Annual Progress Report (APR)

2024 Air Quality Annual Progress Report (APR) for West Lothian Council

In fulfilment of Part IV of the Environment Act 1995, as amended by the Environment Act 2021

Local Air Quality Management

June 2024

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Executive Summary: Air Quality in Our Area

Air Quality in West Lothian Council

West Lothian Council has continued to review and assess air quality throughout the district during 2023 to determine whether or not Scottish air quality objectives are likely to be achieved. Overall, there were no objective exceedances recorded throughout the West Lothian Council air quality monitoring network in 2023 and the air quality in the area remains good.

Air pollutants Nitrogen Dioxide (NO_2) and fine particulates (PM_{10} & $PM_{2.5}$), which are mainly associated with vehicle emissions and domestic fuel burning, have been measured using a network of three continuous air quality monitoring stations located in Linlithgow, Broxburn and Newton.

Alongside this, there is also a network of 30 NO_x passive diffusion tubes located at 24 sites throughout West Lothian. There is one tube located at 21 sites and three tubes co-located with the air quality monitoring stations at Broxburn, Linlithgow and Newton (Sites DT4, DT14 and DT2N respectively) – we also employ 1 travel tube. A diffusion tube (DT24N) was installed in Linlithgow in October 2022, following completion of an updated detailed assessment for the Linlithgow Air Quality Management Area. The locations of all the diffusion tubes can be found on the Air Quality in Scotland website: https://www.scottishairquality.scot/latest

A diffusion tube location map (Figure 8) is also provided at the end of this report in Appendix C.

In October 2023 it was noticed that the data capture for NO_2 at all three sites was 95/96% when it had previously been 100%. Ricardo were notified and advised that this was due to the set-up of the auto calibration. A second, additional auto calibration had been set up at 1-hour intervals where one is sufficient. Our Engineer Support Unit (ESU) was contacted and asked to cancel out the auto calibration programmed for the span and keep the zero calibration for all three of our sites. This rectified the problem. Overall, in 2023 there weren't any significant issues to note with the equipment at any of our 3 automatic monitoring stations.

The 2023 monitoring data at all three continuous air quality monitoring stations has shown that the NO_2, PM_{10} and $PM_{2.5}$ long term average air quality objectives have been met.

NO_2 levels slightly increased at all three continuous monitoring sites from the levels found in 2022 but still remained well below the objective limit. There were no exceedances of the short term NO_2 at any of the three sites.

West Lothian Council measured PM_{10} concentrations at 3 sites during 2023. There was a slight reduction in concentration levels measured in 2023 at all 3 continuous monitoring sites from levels measured in 2022.

$PM_{2.5}$ levels increased at the Newton site during 2023 but decreased at the other 2 sites. It is noted that data capture was 89% at the Newton site compared to the other 2 sites which had 99% data capture.

In relation to the diffusion tube data it can be noted that during 2023 many of the measured concentrations have increased from last years measured levels. The most significant being at DT7N which increased from 12.1µg/m³ in 2022 to 17.1µg/m³ and also DT10N which increased from 14.9µg/m³ to 17.5µg/m³. It is worthwhile noting that both of these tubes are new sites which were added in January 2022. The most significant decrease was at DT12 which decreased from 23.4µg/m³ to 20.0µg/m³.

Further information on the location of West Lothian's AQMA's can be found at West Lothian Air Pollution

Actions to Improve Air Quality

The Council promoted a variety of active and sustainable travel measures during 2023 to help reduce overall emissions. Details of these actions are outlined below:

Membership of West Lothian Councils Eco Stars fleet recognition scheme continued to increase during 2023. At the end of 2023, 199 members and 7232 vehicles are now part of the scheme within the West Lothian Council area which is an increase of 51 members and 2336 vehicles from 2022. West Lothian Councils own fleet of pool vehicles have been members of the Eco Stars scheme since 2019 which aims to support the Councils roadmap to decarbonising its fleet;

Some active travel measure projects that have been delivered in West Lothian during 2023 include;

- A706/B7066 from Whitdale Roundabout to Boghead Roundabout cycle path;
- B7002 Whitburn Road, Bathgate – footway widening;
- Whitburn Town Walk: Blaeberryhill Road to Burnhouse School; and

- Westerinch to Whitehill Industrial Estate: cycleway provision.

Bikeability activities have continued to increase during 2023. The scheme was on target for 27 schools to be delivering Level 2 Bikeability to their pupils. This was a record high for West Lothian Council, with the previous highest number of schools delivering Level 2 Bikeability being 22. This will be 40% of our primary schools delivering essential on road cycle training (Level 2 Bikeability) to the young people of West Lothian. Also taking place during the 2023 session –

- 3 Bikeability Scotland Instructor Courses ran for teachers and volunteers in West Lothian;
- Increased Bikeability cycle fleet enabling more schools to borrow bikes for Bikeability training in their school;
- New helmets to be purchased;
- Cycle kits for schools getting a member of staff trained as a Bikeability Scotland instructor;
- Dr Bikes arranged pre Bikeability Delivery for pupils who need their bikes checked over;
- Working with West Lothian Bike Library for the use of adaptive bikes to ensure cycle training is inclusive to all; and
- Ever increasing engagement from schools enquiring about Bikeability with lots of positive feedback from both teachers and pupils.

The longer-term goal is to have 100% of Primary Schools in West Lothian delivering Level 2 Bikeability training to their pupils meaning that all children attending a Primary School in West Lothian will have the opportunity to participate in essential cycle training. In summary;

- 68 primary schools contacted
- 30 schools visited
- 23 Bikeability loan bikes in use
- 21 schools delivering level 1 Bikeability in terms 1-3
- 8 schools planning to deliver level 1 Bikeability in term 4
- 16 schools delivered level 2 Bikeability in terms 1-3
- 11 schools planning to deliver level 2 Bikeability in term 4

During 2023, there was further expansion of the publicly available EV charging points installed by West Lothian Council. There are currently 76 charging devices providing various

charging capacities (7kW and 50kW) across 51 locations. It is planned to install additional bays and devices in various public spaces throughout the West Lothian Council area in the upcoming year. In August 2023 the West Lothian Public Electric Vehicle Infrastructure Plan was published which sets out an overarching vision for EV charging in West Lothian. It sets out proposals for expanding the network and plans for the expansion of public EV charging infrastructure across the district up until 2026 with 2 key objectives identified. These being that 10% of parking spaces in key West Lothian Council owned car parks will be EV by 2026 and; over 50% of households with no off-road parking in West Lothian will be within a reasonable walk (200-400m) of a charging site by 2026. There are also plans to take it forward in the coming year, with some potential for collaboration with neighbouring authorities.

In December 2022, the Council introduced tariffs for the use of its EV charge points with different tariff levels specified for different charger types. Further details on the charges and the locations of charging points can be found on the West Lothian Council EV Charging webpage.

New development in the West Lothian area is a key issue affecting air quality. Where relevant, development applications are required to submit an Air Quality Impact Assessment to allow for potential impact to be assessed and any necessary mitigation measures to be applied. Applications that may be required to submit an AQIA include developments where increased traffic emissions e.g. major housing developments, may be an issue and major industrial sites. These will be assessed and considered in line with our Air Quality Supplementary Planning Guidance.

West Lothian Council also continues to provide the management and administration support for the East Central Scotland Vehicle Emissions Partnership (VEP), which is a collaboration with Stirling, East Lothian, Midlothian and Falkirk Councils. The remit of the VEP is to assist in reducing vehicle emissions by encouraging drivers to switch off their engine whenever possible, promote good travel modes and vehicle choices and handling idling and emissions complaints. In addition, the VEP uses a broad variety of advertising media to encourage change in driving habits across the councils' areas. Media used includes local TV, radio, public transport networks such as buses and social media. Further information can be found at the Switch Off and Breathe website.

New EV Charger – Best Western Hilcroft Hotel, Whitburn

Local Priorities and Challenges

As highlighted in West Lothian Councils 2022 Annual Progress Report, work began on the revocation of the Broxburn AQMA for ongoing compliance with the NO_2 and PM_{10} air quality objectives. This has progressed during 2023 and both external and internal consultations have taken place with approval from various committees within the Council and external stakeholders. The revocation order is expected to be granted in early 2024. Once the revocation of Broxburn is complete, the focus will then switch to the Linlithgow and Newton Air Quality Management Area's which are being considered for revocation in the upcoming year.

A review of the current Air Quality Action Plans will be considered by early 2024.

A challenge that West Lothian is experiencing is the lack of budget for procurement for additional electric fleet vehicles. During 2023, 11 electric pool vehicles were disposed of bringing the total number of electric vehicles used within West Lothian Council down to 42 from 53 in 2022. There are no specific plans currently to increase the number of vehicles, however West Lothian Council will always consider electric vehicles when replacing vehicles and make a decision based on whole life costs.

Funding applications will continue to be made to the Scottish Government for monitoring equipment and action plan measures.

How to Get Involved

If you would like to find out more about air quality within West Lothian, please visit the [Air Pollution](#) pages of our website.

There are three automatic air quality monitoring sites across the West Lothian Council area. The air quality data from all 3 sites can be viewed on the [Scottish Air Quality](#) website map.

To learn more about the ECO Stars Fleet Recognition Scheme and for details on how to join the scheme if you are a commercial fleet operator please visit https://www.ecostars-uk.com/how-it-works/join-eco-stars/

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1   Local Air Quality Management

This report provides an overview of air quality in West Lothian Council during 2023. It fulfils the requirements of Local Air Quality Management (LAQM) as set out in Part IV of the Environment Act (1995), as amended by the Environment Act (2021), 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 Progress Report (APR) summarises the work being undertaken by West Lothian Council to improve air quality and any progress that has been made.

Table 1.1 – Summary of Air Quality Objectives in Scotland

Pollutant	Air Quality Objective Concentration	Air Quality Objective Measured as	Date to be Achieved by
Nitrogen dioxide (NO_2)	200 µg/m³ not to be exceeded more than 18 times a year	1-hour mean	31.12.2005
Nitrogen dioxide (NO_2)	40 µg/m³	Annual mean	31.12.2005
Particulate Matter (PM_{10})	50 µg/m³, not to be exceeded more than 7 times a year	24-hour mean	31.12.2010
Particulate Matter (PM_{10})	18 µg/m³	Annual mean	31.12.2010
Particulate Matter ($PM_{2.5}$)	10 µg/m³	Annual mean	31.12.2021
Sulphur dioxide (SO_2)	350 µg/m³, not to be exceeded more than 24 times a year	1-hour mean	31.12.2004
Sulphur dioxide (SO_2)	125 µg/m³, not to be exceeded more than 3 times a year	24-hour mean	31.12.2004
Sulphur dioxide (SO_2)	266 µg/m³, not to be exceeded more than 35 times a year	15-minute mean	31.12.2005
Benzene	3.25 µg/m³	Running annual mean	31.12.2010
1,3 Butadiene	2.25 µg/m³	Running annual mean	31.12.2003
Carbon Monoxide	10.0 mg/m³	Running 8-Hour mean	31.12.2003

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 publish and implement an Air Quality Action Plan (AQAP) within 12 months, setting out measures it intends to implement in pursuit of the objectives. Whilst West Lothian Council has three declared AQMA's, only one, Broxburn, has a finalised action plan. The other two, Newton and Linlithgow, remain as draft action plans. As detailed later in this report, successive years of monitoring data within the AQMA's has shown that air pollution objective limits are being met comfortably. The Councils focus has therefore turned to revoking these AQMA's with work to progress the revocation of Broxburn taking place during 2023 and Linlithgow and Newton AQMA's being considered for revocation during 2024.

Updated detailed assessments for the three AQMA's were completed in October 2022. Work then started in late 2023 on the process of revoking both the Linlithgow and Newton AQMA's for NO_2 and PM_{10} and PM_{10} respectively. The detailed assessment for Linlithgow considered;

• A review of measured NO_2, PM_{10} and $PM_{2.5}$ concentrations within the AQMA over recent years;

• Detailed dispersion modelling of NO_2, PM_{10} and $PM_{2.5}$ concentrations for a baseline year of 2017;

• A sensitivity analysis of potential fluctuations in annual mean pollutant concentrations attributable to meteorological conditions;

• Detailed dispersion modelling of NO_2, PM_{10} and $PM_{2.5}$ concentrations in a future year of 2024, reflecting anticipated changes in traffic levels associated with projected growth or planned local developments.

The detailed assessment considered for Newton considered;
• A review of measured NO_2 and PM_{10} concentrations within the AQMA over recent years;

- Detailed dispersion modelling of PM_{10} and $PM_{2.5}$ concentrations for a baseline year of 2017;
- A sensitivity analysis of potential fluctuations in annual mean pollutant concentrations attributable to meteorological conditions;
- Detailed dispersion modelling of PM_{10} and $PM_{2.5}$ concentrations in a future year of 2024 reflecting anticipated changes in traffic levels associated with projected growth or planned local developments.

In considering all the information available from several years of monitoring and from modelling carried out in the 2022 detailed assessments, West Lothian Council intend to revoke the AQMAs for both NO_2 and PM_{10}. The Council will, however, continue to monitor NO_2 and PM_{10} within all three areas for a period. If measured levels remain below the objective levels, the monitoring equipment may be utilised at other potential areas of identified poor air quality within West Lothian.

A summary of AQMAs declared by West Lothian Council can be found in Table 2.1 . Further information related to declared or revoked AQMAs, including maps of AQMA boundaries are available online at AQMA webpage

Broxburn AQMA – East Main Street, Broxburn

Table 2.1 – Declared Air Quality Management Areas

AQMA Name	Pollutants and Air Quality Objectives	City / Town	Description	Action Plan
AQMA Linlithgow	• NO_2 annual mean • PM_{10} annual mean	Linlithgow	Includes Linlithgow, Linlithgow Bridge and land allocated for development	Draft Action Plan
AQMA Broxburn	• NO_2 annual mean • PM_{10} annual mean	Broxburn	West Main Street eastwards to western boundary of service station, Broxburn	Action Plan
AQMA Newton	• PM_{10} annual mean	Newton	The whole of Newton village	Draft Action Plan

2.2 Cleaner Air for Scotland 2

Cleaner Air for Scotland 2 – Towards a Better Place for Everyone (CAFS2) is Scotland's second air quality strategy. CAFS2 sets out how the Scottish Government and its partner organisations propose to further reduce air pollution to protect human health and fulfil Scotland's legal responsibilities over the period 2021 – 2026. CAFS2 was published in July 2021 and replaces Cleaner Air for Scotland – The Road to a Healthier Future (CAFS), which was published in 2015. CAFS2 aims to achieve the ambitious vision for Scotland "to have the best air quality in Europe". A series of actions across a range of policy areas are outlined, a summary of which is available on the Scottish Government's website.

