon targets.		
17	(AQAP3.1) Bus Priority Programmes;	Transport Planning and Infrastructure	Bus route improvements	Jan-17	TfGM	TfGM - BAU Activity	Reduce Traffic; Increase Efficiency	TBC	Priority at Traffic Signals – Initial introduction on A6 deemed successful and now being rolled out on other corridors where Stagecoach are the major operator as connection has already been established and work ongoing to develop connections with other operators in connection with the implementation of the SBNI project.	on-going	N/A
18	(AQAP3.2) Bus Improvements;	Vehicle Fleet Efficiency	Promoting Low Emission Public Transport	Jan-17	TfGM	Mixed	Improve Fleet	TBC	• TfGM through the CA has secured match funds under OLEV’s ULEBs programme for 23 electric replacement buses. TfGM has conducted a research exercise to understand the options available with regards to Battery Electric Buses and associated charging infrastructure. The options are now being reviewed to establish the optimum solution that aligns with the operational requirements and contractual arrangements for both service types. • The proposed CAP Clean bus fund focuses on delivering diesel retrofits, work is ongoing to assess if the proposal could involve an ask for electrification of some replacement buses. • The government have announced the "All electric bus town" funding with up to £50m available. TfGM are coordinating a high level assessment of feasibility, as the fund is targeted at one down rather than CA wide, TfGM have been in touch with districts to understand interest in bidding. • TfGM has continued to encourage operators to invest in zero emission solutions to meet 5YEP objectives. 3 operators bid for ULEBs funding. Stagecoach have in March deployed first of 32 ADL Enviro 400 full EV double decks, these are operating on high frequency services including the 101. • The Confederation of Passenger Transport which includes all the major GM bus operators have	on-going	N/A

									committed to only buying low or zero emission buses from 2025.		
19	(AQAP3.3) Hybrid Bus Improvements;	Vehicle Fleet Efficiency	Promoting Low Emission Public Transport	Jun-17	TfGM	TfGM - BAU Activity	Increase Efficiency	N/A	Assessment of the TfGM-owned fleet continues either in terms of retrofitting if appropriate or replacement if this offers better overall value and delivers Clean Air benefits. Ultra Low Emission Bus (ULEB) project. Stagecoach have now delivered 32 fully electric buses under their ULEB bid and work continues on TfGM's independent bid for Free bus and the Vantage services.	on-going	N/A
20	(AQAP3.4) Trial of Low-Emission Vehicles	Vehicle Fleet Efficiency	Promoting Low Emission Public Transport	Sep-17	TfGM	TfGM - BAU Activity	Improve Fleet	N/A	Trials of EV vehicles are taking place that could be deployed into the TfGM ancillary car/van fleet. This will provide input into the solutions available when conducting the procurement of the ancillary fleet in 2020.	On-going	N/A
21	(AQAP4.1) Cycle Programmes;	Promoting Travel Alternatives	Promotion of cycling	Jan-17	TfGM	Mixed	Reduce Traffic	N/A	TfGM are leading the development of the Bee Network, which will provide 1,800 miles of protected space for cycling and walking throughout Greater Manchester. Around 80 schemes have been submitted by the Districts to the MCF programme to develop this network. The Sustainable Journeys Team are working with the Districts to ensure that appropriate Activation Plans are in place to ensure take up. The Sustainable Journeys Team also offers a comprehensive cycle training programme to encourage and support cycling. This includes both skills and maintenance training at a range of levels, to give people the skills and confidence to consider cycling as a form of transport whether this is for commuting, utility or leisure trips. 2019 saw 2,584 attendees at these courses with the most popular being Learn to Ride. Feedback from attendees of these courses in 2019 showed 76% of attendees intended to cycle more after attending one of the courses. TfGM also operates an Access to Employment programme which supported 13,319 people over the calendar year to access employment via sustainable travel options including free bikes and free and discounted tickets on the network. This scheme also supported 5,447 jobseeker's with 1 day bus tickets to support them when travelling to interviews. 82% of those who received a free bike and 81% of those who received a 28 day ticket felt the offer was extremely important or very important in getting them to / from their new job The Sustainable Journeys team has worked with a number of community groups to support their cycling and walking ambitions with a range of initiatives being developed. We have also supported the Sport England funded Local Pilot with regards its objective of increasing local cycling and walking.	On-going	N/A

22	(AQAP4.2) Public Cycle hire;	Transport Planning and Infrastructure	Public cycle hire scheme	2017	TfGM	Mayor's Challenge Fund	Reduce Traffic	N/A	Following Mobike's withdrawal from Greater Manchester in September 2018, the Cycling and Walking Commissioner gained approval from the GMCA, via correspondence with the district leaders, to deliver a viable, operational model for a for a region-wide bike share scheme. The Vision is that Greater Manchester has a successful public cycle hire scheme that integrates with the wider "Our Network". The GM Public Bike Share scheme was granted programme entry in Tranche 4 of the Mayor's Challenge Fund. This has been progressed through 2019 and an outline specification has been developed that will be taken to the bike hire/share market. The organisation intends to be going out to tender for a single provider to design, implement and operate a bike hire scheme with a view to appointing a partner and having bikes on the ground by Spring 2021. There is a strong vision for a Public Bike Hire scheme in Greater Manchester and this is being combined with a comprehensive understanding of how GM Bike Hire might contribute to COVID-19 recovery.	On-going	N/A
23	(AQAP4.3) Cycle Logistics;	Promoting Travel Alternatives	Promotion of cycling	Jun-17	TfGM	TfGM - BAU Activity	Reduce Traffic	TBC	TfGM have worked with local industry partners to bid for funds intended to trial new models in cycle logistics. We continue to work with partners through the GM logistics forum. Work to facilitate cycling (and therefore support cycle logistics) is set out in the walking and cycling commissioner's "made to move" plan. The transforming cities fund will see additional infrastructure provided to enable more journeys by bike.	on-going	N/A
24	(AQAP4.4) Cycle to 2040;	Promoting Travel Alternatives	Promotion of cycling	Mar-17	TfGM	TfGM - BAU Activity	Reduce Traffic	TBC	Development of the Made to Move agenda and Bee Network continued at pace and in January 2020 the Mayor of Greater Manchester and the Cycling and Walking Commissioner announced the publication of a new report, titled 'Change a Region to Change a Nation', to make the case for the government backing needed to deliver the wide-ranging plans. The report, jointly commissioned by Transport for Greater Manchester (TfGM), Greater Manchester Combined Authority (GMCA) and the Mayor, details the impact that Greater Manchester's cycling and walking network is projected to have over the next 10 years, including: A 350% increase in daily cycling trips, from 100,000 to 450,000 An increase in daily walking trips by a third, from 1,480,000 to 2,050,000 They are calling on Government to back ground-breaking plans for the UK's largest walking and cycling network, cutting congestion and air pollution across the city-region and helping people make 2.5 million journeys every day on foot or by bike1. It is also projected that the change in travel culture will bring huge benefits to the city-region in several key areas.	on-going	N/A

25	(AQAP5.1) Car Clubs;	Alternatives to private vehicle use	Car Clubs	Jun-17	TfGM & LA's	TfGM & LA - BAU Activity	Reduce Traffic; Improve Fleet	TBC	More information relating to each district's progress on this action is contained in the ASR main report.	on-going	N/A
26	(AQAP5.2) Dynamic Road Network Efficiency and Travel Information System;	Public Information	Via other mechanisms	Jan-17	TfGM	TfGM - BAU Activity	Increase Efficiency	N/A	VMS used for Clean Air Week to share Clean Air Messages, and for anti-idling campaign	on-going	N/A
27	(AQAP6.1) Plugged-in Places EV Charging Network;	Promoting Low Emission Transport	Other	Jan-18	TfGM	TfGM - BAU Activity	Improve Fleet	N/A	In December 2019, TfGM appointed a new operator (Electric Vehicle Charging Infrastructure Service Operator (EVCISP)) to deliver a 7-year EVCI Contract. This contract involves the transition of the GMEV network to a new brand that will be launched in Spring/Summer 2020. An announcement detailing the new operator will happen in Spring/Summer 2020. This will set out what is planned for GM's EVCI network in terms of expanding, upgrading and the transition to the future tariff arrangements. The EVCI Contract will be delivered in two main phases at varying stages of maturity aimed at expanding and upgrading the network. This comprises of: TfGM is engaging with all stakeholders (private and public) to suggest future charging locations that could be deployed by the new operator. TfGM has also recently been successful in securing £1.8 million of funding from the Office of Low Emission Vehicles (OLEV) Taxi Infrastructure Fund. This will allow the delivery of up to 160 taxi and PHV charging infrastructure points across Greater Manchester. GMEV network comprises of 151 double headed fast (7kw) charge points and 3 rapid chargers (50kW). GMEV accounts for approx. 50% of total charge points in GM Phase 1a) Early Measures Project -The project is funded following a successful bid to Government's Clean Air Plan 'early measures' fund. The successful application secured in £3m to expand the EV charging network; of which, £1.8m is funding 24 double headed rapid charging points to be installed in 2020 Phases 1b) Network Upgrade – working with our new operator a review of the network is being undertaken to identify which charge points will be replaced and upgraded, and which should be decommissioned. Phase 2) Growth of the GM EVCI network will be delivered through a range of projects delivered through a variety of public	on-going	N/A
28	(AQAP6.2) Car Use Allowances ;	Alternatives to private vehicle use	Other	Mar-17	LA's	District Budgets TBC	Reduce Traffic	N/A	Progress is described by district in the accompanying ASR report.	Progress is described by district	N/A

										in the accompanying ASR report.	
29	(AQAP6.3) Local Authority Parking Charges;	Traffic Management	Workplace Parking Levy, Parking Enforcement on highway	Jun-17	LA's	LA's	Reduce Traffic	N/A	Progress is described by district in the accompanying ASR report.	Progress is described by district in the accompanying ASR report.	N/A
30	(AQAP6.4) School Travel;	Promoting Travel Alternatives	School Travel Plans	Mar-17	TfGM & LA's	TfGM & LA - BAU Activity	Reduce Traffic; Increase Efficiency	N/A	TfGM continues working with schools on sustainable travel. Also worked with a number of schools for Clean Air Day. Quarterly Progress discussion with Air Quality Working Group. More information relating to each district's progress on this action is contained in the ASR main report.	on-going	N/A
31	(AQAP7.1) Website and Online Resources	Public Information	Via the Internet	May-17	TfGM	TfGM - BAU Activity	Reduce Traffic; Increase Efficiency; Improve Fleet	N/A	The www.cleanairgm.com has been completed and continues to operate. The website is also being used for the Clean Air Plan information and consultations. The Clean Air website in 2019 saw 114,052 users and 113,509 of those visitors were unique – showing the success the awareness raising activity had in getting new people onto the website to learn about the Clean Air plan in Greater Manchester. The average session duration of visitors on the website was 3.47 minutes, which is higher than the benchmark of 3 minutes provided by databox. This shows that visitors to the website were highly engaged in the content as well choosing to stay on the website longer to read our content.	Nov-18	N/A
32	(AQAP7.2) Online Route Finding;	Promoting Travel Alternatives	Personalised Travel Planning	N/A	TfGM	TfGM- BAU Activity	Reduce Traffic; Increase Efficiency	N/A	Discussions with app providers, but no product identified.	on-going	No suitable suppliers identified.
33	(AQAP7.3) Pollution Alert;	Public Information	Via other mechanisms	Fen-18	TfGM	TfGM- BAU Activity	Reduce Traffic; Increase Efficiency; Improve Fleet	N/A	Pollution alert service has been set up and can be signed up for https://cleanairgm.com/air-quality-data/forecast-and-alerts. Registered subscribers in each district. Contract with the supplier of this service has been extended. The forecasting and alert page on CleanAirGM is the second most visited page with 15.33% of all pageviews, with an average time on the page being 4.24 minutes.	On-going	N/A
34	(AQAP7.4) Health Effects of Air Pollution in Greater Manchester;	Public Information	Via the Internet	Jan-17	TfGM	PHE BAU	Reduce Traffic; Increase Efficiency; Improve Fleet	N/A	In 2019, PHE released Improving outdoor air quality and health: review of interventions. The document is a comprehensive overview of actions that national and local government and others can take to improve air quality and health. There are plans to audit the recommendations against GM action and this was initially done for the GMSF section on air quality.	on-going	N/A

									The PHE Air Quality economics tool is a resource allowing an assessment of the health impact and costs of air quality. TfGM has been supported to run some initial analyses using this tool.		
35	(AQAP7.5) Contingency Report Plan	Public Information	Other	N/A	TfGM	PHE BAU	Reduce Traffic; Increase Efficiency; Improve Fleet	N/A	A draft project was developed in consultation with primary care practices to create Clean Air Practices that would include providing advice to targeted patients around air quality alerts. This has been paused due to the Covid-19 response.	on-going	N/A
36	(AQAP7.6) TfGM Air Quality Team;	Other	Other	Jan-17	TfGM	TfGM- BAU Activity	Reduce Traffic; Increase Efficiency; Improve Fleet	N/A	TfGM continues to resource AQ expertise to support LA's and partners to focus on AQ and help meet GM objectives and strategies.	Ongoing	N/A
37	(AQAP7.7) Air Quality Monitoring Database;	Other	Other	Jun-17	TfGM & LA's	TfGM & LA's - BAU Activity	Reduce Traffic; Increase Efficiency; Improve Fleet	N/A	TfGM are collating all AQ data and maintaining the database. This data is now being published on the cleanairgm.com website.	on-going	N/A
38	(AQAP7.8) Traffic Flow Data;	Other	Other	Jan-17	TfGM	TfGM- BAU Activity	Reduce Traffic; Increase Efficiency; Improve Fleet	N/A	Contributes to the development of GM CAP	on-going	N/A
39	(AQAP7.9) Awareness Raising;	Public Information	Via other mechanisms	Mar-17	TfGM & LA's	TfGM & LA's - BAU Activity	Reduce Traffic; Increase Efficiency; Improve Fleet	N/A	Clean Air Week was held in June 2019, where TfGM, GMCA and LAs ran a number of events across GM. The objective of these activities was to raise awareness of the health impacts of air pollution and the action GM is taking to address the problem, and to encourage behaviour change; particularly for shorter journeys. Pollution Pods art installation at MediaCity, was in operation throughout the week - a walk through experience recreating air quality from different cities around the globe. An AQ toolkit for schools was developed in collaboration with Global Action Plan, and shared among local schools. A number of schools hosted mini PCSO campaigns to raise awareness of anti-idling. The first Cycling and Walking Commissioners summit in Manchester was held in Manchester, with active travel and air quality among the main topics of discussion. A number of other events were held across GM to encourage businesses and the wider community to consider sustainable travel.	on-going	N/A

2.3 $PM_{2.5}$ – Local Authority Approach to Reducing Emissions and/or Concentrations

As detailed in Policy Guidance LAQM.PG16 (Chapter 7), local authorities are expected to work towards reducing emissions and/or concentrations of $PM_{2.5}$ (particulate matter with an aerodynamic diameter of 2.5µm or less). There is clear evidence that $PM_{2.5}$ has a significant impact on human health, including premature mortality, allergic reactions, and cardiovascular diseases.

The EU has also set a target of a 20% reduction in urban background concentrations of $PM_{2.5}$ between 2010 and 2020.[6] Greater Manchester currently has 5 sites that monitor $PM_{2.5}$: Manchester Piccadilly; Manchester Sharston;[7] Salford Eccles; Salford M60; and Wigan Centre. Monitoring sites that have been in place for a number of years have showed an overall downward trend in $PM_{2.5}$ annual mean concentrations.

Apart from at the Piccadilly site, GM is compliant with the WHO annual standard of 10µg/m³, having shown a downward trend over the last 10 years. Therefore, actions aiming to reduce NO_2 concentrations have been prioritised. Many of the measures that will help achieve this will also be of some benefit in reducing greenhouse gases and particulates, which will be the focus over the longer-term.

Air quality impacts will need to be assessed for all major development schemes where an impact is likely, and mitigation measures implemented where necessary. IAQM's *Guidance on the Assessment of Dust from Demolition and Construction* has been adopted by GM local planning authorities in order to properly assess potential impacts from construction activity and implement appropriate mitigation controls consistently.

Designated under 1993 Clean Air Act legislation, each GM council has a Smoke Control Area in place, where only smokeless or 'authorised fuels' can be burnt unless they are being used in an 'exempt appliance'. The Councils mainly address breaches of this legislation through complaints systems, and seek to resolve issues informally in accordance with local authority enforcement policies across the region. Additionally,

[6] AQ Expert Group, Fine Particulate Matter in the UK https://uk-air.defra.gov.uk/assets/documents/reports/cat11/1212141150_AQEG_Fine_Particulate_Matter_in_the_UK.pdf

[7] $PM_{2.5}$ is usually monitored at Manchester Sharston, however the analyser is currently out of commission and awaiting replacement. It should be noted that $PM_{2.5}$ levels at this site have previously been well within legal limits since the site was set up in 2016 and have not exhibited any significant upward trend.

particulate concentrations will also see reductions through many of the actions which are featured in the Clean Air Plan and the Air Quality Action Plan.

In addition, local authorities investigate complaints and take enforcement action where necessary against smoke nuisance from bonfires. Advice is provided to local residents on disposing of garden and household waste as an alternative to burning.

Public Health Outcomes Framework Indicator 3.01 - Fraction of mortality attributable to particulate air pollution

In 2010 the Department of Health included an air quality indicator based on annual average background concentrations of $PM_{2.5}$ in the Public Health Outcomes Framework (PHOF). Population exposure to anthropogenic (man-made) $PM_{2.5}$ is used as the basis of PHOF indicator 3.01. This indicator measures the percentage of all deaths in people aged 30 and over in a single year that is attributable to long-term exposure to current levels of $PM_{2.5}$. Concentrations of man-made (rather than total) $PM_{2.5}$ are used as the basis of this indicator because estimates based on total $PM_{2.5}$ could give a misleading impression of the extent to which potential policy interventions could have an impact on this measure. The data is presented as 'Fraction of mortality attributable to particulate air pollution' and is updated annually. The latest available dataset is for 2018.

Background annual average $PM_{2.5}$ concentrations for the year of interest are calculated using a computer dispersion model, based on a 1km x 1km grid. The dispersion model is calibrated using measured concentrations taken from background sites in Defra's Automatic Urban and Rural Network (http://uk-air.defra.gov.uk/interactive-map).

Expressing the mortality effect associated with long-term exposure to current levels of air pollution in this way allows comparisons to be made between different areas. In 2017, it is estimated that approximately 4.3% of deaths each year in Greater Manchester are attributable to exposure to man-made $PM_{2.5}$ particulate air pollution. The average figure for Greater Manchester is slightly lower than the England average (5.1%), but similar to the North West region average (4.1%).

It is important to note that these deaths are not individually attributed to air pollution, but instead it is an estimated measure of how many deaths air pollution contributes to. Individuals will have other contributory causes such as respiratory or cardiovascular disease.

By using the PHOF indicator for the percentage of deaths attributable to $PM_{2.5}$, it is possible to estimate the number of deaths attributable to air pollution in Greater Manchester, and in turn the number of life years lost to the local population (by estimating the average years these people would have lived if they had not died prematurely due to long term exposure to particulate air pollution). However, it is recognised that there is a high degree of uncertainty in making these estimates.

The percentage and number of attributable deaths due to exposure to man-made $PM_{2.5}$ for each Greater Manchester district in 2018 is shown in the following table, provided by Public Health England Northwest.

Table 2.3 - An estimate of the attributable deaths and years of life lost in Greater Manchester based on 2018 data

Greater Manchester District	Number of deaths (age 25+)	Percentage of attributable deaths due to exposure to man-made $PM_{2.5}$ (PHOF indicator 3.01)	Estimated number of attributable deaths due to exposure to man-made $PM_{2.5}$
Bolton	2559	4.6	118
Bury	1798	4.5	81
Manchester	3480	4.8	167
Oldham	2085	4.5	94
Rochdale	2027	4.4	89
Salford	2157	4.8	104

Stockport	2666	4.4	117
Tameside	2177	4.6	100
Trafford	1959	4.5	88
Wigan	3165	4.4	139
Greater Manchester	**24073**	**4.6**	**1107**

The table above shows that Manchester, Salford and Tameside had the highest percentage fraction of mortality attributable to particulate air pollution in 2018. It is estimated that there were approximately 1,107 attributable deaths due to exposure to man-made $PM_{2.5}$.

Further information on the PHOF indicator is available from the Public Health England website:

https://fingertips.phe.org.uk/profile/public-health-outcomes-framework/data#page/3/gid/1000043/pat/6/par/E12000002/ati/101/are/E08000006

The Committee on the Medical Effects of Air Pollutants (COMEAP) has concluded that evidence associating NO_2 with health effects has strengthened substantially in recent years. COMEAP is currently considering how to quantify the mortality effects associated with long-term average concentrations of NO_2.

Further information on $PM_{2.5}$ in Greater Manchester can be found in Section 3.2.3, and further information on measures that Greater Manchester is taking to address $PM_{2.5}$ can be found in Section 2.2.1 ‘ASR Responses’.

3 Air Quality Monitoring Data and Comparison with Air Quality Objectives and National Compliance

3.1 Summary of Monitoring Undertaken

3.1.1 Automatic Monitoring Sites

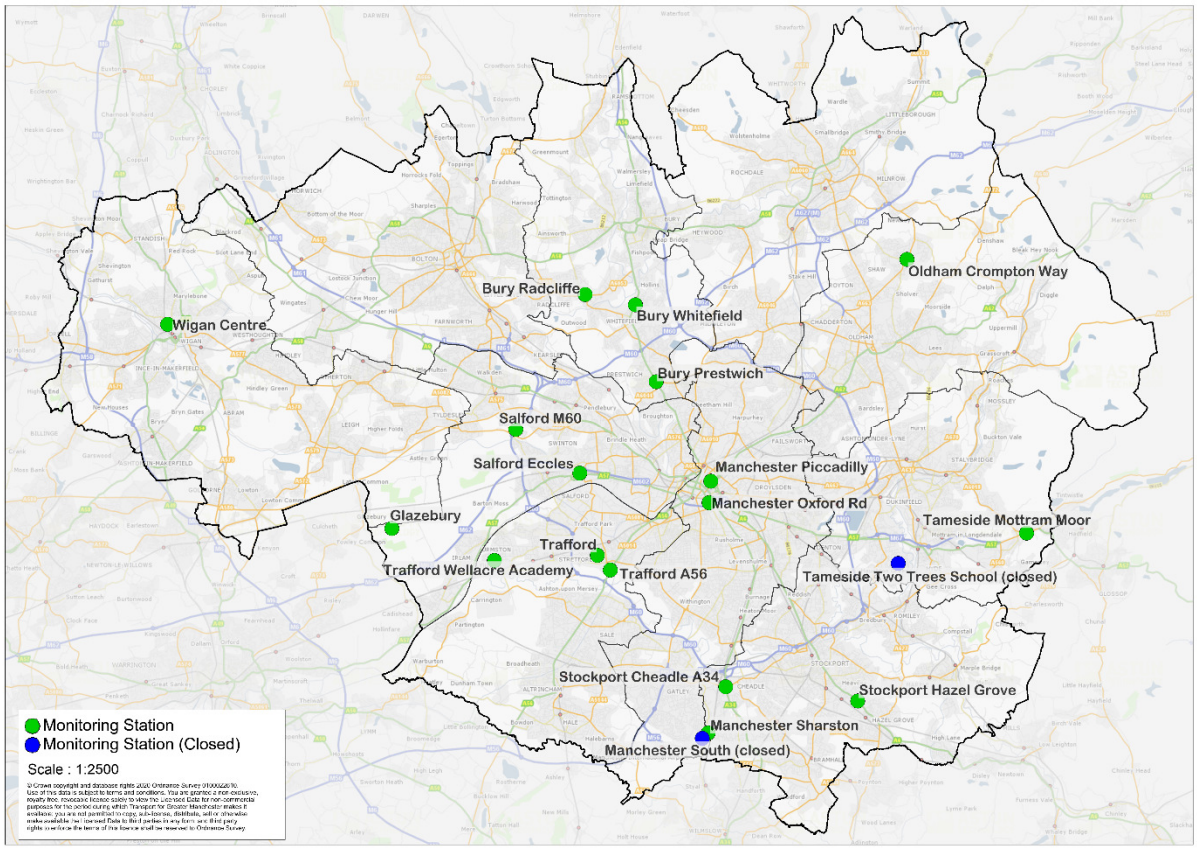
This section sets out what monitoring has taken place and how it compares with national air quality objectives.

Greater Manchester undertook automatic (continuous) monitoring at 17 sites during 2019. Table A.1 in Appendix A shows the details of the sites.

N.B. Local authorities do not have to report annually on the following pollutants: 1, 3 butadiene, benzene, carbon monoxide and lead, unless local circumstances indicate there is a problem.

A map showing the location of automatic monitoring sites are below, and also at this link. Further details on how the monitors are calibrated and how the data has been adjusted are included in Appendix C.

Figure 3.1. Map of Automatic Monitoring Stations



3.1.2 Non-Automatic Monitoring Sites

Greater Manchester undertook non-automatic (passive) monitoring of NO_2 at 400 sites during 2019. **Error! Reference source not found.** in Appendix A shows the details of the sites.

Maps showing the location of the monitoring sites are provided at this link and in Appendix D of this report. Further details on Quality Assurance/Quality Control (QA/QC) for the diffusion tubes, including bias adjustments and any other adjustments applied (e.g. "annualisation" and/or distance correction), are included in Appendix C.

3.2 Individual Pollutants

The air quality monitoring results presented in this section are, where relevant, adjusted for bias[8], "annualisation" (where the data capture falls below 75%), and distance correction[9]. Further details on adjustments are provided in Appendix C. Trend data tables and graphs are provided in Appendix A.

3.2.1 Nitrogen Dioxide (NO_2)

Annual Mean Concentrations

Automatic Monitoring Site Results:

Table A.3 in Appendix A compares the ratified and adjusted monitored NO_2 annual mean concentrations for the past 5 years with the air quality objective of 40µg/m^3. Note that the concentration data presented in Table A.3 represents the concentration at the location of the monitoring site, following the application of bias adjustment and annualisation, as required (i.e. the values are exclusive of any consideration to fall-off with distance adjustment).

For diffusion tubes, the full 2019 dataset of monthly mean values is provided in Appendix B. Note that the concentration data presented in Table B.1 includes distance corrected values, only where relevant.

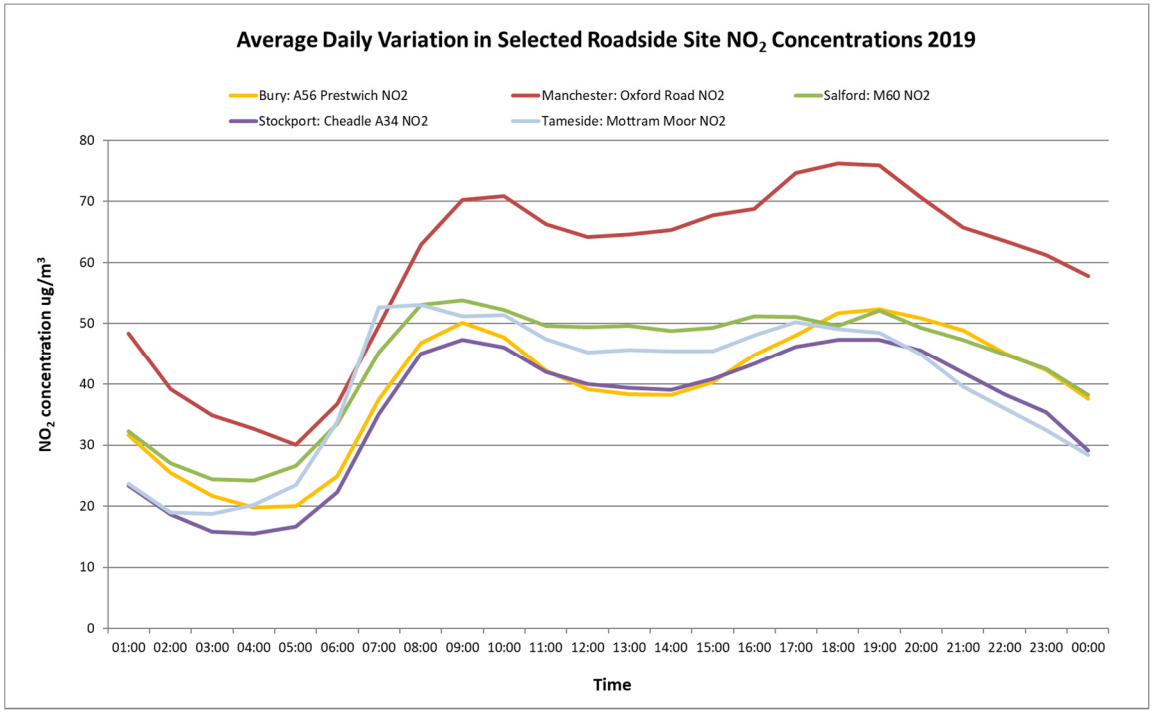
0Table A.4 in Appendix A compares the ratified continuous monitored NO_2 hourly mean concentrations for the past 5 years with the air quality objective of 200µg/m^3, not to be exceeded more than 18 times per year.

Greater Manchester Diurnal Concentrations

[8] https://laqm.defra.gov.uk/bias-adjustment-factors/bias-adjustment.html
[9] Fall-off with distance correction criteria is provided in paragraph 7.77, LAQM.TG(16)

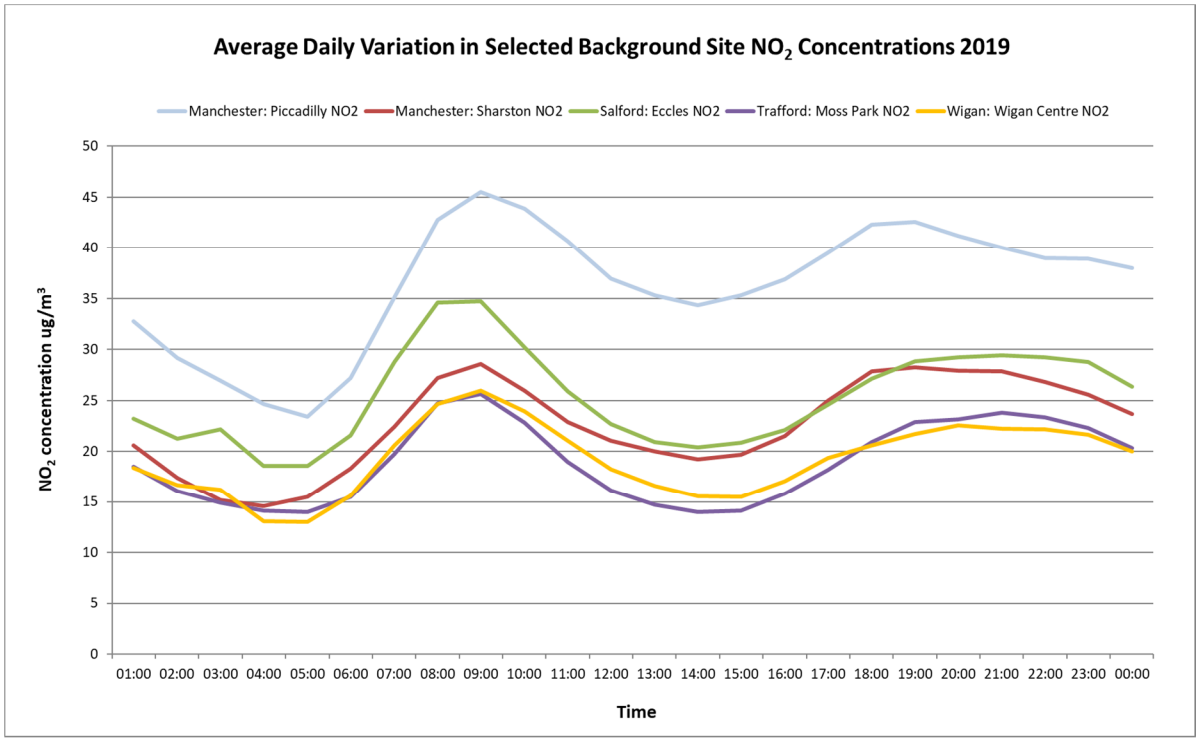
As with other urban areas, the significant change in NO_2 concentrations throughout the day across Greater Manchester is greatly influenced by traffic. This is reflected in Figures 3.2 and 3.3 below, which displays the diurnal trends at various sites across Greater Manchester, divided by Roadside and Urban Background site type.

Figure 3.2 Selected Roadside Site Diurnal NO_2 Concentrations 2019



Most monitoring sites show a similar trend - a peak in NO_2 concentrations occurs in the AM between 08:00 and 09:00. Another evening peak occurs from approximately 17:00 to 19:00. These peaks appear to correspond with commuting traffic peak times, although additional atmospheric conditions may impact these results. The Tameside Mottram Moor and Salford M60 sites show a flatter evening peak, reflecting that they are constantly busy with traffic from the morning until late in the evening.

Figure 3.3 Selected Background Site Diurnal NO_2 Concentrations 2019



Most monitoring sites show a similar trend - a peak in NO_2 concentrations occurs in the AM at approximately 08:00. Another evening peak occurs from approximately 17:00 to 19:00. These peaks correspond to commuting traffic peak times.

134 Diffusion Tubes that were active in 2018 have seen a decrease in 2019. 224 saw an increase.

Detailed analyses and discussion of automatic and non-automatic NO_2 site monitoring and results is presented below by district.

Bolton Metropolitan Borough Council

At the start of 2019 new diffusion tube sites were set up in Bolton, these are in locations close to roads that were identified as exceeding the air quality objectives through the development of the Greater Manchester Clean Air Plan. The sites were located close to where there is relevant human exposure for the annual mean objective. Annual average concentrations are available from 12 sites, as they are new sites it is not possible to identify any trends. The new sites have concentrations ranging from 29 µg/m^3 to 40 µg/m^3. The sites that are 40 µg/m^3 are Topp Way (BOA110), which is a roadside site next to a dual carriageway on the outskirts of the Town Centre and Sharman Street (BOA106), which is a residential terraced street that runs parallel to the A666, St Peter's Way (a 50 mph dual carriageway). Other new sites which are close to the air quality objective are Derby Street (BOA112) (39.2 µg/m^3), a road side

site near a retail park on the outskirts of the town centre and Ruth Street/St Georges Road (BOA106) (35.7 µg/m^3), which is located at the roadside of a single carriageway road.

Of the sites that were in place before 2019 five sites had concentrations over 40 µg/m^3. These were Quintins, Derby Street, Bolton (BO3); Outside the Red Lion, A6 Salford Road, Over Hulton (BO69); The Northbound Exit of Junction 4 M61 (BO71); Turton Street (BO73) and Kay Street (BO74) which are sites close together at the exit of the A666 St. Peters Way. The sites are all very close to busy road and with the exception of Quintins (BO3) are near to road junctions / crossroads where they will be influenced by emissions from more than one road and queueing traffic.

There were an additional 5 sites (7 sites including the 2 new sites referred to above) where concentrations were between 35 and 40 µg/m^3. These are Astley Bridge Clinic (BO15) at 39.9 µg/m^3 , White Horse Tavern, Westhoughton (BO41) at 35.4 µg/m^3, Beehive Roundabout, Horwich (BO43) at 35.5 µg/m^3, Primrose Street, Farnworth (BO61) at 37.2 µg/m^3, Blackburn Road nr Asda, Astley Bridge (BO66) at 36.7 µg/m^3. Each of the sites are close to junctions of busy roads and will be influenced by queueing traffic and emissions from more than one road source.

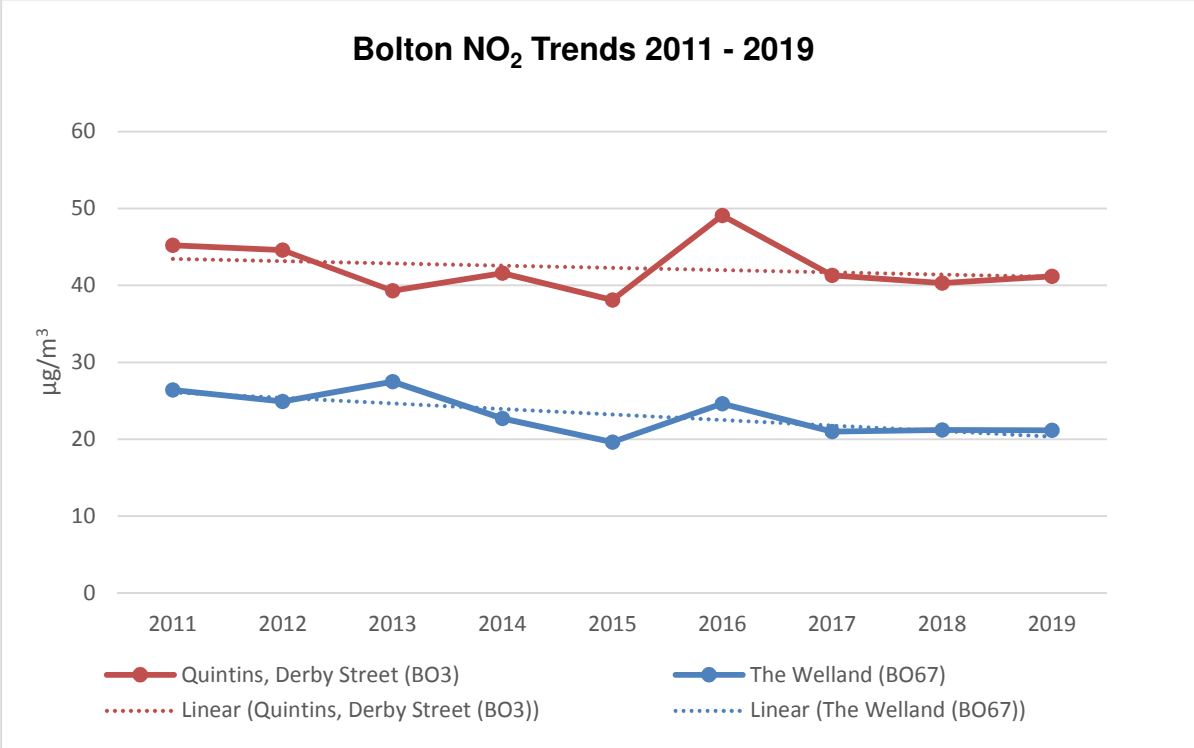
The remainder of the sites are all below 35 µg/m^3, 26 sites in total (20 existing sites and 6 sites newly set up in 2019). As might be expected sites further away from busy roads have lower concentrations, with some background sites having concentrations below 20 µg/m^3.

Between 2018 and 2019 some sites saw an increase in concentrations and some a slight decrease, the sites where levels increased are spread throughout the borough at both background and roadside sites and it has not been possible to identify any specific causes why the levels have not decreased. Overall trends in concentrations are downwards, the Graph below shows the concentrations from two representative sites, one roadside and one background from 2011 until 2019. The trendline shows that concentrations at both sites have decreased over the period, although perhaps not by as much as would have been anticipated in 2011.

All the sites that are outside the AQMA (7 in total) are significantly below 40 µg/m^3. A precautionary approach was taken when declaring the AQMA and it was declared

along the modelled 35 µg/m^3 contour line. There are 14 sites within the AQMA where monitored concentrations are below 30 µg/m^3 as well as further 13 sites when levels are between 30 and 40 µg/m^3. All the sites (7 in total) that are above 40 µg/m^3 are within the AQMA. It would appear that the AQMA extends to areas where the air quality objectives are not at risk of being exceeded, however there are locations where the air quality objectives are not being met. As such the focus of the air quality work in Bolton and the rest of Greater Manchester is the development of the GM Clean Air Plan, which will address those exceedances. As a result, it is the intention to review the AQMA once the GM Clean Air Plan is implemented.

Figure 3.4 NO_2 Pollution Trends 2011-2019 in Bolton



During 2020 a new real-time site will be set up on Derby Street near Bolton University Campus on the outskirts of the town centre. This site has been identified as it is close to sites identified as exceeding the air quality objectives through the target determination work for the GM Clean Air Plan, it is also close to sites (BO3 and BO112) where diffusion tube concentrations are exceeding or close to exceeding the air quality objectives.

Bury Metropolitan Borough Council

Automatic Monitoring

It is good to note that all automatic monitoring sites are below the annual mean objective for Nitrogen dioxide. This is reassuring as all sites are on major A roads. However, it is noted that the nitrogen dioxide result for our Prestwich site is just above last year's and only just below the objective. It will be important to monitor this result next year to see if this upward trend continues.

We have 2 exceedances of the hourly mean for nitrogen dioxide at our Whitefield site. However, the actual hourly mean objective for nitrogen dioxide allows for 18 exceedances per year so this doesn't represent an exceedance. This is an unusual result for this site and something we will monitor over the next twelve months.

Diffusion Tubes

In 2019 we expanded our diffusion tube network from 9 to 19 sites. This expansion followed the Target Determination work which was carried out by Transport for Greater Manchester following the direction from the Government to produce a plan to meet nitrogen dioxide targets in the shortest time possible. The Target Determination work identified those area in Greater Manchester that were expected to breach objectives persistently over the coming years. We decided to widen our diffusion tube monitoring to adequately cover those areas identified. This would allow us to assess the air quality in these areas and monitor progress towards meeting nitrogen dioxide targets. 2019 was the first year of this wider monitoring network

From the results we can see that following the application of a bias correction factor that the following 6 monitoring sites had results suggesting a breach of the nitrogen dioxide target:

Figure 3.5 Bury Diffusion Tube Exceedances in 2019

Monitoring Site	NO_2 µg/m3 (2019 AM)
BU 11 Moorgate Bury	41.3
BU12 Rochdale Road	49.8
BU13 Rochdale Road Bury	49.7
BU15 A 56 Bury New Road Whitefield	46.6
BU16 A 56 Bury New Road Whitefield	46.8
BU 19 Balmoral Avenue Whitefield (at the side of the M60 Whitefield)	42.1

With the exception of BU 19 all these sites were identified in the Target Determination as requiring further action to meet nitrogen dioxide targets. BU 15 and 16 are close together adjacent to the A56 close to Junction 17 of the M60 and BU 11, 12 and 13 are on routes leading from central Bury. The sites were expected to breach the objective level and the actions proposed in our Clean Air Plan including a Greater Manchester wide Clean Air Zone will aim to tackle these exceedences.

