Preston City Council

2024 Air Quality Annual Status Report (ASR)

In fulfilment of Part IV of the Environment Act 1995 Local Air Quality Management, as amended by the Environment Act 2021

Date: February 2025

Information	Preston City Council Details
Local Authority Officer	Chris Hodson
Department	Environmental Health Department
Address	Town Hall, Lancaster Road, Preston, PR1 2RL
Telephone	01772 906154
E-mail	c.hodson@preston.gov.uk
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Executive Summary: Air Quality in Our Area

Air Quality in Preston

Breathing in polluted air affects our health and costs the NHS and our society billions of pounds each year. Air pollution is recognised as a contributing factor in the onset of heart disease and cancer and can cause a range of health impacts, including effects on lung function, exacerbation of asthma, increases in hospital admissions and mortality. In the UK, it is estimated that the reduction in healthy life expectancy caused by air pollution is equivalent to 29,000 to 43,000 deaths a year[1].

Air pollution particularly affects the most vulnerable in society, children, the elderly, and those with existing heart and lung conditions. Additionally, people living in less affluent areas are most exposed to dangerous levels of air pollution[2].

Within Preston, the main pollutant of concern is nitrogen dioxide (NO_2), which is principally related to transport sources. Across the Preston district, the motorway network contributes 24.3% of the total emissions of 1,007 tonnes of NOx[3]. High concentrations of nitrogen dioxide are restricted to a number of hotspots within the Council Boundary. These hotspots are known as Air Quality Management Areas (AQMAs). There are five existing AQMAs across Preston district; however, there are plans to revoke three of the existing AQMAs due to their continued compliance with the annual mean NO_2 objective. Details of Preston District AQMAs are provided within Table 2.1 below, and the locations can be seen by following this link.

During 2023, Preston City Council carried out monitoring within and outside the AQMAs (results are presented in Appendix A: Monitoring Results). No exceedances of the nitrogen dioxide or particulate matter objectives were recorded at any monitoring locations in 2023; the last recorded exceedance of the annual mean nitrogen dioxide objective of 40µg/m^3 was in AQMA 4 in 2019. There has been an overall decline in concentrations since

[1] UK Health Security Agency. Chemical Hazards and Poisons Report, Issue 28, 2022.

[2] Defra. Air quality and social deprivation in the UK: an environmental inequalities analysis, 2006

[3] Lancashire County Council. Preston district, 2025, online. Available: https://www.lancashire.gov.uk/lancashire-insight/area-profiles/local-authority-profiles/preston-district/

2017/2018, with particularly low concentrations in 2020 and 2021, reflecting reduced vehicle use in years affected by Covid restrictions. 2020 was the year most impacted by Covid restrictions, and the associated reduction in travel and resulting emissions, with 2021 having some disruption, but not to the same extent. These trends largely follow the national trend and, although in many cases 2022 has higher concentrations than 2020 and 2021 (which is associated with the return to more 'typical' vehicle use patterns), 2022 and 2023 follow the long-term downward trend. More information on national air quality trends can be found by following this link.

Table ES 1 provides a brief explanation of the key pollutants relevant to Local Air Quality Management and the kind of activities they might arise from.

Table ES 1 - Description of Key Pollutants

Pollutant	Description
Nitrogen Dioxide (NO_2)	Nitrogen dioxide is a gas which is generally emitted from high-temperature combustion processes such as road transport or energy generation.
Sulphur Dioxide (SO_2)	Sulphur dioxide (SO_2) is a corrosive gas which is predominantly produced from the combustion of coal or crude oil.
Particulate Matter (PM_{10} and $PM_{2.5}$)	Particulate matter is everything in the air that is not a gas. Particles can come from natural sources such as pollen, as well as human made sources such as smoke from fires, emissions from industry and dust from tyres and brakes. PM_{10} refers to particles under 10 micrometres. Fine particulate matter or $PM_{2.5}$ are particles under 2.5 micrometres.

Actions to Improve Air Quality

Preston City Council (PCC) is committed to work with local authorities and partners, including Lancashire County Council, to deliver improvements to air quality across Preston.

Whilst air quality has improved significantly in recent decades, there are some areas where local action is needed to protect people and the environment from the effects of air pollution.

The Environmental Improvement Plan[4] sets out actions that will drive continued improvements to air quality and to meet the new national interim and long-term targets for fine particulate matter ($PM_{2.5}$), the pollutant of most harmful to human health. The Air Quality Strategy[5] provides more information on local authorities' responsibilities to work towards these new targets and reduce fine particulate matter in their areas.

The Road to Zero[6] details the Government's approach to reduce exhaust emissions from road transport through a number of mechanisms, in balance with the needs of the local community. This is extremely important given that cars are the most popular mode of personal travel and the majority of Air Quality Management Areas (AQMAs) are designated due to elevated concentrations heavily influenced by transport emissions.

The Central Lancashire Core Strategy has a dedicated air quality policy (Policy 30), which aims to '*Improve air quality through delivery of Green Infrastructure initiatives and through taking account of air quality when prioritising measures to reduce road traffic congestion*'. Air quality issues are a material consideration when reviewing development proposals. Ensuring air quality is considered within the planning system, along with encouraging the implementation of infrastructure for electric vehicles has been the main air quality focus in 2023.

The Preston Western Distributor Road was completed in 2023, which is designed to help relieve congestion on the network, especially access to the motorway at Junctions 1 and 3 of the M55, and on routes through Preston.

An update of the 2014 Air Quality Action Plan is currently in progress, with a draft due to be published in 2025. The updated Air Quality Action Plan will outline measures aimed at the continued reduction of NO_2, PM_{10}, and $PM_{2.5}$.

Conclusions and Priorities

Local monitoring data in Preston has not recorded any exceedances of the air quality objectives during 2023, and show a general long term downward trend in nitrogen dioxide

[4] Defra. Environmental Improvement Plan 2023, January 2023

[5] Defra. Air Quality Strategy – Framework for Local Authority Delivery, August 2023

[6] DfT. The Road to Zero: Next steps towards cleaner road transport and delivering our Industrial Strategy, July 2018

concentrations, which follows the national trend for nitrogen dioxide. No new AQMAs are necessary. It is recommended that AQMAs 1, 3, and 5 are revoked, and it is likely that AQMAs 2 and 4 will require revocation following the 2025 ASR. An updated Air Quality Action Plan is currently being drafted to replace the existing 2014 action plan, which will incorporate measures to reduce nitrogen dioxide and particulate matter across the district, maintaining compliance with the air quality objectives.

Whilst Preston City Council have not recorded exceedances of the air quality objectives in the last 5 years, Preston City Council will continue to work towards reducing emissions of both NOx and particulate matter across the district. Due to new targets set within the Environment Act 2021, particulate matter, and especially $PM_{2.5}$, is likely to become a greater priority over the next few years.

Local Engagement and How to get Involved

The Council is working with key partners to deliver better air quality, in particular Lancashire County Council.

Walking, cycling, and wheeling ('Active Travel') provides opportunities to develop healthier communities and attractive places to live and work.

Lancashire Active Travel Strategy ('Actively Moving Forward' [7]) sets out the ways in which people living and working in the County can engage in active travel, including the schemes and routes available to the public. This involves collaborating with active travel providers and disability related groups to enable Lancashire to be a place where many more people make cycling and walking part of their everyday lives.

There are 600 miles of on- and off-road cycle routes available for people of all cycling abilities in Lancashire, from quiet country lanes, gentle rides on promenades, canal towpaths, throughout cities, including Preston, and scenic hill routes. The Guild Wheel (link here) offers a 21 mile circular route around Preston that can be ridden or walked in any direction and joined at any point. It provides a safe and scenic route for people of all abilities.

[7] Lancashire County Council. Actively Moving Forward. A ten year strategy for Cycling and Walking, 2018, online. Available: https://www.lancashire.gov.uk/media/917305/6469-cycling-and-walking-strategy.pdf

As part of the Lancashire Actively Moving Forward strategy, Local Cycling and Walking Infrastructure Plans (LCWIPs) are being developed across the County to identify potential cycling and walking infrastructure improvements, including for central Lancashire, which includes Preston. More information about LCWIPs in Lancashire is available here, and the Plan covering Preston is available here.

The Road Safety Team work with schools, workplaces and the community to encourage safe and sustainable modes of travel. Initiatives for schools are promoted though the Safer Travel Modle (available here) and include: a series of cycling and walking safety training programmes; guidance and resources for teachers to encourage safe and active travel; and support for creating travel plans.

Further information on switching to cycling, training courses, and cycle routes available in Lancashire can be found by following this link here. Walking routes, locations of country parks, nature reserves and picnic sites in Lancashire are available here.

The Lancashire Insight website provides information on the sources and health impacts of air pollution across the county. Webpages include a summary of emissions data and concentrations of air pollution, which can be accessed by clicking here, and Monitoring of Air Quality and Health Impacts, which can be accessed by clicking here.

Information regarding the air quality within Preston, including copies of previous Annual Status Reports (ASRs) and latest Air Quality Action Plan, can be found on our website below:

https://www.preston.gov.uk/article/1015/Air-quality

Local Responsibilities and Commitment

This ASR was prepared by the Air Quality Consultants Ltd on behalf of the Environmental Health Department of Preston City Council.

A copy of the ASR has been provided to the Cabinet Member for Planning and Regulation.

This ASR has not been signed off by a Director of Public Health.

If you have any comments on this ASR please send them to Chris Hodson at:

Address: Town Hall, Lancaster Road, Preston, PR1 2RL

Telephone: 01772 906154

Email Address: c.hodson@preston.gov.uk

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1 Local Air Quality Management

This report provides an overview of air quality in Preston City Council (PCC) 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 order to achieve and maintain the objectives and the dates by which each measure will be carried out. This Annual Status Report (ASR) is an annual requirement showing the strategies employed by Preston City Council to improve air quality and any progress that has been made.

The statutory air quality objectives applicable to LAQM in England are presented in Table E.1.