Progress by West Lothian Council against relevant actions for which local authorities are the lead delivery bodies within this strategy is demonstrated below.

2.2.1 Placemaking – Plans and Policies

Local authorities, with support from the Scottish Government will assess how effectively air quality is embedded in plans, policies, City Deals and other initiatives, and more generally in cross departmental working, identifying and addressing evidence, skills, awareness and operational gaps.

West Lothian Council currently has the following strategies, plans and policies in place which will help contribute to the principles of CAFS2.

[West Lothian Council Local Development Plan 1 (LDP1)](#) was adopted in 2018 in accordance with the Town and Country Planning (Scotland) Act 1997 and sets out a local interpretation of the requirements of national and strategic policy. LDP1 comprises a written statement which provides the general policy context against which planning applications for new development proposals will be assessed. This is supported by 5 proposal maps which show the range of development opportunities and constraints within the area. Air quality is considered throughout the plan but specifically under sections 'Policy EMG4 Air Quality' and Section 252, Air Quality and Noise.

The Council has begun the process of preparing a new Local Development Plan for West Lothian (LDP2) which will replace the existing LDP1. The new plan will set out planning policies and proposals for the use and development of land within West Lothian for a ten-year period starting from when it is adopted, intended to be by the end of 2026. It would be expected that air quality would be considered as part of the new plan.

West Lothian Council's current [Active Travel Plan 2016-2021: Making Active Connections](#) is a plan to link people to places by active travel. However, it is not just about physical connections, it is also a framework for mainstreaming active travel in West Lothian. The Council aims to achieve this by creating a culture where active travel becomes the norm for suitable everyday trips. It is therefore crucial that West Lothian Council works successfully with external partners and with local communities and "joins up" policies and projects delivered by different services and teams across the Council. Promoting positive behaviours at an early age is essential and schools throughout West Lothian encourage pupils to use active travel methods, emphasising the health, wellbeing and environmental benefits. The current plan is undergoing review and a new plan is being developed which will cover the next 5 years (2024-2029). Measures in the plan include improved walking and cycling opportunities, working with bus operators to enhance public transport,

expanding the network of Park and Ride facilities and expanding the network of electric vehicle (EV) charging points. Through these actions, the Council will contribute to the national target of reducing vehicle kilometres by 20% (2030).

West Lothian Council also has a 'decarbonising the fleet' working group that is actively developing a strategy to reduce the impact of vehicle emissions from the Council fleet of vehicles. At a national level West Lothian Council is liaising with Transport Scotland on how local authorities can meet the Scottish Government's fleet decarbonisation targets.

West Lothian Council, in partnership with the South East of Scotland Transport Partnership (SEStran), operates a free car-sharing service which is open to anyone to use. The scheme can be accessed through Tripshare West Lothian and is part of the national Liftshare network for car-sharing. This scheme can help reduce carbon footprint and vehicle emissions and can also save the user of a car sharing scheme an average of £880 per year.

The West Lothian Council Health Improvement Team, in partnership with community bike lending libraries, have a range of bikes, adult trikes, adaptive bikes (suitable for adults with a wide range of disabilities), folding bikes and power assisted bikes to borrow. The aim of the library is to give access to bikes to those who may otherwise be unable to do so. The Council also run a Bicycle Recycling Project through its Community Payback initiative. So far refurbished bicycles have been donated to RiverKids, a West Lothian childrens charity.

West Lothian Council aims to achieve net-zero targets by reducing emissions by 5% per year; from 2021/22 to 2022/23, the Council achieved an 8% decrease in emissions. There are a number of direct actions that have contributed to our emission reductions including the implementation of energy efficiency projects, moving to twin stream recycling, replacing street lighting with low energy LED equivalents and investing in renewable and low carbon technologies such as biomass boilers and solar photovoltaic (PV) panels.

West Lothian Council have a climate change group which also meets regularly to discuss and consolidate issues around the climate change emergency which includes matters linked to air quality.

Other relevant policies and plans which also contain initiatives that affect air quality include:

- West Lothian Council Climate Change Strategy 2021-28
- Local Outcomes Improvement Plan 2023-2033
- Active Travel Plan 2016-2021: Making Active Connections

- [West Lothian Public Electric Vehicle Infrastructure Plan 2023](#)
- [Local Heat and Energy Efficiency Strategy 2023-2028](#)
- [Supplementary Planning Guidance Air Quality 2019](#)
- [West Lothian Active Travel Plan 2024-2029 DRAFT](#)
- [West Lothian Council Carbon Management Plan 2015-2020](#)

2.2.2 Transport – Low Emission Zones

Local authorities working with Transport Scotland and SEPA will look at opportunities to promote zero-carbon city centres within the existing LEZs structure.

Low Emission Zones have not yet been considered appropriate for implementation within West Lothian Council.

2.3 Implementation of Air Quality Action Plan(s) and/or measures to address air quality

In order to ensure that local authorities implement the measures within an action plan by the timescales stated within that plan, the Scottish Government expects authorities to submit updates on progress through the APR process West Lothian Council has taken forward a number of measures within the action plan during the current reporting year of 2023 in pursuit of improving local air quality and meeting the air quality objectives within the shortest possible time. 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 air quality Action Plan relating to each AQMA and also the various plans and strategies noted in Section 2.2.1 of this report.

Key completed measures for this reporting year are:

- Ongoing LSO training of staff within Environmental Health;
- The Eco Stars fleet management scheme has expanded its membership within West Lothian;
- Extensive tree planting projects and woodland management has taken place in the district;
- Continued use and procurement of electric vehicles within the Councils fleet management scheme;

- Further progress in the installation of Council operated electric vehicle charging points;
- Environmental Health have continued to deal with environmental nuisance (including dust and smoke) complaints across the district;
- Completion of the M9 junction at Winchburgh;
- Developers have been encouraged to include active travel measures in to their plans – included in air quality and planning guidance and general planning condition requirements.

West Lothian Council expects the following measures to be completed over the course of the next reporting year:

- The revocation of the Broxburn Air Quality Management Area shall be finalised. Monitoring will continue at the automatic monitoring site for a period to ensure that levels remain below the target air quality objectives.
- It is intended that both the Newton AQMA (PM_{10}) and Linlithgow AQMA (NO_2 and PM_{10}) shall be revoked by the end of 2024. A period of consultation will take place with relevant stakeholders and consultees during 2024 for the planned revocations. Monitoring will also continue at the automatic monitoring sites in Newton and Linlithgow to ensure that levels remain below air quality targets.
- A review of the current Air Quality Action Plans will be considered in the context of AQMA revocations during 2024.

Table 2.2 – Progress on Measures to Improve Air Quality

Measure No.	Measure	Category	Expected/Actual Completion year	Measure Status	Funding Status	Key Milestones	Progress	Barriers to implementation
1	Electric Vehicle Charging Point Installation	Promoting low emission transport	Ongoing	Annual increase in charging bays/facilities within WLC area	Funding provided through Transport Scotland's Local Authority Installation Programme (LAIP)	Installation of EV charging points and bays	Ongoing programme of installing chargers on Council land	There may be generic barriers such as funding and infrastructure requirements such as the availability of suitable electricity supplies.
2	Active Travel and Cycling Infrastructure	Promoting Travel Alternatives	Ongoing	Scheme uptake and participation statistics compiled annually	Cycling, Walking and Safer Routes grant funding WLC received from Transport Scotland Annual SG Funding	During 2023 3 x Bikeability Scotland Instructor Courses ran for teachers and volunteers in West Lothian; Increased Bikeability cycle fleet enabling more schools to borrow bikes for Bikeability training in their school; Working with West Lothian Bike Library for the use of adaptive bikes to ensure cycling is inclusive to all.	The following projects were delivered in 23/24 at a total cost of £1.093M: B7002 Whitburn Road, Bathgate – footway widening; Whitburn Town Walk: Blaeberryhill Road to Burnhouse School; Removing barriers to accessibility by providing dropped kerbs at various locations throughout West Lothian Accessibility Schemes.	Reduced SG grant funding
3	Removal of solid fuel fires in Council Housing in Newton	Domestic solid fuel burning	This is ongoing, some residents have refused the air source heat pumps and so	In progress	Funding is via the Housing Revenue Account budget which is part of a 5 year housing	Installation of air source heat Pumps in all 12 Council properties in Newton. 7	The Council owns 12 homes in Newton, so far 7 have had air source heat pumps	During 2023 there has been no change as there has been no turnover at these

			installation cannot progress until the current tenant moves out.		capital improvements programme budget for Council owned housing stock. Budgets are monitored throughout the year and reviewed annually.	homes have been completed, 5 still to go.	installed, with 5 still to be done.	houses and therefore no opportunity to upgrade the houses.
4	Electric pool cars available for Council staff use in AQMA	Vehicle fleet efficiency	2021	Completed	Funding awarded annually through the SG's Switched on Fleets programme	Pool cars available for staff use at Linlithgow office	Four electric pool cars in use with the removal of petrol and diesel vehicles	Direction from the SG is that funding is now to be solely used for infrastructure projects rather than the acquisition of electric vehicles.
5	Eco Stars Fleet recognition scheme	Promoting low emission transport	Ongoing	In progress	Annual SG Funding	The latest figures from WLC area show that recruitment has increased since 2022 with 199 members and 7232 vehicles part of scheme.	Ongoing programme of recruiting members and vehicles	Reduced grant funding from SG could limit the expansion and improvement of its ECOStars fleet.
6	Inclusion of Air Quality in the West Lothian Local Development Plan	Policy guidance and development control	Completed and ongoing	In progress	LA Funded	Local planning considerations aim to mitigate the cumulative negative air quality impacts of new developments.	Inclusion of air quality statements in local development plan	
7	Member of the East Central Scotland Vehicle Emissions Partnership (ECSVEP)	Promoting low emission transport	Ongoing	Member of the partnership to help reduce vehicle idling, the reporting of idling complaints, enforcing of fixed penalty notices and the provision of educational	SG Funded	Anticipated reduction in emissions mainly in town centre areas through anti-idling enforcement. Provides the public with a means to report idling	The VEP continues to promote anti-idling in the West Lothian Council area with various complaints investigated and improvements in	Reduction in SG grant funding would mean that sufficient progress could not be made to promote idling awareness.

				resources for the public.		complaints and smoky vehicles.	campaigns and advertising.	

3 Air Quality Monitoring Data and Comparison with Air Quality Objectives

3.1 Summary of Monitoring Undertaken

3.1.1 Automatic Monitoring Sites

This section sets out what monitoring has taken place and how local concentrations of the main air pollutants compare with the objectives.

West Lothian Council undertook automatic (continuous) monitoring at 3 sites during 2023. Table A.1 in Appendix A shows the details of the sites. National monitoring results are available at the Air Quality in Scotland website.

Maps showing the location of the monitoring sites are provided in Appendix C, Figure 9. Further details on how the monitors are calibrated and how the data has been adjusted are included in Appendix C.

3.1.2 Non-Automatic Monitoring Sites

West Lothian Council undertook non- automatic (passive) monitoring of NO_2 at 24 sites during 2023. Table A.2 in Appendix A shows the details of the sites. Following the update of the detailed assessments, modelling highlighted an area of concern within Linlithgow, so an additional diffusion tube was installed (DT24N) within that area in September 2022.

Maps showing the location of the monitoring sites are provided in Appendix C, Figure 8. Further details on Quality Assurance/Quality Control (QA/QC) and bias adjustment for the diffusion tubes are included in Appendix C.

3.1.3 Other Monitoring Activities

There were no other monitoring activities carried out within West Lothian Council during 2023.

3.2 Individual Pollutants

The air quality monitoring results presented in this section are, where relevant, adjusted for annualisation and bias. Further details on adjustments are provided in Appendix C.

3.2.1 Nitrogen Dioxide (NO₂)

Table A.3 in Appendix A compares the ratified monitored NO$_2$ annual mean concentrations for the past five years with the air quality objective of 40 µg/m^3 at automatic monitoring sites. The table shows that the annual mean objective was met at all three continuous monitoring sites, along with all of the diffusion tube locations. NO$_2$ levels were higher at all three continuous monitoring sites than the previous year.

Table A.4 in Appendix A compares the adjusted monitored NO$_2$ annual mean concentrations for the past five years with the air quality objective of 40 µg/m^3 at non automatic monitoring sites.

For diffusion tubes, the full 2023 dataset of monthly mean values is provided in Table B.1 in Appendix B.

Table A.5 in Appendix A compares the ratified continuous monitored NO$_2$ hourly mean concentrations for the past five years with the air quality objective of 200µg/m^3, not to be exceeded more than 18 times per year. There were no exceedances for this objective during 2023. West Lothian Council has consistently met this objective at the 3 continuous monitoring stations, with only one exceedance at Linlithgow in 2019. .

3.2.2 Particulate Matter (PM₁₀)

Table A.6 in Appendix A compares the ratified and adjusted monitored PM$_{10}$ annual mean concentrations for the past five years with the air quality objective of 18µg/m^3. All three continuous monitoring sites have remained within the objective limit.

The Scottish Government issued Guidance Note "Measurement of Ambient Particulate Matter (PM) and the LAQM Reporting of Measured Concentrations – May 2023" which requires the application of a correction factor to PM$_{10}$ and PM$_{2.5}$ concentrations with Palas Fidas 200 analysers in operation. Corrected and uncorrected results are displayed in Tables A.6 and Table A.8. The correction factors have been applied to 2022 and 2023 data as the guidance was issued in 2023. The results remain below objective levels.

Table A.7 in Appendix A compares the ratified continuous monitored PM_{10} daily mean concentrations for the past five years with the air quality objective of $50\mu g/m^3$, not to be exceeded more than seven times per year. There were no exceedances of the objective levels.

3.2.3 Particulate Matter ($PM_{2.5}$)

Table A.8 in Appendix A compares the ratified and adjusted monitored $PM_{2.5}$ annual mean concentrations for the past five years with the air quality objective of $10\mu g/m^3$.

The Scottish Government issued Guidance Note "Measurement of Ambient Particulate Matter (PM) and the LAQM Reporting of Measured Concentrations – May 2023" which requires the application of a correction factor to PM_{10} and $PM_{2.5}$ concentrations with Palas Fidas 200 analysers in operation. Corrected and uncorrected results are displayed in Tables A.6 and Table A.8. The correction factors have been applied to 2022 and 2023 data as the guidance was issued in 2023. The results remain below objective levels.

3.2.4 Sulphur Dioxide (SO_2)

During 2023 there was no monitoring of SO_2 carried out in West Lothian.

3.2.5 Carbon Monoxide, Lead and 1,3-Butadiene

During 2023 there was no monitoring of Carbon Monoxide, Lead and 1,3-Butadiene carried out within West Lothian.