It was noted that BU4 was marginally below the objective at 39.2µg/m3. This tube is also close to the A56 and Junction 17 of the M60 close to BU 15 and 16. Action under the Clean Air Plan should reduce these levels also.

BU19 is on a residential street immediately adjacent to the M60 between Junctions 17 and 18 and therefore concentrations would be expected to be high. Highways England have been asked to look at persistent exceedances on the motorway network. However, we are not aware that they have been asked to take action in relation to this section. It is hoped that the action we take in implementing a Clean Air Zone in Greater Manchester will have a positive impact on emissions at this location.

Manchester City Council

Automatic Monitoring Results

Manchester Oxford Road: Nitrogen dioxide (NO_2) and PM_{10} are measured at this site, and NO_2 levels during 2019 continued to exceed the annual mean objective (AMO). The NO_2 hourly level complies with national limits. Levels of NO_2 have reduced since the introduction of the Oxford Road 'bus gate' scheme in early 2017, and further details of this scheme are included in the diffusion tube section below. Demolition and construction works have been taking place since 2012 at the former BBC site (now known as Circle Square), located directly opposite the monitoring station and, despite the implementation of air quality mitigation measures during construction and operational phases, these works and associated additional vehicle movements (particularly heavy goods vehicles) may have influenced concentrations of air pollutants measured at the site. Trends will continue to be monitored at the site following completion of the Circle Square development.

Manchester Piccadilly Gardens: NO_2, PM_{10} and $PM_{2.5}$ are measured at this site and levels of these pollutants are below legal limits here. During 2019 there were slight

increases in NO_2 and $PM_{2.5}$. Reasons for these slight changes are unknown, and could be related to the vehicle fleet profile in the vicinity of the site, but trends here will continue to be monitored.

Manchester Sharston: NO_2 and PM_{10} were measured at this site during 2019 ($PM_{2.5}$ monitoring here is currently suspended due to analyser breakdown) and levels for both pollutants remain below legal limits here. During 2019 there was a slight decrease in NO_2 (1 µg/m³ change) and PM_{10} levels remained static.

Nitrogen Dioxide Diffusion Tube results

Manchester City Council (MCC) carried out NO_2 diffusion tube monitoring at a total of 32 sites during 2019. Full results for the diffusion tubes are included in the appendices of the report, and a discussion of trends for site types is provided below:

- **Kerbside:** For the thirteen sites of this type, there are twelve results available for comparison with previous years (the thirteenth was a new addition set up in 2019). For these sites there was an average decrease in NO_2 concentrations between 2018 and 2019 (-2.5%) and also from 2014 levels (-8.2%).
- **Roadside:** For the ten sites of this type, there are five results available for comparison with previous years (the additional sites were set up in 2019). For these sites there was an average decrease in NO_2 concentrations between 2018 and 2019 (-3.1%) and also from 2014 levels (-5.0%).
- **Urban Centre:** For the three sites of this type, there was an average increase in NO_2 concentrations between 2018 and 2019 (+1.2%) and a slight decrease from 2014 levels (-0.6%). The only site with a notable increase (Hewitt Street, Tube 77) was possibly influenced by a large amount of construction works and additional large goods vehicle movements in the area (including Owen Street Towers at Deansgate Square, 10-12 Whitworth Street West, and Axis Tower on Albion Street), although air quality mitigation measures were implemented at these construction sites. Works related to the Ordsall Chord rail link (a bridge connecting Manchester Piccadilly, Oxford Road and Victoria stations, intended to increase capacity, ease congestion and provide a direct service through to Manchester Airport) may have previously impacted results at the site as elevated concentrations of NO_2 were recorded during the works in 2016. The link opened in 2017, and levels at the monitoring site reduced during that year but increased again during 2018-19. The operation of the rail link may also be

contributing to NO_2 in the area, and trends at the site will be monitored. Of the two other Urban Centre sites, one saw a decrease for both time periods (Chethams School, Tube 26), and the other (Manchester Piccadilly Gardens, average of Tubes 59-61, co-located with a continuous monitor) experienced a slight increase between 2018 and 2019 (+0.5%) and a significant decrease from 2014 levels (-10.1%). Hewitt Street was the only Urban Centre site to exceed the AMO.

- **Urban Background**: For the five sites of this type, there was an average increase of 0.3% in NO_2 concentrations between 2018 and 2019, and an average decrease of 2.3% since 2014. Three sites saw a decrease and, of the two sites that increased, one is situated in the vicinity of the M56 motorway (Firbank Road, Tube 8a) and the other (Peaceville Road, Tube 81) has a low concentration with a slight increase (22.0 to 23.1 $\mu g/m^3$), a trend which will be monitored.
- **Suburban Industrial:** There is one site of this type (Manchester Sharston, average of Tubes 90-92, co-located with a continuous monitor), and a decrease in NO_2 diffusion tube concentrations was measured both between 2018 and 2019 (-6.7%) and also from 2015 (-16.0%) when the site was established.
- **Air Quality Management Area (Manchester area) sites:** There are a total of twenty-one NO_2 diffusion tube monitoring sites located within the Manchester portion of the Greater Manchester AQMA, and sixteen of these are available for comparison with previous years (the additional sites were set up in 2019). There was an average decrease in concentrations of this pollutant at these sites between 2018 and 2019 (-2.3%) and also from 2014 levels (-7.2%). Approximately 43% of tube monitoring sites within this area do not exceed the AMO.
    - **AQMA City centre sites:** There are eight sites located within the City centre, which is entirely within the AQMA. There was an average decrease in concentrations at these sites between 2018 and 2019 (-1.8%) and also from 2014 levels (-10.8%). Two of the sites do not exceed the AMO (Piccadilly Gardens and Chethams School).
    - **Other AQMA sites:** There are thirteen sites located outside of the City centre and within the AQMA (Manchester area). Eight of these are available for comparison with previous years (the additional sites were

set up in 2019). There was an average decrease in concentrations at these sites between 2018 and 2019 (-2.8%) and also from 2014 levels (-4.4%). Six of the thirteen sites do not exceed the AMO.

No sites outside of the AQMA (Manchester area) recorded exceedances of the AMO in 2019.

Hotspot Actions

The Air Quality Action Plan includes a number of measures designed to address the previous general trend for deteriorating air quality, particularly as a result of road traffic. An update on these measures is provided further below, and provided here are specific actions that are reducing, or intending to reduce, levels of air pollution at specific locations of concern, or 'hotspots':

- **Oxford Street (Tube 29a):** Whilst the NO_2 diffusion tube concentration at this site remains significantly elevated above the AMO in 2019 (55.4 µg/m^3), there was a significant decrease between 2018 and 2019 (-6.8%) and also from 2014 levels (-11.7%). This site is between sections of the Oxford Road 'bus gate' area introduced in early 2017, whereby general traffic is prohibited between 6am and 9pm, 7 days a week, and NO_2 levels at the site are likely to have reduced as a result of this scheme. It should however be noted that the site is close to the Manchester Piccadilly to Oxford Road mainline railway and will be influenced by emissions from this source as well as from road traffic emissions.
- **Oxford Road (average of Tubes 82-84, co-located with a continuous monitor):** Whilst the NO_2 tube concentration at this site remains significantly elevated above the AMO in 2019 (51.3 µg/m^3), there was a decrease between 2018 and 2019 (-3.9%) and also significantly from 2014 levels (-18.4%). This trend is also reflected in the continuous monitoring results. The site is located within the Oxford Road 'bus gate' and this scheme appears to have significantly contributed to the 9.4% reduction in NO_2 levels observed at the site since the introduction of vehicle restrictions in 2017. As mentioned above in relation to the Oxford Road continuous monitoring site, it is also possible that results here have been temporarily adversely influenced by the works at the former BBC site and this will be monitored.
- **Stockport Road (Tube 75):** Whilst the NO_2 concentration at this site remains significantly elevated above the national objective in 2019 (47.0 µg/m3), there

was a slight decrease between 2018 and 2019 (-1.7%) and from 2014 levels (-2.1%). The slight improvement at this site is possibly due in part to the introduction of hybrid buses several years ago along this route. Current road layout works to address 'pinch point' areas along this route are also expected to result in more free-flowing traffic and less congestion, leading to further improvements in air quality at this site and along the A6 Stockport Road arterial route.

- **Great Ancoats Street (Tube 71):** Measurements over the last few years indicate that concentrations are significantly reducing at this site, with levels falling from 51.2 µg/m^3 in 2016 to 45.3 µg/m^3 in 2019 (-2.9% between 2018 and 2019, and -4.4% from 2014 levels). The closure of the Central Retail Park on Great Ancoats Street in 2018 has likely contributed to this decrease, and road layout improvement plans for this route, which forms part of the Manchester Salford Inner Relief Route (MSIRR), are expected to result in more free-flowing traffic and less congestion, leading to further improvements in air quality in this area.
- **Angel Street (Tube 88):** Monitoring indicates that concentrations of NO_2 are decreasing at this site, with significant reductions between 2018 and 2019 (-4.5%) and also from 2014 levels (-15.5%). The concentration measured in 2019 was 45.2 µg/m^3. The road forms part of the MSIRR and has also been in the centre of a large amount of development in recent years, including lane closures, with further developments planned (particularly Angel Gardens and Northern Gateway proposals). Traffic congestion has now been alleviated and, although air quality mitigation measures are required for any future developments, trends at this site will continue to be monitored.
- **Ardwick Green (Tube 96):** A significant exceedance of the AMO was measured at this site in 2019 (46.0 µg/m^3). This site was established in 2019, therefore no trends are currently available but will be reviewed in future years. The school located adjacent to this monitoring site, identified as the nearest sensitive receptor, participated in a university research project in 2019 to determine the optimum hedge species mix for trapping and absorbing pollution and measuring the improvement in air quality at four school sites in Manchester. The results of the project are awaited at the time of writing, but could possibly result in additional planting around the school perimeter in order to reduce

exposure of pupils to air pollution, although it should be noted that the Council's diffusion tube is sited outside of the school boundary, and NO_2 levels within the school grounds are not currently measured by MCC.

- **Princess Street (Tube 24):** Whilst levels of NO_2 at this site remained static from 2018 to 2019 (40.7 µg/m^3), and just exceeded the AMO, concentrations have significantly reduced from 2014 levels (-19.0%). Between 2014 and the introduction of the new Second City Crossing (2CC) Metrolink tram line in early 2017, which includes Princess Street within its route, levels at this site were between 45-55 µg/m^3. The reduction in NO_2 levels since 2017 is -9.9%, indicating that the Metrolink is mainly responsible for this improvement.

It is also anticipated that further improvements will result from the Clean Air Plan work.

Oldham Metropolitan Borough Council

Four additional Nitrogen Dioxide tubes were introduced into Oldham's network in 2019 following specific requests from local members and members of the public concerned about air quality. This brought the total number of tubes across the Borough to 20. None of the new tubes introduced in 2019 measured levels above the 40µg/m^3 calendar year limit value set in the Regulations. Out of the 20 locations monitored in 2019 using diffusion tubes in Oldham, there was just one location which was above this limit value, this was a tube on Hollins Road (A6104), Failsworth. This tube is close to the junction with Cardigan Road. It's annual reading for 2019 was 40.6 µg/m^3 i.e. just above the limit value. Levels of the Nitrogen Dioxide impacting this tube are likely to be affected by the M60 and the slip road serving the anticlockwise direction of the M60 which is only 65 metres from the tube. The nearest house to this tube is approximately 15 metres away, so the tube may not reflect the actual levels at the houses, however there are some homes even closer to the M60 than the tube in this area. This introduction of the Clean Air Plan for Greater Manchester should reduce levels at this site to below the limit value.

In terms of examining trends in levels of Nitrogen Dioxide in Oldham we have been monitoring at two sites with diffusion tubes for the past nine years. Both sites are urban background areas. The graphs below show the levels at each site with a trend line added.

Figure 3.6 Mellor St, Oldham - Diffusion Tube Results 2011-2019

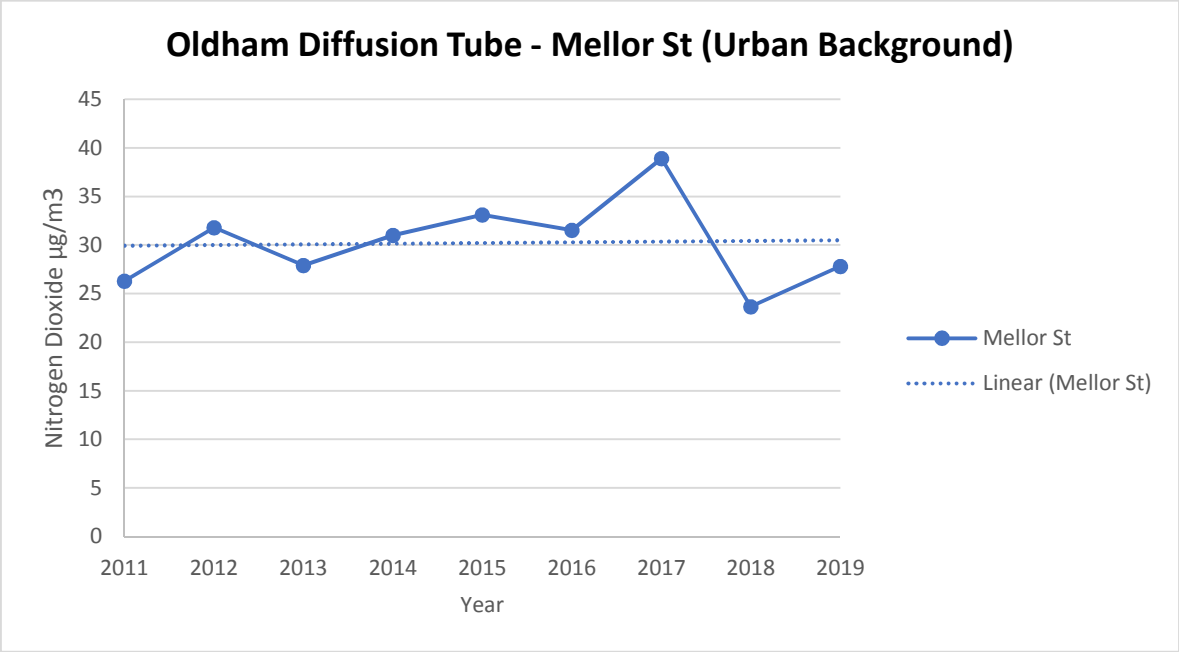
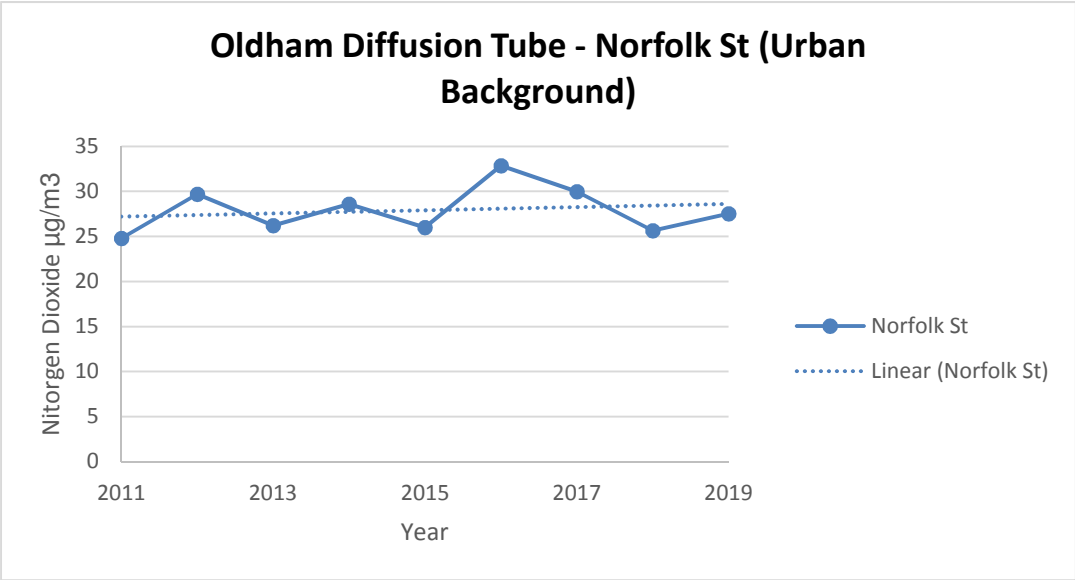


Figure 3.7 Norfolk St, Oldham - Diffusion Tube Results 2011-2019



Both the above graphs appear to show that the urban background levels of Nitrogen Dioxide have been consistent over the past 11 years with a very slight increase showing on the trend line.

To examine potential trends in levels of Nitrogen Dioxide close to roads we have examined levels at two roadside sites where we have diffusion tube results for the past 4 years. They are shown below with a trend line added.

Figure 3.8 Rochdale Road, Oldham - Diffusion Tube Results 2011-2019

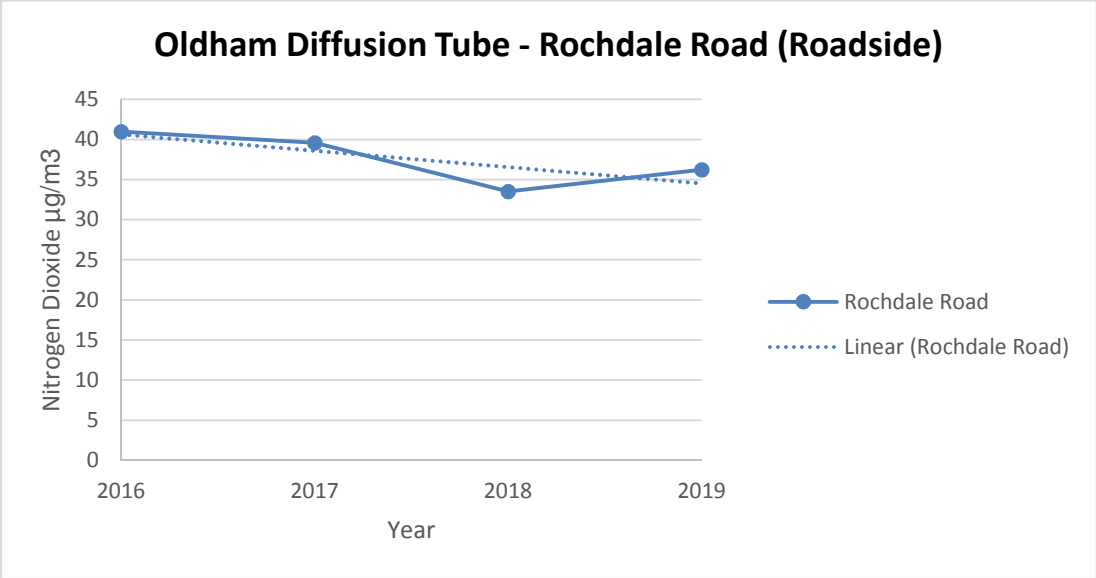
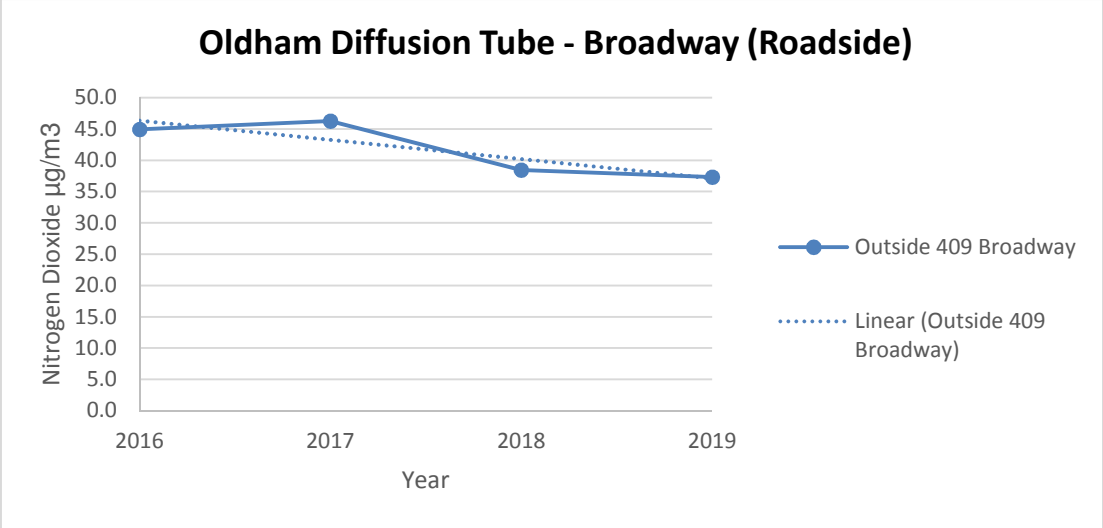


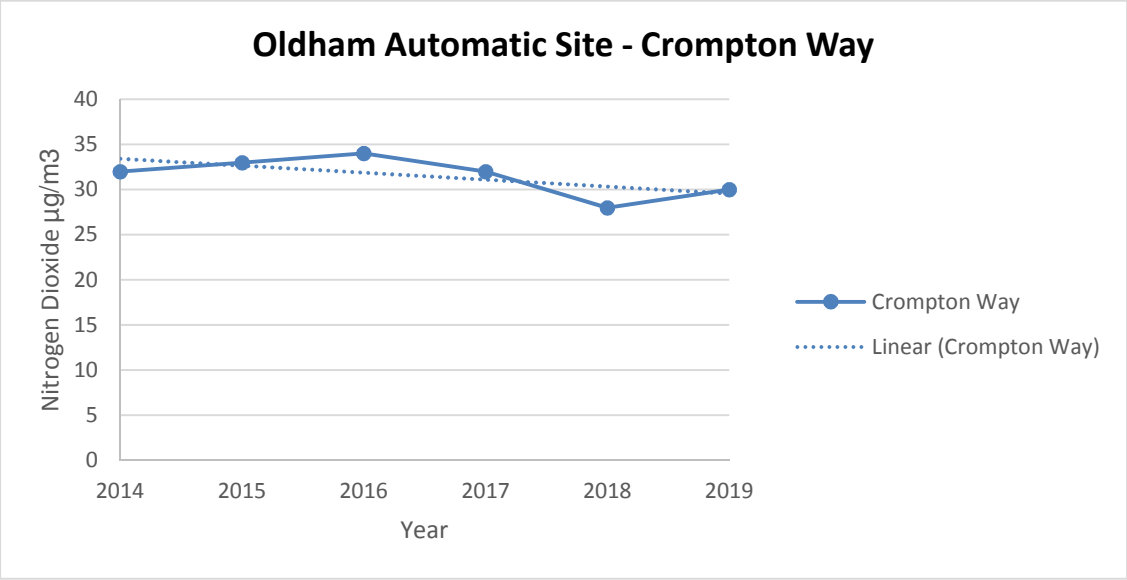
Figure 3.9 Broadway, Oldham - Diffusion Tube Results 2011-2019



Both roadside sites appear to show a gradual trend in reducing levels of Nitrogen Dioxide to levels below the limit value of 40µg/m^3 at both sites.

Oldham Council also has a real time Nitrogen Dioxide situated on the roadside at Crompton Way in Shaw. This has been monitoring since 2014. Below is a graph of the annual average levels of Nitrogen Dioxide recorded at this site with a trend line.

Figure 3.10 Crompton Way, Oldham – Automatic Site 2014-2019



Like the two diffusion tube sites, the real time monitor is tending to show a steady decrease in the roadside levels of Nitrogen Dioxide over the last six years.

In terms of the hourly limit value of 200µg/m^3 not to be exceeded more than 18 times a calendar year, none of the Nitrogen Dioxide tubes measured monthly results greater than 60µg/m^3 which is generally considered indicative that the hourly limit value was not exceeded at any monitoring site in 2019. At the real time monitoring station this limit value was also not exceeded in 2019 as it hasn't been in any previous year since 2014 when monitoring there began.

Rochdale Metropolitan Borough Council

Rochdale does not currently have a continuous monitoring station therefore all the pollution data is from diffusion tubes (DT) monitoring for NOx. There are 26 DT situated around the borough, 6 new tubes were added at the beginning of 2019, with the removal of one tube.

5 tubes show exceedances over 40ug/m3, all except one is located within the AQMA. Three of these tubes are new, including the one outside the AQMA.

10 tubes show an exceedance above 35ug/m3, at which the AQMA was declared. Four of these exceedances are new tubes, of which two are located outside the AQMA.

In 2017 and 2018 four tubes consistently exceeded maximum concentrations, one of these was moved (11) at the beginning of 2019 to a location closer to receptors (26),

however as this tube shows similar results we can assume this is representative of pollution in the area.

Salford City Council

Automatic monitoring sites:

3 automatic air quality monitoring sites in Salford measure NO_2 (Eccles – Urban Background, M60 - Roadside and Glazebury – Rural Background).

At the Eccles monitoring site, the 2019 annual mean NO_2 concentration was the same as in 2018 (both years had an annual mean concentration of 25 ug/m^3).

At the M60 monitoring site, the 2019 annual mean NO_2 concentration was slightly elevated compared to 2018 (44 ug/m^3 in 2019 compared to 41 ug/m^3 in 2018).

At the Glazebury monitoring site, the 2019 annual mean NO_2 concentration was also slightly elevated compared to 2018 (15 ug/m^3 in 2019 compared to 14 ug/m^3 in 2018).

However, the last 5 years of monitoring data has shown an overall downward trend in annual mean NO_2 concentrations at the Eccles and M60 monitoring sites. This downward trend has been particularly noticeable at the M60 site (2015 annual mean NO_2 concentration = 52 ug/m^3). Annual mean NO_2 concentrations at the Rural Background Glazebury site have remained relatively stable over the last 5 years.

There were no exceedances of the annual mean national air quality objectives for NO_2 at the Eccles and Glazebury monitoring sites. Only the M60 monitoring site exceeded the annual mean national air quality objective for NO_2. There were no exceedances of the hourly NO_2 national air quality objective at any of these monitoring sites.

Diffusion tube monitoring sites:

In 2019, there were 48 NO_2 diffusion tube air quality monitoring sites operating in Salford, including those sites that are co-located with automatic monitoring sites for bias adjustment purposes. Nine diffusion tube sites were added into the Salford air quality monitoring network (SA73 to SA81), in response to GM Clean Air Plan dispersion modelling predicted persistent exceedances at these locations. All of the

new sites are within the current Greater Manchester Air Quality Management Area (AQMA). One monitoring site was re-located (SA67 Sanderson Close) to a residential property closer to the M60 motorway to represent a worse case exposure location for the annual mean NO_2 air quality objective. The new re-located site is SA80 Hawthorne Drive.

36 diffusion tube monitoring sites were not co-located with an automatic monitoring site and had annual mean results available for 2018. Of these, 17 had reduced annual mean concentrations in 2019 compared to 2018. Eighteen had an increase in annual mean concentrations in 2019 compared to 2018. The monitoring site that recorded the largest increase in annual mean concentration in 2019 compared to 2018 was SA68 Walkden High Street (2018 annual mean NO_2 = 44.9 ug/m^3, 2019 annual mean NO_2 = 50.6 ug/m^3). The monitoring site that recorded the largest decrease in annual mean concentration in 2019 compared to 2018 was SA60 Regent Road (2018 annual mean NO_2 = 40.7 ug/m^3, 2019 annual mean NO_2 = 36.7 ug/m^3). Major roadworks close to this location were carried out in 2019 along Regent Road to improve signalling and traffic flow along the route, along with cycling and pedestrian crossing infrastructure improvements.

In 2019, there were no diffusion tube sites located outside of the AQMA that recorded annual mean NO_2 concentrations above the annual mean air quality objective. Only 1 diffusion site located outside of the AQMA recorded an annual mean NO_2 concentration exceeding 35 ug/m^3 (SA17 Langley Road, 2019 annual mean concentration = 38.9 ug/m^3).

Of the nine new diffusion tube monitoring sites added into the Salford air quality monitoring network during 2019, most recorded annual mean concentrations close to or above 35 ug/m^3, which is consistent with the AQMA. The only exception to this was SA80 Hawthorne Drive, which recorded a 2019 annual mean NO_2 concentration of 30.1 ug/m^3.

Where longer term trends are available for roadside monitoring sites within the AQMA, there is a general downward trend in concentrations over time. This trend is also apparent for Urban Background monitoring sites.

Stockport Metropolitan Borough Council

Non automatic data

Within Stockport there are now 35 Nitrogen Dioxide (Nox) tubes (5 new ones were added at the beginning of 2019) with 22 in the AQMA. Of these 22, only two are showing an exceedance of the 40 ug/m^3 limit.

12 of the tubes within the AQMA show an exceedance of 35 ug/m3 (the threshold for the AQMA) but no tubes outside the AQMA show an exceedance of this figure.

In 2017 Stockport only had 30 tubes 9 of which exceeded the 35 threshold and only 7 of these still exceed the 35 figures in 2019.

Of the 5 new tubes that were located in areas predicted to exceed 35, 4 do exceed with one exceeding 40 ug/m3 but obviously not enough data to see if there is any trend in these locations.

The overall trend for the Stockport data shows a downward trend in Nox readings across the Network. In 2017 there were 8 tubes showing over 40 ug/m3 and in 2019 of the 30 comparable tubes there is only 1.

Automatic Monitoring data

Stockport carries out automatic monitoring data at two locations, Hazel Grove A6 and Cheadle A34. Both sites monitor for Nitrogen oxides and Pm10.

The Hazel Grove site had shown a slight increase in NO_2 in 2018 but this has reduced again in 2019 and the overall trend shows an improvement in levels of NO_2.

The Cheadle site shows a slight reduction in NO_2 from 2018 and the overall trend is down.

Neither of the sites had exceedances of the hourly mean.

Tameside Metropolitan Borough Council

All of the diffusion tubes located outside of the current Air Quality Management Area (AQMA) have shown a general downward trend in annual concentrations during the period 2011 to 2019. There are no recorded instances of increasing nitrogen dioxide

concentrations at monitored locations outside the AQMA, although sites TA59, TA60, TA61 and TA62 have only been in place for two years and there is insufficient data for these sites to undertake an analysis.

All monitoring locations outside of the currently declared AQMA are recording annual average nitrogen dioxide concentrations below the annual air quality objective of $40\mu g/m^3$.

Diffusion tubes located inside the current AQMA are, on the whole, also showing downward trends in annual average nitrogen dioxide concentrations. The exceptions to this trend are sites T3, T14 and T17 where there has been some considerable yearly variation (up to $5\mu g/m^3$) with no real observable trend up or down in annual concentrations.

There are currently 12 sites within the current AQMA where annual average concentrations have been consistently below the air quality objective of $40\mu g/m^3$.

10 new sites (TA49 to TA48) were specifically deployed at the beginning of 2018 to gather data along a series of road links of concern between the M60 and Ashton town centre. At the time of writing a new automatic station monitoring oxides of nitrogen and particulate matter has been procured and is waiting installation at a location along this route. Seven of the 10 diffusion tube sites have shown exceedances of the $40\mu g/m^3$ annual average air quality objective for Nitrogen Dioxide in either one or both years these sites have been active. It is envisaged that the Greater Manchester Clean Air Plan (GM CAP), which includes a class C chargeable clean air zone (to be implemented following direction by the government) will address these and other exceedances once it comes in to operation.

One other area of concern are the exceedances at sites T11, T21 and T47 and the automatic monitoring station on Mottram Moor, which are located along the Strategic Road Network (SRN) taking high volumes of trans Pennine traffic through the Longdendale Valley villages of Mottram and Hollingworth towards Manchester and beyond. Currently these SRN links are not covered by the proposed CAZ, essentially allowing traffic to travel through already highly polluted areas of Tameside without having to comply with the proposed GM CAP. The SRN is controlled by Highways England who have not been directed to improve air quality on their network within the timeframes set out for local authorities. A local bypass has already been approved,

which will involve de-trunking some of the SRN along this route but it will not be completed within the timescales set by the government directive. At the time of writing Tameside and TfGM are in discussion with JAQU to seek a way to progress the issues around these SRN links.

Trafford Metropolitan Borough Council

The key areas of concern around air quality in Trafford are based around the air quality management area that has been declared for nitrogen dioxide. The AQMA is located predominantly in the north of the borough and includes Junctions 8, 9 and 10 of the M60 motorway that are located within Trafford. The M60 is an orbital route that encompasses Greater Manchester with annual average weekday traffic flows over 200,000 and is often congested at peak times. Other key areas include Trafford Park which is a major industrial centre for the Greater Manchester area and the Trafford centre which is a large out of town shopping centre which attracts over 30m visitors each year.

These locations have residential receptors located close by and the impacts on air quality from vehicle usage and industrial emissions are matters which the Council must take into account at all opportunities.

The predominant source of pollution within the Trafford Borough is nitrogen dioxide from traffic.Trafford Council monitors nitrogen dioxide using 3 continuous monitors and there are 16 passive diffusion tube locations.

The general overall trend within Trafford is decreasing levels of nitrogen dioxide over the last 5 years. In 2019 all monitoring stations presented levels of nitrogen dioxide below the national objective, both annual and hourly levels.

All diffusion tubes locations in 2019 confirmed levels of Nitrogen Dioxide that were below national objective levels.

Wigan Metropolitan Borough Council

Wigan Council introduced an additional 3 diffusion tubes in 2019 bringing the total number deployed by the council to 95.

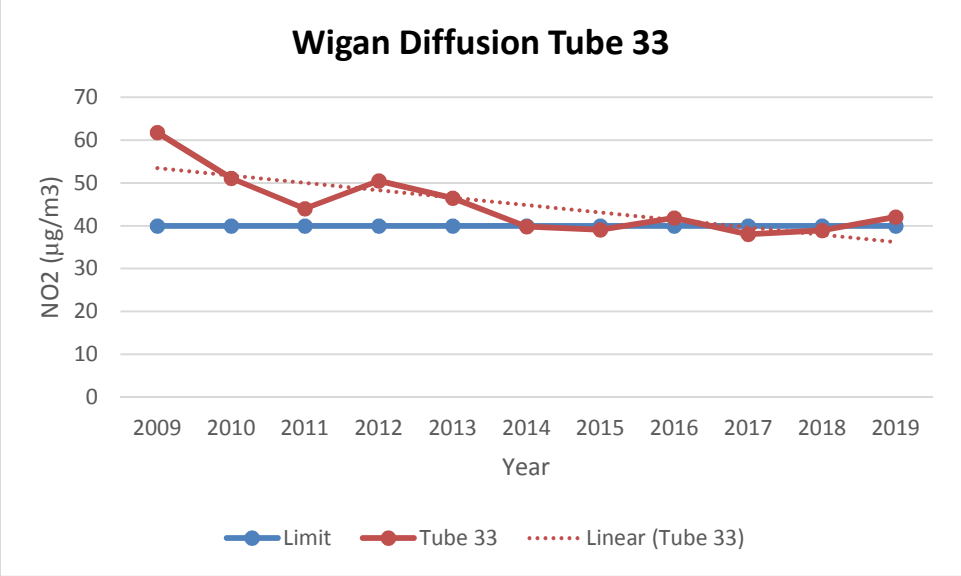
Of the 95 diffusion tubes deployed by Wigan Council 7 returned annual mean results that were above the 40µg/m^3 legal limit value.

Figure 3.11 Wigan Diffusion Tube Exceedances 2019

Tube Number	Annual Mean (µg/m^3)	Location Address	Site Type
33	42.1	Ince Methodist Church, Manchester Road, Ince, WN1 3HF	Roadside
119	43.0	Southgate, Wigan	Roadside
129	58.2	668 Warrington Road, Worsley Mesnes	Roadside
150	41.4	2-4 Wigan Road, Hindley	Roadside (in a junction)
178	46.1	22 School Lane, Standish	Roadside
180	57.9	Winwick Lane	Roadside (on a house)
186	40.7	King Street West C	Roadside (by railway platform)

Diffusion Tube number 33 is a roadside site located on the A577 on the side of the road leading into Wigan town centre. This tube is located within an AQMA.The long-term tread for this tube is reducing levels of nitrogen dioxide, as shown below:

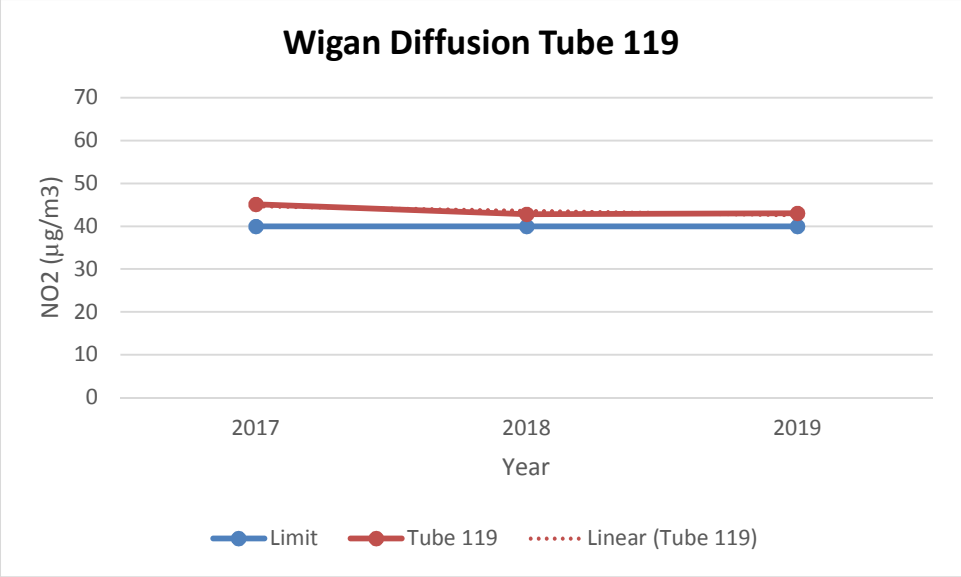
Figure 3.12 Wigan Diffusion Tube 33



Tube 119 was introduced in 2017 along a newly constructed stretch of road called Southgate. This new road was designed to reduce congestion on a busy stretch of road along the A49 where the road became single carriageway in order to pass under a railway line; the new road removed this pinch-point improving traffic flow.

Although we have limited data for this site it can be seen that the trend is a reduction in nitrogen dioxide levels.

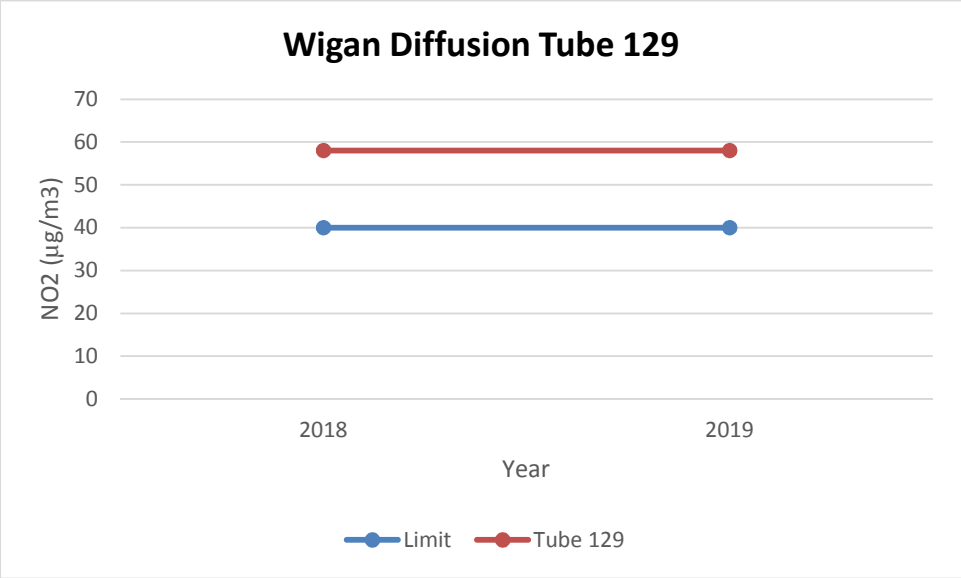
Figure 3.13 Wigan Diffusion Tube 119



Tubes 129, 150 and 178 were introduced in 2018 as part of Wigan Council's initiative to increase the amount of monitoring that was undertaken in the borough.

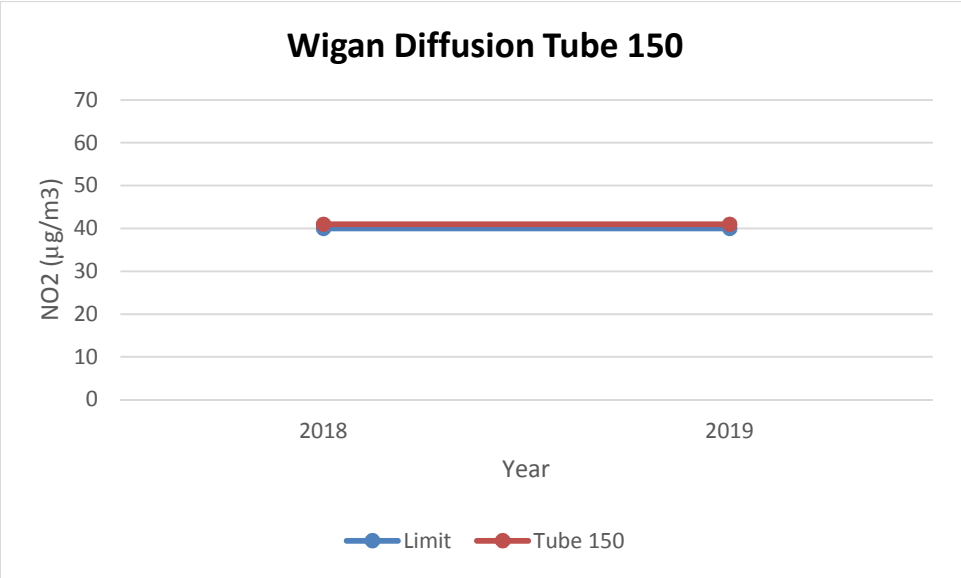
Tube 129 is located on a dual carriage stretch of the A49 between Wigan Town centre and Junction 25 of the M6 motorway on the southbound carriageway. 2019 levels remained the same a 2018 at 58 µg/m^3. It is within an AQMA.

Figure 3.14 Wigan Diffusion Tube 129



Tube 150 is located in the centre of Hindley on the junction of the A577 and the A58. The levels recorded at this tube location remained constant at 41 µg/m^3. It is within an AQMA.