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 should prepare an Air Quality Action Plan (AQAP) within 18 months. The AQAP should specify how air quality targets will be achieved and maintained, and provide dates by which measures will be carried out.

A summary of AQMAs declared by Preston City Council can be found in Table 2.1. The table presents a description of the five AQMAs that are currently designated within Preston City Council. Appendix D: Map(s) of Monitoring Locations and AQMAs provides maps of AQMAs and also the air quality monitoring locations in relation to the AQMAs. The air quality objectives pertinent to the current AQMA designations are as follows:

- Nitrogen dioxide (NO_2) annual mean (all AQMAs); and
- Nitrogen dioxide (NO_2) 1-hour mean (AQMA 3).

Policy 12 in the Preston City Transport Plan 2019 aims to revoke all AQMAs by 2028 through driving investment in non-car modes of travel, reducing the impact of existing travel and providing more choice of travel. in order to achieve this, PCC will support alternative fuel buses, reduce congestion, and promote walking and cycling. Policy 13 focuses on ensuring new development is granted with appropriate EV charging technology through the provision of standards for new homes and wider development. An assessment of the local power network is required to ensure the capacity of infrastructure is sufficient to cope with an increase in the demand for electrical power.

Table 2.1 – Declared Air Quality Management Areas

AQMA Name	Date of Declaration	Pollutants and Air Quality Objectives	One Line Description	Is air quality in the AQMA influenced by roads controlled by Highways England?	Level of Exceedance: Declaration	Level of Exceedance: Current Year	Number of Years Compliant with Air Quality Objective	Name and Date of AQAP Publication	Web Link to AQAP
AQMA 1	Declared Sept 2005	NO_2 Annual Mean	Area of residential at the Prison junction on the A59 Ringway	NO	41	22.4	>5	PCC AQAP 2009	https://www.preston.gov.uk/article/1015/Air-quality
AQMA 2	Declared Sept 2005	NO_2 Annual Mean	Area of residential at the junction of Blackpool Road and Plungington Road	NO	51	26.3	>5 (within 10% of objective in 2019)	PCC AQAP 2009	https://www.preston.gov.uk/article/1015/Air-quality
AQMA 3	Declared May 2012	NO_2 Annual Mean and 1 hour mean	Area of residential in the centre of Broughton Village (A6)	NO	77	14.2	>5	PCC AQAP 2014	https://www.preston.gov.uk/article/1015/Air-quality

AQMA Name	Date of Declaration	Pollutants and Air Quality Objectives	One Line Description	Is air quality in the AQMA influenced by roads controlled by Highways England?	Level of Exceedance : Declaration	Level of Exceedance : Current Year	Number of Years Compliant with Air Quality Objective	Name and Date of AQAP Publication	Web Link to AQAP
AQMA 4	Declared May 2012	NO_2 Annual Mean	Area of residential on New Hall Lane	NO	52	32.4	4	No Plan	https://www.preston.gov.uk/article/1015/Air-quality
AQMA 5	Declared March 2014	NO_2 Annual Mean	Area of residential on London Road	NO	41	27.2	>5	No Plan	https://www.preston.gov.uk/article/1015/Air-quality

☒ **Preston City Council confirm the information on UK-Air regarding their AQMA(s) is up to date.**

☒ **Preston City Council confirm that all current AQAPs have been submitted to Defra.**

2.2 Progress and Impact of Measures to address Air Quality in Preston City Council

Defra's appraisal of last year's ASR concluded that the report was well structured, detailed and provides the information specified in the Guidance. Other than minor spelling and grammatical errors, the comments from Defra were positive, commenting that elements of the report were an example of good practice.

Preston City Council has taken forward a number of direct measures during the current reporting year of 2023 in pursuit of improving local air quality. Details of all measures completed, in progress or planned are set out in Table 2.2. Nine measures are included within Table 2.2, with the type of measure and the progress Preston City Council have made during the reporting year of 2023 presented. Where there have been, or continue to be, barriers restricting the implementation of the measure, these are also presented within Table 2.2.

More detail on these measures can be found in their respective Action Plans (https://www.preston.gov.uk/article/1015/Air-quality) and the Lancashire Highways and Transport Strategy (https://www.lancashire.gov.uk/council/strategies-policies-plans/roads-parking-and-travel/highways-and-transport-strategy-2023-2025/).

Key completed measures are:

- Requiring electric vehicle recharging points on planning applications;
- Installing electric vehicle recharge points to all Council car parks and buildings;
- Completion of the Broughton Bypass;
- Infrastructure improvements on New Hall Lane; and
- Construction of Preston Western distributor Road.

Preston City Council are currently in the process of updating the 2014 Air Quality Action Plan. The draft air quality action plan includes measures 7-9 of the existing AQAP, and a number of new actions under the following five broad topics:

- Policy guidance and development control;
- Promoting low emission transport;
- Public information;
- Transport planning and infrastructure; and

- Traffic management.

Preston City Council expects the new AQAP to be completed over the course of the next reporting year, which will clearly set out the priorities of PCC, specific measures to reduce emissions and a brief explanation of expected impact of these measures.

Preston City Council implemented a number of measures in partnership with the following stakeholders during 2023, including working with Lancashire County Council on delivery of transport interventions, with the Preston Western Distributor Road opening in 2023 :

The principal challenges and barriers to the implementation of the AQAP measures that Preston City Council anticipates facing are:

- Internal resources;
- Issues faced by two-tier authority position - Preston City Council has no direct control over highways and is reliant on joint working with Lancashire County Council;
- The local plan proposes additional development, particularly housing, within the district that will potentially result in additional road traffic;
- Funding – limiting the installation of EV charging and cycling and walking infrastructure across the City:
- Increased cost of living may result in increase in the use of solid fuels, and potentially impact on the transition to electric vehicles.

Preston City Council anticipates that the measures stated above and in Table 2.2, and the additional measures within the draft AQAP, will maintain compliance across the city.

Table 2.2 – Progress on Measures to Improve Air Quality

Measure No.	Measure Title	Category	Classification	Year Measure Introduced in AQAP	Estimated / Actual Completion Date	Organisations Involved	Funding Source	Defra AQ Grant Funding	Funding Status	Estimated Cost of Measure	Measure Status	Reduction in Pollutant / Emission from Measure	Key Performance Indicator	Progress to Date	Comments / Barriers to Implementation
1	Require electric vehicle recharging points on planning applications	Promoting Low Emission Transport	Other	2016	Ongoing	PCC		NO	Funded	< £10k	Completed	N/A	N/A	Completed, standard planning condition used	N/A
2	Install electric vehicle recharge points to all Council car parks and buildings	Promoting Low Emission Transport	Other	2016	Ongoing	PCC/LCC		NO	Not Funded		Planning	N/A	N/A	Electric vehicle charging points installed in Avenham Car Park, Bus Station Car Park. Plus on street Chapel Street.	Funding, plus following feasibility study, the electricity supply infrastructure.
3	Development and implementation of a Lancashire wide planning guidance	Policy Guidance and Development Control	Air Quality Planning and Policy Guidance		n/a	Lancaster City Council, on behalf of all 14 Lancashire Authorities. PCC lead for implementation in Preston	None	NO	Not Funded	< £10k	Aborted	N/A	N/A	Aborted due to review of Central Lancs Core Strategy, Planning	N/A
4	Broughton Bypass	Transport Planning and Infrastructure	Other		2017	LCC		NO	Funded		Completed	Modelled average of 60% reduction in NO2 concentrations	N/A	Completed, significant reductions, see monitoring data	N/A
5	Infrastructure improvements New Hall Lane	Transport Planning and Infrastructure	Other		2017	LCC		NO			Completed	AQMA 4, now compliant	N/A	Completed, help with compliance, Footpath width increased, moving traffic source slight away from residential, bus priority	N/A
6	Construction of Preston Western distributor Road	Transport Planning and Infrastructure	Other		2023	LCC/PCC	City Deal	NO	Funded	£100k - £500k	Completed	Allows future development, reducing congestion on existing road network	N/A	Completed	N/A
7	Local Cycling and Walking Infrastructure Plans	Transport Planning and Infrastructure	Cycle network		2032	LCC		NO	Not Funded		Planning	Potential to increase and improve Cycling and Walking infrastructure	N/A	In the planning process	Funding

Measure No.	Measure Title	Category	Classification	Year Measure Introduced in AQAP	Estimated / Actual Completion Date	Organisations Involved	Funding Source	Defra AQ Grant Funding	Funding Status	Estimated Cost of Measure	Measure Status	Reduction in Pollutant / Emission from Measure	Key Performance Indicator	Progress to Date	Comments / Barriers to Implementation
8	Construction of Cottam Park Way rail station	Transport Planning and Infrastructure	Public transport improvements-interchanges stations and services		2025	LCC/PCC	Transforming Cities/City Deal	NO	Funded		Planning	Includes Park and Ride, provides alternative transport to Preston City Centre	N/A	In the Planning Process	N/A
9	New Public Transport priority corridors along 7 routes into Preston	Transport Planning and Infrastructure	Bus route improvements		2024	LCC		NO			Planning	May effect AQMA 4	N/A		

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

As detailed in Policy Guidance LAQM.PG22 (Chapter 8) and the Air Quality Strategy[8], local authorities are expected to work towards reducing emissions and/or concentrations of fine particulate matter ($PM_{2.5}$). There is clear evidence that $PM_{2.5}$ (particulate matter smaller 2.5 micrometres) has a significant impact on human health, including premature mortality, allergic reactions, and cardiovascular diseases.

In Lancashire the strongest evidence on the population health impacts of air pollution comes from Public Health England's Public Health Outcomes Framework. This Framework estimates the 'fraction of annual all cause adult mortality attributable to particulate air pollution (measured as fine particulate matter, $PM_{2.5}$)' each year. It shows that, while the overall mortality rate from particulate air pollution in Lancashire-12 (5.1%) is lower than the England average (5.8%), air pollution remains a significant public health issue for the county (2023).