4   New Local Developments

4.1 Road Traffic Sources

The total length of roads adopted by West Lothian Council during 2023 was 9355m and these were mainly associated with new housing developments. We only hold record of the roads following adoption, so it is important to note that others will have been constructed and placed on a 12-month pre adoption maintenance period.

The construction of the new M9 junction at Winchburgh was completed and subsequently opened during 2023.

4.2 Other Transport Sources

There were no new other transport sources in 2023.

4.3 Industrial Sources

SEPA provided details on the following new and substantially varied processes which have had licenses issued/varied during 2023:

- PPC/B/5003859 – PPC Part B authorisation located at Firth Road, Houston Industrial Estate, Livingston, EH54 5DJ. The applicant was Mitsubishi Electric Air Conditioning Systems Europe Ltd. The process involves the PPC(B) – Coating and Printing and Textile Treatments. This was a new licence;
- PPC/B/5005983 – PPC Part B authorisation located at Nairn Road, Deans Industrial Estate, Livingston, EH54 8AY. The applicant was Drumcross Generation Ltd. The process involves the PPC(B) – Combustion of Fuels. This was a new licence;
- WML/L/5005806 – new WML located at 11 Naysmith Court, Houston Industrial Estate, Livingston, EH54 5EG. The applicant was CS Clean Systems UK Ltd; and
- WML/L/1164234 – substantial variation in WML located at Drumshoreland Bing, Drumshoreland Road, Pumpherston, EH53 0LF. The applicant was Brewster Brothers Ltd.

4.4 Commercial and Domestic Sources

In 2023, West Lothian Council received a large number of complaints in relation to smoke and odour from domestic sources such as wood burning stoves and open bonfires in gardens. These complaints were thoroughly investigated and advice was provided on burning and smoke control area rules. Guidance is provided by West Lothian Council Environmental Health during the initial planning consultation of any new residential or commercial developments who may be considering installing new combustion appliances such as wood burning stoves. This may include providing information on DEFRA approved stoves, authorised fuels and providing advice on flue heights which will allow effective smoke dispersal to minimise smoke and odour nuisance complaints.

Installation of wood burning stoves continued to grow in West Lothian during 2023. Across the district there have been a total of 10 applications which included the installation of a wood burning stove. These applications are generally given consent subject to acceptable flue height and applicants are given advice in line with DEFRA requirements for exempt appliances and authorised fuels. During 2021, the Environmental Health team started recording the details of wood burning stove applications which assists in identifying potential hot spot areas.

A map of the smoke control area within West Lothian can be viewed at the following link:

https://www.westlothian.gov.uk/media/4233/Smoke-Control-Areas-Map/pdf/Smoke_Control_Areas_Map.pdf?m=1404985283643

There were no applications for any larger scale commercial or domestic developments during 2023.

4.5 New Developments with Fugitive or Uncontrolled Sources

There were no new fugitive or uncontrolled sources during 2023.

5 Planning Applications

West Lothian Councils Local Development Plan (LDP1) has identified a number of sites for large scale development since 2018. Each development site shall be assessed for the impact on air quality through the planning process. Where appropriate, detailed air quality impact assessments will be required to be submitted.

0582/P/21 - Land South of B7066 And West of A706 Heartlands, Whitburn, West Lothian

Planning permission in principle for a 78.4ha mixed-use development including residential, commercial land, community / education facilities, local services, open space, road infrastructure, engineering works and associated landscape proposals (EIA).

The air quality impact assessment for the development can be found at the following link:

https://planning.westlothian.gov.uk/publicaccess/files/DC221BB6319C6C0285A6428C320E56E9/pdf/0582_P_21-CH_10_-_AIR_QUALITY-3046571.pdf

The assessment concluded that in relation to NO_2 the impact of the proposed development is considered to be Negligible for all of the assessed sensitive receptors and therefore the resultant effects are not significant. The assessment concludes that in relation to PM_{10} the impact of the proposed development is considered to be Negligible for all of the assessed sensitive receptors and therefore the resultant effects are not significant. In relation to $PM_{2.5}$ the impact of the proposed development is considered to be Negligible for all of the assessed sensitive receptors and therefore the resultant effects are considered to be Not Significant.

0683/P/23 – Land to South of Lower Bathville, Armadale

Planning permission in principle for residential development with associated works including full permission for restoration of former quarry to form park/open space (EIA Development). We are still awaiting a decision on this application.

The air quality impact assessment for the development can be found at the following link:

https://planning.westlothian.gov.uk/publicaccess/files/7CA830F76DFE1C021ECB73D769C11721/pdf/0683_P_23-

EIA_REPORT_APPENDIX_9_2_AIR_QUALITY_ASSESSMENT_METHODOLOGY-3341515.pdf

The air dispersion modelling exercise predicts NO_2, PM_{10} and $PM_{2.5}$ concentration s at all Sensitive Receptors meet the relevant Air Quality Objectives of 40, 18 and 10µg/m³ respectively for all future scenarios. The model predicts no significant change in NO_2, PM_{10} and $PM_{2.5}$ concentrations at all Sensitive Receptors on comparison of the 'with' and 'without' development scenarios.

1018/P/23 – Riddochhil Colliery Site, Inchmuir Road, Whitehill Industrial Estate, Bathgate

Planning permission in principle for erection of logistics park (class 6) with ancillary office space and associated works. Permission has been granted.

The air quality impact assessment for the development can be found at the following link:

https://planning.westlothian.gov.uk/publicaccess/files/9EEB2752242B207F7E27AB90BA634FC6/pdf/1018_P_23-AIR_QUALITY_ASSESSMENT-3385212.pdf

This air quality assessment considers the potential for the impact of traffic associated with the development on the air quality of existing residents in the vicinity and the suitability for the future site users of this development. The air dispersion modelling exercise predicts NO_2, PM_{10} and $PM_{2.5}$ concentrations at all Sensitive Receptors meet the relevant Air Quality Objectives of 40, 18 and 10µg/m³ respectively for all future scenarios. In relation to potential impacts from development traffic, the model predicts no significant change in NO_2, PM_{10} or $PM_{2.5}$ concentrations.

6   Conclusions and Proposed Actions

6.1 Conclusions from New Monitoring Data

The 2023 monitoring data at all three continuous air quality monitoring stations has shown that the NO_2, PM_{10} and $PM_{2.5}$ long term average air quality objectives have been met and compliance has been achieved with the target air quality objectives.

NO_2 levels slightly increased at all three continuous monitoring sites from the levels found in 2022 but still remained below the objective limit. There were no exceedances of the short term NO_2 at any of the three sites.

West Lothian Council measured PM_{10} concentrations at 3 sites during 2023. There was a slight reduction in concentration levels measured in 2023 at all 3 continuous monitoring sites from levels measured in 2022.

$PM_{2.5}$ levels increased at the Newton site during 2023 but decreased at the other 2 sites. It is noted that data capture was 89% at the Newton site compared to the other 2 sites which had 99% data capture.

In relation to the diffusion tube data it can be noted that during 2023 many of the measured concentrations have increased from last years measured levels. The most significant being at DT7N which increased from 12.1µg/m³ in 2022 to 17.1µg/m³ and also DT10N which increased from 14.9µg/m³ to 17.5µg/m³. It is worthwhile noting that both of these tubes are new sites which were added in January 2022. The most significant decrease was at DT12 which decreased from 23.4µg/m³ to 20.0µg/m³. Overall concentrations continue to be below target objective levels.

6.2 Conclusions relating to New Local Developments

There have been no new local developments that have the potential to introduce new exceedances of relevant air quality objectives in West Lothian. The Local Development Plan (LDP1) for West Lothian identifies various residential sites in and around the AQMA's. It's possible that these developments will introduce further traffic related emissions in the future and may be required to submit an Air Quality Impact Assessment (AQIA) as part of the planning process. These would be considered in line with our adopted Air Quality Supplementary Planning Guidance as and when they arise.

There may also continue to be increased demand from domestic households in relation to the installation of alternative heat and power sources in their homes. The installation of wood burning stoves continues to be popular and West Lothian Council will assess these in line with relevant guidance.

6.3 Proposed Actions

Monitoring data for 2023 has not highlighted any need for additional monitoring to take place. There are no new exceedances of the objectives for any pollutant measured. While measured levels increased in some cases during 2023, it is shown that levels of pollutants in West Lothian have continued to be comfortably below target air quality objectives for several years.

Continue to focus resources on ensuring the continuous monitoring equipment is repaired and/or replaced where necessary and work towards good data capture, with reliable, quality data. Continue to apply for funding to ensure maintenance of our continuous monitoring sites is prioritised.

Continue to ensure that sufficient staff within Environmental Health are suitably trained and are competent in local site operator duties.

West Lothian Council will continue to apply to the Scottish Government for funding to assist with monitoring equipment and action plan measures.

With work already underway at the end of 2023, it is anticipated that both the Newton AQMA (PM_{10}) and Linlithgow AQMA (NO_2 and PM_{10}) will be revoked by December 2024.

In addition, work will also take place on the review of the draft action plans for Linlithgow and Newton during 2024. An updated action plan for Broxburn will also remain in place following any revocation and this will be considered during 2024.

As part of the East Central Scotland Vehicle Emissions Partnership, West Lothian will continue to coordinate testing, and campaigning activities to promote better air quality in the West Lothian area.

The Air Quality Progress Report (APR) as required by the Scottish Government for 2024 shall be submitted by West Lothian Council in June 2025.

Appendix A: Monitoring Results

Table A.1 – Details of Automatic Monitoring Sites

Site ID	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In AQMA? Which AQMA?	Monitoring Technique	Distance to Relevant Exposure (m) [1]	Distance to kerb of nearest road (m) [2]	Inlet Height (m)
CM1	Linlithgow High Street	Roadside	300426	677172	NO_2; PM_{10}; $PM_{2.5}$	Y Linlithgow	FIDAS 200; T200 API NO_X Analyser	4	1.36	2.32
CM2	Broxburn CNC	Roadside	308314	672231	NO_2; PM_{10}; $PM_{2.5}$	Y Broxburn	FIDAS 200; T200 API NO_X Analyser	3.5	2.20	2.36
CM3	Newton CNC	Roadside	309258	677728	NO_2; PM_{10}; $PM_{2.5}$	Y Newton	FIDAS 200; Serinus 40 NO_X Analyser	1.8	1.92	2.41

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.2 – Details of Non-Automatic Monitoring Sites

Site ID	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In AQMA? Which AQMA?	Distance to Relevant Exposure (m) [1]	Distance to kerb of nearest road (m) [2]	Tube co-located with a Continuous Analyser?	Tube Height (m)
DT1N	Newton new site	Roadside	309187	677663	NO$_2$	Yes Newton	0.5	1.9	N	2.3
.DT2N	Newton CNC (3 co-located diffusion tubes)	Roadside	309251	677723	NO$_2$	Yes Newton	1.9	1.9	Y	2.3
DT3N	Pumpherston Road, Uphall Station	Roadside	306061	670495	NO$_2$	No	1.2	1.8	N	2.4
DT4	Broxburn CNC (3 co-located diffusion tubes)	Roadside	308314	672231	NO$_2$	Yes Broxburn	3.2	1.7	Y	2.5
DT5N	Edinburgh Road, Broxburn	Roadside	308856	672226	NO$_2$	No	3.4	2.4	N	2.5
DT6	Cedric Rise, Dedridge	Urban background	306403	666341	NO$_2$	No	2.5	1.6	N	2.4
DT7N	Alderstone Road, Livingston	Roadside	304630	666968	NO$_2$	No	4.5	1.7	N	2.4
DT8	Whitburn Partnership Centre	Roadside	294687	665030	NO$_2$	No	2	0.5	N	2.2

Site ID	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In AQMA? Which AQMA?	Distance to Relevant Exposure (m) [1]	Distance to kerb of nearest road (m) [2]	Tube co-located with a Continuous Analyser?	Tube Height (m)
DT9	Armadale Cross	Roadside	293842	668588	NO_2	No	3	1.4	N	2.3
DT10N	Armadale South Street	Roadside	293473	668944	NO_2	No	4.1	1.8	N	2.4
DT11	Bathgate Steelyard	Roadside	297467	668734	NO_2	No	Façade	2	N	2.5
DT12	Bathgate King St	Roadside	297570	668586	NO_2	No	5	4	N	2.5
DT13	Bathgate High St	Urban Background	297656	669298	NO_2	No	3	10	N	1.5
DT14	Linlithgow CNC (3 co-located diffusion tubes)	Roadside	300412	677124	NO_2	Yes Linlithgow	4	1.36	Y	2.5
DT15	Linlithgow NW High St	Roadside	299930	677070	NO_2	Yes Linlithgow	2	1.4	N	2.4
DT16	Linlithgow SW High St	Roadside	299911	677052	NO_2	Yes Linlithgow	2	2.9	N	2.3

Site ID	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In AQMA? Which AQMA?	Distance to Relevant Exposure (m) [1]	Distance to kerb of nearest road (m) [2]	Tube co-located with a Continuous Analyser?	Tube Height (m)
DT17N	Hopetoun St, Bathgate	Roadside	297456	668937	NO_2	No	Façade	1.5	N	2.3
DT18N	Polkemmet Rd, Whitburn	Roadside	293382	664399	NO_2	No		2.2	N	2.4
DT19N	Manse Road, Whitburn	Roadside	294668	664931	NO2	No	6.2	1.7	N	2.4
DT20	Linlithgow High Street S (Old Post Office pub)	Roadside	300405	677118	NO_2	Yes Linlithgow	Façade	3	N	2.7
DT21	Main St, East Calder	Roadside	308641	667912	NO_2	No	2.0	1.8	N	2.7
DT22	Butcher's, Winchburgh	Roadside	308957	675025	NO_2	No	Façade	1.8	N	2.5
DT23	Main St, Winchburgh	Roadside	309133	675028	NO_2	No	Façade	1.5	N	2.7
DT24N	Barber's, Linlithgow	Roadside	299957	677067	NO_2	No	Façade	2.8	N	2.4

Notes:

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

(2) N/A if not applicable.

Table A.3 – Annual Mean NO$_2$ Monitoring Results: Automatic Monitoring (µg/m^3)

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) [1]	Valid Data Capture 2023 (%) [2]	2019	2020	2021	2022	2023
CM1	Roadside	Automatic	N/A	95	30	16.4	19.6	17.3	20
CM2	Roadside	Automatic	N/A	95	27	19	22	21.4	22.4
CM3	Roadside	Automatic	N/A	95	18	12.6	15.7	12.7 (11.4)	13

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**.

Means for diffusion tubes have been corrected for bias. All means have been "annualised" as per LAQM.TG22 if valid data capture for the full calendar year is less than 75%. These are shown in brackets. See Appendix C for details.

(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%).