Figure 3.15 Wigan Diffusion Tube 150



Tube 178 is located just to the west of Standish town centre, approximately 120 metres from a traffic light-controlled cross-roads. It is not within an AQMA, however, there are AQMA 'bubbles' close by on this stretch of road, see map below. Measured NO_2 levels for this tube location increased from 42µg/m^3 to 46µg/m^3.

Figure 3.16 Wigan Diffusion Tube 178

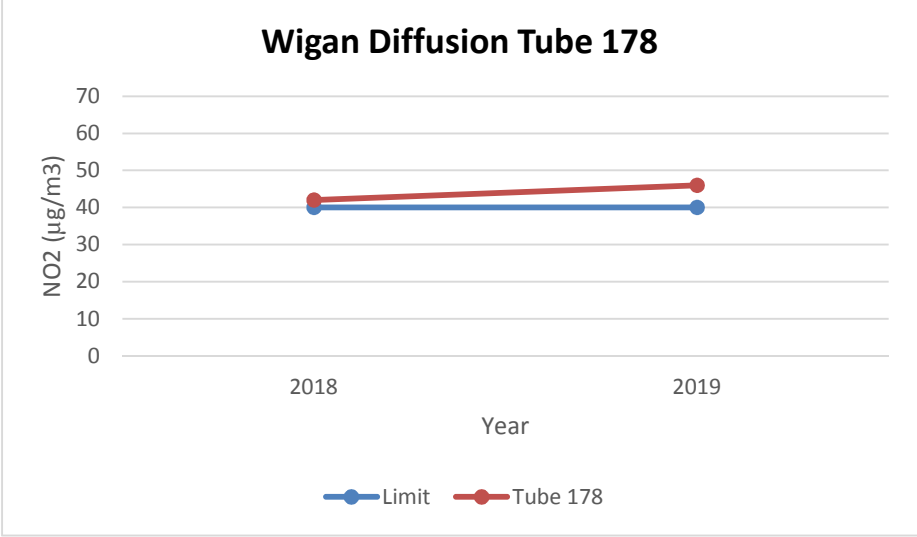


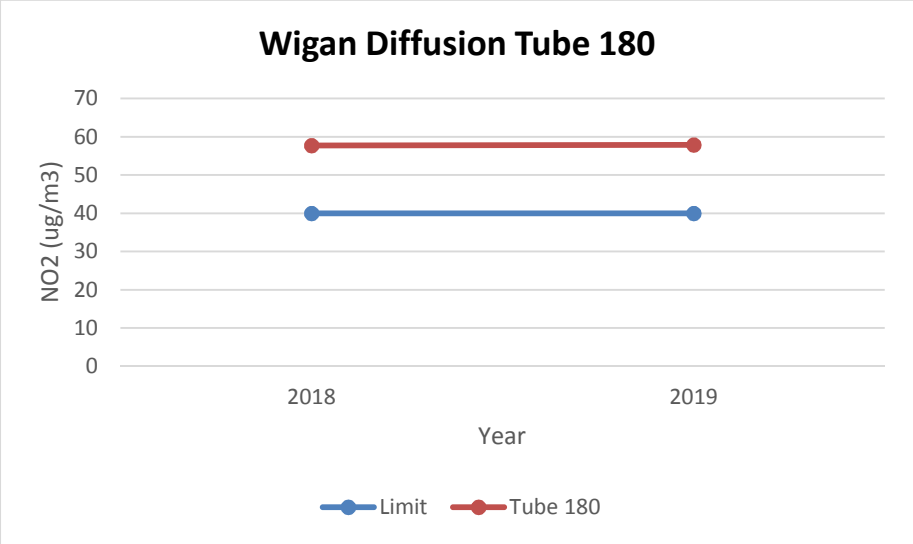
Figure 3.17 Map of Standish AQMA and Tube 178

Tube 180 was introduced in 2018 in response to concerns about pollution levels that was raised by local residents. This tube is located on the front façade of a house on Winwick Lane, Lowton, (the A579) at a location where standing traffic is present for large parts of the day. This particular road forms a short-cut between the M6 at junction 22 and the A580 East Lancashire Road in Lowton.

Levels at this location have increased slightly in 2019 when compared with 2018, going from 57.7µg/m^3 57.9µg/m^3, an increase of 0.2µg/m^3 although this is well within the margin of error associated with this measurement method.

With annual mean measurement at this level it is unlikely that the hourly mean is being exceeded, according to DEFRA's TG16 document. It is not within an AQMA.

Figure 3.17 Wigan Diffusion Tube 180



The maps below show the road layout in this area.

Figure 3.18 Map of Diffusion Tube 180 and Surrounding Road Layout

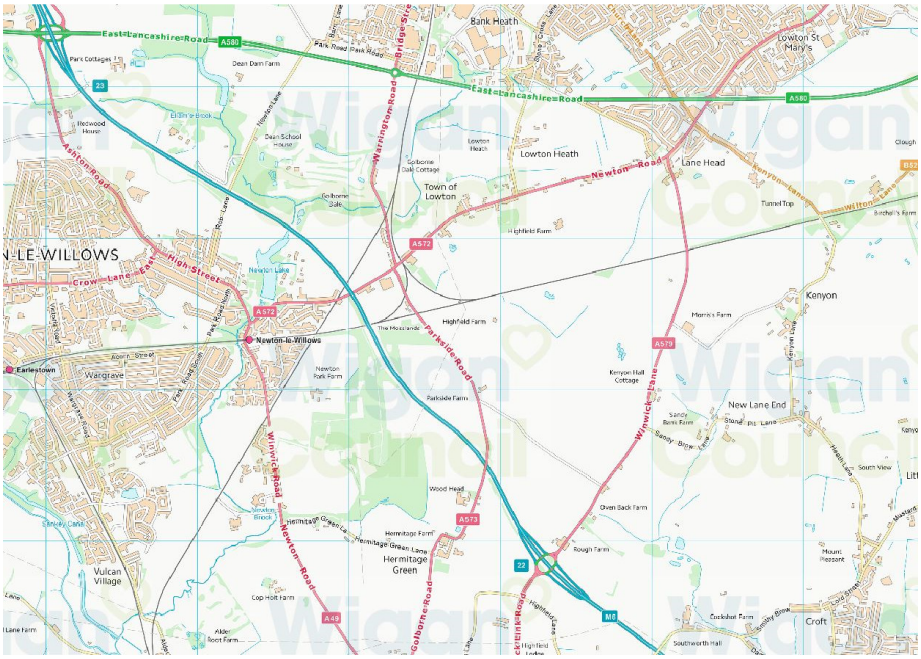


Figure 3.19 Map Showing Diffusion Tube 180 Location

Options aimed at reducing nitrogen dioxide concentrations in this location that have been discussed include:

1) Redesigning the road layout so that the traffic lights at the junction of Winwick and Newton Road are removed; it is likely that there would still be queuing traffic outside the properties on Winwick Lane during rush hours but may eliminate the queue out site rush hours.

2) Introduce a weight restriction to limit the number of HGVs using the route. An experimental south-bound weight restriction has been trailed, however, a proposed north-bound weigh restriction has received objections from, amongst others, Warrington Council and without their support it is not feasible to introduce a northbound weight restriction due to the southern part of the road being in Warrington Borough.

3) Introduce an AQMA in this area; this option has not been progressed since the last ASR as other options were being considered, including the Greater Manchester-wide Clean Air Zone.

Tube 186 was introduced in at the end of 2018 and so 2019 is the first year that an annual average is available for this location. It was introduced to monitor pollution levels in one of the four areas identified by modelling as not being compliant. It is

located on King Street West at a location that may be affected by fumes from diesel trains at Wigan Wallgate train station, where the Manchester-bound line is below.

The annual mean for 2019 was 40.7µg/m^3 which is slightly above the legal limit. It is within an AQMA.

Figure 3.20 Map of Diffusion Tube 186

87 of the 88 tubes that recorded NO_2 levels below the legal limit in 2019 provided annual mean results. The exception being one tube was deployed in November and two months data cannot be annualised into an annual mean value.

Of these 54 NO_2 diffusion tubes recorded increased levels of NO_2 in 2019 when compared with 2018, 12 NO_2 diffusion tubes recorded the same level of NO_2 in 2019 when compared with 2018 and 7 NO_2 diffusion tubes recorded decreased levels of NO_2 in 2019 when compared with 2018.

Those that showed increased levels recorded an average increase of 2.8µg/m^3 whilst those that showed a decrease recorded an average decrease of 1.97µg/m^3.

Automatic Air Quality Monitoring Station Data – Wigan Centre

Wigan Centre is Wigan Council's urban background continuous (automatic) monitoring station. It is located in the grounds of the Deanery High School on Frog Lane, as short distance from Wigan town Centre.

It is affiliated to the AURN. Pollutants measured are nitrogen dioxide, particulate matter (PM10, PM2.5) and ozone.

The NO_2 and particulate analysers were both replaced in 2019, the particulate analysers being upgraded from TEOMs to FIDAS instruments.

Figure 3.21 Wigan Automatic Monitoring Data

Pollutant	Annual Average	No. of Exceedances	Data Capture (%)
NO_2 (µg/m^3)	19	0	97
PM10 (µg/m^3)	16	0	53*/64**
PM2.5 (µg/m^3)	10	n/a	96
Ozone (µg/m^3)	46	12	99

* Data capture from FIDAS (excluding TEOM data)

** Data capture from TEOM (excluding FIDAS data)

NB: there was an overlap period when both the TEOM and FIDAS PM10 analysers were operation, hence, the data capture is in excess of 100% if added together.

It can be seen that all four pollutants monitored at Wigan centre complied with the objectives set out in the air quality regulations, with the exception of the number of occasions ozone was recorded above 100 µg/m^3 which was 12 times against an objective of not more than 10 times, whenmeasureed as a running 8-hour mean. However, ozone is considered to be a transboundary pollutant and is therefore beyond the control of Wigan Council.

A nitrogen dioxide concentration of 19µg/m^3 is higher than the 17µg/m^3 that was recorded in 2018.

3.2.2 Particulate Matter (PM_{10})

Table A.5 in Appendix A compares the ratified and adjusted monitored PM_{10} annual mean concentrations for the past 5 years with the air quality objective of 40µg/m^3.

Table A.6 in Appendix A compares the ratified continuous monitored PM_{10} daily mean concentrations for the past 5 years with the air quality objective of 50µg/m^3, not to be exceeded more than 35 times per year.

The diurnal trend of PM_{10} is distinct from the trend displayed for NO_2 in Figure 3.2. Most monitoring sites show a similar trend – PM_{10} concentrations remain high after the morning peak, gradually reducing over the course of the day. The peak in PM_{10} concentrations occurs from appoximately 08:00. At the Bury A56 Prestwich site, there appears to be a second peak at around 20:00.

Figure 3.22 Selected Roadside Diurnal PM10 concentrations

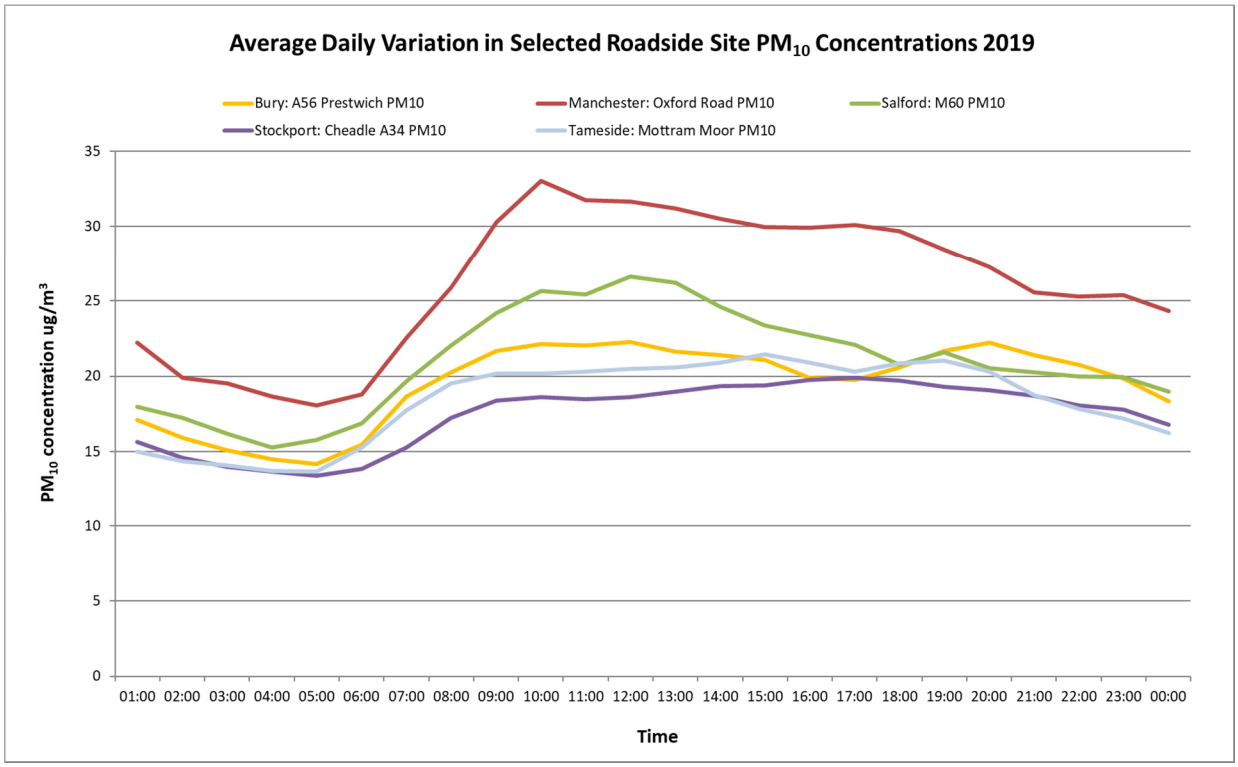
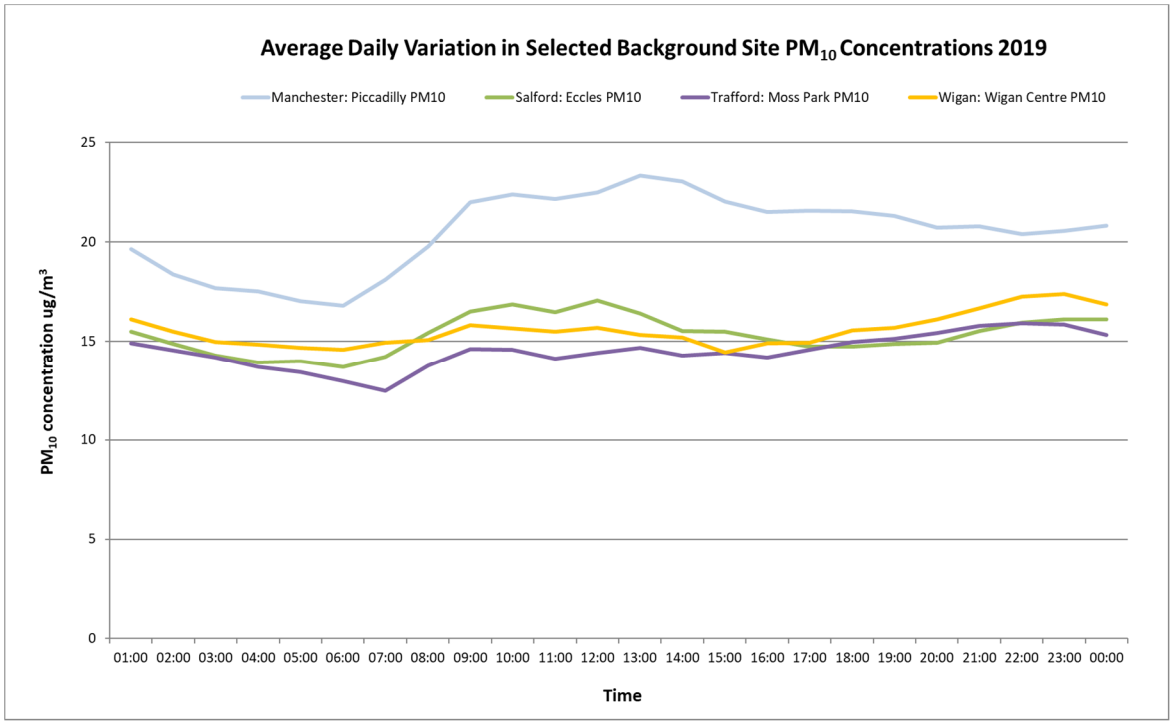


Figure 3.23 Selected Background Diurnal PM10 Concentrations



At the background sites, the monitoring sites show a similar trend for the early part of the day - a peak in PM_{10} concentrations occurs in the AM at approximately 09:00. At the Manchester Piccadilly and Salford Eccles sites, this peak continues until approximately 14:00.

However, at the Salford Eccles site, this tends to decline from approximately 11:00 until approximately 20:00. A smaller peak in concentrations is observed from approximately 22:00 to 01:00.

At the Trafford Moss Park site, PM_{10} concentrations tend to gradually increase throughout the day up until approximately 22:00.

Bury Metropolitan Borough Council

All automatic monitoring sites continued to record annual mean average concentrations of PM_{10} below the annual mean objective. An increase of 2 µg/m³ was recorded at the Bury Whitefield site in 2019; the Prestwich annual mean concentration remained static at 19 µg/m³, while the Radcliffe site saw a reduction of 1 µg/m³ to 17 µg/m³.

Manchester City Council

PM_{10} is measured at Oxford Rd, Piccadilly Gardens and Sharston Automatic Monitoring Stations. PM_{10} levels at all three comply with relevant national objectives. On Oxford Rd, particulate levels have reduced since the introduction of the Oxford

Road 'bus gate' scheme in early 2017, and further details of this scheme are included in the diffusion tube section above.

The reason behind a slight increase in PM_{10} (1 µg/m^3) at Piccadilly is unknown, and could be related to the vehicle fleet profile in the vicinity of the site, but trends here will continue to be monitored. PM_{10} levels remained static at the Sharston site.

Oldham Metropolitan Borough Council

The real time monitoring station on Crompton Way also measures levels of PM_{10}. The calendar year average for PM_{10} in 2019 was measured at 18.5µg/m^3 while the maximum 24-hour mean measured was 79µg/m^3. The number of days 50µg/m^3 for PM_{10} was exceeded at the station in 2019 was 9, therefore both limit values for PM_{10} (average not to exceed 40µg/m^3 in the calendar year and daily 50µg/m^3 more than 35 times in a calendar year) were not exceeded at the monitoring station.

Salford City Council

2 air quality monitoring sites in Salford measure PM_{10} particulate matter (Eccles – Urban Background and M60 - Roadside).

At the Eccles monitoring site, the 2019 annual mean PM10 concentration decreased slightly from the 2018 annual mean concentration (15 µg/m3 in 2019 compared to 17 µg/m3 in 2018).

At the M60 monitoring site, the 2019 annual mean PM10 concentration was slightly elevated compared to 2018 (21 µg/m3 in 2019 compared to 20 µg/m3 in 2018).

The last 5 years of monitoring data has shown an overall downward trend in annual mean PM_{10} concentrations at the Eccles monitoring site (2015 annual mean PM_{10} concentration = 18 µg/m3). Annual mean PM_{10} concentrations at the M60 site have remained relatively stable over the last 5 years.

There were no exceedances of either the annual mean or 24-hour national air quality objectives at these monitoring sites.

Stockport Metropolitan Borough Council

The PM_{10} figure at both sites shows a reduction from the 2018 figure, and 0 sites had more than 35 occurrences of the daily mean.

Tameside Metropolitan Borough Council

Currently particulates are only monitored at one location in Tameside at the automatic monitoring station on Mottram Moor. The station monitors for PM10 and results are well below both the annual average and daily objectives set out in the legislation. A further particulate monitor measuring both PM_{10} and $PM_{2.5}$ has been procured and will be installed at a location along the A635 link between the M60 and Ashton town centre as discussed above.

Trafford Metropolitan Borough Council

Particulate matter (PM_{10}) is measured at two sites within Trafford. In 2019 levels recorded at both continuous monitoring sites were below did not exceed any national

Recorded annual levels of PM_{10} were the same in 2019 and 2018.

New BAM particulate matter monitors have been installed in Trafford in 2019.

Wigan Metropolitan Borough Council

The PM_{10} level of 16µg/m^3 at Wigan Central is lower than the 17µg/m^3 that was recorded in 2018.

3.2.3 Particulate Matter ($PM_{2.5}$)

Table A.7 and Figure A.5 in Appendix A presents the ratified and adjusted monitored $PM_{2.5}$ annual mean concentrations for the past 5 years.

Manchester City Council

During 2019 there was an increase of 1 µg/m3 in $PM_{2.5}$ at Piccadilly Gardens. Reasons for these slight changes are unknown, and could be related to the vehicle fleet profile in the vicinity of the site, but trends here will continue to be monitored.

Salford City Council

2 air quality monitoring sites in Salford measure $PM_{2.5}$ particulate matter (Eccles – Urban Background and M60 - Roadside). At the Eccles monitoring site, the 2019 annual mean $PM_{2.5}$ concentration decreased slightly from the 2018 annual mean concentration (9 µg/m3 in 2019 compared to 11 µg/m3 in 2018). At the M60 monitoring site, the 2019 annual mean $PM_{2.5}$ concentration was the same as in 2018 (both years had an annual mean concentration of 10 ug/m3).

Over the last 5 years, annual mean $PM_{2.5}$ concentrations have remained relatively stable at the Eccles site. Annual mean $PM_{2.5}$ concentrations are available for the last 3 years at the M60 monitoring site – again, concentrations have remained relatively stable over this period.

There were no exceedances of the annual mean national air quality objective at these monitoring sites.

In addition to progress with actions contained in the Greater Manchester Air Quality Action Plan, Salford City Council investigated 84 complaints related to smoke nuisance in 2019, and therefore this will have a beneficial effect on reducing local particulate matter concentrations.

Wigan Metropolitan Borough Council

For $PM_{2.5}$ an annual mean concentration of 10µg/m^3 was recorded in 2019 at the Wigan Centre automatic site, which is an improvement on the 12µg/m^3 that was recorded in 2018.

3.2.4 Sulphur Dioxide (SO_2)

Table A.8 in Appendix A compares the ratified continuous monitored SO_2 concentrations for 2019 with the air quality objectives for SO_2.

There were no exceedances of of the 15-minute, 1-hour or 24-hour Objective for SO_2 in Greater Manchester in 2019.

Appendix A: Monitoring Results

Table A.1 - Details of Automatic Monitoring Sites

Site ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA?	Monitoring Technique	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Inlet Height (m)
BURY	Bury Whitefield	Roadside	380637	406974	NO2 PM10	YES	Chemiluminescent & FDMS	24	7	3.5
BUR2	Bury Prestwich	Roadside	381650	403222	NO2 PM10	YES	Chemiluminescent & TEOM/BAM(3)	15	2.5	1.5
BUR1	Bury Radcliffe	Roadside	378190	407480	NO2 PM10	YES	Chemiluminescent & TEOM/BAM(3)	10	2.5	1.5
GLAZ	Glazebury	Rural	368758	396031	NO2 O3	YES	Chemiluminescent & UV absorption	132	1370	3
MAN1	Manchester Oxford Rd	Kerbside	384233	397287	NO2 PM10	YES	Chemiluminescent & BAM	1	1	2
MAN3	Manchester Piccadilly	Urban Centre	384310	398337	NO2 O3 PM10 PM2.5 SO2	YES	Chemiluminescent & UV absorption & BAM & FDMS & UV fluorescence	2	30	4
MAHG	Manchester Sharston[10]	Suburban	384179	386086	NO2 O3 SO2	NO	Chemiluminescent & UV absorption & UV fluorescence & Partisol	35	6	2.7
CW	Oldham Crompton Way	Roadside	393887	409191	NO2 PM10	YES	Chemiluminescent & TEOM	10	1	1.5
ECCL	Salford Eccles	Industrial	377924	398728	NO2 PM10 PM2.5	YES	Chemiluminescent, Palas Fidas	6	5	3.5

[10] $PM_{2.5}$ is also usually monitored by Partisol analyser at Manchester Sharston; this analyser is currently out of commission and awaiting replacement.

M60	Salford M60	Roadside	374807	400858	NO2 PM10 PM2.5 O3	YES	Chemiluminescent, BAM & UV absorption	82	22.5	3
STK5	Stockport Hazel Grv	Roadside	391481	387637	NO2 PM10	YES	Chemiluminescent & TEOM/BAM(3)	33	4	2
TAM1	Tameside Mottram M'r	Roadside	399719	395804	NO2 PM10	YES	Chemiluminescent & TEOM	4	5	4
TRF3	Trafford Wellacre Academy	Urban Background	373758	394473	NO2	NO	Chemiluminescent	79	160	2.5
TRAF	Trafford	Urban Background	378783	394726	NO2 PM10 SO2	NO	Chemiluminescent & TEOM/BAM(3)	60	98	2.5
TRF2	Trafford A56	Urban Traffic	379413	394014	NO2 PM10	YES	Chemiluminescent & TEOM/BAM(3)	40	2	2.5
WIG5	Wigan Centre	Urban Background	357816	406024	NO2 O3 PM10, PM2.5	NO	Chemiluminescent & TEOM/FIDAS(3)	0	175	2.5
STK7	Stockport Cheadle A34	Roadside	385047	388339	NO2 PM10	YES	Chemiluminescent & TEOM/BAM(3)	18	2	2

Notes:

(1) 0m if the monitoring site is at a location of exposure (e.g. installed on the façade of a residential property).

(2) N/A if not applicable

(3) Upgrades within year 2019 summarised as follows: Bury Radcliffe – TEOM changed to Smart heated BAM in Dec 2019; Bury Prestwich – TEOM changed to Smart heated BAM in Dec 2019; Stockport Cheadle A34 - TEOM changed to Smart heated BAM in Nov 2019; Stockport Hazel Grove - TEOM changed to Smart heated BAM in Nov 2019; Trafford Moss Park - TEOM changed to Smart heated BAM in Nov 2019; Trafford A56 - TEOM changed to Smart heated BAM in Nov 2019; Wigan Centre – TEOM and FDMS changed to a FIDAS in Aug 2019.

Table A.2 – Details of Non-Automatic Monitoring Sites

Site ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA?	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Tube co-located with a Continuous Analyser?	Height (m)
BO15NO	Astley Bridge t/lights 15	Kerbside	371435	411690	NO2	y	15	0.5	No	2.4
BO4NO	Manley terr 4	Urban Background	371394	411718	NO2	y	0	2.5	no	2.4
BO16NO	Drummond St 16	Urban Background	371304	411748	NO2	N	6	2	No	2.4
BO3NO	Quintins 3	Kerbside	370763	407929	NO2	y	2	0.5	No	2.4
BO48NO	Ainsworth Rd L/L 48	Urban Background	375397	407457	NO2	y	3	1.5	no	2.2
BO54NO	20 Laburnham Park 54	Urban Background	372908	412120	NO2	N	0	4	no	2.2
BO53NO	3 Turton Road yard 53	Urban Background	373236	411968	NO2	y	0	4	no	2.2
BO44NO	1007 Chorley new 44	Urban Background	365599	409845	NO2	y	0	19	No	2
BO45NO	1007 Chorley new 45	Urban Background	365599	409845	NO2	y	0	19	No	2
BO43NO	Bee Hive Pub kerb 43	Kerbside	365501	409887	NO2	y	20	1	No	2.4
BO11NO	Horwich Allotments 11	Urban Background	363712	412396	NO2	N	40	138	No	1
BO41NO	Bolton Road 41	Urban Background	366286	406561	NO2	N	5	1.5	No	2.4
BO60NO	134 Buckley Lane 60	Roadside	373287	405061	NO2	y	3	1.5	no	2.4
BO61NO	Primrose Street 61	Kerbside	374450	405207	NO2	y	22	0.5	no	1
BO62NO	13 Higher Market Street 62	Urban Background	374194	405460	NO2	y	0	1.5	no	2.4

BO14NO	Farnworth Town Hall 14	Roadside	373839	406130	NO2	N	3	2.5	No	2.4
BO63NO	Fern Street 63	Urban Background	374282	406257	NO2	y	5	1.5	no	2.4
BO64NO	Bolton Gate Retail 64	Roadside	371965	409907	NO2	y	30	2	no	2.4
BO65NO	Pheonix Street 65	Urban Background	372059	409877	NO2	y	7	1.5	no	2.4
BO8NO	Le Mans Crescent 8	Kerbside	371352	409094	NO2	N	5	0.5	No	2.4
BO66NO	Blackburn Road 66	Roadside	371442	411599	NO2	y	20	3	no	2.4
BO67NO	The Welland 67	Urban Background	365163	405640	NO2	N	8	1.5	No	2.4
BO68NO	26 Winslow Road 68	Urban Background	367672	406910	NO2	y	13	1.5	No	2.4
BO69NO	Red Lion Salford Road 69 Lamp Post No2	Roadside	369030	405809	NO2	y	30	1.5	No	2.4
BO70NO	Cornwall Avenue Lamp Post No. 4 70	Roadside	368757	405701	NO2	y	8	1.5	No	2.4
BO71NO	Junct 4 traffic Lights - northbound exit 71	Roadside	370362	405400	NO2	y	300	1.5	No	2.4
BO72NO	Watergate Drive 72	Roadside	370115	405372	NO2	y	75	9.5	No	2.4
BO73NO	Turton Street 73	Roadside	371805	409820	NO2	y	3	2	No	2.4
BO74NO	Kay Street 74	Roadside	371805	409832	NO2	y	100	2	No	2.4
BO75NO	Oxford St. (post near costa coffee) 75	Roadside	371623	409235	NO2	y	50	3	No	2.4
BU1NO	BU1	Urban Background	384372	404917	NO2	Yes	7	1.2	No	2.6
BU2NO	BU2	Urban Background	379101	417145	NO2	No	6	2	No	2.6
BU3ANO	BU3 a	Roadside	380636	406973	NO2	No	19	7	Yes	3
BU3BNO	BU3 b	Roadside	380636	406973	NO2	No	19	7	Yes	3

BU3CNO	BU3 c	Roadside	380636	406973	NO2	No	19	7	Yes	3
BU4NO	BU4	Urban Background	380964	404831	NO2	Yes	8.2	30	No	2.3
BU5NO	BU5	Roadside	380501	405413	NO2	No	6.5	2.8	No	2.5
BU6NO	BU6	Roadside	379658	410888	NO2	Yes	0	5	No	2
BU7NO	BU7	Urban Background	381984	411866	NO2	Yes	5	6	No	2.7
BU8NO	BU8	Kerbside	380754	412619	NO2	No	6	0.3	No	2.6
BU9NO	BU9	Roadside	379630	411031	NO2	Yes	NA	3.5	No	2.5
BU10NO	BU10	Roadside	379854	410978	NO2	Yes	NA	4.4	No	2.5
BU11NO	BU11	Roadside	380980	411193	NO2	Yes	NA	1.5	No	2.5
BU12NO	BU12	Kerbside	381344	410744	NO2	Yes	1.9	0.5	No	2.2
BU13NO	BU13	Kerbside	381804	410657	NO2	Yes	11	0.5	No	2.5
BU14NO	BU14	Roadside	380398	410455	NO2	Yes	NA	3	No	2.2
BU15NO	BU15	Roadside	380852	405209	NO2	Yes	NA	0.5	No	2.3
BU16NO	BU16	Roadside	380914	404898	NO2	Yes	5	2.2	No	2.6
BU17NO	BU17	Roadside	381105	404279	NO2	Yes	13	3	No	2.3
BU18NO	BU18	Roadside	382075	411364	NO2	Yes	3	2	No	2.3
BU19NO	BU19	Roadside	381321	405115	NO2	Yes	7	12	No	2.5
MA8ANO	8A	Urban Background	381384	387484	NO2	No	10	1.5	No	3
MA9ANO	9A	Kerbside	384601	398303	NO2	Y	43	0.5	No	3
MA24NO	24	Kerbside	383954	398060	NO2	Yes	150	0.5	No	3
MA26ANO	26A	Urban Background	383971	398876	NO2	Yes	5	59	No	3
MA28NO	28	Roadside	387951	397430	NO2	Yes	3	1	No	3
MA29ANO	29A	Roadside	384114	397512	NO2	Yes	2	2.5	No	3
MA36NO	36	Roadside	385205	399750	NO2	Yes	7	3	No	3

MA37NO	37	Roadside	382829	391493	NO2	Yes	10	4	No	3
MA59NO	59	Urban Background	384310	398337	NO2	Yes	45	56	Yes	4
MA60NO	60	Urban Background	384310	398337	NO2	Yes	45	56	Yes	4
MA61NO	61	Urban Background	384310	398337	NO2	Yes	45	56	Yes	4
MA71NO	71	Roadside	385161	398290	NO2	Yes	10	3	No	3
MA72NO	72	Urban Background	384761	397384	NO2	Yes	7	46	No	3
MA73NO	73	Roadside	388601	396048	NO2	Yes	12	3	No	3
MA74NO	74	Roadside	385399	390093	NO2	Yes	7	3	No	3
MA75NO	75	Kerbside	387363	394617	NO2	Yes	3	0.5	No	3
MA77NO	77	Urban Background	383602	397488	NO2	Yes	2	8	No	3
MA78NO	78	Urban Background	386289	396828	NO2	Yes	7.5	23	No	3
MA79NO	79	Urban Background	386875	395861	NO2	No	3	5	No	3
MA80NO	80	Roadside	387358	393990	NO2	No	3	7	No	3
MA81NO	81	Urban Background	386589	394083	NO2	No	10	18	No	3
MA82NO	82	Roadside	384233	397287	NO2	Yes	35	3	Yes	2
MA83NO	83	Roadside	384233	397287	NO2	Y	35	3	Yes	2
MA84NO	84	Roadside	384233	397287	NO2	Y	35	3	Yes	2
MA88NO	88	Kerbside	384469	398981	NO2	Y	5	1	No	3
MA86ANO	86A	Roadside	387150	396808	NO2	Y	30	4	No	3
MA87ANO	87A	Roadside	387020	396561	NO2	Y	10	3	No	3
MA88ANO	88A	Roadside	386536	396699	NO2	Y	25	3	No	3
MA89ANO	89A	Roadside	386681	396806	NO2	Y	20	2.5	No	3
MA90BNO	90	Suburban	384202	386121	NO2	No	35	44	Yes	1.75

MA91BNO	91	Suburban	384202	386121	NO2	No	35	44	Yes	1.75
MA92BNO	92	Suburban	384202	386121	NO2	No	35	44	Yes	1.75
MA93BNO	93	Roadside	382419	390010	NO2	Y	22	3	No	3
MA94BNO	94	Roadside	382083	388414	NO2	Y	7	6	No	3
MA95BNO	95	Roadside	386568	397580	NO2	Y	9	2.5	No	3
MA96BNO	96	Roadside	385189	397167	NO2	Y	2	3	No	3
MA97BNO	97	Roadside	382886	397215	NO2	Y	11	7.5	No	3
MA98BNO	98	Kerbside	388460	403313	NO2	N	10	35	No	3
OLMSNO	Mellor St	Urban Background	388871	400997	NO2	N	1.6	1.6	N	2
OLNSNO	Norfolk St	Urban Background	391217	403860	NO2	N	10	20	N	2
OLTSNO	Terrace St	Roadside	393782	405093	NO2	Y	26	12	N	2
OLCW1NO	Crompton Way 1	Kerbside	393884	409183	NO2	N	3	2	Y	1.5
OLCW2NO	Crompton Way 2	Kerbside	393884	409183	NO2	N	3	2	Y	1.5
OLBWNO	Broadway (Milton Drive)	Roadside	390125	404833	NO2	N	16	21	N	2
OLOBNO	Outside 409 Broadway	Kerbside	389715	403625	NO2	Y	10	8	N	2
OLRDNO	Rochdale Road	Kerbside	392111	406432	NO2	N	3	3	N	2
OL136RDNO	Opposite 136 Rochdale Rd	Kerbside	391863	407968	NO2	N	3	2	N	2
OLSHSNO	St Herberts School	Roadside	390394	405454	NO2	Y	11	2.3	N	2
OLHRNO	Hollins Road	Kerbside	390756	402571	NO2	Y	5	3	N	2
OLARNO	Ashton Road	Kerbside	392771	402951	NO2	N	3	3	N	2
OLSMWNO	St Marys Way	Kerbside	392748	405294	NO2	N	8	21	N	2
OLNSLNO	New Street, Lees	Kerbside	395225	404648	NO2	N	2	1.5	N	2
OLCVNO	65 Chew Valley Rd	Kerbside	399533	404454	NO2	N	2.5	2	N	2

OLHSNO	18 High St Uppermill	Kerbside	399589	405511	NO2	N	2	2	N	2
OLHURNO	617 Huddersfield Rd	Kerbside	395561	405751	NO2	N	4	2	N	2
OLRRNO	45 Ripponden Rd	Roadside	394210	405752	NO2	N	1	1.5	N	2
OLDLNO	Denton Lane (opp 1 Gorton St)	Roadside	390770	404695	NO2	N	13	4	N	2
OLMRNO	Middleton Rd (Chadd Precinct)	Roadside	390746	405397	NO2	N	3.5	2	N	2
RO2ANO	2	Urban Background	388537	409942	NO2	YES	0	20	NO	2
RO3ANO	3	Urban Background	388581	409797	NO2	YES	100	15	NO	2
RO4ANO	4	Urban Background	387080	406278	NO2	YES	0	5	NO	2
RO5ANO	5	Roadside	386870	404044	NO2	YES	100	10	NO	2
RO6ANO	6	Kerbside	385413	408320	NO2	YES	15	1	NO	2
RO7ANO	7	Urban Background	388603	411925	NO2	YES	0	6	NO	2
RO8ANO	8	Roadside	388932	412091	NO2	YES	0	4	NO	2
RO9ANO	9	Kerbside	389057	412217	NO2	YES	0	1	NO	2
RO10ANO	10	Urban Background	388800	413603	NO2	YES	0	4	NO	2
RO12ANO	12	Roadside	392072	415687	NO2	YES	20	2	NO	2
RO13ANO	13	Urban Background	392042	415707	NO2	NO	30	15	NO	2
RO14ANO	14	Rural	393665	417816	NO2	NO	100	50	NO	2
RO15ANO	15	Roadside	392976	411906	NO2	YES	30	10	NO	2
RO16ANO	16	Urban Background	392542	411709	NO2	YES	40	2	NO	2
RO17ANO	17	Urban Background	391214	412609	NO2	YES	50	12	NO	2
RO18ANO	18	Urban Background	389877	413590	NO2	NO	150	1	NO	2

RO19ANO	19	Roadside	389971	413646	NO2	NO	100	2	NO	2
RO20ANO	20	Roadside	385814	408942	NO2	YES	50	1	NO	2
RO21ANO	21	Roadside	385820	410776	NO2	NO	50	2	NO	2
RO22ANO	22	Roadside	390464	411976	NO2	YES	20	2	NO	2
RO23ANO	23	Roadside	390377	412030	NO2	No	5	2	No	2.5
RO24ANO	24	Urban Background	388089	410822	NO2	No	13	3	No	2.5
RO25ANO	25	Roadside	387798	406006	NO2	No	1	1.5	No	3
RO26ANO	26	Roadside	389790	414230	NO2	Yes	20	1.5	No	3
RO27ANO	27	Roadside	390707	414563	NO2	Yes	1	1.5	No	2.5
RO28ANO	28	Urban Background	392871	415127	NO2	No	1	2	No	3
SA1NO	1	Urban Background	372767	394104	NO2	No	16	45	No	1.7
SA2NO	2	Urban Background	372140	394210	NO2	No	55	67	No	3
SA4NO	4	Roadside	377453	401830	NO2	No	1.5	21.5	No	2.5
SA9NO	9	Urban Background	374741	400937	NO2	No	0	124	No	2
SA13NO	13	Urban Background	379613	399783	NO2	No	12	2.7	No	3
SA14NO	14	Kerbside	382833	401035	NO2	No	36	2	No	3
SA16NO	16	Urban Background	371200	404485	NO2	No	10.5	2	No	3
SA17NO	17	Kerbside	380742	400862	NO2	No	12.5	2.5	No	3
SA20NO	20	Roadside	374807	400858	NO2	YES	82	22.5	Yes	3
SA21NO	21	Roadside	374807	400858	NO2	YES	82	22.5	Yes	3
SA22NO	22	Roadside	374807	400858	NO2	YES	82	22.5	Yes	3
SA23NO	23	Urban Background	377924	398728	NO2	No	6	5	Yes	3.5

SA24NO	24	Urban Background	377924	398728	NO2	No	6	5	Yes	3.5
SA29NO	29	Urban Background	377924	398728	NO2	No	6	5	Yes	3.5
SA25NO	25	Roadside	381304	398014	NO2	YES	10.5	22.5	No	3
SA26NO	26	Roadside	380718	399597	NO2	YES	16	6	No	2
SA27NO	27	Roadside	383078	398741	NO2	YES	2.2	1.5	No	3
SA31NO	31	Roadside	374025	401905	NO2	YES	8.5	3.5	No	3
SA33NO	33	Roadside	372600	400721	NO2	No	4.7	4.5	No	2.5
SA34NO	34	Roadside	375367	397800	NO2	YES	1	8	No	1.7
SA38NO	38	Roadside	377788	403063	NO2	No	7.5	1.5	No	3
SA39NO	39	Roadside	383040	398563	NO2	YES	0	8	No	3
SA44NO	44	Roadside	380412	398439	NO2	YES	2.5	13.5	No	3
SA50NO	50	Roadside	375396	397805	NO2	YES	1.5	13.5	No	2.5
SA51NO	51	Roadside	375213	397661	NO2	YES	3.5	3	No	2
SA52NO	52	Roadside	375149	397587	NO2	YES	7	6	No	2.5
SA53NO	53	Urban Background	374757	399891	NO2	No	7.5	3.5	No	3
SA54NO	54	Urban Background	374901	399981	NO2	No	4.5	1.5	No	3
SA55NO	55	Roadside	372850	400733	NO2	YES	21	4	No	3
SA56NO	56	Rural	368758	396031	NO2	No	132	1370	Yes	3
SA57NO	57	Rural	368758	396031	NO2	No	132	1370	Yes	3
SA58NO	58	Rural	368758	396031	NO2	No	132	1370	Yes	3
SA59NO	59	Roadside	381822	397895	NO2	YES	11	14	No	3
SA60NO	60	Roadside	382445	397724	NO2	YES	3	4	No	2
SA61NO	61	Roadside	377264	400941	NO2	YES	9	3.5	No	3
SA62NO	62	Roadside	380768	399637	NO2	YES	6.5	4	No	3