Working with district councils, Lancashire County Council (LCC) has an important role to play in taking action to reduce the health impacts of air pollution. Responsible for transport planning, network management, highway maintenance, public health and procuring local vehicle fleets, there are a number of ways LCC can support local and county wide efforts to improve air quality.

In summary, the following activities are underway or in development, which should assist in reductions of $PM_{2.5}$:

1. Encouraging the use of sustainable forms of travel

Details on encouraging sustainable transport are outlined in the above section, Local Engagement and How to get Involved. Lancashire's cycling and walking strategy, Actively Moving Forward, sets out an ambitious plan for increasing the number of people walking and cycling in the county by 2028. By improving and increasing access to cycling and walking infrastructure, alongside training and promotional activities, it aims to significantly increase the amount of cycling and walking people do across the county. Information on

[8] Defra. Air Quality Strategy – Framework for Local Authority Delivery, August 2023

the LCC's ongoing activities in this area can be found on the Active Travel in Lancashire website.

Bus services across Lancashire operate in a deregulated market, meaning the County Council does not control the bus network, franchise routes or control fares. In the next three years, the County Council will continue to work more closely with bus operators, alongside local communities, to create a network that people want and will use. The council has published a ten-year Enhanced Partnership Plan and Scheme alongside its Bus Service Improvement Plan which together will deliver measures to restore confidence and grow patronage numbers.

2. Supporting the transition to low emission vehicles

LCC, working with BP Pulse, has installed 150 Electric Vehicle charge points either at the side of the adopted highway or in County Council carparks. These charge points are ultra-chargers which will allow most vehicles to take a full charge in less than an hour and fast chargers that will take around three hours to charge the vehicles. The mix of these units depends on location, power supply, and demand.

Since the installation of these points the focus has been on supporting residents who do not have off-street parking to charge at home, with the County Council trialling an innovative footway cable-tray which will provide a low cost and practical solution to support residents without off street parking to charge at home. The cable-tray enables residents to safely pass an electric cable across the footway from their property to the carriageway enabling charging their vehicle from their domestic supply. Two products (one designed in-house and one adapted product) have been trialled at several residential properties in the county. The County Council is one of 16 councils in England to secure funding from the Local Electric Vehicle Infrastructure (LEVI) extended pilot scheme to expand this trial to more residents and to trial lamp post integrated charge points in residential areas, helping those that do not have access to off-street parking.

In addition to the LEVI extended pilot, the County Council has been allocated indicative funding of £10.1m from the LEVI capital fund for the provision of local, low power, public on-street charging infrastructure. This will help us scale up the deployment of local charge points and solutions for residents without access to off-street parking beyond the pilot projects and deliver the vision and aims of the Lancashire and Blackburn with Darwen EV Infrastructure Strategy.

The County Council's parking services fleet is now fully electric, with charging infrastructure installed at the offices and depots where the vehicles are based, and regularly visit. Fleet services are continuing to deliver their programme to upgrade to ultra-low emission vehicles. It should be noted that while the switch to EV will eliminate tailpipe emission (and associated nitrogen dioxide emissions), there will continue to be $PM_{2.5}$ emissions associated with brake, tyre, and road wear. However, the use of regenerative braking in EVs will help reduce brake wear.

3. Creating cleaner, healthier road networks

Work to develop the next Local Transport Plan (LTP4) for Lancashire, Blackpool and Blackburn with Darwen is underway. The Public Health team has submitted an evidence base to inform the process, highlighting transport related health challenges affecting the population of Lancashire and making recommendations about how local transport planning policy can make a contribution to addressing these. The local Highways and Transport Masterplans will be refreshed to align with the priorities of LTP4. This will provide an opportunity to identify longer-term network solutions that address issues in AQMAs and have a positive impact on air quality generally.

4. Embedding air quality into policy

The County Council works with district planners to ensure air quality is a key consideration of Local Plans, alongside wider public health issues. It supports district councils in developing policies that seek to ensure new developments do not contribute to increasing levels of air pollutants and that requirements for appropriate mitigation are in place.

The County Council, as part of its highways input into planning applications, actively encourages measures that aim to promote sustainable forms of travel. Working under the direction of the National Planning Policy Framework, the County Council seeks measures that facilitate cycling and walking, increase the use of public transport and provide access to electric vehicle charge points. The County Council also seeks funding from developers, through section 106 contributions, to support existing bus services or to provide new bus services suitable to serve development sites once they are built.

The new $PM_{2.5}$ targets[9] require a different approach to that used by Local Authorities in response to existing air quality legislation. The new approach moves away from a requirement to assess solely whether a scheme is likely to lead to an exceedance of a legal limit and instead ensures that appropriate mitigation measures are implemented from the design stage, streamlining the process for planning and ensuring the minimum amount of pollution is emitted and that exposure is minimised. Interim guidance has been published, pending guidance on how these requirements will be implemented in practice. PCC will implement the new requirements through the planning system when future guidance is published.

5. Raising awareness and increasing engagement

The Lancashire Insight website provides information on the sources and health impacts of air pollution across the county, which may encourage behaviour change to reduce emissions. Webpages include a Summary of Emissions Data and Monitoring of Air Quality and Health Impacts.

[9] Defra (2024) $PM_{2.5}$ Targets: Interim Planning Guidance, [Online], Available: https://uk-air.defra.gov.uk/pm25targets/planning.

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

This section sets out the monitoring undertaken within 2023 by Preston City Council and how it compares with the relevant air quality objectives. In addition, monitoring results are presented for a five-year period between 2019 and 2023 to allow monitoring trends to be identified and discussed.

3.1 Summary of Monitoring Undertaken

3.1.1 Automatic Monitoring Sites

Preston City Council undertook automatic (continuous) monitoring at two sites during 2024. Table A.1 in Appendix A shows the details of the automatic monitoring sites. The https://www.preston.gov.uk/article/1015/Air-quality page presents automatic monitoring results for Preston City Council, with automatic monitoring results also available through the UK-Air website.

Maps showing the location of the monitoring sites are provided in Appendix D. 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

Preston City Council undertook non-automatic (i.e. passive) monitoring of NO_2 at 31 sites during 2023. Table A.2 in Appendix A presents the details of the non-automatic sites.

Maps showing the location of the monitoring sites are provided in Appendix D. 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.

An additional four monitoring sites (PR26 – PR29) were added in 2023 along Preston Road.

3.2 Individual Pollutants

The air quality monitoring results presented in this section are, where relevant, adjusted for bias, annualisation (where the annual mean data capture is below 75% and greater than 25%), and distance correction. Further details on adjustments are provided in Appendix C.

3.2.1 Nitrogen Dioxide (NO_2)

Table A.3 and Table A.4 in Appendix A compare the ratified and adjusted monitored NO_2 annual mean concentrations for the past five years with the air quality objective of 40µg/m^3. Note that the concentration data presented 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 2023 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 (no diffusion tubes require distance correction in Preston during 2023).

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.

During 2023, no passive or automatic monitoring locations exceeded the nitrogen dioxide annual mean objective of 40 µg/m^3. The last exceedance recorded in Preston was within AQMA 4 in 2019. There have been no exceedances of the hourly mean nitrogen dioxide objective in the last five years.

- AQMA 1 has no recorded exceedances since monitoring resumed in 2020, with concentrations well below the objective. Prior to 2020, monitoring was stopped as concentrations were well below the objectives. It is therefore considered that **this AQMA should be revoked**.
- AQMA 2 has had no exceedances of the objectives for the last ten years (since 2013), with the highest value of 37.1 µg/m^3 in 2019, compared to 26.3 µg/m^3 in 2023. As there has not been 3 years below 90% of the objective level, outside of years affected by Covid, in line with TG(22), this AQMA will be retained.

- AQMA 3 has been in compliance for the last six years (since 2018), with the highest value of 41.0µg/m^3 measured in 2017, compared to 14.2 µg/m^3 in 2023. It is therefore considered that **this AQMA should be revoked**.
- AQMA 4 last recorded an exceedance of the objective (42.2 µg/m^3) in 2019; the maximum recorded concentration within the AQMA in 2023 was 32.4 µg/m^3. In line with TG(22), as there has not been 3 years outside of years affected by Covid below 90% of the objective level, this AQMA will be retained.
- AQMA 5 has been in compliance for over five years (since 2016), with a maximum concentration of 36.0 µg/m^3 measured in 2019, compared to 24.6 µg/m^3 in 2023. As there has been over five years, at or below 90% of the air quality objective, it is therefore considered that **this AQMA should be revoked**.

There has been an overall decline in concentrations since 2017/2018 with lower concentrations in 2020 and 2021 reflecting reduced vehicle use in years affected by Covid restrictions. The local trends largely follow the national trend.

3.2.2 Particulate Matter (PM_{10})

Table A.6 in Appendix A: Monitoring Results compares the ratified and adjusted monitored PM_{10} annual mean concentrations for the past five years with the air quality annual mean objective of 40µg/m^3.

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 50µg/m^3, not to be exceeded more than 35 times per year.

PM_{10} monitoring of background concentrations in 2023 showed compliance with the annual mean objective and was consistent with the previous years. There is no discernible trend in PM_{10} concentrations.

Despite PM_{10} objectives being met within the Preston district, particulate matter pollution is considered to be a non-threshold pollutant (i.e. there is no safe level) and needs to be as low as possible to protect health. Emission reduction is still a priority for Preston City Council.

No AQMAs are required for PM_{10}.

3.2.3 Particulate Matter ($PM_{2.5}$)

Table A.8 in Appendix A presents the ratified and adjusted monitored $PM_{2.5}$ annual mean concentrations for the past five years.

Annual mean $PM_{2.5}$ concentrations have reduced from 2022 to 2023, however there is no clear trend in $PM_{2.5}$ concentrations over the last five-year monitoring period.