Table A.4 – Annual Mean NO₂ Monitoring Results: Non-Automatic Monitoring (µg/m³)

Diffusion Tube ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) [1]	Valid Data Capture 2023 (%) [2]	2019	2020	2021	2022	2023
DT1N*	309187	677663	Roadside	NA	100.0	-	-	-	11.0	11.7
DT2Na* DT2Nb, DT2Nc	309251	677723	Roadside	NA	100.0	-	-	-	14.1	13.2
DT3N*	306061	670495	Roadside	NA	100.0	-	-	-	15.2	16.8
DT4a, DT4b, DT4c	308314	672231	Roadside	NA	92.3	27.2	15.5	25.6	22.7	22.3
DT5N*	308856	672226	Roadside	NA	100.0	-	-	-	13.8	13.9
DT6	306403	666341	Urban Background	NA	100.0	11.6	6.9	9.7	10	9.0
DT7N*	304630	666968	Roadside	NA	100.0	-	-	-	12.1	17.1
DT8	294687	665030	Roadside	NA	92.3	23.8	14.9	21.7	18.8	17.7
DT9	293842	668588	Roadside	NA	100.0	24.2	12.6	20.4	18.2	16.7
DT10N*	293473	668944	Roadside	NA	100.0	-	-	-	14.9	17.5
DT11	297467	668734	Roadside	NA	100.0	26.6	9.1	21.5	17.2	17.7

Diffusion Tube ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) [1]	Valid Data Capture 2023 (%) [2]	2019	2020	2021	2022	2023
DT12	297570	668586	Roadside	NA	100.0	26.3	15.3	21.1	23.4	20.0
DT13	297656	669298	Urban Background	NA	100.0	9.5	6.1	8.2	7.4	6.7
DT14a, DT14b, DT14c	300412	677124	Roadside	NA	100.0	25.3	13.9	19.3	18.5	18.3
DT15	299930	677070	Roadside	NA	100.0	24.6	11.8	18.4	17.3	17.1
DT16	299911	677052	Roadside	NA	90.4	29.4	13.8	21.3	20.8	18.4
DT17N*	297456	668937	Roadside	NA	100.0	-	-	-	15.9	16.0
DT18N*	293382	664389	Roadside	NA	100.0	-	-	-	8.4	9.3
DT19N*	294668	664931	Roadside	NA	100.0	-	-	-	17	16.0
DT20	300405	677118	Roadside	NA	100.0	25.1	13.9	17.9	18.1	17.2
DT21	308641	667912	Roadside	NA	100.0	12.9	6.3	11.9	10.2	10.8
DT22	308957	675025	Roadside	NA	100.0	16.2	9.0	13.8	12	13.1

Diffusion Tube ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) [1]	Valid Data Capture 2023 (%) [2]	2019	2020	2021	2022	2023
DT23	309133	675028	Roadside	NA	100.0	13.0	7.7	13.5	11.3	11.8
DT24N**	299957	677067	Roadside	NA	100.0				17.8(12.8)	18.9

*New sites added January 2022

** New site added October 2022

Shaded rows - results shown for these sites are averages of the 3 co-located tubes. Please see table B.1 for the results for each individual tube

☐ **Annualisation has been conducted where data capture is <75% and >25% in line with LAQM.TG22**

☒ **Diffusion tube data has been bias adjusted.**

☐ **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 correction**

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**.

Means for diffusion tubes have been corrected for bias. All means have been "annualised" as per LAQM.TG(22) if valid data capture for the full calendar year is less than 75%. This figure is shown in brackets. See Appendix C for details.

(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%).

Table A.5 – 1-Hour Mean NO$_2$ Monitoring Results, Number of 1-Hour Means > 200µg/m^3

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) [1]	Valid Data Capture 2023 (%) [2]	2019	2020	2021	2022	2023
CM1	Roadside	Automatic	N/A	95	**1**	0	0	0	0
CM2	Roadside	Automatic	N/A	95	0	0	0	0	0
CM3	Roadside	Automatic	N/A	95	0	0	0	0	0

Notes:

Exceedances of the NO$_2$ 1-hour mean objective (200 µg/m^3 not to be exceeded more than 18 times/year) are shown in bold.

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

(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%).

Table A.6 – Annual Mean PM$_{10}$ Monitoring Results (µg/m^3)

Site ID	Site Type	Valid Data Capture for Monitoring Period (%) [1]	Valid Data Capture 2023 (%) [2]	2019	2020	2021	2022	2023	Correction factor applied to 2023 data (divide by 0.909) [3]
CM1	Roadside	N/A	99%	12	8(7.7)	8.5	11.9	9	9.9
CM2	Roadside	N/A	99%	14	11	12	11.9	10	11
CM3	Roadside	N/A	89%	14	11(11.3)	11.3	8.2	10	11

Notes:

Exceedances of the PM$_{10}$ annual mean objective of 18 µg/m^3 are shown in bold.

All means have been "annualised" as per LAQM.TG(22), valid data capture for the full calendar year is less than 75%. These are shown in brackets. See Appendix C for details.

(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) Correction factor applied in accordance with the Scottish Government Guidance Note "Measurement of Ambient Particulate Matter (PM) and the LAQM Reporting of Measured Concentrations - May 2023."

Table A.7 – 24-Hour Mean PM$_{10}$ Monitoring Results, Number of PM$_{10}$ 24-Hour Means > 50µg/m^3

Site ID	Site Type	Valid Data Capture for Monitoring Period (%) [1]	Valid Data Capture 2023 (%) [2]	2019	2020	2021	2022	2023
CM1	Roadside	N/A	99%	**5**	0	0	0	0
CM2	Roadside	N/A	99%	**4**	0	0	**2**	0
CM3	Roadside	N/A	89%	**2**	0	0	0	0

Notes:

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

If the period of valid data is less than 85%, the 98.1st percentile of 24-hour means is provided in brackets.

(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%).

Table A.8 – Annual Mean PM$_{2.5}$ Monitoring Results (µg/m^3)

Site ID	Site Type	Valid Data Capture for Monitoring Period (%) [1]	Valid Data Capture 2023 (%) [2]	2019	2020	2021	2022	2023	Correction factor applied to 2023 data (multiply by 1.06) [3]
CM1	Roadside	N/A	99%	7	5	5.4	6.5	5	5.3
CM2	Roadside	N/A	99%	8	6	6	6.3	5	5.3
CM3	Roadside	N/A	99%	10	8	7.3	4.6	6	6.36

Notes:

Exceedances of the PM$_{2.5}$ annual mean objective of 10 µg/m^3 are shown in bold.

All means have been "annualised" as per LAQM.TG(22), valid data capture for the full calendar year is less than 75%. See Appendix C for details.

(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) Correction factor applied in accordance with the Scottish Government Guidance Note "Measurement of Ambient Particulate Matter (PM) and the LAQM Reporting of Measured Concentrations - May 2023."

Appendix B: Full Monthly Diffusion Tube Results for 2023

Table B.1 – NO₂ 2023 Monthly Diffusion Tube Results (µg/m³)

DT ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean: Raw Data	Annual Mean: Bias Adjusted (0.77)
DT1N	309187	677663	18.9	16.8	18.0	15.4	14.0	11.0	11.4	13.7	14.2	15.3	23.3	10.2	15.2	11.7
DT2N (Overall average)	309251	677723	20.0	15.2	21.1	18.0	15.7	14.3	13.0	14.9	15.3	16.6	22.0	19.5	17.1	13.2
DT2Na	309251	677723	20.3	15.7	21.1	18.5	14.8	14.6	12.9	14.7	15.1	15.9	26.5	20.9	17.6	13.6
DT2Nb	309251	677723	18.3	16.5	21.2	18.1	16.5	13.9	12.7	15.2	14.6	16.4	17.1	19.3	16.7	12.9
DT2Nc	309251	677723	21.4	13.4	21.1	17.5	15.7	14.3	13.3	14.7	16.2	17.4	22.3	18.2	17.1	13.2
DT3N	306061	670495	21.5	15.7	21.5	25.6	23.7	19.7	16.4	20.3	19.8	24.6	32.8	20.0	21.8	16.8
DT4 (Overall average)	308314	672231	32.0		31.5	32.9	31.1	23.2	23.4	26.4	26.6	27.4	38.2	26.2	29.0	22.3
DT4a	308314	672231	33.6		30.8	32.5	31.0	21.8	23.6	24.3	25.9	33.8	39.8	30.0	29.7	22.8
DT4b	308314	672231	27.4		33.6	33.4	29.6	22.5	23.4	26.0	27.8	23.8	34.6	16.2	27.1	20.9
DT4c	308314	672231	34.9		30.2	32.8	32.8	25.2	23.1	28.8	26.2	24.5	40.1	32.3	30.1	23.2

DT ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean: Raw Data	Annual Mean: Bias Adjusted (0.77)
DT5N	308856	672226	18.9	18.0	18.8	21.7	16.2	12.8	12.7	15.7	16.4	19.7	24.0	21.9	18.1	13.9
DT6	306403	666341	15.3	6.9	14.7	15.3	8.9	8.6	6.1	8.7	9.2	11.8	19.5	15.6	11.7	9.0
DT7N	304630	666968	20.4	7.7	18.4	20.9	16.0	15.0	14.4	16.7	74.6	19.1	25.4	18.4	22.3	17.1
DT8	294687	665030	27.7		25.0	27.5	16.4	18.4	16.6	20.8	19.0	26.0	34.1	21.2	23.0	17.7
DT9	293842	668588	23.2	18.0	26.7	19.8	16.8	16.1	20.7	21.2	22.8	24.7	28.9	22.3	21.8	16.7
DT10N	293473	668944	21.2	19.2	24.2	22.8	17.8	15.7	13.9	16.7	55.7	17.3	28.8	20.2	22.8	17.5
DT11	297467	668734	32.7	12.2	31.1	20.7	18.5	15.5	17.9	21.4	20.4	21.4	36.4	27.9	23.0	17.7
DT12	297570	668586	31.8	23.2	26.7	28.2	20.9	19.2	19.5	24.2	27.6	28.4	27.6	34.8	26.0	20.0
DT13	297656	669298	13.6	5.0	9.8	9.8	6.1	7.9	5.3	6.1	4.0	10.7	13.4	12.4	8.7	6.7
DT14 (Overall average)	300412	677124	30.2	14.7	29.0	25.9	21.5	20.4	18.1	20.5	23.4	22.5	29.7	29.2	23.8	18.3
DT14a	300412	677124	30.2	21.6	25.8	25.9	21.3	20.9	17.7	20.1	23.7	20.8	30.2	27.8	23.8	18.3
DT14b	300412	677124	29.8	9.2	29.8	25.9	21.2	19.7	18.3	20.7	23.5	24.0	29.5	32.7	23.7	18.2

DT ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean: Raw Data	Annual Mean: Bias Adjusted (0.77)
DT14c	300412	677124	30.5	13.3	31.4	26.0	22.1	20.6	18.2	20.7	23.0	22.7	29.4	27.0	23.7	18.2
DT15	299930	677070	25.0	18.9	27.8	25.3	26.3	18.9	16.4	20.9	20.8	22.1	20.2	23.6	22.2	17.1
DT16	299911	677052	33.4	13.7	26.1	23.2	23.9	23.4	20.9	21.6	25.0	26.6		25.1	23.9	18.4
DT17N	297456	668937	29.3	18.7	25.5	22.5	17.1	15.0	13.8	17.1	17.8	21.6	30.1	21.2	20.8	16.0
DT18N	293382	664389	14.9	11.6	12.3	13.7	10.2	10.2	9.8	9.6	11.2	12.6	18.3	11.3	12.1	9.3
DT19N	294668	664931	24.9	11.4	24.7	23.4	23.8	18.5	15.8	19.3	20.2	20.5	30.3	16.4	20.8	16.0
DT20	300405	677118	29.6	12.0	21.5	24.2	19.8	18.3	18.0	20.2	25.9	24.2	29.0	26.1	22.4	17.2
DT21	308641	667912	17.1	12.3	15.2	15.4	11.0	11.8	10.1	11.9	14.1	14.0	20.1	15.5	14.0	10.8
DT22	308957	675025	20.3	10.9	19.9	18.5	11.4	11.1	12.8	14.5	19.2	17.4	26.6	22.1	17.1	13.1
DT23	309133	675028	18.6	11.6	17.5	18.5	14.3	12.9	11.4	13.6	13.0	16.8	23.5	12.6	15.4	11.8
DT24N	299957	677067	31.2	19.3	29.0	26.0	20.2	20.7	19.5	23.1	23.4	23.6	31.1	27.2	24.5	18.9

☒ **All erroneous data has been removed from the NO$_2$ diffusion tube dataset presented in Table B.1.**

☐ **Annualisation has been conducted where data capture is <75% and >25% in line with LAQM.TG22.**

☐ **Local bias adjustment factor used.**

☒ **National bias adjustment factor used**

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

☒ **West Lothian Council confirm that all 2023 diffusion tube data has been uploaded to the Diffusion Tube Data Entry System**.

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**.

See Appendix C for details on bias adjustment and annualisation.

Table B.1 – Historical Monthly Diffusion Tube Results – 2019 to 2023

SITE ID	2019 Raw data	2019 Bias adjusted data	2020 Raw data	2020 Bias adjusted data	2021 Raw data	2021 Bias adjusted data	2022 Raw data	2022 Bias adjusted data	2023 Raw data	2023 Bias adjusted data
DT1N*	-	-	-	-	-	-	14.5	11.0	15.2	11.7
DT2N*	-	-	-	-	-	-	18.6	14.1	17.1	13.2
DT3N*	-	-	-	-	-	-	20.0	15.2	21.8	16.8
DT4	35.3	27.2	22.8	15.5	32.8	25.6	29.8	22.7	29.0	22.3
DT5N*							18.1	13.8	18.1	13.9
DT6	15.1	11.6	10.1	6.9	12.4	9.7	13.1	10	11.7	9.0
DT7N*							15.9	12.1	22.3	17.1
DT8	25.6	20.5	30.9	23.8	21.9	14.9	24.7	18.8	23.0	17.7
DT9	28.9	23.1	31.4	24.2	18.5	12.6	24.0	18.2	21.8	16.7
DT10N*							19.6	14.9	22.8	17.5
DT11	30.6	24.5	34.5	26.6	13.4	9.1	22.6	17.2	23.0	17.7
DT12	33.2	26.6	34.2	26.3	22.5	15.3	30.8	23.4	26.0	20.0
DT13	12.4	9.9	12.3	9.5	8.9	6.1	9.7	7.4	8.7	6.7

DT14	33.6	**26.9**	32.8	**25.3**	20.4	**13.9**	24.3	18.5	**23.8**	18.3
DT15	30.9	**24.7**	32	**24.6**	17.3	**11.8**	22.7	17.3	**22.2**	17.1
DT16	36.5	**29.2**	38.2	**29.4**	20.3	**13.8**	27.4	20.8	**23.9**	18.4
DT17N*							20.9	15.9	**20.8**	16.0
DT18N*							11.0	8.4	**12.1**	9.3
DT19N*							22.3	17	**20.8**	16.0
DT20	33.3	**26.6**	32.6	**25.1**	20.4	**13.9**	23.8	18.1	**22.4**	17.2
DT21			16.7	**12.9**	9.3	**6.3**	13.4	10.2	**14.0**	10.8
DT22			21.1	**16.2**	13.3	**9.0**	15.8	12	**17.1**	13.1
DT23	16.9	**13.0**	11.3	**7.7**	17.3	**13.5**	14.8	11.3	**15.4**	11.8
DT24N**							**23.4(16.9)*****	17.8(12.8)***	**24.5**	18.9

* New site added in January 2022

** New site added in October 2022

*** Annualised data in brackets – due to low data capture

NB: DT2N, DT4 and DT14 sites all have 3 tubes co-located with the continuous monitors.