SA63NO	63	Roadside	374673	399912	NO2	YES	4	21	No	3
SA64NO	64	Roadside	378804	399844	NO2	YES	14	1.5	No	2.5
SA65NO	65	Roadside	378584	399220	NO2	YES	11.5	3	No	3
SA66NO	66	Roadside	375118	398502	NO2	YES	4.5	12.5	No	3
SA68NO	68	Roadside	373570	403096	NO2	YES	3.5	2.5	No	3
SA69NO	69	Roadside	379397	401370	NO2	YES	8.5	1.5	No	3
SA70NO	70	Roadside	381677	398832	NO2	YES	10.5	21.5	No	3
SA71NO	71	Roadside	381351	397185	NO2	YES	15	1	No	3
SA72NO	72	Roadside	377536	401804	NO2	YES	1.5	0.5	No	3
SA73NO	73	Roadside	374576	400611	NO2	YES	75	3	No	3
SA74NO	74	Roadside	376315	399249	NO2	YES	5.4	2.7	No	3
SA75NO	75	Roadside	379608	398539	NO2	YES	7.5	0.5	No	3
SA76NO	76	Roadside	380540	398422	NO2	YES	6.9	2.9	No	3
SA77NO	77	Roadside	381686	398504	NO2	YES	5.6	13.5	No	3
SA78NO	78	Roadside	381220	399529	NO2	YES	3.6	1.5	No	3
SA79NO	79	Roadside	382602	398519	NO2	YES	2	10	No	3
SA80NO	80	Roadside	375428	401417	NO2	YES	10.4	1.5	No	3
SA81NO	81	Roadside	382571	397718	NO2	YES	82	2	No	3
ST1NO	ST 1	Urban Background	389077.064	392011.822	NO2	YES	99	93	NO	1.5
ST2NO	ST 2	Urban Background	385047	388339	NO2	YES	10	3	YES	2
ST3NO	ST 3	Urban Background	388550.609	391846.389	NO2	YES	8	2	NO	2.5
ST4NO	ST 4	Rural	396469.167	390800.349	NO2	NO	15	20	NO	2.5
ST5NO	ST 5	Rural	396868.651	382692.179	NO2	NO	8	100	NO	1.5
ST6NO	ST 6	Urban Background	385953.537	388534.058	NO2	NO	24	20	NO	1.5

ST7NO	ST 7	Kerbside	392063.265	386968.54	NO2	YES	3	1	NO	2
ST8NO	ST 8	Urban Background	392016.512	387042.782	NO2	YES	14	15	NO	1.5
ST9NO	ST 9	Urban Background	392742.788	385680.865	NO2	NO	0	25	NO	1.5
ST10NO	ST 10	Urban Background	392781.3	387271.486	NO2	NO	0	6	NO	1.5
ST11NO	ST 11	Roadside	391083.207	387938.058	NO2	YES	3	3	NO	2
ST12NO	ST 12	Roadside	385047	388339	NO2	YES	12	3	YES	2
ST13NO	ST 13	Urban Background	384679.794	386357.007	NO2	NO	4	2	NO	2
ST14NO	ST 14	Urban Background	385047	388339	NO2	YES	8	1	YES	2.5
ST15NO	ST 15	Roadside	389886.321	388961.332	NO2	YES	4	2	NO	2
ST16NO	ST 16	Roadside	391568.679	391225.883	NO2	YES	20	3	NO	2.5
ST17NO	ST 17	Urban Background	388442.177	390077.487	NO2	YES	82	2	NO	2
ST18NO	ST 18	Urban Background	389272.176	390440.811	NO2	YES	20	3	NO	2
ST19NO	ST 19	Roadside	389479.355	393463.855	NO2	YES	0	2.2	NO	2.5
ST20NO	ST 20	Urban Background	386921.232	389528.855	NO2	YES	3	15	NO	2
ST21NO	ST 21	Urban Background	388598.721	389415.552	NO2	NO	0	1	NO	2.5
ST22NO	ST 22	Roadside	391483.11	387635.566	NO2	YES	5	5	YES	2.5
ST23NO	ST 23	Roadside	391483.11	387635.566	NO2	YES	5	5	YES	2.5
ST24NO	ST 24	Roadside	391483.11	387635.566	NO2	YES	5	5	YES	2.5
ST25NO	ST 25	Roadside	395770.138	388655.432	NO2	NO	5	3	NO	2.5
ST26NO	ST 26	Urban Background	389396	387357	NO2	NO	0	10	NO	1.5
ST27NO	ST 27	Urban Background	387091	391384	NO2	NO	0	6	NO	1.5
ST28NO	ST 28	Roadside	385700.368	386219.938	NO2	YES	2	3	NO	2.5

ST29NO	ST 29	Urban Background	390087.537	388545.187	NO2	NO	0	2	NO	1.5
ST31NO	ST 31	Roadside	392441	391747	NO2	YES	10	2	NO	2.5
ST32NO	ST 32	Roadside	389480	390957	NO2	YES	30	2	NO	2.5
ST33NO	ST 33	Roadside	390416	390087	NO2	YES	10	2	NO	2.5
ST34NO	ST 34	Roadside	388304	390351	NO2	YES	6	2	NO	2.5
ST35NO	ST 35	Roadside	395020	385360	NO2	YES	2	2	NO	2.5
TA1NO	T 1	Roadside	394050	397190	NO2	Yes	1	2	No	3
TA2NO	T 2	Urban Background	394788	394933	NO2	No	47	2	No	3
TA3NO	T 3	Urban Background	390560	395415	NO2	Yes	3	2	No	3
TA5NO	T 5	Urban Background	400507	396518	NO2	No	1	2	No	3
TA9NO	T 9	Urban Background	393451	394330	NO2	No	0	53	YES	3
TA10NO	T 10	Roadside	392516	396748	NO2	Yes	12	1	No	3
TA11NO	T 11	Roadside	400390	396025	NO2	Yes	1	2	No	3
TA12NO	T 12	Urban Background	393451	394330	NO2	No	26	53	YES	3
TA13NO	T 13	Roadside	392586	398431	NO2	Yes	10	3	No	3
TA14NO	T 14	Roadside	393710	398790	NO2	Yes	30	10	No	3
TA15NO	T 15	Roadside	395371	398736	NO2	Yes	17	12	No	3
TA16NO	T 16	Roadside	391435	397970	NO2	Yes	8	2	No	3
TA17NO	T 17	Roadside	389106	398242	NO2	Yes	4	4	No	3
TA18NO	T 18	Roadside	391970	395521	NO2	Yes	35	2	No	3
TA19NO	T 19	Roadside	392477	395506	NO2	Yes	5	1	No	3
TA20NO	T 20	Roadside	394610	395102	NO2	Yes	100	1	No	3
TA21NO	T 21	Roadside	400423	395965	NO2	Yes	1	1	No	3

TA22NO	T 22	Urban Background	393249	399159	NO2	No	20	25	No	4
TA23NO	T 23	Urban Background	393621	398589	NO2	No	1	9	No	3
TA24NO	T 24	Roadside	390475	395621	NO2	Yes	5	2	No	3
TA25NO	T 25	Roadside	396950	402329	NO2	Yes	5	2	No	3
TA26NO	T 26	Roadside	394948	401815	NO2	no	150	2	No	3
TA27NO	T 27	Roadside	396177	398218	NO2	Yes	17	2	No	3
TA28NO	T 28	Roadside	393050	401038	NO2	No	5	2	No	3
TA29NO	T 29	Suburban	393370	399494	NO2	No	3	75	No	3
TA30NO	T 30	Roadside	393419	399691	NO2	Yes	2	2	No	3
TA31NO	T 31	Suburban	396899	402450	NO2	No	5	2	No	3
TA32NO	T 32	Roadside	396982	402437	NO2	No	2	2	No	3
TA33NO	T 33	Roadside	397010	402560	NO2	No	2	2	No	3
TA34NO	T 34	Roadside	397060	402581	NO2	No	16	2	No	3
TA35NO	T 35	Roadside	397080	402540	NO2	No	8	2	No	3
TA36NO	T 36	Suburban	397060	402387	NO2	No	2	1	No	3
TA37NO	T 37	Roadside	396728	402073	NO2	No	7	2	No	3
TA38NO	T 38	Urban Background	394006	399392	NO2	No	11	22	No	3
TA39NO	T 39	Urban Background	394114	399366	NO2	No	11	1	No	3
TA40NO	T 40	Urban Background	394066	399315	NO2	No	45	1	No	3
TA41NO	T 41	Urban Background	394118	399259	NO2	Yes	1	2	No	3
TA42NO	T 42	Urban Background	394494	399010	NO2	No	6	2	No	3
TA43NO	T 43	Urban Background	394214	398933	NO2	No	30	13	No	3

TA44NO	T 44	Urban Background	397418	394398	NO2	No	22	12	No	3
TA45NO	T 45	Roadside	399719	395805	NO2	Yes	24	5	YES	4
TA46NO	T 46	Roadside	399719	395805	NO2	Yes	24	5	YES	4
TA47NO	T 47	Roadside	399719	395805	NO2	Yes	24	5	YES	4
TA48NO	T 48	Roadside	392699	395733	NO2	No	5	75	No	3
TA49NO	T 49	Roadside	393731	398770	NO2	Yes	46	3	No	3
TA50NO	T 50	Roadside	393498	398704	NO2	Yes	140	4	No	3
TA51NO	T 51	Kerbside	393314	398624	NO2	Yes	82	1	No	3
TA52NO	T 52	Roadside	393509	398737	NO2	Yes	103	5	No	3
TA53NO	T 53	Roadside	393133	398536	NO2	Yes	31	3	No	3
TA54NO	T 54	Roadside	392958	398474	NO2	Yes	24	3	No	3
TA55NO	T 55	Roadside	392743	398465	NO2	Yes	6	3	No	3
TA56NO	T 56	Roadside	392490	398368	NO2	Yes	11	5	No	3
TA57NO	T 57	Roadside	392844	398544	NO2	Yes	28	3	No	3
TA58NO	T 58	Roadside	393080	398620	NO2	Yes	40	4	No	3
TA59NO	T 59	Roadside	395652	399140	NO2	No	23	2	No	3
TA60NO	T 60	Roadside	395747	397112	NO2	No	9	3	No	3
TA61NO	T 61	Roadside	395683	399172	NO2	No	6	3	No	3
TA62NO	T 62	Roadside	396576	399240	NO2	No	25	4	No	3
TR5NO	5	Urban Background	379052	392043	NO2	YES	10	5	N	4
TR9NO	9	Urban Background	380933	395889	NO2	YES	20	100	3	3
TR19NO	19	Urban Background	378783	394728	NO2	NO	65	100	Y	2
TR19ANO	19a	Urban Background	378783	394728	NO2	NO	65	100	Y	2

TR19BNO	19b	Urban Background	378783	394728	NO2	NO	65	100	Y	2
TR20NO	20	Roadside	379418	394009	NO2	YES	42	5	Y	3
TR20ANO	20a	Roadside	379418	394009	NO2	YES	42	5	Y	3
TR20ANO	20b	Roadside	379418	394009	NO2	YES	42	5	Y	3
TR21NO	21	Roadside	379619	396371	NO2	NO	700	5	N	3
TR22NO	22	Kerbside	377061	390086	NO2	YES	50	0	N	4
TR13NO	13	Urban Background	381221	396441	NO2	YES	300	5	N	4
TR15NO	15	Roadside	379089	393282	NO2	YES	350	5	N	4
TR16NO	16	Urban Background	377416	395756	NO2	YES	60	80	N	3
TR16ANO	16a	Urban Background	377416	395756	NO2	YES	60	80	N	3
TR18NO	18	Urban Background	378822	389010	NO2	NO	15	15	N	4
TR23NO	23	Roadside	376438	396383	NO2	YES	3	4	N	3
TR23ANO	23a	Roadside	376395	396360	NO2	YES	3	4	N	3
TR24NO	24	Roadside	379263	385812	NO2	NO	16	3	N	3
TR25NO	25	Urban Background	373755	394477	NO2	NO	125	160	Y	2
TR25ANO	25a	Urban Background	373755	394477	NO2	NO	125	160	Y	2
TR25BNO	25b	Urban Background	373755	394477	NO2	NO	125	160	Y	2
TR26NO	26	Kerbside	379272	393666	NO2	YES	160	1	N	3
TR26ANO	26a	Kerbside	379272	393666	NO2	YES	160	1	N	3
TR27NO	27	Kerbside	371419	390760	NO2	no	20	1	no	2
TR28NO	28	Kerbside	376851	387792	NO2	no	100	1	NO	2
WI14NO	14	Roadside	366880	403255	NO2	Yes	0	7	No	2
WI23NO	23	Roadside	361835	404090	NO2	Yes	0	3	No	2

WI27NO	24	Roadside	358341	405539	NO2	Yes	0	8	No	2
WI28NO	28	Roadside	366424	399894	NO2	Yes	1	4	No	2
WI30NO	30	Roadside	363833	402028	NO2	No	0	7	No	2
WI33NO	33	Roadside	359723	405537	NO2	Yes	30	3	No	2
WI35NO	35	Kerbside	357132	398670	NO2	Yes	7	1	No	2
WI47NO	47	Urban Background	357812	406021	NO2	Yes	0	3	No	2
WI48NO	48	Urban Background	357812	406021	NO2	No	0	177	Yes	2.5
WI49NO	49	Urban Background	357812	406021	NO2	No	0	177	Yes	2.5
WI51NO	51	Kerbside	358787	405933	NO2	No	0	177	Yes	2.5
WI52NO	52	Roadside	362137	399948	NO2	Yes	35	1	No	2
WI53NO	53	Roadside	353896	408518	NO2	Yes	3	3	No	2
WI54NO	54	Urban Background	370612	400586	NO2	Yes	0	14	No	2
WI61NO	61	Roadside	364025	403080	NO2	Yes	3	17	No	2
WI63NO	63	Roadside	356928	404982	NO2	Yes	0	3	No	2
WI71NO	71	Roadside	368244	402563	NO2	No	0	3	No	2
WI81NO	81	Roadside	355979	410362	NO2	Yes	0	5	No	2
WI114NO	114	Roadside	365115	400259	NO2	No	0	4	No	2
WI115NO	115	Urban Background	353845	405360	NO2	Yes	28	3	No	2
WI116NO	116	Urban Background	365864	401720	NO2	Yes	0	21	No	2
WI117NO	117	Roadside	357048	405200	NO2	No	0	0	No	2
WI118NO	118	Roadside	357287	405114	NO2	No	2	42	No	2
WI119NO	119	Roadside	357289	405107	NO2	No	1	11	No	2
WI121NO	121	Roadside	357088	405158	NO2	Yes	4.5	6	No	2

WI122NO	122	Roadside	356883	405239	NO2	No	0.5	16	No	2
WI124NO	124	Roadside	357310	403672	NO2	No	3	2	No	2
WI125NO	125	Roadside	357645	404259	NO2	No	6	0	No	2
WI126NO	126	Roadside	355819	402194	NO2	No	5	2	No	2
WI127NO	127	Roadside	355473	403194	NO2	No	6	2	No	2
WI128NO	128	Roadside	356817	402536	NO2	No	40	2	No	2
WI129NO	129	Roadside	356848	402906	NO2	No	3	4	No	2
WI130NO	130	Roadside	356354	403838	NO2	No	20	3	No	2
WI131NO	131	Roadside	356667	404065	NO2	No	3	15	No	2
WI132NO	132	Roadside	356869	404808	NO2	No	3	17	No	2
WI133NO	133	Roadside	356748	404786	NO2	No	3	2	No	2
WI134NO	134	Roadside	356428	404722	NO2	No	4	0	No	2
WI135NO	135	Kerbside	354614	404685	NO2	No	0	1	No	2
WI136NO	136	Kerbside	354057	404824	NO2	No	4	1	No	2
WI137NO	137	Roadside	353844	404922	NO2	Yes	7	2	No	2
WI138NO	138	Roadside	355321	404017	NO2	No	100	2	No	2
WI139NO	139	Roadside	355638	404023	NO2	No	12	3	No	2
WI140NO	140	Roadside	355816	404062	NO2	No	4	2	No	2
WI141NO	141	Roadside	356469	404550	NO2	No	22	2	No	2
WI142NO	142	Roadside	360528	403020	NO2	No	6	0	No	2
WI143NO	143	Roadside	360321	402935	NO2	No	1	2	No	2
WI144NO	144	Roadside	360643	402297	NO2	No	4	2	No	2
WI145NO	145	Roadside	360515	402212	NO2	No	3	2	No	2
WI146NO	146	Roadside	360306	402279	NO2	No	9	2	No	2
WI147NO	147	Roadside	360437	405089	NO2	No	18	2	No	2

WI148NO	148	Kerbside	361247	404576	NO2	No	5	1	No	2
WI149NO	149	Kerbside	363081	403512	NO2	No	7	1	No	2
WI150NO	150	Kerbside	361579	404298	NO2	No	16	1	No	2
WI151NO	151	Kerbside	361501	404216	NO2	No	2	1	No	2
WI152NO	152	Roadside	364021	402391	NO2	No	10	3	No	2
WI153NO	153	Roadside	364955	402768	NO2	No	9	2	No	2
WI154NO	154	Roadside	365054	403019	NO2	No	18	2	No	2
WI155NO	155	Roadside	366233	403024	NO2	No	4	0	No	2
WI156NO	156	Kerbside	366324	402151	NO2	No	8	1	No	2
WI157NO	157	Roadside	366458	402462	NO2	No	13	2	No	2
WI158NO	158	Roadside	365615	401368	NO2	No	9	2	No	2
WI159NO	159	Kerbside	368024	403514	NO2	No	44	1	No	2
WI160NO	160	Roadside	368671	402250	NO2	No	18	0	No	2
WI161NO	161	Roadside	369635	402019	NO2	No	0	2	No	2
WI162NO	162	Roadside	370534	401953	NO2	No	5	0	No	2
WI163NO	163	Kerbside	371234	401895	NO2	No	15	1	No	2
WI164NO	164	Roadside	371981	401209	NO2	No	5	2	No	2
WI165NO	165	Kerbside	371039	400996	NO2	No	23	1	No	2
WI166NO	166	Kerbside	368414	399638	NO2	No	23	1	No	2
WI167NO	167	Roadside	363544	397934	NO2	No	15	2	No	2
WI168NO	168	Kerbside	362463	397005	NO2	Yes	15	1	No	2
WI169NO	169	Roadside	362557	396906	NO2	No	28	2	No	2
WI170NO	170	Roadside	362236	396675	NO2	No	11	2	No	2
WI171NO	171	Roadside	357095	400717	NO2	No	21	2	No	2
WI172NO	172	Kerbside	356881	401314	NO2	No	3	1	No	2

WI173NO	173	Roadside	357983	405377	NO2	Yes	78	6	No	2
WI174NO	174	Roadside	358294	405137	NO2	Yes	33	3	No	2
WI175NO	175	Roadside	358537	405774	NO2	Yes	24	3	No	2
WI176NO	176	Roadside	359227	405480	NO2	No	1	2	No	2
WI177NO	177	Kerbside	356230	410105	NO2	No	1	1	No	2
WI178NO	178	Kerbside	356021	410128	NO2	No	6	1	No	2
WI179NO	179	Kerbside	354900	410475	NO2	No	15	1	No	2
WI180NO	180	Kerbside	362105	396491	NO2	No	0	1	No	2
WI181NO	181	Kerbside	354828	406235	NO2	No	5	1	No	2
WI182NO	182	Kerbside	358756	406175	NO2	No	38	1	No	2
WI183NO	183	Roadside	358595	405297	NO2	Yes	155	2	No	2
WI184NO	184	Roadside	358013	405654	NO2	Yes	14	2	No	2
WI185NO	185	Kerbside	358054	405613	NO2	Yes	30	1	No	2
WI186NO	186	Kerbside	358070	405587	NO2	Yes	88	1	No	2
WI187NO	187	Roadside	360470	402400	NO2	Yes	3	2	No	2
WI188NO	188	Roadside	362111	396526	NO2	No	18	2	No	2
WI189NO	189	Kerbside	362095	396547	NO2	No	26	1	No	2
WI191NO	191/190	Kerbside	358611	405994	NO2	Yes	54	1	No	2
WI192NO	192	Roadside	356771	403124	NO2	No	24	2	No	2

Notes:

(1) 0m if the monitoring site is at a location of exposure (e.g. installed on the façade of a residential property).

(2) N/A if not applicable.

Table A.3 – Annual Mean NO_2 Monitoring Results (Provisional)

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2019 (%) (2)	NO_2 Annual Mean Concentration (µg/m^3) (3) (4)				
							2015	2016	2017	2018	2019
Bury Whitefield	380637	406974	Roadside	Automatic	N/A	96.31%	25	30	28	25	27
Bury Prestwich	381650	403222	Roadside	Automatic	N/A	92.58%	**42**	**42**	**42**	38	39
Bury Radcliffe	378190	407480	Roadside	Automatic	N/A	95.38%	27	28	27	25	26
Glazebury	368758	396031	Rural	Automatic	N/A	96.94%	15	16	13	14	15
Manchester Oxford Rd	384233	397287	Kerbside	Automatic	N/A	97.60%	**66**	**66**	**65**	**62**	**59**
Manchester Piccadilly	384310	398337	Urban Centre	Automatic	N/A	98.85%	39	**40**	36	35	36
Manchester Sharston	384179	386086	Suburban	Automatic	N/A	99.10%	-	23	24	24	23
Oldham Crompton Way	393887	409191	Roadside	Automatic	N/A	95.16%	33	34	32	28	30
Salford Eccles	377924	398728	Industrial	Automatic	N/A	97.15%	27	29	26	25	25
Salford M60	374807	400858	Roadside	Automatic	N/A	99.26%	**52**	**46**	**43**	**41**	**44**
Stockport Hazel Grv	391481	387637	Roadside	Automatic	N/A	96.22%	24	25	22	25	23
Tameside Mottram M'r	399719	395804	Roadside	Automatic	N/A	97.21%	**54**	**49**	**44**	**43**	**40**
Trafford Wellacre Academy	373758	394473	Urban Background	Automatic	N/A	97.45%	17	17	15	15	15

Trafford	378783	394726	Urban Background	Automatic	N/A	99.02%	20	22	19	18	19
Trafford A56	379413	394014	Urban Traffic	Automatic	N/A	98.98%	30	33	30	29	30
Wigan Centre	357816	406024	Urban Background	Automatic	N/A	96.91%	19	21	18	17	19
Stockport Cheadle A34	385047	388339	Roadside	Automatic	N/A	94.16%	-	-	**43**	37	36
Manchester South	383904	385818	Suburban	Automatic	N/A	N/A	20	-	-	-	-
Tameside Two T's	393454	394330	Urban Background	Automatic	N/A	N/A	19	18	-	-	-

☒ **Diffusion tube data has been bias corrected**

☒ **Annualisation has been conducted where data capture is <75%**

☒ **Reported concentrations are those at the location of the monitoring site (bias adjusted and annualised, as required), i.e. prior to any fall-off with distance adjustment**

Notes:

Exceedances of the NO_2 annual mean objective of 40µg/m^3 are shown in **bold**.

NO_2 annual means exceeding 60µg/m^3, indicating a potential exceedance of the NO_2 1-hour mean objective are shown in **bold and underlined.**

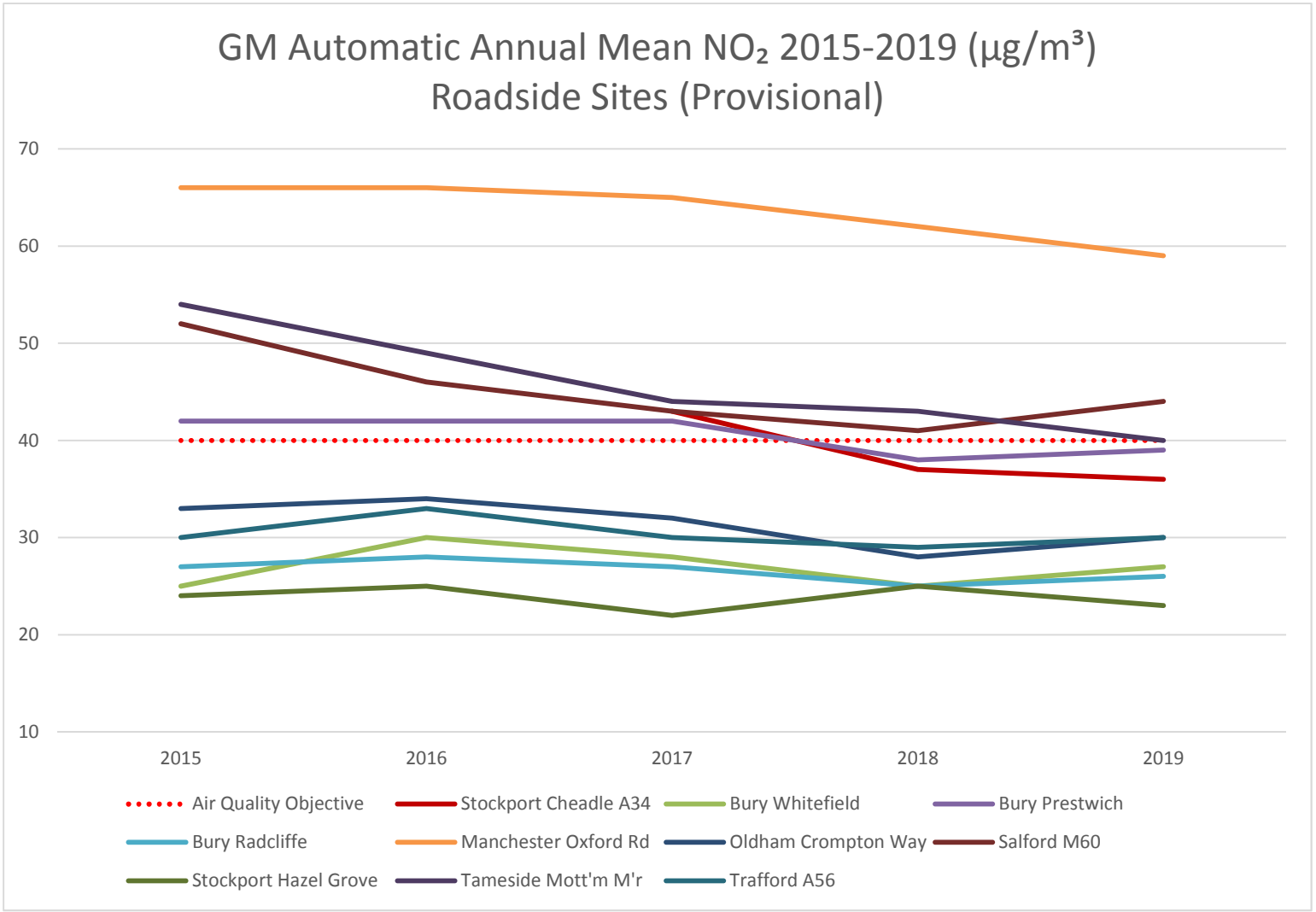
(1) Data capture for the monitoring period, in cases where monitoring was only carried out for part of the year.

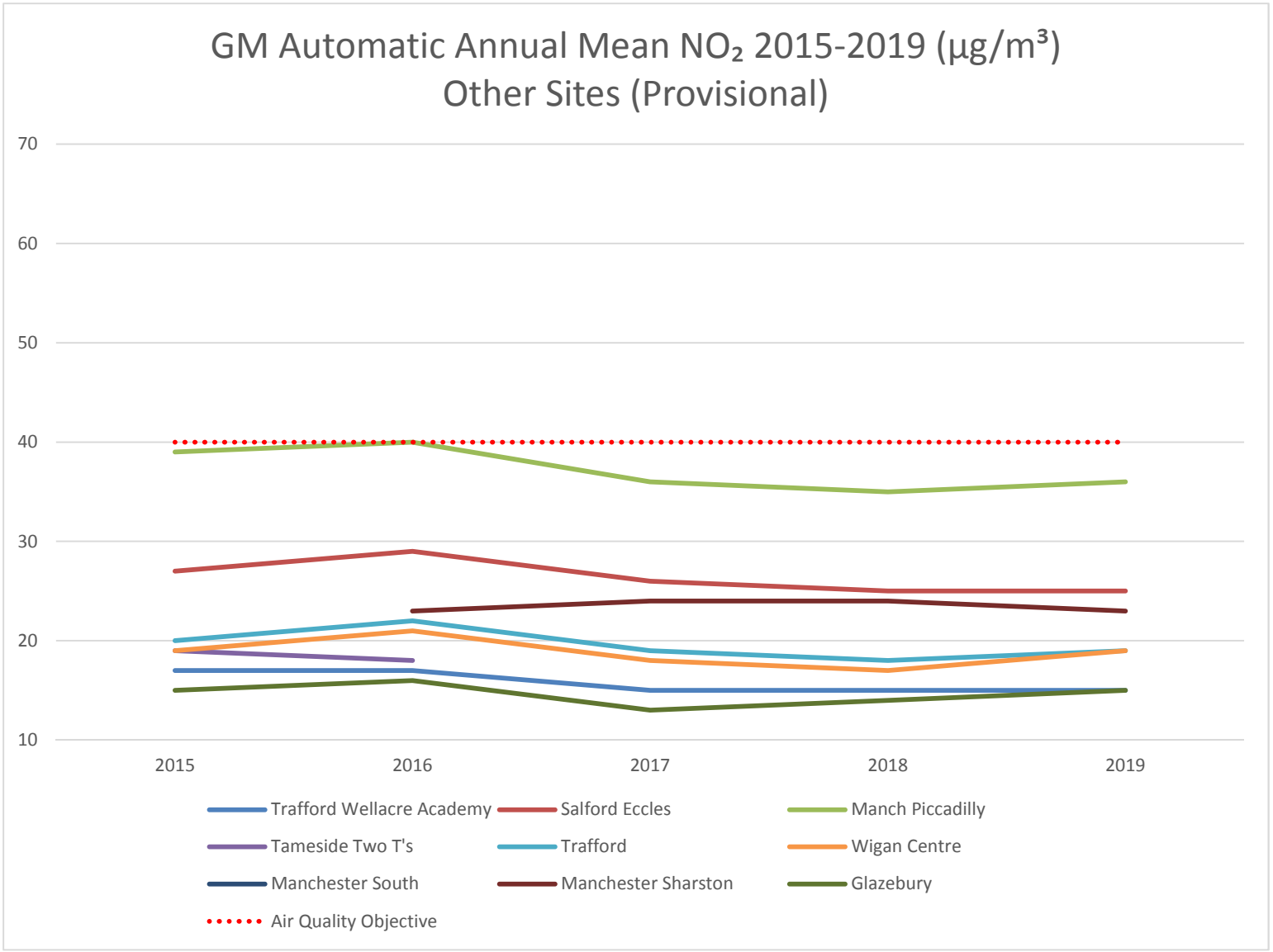
(2) Data capture for the full calendar year (e.g. if monitoring was carried out for 6 months, the maximum data capture for the full calendar year is 50%).

(3) Means for diffusion tubes have been corrected for bias. All means have been "annualised" as per Boxes 7.9 and 7.10 in LAQM.TG16 if valid data capture for the full calendar year is less than 75%. See Appendix C for details.

(4) Concentrations are those at the location of monitoring and not those following any fall-off with distance adjustment.

Figure A.1 – Trends in Annual Mean NO_2 Concentrations (Provisional)




GM Automatic Annual Mean NO₂ 2015-2019 (µg/m³)
Other Sites (Provisional)
70
60
50
40
30
20
10
2015
2016
2017
2018
2019
Trafford Wellacre Academy
Salford Eccles
Manch Piccadilly
Tameside Two T's
Trafford
Wigan Centre
Manchester South
Manchester Sharston
Glazebury
Air Quality Objective

0Table A.4 – 1-Hour Mean NO_2 Monitoring Results (Provisional)

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2019 (%) (2)	NO_2 1-Hour Means > 200µg/m^3 (3)				
							2015	2016	2017	2018	2019
Bury Whitefield	380637	406974	Roadside	Automatic	N/A	96.31%	**0**	**0**	**0**	**0**	**2**
Bury Prestwich	381650	403222	Roadside	Automatic	N/A	92.58%	**0**	**0**	**0**	**0**	**0**
Bury Radcliffe	378190	407480	Roadside	Automatic	N/A	95.38%	**0**	**0**	**5**	**0**	**0**
Glazebury	368758	396031	Rural	Automatic	N/A	96.94%	**0**	**0**	**0**	**0(69)**	**0**
Manchester Oxford Rd	384233	397287	Kerbside	Automatic	N/A	97.60%	**60**	**90**	**6**	**2**	**1**
Manchester Piccadilly	384310	398337	Urban Centre	Automatic	N/A	98.85%	**1**	**0**	**1**	**0**	**0**
Manchester Sharston	384179	386086	Suburban	Automatic	N/A	99.10%	**-**	**0**	**0**	**0**	**0**
Oldham Crompton Way	393887	409191	Roadside	Automatic	N/A	95.16%	**0(109)**	**0**	**0**	**0**	**0**
Salford Eccles	377924	398728	Industrial	Automatic	N/A	97.15%	**0**	**0**	**0**	**0**	**0**
Salford M60	374807	400858	Roadside	Automatic	N/A	99.26%	**3**	**0**	**0**	**0**	**0**
Stockport Hazel Grv	391481	387637	Roadside	Automatic	N/A	96.22%	**0**	**0**	**0**	**0**	**0**
Tameside Mottram M'r	399719	395804	Roadside	Automatic	N/A	97.21%	**8(189)**	**0**	**0**	**0**	**0**
Trafford Wellacre Academy	373758	394473	Urban Background	Automatic	N/A	97.45%	**0**	**0**	**0**	**0**	**0**

Trafford	378783	394726	Urban Background	Automatic	N/A	99.02%	**0**	**0**	**0**	**0**	**0**
Trafford A56	379413	394014	Roadside	Automatic	N/A	98.98%	**0(107)**	**0**	**0**	**0**	**0**
Wigan Centre	357816	406024	Urban Background	Automatic	N/A	96.91%	**0**	**0**	**0**	**0**	**0**
Stockport Cheadle A34	385047	388339	Roadside	Automatic	N/A	94.16%	**-**	**-**	**0**	**0**	**0**
Manchester South	383904	385818	Suburban	Automatic	N/A	N/A	**0**	**-**	**-**	**-**	**-**
Tameside Two T's	393454	394330	Urban Background	Automatic	N/A	N/A	**0**	**0**	**-**	**-**	**-**

Notes:

Exceedances of the NO_2 1-hour mean objective (200µg/m^3 not to be exceeded more than 18 times/year) are shown in **bold.**

(1) Data capture for the monitoring period, in cases where monitoring was only carried out for part of the year.

(2) Data capture for the full calendar year (e.g. if monitoring was carried out for 6 months, the maximum data capture for the full calendar year is 50%).

(3) If the period of valid data is less than 85%, the 99.8th percentile of 1-hour means is provided in brackets.

Figure A.2 – Trends in Number of NO_2 1-Hour Means > 200µg/m^3

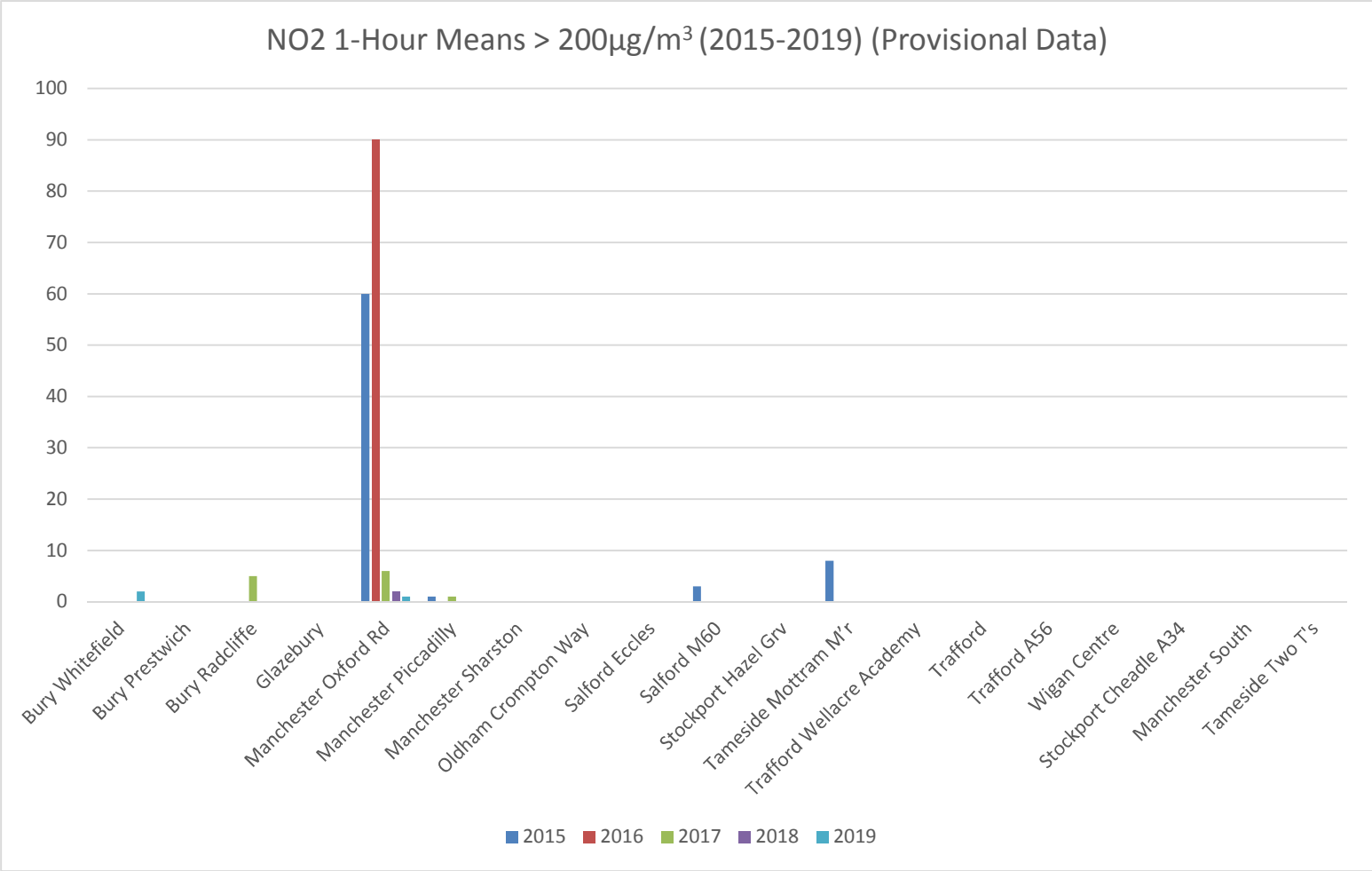


Table A.5 – Annual Mean PM_{10} Monitoring Results (Provisional)

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2019 (%) (2)	PM_{10} Annual Mean Concentration (µg/m^3) (3)				
						2015	2016	2017	2018	2019
Bury Whitefield	380637	406974	Roadside	N/A	96.23%	17	15	15	16	18
Bury Prestwich	381650	403222	Roadside	N/A	91.84%	20	19	19	19	19
Bury Radcliffe	378190	407480	Roadside	N/A	96.67%	18	18	16	18	17
Manchester Oxford Rd	384233	397287	Kerbside	N/A	96.56%	28	27	27	30	26
Manchester Piccadilly	384310	398337	Urban Centre	N/A	95.90%	20	20	20	21	20
Manchester Sharston	384179	386086	Suburban	N/A	100%	-	13.6	13.4	14.24	14.2
Oldham Crompton Way	393887	409191	Roadside	N/A	98.21%	19	17	17	19	19
Salford Eccles	377924	398728	Industrial	N/A	99.93%	18	17	16	17	15
Salford M60	374807	400858	Roadside	N/A	98.78%	20	20	20	20	21
Stockport Hazel Grv	391481	387637	Roadside	N/A	75.50%	18	19	16	19	15
Tameside Mottram M'r	399719	395804	Roadside	N/A	95.96%	18	18	17	19	18
Trafford	378783	394726	Urban Background	N/A	98.71%	15	15	13	14	15
Trafford A56	379413	394014	Roadside	N/A	98.96%	18	17	15	18	17

Wigan Centre	357816	406024	Urban Background	N/A	98.10%	18	16	15	17	15.65
Stockport Cheadle A34	385047	388339	Roadside	N/A	97.11%	-	-	18	19	17

☒ **Annualisation has been conducted where data capture is <75%**

Notes:

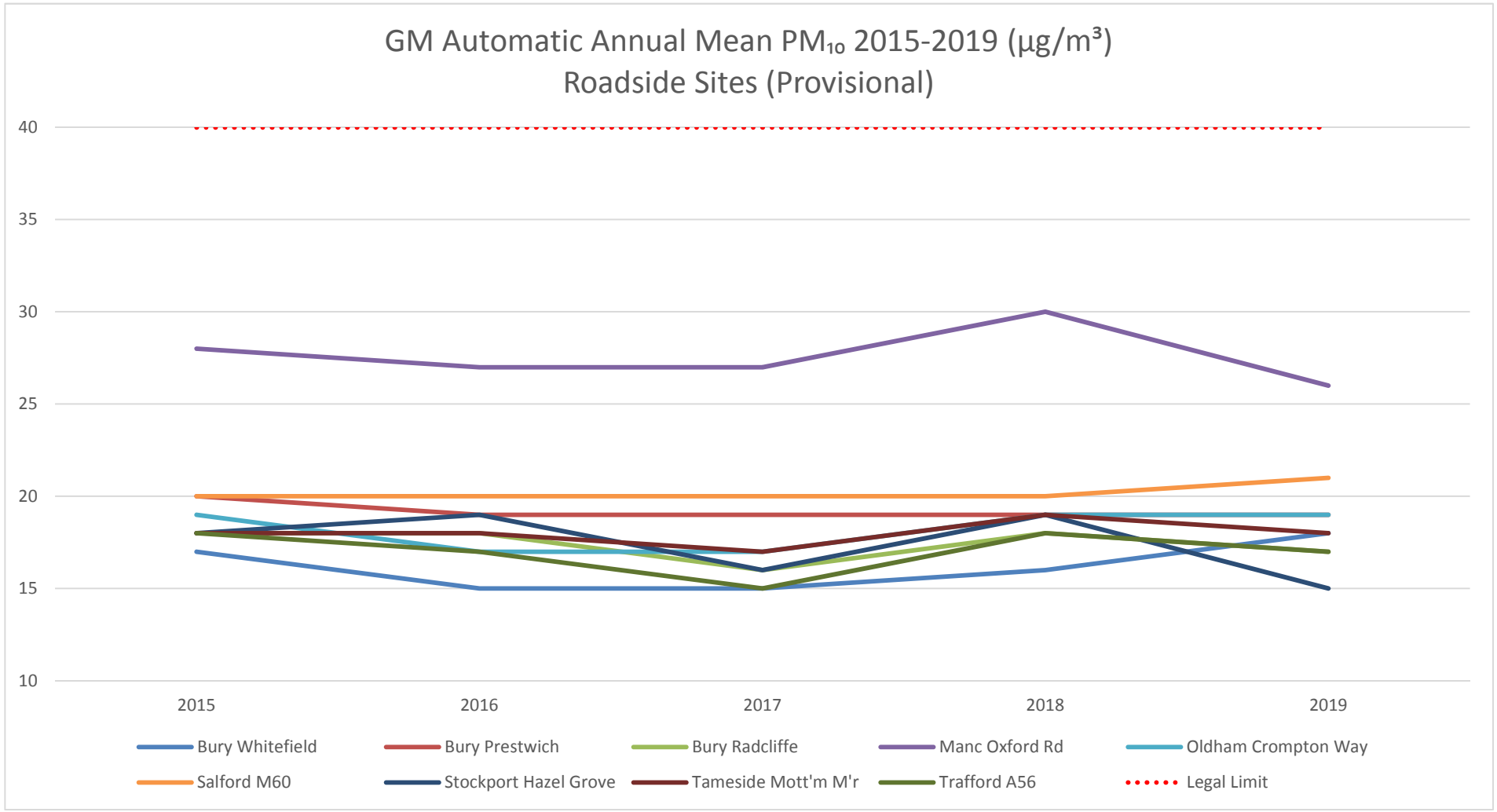
Exceedances of the PM_{10} annual mean objective of 40µg/m^3 are shown in **bold.**

(1) Data capture for the monitoring period, in cases where monitoring was only carried out for part of the year.