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? Which AQMA?	Monitoring Technique	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Inlet Height (m)
PRA1	Meadow Street	Roadside	354138	429863	NO_2	NO	Chemiluminescent;	7	5	2.5
PRA2	Bootle Street	Urban Background	355250	430126	NO_2, PM_{10} $PM_{2.5}$, O_3	NO	Chemiluminescent, FIDAS	9	N/A	2.5

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

Diffusion Tube ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	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)
PR1	Red Rose Radio	Roadside	354307	429769	NO_2	NO	0	3.3	No	2.0
PR5	215 Plungington Road	Roadside	353072	431014	NO_2	YES (AQMA 2)	0	2.5	No	2.0
PR6	347 Blackpool Road	Roadside	353085	431045	NO_2	YES (AQMA 2)	0	4.0	No	2.0
PR7	336 Blackpool Road	Roadside	353111	431080	NO_2	YES (AQMA 2)	0	3.0	No	2.0
PR8	240 Plungington Road	Roadside	353054	431095	NO_2	YES (AQMA 2)	0	2.3	No	2.0
PR9[3]	78 Church Street	Roadside	354555	429624	NO_2	YES (AQMA 1)	0	2.8	No	2.0
PR21	Meadow Street 1[4]	Roadside	354138	429864	NO_2	NO	7.0	5.0	Yes	2.0
PR22	Meadow Street 2[4]	Roadside	354138	429864	NO_2	NO	7.0	5.0	Yes	2.0
PR23	Meadow Street 3[4]	Roadside	354138	429864	NO_2	NO	7.0	5.0	Yes	2.0
PR24	Garrison PH	Roadside	354775	431481	NO_2	NO	0	2.3	No	2.0
PR25	160 Watling Street Road	Roadside	354751	431521	NO_2	NO	4.5	4.5	No	2.0
PR26	103 Preston Rd	Roadside	358281	433958	NO_2	NO	0	4.0	No	2.0
PR27	88 Preston Rd	Roadside	358317	434171	NO_2	NO	0	7.8	No	2.0
PR28	204 Preston Rd	Roadside	358918	434469	NO_2	NO	14.1	4.3	No	2.0
PR29	315 Preston Rd	Roadside	359347	434644	NO_2	NO	0	6.3	No	2.0
PR44A	39 Whittingham Lane	Roadside	352808	435283	NO_2	NO	-10.0 [5]	24.0	No	2.0
PR45	503 Garstang Road	Roadside	352471	435012	NO_2	YES (AQMA 3)	0	1.5	No	2.0

Diffusion Tube ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	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)
PR46	482 Garstang Road	Roadside	352483	435006	NO_2	YES (AQMA 3)	0	1.6	No	2.0
PR39	7 New Hall Lane	Roadside	354841	429594	NO_2	YES (AQMA 4)	0	3.5	No	2.0
PR40	23 New Hall Lane	Roadside	354880	429594	NO_2	YES (AQMA 4)	0	3.5	No	2.0
PR41	St Matts Church, New Hall Lane	Roadside	355556	429906	NO_2	YES (AQMA 4)	0	11.0	No	2.0
PR42	St Matts School, New Hall Lane	Roadside	355585	429908	NO_2	YES (AQMA 4)	0	3.0	No	2.0
PR38	149 London Road	Roadside	355070	429198	NO_2	YES (AQMA 5)	0	4.0	No	2.0
PR47	181 London Road	Roadside	355124	429106	NO_2	YES (AQMA 5)	4.0	4.0	No	2.0
PR48	119 London Road	Roadside	355015	429282	NO_2	YES (AQMA 5)	0	3.0	No	2.0
PR49	24 Grosvenor Street	Roadside	354849	429437	NO_2	YES (AQMA 5)	0	13.5	No	2.0
PR50	7 Moore Street	Roadside	355038	429207	NO_2	YES (AQMA 5)	5.0	6.0	No	2.0
PR55	14 Watery Lane	Roadside	352400	429950	NO_2	NO	0	5.7	No	2.0
PR56	Wheatsheaf Inn, Tulketh Road	Roadside	352442	430000	NO_2	NO	0	2.6	No	2.0
PR57	228 Strand Road	Roadside	352465	429971	NO_2	NO	0	4.8	No	2.0

Diffusion Tube ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	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)
PR58	291 Fylde Road	Roadside	352644	430082	NO_2	NO	0	7.5	No	2.0

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) PR9 is situated 23 m southeast of AQMA 1

(4) Triplicate sites

(5) The location of relevant exposure is closer to the kerb than the monitoring site, hence a negative value.

Table A.3 – Annual Mean NO_2 Monitoring Results: Automatic Monitoring (µg/m^3)

Site 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
PRA1	354138	429863	Roadside	99.5	99.5	24	20	21	20	18
PRA2	355250	430126	Urban Background	98.4	98.4	23	18	20	18	16

☒ **Annualisation has been conducted where data capture is <75% and >25% in line with LAQM.TG22 (no annualisation required).**

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

Notes:

The annual mean concentrations are presented as µg/m^3.

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

All means have been "annualised" as per LAQM.TG22 if valid data capture for the full calendar year is less than 75%. See Appendix C for details.

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

(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 NO_2 Monitoring Results: Non-Automatic Monitoring (µg/m^3)

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
PR1	354307	429769	Roadside	50.0	50.0	35	28	34	30	25.7
PR5	353072	431014	Roadside	100.0	100.0	37	29	30	29	26.3
PR6	353085	431045	Roadside	8.3	8.3	31	26	30	28	-[3]
PR7	353111	431080	Roadside	75.0	75.0	29	24	25	25	21.0
PR8	353054	431095	Roadside	100.0	100.0	33	24	27	26	23.8
PR9	354555	429624	Roadside	75.0	75.0	-	-	-	25.5	22.4
PR21	354138	429864	Roadside	91.7	91.7	24	21	21	20	18.1
PR22	354138	429864	Roadside	91.7	91.7	25	20	21	20	18.4
PR23	354138	429864	Roadside	91.7	91.7	24	20	21	20	18.1
PR24	354775	431481	Roadside	91.7	91.7	33	27	32	28	23.8
PR25	354751	431521	Roadside	83.3	83.3	32	27	29	27	23.9
PR26	358281	433958	Roadside	75.0	75.0	-	-	-	-	11.6
PR27	358317	434171	Roadside	75.0	75.0	-	-	-	-	17.7
PR28	358918	434469	Roadside	58.3	58.3	-	-	-	-	18.3
PR29	359347	434644	Roadside	75.0	75.0	-	-	-	-	11.7
PR44A	352808	435283	Roadside	91.7	91.7	23	18	19	18	16.5
PR45	352471	435012	Roadside	100.0	100.0	16	13	14	15	12.3
PR46	352483	435006	Roadside	100.0	100.0	18	15	17	16	14.2
PR39	354841	429594	Roadside	91.7	91.7	**42**	34	37	33	32.4
PR40	354880	429594	Roadside	100.0	100.0	38	31	32	32	29.1
PR41	355556	429906	Roadside	83.3	83.3	24	19	22	25	21.8
PR42	355585	429908	Roadside	83.3	83.3	32	24	26	26	25.3
PR38	355070	429198	Roadside	100.0	100.0	36	27	29	29	24.6
PR47	355124	429106	Roadside	100.0	100.0	32	27	29	28	26.5
PR48	355015	429282	Roadside	91.7	91.7	34	28	32	29	27.2
PR49	354849	429437	Roadside	100.0	100.0	22	17	19	17	16.1
PR50	355038	429207	Roadside	33.3	33.3	28	22	24	22.4	22.7
PR55	352400	429950	Roadside	83.3	83.3	-	-	20	19	18.3
PR56	352442	430000	Roadside	100.0	100.0	-	-	25	27	24.8
PR57	352465	429971	Roadside	91.7	91.7	-	-	28	27	25.2
PR58	352644	430082	Roadside	100.0	100.0	-	-	27	25	23.3

☒ **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 (not required).**

Notes:

The annual mean concentrations are presented as µg/m^3.

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%. See Appendix C for details.

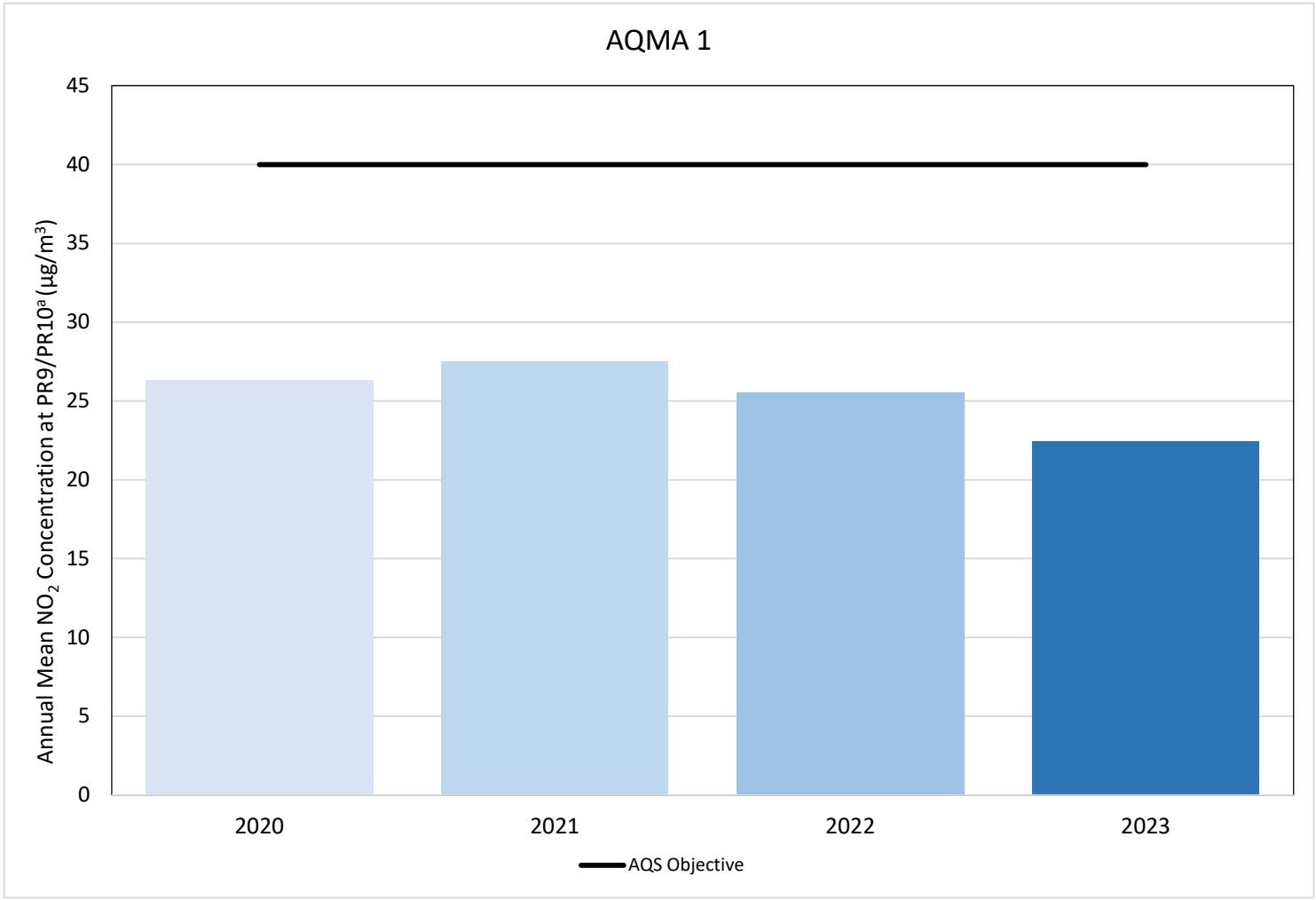
Concentrations are those at the location of monitoring and not those following any fall-off with distance adjustment.