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

New or Changed Sources Identified Within West Lothian Council During 2023

As noted in Section 4.3 of this report, West Lothian Council obtained information from SEPA regarding any new or altered authorised processes that could impact on air quality within the Council area. The following processes were highlighted as new/varied potential sources during 2023.

Authorisation Number	Authorisation Level	Site Address	Authorisation Holder	Authorisation Activity	Application Type
PPC/B/5003859	PPC Part B	Firth Road, Houston Industrial Estate, Livingston, EH54 5DJ	Mitsubishi Electric Air Conditioning Systems Europe Ltd	PPC(B) – Coating and Printing and Textile Treatments	New Licence
PPC/B/5005983	PPC Part B	MCP, Drumcross Generation Plant. Nairn Road, Deans Industrial Estate, Livingston, EH54 8AY	Drumcross Generation Ltd	PPC(B) – Combustion of Fuels	New Licence
WML/L/5005806	WML	11 Naysmith Court, Houston Industrial Estate, Deans, Livingston, EH54 5EG	CS Clean Systems UK Ltd	Waste – Other Waste Storage and Treatment Sites	New Licence

WML/L/1164234	WML	Drumshoreland Bing, Drumshoreland Road, Pumpherston, EH53 0LF	Brewster Brothers Ltd	Waste – Other Waste Storage and Treatment Sites	Substantial Variation

Additional Air Quality Works Undertaken by West Lothian Council During 2023

The revocation of the Broxburn AQMA is almost complete. Consultation with public and internal/external stakeholders has taken place during 2023 with the revocation order expected to be finalised in early 2024. The Air Quality Action Plans for all 3 sites will also be looked at with a view to updating these at the end of 2023 or beginning of 2024. Links to the updated detailed assessments can be found in the reference section at the end of this report.

QA/QC of Diffusion Tube Monitoring

The supplier used for diffusion tubes within 2023 in West Lothian was SOCOTEC and the method of preparation that was used was by spiking Acetone: Triethanolamine (50:50) onto the grids prior to the tubes being assembled. The tubes were desorbed with distilled water and the extract analysed using a segmented flow auto analyser with ultraviolet detection. The lab used for analysis was SOCOTEC Didcot.

The samples have been analysed in accordance with SOCOTEC's standard operating procedure ANU/SOP/1015. This method meets the guidelines set out in DEFRA's 'Diffusion Tubes for Ambient NO_2 Monitoring: Practical Guidance. As set out in the practical guidance, the results were initially calculated assuming an ambient temperature of 11°C, the reported values have been adjusted to 20°C to allow for direct comparison with EU limits. This analysis of diffusion tube samples to determine the amount of nitrogen dioxide present on the tube is within the scope of our UKAS schedule. Any further calculations and assessments requiring exposure details and conditions fall outside the scope of our accreditation. In the AIR PT inter comparison scheme for comparing spiked Nitrogen Dioxide diffusion tubes, SOCOTEC currently holds the highest rank of a Satisfactory laboratory.

The same diffusion tube supplier was used in West Lothian throughout 2023.

West Lothian Council changed the diffusion tubes in accordance with the LAQM Nitrogen Dioxide Diffusion tube monitoring calendar throughout 2023.

Diffusion Tube Annualisation

All diffusion tube monitoring locations within West Lothian Council recorded data capture of 75% therefore it was not required to annualise any monitoring data. In addition, any sites with a data capture which is below 25% do not require annualisation.

Diffusion Tube Bias Adjustment Factors

West Lothian Council calculated both a national and local bias adjustment factor of 0.77 (national) and 0.77 (local) for 2023, for comparison. A summary of bias adjustment factors used by West Lothian Council over the past five years is presented in Table C.1. The data in Table B.1 has the national bias adjustment factor applied. With reference to LAQM TG22 Chapter 7 Box 7-13, it was decided to apply the national bias adjustment factor to the 2023 monitoring data for the following reasons:

- Diffusion tubes are changed monthly, but had they been changed more frequently, this would have favoured the use of the local bias adjustment factor;

- There are no unusual situations with any of our co-located sites; and

- The diffusion tube study was not less than 12 months. A national factor has been used for the diffusion tube bias adjustment factor although they both worked out to be the same. The co-location study has been completed at three sites Linlithgow, Broxburn and Newton and can be seen in **Error! Reference source not found.**.

- Since more than one co-location study has been utilised to derive a local factor, the calculations can be seen in Table C.3. These have been completed in line with guidance provided within LAQM.TG22 Chapter 7: NO_X and NO_2 Monitoring, NO_2 by Diffusion Tubes. The bias adjustment factor was also calculated using the diffusion tube processing tool and worked out to be the same as the calculation carried out in Table C.3.

Table C.1 – Bias Adjustment Factor

Year	Local or National	If National, Version of National Spreadsheet	Adjustment Factor

2023	National	03/24 (28 studies applicable to this factor)	0.77
2022	National	03/23 (4 studies applicable to this factor)	0.76
2021	National	03/22	0.78
2020	Local	-	0.68
2019	Local	-	0.77

NO_2 Fall-off with Distance from the Road

No diffusion tube NO_2 monitoring locations within West Lothian Council required distance correction during 2023.

QA/QC of Automatic Monitoring

The data management and LSO duties are carried out by Public Health Protection Officer Sarah Gillespie at West Lothian Council. LSO duties are also carried out by Public Health Protection Officers Andrew Kerr and Lorraine McMurray.

Manual Calibrations are now carried out fortnightly on the NO_X analysers at each of the three automatic monitoring stations. These are carried out by both Technical Officers and Environmental Health Officers in the Public Health Team. Audits are carried out every 6 months by Ricardo AEA Technology and servicing is also carried out every 6 months by an engineer from Enviro Technology.

Ratification of the data is carried out by Ricardo AEA, and the monitoring data presented within the APR is ratified;

Live and historic data is currently available on the Scottish Air quality web-site. This is available on the [Air Quality in Scotland](#) website.

PM_{10} and $PM_{2.5}$ Monitoring Adjustment (Palas Fidas 200 Analyser)

The Scottish Government issued Guidance Note "Measurement of Ambient Particulate Matter (PM) and the LAQM Reporting of Measured Concentrations – May 2023" which requires the application of a correction factor to PM_{10} and $PM_{2.5}$ concentrations with Palas Fidas 200 analysers in operation. Corrected and uncorrected results are displayed in Tables A.6 and Table A.8. The correction factors have only been applied to 2022 and 2023 data as the guidance was issued in 2023. The results remained below the objectives.

Automatic Monitoring Annualisation

All automatic monitoring locations within West Lothian Council recorded data capture of greater than 75% therefore it was not required to annualise any monitoring data. In addition, any sites with a data capture below 25% do not require annualisation.

NO$_2$ Fall-off with Distance from the Road

No automatic NO$_2$ monitoring locations within West Lothian Council required distance correction during 2023.

Table C.2 – Local Bias Correction Factor Summary

	Local Bias Adjustment Linlithgow	Local Bias Adjustment Broxburn	Local Bias Adjustment Newton
Periods used to calculate bias	11	9	11
Bias Factor A	0.8	0.77	0.74
Bias Factor B	25%	31%	35%
Diffusion Tube Mean (µg/m^3)	25	29	17
Mean CV (Precision)	4	6	5
Automatic Mean (µg/m^3)	20	23	12
Data Capture	95	95	95
Adjusted Tube Mean (µg/m^3)	20	23	12

Table C.3 – Local Bias Correction Factor Calculation

Automatic Roadside Monitoring Site	Bias B%
Linlithgow	25
Broxburn	31
Newton	35
Mean Bias B	30
Factor + 1	1.30
Inverse	***0.77**

As per paragraph 7.222 in LAQM-TG22, as there was more than one local co-location study, the B values have been averaged (30), the resultant figure expressed as a factor (1.30) and the inverse of this factor taken i.e. 1/1.30 = 0.77.

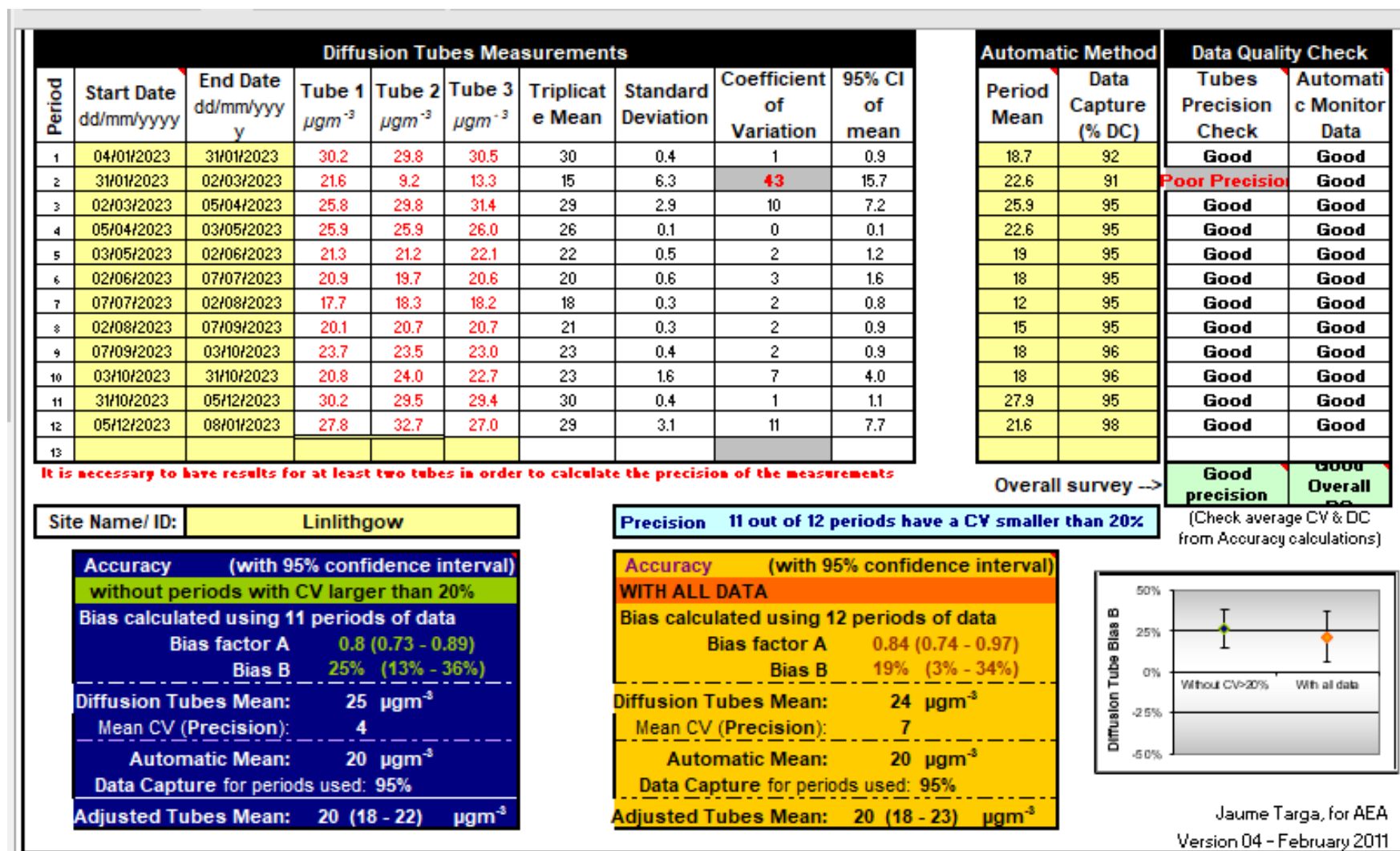**Figure 1 – Screenshot from AEA Spreadsheet – Bias Adjustment Factors for Diffusion Tubes – Linlithgow AQ Station**