(2) Data capture for the full calendar year (e.g. if monitoring was carried out for 6 months, the maximum data capture for the full calendar year is 50%).

(3) All means have been "annualised" as per Boxes 7.9 and 7.10 in LAQM.TG16, valid data capture for the full calendar year is less than 75%. See Appendix C for details.

Figure A.3 – Trends in Annual Mean PM_{10} Concentrations (Provisional)



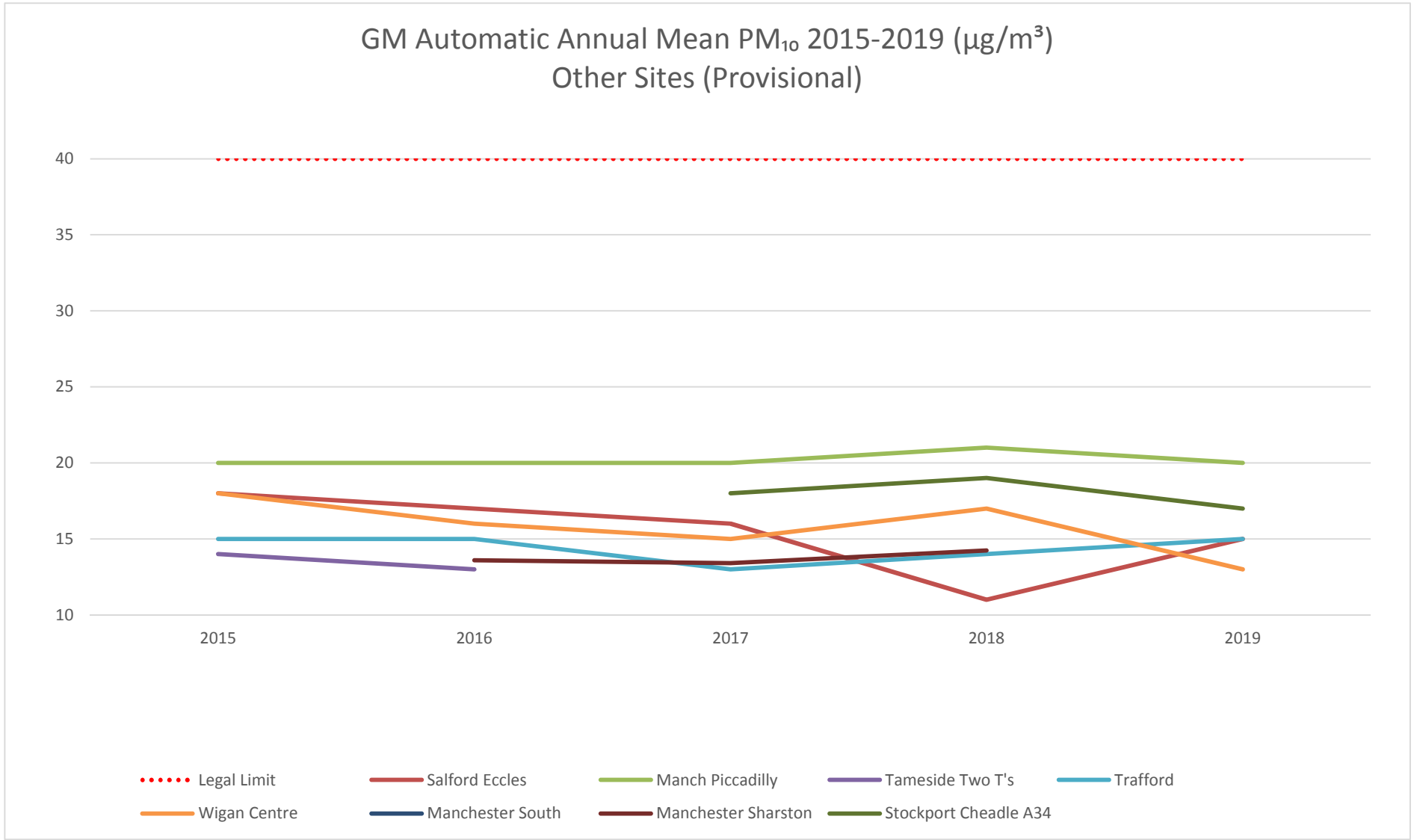

GM Automatic Annual Mean PM10 2015-2019 (µg/m3)
Other Sites (Provisional)
40
35
30
25
20
15
10
2015
2016
2017
2018
2019
Legal Limit
Salford Eccles
Manch Piccadilly
Tameside Two T's
Trafford
Wigan Centre
Manchester South
Manchester Sharston
Stockport Cheadle A34

Table A.6 – 24-Hour Mean PM_{10} Monitoring Results (Provisional)

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) [1]	Valid Data Capture 2019 (%) [2]	PM_{10} 24-Hour Means > 50µg/m^3 [3]				
						2015	2016	2017	2018	2019
Bury Whitefield	380637	406974	Roadside	N/A	96.23%	**6**	**1**	**1**	**2**	9
Bury Prestwich	381650	403222	Roadside	N/A	91.84%	**6**	**1**	**4(29)**	**1**	9
Bury Radcliffe	378190	407480	Roadside	N/A	96.67%	**5**	**2**	**1**	**1**	10
Manchester Oxford Rd	397287	397287	Kerbside	N/A	96.56%	**25**	**16**	**15**	**15**	18
Manchester Piccadilly	384310	398337	Urban Centre	N/A	95.90%	**3**	**3**	**3**	**2**	7
Oldham Crompton Way	393887	409191	Roadside	N/A	98.21%	**11**	**1**	**2**	**0**	9
Salford Eccles	377924	398728	Industrial	N/A	99.93%	**5**	**2**	**5**	**2**	8
Salford M60	374807	400858	Roadside	N/A	98.78%	**5**	**5(34)**	**8**	**4**	11
Stockport Hazel Grv	391481	387637	Roadside	N/A	75.50%	**6**	**5**	**1**	**5(33)**	3(26)
Tameside Mottram M'r	399719	395804	Roadside	N/A	95.96%	**3**	**0**	**2**	**0**	7
Trafford	378783	394726	Urban Background	N/A	98.71%	**2**	**0**	**0**	**0**	3
Trafford A56	379413	394014	Roadside	N/A	98.96%	**5**	**0**	**0**	**0**	5
Wigan Centre	357816	406024	Urban Background	N/A	98.10%	**1**	**0**	**3**	**1**	3

Stockport Cheadle A34	385047	388339	Roadside	N/A	97.11%	-	-	**0**	**0**	3
Manchester Sharston	384179	386086	Suburban	N/A	100%	-	**0**	**0**	**0**	3

Notes:

Exceedances of the PM_{10} 24-hour mean objective (50µg/m^3 not to be exceeded more than 35 times/year) are shown in **bold.**

(1) Data capture for the monitoring period, in cases where monitoring was only carried out for part of the year.

(2) Data capture for the full calendar year (e.g. if monitoring was carried out for 6 months, the maximum data capture for the full calendar year is 50%).

(3) If the period of valid data is less than 85%, the 90.4th percentile of 24-hour means is provided in brackets.

Figure A.4 – Trends in Number of 24-Hour Mean PM_{10} Results >50µg/m^3 (Provisional)

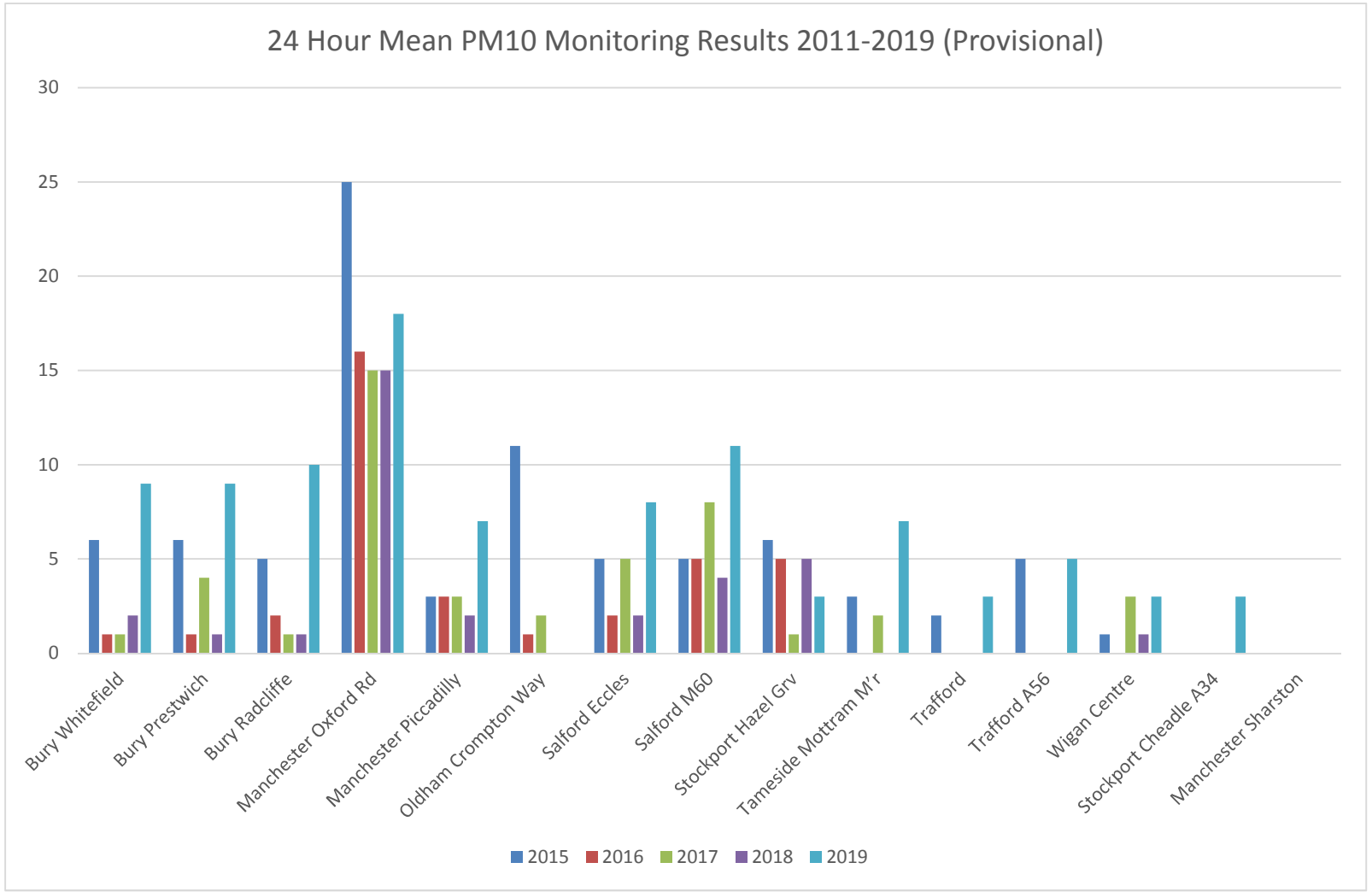


Table A.7 – $PM_{2.5}$ Monitoring Results

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2019 (%) (2)	$PM_{2.5}$ Annual Mean Concentration (µg/m^3) (3)				
						2015	2016	2017	2018	2019
Manchester Piccadilly	384310	398337	Urban Centre	N/A	92.15%	10	10	8	11	12
Salford Eccles	377924	398728	Industrial	N/A	99.93%	11	10	11	11	9
Salford M60	374807	400858	Roadside	N/A	97.50%	-	-	9	10	10
Wigan Centre	357816	406024	Urban Background	N/A	96.07%	11	11	10	12	10
Manchester Sharston (4)	384179	386086	Suburban	N/A		-	8.2	7.6	8.1	-

☒ Annualisation has been conducted where data capture is <75%

Notes:

(1) Data capture for the monitoring period, in cases where monitoring was only carried out for part of the year.

(2) Data capture for the full calendar year (e.g. if monitoring was carried out for 6 months, the maximum data capture for the full calendar year is 50%).

(3) All means have been "annualised" as per Boxes 7.9 and 7.10 in LAQM.TG16, valid data capture for the full calendar year is less than 75%. See Appendix C for details.

(4) PM2.5 is also usually monitored at Manchester Sharston, however the analyser is currently out of commission and awaiting replacement. It should be noted that PM2.5 levels at this site have previously been well within legal limits since the site was set up in 2016 and have not exhibited any significant upward trend.

Figure A.5 – Trends in Annual Mean $PM_{2.5}$ Concentrations (Provisional)

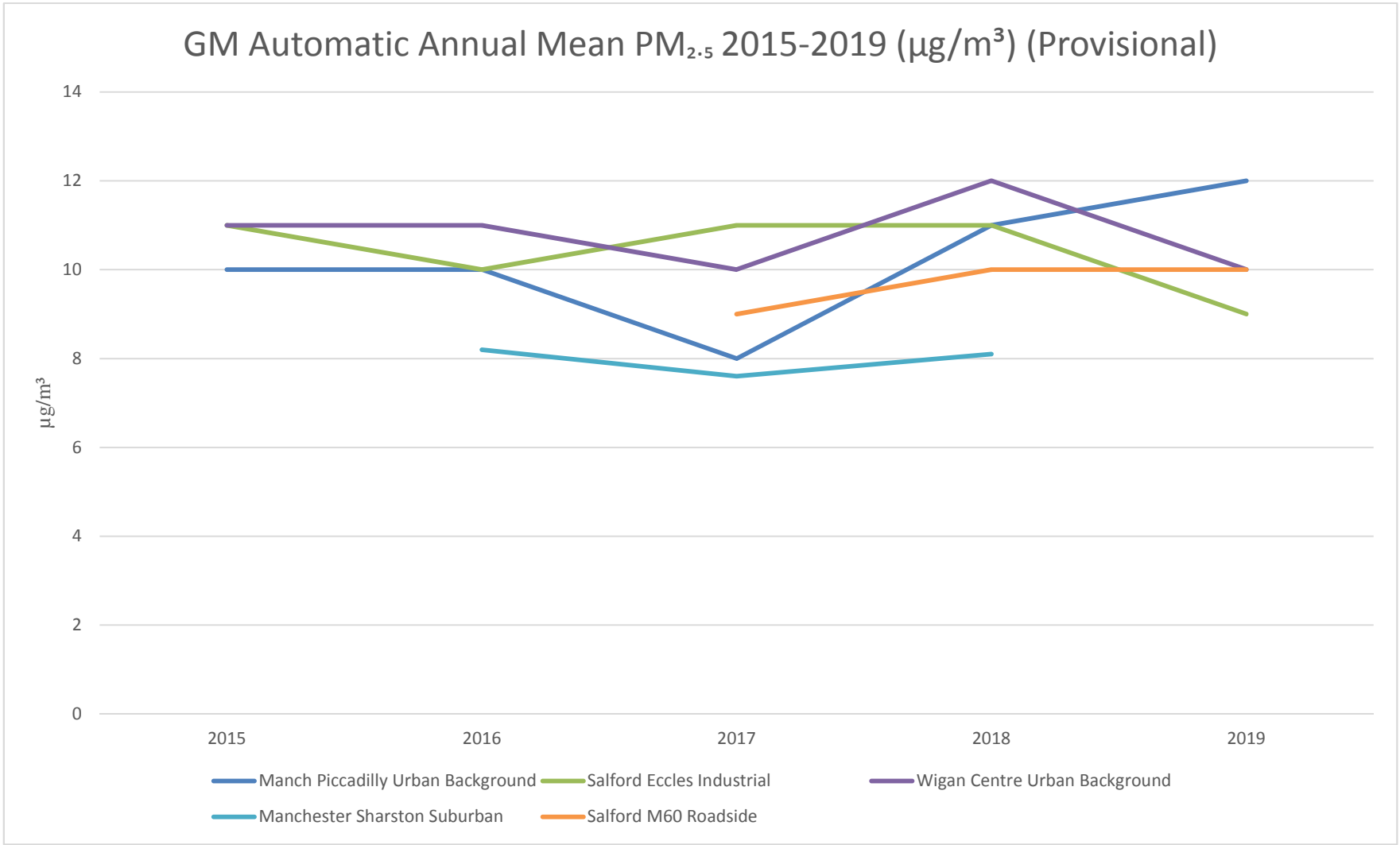


Table A.8 – SO_2 Monitoring Results

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for monitoring Period (%) [1]	Valid Data Capture 2019 (%) [2]	Number of Exceedances 2019 (percentile in bracket) [3]		
						15-minute Objective (266 µg/m^3)	1-hour Objective (350 µg/m^3)	24-hour Objective (125 µg/m^3)
Manchester Piccadilly	384310	398337	Urban Centre	N/A	89.49%	0	0	0
Manchester Sharston	384179	386086	Suburban	N/A	98.80%	0	0	0

Notes:

Exceedances of the SO_2 objectives are shown in **bold** (15-min mean = 35 allowed a year, 1-hour mean = 24 allowed a year, 24-hour mean = 3 allowed a year)

(1) Data capture for the monitoring period, in cases where monitoring was only carried out for part of the year.

(2) Data capture for the full calendar year (e.g. if monitoring was carried out for 6 months, the maximum data capture for the full calendar year is 50%).

(3) If the period of valid data is less than 85%, the relevant percentiles are provided in brackets.

Appendix B: Full Monthly Diffusion Tube Results for 2019

Table B.1 - NO_2 Monthly Diffusion Tube Results - 2019

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	NO_2 Mean Concentrations (µg/m^3)														
			Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean		
															Raw Data	Bias Adjusted (0.93) and Annualised (1)	Distance Corrected to Nearest Exposure (2)
BO15NO	371435	411690	51.4	64.6	37.0	33.7	31.6	35.6	33.1	40.0	47.8	45.1	43.6	50.7	42.9	39.9	32.4
BO4NO	371394	411718	41.7	45.9	24.9	21.6	19.0	22.3	19.5	25.8	23.1	33.5	33.1	38.7	29.1	27.1	
BO16NO	371304	411748	34.7	37.6	13.9	15.7	12.9	14.2	I/S	16.5	18.6	26.8	33	33	23.4	21.7	
BO3NO	370763	407929	52.1	60.2	35.1	42.3	36.8	41	36.2	33	39.5	50.8	59	45.4	44.3	41.2	33.3
BO48NO	375397	407457	44	37.6	26.2	17.7	20.9	22.5	21.8	21.7	28.5	29.8	I/S	56	29.7	27.6	
BO54NO	372908	412120	26.2	25.6	12.6	10.6	8.5	8.6	9.7	11.9	14.9	17.2	22.3	23.7	16.0	14.9	
BO53NO	373236	411968	32.9	30.9	15.2	16.6	13.3	17.5	13.3	15.7	19.5	23.5	26.5	26	20.9	19.4	
BO44NO	365599	409845	38.7	32.8	31.5	16.3	18.5	18.4	19.2	22.2	23.7	28.3	30	33	26.1	24.2	
BO45NO	365599	409845	42.8	23	29.2	16	19.8	20.2	21.1	24.4	26.1	25.2	27	30.1	25.4	23.6	
BO43NO	365501	409887	54.8	47.6	35.4	27.5	28.4	33.1	32.5	35.1	40.2	43.3	39.8	40.9	38.2	35.5	
BO11NO	363712	412396	23.5	17.6	10.7	7.1	8.1	8.6	8.8	10.1	13.2	14.2	18.5	18.9	13.3	12.3	
BO41NO	366286	406561	52.7	41.9	36	30	32.2	34.3	I/S	28.6	32.3	42.6	51.4	36.9	38.1	35.4	
BO60NO	373287	405061	49.1	44.9	29.5	33.3	24.6	29.7	23.4	28.6	32.2	37.7	42.1	37.8	34.4	32.0	
BO61NO	374450	405207	48.4	54.4	27.8	40.4	35.1	39.6	24.2	32.1	40	44.4	56.8	37.3	40.0	37.2	30.7

BO62NO	374194	405460	171	56.6	40.7	32.9	31.1	37.5	31.4	39.6	39	43.8	47.6	43.9	51.3	47.7	41.6
BO14NO	373839	406130	39.6	37.2	21.8	17.1	14.3	19.1	16.5	20.4	23.7	30.5	32.8	29.3	25.2	23.4	
BO63NO	374282	406257	41.9	44.5	23	23.7	16.1	21.1	19.1	19.9	24.1	24.6	35.4	29	26.9	25.0	
BO64NO	371965	409907	47.9	47.7	26.1	20.9	19.9	21.6	20.8	25.7	26.2	35.4	40.3	36.7	30.8	28.6	
BO65NO	372059	409877	41.7	38.2	26.1	19.9	19.2	25.7	I/S	28.5	31	31.2	38.7	17.2	28.9	26.8	
BO8NO	371352	409094	42.4	46.1	25.8	20.5	20.3	20.9	22.2	23.1	34.7	I/S	38.1	30.2	29.5	27.4	
BO66NO	371442	411599	58.9	45.5	29.3	32.6	32.9	31.6	32.7	35.6	39.4	37.2	49.4	48.2	39.4	36.7	36.7
BO67NO	365163	405640	35.7	31.3	19.4	18.2	13.4	14.9	14.5	18.9	I/S	24.4	33.9	25.7	22.8	21.2	
BO68NO	367672	406910	43.6	53.9	34.1	21.9	25	26	24.1	33.8	29.5	35.8	33.5	40.5	33.5	31.1	
BO69NO	369030	405809	69.6	58	47.7	46.6	48.1	49.8	43.2	45.5	44.4	53.5	62.8	45.8	51.3	47.7	
BO70NO	368757	405701	42.7	32.7	19.1	23.9	16.3	17.4	16.4	15.1	26.5	31.9	41.7	24.1	25.7	23.9	
BO71NO	370362	405400	70.3	70.6	57.6	52.7	51.7	51	48	46.8	61.5	62.2	64.3	48.3	57.1	53.1	26.9
BO72NO	370115	405372	46.2	47.7	26.9	32.5	26.6	18.9	23.5	25.4	32.8	37	45.6	35.5	33.2	30.9	
BO73NO	371805	409820	64.9	62.6	33.5	48.6	31.7	40.7	34.9	39.1	47.3	55.7	59.5	58.7	48.1	44.7	39.8
BO74NO	371805	409832	62.1	71.2	53.8	36.9	38.2	43.6	45.4	46	49.3	55.8	53.1	49.8	50.4	46.9	33.4
BO75NO	371623	409235	38.3	30.9	25.8	18.3	21.3	12.5	I/S	I/S	34.6	34.5	I/S	62.2	30.9	28.8	
BU1NO	384372	404917	41.9	45.9	35	26.4	26.9	27.6	30.4	33.7	30.4	36.3	39.3	43.8	34.8	32.4	
BU2NO	379101	417145	50.1	49.9	44.1	33.2	39.3	I/S	38	46.6	36.9	34.6	39.2	46.7	41.7	38.8	30.8
BU3ANO	380636	406973	42.4	43.1	28.7	19.6	20.6	19	20.7	25.2	25.8	32	35.3	34.2	28.9	26.9	
BU3BNO	380636	406973	41.8	39.3	28.5	19.9	17.4	19.9	21	24.7	25.1	30.8	35.6	32.3	28.0	26.1	
BU3CNO	380636	406973	43.9	40.9	26.9	21.3	19.4	18.5	20.9	24.3	23.6	29.4	33.6	33.5	28.0	26.1	
BU4NO	380964	404831	51.1	54.1	39.7	34.3	33.5	33.4	33.6	47.5	39.6	41.4	44.5	53.2	42.2	39.2	39.4
BU5NO	380501	405413	46.3	I/S	27.5	21.9	21.7	21	21.3	24.8	30.5	33.9	38.6	31.6	29.0	27.0	
BU6NO	379658	410888	53.3	50.1	41.3	32.9	33.9	23.2	34.9	37	38.8	I/S	46.4	38.2	39.1	36.4	36.4
BU7NO	381984	411866	45.2	I/S	I/S	18.9	22.8	26.1	31.3	33.6	31	34.9	35.7	49	32.9	30.6	
BU8NO	380754	412619	50.3	51.3	27.4	32.8	27.3	28.5	27.2	29.8	36.3	39.4	47.6	44.3	36.9	34.3	

BU9NO	379630	411031	52.5	46.6	40.3	20	30.8	26.9	31.2	35.7	34.5	43.8	46.8	48.1	38.1	35.4	
BU10NO	379854	410978	49.9	51.3	38.4	28.6	34.7	32.3	35.4	38.5	36.9	I/S	43	49.7	39.9	37.1	29.5
BU11NO	380980	411193	66.9	57.2	48.5	36.1	35.5	2.9	58.1	42.2	43.8	46.9	54.4	40	44.4	41.3	25
BU12NO	381344	410744	67.5	61.9	64.8	43	51.8	I/S	I/S	I/S	57.7	56.2	61.9	53.9	57.6	53.6	42.3
BU13NO	381804	410657	67	67	57.3	39.6	I/S	49.7	46.9	30.9	50.2	58.2	62.3	58.7	53.4	49.7	33.5
BU14NO	380398	410455	58.8	46.6	38.1	25.7	31.5	34.9	33	32.5	45.3	I/S	58.3	39.1	40.3	37.5	36.9
BU15NO	380852	405209	68	67.9	44.4	34.2	38.9	44	43.2	49.9	45.5	53.8	55.3	55.9	50.1	46.6	36.3
BU16NO	380914	404898	65.4	66.2	43.5	38.4	39.4	39.6	38.9	46.8	51.6	54.4	59.8	60.3	50.4	46.8	41.2
BU17NO	381105	404279	51.8	46.8	41.2	28.5	28.1	28.2	31.4	32.5	36.2	41.1	46	45.5	38.1	35.4	
BU18NO	382075	411364	57.2	49.4	30.8	38.2	32.7	35.2	29	32.9	I/S	48.7	53.3	44.7	41.1	38.2	33.4
BU19NO	381321	405115	54.2	I/S	40.2	48.8	40.3	37.9	38.8	48.6	39.5	49.3	43.8	56.3	45.2	42.1	37.4
MA8ANO	381384	387484	41.1	37.5	23.8	23.3	23.9	25.5	23.4	24.2	27.7	32.5	45.3	32.6	30.1	28.0	
MA9ANO	384601	398303	55.2	57.6	50.4	37.3	38.5	43.1	44.5	53.2	43.6	48.9	52.6	54.7	48.3	44.9	34.2
MA24NO	383954	398060	57.6	47.1	46.8	35.3	37.2	39.9	46	40.7	37.6	47.4	46	44.5	43.8	40.8	38.0
MA26ANO	383971	398876	50	43.3	32.1	27.7	25.9	30.3	25.9	25.9	30.5	38.2	49.4	46.5	35.5	33.0	
MA28NO	387951	397430	53.1	41.9	31.7	27	27.9	33.9	33.1	32.7	38.2	46.5	58.4	41.9	38.9	36.1	32.0
MA29ANO	384114	397512	70.6	63	52.5	I/S	55.9	56.9	58.1	57.1	58.5	62.8	66.2	53.6	59.6	55.4	49.5
MA36NO	385205	399750	46.8	43.1	33.2	22.1	26.6	27.9	28.7	31.2	32.6	37.8	39.4	39.6	34.1	31.7	
MA37NO	382829	391493	55.6	47	45.8	21.9	35.9	37.1	38.2	38.9	41.3	42.6	51.7	43.2	41.6	38.7	27.4
MA59NO	384310	398337	47.3	43.6	32.8	30.4	25.5	30.1	28.3	30.3	35.5	39.9	40.8	42	35.5	33.1	
MA60NO	384310	398337	46.7	45.5	32.9	30.7	26	28.5	27.5	29.8	32.9	36.3	44.7	39.2	35.1	32.6	
MA61NO	384310	398337	45.5	42	31.4	30	26.4	30.4	27.9	30	29.3	34.2	44	37	34.0	31.6	
MA71NO	385161	398290	59.8	60.6	46.6	33.5	33	39.8	49.1	47.9	44.5	54.3	56.6	58.5	48.7	45.3	40.9
MA72NO	384761	397384	49.8	39.6	35.5	23.2	28.1	30.3	30.8	30.1	30.8	35.6	50.8	38.9	35.3	32.8	
MA73NO	388601	396048	58.5	43.3	37	31.6	32.8	37.8	38.8	31.9	45.5	42.2	60.4	31	40.9	38.0	35.0
MA74NO	385399	390093	51.5	43.1	36	24.4	29.1	29.1	32.6	31.1	34.3	40.1	43.4	39	36.1	33.6	

MA75NO	387363	394617	59.9	54.7	44.6	39.4	39.4	45.7	48.5	43	50.1	58.8	68.2	53.9	50.5	47.0	40.9
MA77NO	383602	397488	58.5	49.9	48.1	41.2	37.4	41.4	42.5	42.9	46.3	49.2	58.1	47.9	47.0	43.7	52.2
MA78NO	386289	396828	51.7	40	35.7	19.2	23.8	27.2	32.6	31.6	36	40	48	40.5	35.5	33.0	
MA79NO	386875	395861	45.2	40.3	33.3	15.5	25.1	26.5	29.6	27	31.6	35.4	42.5	26.4	31.5	29.3	
MA80NO	387358	393990	47.6	40.6	34	25	27.9	33	32.3	29.2	38.3	37.6	47.9	35.2	35.7	33.2	
MA81NO	386589	394083	34.7	30.9	24.9	16.4	17	20.9	20.9	20.7	24.1	26	31.5	29.6	24.8	23.1	
MA82NO	384233	397287	65.6	62.5	63.3	39.9	46.1	48	56.1	55.7	51	57.9	64.6	54.8	55.5	51.6	39.6
MA83NO	384233	397287	67.1	60.8	57.5	36.2	45.4	50.9	54.9	56.2	48	58.6	62	52.3	54.2	50.4	39.0
MA84NO	384233	397287	67.9	64.6	56.4	37	47.4	49.5	54.9	57.4	56.9	57.9	64.8	56.2	55.9	52.0	39.8
MA88NO	387150	396808	61.8	49.3	37	47.9	36.2	45.5	44.1	41.8	48.3	54.8	66.6	49.9	48.6	45.2	40.7
MA86ANO	387020	396561	49.6	46.2	26.9	27.8	27	30.8	27.9	29.8	32.7	43	50.1	42.1	36.2	33.6	
MA87ANO	386536	396699	51.2	44.4	I/S	30.3	28.2	31.1	34.1	33.2	36.5	30.4	41.5	41	36.5	34.0	
MA88ANO	384469	398981	53.9	52.8	49.4	29.3	32.7	37.9	45.6	48.7	49	44.6	57.5	57.1	46.5	43.3	34.5
MA89ANO	386681	396806	46.5	38.2	30.3	16.7	21	27.2	29.1	28.7	28.1	39.2	45.2	40.6	32.6	30.3	
MA90BNO	384202	386121	31.9	25.3	21.3	16.1	15.2	17.2	16.2	17	18.9	21.4	27.7	22.2	20.9	19.4	
MA91BNO	384202	386121	28.5	27.2	21.2	13.3	15	16	16.6	16.8	17.8	21.7	28.6	12.4	19.6	18.2	
MA92BNO	384202	386121	25	23	22.1	15.4	14.6	16.8	16.8	17.4	18.2	22.8	27.4	24.3	20.3	18.9	
MA93BNO	382419	390010	59.9	51.2	47.9	32.6	40.9	40.6	40.6	44	48.6	47.1	55.1	45	46.1	42.9	32.5
MA94BNO	382083	388414	41.6	40.6	37.7	20.2	28.9	31.8	33.8	30	35.5	34.8	41	37.9	34.5	32.1	
MA95BNO	386568	397580	67.8	56.8	I/S	19.4	I/S	34.9	40.8	42.9	43.8	51.4	56.6	52.7	46.7	43.4	35.7
MA96BNO	385189	397167	63.2	44.1	38.6	40.2	37.8	41	52.3	32.3	49.9	54.9	79.3	60.1	49.5	46.0	46.0
MA97BNO	382886	397215	43.6	35.2	29.1	32.5	24.8	31.4	31	24	36.2	32.5	60.1	36.2	34.7	32.3	
MA98BNO	388460	403313	50	47.9	37.9	22	28.1	31	I/S	34.2	33.6	43.8	51.7	48.5	39.0	36.2	33.0
OLMSNO	388871	400997	44.2	34.1	36.9	17.6	28.8	19.8	21	24.3	28	32.4	40.1	31.8	29.9	27.8	
OLNSNO	391217	403860	42.3	41.4	27.5	22.4	28.7	18.8	19.3	23.7	28.7	34.8	40.9	26.6	29.6	27.5	
OLTSNO	393782	405093	46.9	47.2	36.9	19.3	32.9	23	I/S	30.1	30.6	36.1	51	40.4	35.9	33.3	

OLCW1NO	393884	409183	47.8	34.5	25.3	21.6	42.2	24.7	29.4	31.2	33.7	39.3	45	37.9	34.4	32.0	
OLCW2NO	393884	409183	53	40.6	32.4	23.1	43.1	27.9	29.1	32.7	33.2	34.7	43.3	36.8	35.8	33.3	
OLBWNO	390125	404833	39.1	34	23.4	20.4	25.2	17.4	16.2	20.1	23.6	30.5	36.1	31.4	26.5	24.6	
OLOBNO	389715	403625	51.3	55.3	40.9	19.8	40.5	31.1	32.1	40.9	37.9	43.2	45.9	42.7	40.1	37.3	33.4
OLRDNO	392111	406432	54.7	51	30.2	27.6	I/S	25	24.5	I/S	34	45.3	50.7	46.6	39.0	36.2	36.2
OL136RDNO	391863	407968	47.6	39.6	25.2	19.6	28.4	19	18.7	23.9	29	36.9	41.9	31.7	30.1	28.0	
OLSHSNO	390394	405454	48.1	42.2	25.3	28.7	30.4	I/S	22.1	I/S	I/S	52.1	57.8	42.7	38.8	36.1	29.8
OLHRNO	390756	402571	55.8	53.7	48.2	22.7	43.3	32.9	36.5	43.8	I/S	46.7	47.8	49.2	43.7	40.6	39.2
OLARNO	392771	402951	46.1	I/S	33.7	22.8	35.3	23.4	24	26	33.5	36.5	44.9	35.5	32.9	30.6	
OLSMWNO	392748	405294	35.8	49.2	35.7	17.8	33.9	25.3	25.7	33.5	28.4	34.7	35.9	42.3	33.2	30.9	
OLNSLNO	395225	404648	34.8	32.9	25.1	13.4	19.3	13.6	14.4	18.9	17.9	24.3	I/S	29.8	22.2	20.7	
OLCVNO	399533	404454	N/A	17.4	21.7	16.8	22.6	18.5	17.8	17.6	20.3	25.5	27.9	19.5	20.5	19.1	
OLHSNO	399589	405511	N/A	37.9	33.6	24.5	35.7	26.7	26.8	30.4	27.8	34.9	39.1	37.6	32.3	30.0	
OLHURNO	395561	405751	N/A	35	38.2	36	47.8	33.2	28.7	I/S	37.6	40.7	49.8	38.4	38.5	35.8	
OLRRNO	394210	405752	N/A	41.6	42.7	25	46.5	32.1	33.4	37.7	36.9	38.9	42.8	39.8	37.9	35.3	
OLDLNO	390770	404695	N/A	33.9	28.9	22.4	26.2	20.5	21.5	25.4	29.8	33.4	39.8	33.8	28.7	26.7	
OLMRNO	390746	405397	N/A	38.6	35.3	21.9	35.7	25.4	26.2	31.3	33.9	35.6	47	41.3	33.8	31.5	
RO2ANO	388537	409942	42.7	51.9	31.8	37.9	29.9	29.9	27.9	39.8	27.8	31.5	I/S	I/S	35.1	32.7	
RO3ANO	388581	409797	32.8	29.6	23.6	19.7	20.4	20.1	18.9	18.2	23.2	24	30	24.1	23.7	22.1	
RO4ANO	387080	406278	41.6	42.4	27.1	21.3	21	25.1	24.1	26.4	28.7	21.7	33.8	115.4	35.7	33.2	
RO5ANO	386870	404044	37.4	33	33.6	15.5	16.8	15.5	18.5	19.8	< 1.0	48.2	27.4	24.4	26.4	24.5	
RO6ANO	385413	408320	53.9	52.8	40.1	45	39.4	38.8	44.3	46.1	44.1	50.4	53.3	40.5	45.7	42.5	
RO7ANO	388603	411925	47.3	46.4	21.3	37.7	24.5	30.1	26.8	I/S	18.4	37.2	47.1	42.7	34.5	32.1	
RO8ANO	388932	412091	60	56.4	38.4	46.5	44	42.2	46.6	43.2	48.7	56.5	54.1	40.5	48.1	44.7	27.8
RO9ANO	389057	412217	45.8	53.4	36.3	34.2	34.8	41.3	39.4	40.9	42.5	48.8	48.9	44.6	42.6	39.6	30.2

RO10ANO	388800	413603	32	< 1.0	I/S	I/S	I/S	I/S	I/S	I/S	I/S	I/S	23.1	27.4	27.5	17.7	
RO12ANO	392072	415687	53.2	56	35.5	31.6	I/S	33.8	32.3	39.8	40.8	47.4	44.1	51.4	42.4	39.4	31.7
RO13ANO	392042	415707	27.3	< 1.0	< 1.0	< 1.0	I/S	12.3	13.4	15.7	16.4	21.1	23	20.8	18.8	17.2	
RO14ANO	393665	417816	I/S	23	10.7	I/S	7.8	9.2	9.4	12.2	I/S	< 1.0	16.5	I/S	12.7	12.9	
RO15ANO	392976	411906	I/S	39.7	28.3	25.8	I/S	25.2	24.2	26.4	27.1	28.4	32.5	32.9	29.1	27.0	
RO16ANO	392542	411709	31.5	< 1.0	I/S	26.2	20.3	I/S	I/S	19.9	23.2	24.2	28.5	9.8	23.0	19.9	
RO17ANO	391214	412609	36.6	36.2	22.8	I/S	16.2	19.1	20.1	22.2	22.8	24.9	27.3	29.4	25.2	23.5	
RO18ANO	389877	413590	46.1	40.9	31.7	20.7	19.1	22.4	21.6	23.2	I/S	27.3	35.2	< 1.0	28.8	26.8	
RO19ANO	389971	413646	54.2	48.9	32.9	30.1	29.5	30.8	34	I/S	I/S	41.6	47	35.5	38.5	35.8	
RO20ANO	385814	408942	49.9	46.4	31.4	20.4	22.7	28.3	28	33.2	I/S	34.2	36.2	39.9	33.7	31.3	
RO21ANO	385820	410776	47.9	58.1	36.9	28	25	30.5	35.2	37.6	I/S	I/S	46.6	56.1	40.2	37.4	31.5
RO22ANO	390464	411976	61.4	53	39.3	I/S	36.8	41.5	42.2	I/S	I/S	45.8	49.8	49.8	46.6	43.4	34.8
RO23ANO	390377	412030	50.7	46.2	35.5	33.2	I/S	I/S	33.5	31.1	I/S	42.3	56.1	37.1	40.6	37.8	36.0
RO24ANO	388089	410822	45.3	44.4	25.8	22.6	22.7	27	26.9	27.6	I/S	34.2	39.8	38.6	32.3	30.0	
RO25ANO	387798	406006	54.7	45.7	26.3	30.9	31.2	31.5	27.1	30.2	31.9	42	59.4	I/S	37.4	34.7	
RO26ANO	389790	414230	60.6	49.8	41.4	30.9	35.9	37.4	44.3	42.6	I/S	49.6	52.3	47	44.7	41.6	39.9
RO27ANO	390707	414563	57.8	55.9	40.8	41.5	29.9	36.8	40.7	I/S	< 1.0	97	54.2	40.8	49.5	46.1	41.5
RO28ANO	392871	415127	53.4	39.6	30.8	< 1.0	I/S	25.1	26.3	I/S	I/S	33.1	32.9	35.3	34.6	29.5	
SA1NO	372767	394104	31.8	25.5	20	16.3	15.3	16	16.4	17.3	20.2	24.9	32.5	20.5	21.4	19.9	
SA2NO	372140	394210	36.3	27.6	19.7	15.5	15.8	15.9	16.2	16.4	19.4	22.3	32.5	23.3	21.7	20.2	
SA4NO	377453	401830	40.7	32.1	22.2	24.1	21	21.6	21.1	20.9	26.3	32.5	40	31.9	27.9	25.9	
SA9NO	374741	400937	35.3	37.7	20	24	18.1	18.9	19.5	22.9	23.3	31	35.3	30.1	26.3	24.5	
SA13NO	379613	399783	37	34.8	19.8	18.1	13.9	16.9	I/S	17.9	20.7	28.3	35.2	19.9	23.9	22.2	
SA14NO	382833	401035	47.8	42.3	34.2	I/S	26.4	26.9	30.5	28.9	32.7	34.5	I/S	35.4	34.0	31.6	