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

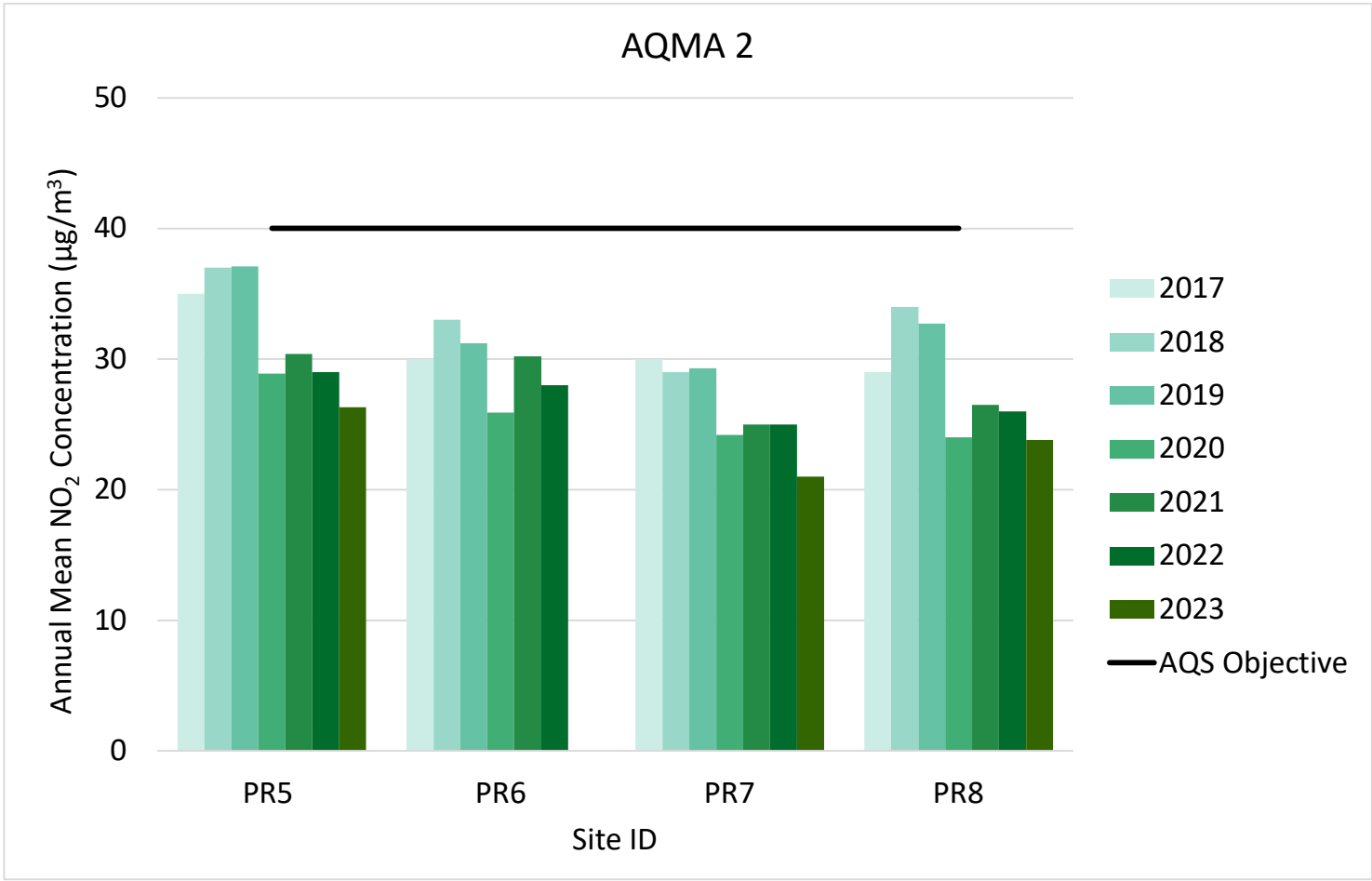
(2) Data capture for the full calendar year (e.g. if monitoring was carried out for 6 months, the maximum data capture for the full calendar year is 50%).

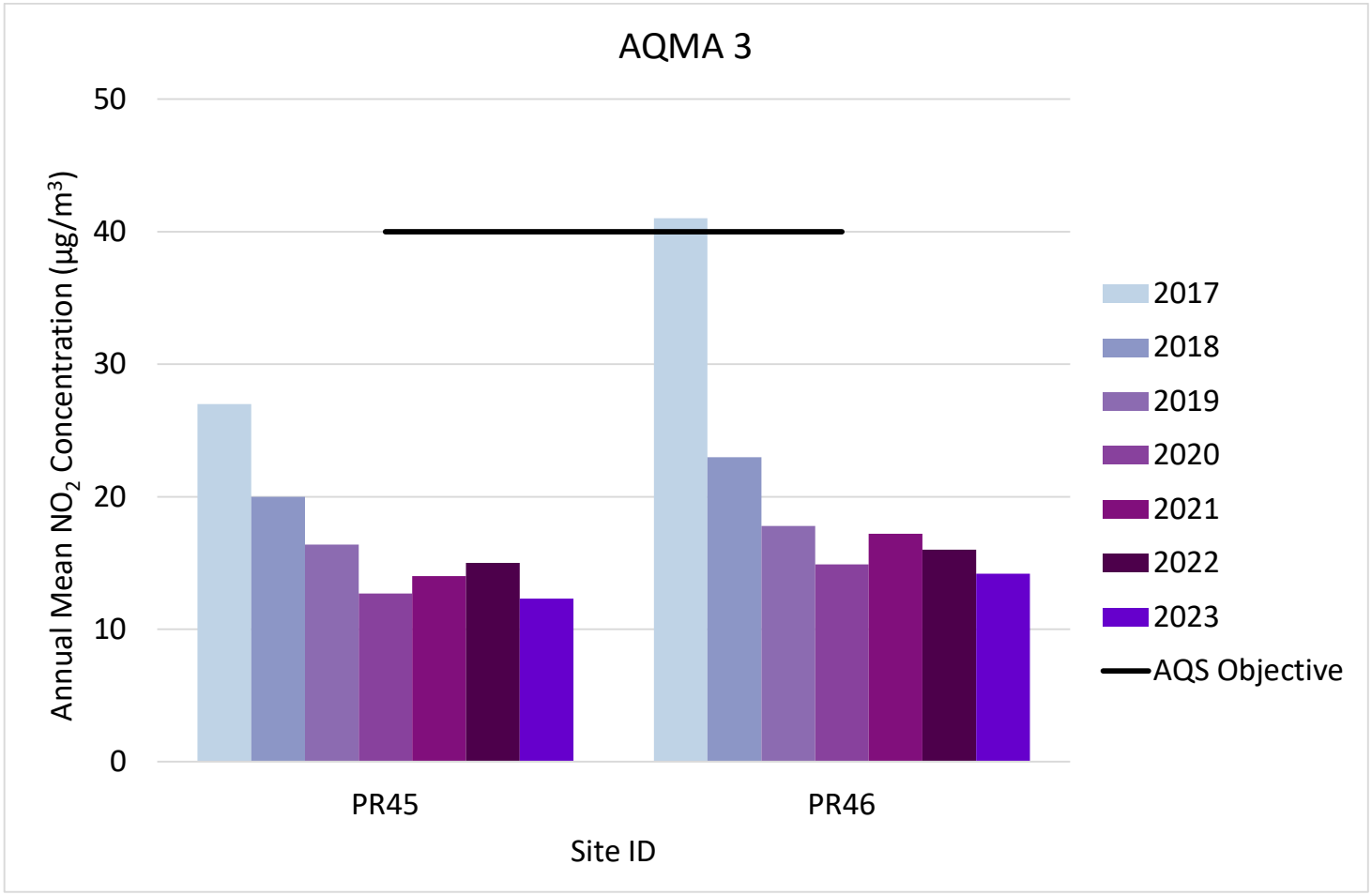
(3) Data capture is below 25% therefore no annualisation has been undertaken as per LAQM.TG22 and data has not been presented.