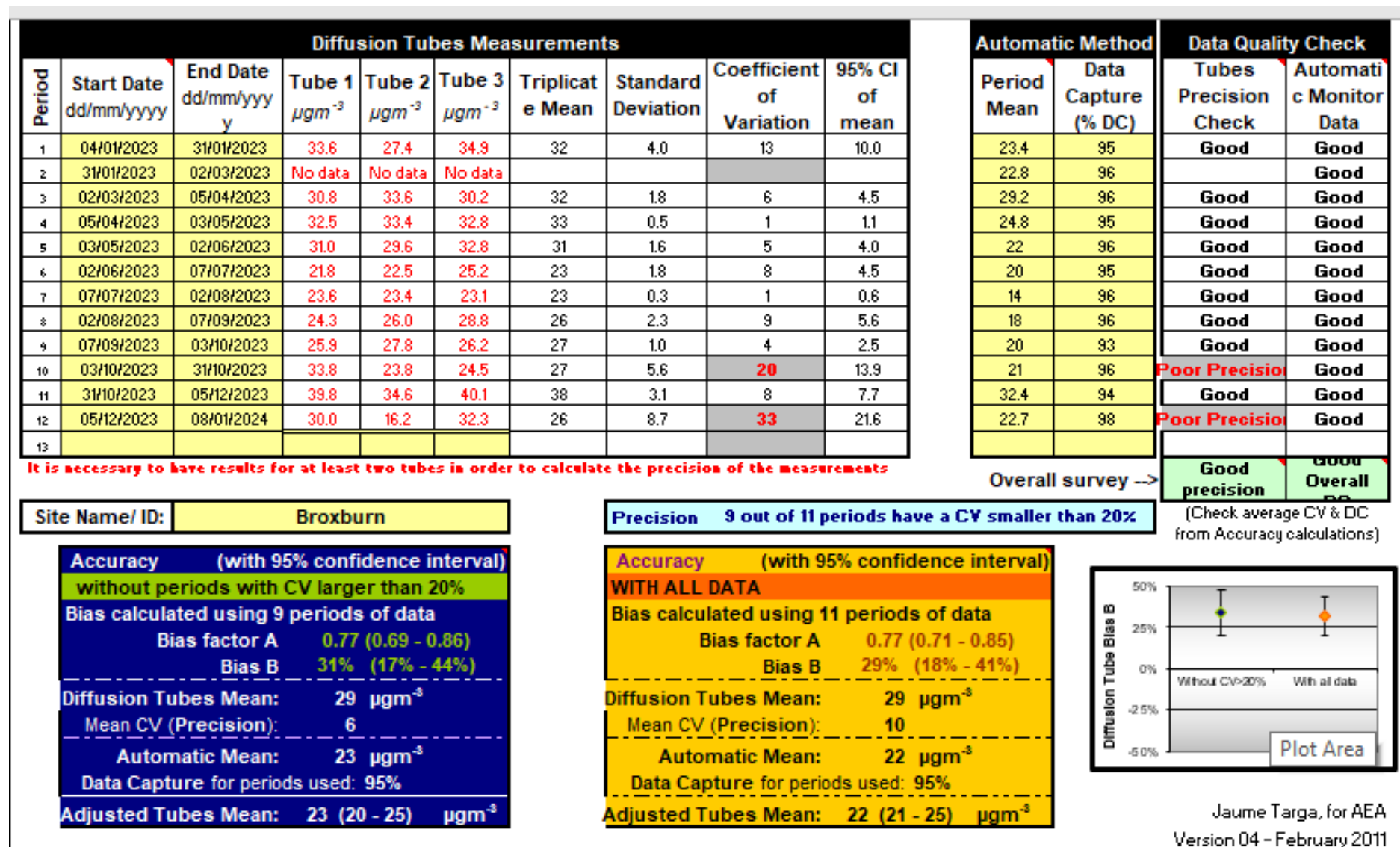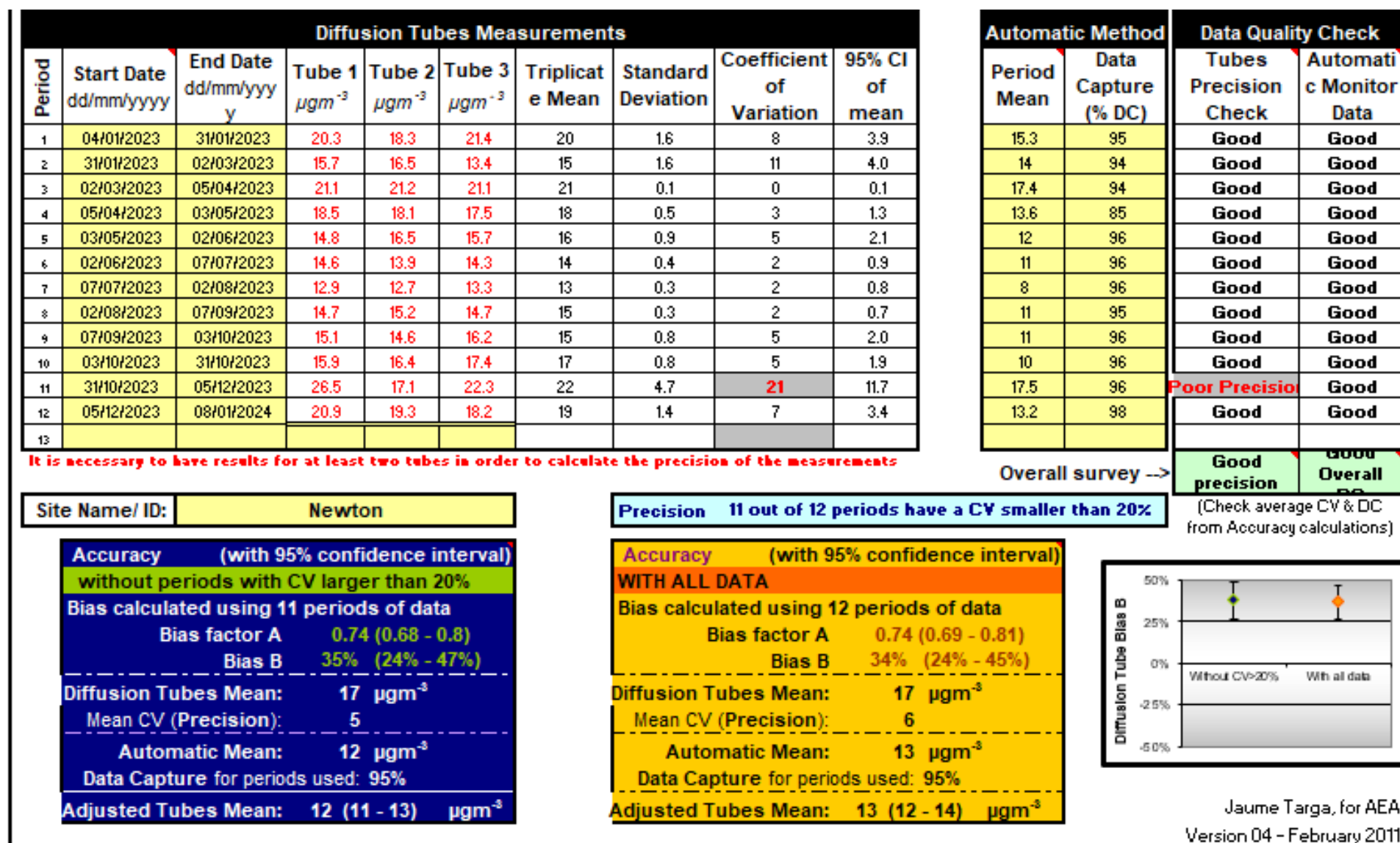**Figure 2 – Screenshot from AEA Spreadsheet – Bias Adjustment Factors for Diffusion Tubes – Broxburn AQ Station**

Period	Start Date dd/mm/yyyy	End Date dd/mm/yyyy	Tube 1 µgm⁻³	Tube 2 µgm⁻³	Tube 3 µgm⁻³	Triplicate Mean	Standard Deviation	Coefficient of Variation	95% CI of mean	Period Mean	Data Capture (% DC)	Tubes Precision Check	Automatic Monitor Data
1	04/01/2023	31/01/2023	33.6	27.4	34.9	32	4.0	13	10.0	23.4	95	Good	Good
2	31/01/2023	02/03/2023	No data	No data	No data					22.8	96		Good
3	02/03/2023	05/04/2023	30.8	33.6	30.2	32	1.8	6	4.5	29.2	96	Good	Good
4	05/04/2023	03/05/2023	32.5	33.4	32.8	33	0.5	1	1.1	24.8	95	Good	Good
5	03/05/2023	02/06/2023	31.0	29.6	32.8	31	1.6	5	4.0	22	96	Good	Good
6	02/06/2023	07/07/2023	21.8	22.5	25.2	23	1.8	8	4.5	20	95	Good	Good
7	07/07/2023	02/08/2023	23.6	23.4	23.1	23	0.3	1	0.6	14	96	Good	Good
8	02/08/2023	07/09/2023	24.3	26.0	28.8	26	2.3	9	5.6	18	96	Good	Good
9	07/09/2023	03/10/2023	25.9	27.8	26.2	27	1.0	4	2.5	20	93	Good	Good
10	03/10/2023	31/10/2023	33.8	23.8	24.5	27	5.6	20	13.9	21	96	Poor Precision	Good
11	31/10/2023	05/12/2023	39.8	34.6	40.1	38	3.1	8	7.7	32.4	94	Good	Good
12	05/12/2023	08/01/2024	30.0	16.2	32.3	26	8.7	33	21.6	22.7	98	Poor Precision	Good
13													

It is necessary to have results for at least two tubes in order to calculate the precision of the measurements

Overall survey --> **Good precision** / **Good Overall** (Check average CV & DC from Accuracy calculations)

Site Name/ ID: Broxburn

Precision 9 out of 11 periods have a CV smaller than 20%

Accuracy (with 95% confidence interval)
without periods with CV larger than 20%
Bias calculated using 9 periods of data
Bias factor A — 0.77 (0.69 - 0.86)
Bias B — 31% (17% - 44%)
Diffusion Tubes Mean: 29 µgm⁻³
Mean CV (Precision): 6
Automatic Mean: 23 µgm⁻³
Data Capture for periods used: 95%
Adjusted Tubes Mean: 23 (20 - 25) µgm⁻³

Accuracy (with 95% confidence interval)
WITH ALL DATA
Bias calculated using 11 periods of data
Bias factor A — 0.77 (0.71 - 0.85)
Bias B — 29% (18% - 41%)
Diffusion Tubes Mean: 29 µgm⁻³
Mean CV (Precision): 10
Automatic Mean: 22 µgm⁻³
Data Capture for periods used: 95%
Adjusted Tubes Mean: 22 (21 - 25) µgm⁻³

Jaume Targa, for AEA
Version 04 – February 2011

Figure 3 – Screenshot from AEA Spreadsheet – Bias Adjustment Factors for Diffusion Tubes – Newton AQ Station

Figure 4 – Screenshot of National Diffusion Tube Bias Adjustment Factors Spreadsheet (DEFRA)

| Analysed By[1]	Method	Year[5]	Site Type	Local Authority	Length of Study (months)	Diffusion Tube Mean Conc. (Dm) ($\mu g/m^3$)	Automatic Monitor Mean Conc. (Cm) ($\mu g/m^3$)	Bias (B)	Tube Precision[6]	Bias Adjustment Factor (A) (Cm/Dm)
SOCOTEC Didcot	50% TEA in acetone	2023	R	City Of York Council	9	22	17	33.7%	G	0.75
SOCOTEC Didcot	50% TEA in acetone	2023	R	City Of York Council	10	31	25	26.1%	G	0.79
SOCOTEC Didcot	50% TEA in acetone	2023	UB	Gravesham Borough Council	12	19	15	25.6%	G	0.80
SOCOTEC Didcot	50% TEA in acetone	2023	UB	Gravesham Borough Council	12	23	19	18.4%	G	0.84
SOCOTEC Didcot	50% TEA in acetone	2023	R	Ipswich Borough Council	9	26	20	33.0%	G	0.75
SOCOTEC Didcot	50% TEA in acetone	2023	R	Ipswich Borough Council	12	36	27	34.3%	G	0.74
SOCOTEC Didcot	50% TEA in acetone	2023	R	North East Lincolnshire Council	12	43	26	61.9%	G	0.62
SOCOTEC Didcot	50% TEA in acetone	2023	UB	North East Lincolnshire Council	10	13	10	29.1%	G	0.77
SOCOTEC Didcot	50% TEA in acetone	2023	R	North East Lincolnshire Council	11	24	21	18.0%	G	0.85
SOCOTEC Didcot	50% TEA in acetone	2023	R	Cardiff Council / Shared Regulatory Services	11	41	34	22.2%	G	0.82
SOCOTEC Didcot	50% TEA in acetone	2023	UB	Torfaen County Borough Council	11	12	9	43.9%	G	0.70
SOCOTEC Didcot	50% TEA in acetone	2023	R	East Suffolk Council	12	29	21	38.9%	G	0.72
SOCOTEC Didcot	50% TEA in Acetone	2023	R	Wrexham County Borough Council	11	17	14	25.2%	G	0.80
SOCOTEC Didcot	50% TEA in Acetone	2023	R	Horsham District Council	12	21	17	23.5%	G	0.81
SOCOTEC Didcot	50% TEA in Acetone	2023	R	Horsham District Council	10	25	17	43.5%	G	0.70
SOCOTEC Didcot	50% TEA in Acetone	2023	R	Horsham District Council	10	23	24	-5.4%	G	1.06
SOCOTEC Didcot	50% TEA in Acetone	2023	UI	North Lincolnshire Council	10	14	11	26.2%	G	0.79
SOCOTEC Didcot	50% TEA in acetone	2023	R	Bridgend Council	11	32	27	20.8%	G	0.83
SOCOTEC Didcot	50% TEA in acetone	2023	R	Cambridge City Council	12	22	18	24.8%	G	0.80
SOCOTEC Didcot	50% TEA in acetone	2023	R	Leeds City Council	10	39	29	32.3%	G	0.76
SOCOTEC Didcot	50% TEA in acetone	2023	KS	Leeds City Council	10	30	20	48.9%	G	0.67
SOCOTEC Didcot	50% TEA in acetone	2023	R	Leeds City Council	12	25	19	30.0%	G	0.77
SOCOTEC Didcot	50% TEA in acetone	2023	UC	Leeds City Council	11	26	19	40.0%	G	0.71
SOCOTEC Didcot	50% TEA in acetone	2023	KS	Marylebone Road intercomparison	11	53	38	41.4%	G	0.71
SOCOTEC Didcot	50% TEA in acetone	2023	R	Vale Of White Horse District Council	10	22	18	21.2%	G	0.83
SOCOTEC Didcot	50% TEA in acetone	2023	UB	Wirral Council	11	15	13	16.7%	G	0.86
SOCOTEC Didcot	50% TEA in acetone	2023		Overall Factor[3] (28 studies)					Use	0.77