SA16NO	371200	404485	34.4	33	19.1	17.2	I/S	14.9	15	14.7	18.7	23.2	I/S	23	21.3	19.8	
SA17NO	380742	400862	35.7	49	41.6	25.2	28.7	27.4	33.3	37.3	38.2	60.1	80.6	44.2	41.8	38.9	36.7
SA20NO	374807	400858	52.5	65.6	34.1	50.8	36.8	40.9	34.7	42.2	35.9	50.5	49.1	44.5	44.8	41.7	
SA21NO	374807	400858	51.6	64.4	37	50.1	41.5	39.1	35	I/S	38.9	48.6	41.3	42.4	44.5	41.4	
SA22NO	374807	400858	46.6	65.7	33.6	54.6	37.7	39.4	36.4	41.3	35	50.2	42.1	50	44.4	41.3	
SA23NO	377924	398728	32.1	33.4	26	23.1	19.9	21	21.2	20.2	26.5	27.2	41.7	28.1	26.7	24.8	
SA24NO	377924	398728	42	33.9	25.3	24	19.7	20.2	20.7	20.7	24.6	32.4	40.8	25.8	27.5	25.6	
SA29NO	377924	398728	40.2	32.9	24.9	23.3	20.3	21.6	20.8	20.9	26.3	31.7	39.9	24	27.2	25.3	
SA25NO	381304	398014	41.9	40	28.2	33	23	25.6	26.3	23.5	29.7	36.8	48.2	33.2	32.5	30.2	
SA26NO	380718	399597	52.3	37.8	28.4	31.5	30	33.1	29.8	26.4	35.7	40.4	52.3	19.6	34.8	32.3	
SA27NO	383078	398741	42.4	49.5	35.6	28.2	31.1	36.2	35.4	38.1	39.7	50	48.2	45.7	40.0	37.2	34.9
SA31NO	374025	401905	45.8	40.2	24.1	22	21.1	I/S	25.8	24.7	30	34.6	43.9	34.1	31.5	29.3	
SA33NO	372600	400721	45.7	40.4	32.8	24.7	22.1	25.3	29.5	27.1	32.7	36.3	42.1	35.2	32.8	30.5	
SA34NO	375367	397800	57.2	53.2	43.3	30.5	37.8	40.3	34.8	37.8	40.2	44.7	52.7	42	42.9	39.9	39.1
SA38NO	377788	403063	42.9	32.2	23.2	24.2	24	24.2	22.5	20.6	25.7	33.2	40.5	30.2	28.6	26.6	
SA39NO	383040	398563	52.6	56.9	43.9	47.6	37.2	41.3	40.5	37.4	40	47.6	46.6	47	44.9	41.7	41.6
SA44NO	380412	398439	54	45.9	38.9	28.2	25.7	27.6	31.9	32.9	34.2	44.9	50.9	44.2	38.3	35.6	
SA50NO	375396	397805	43.4	49.1	42.9	32.6	34	36.4	38.2	34.9	36.1	40.2	I/S	48.3	39.6	36.9	37.7
SA51NO	375213	397661	49.7	44.5	29.9	36.7	28	30.6	28.1	29	34.5	42.9	55.3	38.9	37.3	34.7	
SA52NO	375149	397587	41.6	41.5	25.5	29.5	21.8	26	25.4	26.3	26.2	40.3	41.4	36.5	31.8	29.6	
SA53NO	374757	399891	50.3	43.2	36.1	22.4	25.1	25.7	30.5	31.4	30.5	34.6	39.5	38.4	34.0	31.6	
SA54NO	374901	399981	37.3	39.6	30.8	17.8	19.5	21.5	24.1	24.8	26.9	30.8	37.8	34	28.7	26.7	
SA55NO	372850	400733	43.5	48.9	32	28.9	25.6	22.2	30.5	31.2	32.9	36.7	48.8	34.8	34.7	32.2	
SA56NO	368758	396031	25.8	22.1	14	12.9	9.9	10	10.5	13.1	13.7	15.9	25.8	17.7	16.0	14.8	
SA57NO	368758	396031	27.8	22.3	12.7	14.9	10.7	9.1	10.1	11.4	13.9	17.6	25.2	19.4	16.3	15.1	
SA58NO	368758	396031	25.5	19.9	7.5	10.9	9.8	9.6	I/S	10.9	13.9	18.4	25.5	15.8	15.2	14.2	

SA59NO	381822	397895	48.4	39.3	29.5	32	24.1	< 1.0	27	22.5	34.2	38.6	53	35.2	34.9	32.4	
SA60NO	382445	397724	51.6	43.4	37.9	34.7	32.6	32	30.6	30.1	41.4	45.1	56.7	36.9	39.4	36.7	34.5
SA61NO	377264	400941	58.8	40.6	44.4	33.6	36.9	37.6	37.2	33.8	42.4	42	53.6	39.2	41.7	38.8	33.7
SA62NO	380768	399637	48.2	43.9	33.6	25.4	25.3	27.4	28.7	30.4	32.3	35.4	43.2	41.2	34.6	32.2	
SA63NO	374673	399912	59.7	59	53.3	27.3	40.4	40.6	48.6	47.2	43.8	44.8	38.3	48.5	46.0	42.7	49.5
SA64NO	378804	399844	42.2	41.5	31.2	18.8	18.4	22.4	24.7	25.1	29	33.6	39.6	33	30.0	27.9	
SA65NO	378584	399220	60.3	56.5	53.6	32.6	37	35.7	44.3	43	40.2	49.8	53.2	49.6	46.3	43.1	34.5
SA66NO	375118	398502	46.4	39.6	23.3	38.9	28.3	31.8	28.7	25.1	31.1	I/S	50.2	35.8	34.5	32.1	
SA68NO	373570	403096	64.4	87	44.1	48.4	41.9	43.3	46.2	50.3	54.8	56.4	63.9	52.7	54.5	50.6	44.8
SA69NO	379397	401370	62.4	67.6	48.7	47.3	41.3	46.2	51.9	51.1	49.4	50.8	55	47	51.6	47.9	34.8
SA70NO	381677	398832	47.2	I/S	I/S	27	20.5	25.8	26.5	24.3	30.8	36.6	47	33.6	31.9	29.7	
SA71NO	381351	397185	52.1	48.8	32.4	31.9	29.4	32.3	35.6	36.8	38.7	43.6	51.6	45.5	39.9	37.1	31.2
SA72NO	377536	401804	60.8	58.9	52.8	42.7	48.7	47.1	51.7	I/S	52.6	61.6	59.7	49.6	53.3	49.6	41.0
SA73NO	374576	400611	51.1	64.3	44.3	53.8	44.5	47	42.2	40	45.8	46.9	54.2	54.5	49.1	45.6	
SA74NO	376315	399249	58	57	42.1	34.5	29.8	33.3	34.3	38.8	42.4	46.3	49.6	49.1	42.9	39.9	40.4
SA75NO	379608	398539	49.8	41.7	33.9	30.1	28.2	31.1	26.6	29.1	30.9	40.9	51.6	37.7	36.0	33.4	
SA76NO	380540	398422	55	44.9	39.5	27.4	29.6	33	34.5	32	39.5	42.7	63.8	38.9	40.1	37.3	36.7
SA77NO	381686	398504	47.7	49.2	29	33.8	24	30	28.3	30.7	32.9	40.6	48	39.6	36.2	33.6	
SA78NO	381220	399529	60.1	56.8	47.3	42.8	35.6	46.6	48.1	45.9	48.4	55.2	62	53.2	50.2	46.7	40.2
SA79NO	382602	398519	53.7	59.6	38.3	29.4	32.5	36.5	38.8	40.6	39.2	45.2	67.5	49.2	44.2	41.1	39.8
SA80NO	375428	401417	N/A	N/A	N/A	19.8	32.3	29.5	35.3	30.8	33	35	41.5	33.9	32.3	30.1	
SA81NO	382571	397718	N/A	N/A	N/A	N/A	N/A	34.3	41.4	36.4	I/S	54.3	62.2	52.2	46.8	46.4	
ST1NO	389077.064	392011.822	35.9	28.3	I/S	I/S	14.6	16.8	1.1	18.1	19.7	24.4	31.7	< 1.0	21.2	19.7	
ST2NO	385047	388339	56.4	48.3	46.9	18.1	37	34.8	36.5	34.7	37.3	40.6	70.8	40.6	41.8	38.9	34.2
ST3NO	388550.609	391846.389	41.1	38.6	31.9	14.5	19.4	21.4	22.7	22.6	25.4	31.5	28.7	33.5	27.6	25.7	

ST4NO	396469.167	390800.349	24.3	17.8	12.9	12.1	10.5	9.4	11.5	11	13.9	14.2	21.1	I/S	14.4	13.4	
ST5NO	396868.651	382692.179	17.3	10.3	9	11.3	6.2	6.6	7.6	5.3	6.4	8.4	17.6	8.5	9.5	8.9	
ST6NO	385953.537	388534.058	28	22.4	17.9	12.9	11.5	14.2	13.4	12.2	16.3	19.1	27.3	19.7	17.9	16.7	
ST7NO	392063.265	386968.54	55.3	59.9	37.3	31.9	32	36.2	33.9	36.7	43.5	43.9	53	46.1	42.5	39.5	34.2
ST8NO	392016.512	387042.782	34.6	28.2	25.5	15.2	18.2	17.8	20.3	18	22.8	25.2	31	24.4	23.4	21.8	
ST9NO	392742.788	385680.865	25.2	17.8	15.3	11.7	9.7	9.2	11.2	9.8	14.1	15	21.5	15.3	14.7	13.6	
ST10NO	392781.3	387271.486	29.4	20.2	16.4	11.7	9.5	10.5	12	10.8	14	15.4	18.7	18.8	15.6	14.5	
ST11NO	391083.207	387938.058	55.6	48.1	38.7	33.5	32.5	31.9	32.6	32.3	40.6	38	42.9	40.5	38.9	36.2	35.2
ST12NO	385047	388339	55.5	49.8	42.9	31.9	33	32.8	35.8	34.2	38.2	31.6	45.1	41.5	39.4	36.6	34.0
ST13NO	384679.794	386357.007	30.5	22.1	17.7	12.9	11.5	13.4	14.3	13.5	17.7	< 1.0	51.1	18.1	20.3	18.8	
ST14NO	385047	388339	46.5	46.7	44.5	27	36	38.2	38.8	35.9	37.4	31.2	44	41.1	38.9	36.2	30.7
ST15NO	389886.321	388961.332	< 1.0	13.1	< 1.0	3.6	26.7	28.3	12.4	24.9	29.6	33.7	43.8	< 1.0	24.0	22.3	
ST16NO	391568.679	391225.883	42.8	31.9	31.1	18	20.8	24	26.3	22	24.9	27.9	37.9	29.9	28.1	26.2	
ST17NO	388442.177	390077.487	47.7	31	27.5	23.3	21.8	23.7	23.5	19.4	24.8	30	41.9	28.6	28.6	26.6	
ST18NO	389272.176	390440.811	51.3	53.8	42.6	26.4	32.7	36.8	40.3	37.6	38	40	44.6	41	40.4	37.6	37.3
ST19NO	389479.355	393463.855	57.6	53.8	48.4	28.7	35.9	34.2	42.3	I/S	45.7	43.6	44.9	46.2	43.8	40.7	40.7
ST20NO	386921.232	389528.855	59.2	43.3	53.9	28.9	29.6	41.8	39.9	32.5	37.4	36	49.3	35.2	40.6	37.7	37.2
ST21NO	388598.721	389415.552	38.9	31.2	19.2	13	13.4	16.9	17.3	16.9	22.5	25.3	37.9	26.4	23.2	21.6	
ST22NO	391483.11	387635.566	40.3	28.7	22.1	29.3	20.7	21.6	21.6	16.4	23.5	26	42.8	25.2	26.5	24.7	
ST23NO	391483.11	387635.566	39.6	29	22.6	24.4	22.8	21.3	21.5	16.9	25.7	28.7	37.4	22.9	26.1	24.2	
ST24NO	391483.11	387635.566	42.5	25.6	20.5	26.2	21.3	22.6	21.6	15.7	23.7	31.6	41.5	24	26.4	24.6	
ST25NO	395770.138	388655.432	39	33.9	28.9	26.8	24.4	26.3	28.5	22.4	30.6	31.1	40.5	30.5	30.2	28.1	
ST26NO	389396	387357	30	20.8	14.1	12.4	10.2	11.2	11.1	9.1	15.1	18.1	27.2	17.7	16.4	15.3	
ST27NO	387091	391384	29.7	24	16.7	15.4	11.5	12.4	12.9	12.7	17.8	23.8	29.8	19.7	18.9	17.5	
ST28NO	385700.368	386219.938	52.3	61	38.4	37.5	29.7	36.6	37.1	31.5	40.1	40.8	54.5	38.3	41.5	38.6	34.7

ST29NO	390087.537	388545.187	33.3	25.8	20.2	13	12.2	13.6	12.6	13	18.4	20.1	31.2	21.8	19.6	18.2	
ST31NO	392441	391747	56.5	49.6	37.2	31.8	I/S	32	37.8	35.6	37.2	42.9	51	39.9	41.0	38.2	33.6
ST32NO	389480	390957	44.3	47.9	32	30	30.1	31.8	I/S	33.5	29.9	41.9	47.2	41.8	37.3	34.7	
ST33NO	390416	390087	46.6	49.2	43.3	33.3	33.3	36.4	38.6	30.9	40.4	39.3	51.6	42.1	40.4	37.6	34.1
ST34NO	388304	390351	58	50	43.3	38.7	37.9	43.7	36.3	33.5	46.9	44.4	57.2	43.5	44.5	41.3	31.3
ST35NO	395020	385360	27	24.9	25.5	22	23.7	24.5	23.1	20.2	28.5	26.1	40.5	23.5	25.8	24.0	
TA1NO	394050	397190	40.5	37.7	I/S	19.1	15	23.3	21.5	0	26.5	24.7	37	28.4	27.4	25.5	
TA2NO	394788	394933	36.4	32.2	26.7	20.8	17.7	22.7	20	0	27.8	27.5	34.2	37.8	27.6	25.7	
TA3NO	390560	395415	43.8	30.3	24.4	29.8	23.3	20.1	21.1	0	30.3	35.4	45.5	32.8	30.6	28.5	
TA5NO	400507	396518	24.9	18.6	14.5	11.1	7.8	9.7	10	0	12.3	15.6	20.2	13.5	14.4	13.4	
TA9NO	393451	394330	29.3	21.8	19	10.4	10.1	11.4	12.5	0	16	18.2	23.6	19.3	17.4	16.2	
TA10NO	392516	396748	55.6	46.4	42.1	27.4	31.6	33.2	33.4	0	37.3	42	51.4	43.3	40.3	37.5	27.8
TA11NO	400390	396025	61.5	70.8	56.4	52.1	52.3	53	57.8	0	62.4	64	64.8	56.2	59.2	55.1	51.6
TA12NO	393451	394330	29.7	22.1	17.5	10.3	10.9	11	12.7	0	14.2	19	24.2	19.4	17.4	16.1	
TA13NO	392586	398431	56	48.2	47.3	33.3	37.5	32.3	39.6	0	46.8	46.5	53.5	45.9	44.3	41.2	37.7
TA14NO	393710	398790	55.2	45.9	37.4	30.7	34.1	31.8	30.7	0	40	44.6	47.6	44.1	40.2	37.4	36.9
TA15NO	395371	398736	I/S	I/S	I/S	I/S	I/S	22.7	22.3	0	26.1	29.5	35	25.9	26.9	26.7	
TA16NO	391435	397970	61.7	49.2	42.8	36.9	37.2	37	36.2	0	46.6	53.3	53.8	46.3	45.5	42.4	35.5
TA17NO	389106	398242	53.6	43.1	< 1.0	23.5	27.4	26.3	28.4	0	39.1	36.8	49.6	39.4	36.7	34.1	
TA18NO	391970	395521	64.1	45.1	50.2	37.8	42	41.6	41.8	0	42.9	42.6	60.8	45.1	46.7	43.5	39.1
TA19NO	392477	395506	48.5	41.3	35	40	34.5	37.3	28.9	0	31.1	53.5	60.8	37.3	40.7	37.9	33.9
TA20NO	394610	395102	50.5	45.1	47	31	24.4	34.4	34.1	0	39	39.8	50.5	42.5	39.8	37.1	33.1
TA21NO	400423	395965	62.1	58.4	45.6	45.8	46	49.4	40.5	0	61.9	53.4	49.3	40.8	50.3	46.8	35.9
TA22NO	393249	399159	36.3	28.8	23	16.3	15.5	17.1	16.7	0	19	24.9	29.9	26.5	23.1	21.5	
TA23NO	393621	398589	35.7	29.3	23.2	20.5	18.8	16.8	18	0	23.7	25.3	33.2	25.6	24.6	22.8	

TA24NO	390475	395621	60.9	34.5	34.2	29.6	29	30.6	26.2	0	33	56.5	58	30.1	38.4	35.7	
TA25NO	396950	402329	39.5	31.4	35.4	22	22.9	23.3	30.6	0	30.9	36.7	35.3	< 1.0	30.8	28.6	
TA26NO	394948	401815	37.5	31.1	18.5	17.3	14.9	16.5	16.6	0	21.8	25	30.6	I/S	23.0	21.4	
TA27NO	396177	398218	45.7	32	30.6	24.4	23.8	24.9	22	0	30	33	40.7	32.2	30.8	28.7	
TA28NO	393050	401038	49.4	46.6	32.3	28.3	33.6	32.7	30.3	0	I/S	42.1	42.8	39.4	37.8	35.1	
TA29NO	393370	399494	36.3	35.2	25.9	17.5	17.6	21.2	19.3	0	25.1	30.4	32.6	29.7	26.4	24.6	
TA30NO	393419	399691	53	45	34.1	32.2	30	33.7	31.8	0	37.4	43.7	48.2	42	39.2	36.4	30.9
TA31NO	396899	402450	31.7	I/S	I/S	I/S	I/S	17.3	13.8	0	20.6	I/S	57.7	24	27.5	27.2	
TA32NO	396982	402437	36.3	34.2	24.3	21.3	20.5	21.6	21.7	0	25.9	30.4	32.5	27.7	26.9	25.1	
TA33NO	397010	402560	38.1	32.6	24.8	16.2	19.2	23.9	21.2	0	23.3	27.5	30	29.2	26.0	24.2	
TA34NO	397060	402581	40.7	30.9	25	I/S	20	20.9	17	0	24.4	18.5	20.5	29.9	24.8	23.0	
TA35NO	397080	402540	44.7	49.6	38.9	I/S	32.9	35.8	30.7	0	32.4	46.3	46	39.5	39.7	36.9	36.9
TA36NO	397060	402387	38.4	28	26.6	12	18	16.4	19.1	0	23.2	28.7	24.7	25.4	23.7	22.0	
TA37NO	396728	402073	52.7	45.4	23.5	24.9	34.1	29.3	22.9	0	37.4	35.2	33.6	35.6	34.1	31.7	
TA38NO	394006	399392	46.3	41.4	31.9	22.7	24.8	25.4	28.2	0	32	35.9	40.2	38.7	33.4	31.1	
TA39NO	394114	399366	49.9	43.8	37.3	20.2	25.7	30.8	32.3	0	37.4	36.9	41.9	42.4	36.2	33.7	
TA40NO	394066	399315	49.3	38.1	31.7	23.1	25.3	27.3	24.7	0	33.7	35.5	43.8	34.2	33.3	31.0	
TA41NO	394118	399259	41	41.8	35.5	23.5	27.5	27.6	30.9	0	33.3	36.6	36	40.8	34.0	31.7	
TA42NO	394494	399010	45.1	38.6	28.4	21.4	23.3	24.3	25.5	0	34.9	36.2	42.7	36.2	32.4	30.1	
TA43NO	394214	398933	55.1	50.8	43.7	33.8	35.9	38.5	39	0	43.3	39.2	51.1	46.7	43.4	40.3	33.7
TA44NO	397418	394398	32.6	18.5	12.4	13.1	10.6	12.4	11.9	0	15.2	17.1	24.9	14.9	16.7	15.5	
TA45NO	399719	395805	66.6	52	51.4	59.5	55.2	58.1	49.8	0	56.5	62.6	68	46.8	57.0	53.0	47.9
TA46NO	399719	395805	68.8	54	50.8	66.5	60.2	62.8	51.1	0	55.6	57	74	44.2	58.6	54.5	49.2
TA47NO	399719	395805	73.8	54	50.7	67.1	56.3	62.8	48.2	0	59.5	61.8	76.1	47	59.8	55.6	50.1
TA48NO	392699	395733	50.9	36.6	34.4	20.1	30.2	29	28.1	0	38	37.6	48.2	35.4	35.3	32.8	
TA49NO	393731	398770	52.7	42.5	45	26.8	33.5	35	33.3	0	39.7	42.9	49.4	38.8	40.0	37.2	36.1

TA50NO	393498	398704	62	52.2	50.3	35.7	42.5	44.8	39.4	0	45.3	44.9	52	45.6	46.8	43.5	41.4
TA51NO	393314	398624	56.3	45.9	48.4	20.5	34.8	37	37.1	0	40.8	39.2	I/S	39.6	40.0	37.2	30.5
TA52NO	393509	398737	52.5	55	47.6	42.5	32.2	32.7	40	0	50.1	54.8	59.7	49.7	47.0	43.7	38.2
TA53NO	393133	398536	57.3	41.7	35.7	30.6	31.5	34.7	27	0	38.7	36.7	56.7	39.6	39.1	36.4	29.8
TA54NO	392958	398474	67.6	62.9	39	42.7	49	49.7	43.3	0	60.5	53.5	63.6	49.7	52.9	49.2	46.4
TA55NO	392743	398465	71.8	68.3	51.2	42.4	50.5	42.3	59.3	0	69.2	69.8	68.5	61.9	59.6	55.4	47.3
TA56NO	392490	398368	62.9	43.1	46.6	26.7	41.9	54.5	39.4	0	54.9	47.5	58.7	40.8	47.0	43.7	37.5
TA57NO	392844	398544	62.9	59.3	42.7	44.4	36.3	44.2	37.8	0	47.8	48.6	59.2	50.9	48.6	45.2	38.4
TA58NO	393080	398620	53.8	48.2	39.7	32.8	33	33.6	28.6	0	42	43.9	51.7	37	40.4	37.6	27.9
TA59NO	395652	399140	30.1	29.1	20.5	14.2	14.1	14.5	15.2	0	17.4	27.3	28.1	24.1	21.3	19.8	
TA60NO	395747	397112	44	34.6	24.6	20.5	18.6	41.2	22.5	0	27.7	29.8	38.8	27	29.9	27.8	
TA61NO	395683	399172	41.2	36.5	29.4	17.8	22.2	18.6	14.9	0	24.4	19.6	30.9	28.7	25.8	24.0	
TA62NO	396576	399240	37.6	30.3	27.2	14.5	17.7	17.5	20.1	0	22.2	31.2	23.5	30.8	24.8	23.0	
TR5NO	379052	392043	34.9	31.7	19.6	26.6	20	23.1	20.7	19.5	18.9	34.1	37.1	27.1	26.1	24.3	
TR9NO	380933	395889	37.8	32.3	22.4	17.4	18.2	22.7	20.5	20.6	26.5	22.7	38.4	30.9	25.9	24.1	
TR19NO	378783	394728	29.3	29.8	17.3	14.6	12.5	I/S	I/S	13.4	20.4	26.2	29.5	26.3	21.9	20.4	
TR19ANO	378783	394728	27.9	32.3	15.6	16.4	11.9	I/S	I/S	13.6	20	24.6	29	26.3	21.8	20.2	
TR19BNO	378783	394728	31.5	35.4	13.8	16	12.9	I/S	I/S	13.2	21.8	26.5	29.2	23.7	22.4	20.8	
TR20NO	379418	394009	45.2	49.2	I/S	1.1	I/S	26.8	23.7	25.3	28.9	34.8	35.6	38	30.9	28.7	
TR20ANO	379418	394009	41.7	55.6	25.5	19.7	23.1	28.4	26	22.3	29.4	37.6	39.7	36	32.1	29.8	
TR20ANO	379418	394009	47.8	42.8	26.2	20.5	24.6	I/S	27.4	27.6	30.9	34.9	34.9	34.7	32.0	29.8	
TR21NO	379619	396371	51.1	43.1	22.2	18.1	19.6	22.6	20.9	21.5	22.6	37.5	38.3	30.4	29.0	27.0	
TR22NO	377061	390086	50.2	55.1	25.5	29.1	32.4	33.3	28.7	27.8	37.4	46.2	53.2	36.8	38.0	35.3	
TR13NO	381221	396441	52	51.5	I/S	27.3	30.6	38.1	35.8	29.6	36.8	46.7	53.5	41.7	40.3	37.5	35.9
TR15NO	379089	393282	38.9	37.3	18.9	28.1	26.6	34.8	24.4	19.6	30.4	39.6	52.2	34.5	32.1	29.9	
TR16NO	377416	395756	45.1	43.8	18.9	27	24.5	29.7	26.2	23	32.6	41.4	46.1	35.8	32.8	30.5	

TR16ANO	377416	395756	45.4	44.3	19.9	24.8	< 1.0	52.6	25.6	24.7	28.4	41.5	45.3	35.5	35.3	32.8	
TR18NO	378822	389010	29.2	28.1	15.3	14.8	11.5	I/S	13.4	11.9	17.6	23.6	26.1	20.9	19.3	18.0	
TR23NO	376438	396383	42.6	37.6	I/S	29.6	I/S	45.1	36.9	31.2	39.7	45.7	45.5	39.3	39.3	36.6	34.9
TR23ANO	376395	396360	57.1	43.7	34.8	32.3	35.9	34.8	32.8	27.8	38.1	42.3	53.2	38.3	39.3	36.5	31.5
TR24NO	379263	385812	38.5	26.9	20.8	23.5	19.8	21.6	19.2	14.5	25.6	25.7	42.1	24.4	25.2	23.5	
TR25NO	373755	394477	I/S	I/S	11.6	13	11.1	I/S	I/S	10.8	14.4	21.4	I/S	17.8	14.3	15.2	
TR25ANO	373755	394477	I/S	I/S	11.6	14.2	11.1	I/S	I/S	I/S	14.1	20.8	I/S	16.8	14.8	14.7	
TR25BNO	373755	394477	I/S	I/S	10.7	13.3	10.6	I/S	I/S	11	14.4	19.8	I/S	14.5	13.5	13.0	
TR26NO	379272	393666	51.6	65.2	30.8	35.6	32.3	38.2	34	36.2	40.9	48.4	I/S	41.7	41.4	38.5	49.8
TR26ANO	379272	393666	50.9	73.5	30.9	35.4	38.3	37.9	33.8	35.4	39.7	43.4	I/S	46.2	42.3	39.3	40.6
TR27NO	371419	390760	30.3	31.1	18.4	14.2	14.3	< 1.0	I/S	14.4	20.8	27.9	36.7	25	23.3	21.7	
TR28NO	376851	387792	N/A	N/A	N/A	N/A	N/A	N/A	N/A	27.3	31.1	37.3	41.3	I/S	34.3	29.8	
WI14NO	366880	403255	48.1	47.8	33.1	30.1	28.3	30.4	30	31.6	33.7	36.8	36.3	35.6	35.2	32.7	
WI23NO	361835	404090	50.5	39	38.7	36.2	30	29.5	30.5	26.9	37.9	40.6	52	34.9	37.2	34.6	
WI27NO	358341	405539	59.7	34.6	14.2	35.6	17.7	26.8	20.6	28	33.9	33.5	42.4	42.8	32.5	30.2	
WI28NO	366424	399894	51.3	44.8	39.3	27.3	29.9	32.8	I/S	I/S	I/S	41.3	54.3	I/S	40.1	33.6	
WI30NO	363833	402028	41	37.1	24.8	24.9	19.1	24.8	22.2	22.7	28.7	35.7	40.8	32.6	29.5	27.5	
WI33NO	359723	405537	67.3	I/S	65.5	35.6	32.9	33.3	38.4	I/S	41.2	42.9	50.3	45.2	45.3	42.1	36.9
WI35NO	357132	398670	50.4	49.5	42.7	24.1	29.8	30.1	32.4	41.6	39.5	40.6	39.1	62	40.2	37.3	29.6
WI47NO	357812	406021	96.1	41.9	17.9	12.8	11.9	17	13.8	20.8	24.8	30.3	39.3	33.7	30.0	27.9	
WI48NO	357812	406021	104.6	43.6	18.2	14.2	13.3	16	14.9	21.5	25.2	31.2	38.5	35	31.4	29.2	
WI49NO	357812	406021	105.3	46.3	20	9.9	10.6	16.1	15.7	20.1	25	29.9	40.1	30.5	30.8	28.6	
WI51NO	358787	405933	I/S	I/S	75.3	27.7	24.8	25	23.1	24.6	31	34.2	43.1	31.8	34.1	31.7	
WI52NO	362137	399948	49.7	57	39.5	41.2	30.6	34.2	34.5	38.4	43.1	45.9	49.8	44.6	42.4	39.4	33.4
WI53NO	353896	408518	38.3	35.9	26.2	19.9	20.7	22	21.9	23.7	25.9	29.6	36	33.6	27.8	25.9	

WI54NO	370612	400586	44.8	44	26.9	28.7	24.9	27.5	25.3	29.6	30.2	37.4	40.6	31.3	32.6	30.3	
WI61NO	364025	403080	44.1	43.8	29.8	38	30.4	32.8	30.7	I/S	N/A	N/A	N/A	N/A	35.7	34.4	
WI63NO	356928	404982	41	35.9	27.1	27.5	25.8	26.2	25.6	24.7	29.1	36.2	40.4	30.4	30.8	28.7	
WI71NO	368244	402563	48.7	39.1	35.2	28.1	31.2	33.3	34.8	26.4	34.8	37.6	44.4	33.1	35.6	33.1	
WI81NO	355979	410362	41.2	I/S	61.3	21.3	18	22.5	23.5	20.1	27.5	29.9	39.1	28	30.2	28.1	
WI114NO	365115	400259	55.6	52.9	41.3	28.7	35.9	37	38.5	39.4	42.7	47.1	54.1	41	42.9	39.9	31.6
WI115NO	353845	405360	28.3	42.5	17.3	40	24	23.5	20.7	21.2	26.6	33.1	38.1	33.3	29.1	27.0	
WI116NO	365864	401720	34.6	30.2	18.2	16.4	10.1	13.5	15	15.9	18.8	24.2	30.5	25.8	21.1	19.6	
WI117NO	357048	405200	43	49.2	22.6	23.2	28.4	30.2	32.8	29	33.9	36.4	44.5	34.5	34.0	31.6	
WI118NO	357287	405114	I/S	I/S	15.3	19.4	16.6	17.5	20	I/S	25.2	29.6	39.5	28	23.5	21.8	
WI119NO	357289	405107	60.7	66.7	35.8	41.8	35.8	40.9	I/S	42	28.3	51.4	59	I/S	46.2	43.0	29.4
WI121NO	357088	405158	50.3	51.1	25.6	34.5	34.4	36.8	35.4	33.6	40.9	44.2	51.8	37.3	39.7	36.9	36.9
WI122NO	356883	405239	50.6	64.5	23.7	43.3	31.1	37.5	34.4	34.1	40.9	47.8	I/S	44	41.1	38.2	22.6
WI124NO	357310	403672	I/S	76.6	21.1	13.1	18.9	20.9	18.8	21.9	25.2	34.2	44.4	31.1	29.7	27.6	
WI125NO	357645	404259	59.4	40	35.3	21.5	29.7	31.5	25.5	29.7	33.6	42.8	51.4	38	36.5	34.0	
WI126NO	355819	402194	30.4	31.2	14.4	16.6	11.9	12	14	14.8	17.6	23.3	30.1	25.8	20.2	18.8	
WI127NO	355473	403194	42.4	47	24.7	29.3	26.8	29.8	27	27.4	33.6	42.3	47.1	35.9	34.4	32.0	
WI128NO	356817	402536	41.2	43.9	26.4	28.5	24.1	25.3	I/S	I/S	28.6	I/S	71.3	I/S	36.2	31.3	
WI129NO	356848	402906	I/S	149.5	I/S	I/S	I/S	43.9	I/S	45.8	51.4	59.1	65	51.5	66.6	58.2	50.1
WI130NO	356354	403838	43.6	39.6	I/S	I/S	20.2	23.8	22.3	21.5	28.6	34.3	44.9	32.2	31.1	28.9	
WI131NO	356667	404065	48	I/S	31.2	22.7	26	22.3	19.6	19.2	28.8	35.4	44.9	35.7	30.3	28.2	
WI132NO	356869	404808	40.9	42	25.5	25.1	14.8	21.9	21.8	23.7	27.1	35.5	42.7	35.6	29.7	27.6	
WI133NO	356748	404786	44.2	45.4	28.7	28.9	22.3	25.7	25.8	29.1	32.9	38.5	46.4	38.2	33.8	31.5	
WI134NO	356428	404722	36.3	34.4	24	24.2	18.4	20.9	19.8	19.1	25.7	32.7	41.8	30.4	27.3	25.4	
WI135NO	354614	404685	49.9	48.9	39.8	31.3	34.3	29.6	36.7	I/S	40.4	46.4	49.2	41.1	40.7	37.8	37.8
WI136NO	354057	404824	48.3	38.5	38.8	27.1	27.6	29.4	30.5	28.8	I/S	39.6	46	35.2	35.4	33.0	

WI137NO	353844	404922	42.5	45.4	30	41.3	28.5	30.9	27.8	28.3	36.1	48.4	53.7	43.1	38.0	35.3	
WI138NO	355321	404017	35.2	34.8	19.5	I/S	12.7	14.6	I/S	17.7	21.4	27.5	36.7	30.8	25.1	23.3	
WI139NO	355638	404023	40.5	38.4	23.6	21.1	19.5	23.1	21.6	23.3	I/S	30.1	36	I/S	27.7	25.8	
WI140NO	355816	404062	42.2	37.8	22.9	22.8	16.6	22.5	18.5	22.5	29.4	35.6	43.7	44.6	29.9	27.8	
WI141NO	356469	404550	39.7	36.7	22.8	22.1	17.9	19	19.4	21.8	26.7	34.1	42.2	30	27.7	25.8	
WI142NO	360528	403020	45.1	43.9	35	22	24.7	28.5	28.5	32.4	I/S	36.7	40.8	31.1	33.5	31.2	
WI143NO	360321	402935	35.3	30.2	21.8	19.4	16.1	18.6	18.5	17.1	21.3	26.8	31.2	27.2	23.6	22.0	
WI144NO	360643	402297	56.7	44.6	35	25.7	25.4	29.6	29.9	31.2	36.4	43.6	49	42.1	37.4	34.8	
WI145NO	360515	402212	50.9	42.6	31.8	I/S	26	25.7	29.7	28.3	34.5	38.8	44.5	37.7	35.5	33.0	
WI146NO	360306	402279	39.7	37.5	19.3	23.4	13.9	20	16.8	19.9	23.4	30	37.2	30.6	26.0	24.2	
WI147NO	360437	405089	41.6	I/S	58.9	23.3	23.9	22.4	23.6	26.9	31.4	36.5	37.1	35.9	32.9	30.6	
WI148NO	361247	404576	38.2	40.5	30.9	28.3	23.4	23.4	25.3	24.4	30	32.5	44.1	34.9	31.3	29.1	
WI149NO	363081	403512	57.3	45.2	38.9	30.1	30.7	29.4	30	30.1	37.9	41	51	38.5	38.3	35.7	
WI150NO	361579	404298	59	46.7	42.5	38.5	37	40.4	41.7	38.5	45.7	47.9	54.5	41.7	44.5	41.4	41.4
WI151NO	361501	404216	41.1	37	21.9	27.3	17.3	22	18.9	19.2	23.9	31.5	41.7	32.6	27.9	25.9	
WI152NO	364021	402391	37.8	35.4	19.2	23	17.6	21.3	16.5	15.6	23.1	31.5	42.7	22.5	25.5	23.7	
WI153NO	364955	402768	38	35.7	21.1	21.9	17	19.9	17.8	19.8	22.7	29.3	35.5	I/S	25.3	23.6	
WI154NO	365054	403019	35.7	28.3	19.5	20.8	15.9	17.9	15.8	14.5	19.8	24.8	34.9	25	22.7	21.1	
WI155NO	366233	403024	41	33.8	24.3	24.2	15.4	20.6	18.8	19.1	25.4	31.4	34	29.3	26.4	24.6	
WI156NO	366324	402151	I/S	37.3	22.8	26.4	19.4	22.8	21.4	21.2	27.2	31	42.2	30.1	27.4	25.5	
WI157NO	366458	402462	41.5	32.9	25.9	23.7	22	24.9	21.7	20.8	26.7	31.4	40.3	27.9	28.3	26.3	
WI158NO	365615	401368	48.5	43.3	32.1	25.9	24.7	26.2	23.7	< 1.0	52.4	36.5	40.2	36.5	35.5	33.0	
WI159NO	368024	403514	40.1	34.6	24.7	26.5	22.5	24.1	21.2	22.2	28.9	35.9	43.5	I/S	29.5	27.4	
WI160NO	368671	402250	47.4	41.5	35.3	31.4	28.3	30.7	31	31.4	35.5	39	I/S	39.1	35.5	33.0	
WI161NO	369635	402019	45.7	35.4	31.2	23.1	21.6	24.2	23.2	23.9	30.2	34	48.3	23.5	30.4	28.2	

WI162NO	370534	401953	48.4	39.1	32.1	28.5	28.4	31	27.8	24.4	34.6	40.9	52.4	34.4	35.2	32.7	
WI163NO	371234	401895	51.4	41	37.2	25.5	29.3	30.8	34.9	33.2	40.3	40	49.1	43.3	38.0	35.3	
WI164NO	371981	401209	44.7	39.5	27.2	22.4	21.9	21.6	24.9	25.8	28.9	33.9	40.2	35.8	30.6	28.4	
WI165NO	371039	400996	43	37.3	27.9	26.7	22.8	26.2	25.6	28.3	30.7	33.1	42.3	33.9	31.5	29.3	
WI166NO	368414	399638	35.2	25.3	18.7	18.8	15.4	15.3	16.5	14.3	19.8	23.6	34.3	23.8	21.8	20.2	
WI167NO	363544	397934	40.4	30.9	29.9	21.3	22.7	22	23.7	23.8	27.2	30.4	36.7	30.2	28.3	26.3	
WI168NO	362463	397005	51.1	49	38.2	28.5	30.2	30.7	31.7	35.5	37.5	43.6	51.4	33.7	38.4	35.7	
WI169NO	362557	396906	49.7	32.3	39.1	29.9	29.5	29.1	31.9	29.5	35.4	34.1	51.6	29.7	35.2	32.7	
WI170NO	362236	396675	42.7	31.3	29.5	23	25.9	27.4	26.2	25.4	31.7	34.2	41.6	29	30.7	28.5	
WI171NO	357095	400717	45.6	43.6	33.3	31.9	29.8	29.9	28.7	28.2	35.2	40.3	45	37.2	35.7	33.2	
WI172NO	356881	401314	44.8	42.5	29	25.1	22.9	28.4	27.5	30	36.3	41.3	48.4	39.1	34.6	32.2	
WI173NO	357983	405377	54.3	43.5	26.4	38.9	25.5	I/S	29.3	33.3	36.8	44.9	48.9	41.7	38.5	35.8	
WI174NO	358294	405137	62.9	45.1	I/S	36.7	31.1	33.8	38.7	34.2	38.6	40.5	53.8	36.8	41.1	38.2	29.8
WI175NO	358537	405774	45.7	34.6	30.8	25.5	22.7	25.4	22.7	24.4	27.7	33.3	40.8	33.8	30.6	28.5	
WI176NO	359227	405480	57.9	I/S	59.2	24.5	23.2	27.4	25.7	28.9	33.3	38.8	41.1	38.1	36.2	33.7	
WI177NO	356230	410105	74	I/S	64.8	26.4	26.3	25.8	26.9	24.8	34	35.1	48.9	28.5	37.8	35.1	
WI178NO	356021	410128	58.7	I/S	92.6	36.5	39.9	37.7	43.6	41.9	49.4	44.6	58.9	42	49.6	46.1	30.4
WI179NO	354900	410475	42.8	I/S	63	20.2	17.4	19.6	23.1	23.6	26.8	32.6	38.3	30.3	30.7	28.6	
WI180NO	362105	396491	80.3	69.8	67.5	43.3	53.4	49.8	63	58.8	64.7	66.6	72.1	57.7	62.3	57.9	57.9
WI181NO	354828	406235	I/S	I/S	I/S	I/S	22.8	23.4	24.6	26	31.9	33.9	39.6	35.3	29.7	30.8	
WI182NO	358756	406175	I/S	70.5	17.6	21.5	25.4	24.9	27.9	26.6	29.3	30.1	34.7	32.4	31.0	28.8	
WI183NO	358595	405297	113.8	I/S	I/S	20.9	29.7	31.7	34	33.3	37.5	30	41.7	48.7	42.1	39.2	30.9
WI184NO	358013	405654	I/S	I/S	I/S	I/S	20.3	28.2	24.7	25.5	32.6	30.4	48.5	35.8	30.8	30.0	
WI185NO	358054	405613	I/S	I/S	I/S	I/S	26.7	29	27.4	30.6	34.3	35.7	41.7	36.1	32.7	31.8	
WI186NO	358070	405587	I/S	I/S	I/S	I/S	30.8	33.5	I/S	36.1	44	48.5	53.2	45.7	41.7	40.6	38.5
WI187NO	360470	402400	51.5	49.5	35.6	41.9	33.5	32.6	30.3	35.1	38	41.1	41	41.3	39.3	36.5	23.9

WI188NO	362111	396526	52.5	50	44.4	26.4	36.8	33	38.7	42	41.7	44.7	46.9	37.1	41.2	38.3	38.3
WI189NO	362095	396547	45.1	51.6	27.6	37.5	29.3	30.1	28.7	27.9	34.4	43.6	51.1	46.2	37.8	35.1	
WI191NO	358611	405994	N/A	89.4	17.6	32.2	23.7	28.4	25.3	27.2	30.9	35.5	39.3	40.2	35.4	32.9	
WI192NO	356771	403124	N/A	N/A	N/A	N/A	N/A	26.9	21.7	23.7	35.5	37.4	45.9	40.2	33.0	33.1	

☐ **Local bias adjustment factor used**

☒ **National bias adjustment factor used**

☒ **Annualisation has been conducted where data capture is <75%**

☒ **Where applicable, data has been distance corrected for relevant exposure in the final column**

Notes:

Exceedances of the NO_2 annual mean objective of 40µg/m^3 are shown in **bold**.