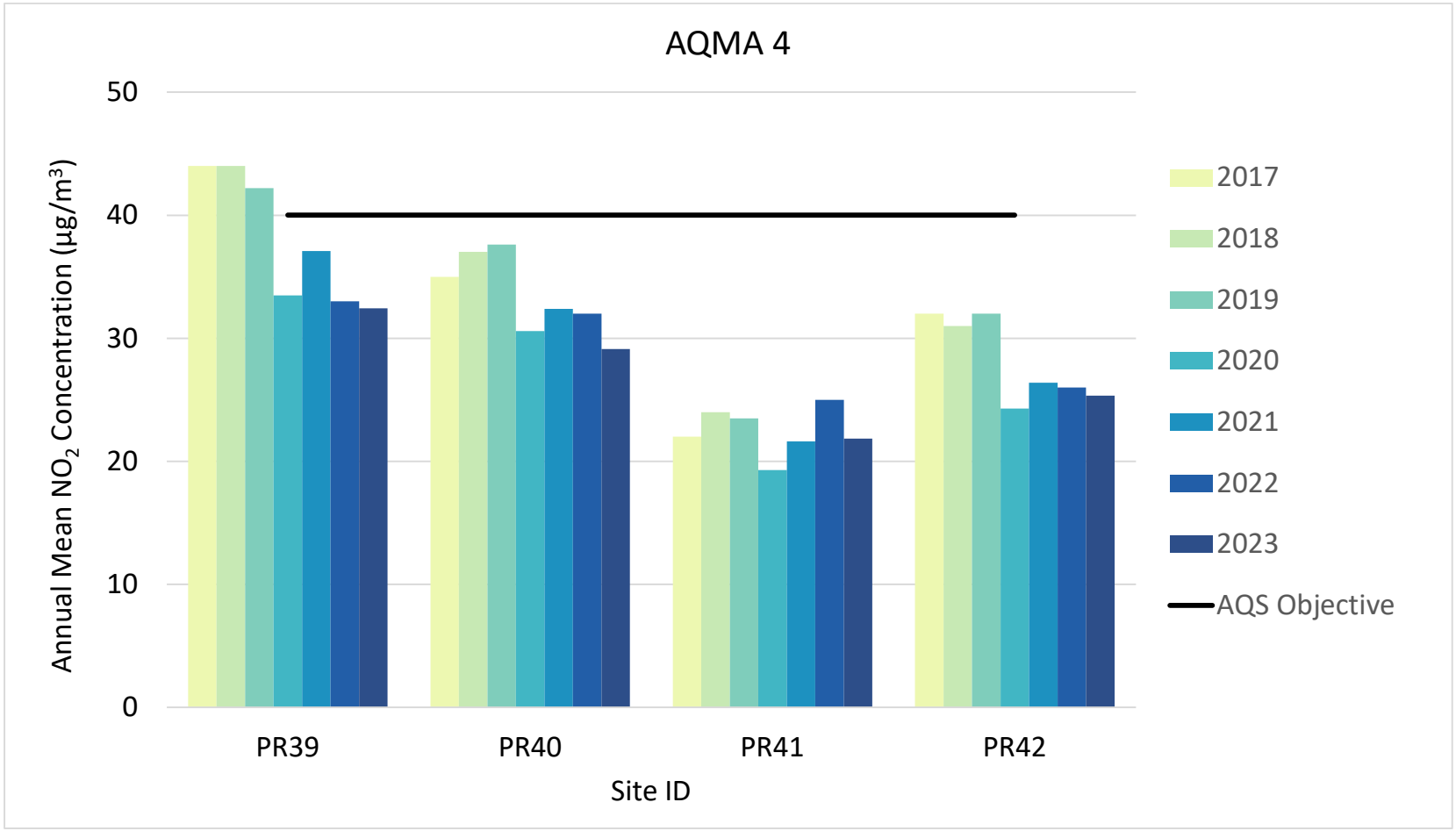
Figure A.1 – Trends in Annual Mean NO_2 Concentrations

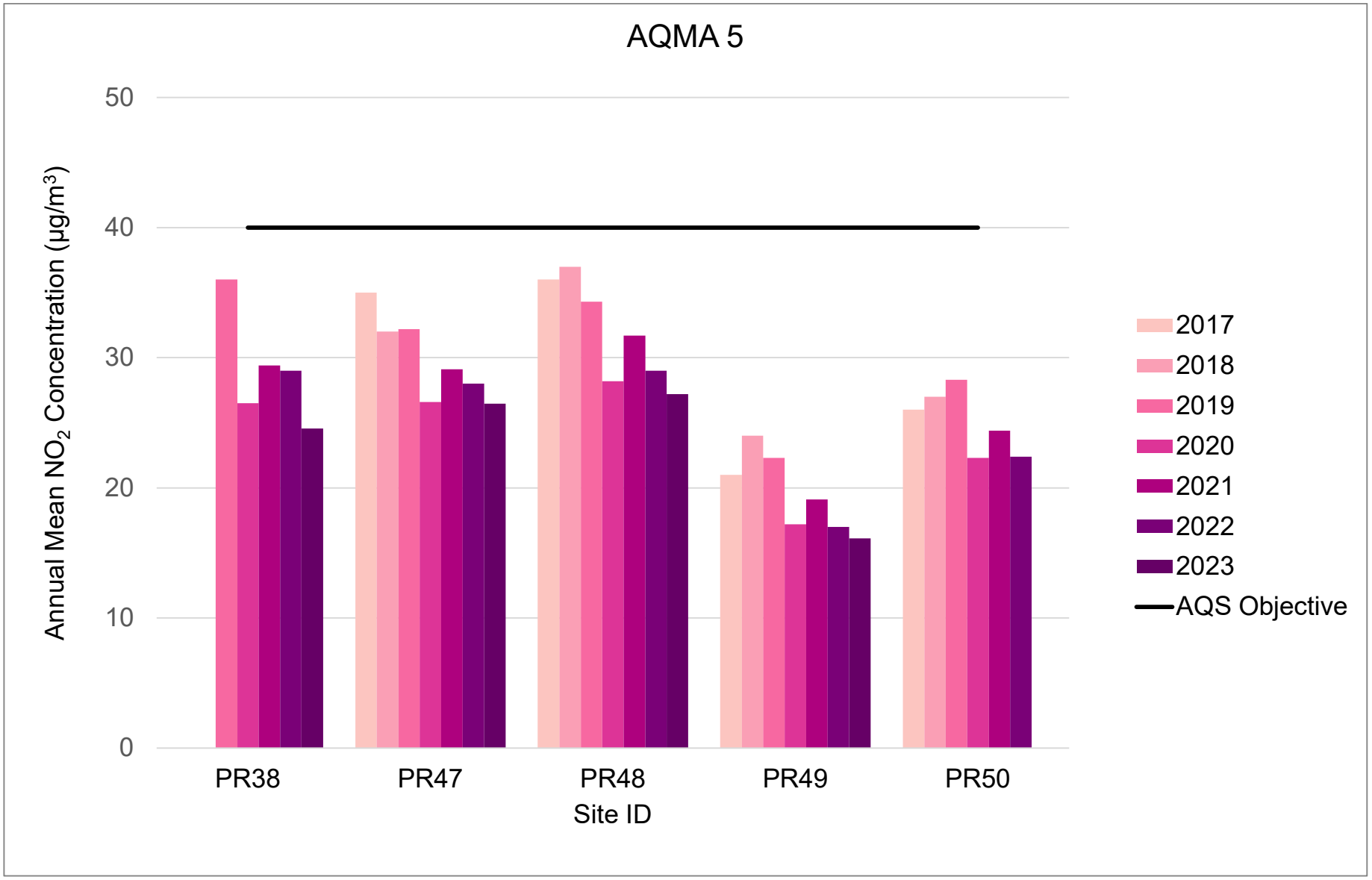


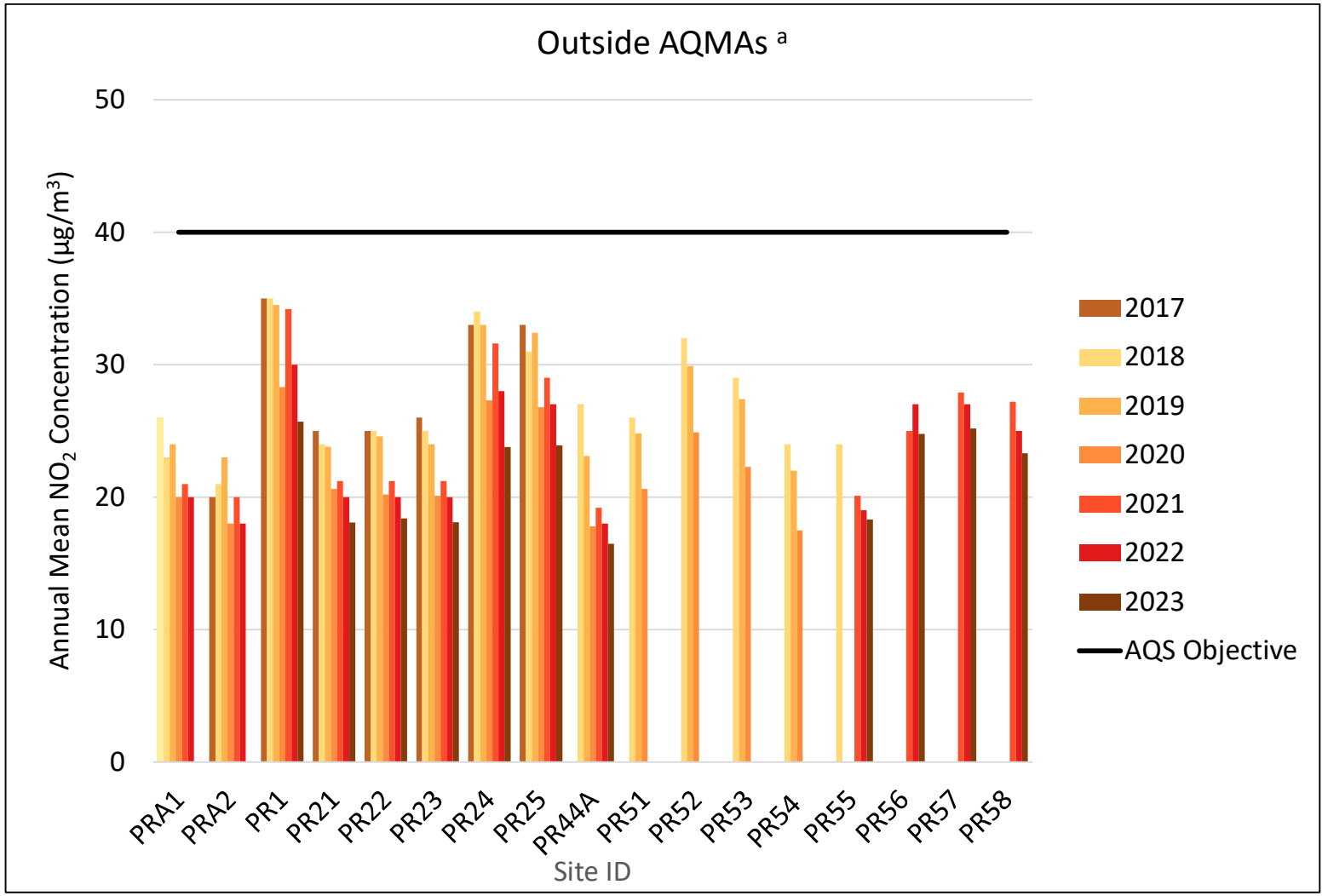
[a] Monitoring at PR10 ended at the end of 2022, and monitoring at site PR9 recommenced at the beginning of 2023 (having not been operational since 2017).