Figure 5 – Pollutant trend graphs over the past 5 years – NO₂ trend graph - 2019 to 2023
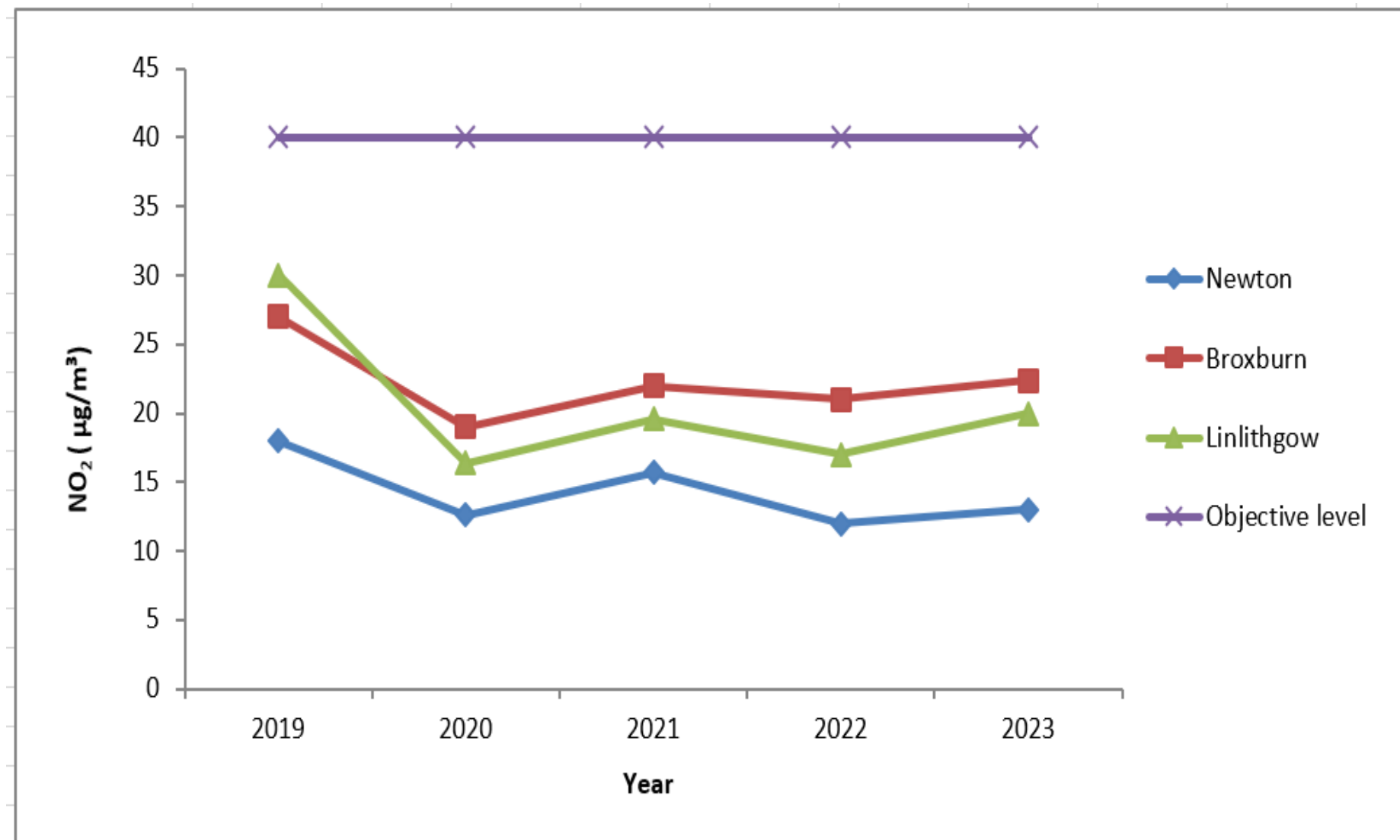
Figure 6 – Pollutant trend graphs over the past 5 years – PM$_{10}$ trend graph - 2019 to 2023
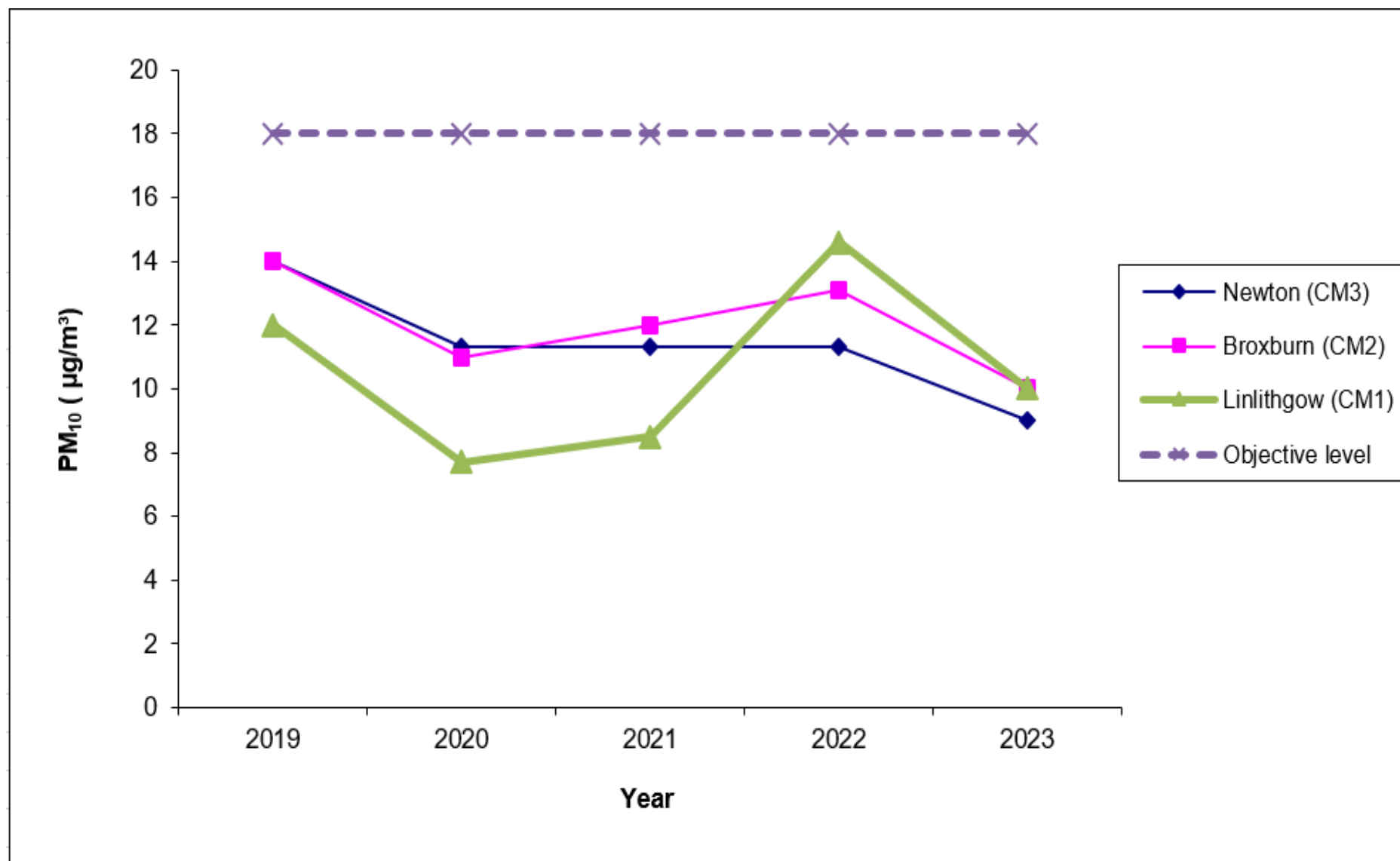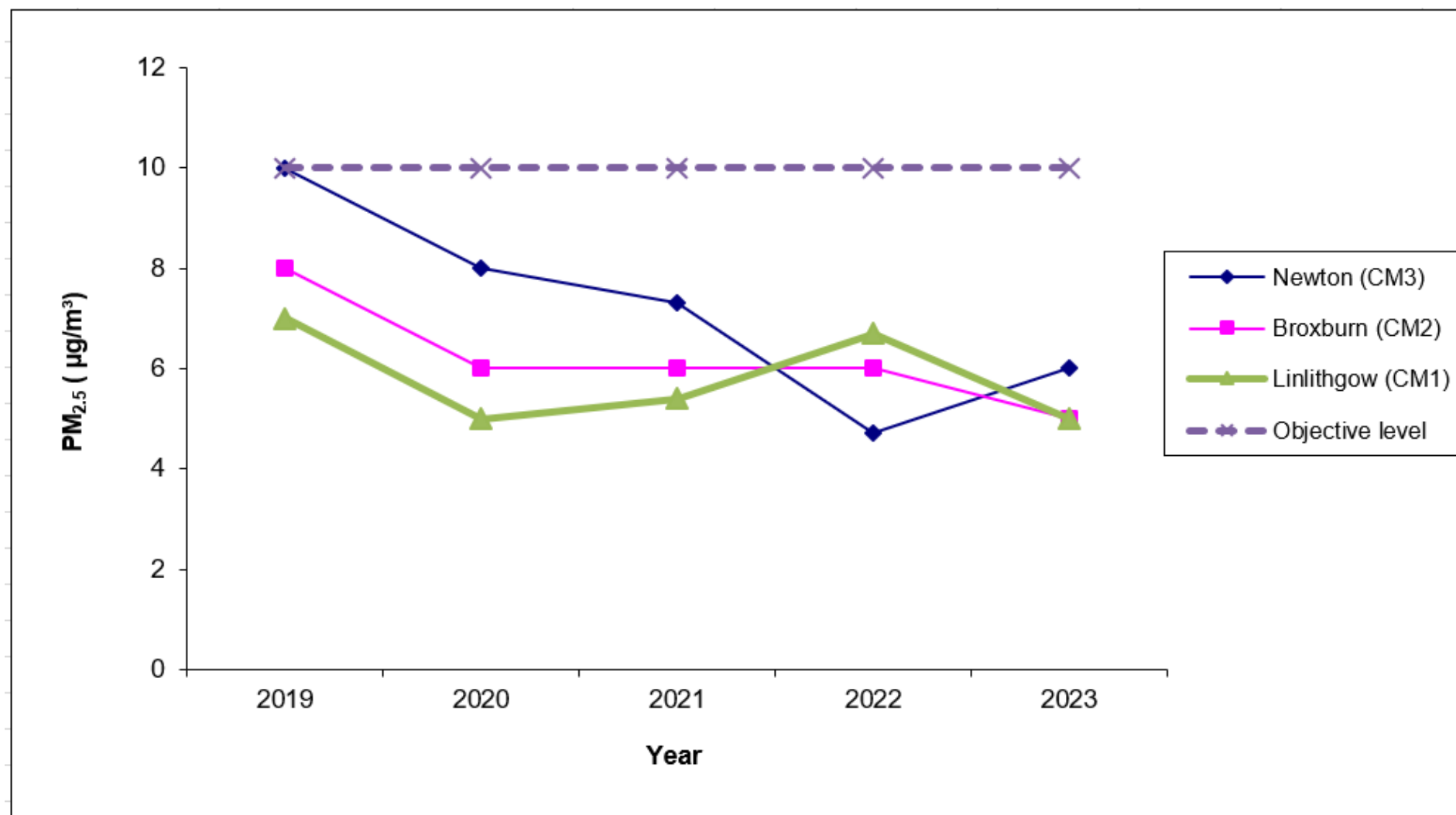
Figure 7 – Pollutant trend graphs over the past 5 years – PM$_{2.5}$ trend graph - 2019 to 2023

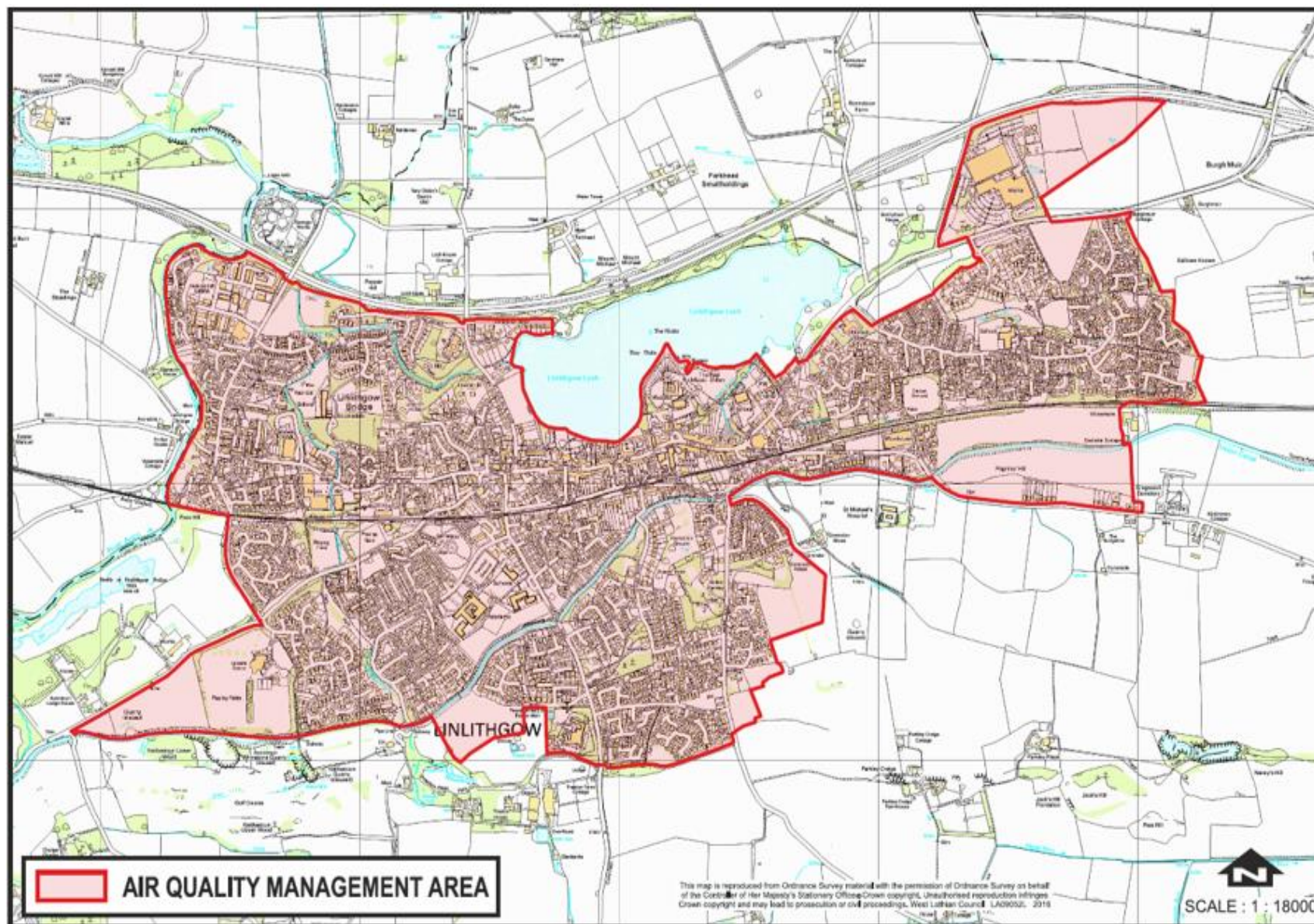**Figure 8 - Air Quality Management Area Maps – Linlithgow Air Quality Management Area**