NO_2 annual means exceeding 60µg/m^3, indicating a potential exceedance of the NO_2 1-hour mean objective are shown in **bold and underlined.**

(1) See Appendix C for details on bias adjustment and annualisation.

(2) Distance corrected to nearest relevant public exposure.

Appendix C: Supporting Technical Information / Air Quality Monitoring Data QA/QC

Diffusion Tube Annualisation

Annualisation is applied where monitoring has been completed for less than 75% of the year and are used to estimate an annual average from a part year average. The example in Figure C1 below shows calculations used to annualise 11 diffusion tubes, as recommended by DEFRAs Local Air Quality Management Technical Guidance (TG16).

Annualisation was applied to 20 diffusion tubes in 2019.

Figure C.1 Annualisation Calculations of Diffusion Tubes

RO10

Diffusion Tube Period	Start Date	End Date	Period average continuous background monitoring site results ug/m3			Diffusion tube site result ug/m3	Period average continuous background monitoring site results ug/m3		
			B1 - Salford Eccles	B2 - Glazebury	B3 - Trafford Wellacre Academy	D1 - RO10	B1 when D1 is available	B2 when D1 is available	B3 when D1 is available
January	09/01/2019	06/02/2019	39.3	25.5	25.2	32	39.30266	25.51842	25.18939
February	06/02/2019	06/03/2019	31.8	20.1	20.8				
March	06/03/2019	05/04/2019	22.9	11.0	13.5				
April	05/04/2019	01/05/2019	23.9	13.7	17.4				
May	01/05/2019	04/06/2019	17.9	10.4	9.7				
June	04/06/2019	03/07/2019	18.3	9.4	9.0				
July	03/07/2019	07/08/2019	15.0	8.5	8.4				
August	07/08/2019	04/09/2019	16.3	8.5	9.4				
September	04/09/2019	02/10/2019	22.6	10.4	12.5				
October	02/10/2019	06/11/2019	28.3	14.9	18.0				
November	06/11/2019	03/12/2019	38.9	25.7	25.6	23.1	38.9	25.66	25.6
December	03/12/2019	08/01/2020	26.8	15.2	15.6	27.4	26.8	15.24	15.6
Average			**25.2**	**14.4**	**15.4**	**27.5**	**35.0**	**22.1**	**22.1**

2. Annualisation calculation

For continuous monitoring site B1

	Result	Unit
Annual mean of B1 (	25.17	ug/m3
Period mean of B1 (P	34.99	ug/m3
Ratio (Am/Pm)	0.72	-

For continuous monitoring site B2

	Result	Unit
Annual mean of B2 (	14.45	ug/m3
Period mean of B2 (P	22.14	ug/m3
Ratio (Am/Pm)	0.65	-

For continuous monitoring site B3

	Result	Unit
Annual mean of B3 (	15.42	ug/m3
Period mean of B3 (P	22.15	ug/m3
Ratio (Am/Pm)	0.70	-

Average ratio	0.69	-
Annualisation factor	0.69	-

Diffusion tube D1 uncorrected annual me	27.5	ug/m3
Diffusion tube D1 annualised mean	**19.0**	ug/m3

RO13

Diffusion Tube Period	Start Date	End Date	Period average continuous background monitoring site results ug/m3			Diffusion tube site result ug/m3	Period average continuous background monitoring site results ug/m3		
			B1 - Salford Eccles	B2 - Glazebury	B3 - Trafford Wellacre Academy	D1 - RO13	B1 when D1 is available	B2 when D1 is available	B3 when D1 is available
January	09/01/2019	06/02/2019	39.3	25.5	25.2	27.3	39.30266	25.51842	25.18939
February	06/02/2019	06/03/2019	31.8	20.1	20.8				
March	06/03/2019	05/04/2019	22.9	11.0	13.5				
April	05/04/2019	01/05/2019	23.9	13.7	17.4				
May	01/05/2019	04/06/2019	17.9	10.4	9.7				
June	04/06/2019	03/07/2019	18.3	9.4	9.0	12.3	18.34898	9.420899	9.002113
July	03/07/2019	07/08/2019	15.0	8.5	8.4	13.4	15.02801	8.541143	8.378532
August	07/08/2019	04/09/2019	16.3	8.5	9.4	15.7	16.25371	8.484174	9.371198
Septembe	04/09/2019	02/10/2019	22.6	10.4	12.5	16.4	22.58849	10.39701	12.50478
October	02/10/2019	06/11/2019	28.3	14.9	18.0	21.1	28.31235	14.8797	18.01877
Novembe	06/11/2019	03/12/2019	38.9	25.7	25.6	23	38.9073	25.66275	25.62013
Decembe	03/12/2019	08/01/2020	26.8	15.2	15.6	20.8	26.75973	15.23839	15.6383
Average			**25.2**	**14.5**	**15.5**	**18.75**	**25.7**	**14.8**	**15.5**

2. Annualisation calculation

For continuous monitoring site B1

	Result	Unit
Annual mean of B1 (Am)	25.22	ug/m3
Period mean of B1 (Pm)	25.69	ug/m3
Ratio (Am/Pm)	0.98	-

For continuous monitoring site B2

	Result	Unit
Annual mean of B2 (Am)	14.45	ug/m3
Period mean of B2 (Pm)	14.77	ug/m3
Ratio (Am/Pm)	0.98	-

For continuous monitoring site B3

	Result	Unit
Annual mean of B3 (Am)	15.45	ug/m3
Period mean of B3 (Pm)	15.47	ug/m3
Ratio (Am/Pm)	1.00	-

Average ratio	0.99	-
Annualisation factor	0.99	-

Diffusion tube D1 uncorrected annual mean	18.75	ug/m3
Diffusion tube D1 annualised mean	**18.5**	ug/m3

RO14

Diffusion Tube Period	Start Date	End Date	Period average continuous background monitoring site results ug/m3			Diffusion tube site result ug/m3	Period average continuous background monitoring site results ug/m3		
			B1 - Salford Eccles	B2 - Glazebury	B3 - Trafford Wellacre Academy	D1 - RO14	B1 when D1 is available	B2 when D1 is available	B3 when D1 is available
January	09/01/2019	06/02/2019	39.3	25.5	25.2				
February	06/02/2019	06/03/2019	31.8	20.1	20.8	23	31.82133	20.13307	20.83573
March	06/03/2019	05/04/2019	22.9	11.0	13.5	10.7	22.90407	11.02735	13.48817
April	05/04/2019	01/05/2019	23.9	13.7	17.4				
May	01/05/2019	04/06/2019	17.9	10.4	9.7	7.8	17.93741	10.36952	9.676888
June	04/06/2019	03/07/2019	18.3	9.4	9.0	9.2	18.34898	9.420899	9.002113
July	03/07/2019	07/08/2019	15.0	8.5	8.4	9.4	15.02801	8.541143	8.378532
August	07/08/2019	04/09/2019	16.3	8.5	9.4	12.2	16.25371	8.484174	9.371198
Septembe	04/09/2019	02/10/2019	22.6	10.4	12.5				
October	04/09/2019	06/11/2019	25.8	12.9	15.3				
Novembe	06/11/2019	03/12/2019	38.9	25.7	25.6	16.5	38.9073	25.66275	25.62013
Decembe	03/12/2019	08/01/2020	26.8	15.2	15.6				
Average			**25.2**	**14.5**	**15.5**	**12.68571**	**23.0**	**13.4**	**13.8**

2. Annualisation calculation

For continuous monitoring site B1

	Result	Unit
Annual mean of B1 (	25.22	ug/m3
Period mean of B1 (F	23.03	ug/m3
Ratio (Am/Pm)	1.10	-

For continuous monitoring site B2

	Result	Unit
Annual mean of B2 (	14.45	ug/m3
Period mean of B2 (F	13.38	ug/m3
Ratio (Am/Pm)	1.08	-

For continuous monitoring site B3

	Result	Unit
Annual mean of B3 (	15.45	ug/m3
Period mean of B3 (F	13.77	ug/m3
Ratio (Am/Pm)	1.12	-

Average ratio	1.10	-
Annualisation factor	1.10	-

Diffusion tube D1 uncorrected annual me	12.68571	ug/m3
Diffusion tube D1 annualised mean	**13.9**	ug/m3

RO16

Diffusion Tube Period	Start Date	End Date	Period average continuous background monitoring site results ug/m3			Diffusion tube site result ug/m3	Period average continuous background monitoring site results ug/m3		
			B1 - Salford Eccles	B2 - Glazebury	B3 - Trafford Wellacre Academy	D1 - RO16	B1 when D1 is available	B2 when D1 is available	B3 when D1 is available
January	09/01/2019	06/02/2019	39.3	25.5	25.2	31.5	39.30266	25.51842	25.18939
February	06/02/2019	06/03/2019	31.8	20.1	20.8				
March	06/03/2019	05/04/2019	22.9	11.0	13.5				
April	05/04/2019	01/05/2019	23.9	13.7	17.4	26.2	23.87947	13.70735	17.35544
May	01/05/2019	04/06/2019	17.9	10.4	9.7	20.3	17.93741	10.36952	9.676888
June	04/06/2019	03/07/2019	18.3	9.4	9.0				
July	03/07/2019	07/08/2019	15.0	8.5	8.4				
August	07/08/2019	04/09/2019	16.3	8.5	9.4	19.9	16.25371	8.484174	9.371198
Septembe	04/09/2019	02/10/2019	22.6	10.4	12.5	23.2	22.58849	10.39701	12.50478
October	02/10/2019	06/11/2019	28.3	14.9	18.0	24.2	28.31235	14.8797	18.01877
Novembe	06/11/2019	03/12/2019	38.9	25.7	25.6	28.5	38.9073	25.66275	25.62013
Decembe	03/12/2019	08/01/2020	26.8	15.2	15.6	9.8	26.75973	15.23839	15.6383
Average			**25.2**	**14.5**	**15.5**	**22.95**	**26.7**	**15.5**	**16.7**

2. Annualisation calculation

For continuous monitoring site B1

	Result	Unit
Annual mean of B1 (	25.22	ug/m3
Period mean of B1 (F	26.74	ug/m3
Ratio (Am/Pm)	0.94	-

For continuous monitoring site B2

	Result	Unit
Annual mean of B2 (	14.45	ug/m3
Period mean of B2 (F	15.53	ug/m3
Ratio (Am/Pm)	0.93	-

For continuous monitoring site B3

	Result	Unit
Annual mean of B3 (	15.45	ug/m3
Period mean of B3 (F	16.67	ug/m3
Ratio (Am/Pm)	0.93	-

Average ratio	0.93	-
Annualisation factor	0.93	-

Diffusion tube D1 uncorrected annual me	22.95	ug/m3
Diffusion tube D1 annualised mean	**21.4**	ug/m3

RO28

Diffusion Tube Period	Start Date	End Date	Period average continuous background monitoring site results ug/m3			Diffusion tube site result ug/m3	Period average continuous background monitoring site results ug/m3		
			B1 - Salford Eccles	B2 - Glazebury	B3 - Trafford Wellacre Academy	D1 - RO28	B1 when D1 is available	B2 when D1 is available	B3 when D1 is available
January	09/01/2019	06/02/2019	39.3	25.5	25.2	53.4	39.30266	25.51842	25.18939
February	06/02/2019	06/03/2019	31.8	20.1	20.8	39.6	31.82133	20.13307	20.83573
March	06/03/2019	05/04/2019	22.9	11.0	13.5	30.8	22.90407	11.02735	13.48817
April	05/04/2019	01/05/2019	23.9	13.7	17.4				
May	01/05/2019	04/06/2019	17.9	10.4	9.7				
June	04/06/2019	03/07/2019	18.3	9.4	9.0	25.1	18.34898	9.420899	9.002113
July	03/07/2019	07/08/2019	15.0	8.5	8.4	26.3	15.02801	8.541143	8.378532
August	07/08/2019	04/09/2019	16.3	8.5	9.4				
Septembe	04/09/2019	02/10/2019	22.6	10.4	12.5				
October	04/09/2019	06/11/2019	25.8	12.9	15.3	33.1	25.81239	12.85525	15.27017
Novembe	06/11/2019	03/12/2019	38.9	25.7	25.6	32.9	38.9073	25.66275	25.62013
Decembe	03/12/2019	08/01/2020	26.8	15.2	15.6	35.3	26.75973	15.23839	15.6383
Average			**25.2**	**14.5**	**15.5**	**34.5625**	**27.4**	**16.0**	**16.7**

2. Annualisation calculation

For continuous monitoring site B1

	Result	Unit
Annual mean of B1 (	25.22	ug/m3
Period mean of B1 (F	27.36	ug/m3
Ratio (Am/Pm)	0.92	-

For continuous monitoring site B2

	Result	Unit
Annual mean of B2 (	14.45	ug/m3
Period mean of B2 (F	16.05	ug/m3
Ratio (Am/Pm)	0.90	-

For continuous monitoring site B3

	Result	Unit
Annual mean of B3 (	15.45	ug/m3
Period mean of B3 (F	16.68	ug/m3
Ratio (Am/Pm)	0.93	-

Average ratio	0.92	-
Annualisation factor	0.92	-

Diffusion tube D1 uncorrected annual me	34.5625	ug/m3
Diffusion tube D1 annualised mean	**31.7**	ug/m3

SA81

Diffusion Tube Period	Start Date	End Date	Period average continuous background monitoring site results			Diffusion tube site result	Period average continuous background monitoring site results		
			B1 - Salford Eccles	B2 - Glazebury	B3 - Trafford Wellacre Academy	D1 - SA81 Regent Road 2	B1 when D1 is available	B2 when D1 is available	B3 when D1 is available
January	09/01/2019	05/02/2019	39.7	25.6	25.4				
February	05/02/2019	05/03/2019	32.3	20.6	21.3				
March	05/03/2019	02/04/2019	22.5	10.7	13.0				
April	02/04/2019	30/04/2019	23.9	13.4	17.3				
May	30/04/2019	07/06/2019	18.8	10.9	10.1				
June	07/06/2019	04/07/2019	17.5	8.9	8.8	34.3	17.5	8.88	8.8
July	04/07/2019	07/08/2019	14.9	8.4	8.3	41.4	14.9	8.45	8.3
August	07/08/2019	04/09/2019	16.3	8.5	9.4	36.4	16.3	8.48	9.4
September	04/09/2019	02/10/2019	22.6	10.4	12.5				
October	02/10/2019	06/11/2019	28.3	14.9	18.0	54.3	28.3	14.88	18.0
November	06/11/2019	03/12/2019	38.9	25.7	25.6	62.2	38.9	25.66	25.6
December	03/12/2019	07/01/2020	27.0	15.4	15.8	52.2	27.0	15.38	15.8
Average			**25.2**	**14.5**	**15.5**	**46.8**	**23.8**	**13.6**	**14.3**

2. Annualisation calculation

For continuous monitoring site B1

	Result	Unit
Annual mean of B1 (	25.22	ug/m3
Period mean of B1 (F	23.82	ug/m3
Ratio (Am/Pm)	1.06	-

For continuous monitoring site B2

	Result	Unit
Annual mean of B2 (	14.45	ug/m3
Period mean of B2 (F	13.62	ug/m3
Ratio (Am/Pm)	1.06	-

For continuous monitoring site B3

	Result	Unit
Annual mean of B3 (	15.45	ug/m3
Period mean of B3 (F	14.31	ug/m3
Ratio (Am/Pm)	1.08	-
Average ratio	1.07	-
Annualisation factor	1.07	-

Diffusion tube D1 uncorrected annual me	46.8	ug/m3
Diffusion tube D1 annualised mean	**49.9**	ug/m3

TA15 & TA31

Period	Start Date	End Date	Period average continuous background monitoring site results ug/m3			Diffusion tube site result ug/m3	Period average continuous background monitoring site results ug/m3			Diffusion tube site result ug/m3	Period average continuous background monitoring site results ug/m3		
			B1 - Salford Eccles	B2 - Glazebury	B3 - Trafford Wellacre Academy	D1 - TA15 - Tamford Street, Stalybridge	B1 when D1 is available	B2 when D1 is available	B3 when D1 is available	D1 - TA31 - Waterton Lane, Mossley	B1 when D1 is available	B2 when D1 is available	B3 when D1 is available
January	09/01/2019	05/02/2019	39.7	25.6	25.4					31.7	39.7	25.6	25.4
February	05/02/2019	05/03/2019	32.3	20.6	21.3								
March	05/03/2019	02/04/2019	22.5	10.7	13.0								
April	02/04/2019	30/04/2019	23.9	13.4	17.3								
May	30/04/2019	07/06/2019	18.8	10.9	10.1								
June	07/06/2019	04/07/2019	17.5	8.9	8.8	22.7	17.5	8.88	8.8	17.3	17.5	8.9	8.8
July/ August	02/07/2019	05/09/2019	15.60	8.43	8.76	22.3	15.6	8.43	8.8	13.8	15.6	8.4	8.8
September	05/09/2019	02/10/2019	22.6	10.4	12.5	26.1	22.6	10.40	12.5	20.6	15.65	8.50	8.80
October	02/10/2019	06/11/2019	28.3	14.9	18.0	29.5	28.3	14.88	18.0				
November	06/11/2019	03/12/2019	38.9	25.7	25.6	35	38.9	25.66	25.6	57.7	38.9	25.7	25.6
December	03/12/2019	07/01/2020	27.0	15.4	15.8	25.9	27.0	15.38	15.8	24	27.0	15.4	15.8
Average			**26.1**	**15.0**	**16.0**	**26.9**	**25.0**	**13.9**	**14.9**	**27.5**	**25.7**	**15.4**	**15.5**
(ta15 july august)	02/07/2019	05/09/2019	15.60	8.43	8.76								
(ta31 july august)	02/07/2019	04/09/2019	15.65	8.50	8.80								

2. Annualisation calculation

For continuous monitoring site B1

	Result	Unit
Annual mean of B1 (Am)	26.09	ug/m3
Period mean of B1 (Pm)	24.98	ug/m3
Ratio (Am/Pm)	1.04	-

For continuous monitoring site B2

	Result	Unit
Annual mean of B2 (Am)	14.99	ug/m3
Period mean of B2 (Pm)	13.94	ug/m3
Ratio (Am/Pm)	1.08	-

For continuous monitoring site B3

	Result	Unit
Annual mean of B3 (Am)	16.05	ug/m3
Period mean of B3 (Pm)	14.91	ug/m3
Ratio (Am/Pm)	1.08	-
Average ratio	1.07	-
Annualisation factor	1.07	-

Stamford Street, Stalybridge uncorrected annual mean	26.91666667	ug/m3	ta15
Stamford Street, Stalybridge annualised mean	**28.7**	ug/m3	
Waterton Lane, Mossley uncorrected annual mean	27.51667	ug/m3	ta31
Waterton Lane, Mossley annualised mean	29.3	ug/m3	

TR 25

Diffusion Tube Period	Start Date	End Date	Period average continuous background monitoring site results ug/m3			Diffusion tube site result ug/m3	Period average continuous background monitoring site results ug/m3		
			B1 - Salford Eccles	B2 - Glazebury	B3 - Trafford Wellacre Academy	D1 - TR25	B1 when D1 is available	B2 when D1 is available	B3 when D1 is available
January	09/01/2019	06/02/2019	39.3	25.5	25.2				
February	06/02/2019	08/03/2019	31.4	19.5	20.4				
March	08/03/2019	15/04/2019	22.2	11.1	14.0	11.6	22.15138	11.11611	14.04494
April	15/04/2019	07/05/2019	24.5	13.4	16.5	13	24.52007	13.42362	16.53677
May	07/05/2019	14/06/2019	18.8	10.6	9.8	11.1	18.79177	10.55399	9.815441
June	14/06/2019	03/07/2019	17.1	8.5	8.3				
July	03/07/2019	27/08/2019	15.7	8.6	9.0				
August	27/08/2019	05/09/2019	14.6	7.4	7.3	10.8	14.64197	7.395579	7.33216
Septembe	05/09/2019	14/10/2019	22.8	11.1	12.9	14.4	22.75679	11.09257	12.8658
October	14/10/2019	14/11/2019	31.6	17.5	21.3	21.4	31.5645	17.54324	21.33893
Novembe	14/11/2019	05/12/2019	41.6	27.8	27.2				
Decembe	05/12/2019	05/01/2020	26.7	15.0	15.7	17.8	26.72044	15.01855	15.7438
Average			**25.5**	**14.7**	**15.6**	**14.3**	**23.0**	**12.3**	**14.0**

2. Annualisation calculation

For continuous monitoring site B1

	Result	Unit
Annual mean of B1 (	25.52	ug/m3
Period mean of B1 (F	23.02	ug/m3
Ratio (Am/Pm)	1.11	-

For continuous monitoring site B2

	Result	Unit
Annual mean of B2 (	14.66	ug/m3
Period mean of B2 (F	12.31	ug/m3
Ratio (Am/Pm)	1.19	-

For continuous monitoring site B3

	Result	Unit
Annual mean of B3 (	15.64	ug/m3
Period mean of B3 (F	13.95	ug/m3
Ratio (Am/Pm)	1.12	-
Average ratio	1.14	-
Annualisation factor	1.14	-

Diffusion tube D1 uncorrected annual me	14.3	ug/m3
Diffusion tube D1 annualised mean	**16.3**	ug/m3

TR25A

Diffusion Tube Period	Start Date	End Date	Period average continuous background monitoring site results ug/m3			Diffusion tube site result ug/m3	Period average continuous background monitoring site results ug/m3		
			B1 - Salford Eccles	B2 - Glazebury	B3 - Trafford Wellacre Academy	D1 - TR25A	B1 when D1 is available	B2 when D1 is available	B3 when D1 is available
January	09/01/2019	06/02/2019	39.3	25.5	25.2				
February	06/02/2019	08/03/2019	31.4	19.5	20.4				
March	08/03/2019	15/04/2019	22.2	11.1	14.0	11.6	22.15138	11.11611	14.04494
April	15/04/2019	07/05/2019	24.5	13.4	16.5	14.2	24.52007	13.42362	16.53677
May	07/05/2019	14/06/2019	18.8	10.6	9.8	11.1	18.79177	10.55399	9.815441
June	14/06/2019	03/07/2019	17.1	8.5	8.3				
July	03/07/2019	27/08/2019	15.7	8.6	9.0				
August	27/08/2019	05/09/2019	14.6	7.4	7.3				
Septembe	05/09/2019	14/10/2019	22.8	11.1	12.9	14.1	22.75679	11.09257	12.8658
October	14/10/2019	14/11/2019	31.6	17.5	21.3	20.8	31.5645	17.54324	21.33893
Novembe	14/11/2019	05/12/2019	41.6	27.8	27.2				
Decembe	05/12/2019	05/01/2020	26.7	15.0	15.7	16.8	26.72044	15.01855	15.7438
Average			**25.5**	**14.7**	**15.6**	**14.76667**	**24.4**	**13.1**	**15.1**

2. Annualisation calculation

For continuous monitoring site B1

	Result	Unit
Annual mean of B1 (	25.52	ug/m3
Period mean of B1 (F	24.42	ug/m3
Ratio (Am/Pm)	1.05	-

For continuous monitoring site B2

	Result	Unit
Annual mean of B2 (	14.66	ug/m3
Period mean of B2 (F	13.12	ug/m3
Ratio (Am/Pm)	1.12	-

For continuous monitoring site B3

	Result	Unit
Annual mean of B3 (	15.64	ug/m3
Period mean of B3 (F	15.06	ug/m3
Ratio (Am/Pm)	1.04	-
Average ratio	1.07	-
Annualisation factor	1.07	-

Diffusion tube D1 uncorrected annual me	14.76667	ug/m3
Diffusion tube D1 annualised mean	**15.8**	ug/m3

TR25B

Diffusion Tube Period	Start Date	End Date	Period average continuous background monitoring site results ug/m3			Diffusion tube site result ug/m3	Period average continuous background monitoring site results ug/m3		
			B1 - Salford Eccles	B2 - Glazebury	B3 - Trafford Wellacre Academy	D1 - TR25B	B1 when D1 is available	B2 when D1 is available	B3 when D1 is available
January	09/01/2019	06/02/2019	39.3	25.5	25.2				
February	06/02/2019	08/03/2019	31.4	19.5	20.4	10.7	31.43613	19.46536	20.35777
March	08/03/2019	15/04/2019	22.2	11.1	14.0	13.3	22.15138	11.11611	14.04494
April	15/04/2019	07/05/2019	24.5	13.4	16.5	10.6	24.52007	13.42362	16.53677
May	07/05/2019	14/06/2019	18.8	10.6	9.8				
June	14/06/2019	03/07/2019	17.1	8.5	8.3				
July	03/07/2019	27/08/2019	15.7	8.6	9.0				
August	27/08/2019	05/09/2019	14.6	7.4	7.3	11	14.64197	7.395579	7.33216
Septembe	05/09/2019	14/10/2019	22.8	11.1	12.9	14.4	22.75679	11.09257	12.8658
October	14/10/2019	14/11/2019	31.6	17.5	21.3	19.8	31.5645	17.54324	21.33893
Novembe	14/11/2019	05/12/2019	41.6	27.8	27.2				
Decembe	05/12/2019	05/01/2020	26.7	15.0	15.7	14.5	26.72044	15.01855	15.7438
Average			**25.5**	**14.7**	**15.6**	**13.47143**	**24.8**	**13.6**	**15.5**

2. Annualisation calculation

For continuous monitoring site B1

	Result	Unit
Annual mean of B1 (	25.52	ug/m3
Period mean of B1 (F	24.83	ug/m3
Ratio (Am/Pm)	1.03	-

For continuous monitoring site B2

	Result	Unit
Annual mean of B2 (	14.66	ug/m3
Period mean of B2 (F	13.58	ug/m3
Ratio (Am/Pm)	1.08	-

For continuous monitoring site B3

	Result	Unit
Annual mean of B3 (	15.64	ug/m3
Period mean of B3 (F	15.46	ug/m3
Ratio (Am/Pm)	1.01	-
Average ratio	1.04	-
Annualisation factor	1.04	-

Diffusion tube D1 uncorrected annual me	13.47143	ug/m3
Diffusion tube D1 annualised mean	**14.0**	ug/m3

TR28

Diffusion Tube Period	Start Date	End Date	Period average continuous background monitoring site results ug/m3			Diffusion tube site result ug/m3	Period average continuous background monitoring site results ug/m3		
			B1 - Salford Eccles	B2 - Glazebury	B3 - Trafford Wellacre Academy	D1 - TR28	B1 when D1 is available	B2 when D1 is available	B3 when D1 is available
January	09/01/2019	06/02/2019	39.3	25.5	25.2				
February	06/02/2019	08/03/2019	31.4	19.5	20.4				
March	08/03/2019	15/04/2019	22.2	11.1	14.0				
April	15/04/2019	07/05/2019	24.5	13.4	16.5				
May	07/05/2019	14/06/2019	18.8	10.6	9.8				
June	14/06/2019	03/07/2019	17.1	8.5	8.3				
July	03/07/2019	27/08/2019	15.7	8.6	9.0				
August	07/08/2019	04/09/2019	16.3	8.5	9.4	27.3	16.25371	8.484174	9.371198
Septembe	04/09/2019	02/10/2019	22.6	10.4	12.5	31.1	22.58849	10.39701	12.50478
October	02/10/2019	11/11/2019	29.1	15.9	18.8	37.3	29.05171	15.91817	18.81018
Novembe	11/11/2019	05/12/2019	40.0	26.4	25.8	41.3	39.95503	26.35503	25.82764
Decembe	05/12/2019	08/01/2020	25.9	14.5	15.1				
Average			**25.2**	**14.4**	**15.4**	**34.25**	**27.0**	**15.3**	**16.6**

2. Annualisation calculation

For continuous monitoring site B1

	Result	Unit
Annual mean of B1 (	25.23	ug/m3
Period mean of B1 (F	26.96	ug/m3
Ratio (Am/Pm)	0.94	-

For continuous monitoring site B2

	Result	Unit
Annual mean of B2 (	14.40	ug/m3
Period mean of B2 (F	15.29	ug/m3
Ratio (Am/Pm)	0.94	-

For continuous monitoring site B3

	Result	Unit
Annual mean of B3 (	15.41	ug/m3
Period mean of B3 (F	16.63	ug/m3
Ratio (Am/Pm)	0.93	-
Average ratio	0.93	-
Annualisation factor	0.93	-

Diffusion tube D1 uncorrected annual me	34.25	ug/m3
Diffusion tube D1 annualised mean	**32.0**	ug/m3

WI28

Annualisation Calculations - Diffusion tube No 28

Month	Start Date	End Date	B1	B2	D28	B1 when D28 is available	B2 when D28 is available
Jan	09/01/2019	06/02/2019	31.9	25.6	51.3	31.9	25.6
Feb	06/02/2019	05/03/2019	26.8	20.8	44.8	26.8	20.8
March	05/03/2019	02/04/2019	14.0	10.8	39.3	14.0	10.8
April	02/04/2019	30/04/2019	18.4	13.2	27.3	18.4	13.2
May	30/04/2019	04/06/2019	12.1	10.7	29.9	12.1	10.7
June	04/06/2019	02/07/2019	11.6	9.5	32.8	11.6	9.5
July	02/07/2019	06/08/2019	9.7	8.6			
Aug	06/08/2019	03/09/2019	11.8	8.5			
Sept	03/09/2019	01/10/2019	15.1	10.2			
Oct	01/10/2019	05/11/2019	22.7	14.4	41.3	22.7	14.4
Nov	05/11/2019	03/12/2019	30.6	25.2	54.3	30.6	25.2
Dec	03/12/2019	08/01/2020	25.4	15.5			
Average			19.2	14.4	40.1	21.0	16.3

Diffusion tube No 28 uncorrected annual mean	40.1	ug/m3
Diffusion tube No 28 annualised mean	36.1	ug/m3
Diffusion tube No 28 annualised & Bias Adjusted Mean	**33.6**	**ug/m3**

Wigan Centre (B1)	Result (ug/m3)
Annual Mean of B1, Am =	19.2
Period Mean of B1, Pm =	21.0
Ratio of Am/Pm =	0.912715703

Glazebury (B2)	Result (ug/m3)
Annual Mean of B1, Am =	14.4
Period Mean of B1, Pm =	16.3
Ratio of Am/Pm =	0.885681857

Average ratio	0.90
Annualisation factor	0.90
Bias Ajustment Factor	0.93

WI61

Annualisation Calculations - Diffussion tube No 61							
Month	**Start Date**	**End Date**	**B1**	**B2**	**D61**	**B1 when D61 is available**	**B2 when D61 is available**
Jan	09/01/2019	06/02/2019	31.9	25.6	44.1	31.9	25.6
Feb	06/02/2019	05/03/2019	30.1	24.4	43.8	30.1	24.4
March	05/03/2019	03/04/2019	14.0	10.7	29.8	14.0	10.7
April	03/04/2019	30/04/2019	18.5	13.4	38	18.5	13.4
May	30/04/2019	04/06/2019	12.1	10.7	30.4	12.1	10.7
June	04/06/2019	02/07/2019	11.6	9.5	32.8	11.6	9.5
July	02/07/2019	06/08/2019	9.7	8.6	30.7	9.7	8.6
Aug	06/08/2019	04/09/2019	11.7	8.5			
Sept	04/09/2019	02/10/2019	15.3	10.2			
Oct	02/10/2019	06/11/2019	23.3	14.6			
Nov	06/11/2019	04/12/2019	31.2	26.1			
Dec	04/12/2019	07/01/2020	25.0	15.0			
Average			19.5	14.8	35.7	18.3	14.7

Diffusion tube No 61 uncorrected annual mean	35.7	ug/m3
Diffusion tube No 61 annualised mean	37.0	ug/m3
Diffusion tube No 61 annualised & Bias Adjusted Mean	**34.4**	**ug/m3**

Wigan Centre (B1)	Result (ug/m3)
Annual Mean of B1, Am =	19.5
Period Mean of B1, Pm =	18.3
Ratio of Am/Pm =	1.068612079

Glazebury (B2)	Result (ug/m3)
Annual Mean of B1, Am =	14.8
Period Mean of B1, Pm =	14.7
Ratio of Am/Pm =	1.005439

Average ratio	1.04
Annualisation factor	1.04
Bias Ajustment Factor	0.93

WI126

Annualisation Calculations - Diffussion tube No 126							
Month	**Start Date**	**End Date**	**B1**	**B2**	**D126**	**B1 when D126 is available**	**B2 when D126 is available**
Jan	08/01/2019	07/02/2019	31.4	25.5	30.4	31.4	25.5
Feb	07/02/2019	07/03/2019	25.9	24.2	149.5	25.9	24.2
March	07/03/2019	03/04/2019	14.0	10.8			
April	03/04/2019	01/05/2019	18.5	13.5			
May	01/05/2019	05/06/2019	12.1	10.6			
June	05/06/2019	03/07/2019	11.2	9.4	43.9	11.2	9.4
July	03/07/2019	07/08/2019	9.6	8.5			
Aug	07/08/2019	04/09/2019	11.9	8.5	45.8	11.9	8.5
Sept	04/09/2019	02/10/2019	15.4	10.4	17.6	15.4	10.4
Oct	02/10/2019	06/11/2019	22.4	15.0	59.1	22.4	15.0
Nov	06/11/2019	05/12/2019	31.7	25.9	65	31.7	25.9
Dec	05/12/2019	07/01/2020	24.3	14.8	51.5	24.3	14.8
Average			19.0	14.8	57.9	21.8	16.7

Diffusion tube No 126 uncorrected annual mean	57.9	ug/m3
Diffusion tube No 126 annualised mean	50.8	ug/m3
Diffusion tube No 126 annualised & Bias Adjusted Mean	**47.3**	**ug/m3**

Wigan Centre (B1)	Result (ug/m3)
Annual Mean of B1, Am =	19.0
Period Mean of B1, Pm =	21.8
Ratio of Am/Pm =	0.874071285

Glazebury (B2)	Result (ug/m3)
Annual Mean of B1, Am =	14.8
Period Mean of B1, Pm =	16.7
Ratio of Am/Pm =	0.88317026

Average ratio	0.88
Annualisation factor	0.88
Bias Ajustment Factor	0.93

WI128

Annualisation Calculations - Diffussion tube No 128							
Month	**Start Date**	**End Date**	**B1**	**B2**	**D128**	**B1 when D128 is available**	**B2 when D128 is available**
Jan	08/01/2019	06/02/2019	31.9	25.7	41.2	31.9	25.7
Feb	06/02/2019	06/03/2019	26.5	20.4	43.9	26.5	20.4
March	06/03/2019	03/04/2019	13.9	10.7	26.4	13.9	10.7
April	03/04/2019	30/04/2019	18.5	13.4	28.5	18.5	13.4
May	30/04/2019	05/06/2019	12.3	10.8	24.1	12.3	10.8
June	05/06/2019	03/07/2019	11.2	9.2	25.3	11.2	9.2
July	03/07/2019	07/08/2019	9.6	8.6			
Aug	07/08/2019	04/09/2019	11.9	8.6			
Sept	04/09/2019	02/10/2019	15.4	10.3	28.6	15.4	10.3
Oct	02/10/2019	06/11/2019	22.4	14.1			
Nov	06/11/2019	05/12/2019	31.7	25.9	71.3	31.7	25.9
Dec	05/12/2019	07/01/2020	24.3	14.8			
Average			19.1	14.4	36.2	20.2	15.8

Diffusion tube No 128 uncorrected annual mean	36.2	ug/m3
Diffusion tube No 128 annualised mean	33.6	ug/m3
Diffusion tube No 128 annualised & Bias Adjusted Mean	**31.3**	**ug/m3**

Wigan Centre (B1)	Result (ug/m3)
Annual Mean of B1, Am =	19.1
Period Mean of B1, Pm =	20.2
Ratio of Am/Pm =	0.948715695

Glazebury (B2)	Result (ug/m3)
Annual Mean of B1, Am =	14.4
Period Mean of B1, Pm =	15.8
Ratio of Am/Pm =	0.909807086

Average ratio	0.93
Annualisation factor	0.93
Bias Ajustment Factor	0.93

WI129

Annualisation Calculations - Diffussion tube No 129							
Month	**Start Date**	**End Date**	**B1**	**B2**	**D129**	**B1 when D129 is available**	**B2 when D126 is available**
Jan	10/01/2019	06/02/2019	31.9	25.6			
Feb	06/02/2019	07/03/2019	30.1	24.4	149.5	30.1	24.4
March	07/03/2019	03/04/2019	14.0	10.7			
April	03/04/2019	01/05/2019	18.5	13.4			
May	01/05/2019	05/06/2019	12.1	10.7			
June	05/06/2019	03/07/2019	11.6	9.5	43.9	11.6	9.5
July	03/07/2019	07/08/2019	9.7	8.6			
Aug	07/08/2019	04/09/2019	11.7	8.5	45.8	11.7	8.5
Sept	04/09/2019	02/10/2019	15.3	10.2	51.4	15.3	10.2
Oct	02/10/2019	06/11/2019	23.3	14.6	59.1	23.3	14.6
Nov	06/11/2019	06/12/2019	31.2	26.1	65	31.2	26.1
Dec	06/12/2019	07/01/2020	25.0	15.0	51.5	25.0	15.0
Average			19.5	14.8	66.6	21.2	15.5

Diffusion tube No 129 uncorrected annual mean	66.6	ug/m3
Diffusion tube No 129 annualised mean	62.5	ug/m3
Diffusion tube No 129 annualised & Bias Adjusted Mean	**58.2**	**ug/m3**

Wigan Centre (B1)	Result (ug/m3)
Annual Mean of B1, Am =	19.5
Period Mean of B1, Pm =	21.2
Ratio of Am/Pm =	0.923117059

Glazebury (B2)	Result (ug/m3)
Annual Mean of B1, Am =	14.8
Period Mean of B1, Pm =	15.5
Ratio of Am/Pm =	0.954580038

Average ratio	0.94
Annualisation factor	0.94
Bias Ajustment Factor	0.93

WI181

Annualisation Calculations - Diffussion tube No 181										
Month	**Start Date**	**End Date**	**B1**	**B2**	**D181**	**B1 when D181 is available**	**B2 when D181 is available**	Wigan Centre (B1)		Result (ug/m3)
Jan	08/01/2019	06/02/2019	31.9	25.7				Annual Mean of B1, Am =		19.1
Feb	06/02/2019	06/03/2019	26.5	20.4				Period Mean of B1, Pm =		17.3
March	06/03/2019	03/04/2019	13.9	10.7				Ratio of Am/Pm =		1.103271508
April	03/04/2019	30/04/2019	18.5	13.4						
May	30/04/2019	06/06/2019	12.2	10.1	22.8	12.2	10.1	Glazebury (B2)		Result (ug/m3)
June	06/06/2019	03/07/2019	10.9	9.2	23.4	10.9	9.2	Annual Mean of B1, Am =		14.4
July	03/07/2019	07/08/2019	9.6	8.6	24.6	9.6	8.6	Period Mean of B1, Pm =		12.8
Aug	07/08/2019	04/09/2019	11.9	8.6	26	11.9	8.6	Ratio of Am/Pm =		1.12533664
Sept	04/09/2019	02/10/2019	15.4	10.3	31.9	15.4	10.3			
Oct	02/10/2019	06/11/2019	22.4	14.1	33.9	22.4	14.1	**Average ratio**	1.11	
Nov	06/11/2019	04/12/2019	31.2	26.0	39.6	31.2	26.0	**Annualisation factor**	1.11	
Dec	04/12/2019	07/01/2020	25.0	15.1	35.3	25.0	15.1			
Average			19.1	14.4	29.7	17.3	12.8	**Bias Ajustment Factor**	0.93	

Diffusion tube No 181 uncorrected annual mean	29.7	ug/m3
Diffusion tube No 181 annualised mean	33.1	ug/m3
Diffusion tube No 181 annualised & Bias Adjusted Mean	**30.8**	**ug/m3**

WI184

Annualisation Calculations - Diffussion tube No 184										
Month	**Start Date**	**End Date**	**B1**	**B2**	**D184**	**B1 when D184 is available**	**B2 when D184 is available**	Wigan Centre (B1)		Result (ug/m3)
Jan	10/01/2019	07/02/2019	31.1	25.1				Annual Mean of B1, Am =		19.2
Feb	07/02/2019	07/03/2019	25.9	25.1				Period Mean of B1, Pm =		17.6
March	07/03/2019	03/04/2019	14.0	25.0				Ratio of Am/Pm =		1.091067562
April	03/04/2019	01/05/2019	18.5	24.9						
May	01/05/2019	03/06/2019	11.9	24.9	20.3	11.9	24.9	Glazebury (B2)		Result (ug/m3)
June	03/06/2019	02/07/2019	11.6	24.9	28.2	11.6	24.9	Annual Mean of B1, Am =		24.9
July	02/07/2019	08/08/2019	9.6	24.8	24.7	9.6	24.8	Period Mean of B1, Pm =		24.8
Aug	08/08/2019	05/09/2019	11.7	24.8	25.5	11.7	24.8	Ratio of Am/Pm =		1.003738977
Sept	05/09/2019	30/09/2019	15.6	24.7	32.6	15.6	24.7			
Oct	30/09/2019	08/11/2019	23.1	24.7	30.4	23.1	24.7	**Average ratio**	1.05	
Nov	08/11/2019	04/12/2019	31.9	24.6	48.5	31.9	24.6	**Annualisation factor**	1.05	
Dec	04/12/2019	07/01/2020	25.0	24.6	35.8	25.0	24.6			
Average			19.2	24.9	30.8	17.6	24.8	**Bias Ajustment Factor**	0.93	

Diffusion tube No 184 uncorrected annual mean	30.8	ug/m3
Diffusion tube No 184 annualised mean	32.2	ug/m3
Diffusion tube No 184 annualised & Bias Adjusted Mean	**30.0**	**ug/m3**

WI185

Annualisation Calculations - Diffussion tube No 185										
Month	**Start Date**	**End Date**	**B1**	**B2**	**D185**	**B1 when D185 is available**	**B2 when D185 is available**	Wigan Centre (B1)		Result (ug/m3)
Jan	10/01/2019	07/02/2019	31.1	25.1				Annual Mean of B1, Am =		19.2
Feb	07/02/2019	07/03/2019	25.9	25.1				Period Mean of B1, Pm =		17.6
March	07/03/2019	03/04/2019	14.0	25.0				Ratio of Am/Pm =		1.091067562
April	03/04/2019	01/05/2019	18.5	24.9						
May	01/05/2019	03/06/2019	11.9	24.9	26.7	11.9	24.9	Glazebury (B2)		Result (ug/m3)
June	03/06/2019	02/07/2019	11.6	24.9	29	11.6	24.9	Annual Mean of B1, Am =		24.9
July	02/07/2019	08/08/2019	9.6	24.8	27.4	9.6	24.8	Period Mean of B1, Pm =		24.8
Aug	08/08/2019	05/09/2019	11.7	24.8	30.6	11.7	24.8	Ratio of Am/Pm =		1.003738977
Sept	05/09/2019	30/09/2019	15.6	24.7	34.3	15.6	24.7			
Oct	30/09/2019	08/11/2019	23.1	24.7	35.7	23.1	24.7	**Average ratio**	1.05	
Nov	08/11/2019	04/12/2019	31.9	24.6	41.7	31.9	24.6	**Annualisation factor**	1.05	
Dec	04/12/2019	07/01/2020	25.0	24.6	36.1	25.0	24.6			
Average			19.2	24.9	32.7	17.6	24.8	**Bias Ajustment Factor**	0.93	

Diffusion tube No 185 uncorrected annual mean	32.7	ug/m3
Diffusion tube No 185 annualised mean	34.2	ug/m3
Diffusion tube No 185 annualised & Bias Adjusted Mean	**31.8**	**ug/m3**

WI186

Annualisation Calculations - Diffusion tube No 186										
Month	**Start Date**	**End Date**	**B1**	**B2**	**D186**	**B1 when D186 is available**	**B2 when D186 is available**	Wigan Centre (B1)		Result (ug/m3)
Jan	10/01/2019	07/02/2019	31.1	25.1				Annual Mean of B1, Am =		19.2
Feb	07/02/2019	07/03/2019	25.9	25.1				Period Mean of B1, Pm =		17.6
March	07/03/2019	03/04/2019	14.0	25.0				Ratio of Am/Pm =		1.091067562
April	03/04/2019	01/05/2019	18.5	24.9						
May	01/05/2019	03/06/2019	11.9	24.9	30.8	11.9	24.9	Glazebury (B2)		Result (ug/m3)
June	03/06/2019	02/07/2019	11.6	24.9	33.5	11.6	24.9	Annual Mean of B1, Am =		24.9
July	02/07/2019	08/08/2019	9.6	24.8		9.6	24.8	Period Mean of B1, Pm =		24.8
Aug	08/08/2019	05/09/2019	11.7	24.8	36.1	11.7	24.8	Ratio of Am/Pm =		1.003738977
Sept	05/09/2019	30/09/2019	15.6	24.7	44	15.6	24.7			
Oct	30/09/2019	08/11/2019	23.1	24.7	48.5	23.1	24.7	**Average ratio**	1.05	
Nov	08/11/2019	04/12/2019	31.9	24.6	53.2	31.9	24.6	**Annualisation factor**	1.05	
Dec	04/12/2019	07/01/2020	25.0	24.6	45.7	25.0	24.6			
Average			19.2	24.9	41.7	17.6	24.8	**Bias Ajustment Factor**	0.93	
Diffusion tube No 186 uncorrected annual mean					41.7	ug/m3				
Diffusion tube No 186 annualised mean					43.7	ug/m3				
Diffusion tube No 186 annualised & Bias Adjusted Mean					**40.6**	**ug/m3**				

WI192

Annualisation Calculations - Diffusion tube No 192										
Month	**Start Date**	**End Date**	**B1**	**B2**	**D192**	**B1 when D192 is available**	**B2 when D192 is available**	Wigan Centre (B1)		Result (ug/m3)
Jan	09/01/2019	06/02/2019	31.9	25.6				Annual Mean of B1, Am =		19.2
Feb	06/02/2019	05/03/2019	26.8	20.8				Period Mean of B1, Pm =		18.2
March	05/03/2019	02/04/2019	14.0	10.8				Ratio of Am/Pm =		1.059044031
April	02/04/2019	30/04/2019	18.4	13.2						
May	30/04/2019	04/06/2019	12.5	10.7				Glazebury (B2)		Result (ug/m3)
June	04/06/2019	03/07/2019	10.9	9.2	26.9	10.9	9.2	Annual Mean of B1, Am =		14.4
July	03/07/2019	07/08/2019	9.6	8.6	21.7	9.6	8.6	Period Mean of B1, Pm =		13.2
Aug	07/08/2019	04/09/2019	11.9	8.6	23.7	11.9	8.6	Ratio of Am/Pm =		1.097153328
Sept	04/09/2019	02/10/2019	15.3	10.2	35.5	15.3	10.2			
Oct	02/10/2019	06/11/2019	23.3	14.6	37.4	23.3	14.6	**Average ratio**	1.08	
Nov	06/11/2019	05/12/2019	31.7	25.9	45.9	31.7	25.9	**Annualisation factor**	1.08	
Dec	05/12/2019	07/01/2020	24.3	14.8	40.2	24.3	14.8			
Average			19.2	14.4	33.0	18.2	13.2	**Bias Ajustment Factor**	0.93	
Diffusion tube No 192 uncorrected annual mean					33.0	ug/m3				
Diffusion tube No 192 annualised mean					35.6	ug/m3				
Diffusion tube No 192 annualised & Bias Adjusted Mean					**33.1**	**ug/m3**				

Diffusion Tube Bias Adjustment Factors

The tubes are prepared and analysed by Staffordshire Scientific Services using the 20% triethanolamine (TEA) in water method. The laboratory method is UKAS accredited, and the laboratory takes part in the AIR-PT independent quality assurance scheme. A summary report on laboratory performance in the AIR-PT scheme between April 2017 to February 2019 shows good performance during 2018.

NO_2 diffusion tubes are affected by several factors, which may cause them to have bias (over-read), or negative bias (under-read) relative to the reference technique. To compare with the AQS objectives it's important that tubes are corrected (adjusted) by comparing with a chemiluminescent analyser reference method for NO_2.

A bias factor is calculated using a spread sheet provided by the National Physical Laboratory. Bias factors are collated in a national database enabling a large number of factors at a range of different site locations using the same laboratory and analysis method. There is a choice of using a locally derived bias factor based on local data or using the national dataset.

The bias adjustment factor used for 2019 is 0.93. This is the average bias adjustment factor for all colocation studies for Staffordshire Scientific Services, from the Defra National Bias Adjustment Factors Spreadsheet, March 2020 (version 03/20), available from the DEFRA website and in Figure C2 below.

Figure C2. National Diffusion Tube Bias Adjustment Factor Spreadsheet

National Diffusion Tube Bias Adjustment Factor Spreadsheet — Spreadsheet Version Number: 03/20

Follow the steps below **in the correct order** to show the results of **relevant** co-location studies
Data only apply to tubes exposed monthly and are not suitable for correcting individual short-term monitoring periods
Whenever presenting adjusted data, you should state the adjustment factor used and the version of the spreadsheet
This spreadhseet will be updated every few months: the factors may therefore be subject to change. This should not discourage their immediate use.

This spreadsheet will be updated at the end of June 2020

LAQM Helpdesk Website

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.

Spreadsheet maintained by the National Physical Laboratory. Original compiled by Air Quality Consultants Ltd.

Step 1: Select the Laboratory that Analyses Your Tubes from the Drop-Down List — If a laboratory is not shown, we have no data for this laboratory

Step 2: Select a Preparation Method from the Drop-Down List — If a preparation method is not shown, we have no data for this method at this laboratory

Step 3: Select a Year from the Drop-Down List — If a year is not shown, we have no data[2]

Step 4: 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[3] shown in blue at the foot of the final column.

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@uk.bureauveritas.com or 0800 0327953

Analysed By[1]	Method (To undo your selection, choose (All) from the pop-up list)	Year[5] (To undo your selection, choose (All))	Site Type	Local Authority	Length of Study (months)	Diffusion Tube Mean Conc. (Dm) (µg/m³)	Automatic Monitor Mean Conc. (Cm) (µg/m³)	Bias (B)	Tube Precision[6]	Bias Adjustment Factor (A) (Cm/Dm)
Staffordshire Scientific Services	20% TEA in water	2019	KS	Manchester City Council	12	55	59	-6.3%	G	1.07
Staffordshire Scientific Services	20% TEA in water	2019	UC	Manchester City Council	12	35	36	-3.9%	G	1.04
Staffordshire Scientific Services	20% TEA in water	2019	SI	Manchester City Council	12	20	22	-9.1%	G	1.10
Staffordshire Scientific Services	20% TEA in water	2019	R	Stockport MBC	12	40	36	12.8%	G	0.89
Staffordshire Scientific Services	20% TEA in water	2019	R	Stockport MBC	11	27	23	15.0%	G	0.87
Staffordshire Scientific Services	20% TEA in water	2019	UB	Trafford	10	22	19	18.1%	G	0.85
Staffordshire Scientific Services	20% TEA in water	2019	UB	Wigan Council	11	24	18	34.1%	G	0.75
Staffordshire Scientific Services	20% TEA in water	2019	R	East Staffordshire Borough Council	11	41	36	14.1%	G	0.88
Staffordshire Scientific Services	20% TEA in water	2019		Overall Factor[3] (17 studies)				Use		0.93

Figure C3. Bias Adjustment Calculation

Clipboard | Font | Alignment | Number | Styles | Cells | Editing

Q8 | =P8*0.93

Table B.1 – NO_2 Monthly Diffusion Tube Results - 2019

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	NO_2 Mean Concentrations (µg/m³)												Annual Mean		
			Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Raw Data	Bias Adjusted (0.93) and Annualised (1)	Distance Corrected to Nearest Exposure (2)
BO15NO	371435	411690	51.4	64.6	37.0	33.7	31.6	35.6	33.1	40.0	47.8	45.1	43.6	50.7	42.9	39.9	
BO4NO	371394	411718	41.7	45.9	24.9	21.6	19.0	22.3	19.5	25.8	23.1	33.5	33.1	38.7	29.1	27.1	

As can be seen in Figure C2, the bias adjustment is applied to the annual average NO_2 concentration.

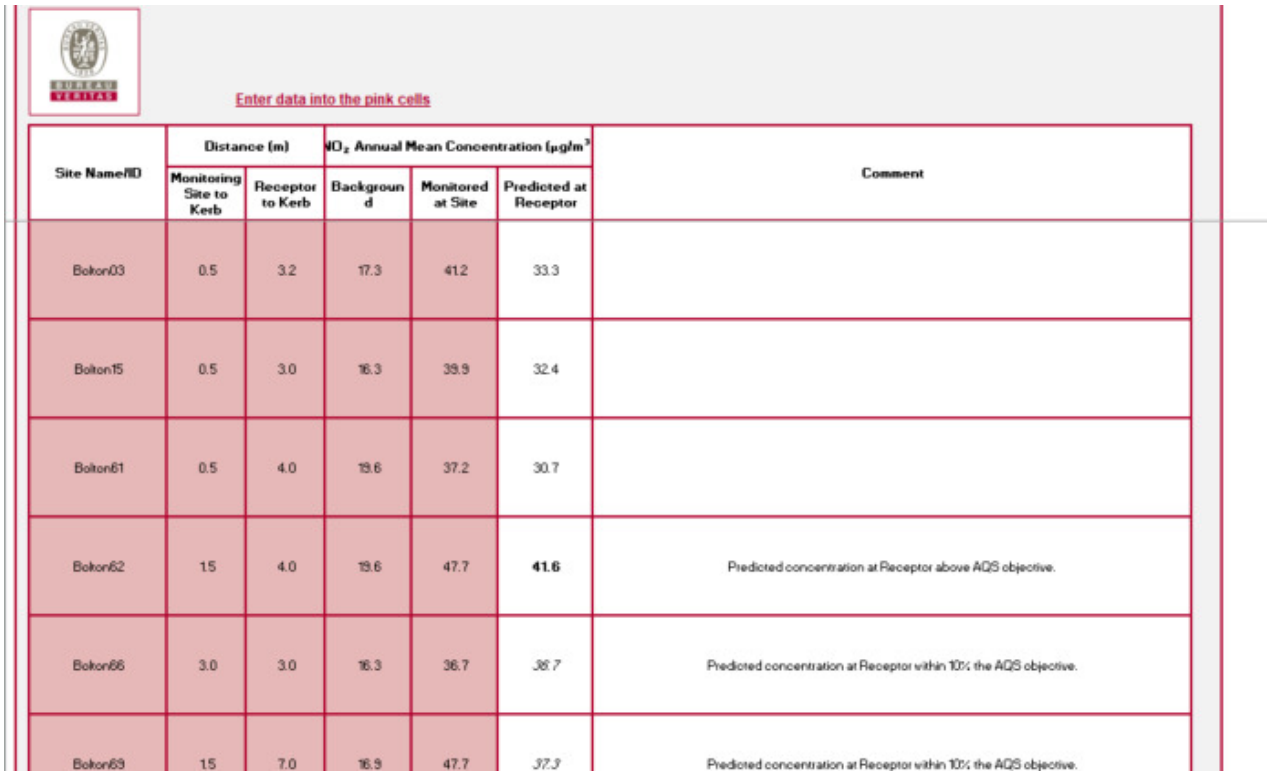
Distance Correction

Distance Correction is also required to represent the relevant exposure as it is not always possible to measure concentrations at precisely the desired location. For this, the DEFRA's NO_2 Fall-off with distance calculator (v4.2) has been applied to the bias adjusted concentrations. The methodology consists of comparing the monitored annual mean NO_2 concentrations at a given point against known relationships between NO_2 concentrations and the distance from a road source. Results should be treated with caution as a number of limitations of this methodology are acknowledged and can

be downloaded from the DEFRA website: https://laqm.defra.gov.uk/tools-monitoring-data/no2-falloff.html

Figure C3 shows an example of the calculator being used to determine distance correction values. This calculation was only applied to DTs with concentrations within 10% of the NO_2 AM objective.

Figure C3. Examples of Distance Correction Calculations



Enter data into the pink cells

Site Name/ID	Distance (m)		NO_2 Annual Mean Concentration (µg/m³)			Comment
	Monitoring Site to Kerb	Receptor to Kerb	Background	Monitored at Site	Predicted at Receptor	
Bolton03	0.5	3.2	17.3	41.2	33.3	
Bolton15	0.5	3.0	16.3	39.9	32.4	
Bolton61	0.5	4.0	19.6	37.2	30.7	
Bolton62	1.5	4.0	19.6	47.7	**41.6**	Predicted concentration at Receptor above AQS objective.
Bolton66	3.0	3.0	16.3	36.7	*36.7*	Predicted concentration at Receptor within 10% the AQS objective.
Bolton69	1.5	7.0	16.9	47.7	*37.3*	Predicted concentration at Receptor within 10% the AQS objective.

Automatic Analysers

Automatic air quality analysers in Greater Manchester area are subject to a high level of quality assurance/ quality control. All analysers are either operated as part of the national Automatic Urban and Rural Network (AURN) or are part of the 'Calibration Club' scheme run by Ricardo-AEA.

The procedures are equivalent to the UK Automatic Urban and Rural Network (AURN) the main features of the services being:-

Calibration Club

- Data screened daily for errors and final data ratified and published to same standard as AURN sites.

- Data checked daily for errors and faults reported to Local Site operators.
- Independent audits twice per year.
- Final data set scaled and ratified to same standard as AURN.

Greater Manchester Air Quality Network (GMAQN)

Ricardo-AEA manages QA/QC and audit of the air quality stations to the same standard as the AURN. The GMAQN officially started on 1 September 2013. Table A1 lists the Greater Manchester sites that are currently operational.

Particulate Monitoring

A number of different instruments are used in Greater Manchester for the measurement of particles. Historically TEOM have been used, but DEFRA replaced a number of instruments with TEOM FDMS and some sites use the BAM or Partisol.

The reference method for the UK PM_{10} Objectives (and EU limit values) is based upon measurements from a gravimetric sampler. This samples over a 24 hour period and the particulate proportion less than 10 microns (PM_{10}) is measured by the mass difference before and after exposure. It is labour intensive and the UK, and European countries have invested heavily in the TEOM (Tapered Element Oscillating Microbalance). The TEOM measurements have been historically adjusted by a factor of 1.3 to make them gravimetric equivalent. However to further improve the technique; the measurement was modified by lowering the sampling temperature from 50℃ to 30℃ and adding a dryer to remove water vapour. This system is referred to a Filter Dynamics Measurement System (FDMS) and is equivalent to the EU reference method.

Due to widespread use of the TEOM, and its reliability and the need to report to the EU using an 'equivalent method', The Volatile Correction Model (VCM) was developed by Kings College London, to adjust the TEOM data. Studies have shown that FDMS sites within 200 kilometres can be used to correct the TEOM data as it assumes that the sample lost by the heating is the same over this geographical area. Sufficient FDMS sites have only been available since 2008/9 for the correction to be applied. VCM corrections have been applied to TEOM analyser results automatically since 2014 and historic records within the ASR have been altered to reflect VCM corrected results.

Appendix D: Map(s) of Monitoring Locations and AQMAs

Figure D.1 Wigan and Bolton

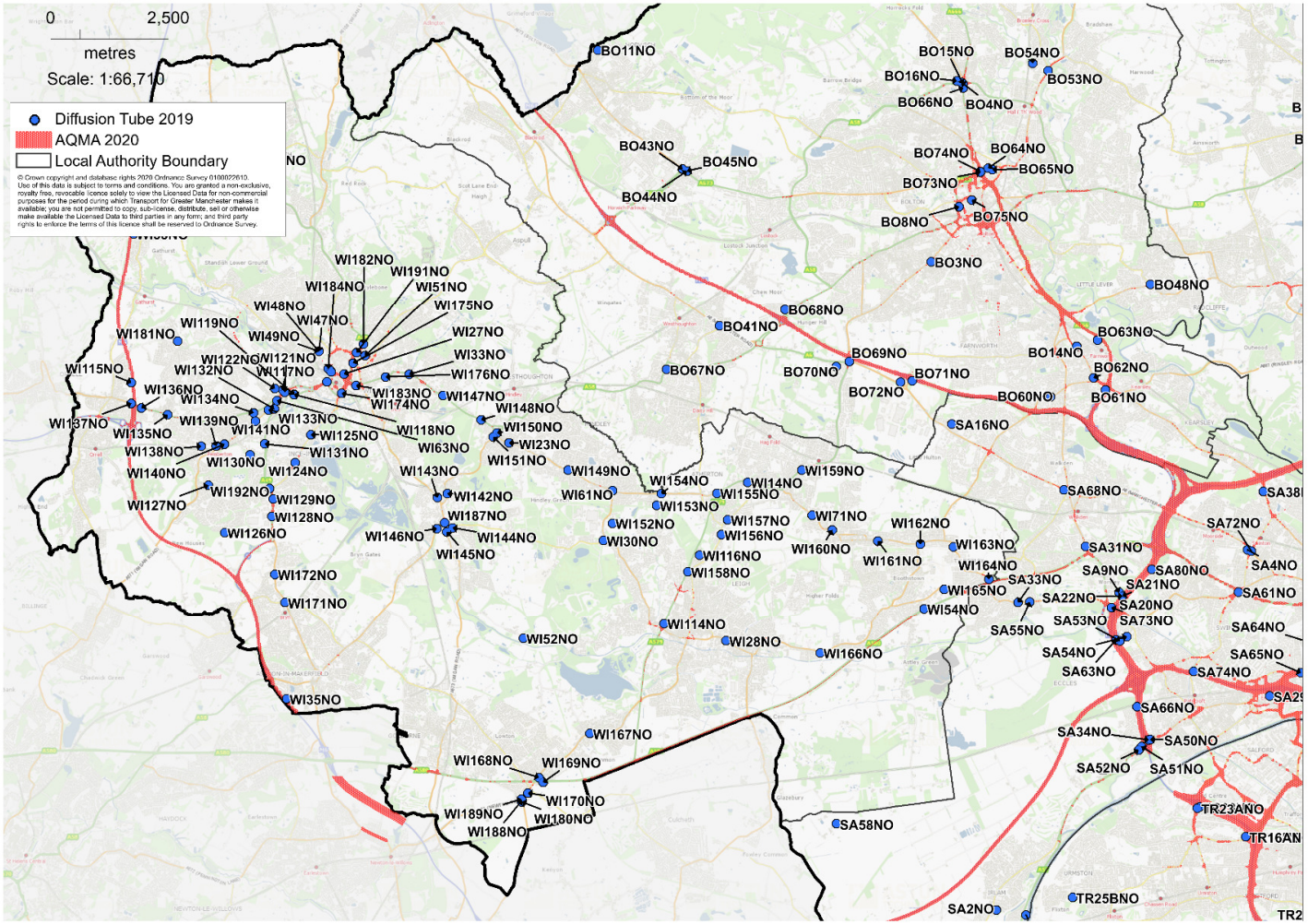


Figure D.2 Trafford, Salford and Manchester

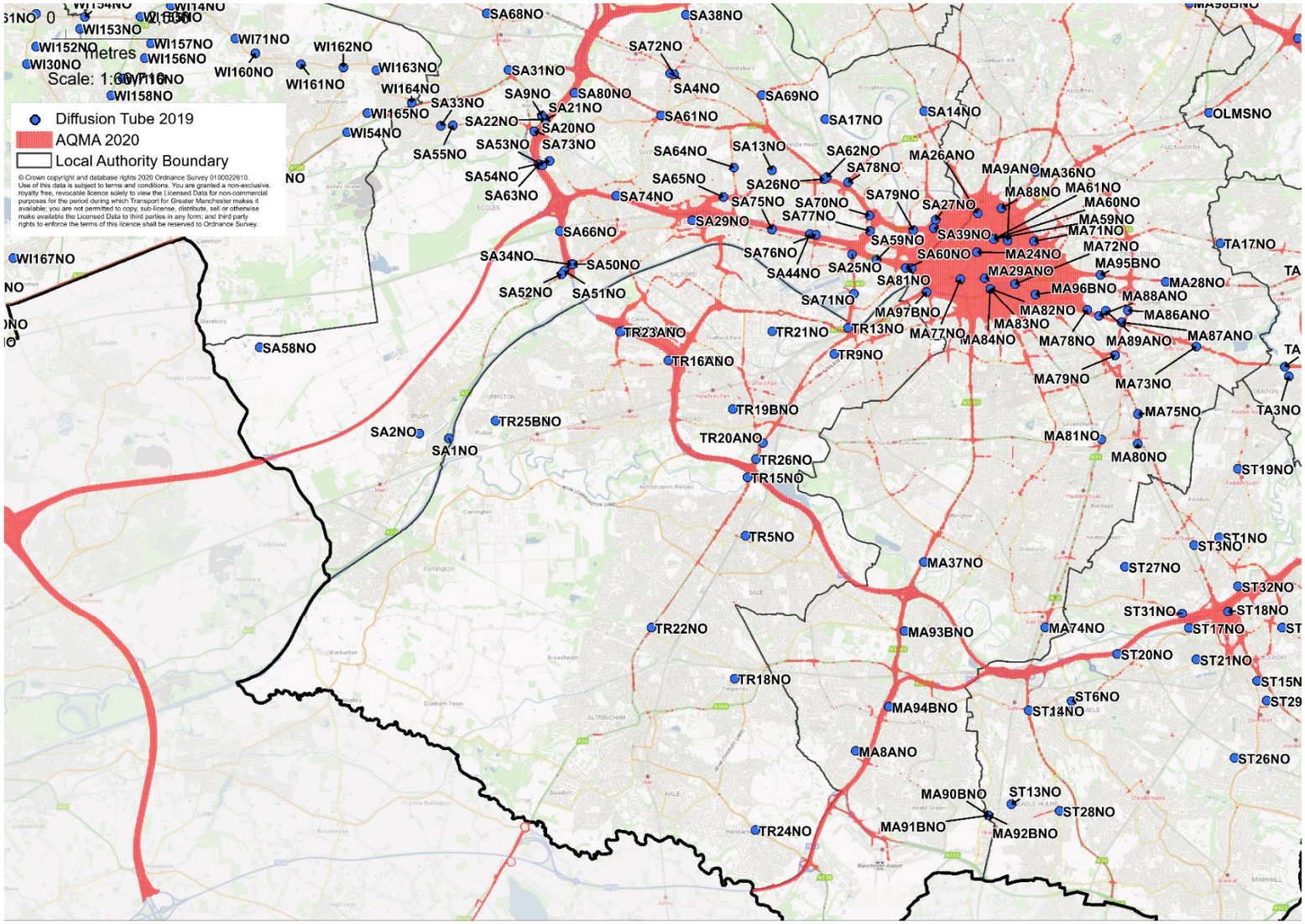


Figure D.3 Manchester, Stockport and Tameside

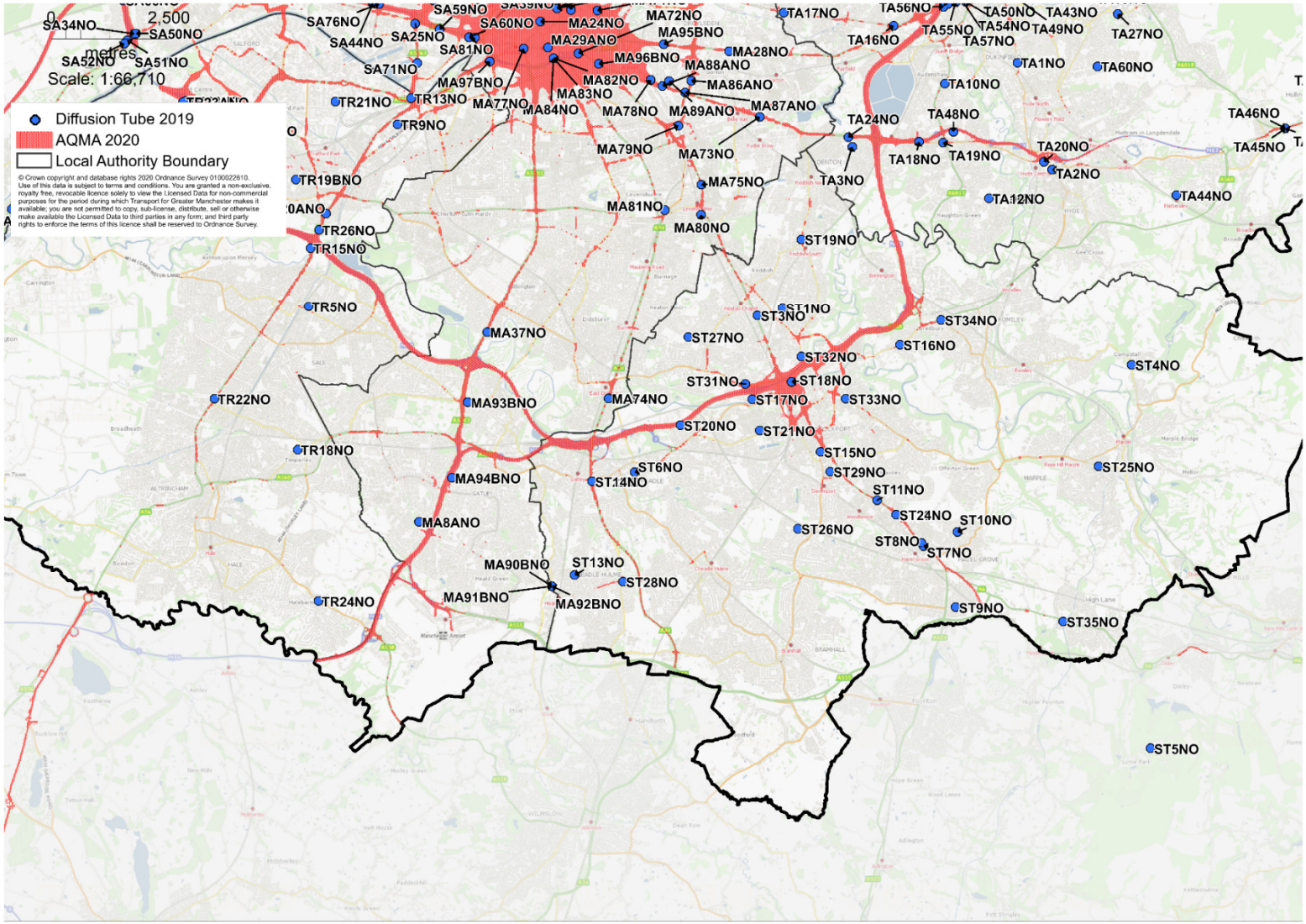


Figure D.4 Tameside

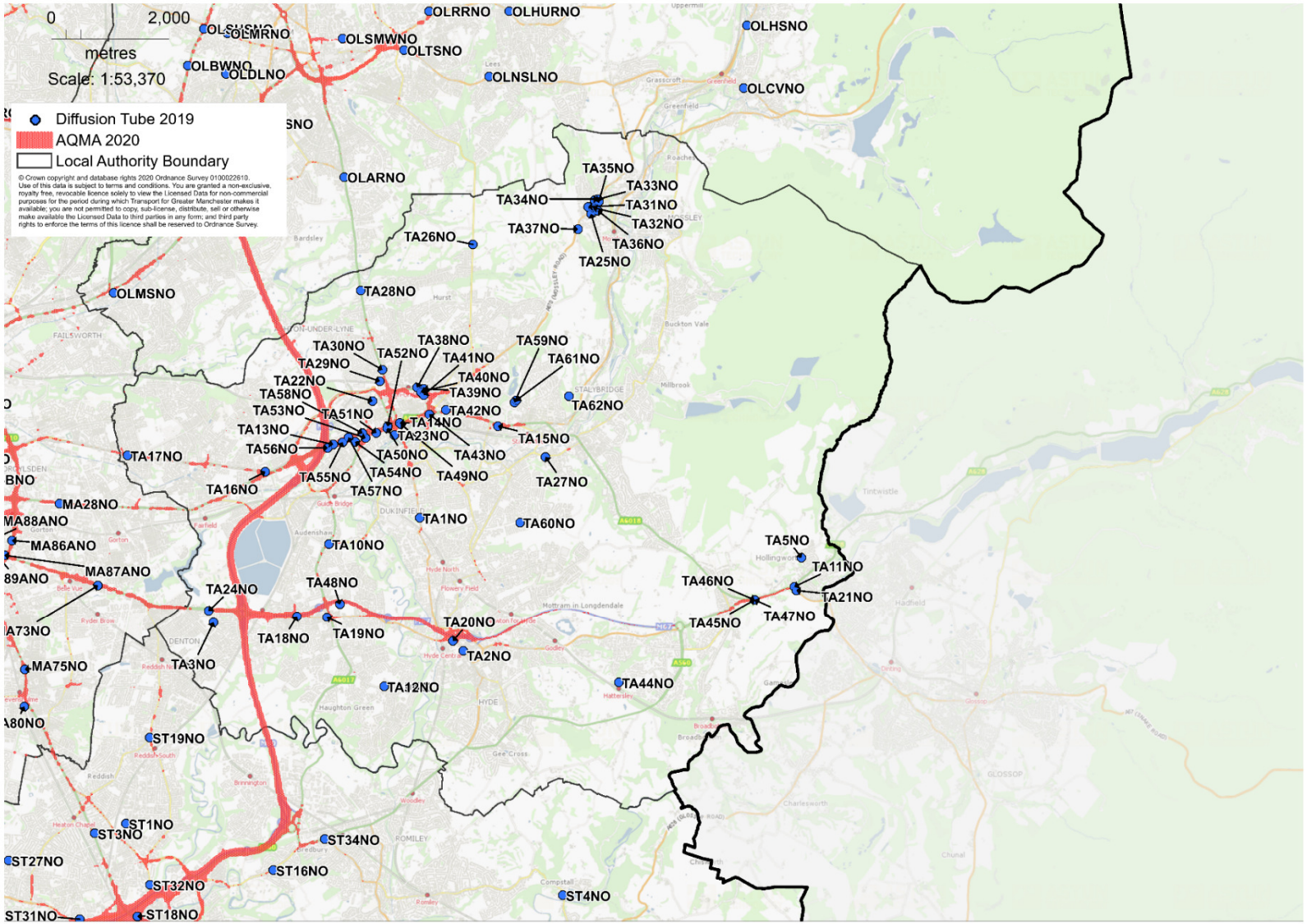


Figure D.5 Bury, Rochdale and Oldham

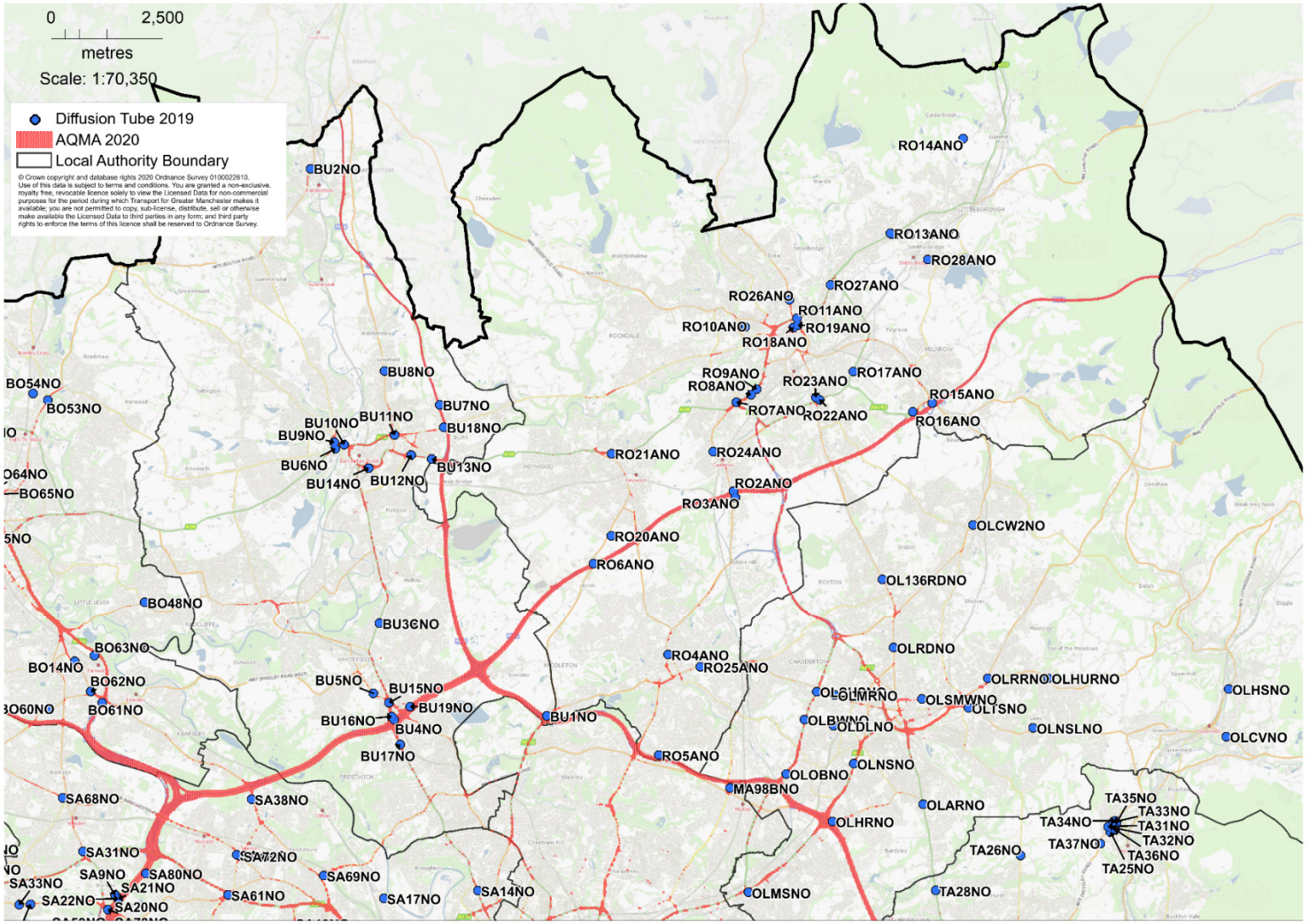
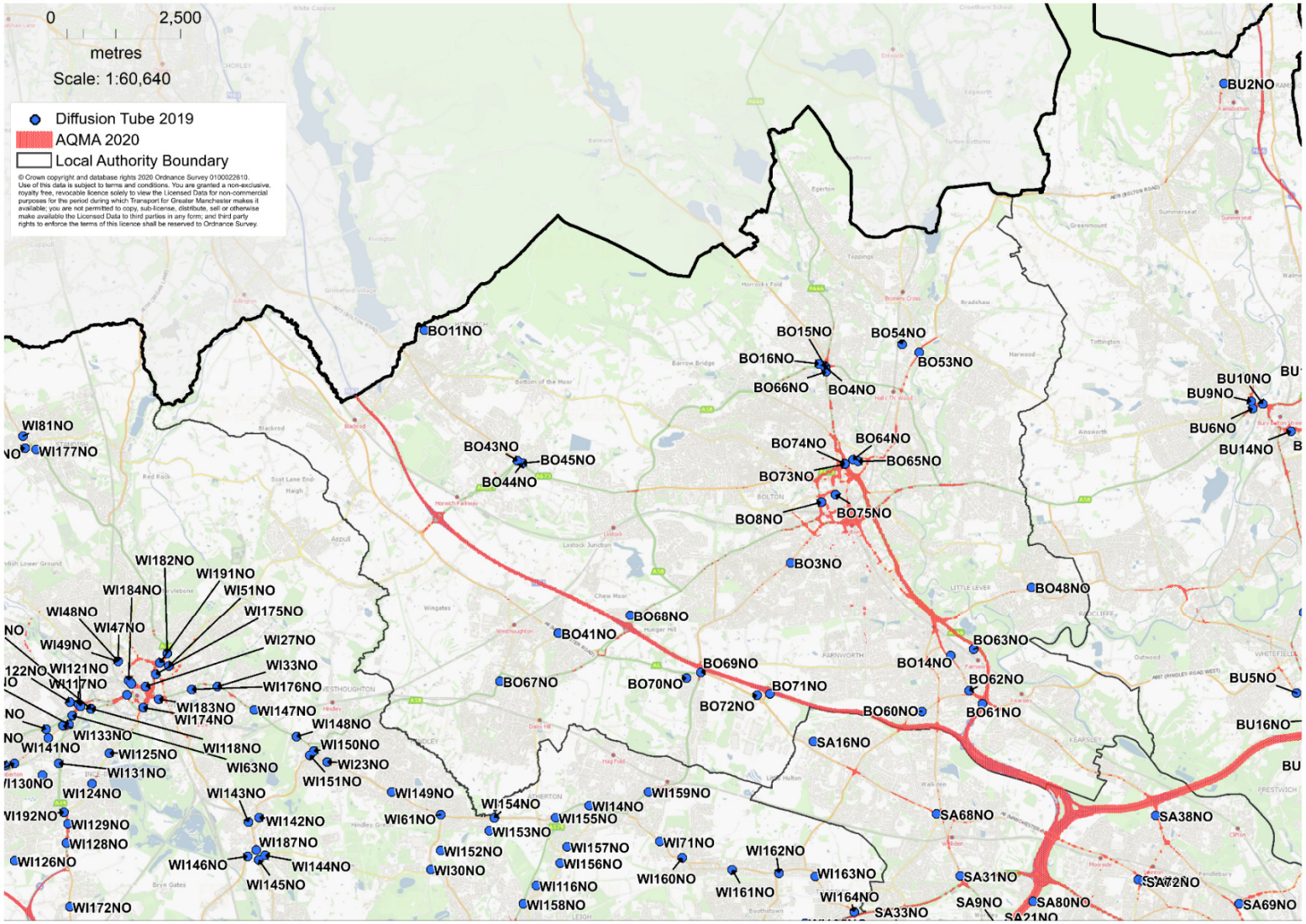


Figure D.6 Wigan, Bolton and Bury



Appendix E: Summary of Air Quality Objectives in England

Table E.1 – Air Quality Objectives in England

Pollutant	Air Quality Objective[11]	
	Concentration	Measured as
Nitrogen Dioxide (NO_2)	200 µg/m^3 not to be exceeded more than 18 times a year	1-hour mean
	40 µg/m^3	Annual mean
Particulate Matter (PM_{10})	50 µg/m^3, not to be exceeded more than 35 times a year	24-hour mean
	40 µg/m^3	Annual mean
Sulphur Dioxide (SO_2)	350 µg/m^3, not to be exceeded more than 24 times a year	1-hour mean
	125 µg/m^3, not to be exceeded more than 3 times a year	24-hour mean
	266 µg/m^3, not to be exceeded more than 35 times a year	15-minute mean

[11] The units are in microgrammes of pollutant per cubic metre of air (µg/m^3).

Glossary of Terms

Abbreviation	Description
AQAP	Air Quality Action Plan - A detailed description of measures, outcomes, achievement dates and implementation methods, showing how the local authority intends to achieve air quality limit values'
AQMA	Air Quality Management Area – An area where air pollutant concentrations exceed / are likely to exceed the relevant air quality objectives. AQMAs are declared for specific pollutants and objectives
ASR	Air quality Annual Status Report
Defra	Department for Environment, Food and Rural Affairs
DMRB	Design Manual for Roads and Bridges – Air quality screening tool produced by Highways England
EU	European Union
FDMS	Filter Dynamics Measurement System
LAQM	Local Air Quality Management
NO_2	Nitrogen Dioxide
NO_x	Nitrogen Oxides
PM_{10}	Airborne particulate matter with an aerodynamic diameter of 10µm (micrometres or microns) or less
$PM_{2.5}$	Airborne particulate matter with an aerodynamic diameter of 2.5µm or less
QA/QC	Quality Assurance and Quality Control
SO_2	Sulphur Dioxide
…	…

References

Air Quality Expert Group, Fine Particulate Matter ($PM_{2.5}$) in the United Kingdom, 2012 [Link]

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