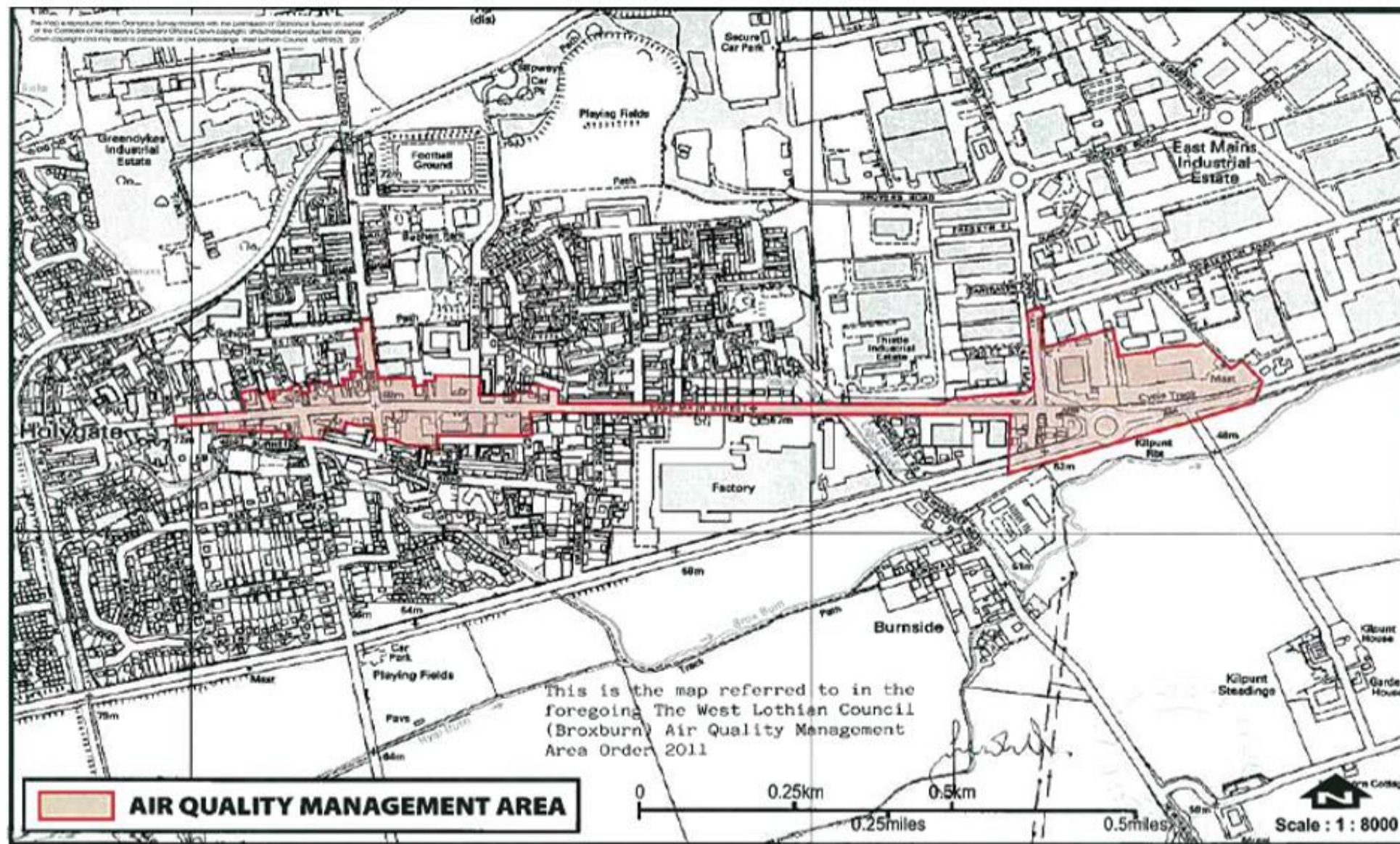**Figure 9 – Broxburn Air Quality Management Area**

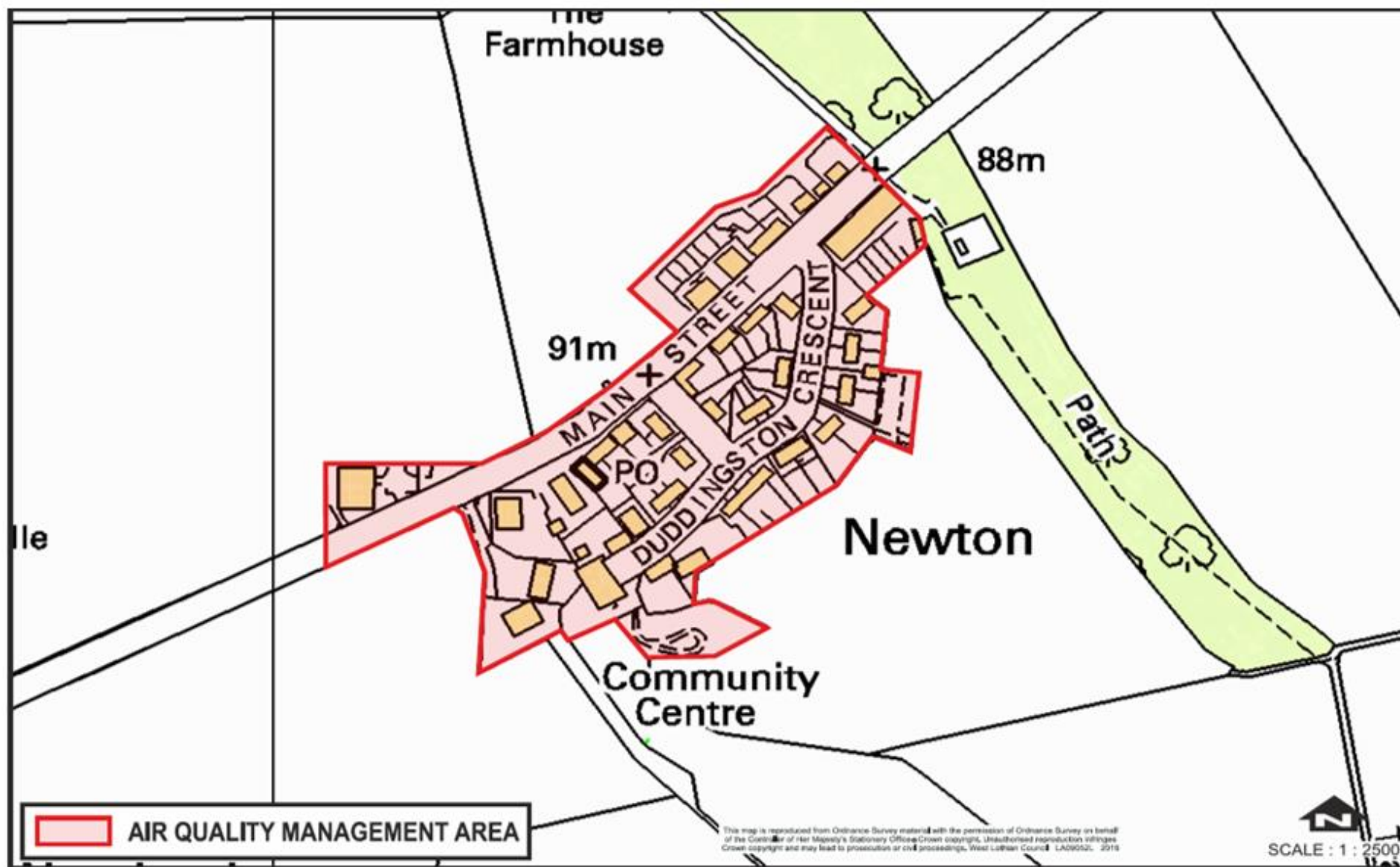**Figure 10 – Newton Air Quality Management Area**
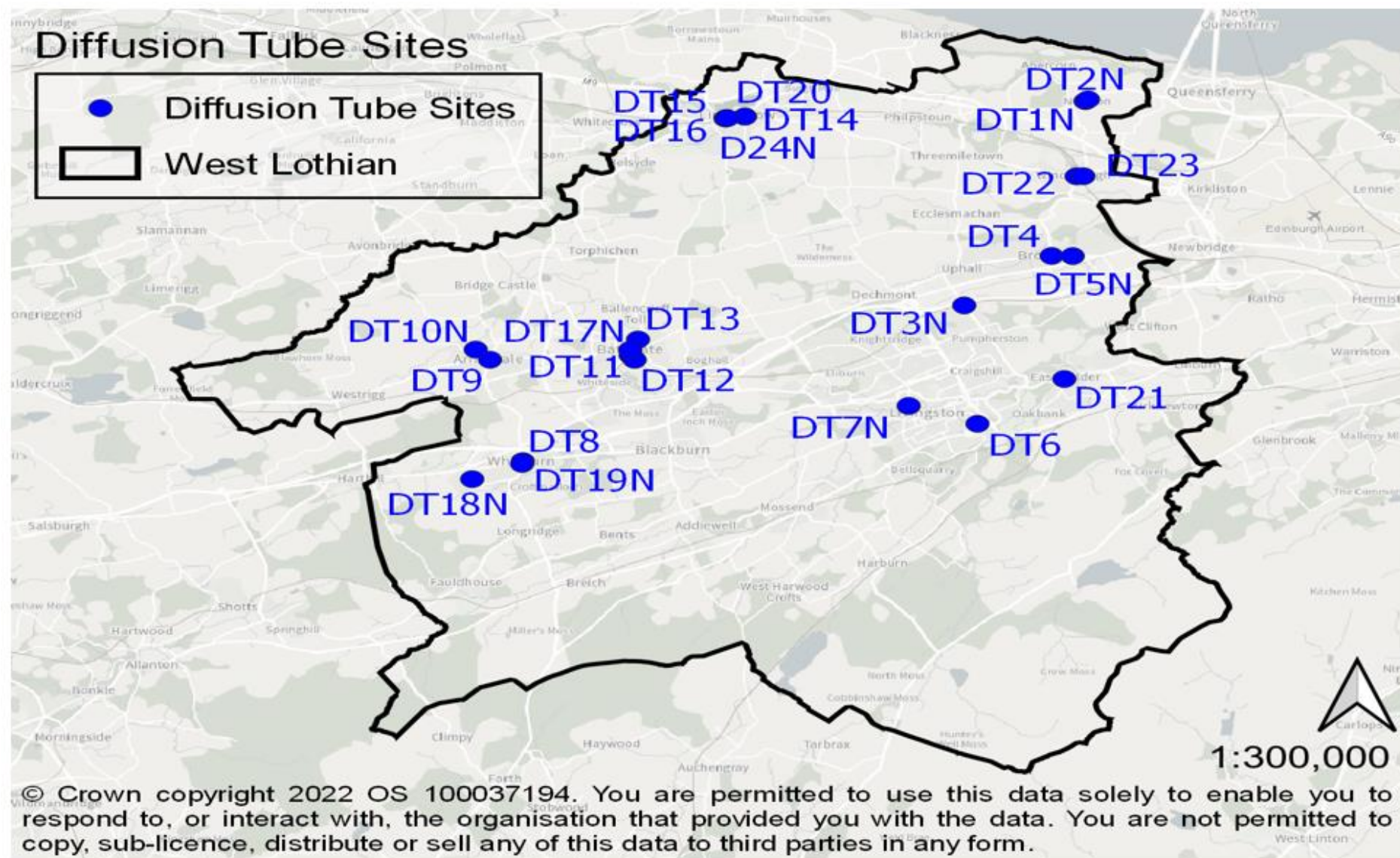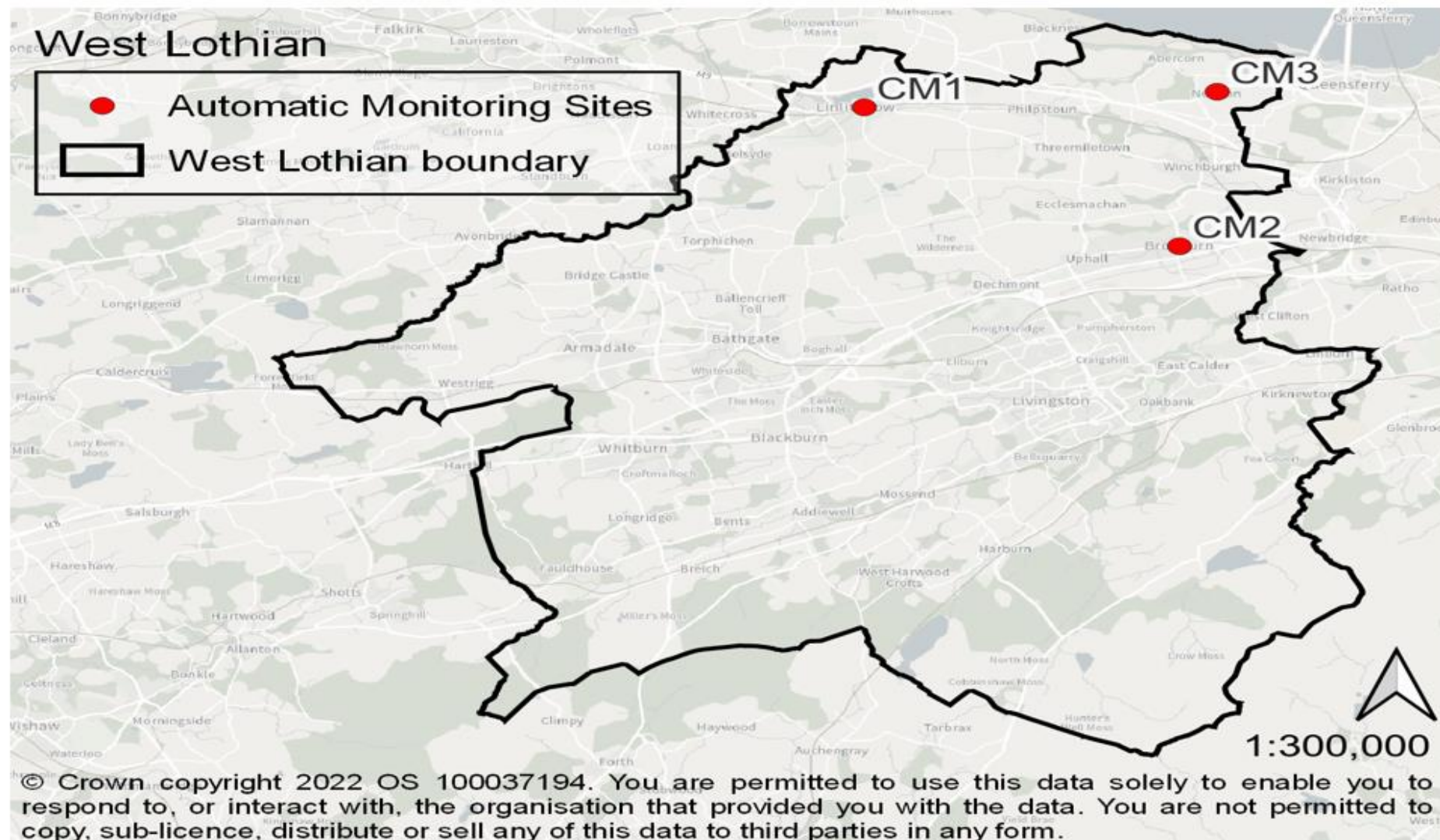
Figure 11 – Diffusion Tube Locations Map

Figure 12 – Map of Continuous Monitoring Locations in West Lothian

Glossary of Terms

Abbreviation	Description
AQAP	Air Quality Action Plan - A detailed description of measures, outcomes, achievement dates and implementation methods, showing how the LA 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
APR	Air Quality Annual Progress Report
AURN	Automatic Urban and Rural Network (UK air quality monitoring network)
Defra	Department for Environment, Food and Rural Affairs
DMRB	Design Manual for Roads and Bridges – Air quality screening tool produced by Highways England
DT	Diffusion Tube
ESU	Engineer Support Unit
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

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