AQMA 2
50
40
30
20
10
0
Annual Mean NO2 Concentration (µg/m3)
PR5
PR6
PR7
PR8
Site ID
2017
2018
2019
2020
2021
2022
2023
AQS Objective


AQMA 3
50
40
30
20
10
0
Annual Mean NO2 Concentration (µg/m3)
PR45
PR46
Site ID
2017
2018
2019
2020
2021
2022
2023
AQS Objective


AQMA 4
50
40
30
20
10
0
Annual Mean NO2 Concentration (µg/m3)
PR39
PR40
PR41
PR42
Site ID
2017
2018
2019
2020
2021
2022
2023
AQS Objective


AQMA 5
Annual Mean NO2 Concentration (µg/m3)
50
40
30
20
10
0
PR38
PR47
PR48
PR49
PR50
Site ID
2017
2018
2019
2020
2021
2022
2023
AQS Objective



[a] New diffusion tube monitoring sites PR26, PR27, PR28, and PR29 have not been included in the graph due to having one year of monitoring data only.

Table A.5 – 1-Hour Mean NO_2 Monitoring Results, Number of 1-Hour Means > 200µg/m^3

Site 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
PRA1	354138	429863	Roadside	99.5	99.5	0	0	0	0	0
PRA2	355250	430126	Urban Background	98.4	98.4	0	0	0	0	0

Notes:

Results are presented as the number of 1-hour periods where concentrations greater than 200µg/m^3 have been recorded.

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**.

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 ($\mu g/m^3$)

Site 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
PRA2	355250	430126	Urban Background	99.9	99.9	12	13	13	14	12

☒ **Annualisation has been conducted where data capture is <75% and >25% in line with LAQM.TG22 (not required)**

Notes:

The annual mean concentrations are presented as $\mu g/m^3$.

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

All means have been "annualised" as per LAQM.TG22 if 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%).

Figure A.2 – Trends in Annual Mean PM_{10} Concentrations

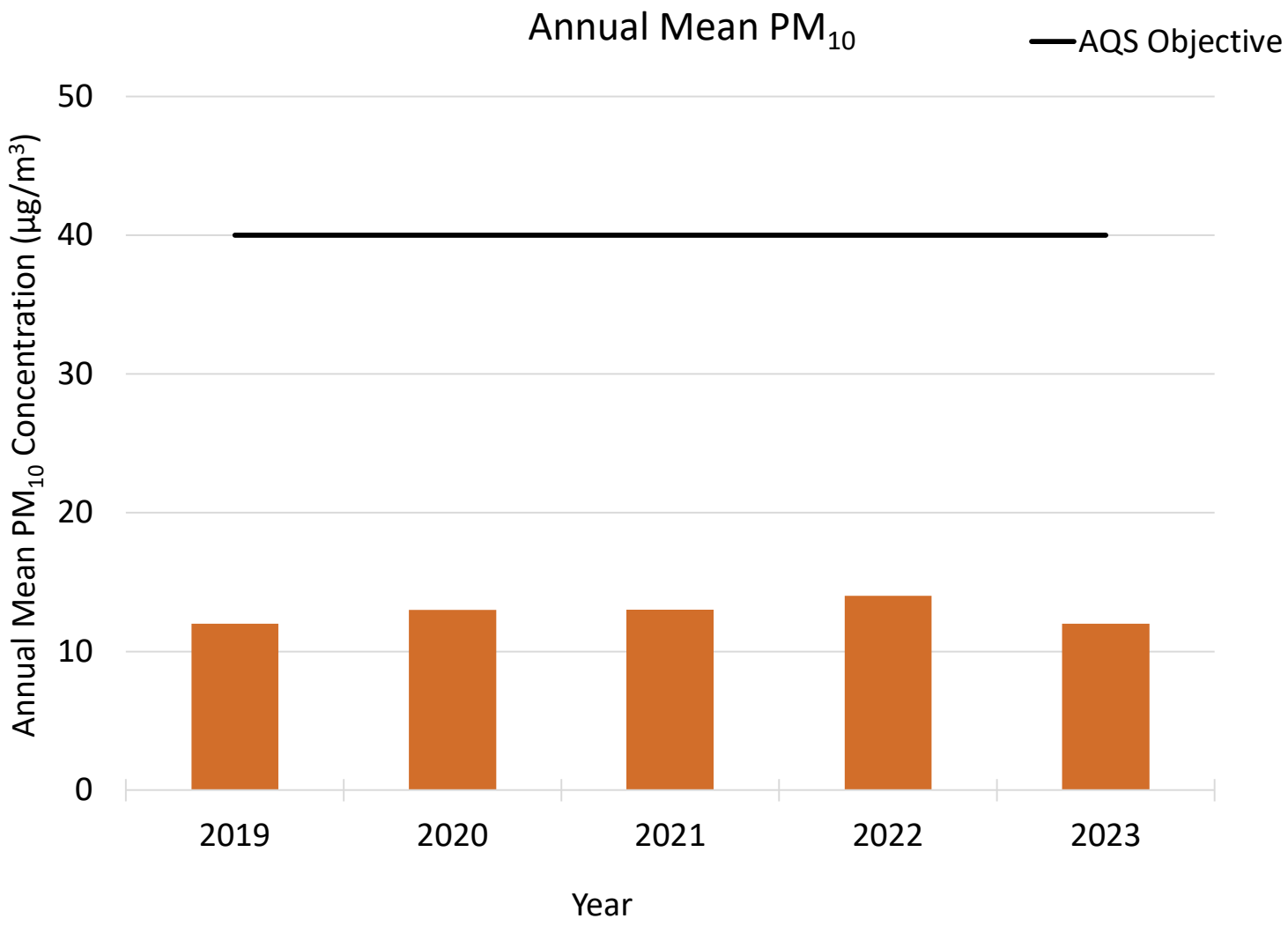


Table A.7 – 24-Hour Mean PM_{10} Monitoring Results, Number of PM_{10} 24-Hour Means > 50µg/m^3

Site 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
PRA2	355250	430126	Urban Background	99.9	99.9	0	0	0	4	0

Notes:

Results are presented as the number of 24-hour periods where daily mean concentrations greater than 50µg/m^3 have been recorded.

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**.

If the period of valid data is less than 85%, the 90.4th 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	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
PRA2	355250	430126	Urban Background	99.9	99.9	9	7	8	8	7

☒ **Annualisation has been conducted where data capture is <75% and >25% in line with LAQM.TG22 (not required)**

Notes:

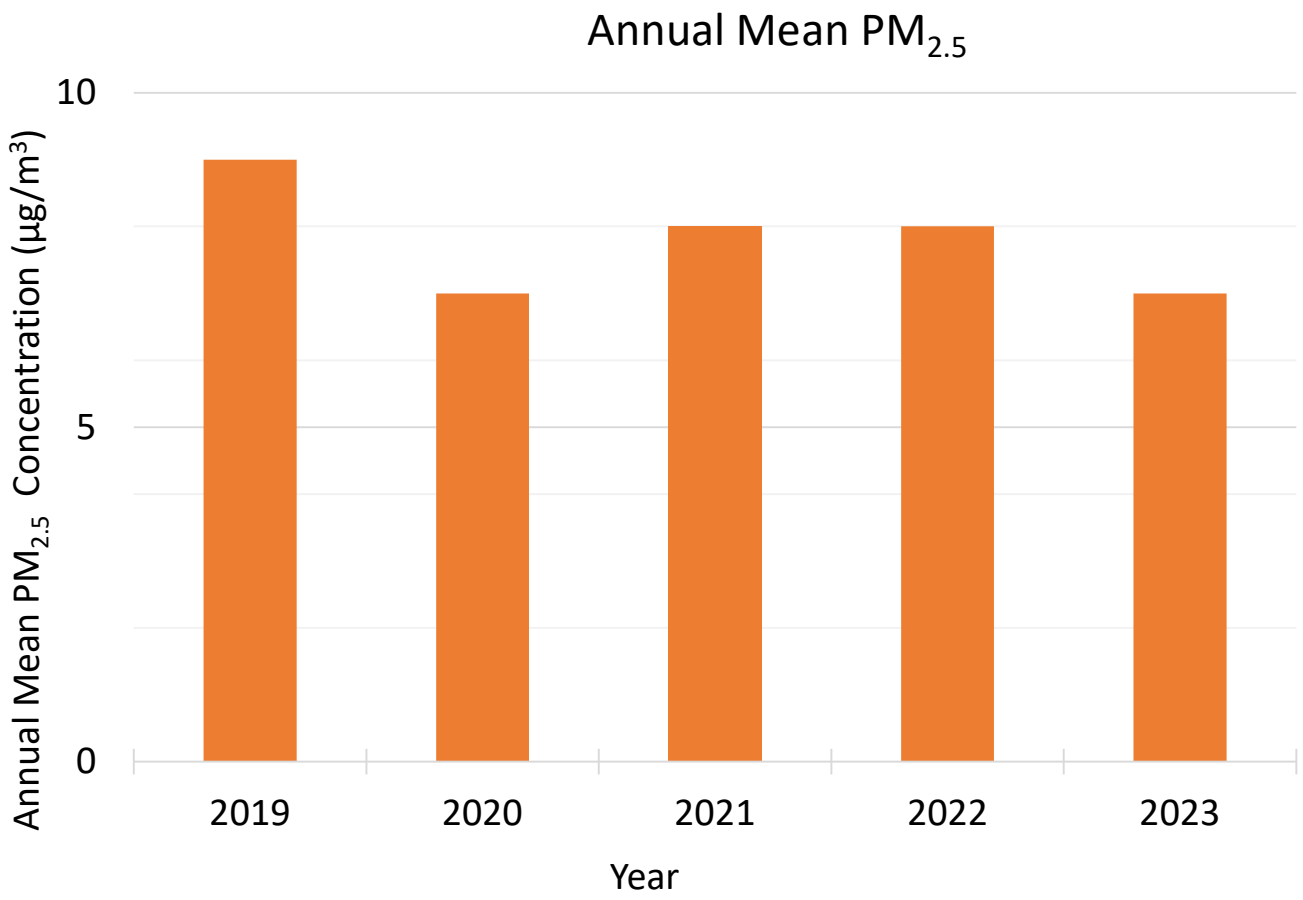
The annual mean concentrations are presented as µg/m^3.

All means have been "annualised" as per LAQM.TG22 if 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%).

Figure A.3 – Trends in Annual Mean $PM_{2.5}$ Concentrations



Appendix B: Full Monthly Diffusion Tube Results for 2023

Table B.1 – NO_2 2023 Diffusion Tube Results ($\mu g/m^3$)

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: Annualised and Bias Adjusted (0.82)	Annual Mean: Distance Corrected to Nearest Exposure	Comment
PR1	354307	429769		35.21		29.28	29.87	32.99			32.96			31.21	31.9	25.7		
PR5	353072	431014	44.16	32.13	36.28	29.16	23.47	30.01	22.79	31.16	32.31	31.99	42.45	31.45	32.1	26.3		
PR6	353085	431045	43.08												43.1	35.3		
PR7	353111	431080			29.34	22.88	18.22	25.09	18.37	26.92		28.97	35.58	26.86	25.6	21.0		
PR8	353054	431095	38.67	30.86	31.47	29.12	25.78	24.64	17.07	28.87	26.79	32.08	41.61	27.15	29.1	23.8		
PR9	354555	429624	35.09	31.22	29.54	25.42	21.00	21.76	18.58			28.37	37.69		27.3	22.4		
PR21	354138	429864	33.59	21.00	23.13	18.28	12.49	19.15	16.24		23.27	23.62	31.21	22.32	22.1	18.1		
PR22	354138	429864	33.34	21.39	22.48	18.64	13.19	18.90	16.41		24.52	24.87	31.83	22.56	22.4	18.4		
PR23	354138	429864	35.09	21.37	22.18	17.87	12.98	19.82	16.02		23.48	23.36	30.00	22.58	22.1	18.1		
PR24	354775	431481		32.54	29.53	28.50	22.65	30.51	21.71	31.79	28.61	31.00	38.71	27.18	29.0	23.8		
PR25	354751	431521		33.09	30.61	29.55	25.67	31.48	19.04	29.19	28.23		39.17	29.61	29.2	23.9		
PR26	358281	433958				13.21	10.38	12.76	8.45	13.78	14.42	18.29	21.65	15.42	14.1	11.6		
PR27	358317	434171				22.43	18.95	20.92	14.38	21.28	21.45	24.70	31.07	21.67	21.6	17.7		
PR28	358918	434469				22.41	20.54	17.66	14.88	22.98	19.48		29.79		20.7	18.3		
PR29	359347	434644				12.98	10.86	12.68	8.88	14.24	13.99	17.43	22.78	15.98	14.2	11.7		
PR44A	352808	435283	26.97	17.35	25.54	16.10		17.07	12.26	19.47	19.92	22.46	26.98	18.31	20.1	16.5		
PR45	352471	435012	33.15	15.45	15.80	16.69	9.26	9.74	4.21	12.77	12.98	15.40	24.52	14.62	15.0	12.3		
PR46	352483	435006	28.67	21.07	19.25	12.04	13.26	12.94	10.07	15.93	15.41	18.68	26.35	17.35	17.3	14.2		
PR39	354841	429594	49.23	47.93	37.53	38.13	38.94		31.87	40.24	38.24	35.18	43.84	39.31	39.6	32.4		
PR40	354880	429594	44.32	45.33	34.25	33.97	32.61	32.88	27.61	34.94	34.89	34.66	39.34	35.82	35.5	29.1		
PR41	355556	429906	39.31	26.76	23.30		21.77	23.79	16.93	26.33		29.33	35.40	27.56	26.6	21.8		
PR42	355585	429908	40.34	35.71	26.55	28.24	26.88	24.79			28.44	32.67	38.60	29.59	30.9	25.3		
PR38	355070	429198	44.99	29.08	33.29	26.14	20.98	29.18	22.99	27.88	30.48	31.82	36.54	27.46	29.9	24.6		
PR47	355124	429106	49.54	39.46	31.67	30.85	29.64	28.84	21.32	30.67	27.19	30.19	41.78	32.62	32.3	26.5		
PR48	355015	429282	42.32	36.82	31.78		31.08	30.16	22.46	32.25	29.37	38.28	44.46	31.77	33.2	27.2		
PR49	354849	429437	27.87	23.14	13.63	20.16	18.43	16.02	13.05	19.96	16.71	22.57	29.05	20.40	19.7	16.1		
PR50	355038	429207		28.78						23.34			36.26	24.55	28.2	22.7		

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: Annualised and Bias Adjusted (0.82)	Annual Mean: Distance Corrected to Nearest Exposure	Comment
PR55	352400	429950	32.19	23.29	20.12	20.42			12.91	21.47	19.46	24.78	31.68	22.06	22.3	18.3		
PR56	352442	430000	41.77	34.89	31.06	32.57	31.28	27.88	14.78	30.76	27.78	31.63	39.27	26.41	30.2	24.8		
PR57	352465	429971	39.9	33.27	34.24	29.57	23.78	26.51	21.34	31.22	31.16	31.12	38.82		30.7	25.2		
PR58	352644	430082	39.39	33.17	30.98	32.25	20.8	24.17	16.97	28.79	23.67	31.90	36.35	28.11	28.4	23.3		

☒ **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 (not required).**

☒ **Preston City 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.

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

New or Changed Sources Identified Within Preston City Council During 2023

Preston City Council has identified the Western Distributor Road (completed summer 2023) as a potential new road source. There are currently no potential receptors within 20 m of the Western Distributor Road. The road is designed to help relieve congestion on the network, especially access to the motorway at junctions one and three of the M55, and on routes through Preston. The Full Business Case for the Road assumes a net positive impact on air quality[10]. Any future development will be appraised through the planning application process.

Additional Air Quality Works Undertaken by Preston City Council During 2023

Preston City Council has not completed any additional works within the reporting year of 2023.

As detailed above, Preston City Council is working with Lancashire County Council to develop transport plans for the city centre that benefit air quality.

QA/QC of Diffusion Tube Monitoring

The NO_2 diffusion tubes used for monitoring in 2023 were provided and analysed by Gradko International Ltd. The preparation method was 20% TEA in water. Gradko participate in the AIR-PT scheme which is an independent analytical proficiency-testing (PT) scheme, operated by LGC Standards and supported by the Health and Safety Executive (HSE). In 2023 Gradko had 100% of results determined to be 'Satisfactory' in each of the four rounds.

[10] Lancashire County Council (2019) Preston Western Distributor Road Full Business Case. Available: https://lancashirelep.co.uk/wp-content/uploads/2019/06/Appendix-Z-B2237517-Preston-Western-Distributor-ME-Plan-Rev03c.pdf

Diffusion Tube Annualisation

All diffusion tubes (except PR1, PR6, PR28, and PR50) within Preston City Council recorded data capture of 75% or above, meaning annualisation was not required. Sites PR1, PR28 and PR50 had data capture of 50%, 58%, and 33% respectively, thus required annualisation. Site PR6 recorded only 8.3% data capture, therefore there was insufficient data to annualise the tube.

Table C.1 – Annualisation Summary (concentrations presented in µg/m^3)

Site ID	Annualisation Factor Preston Bootle	Annualisation Factor Blackpool Marton	Average Annualisation Factor	Raw Data Annual Mean	Annualised Annual Mean
PR1	0.981	0.988	0.984	31.9	31.4
PR28	1.056	1.100	1.078	20.7	22.3
PR50	0.981	0.988	0.984	28.2	27.7

Diffusion Tube Bias Adjustment Factors

The diffusion tube data presented within the 2023 ASR have been corrected for bias using an adjustment factor calculated using triplicate tubes at the PRA1 Meadow Street automatic analyser. Bias represents the overall tendency of the diffusion tubes to under or over-read relative to the reference chemiluminescence analyser. LAQM.TG22 provides guidance with regard to the application of a bias adjustment factor to correct diffusion tube monitoring. Triplicate co-location studies can be used to determine a local bias factor based on the comparison of diffusion tube results with data taken from NO_x/NO_2 continuous analysers. Alternatively, the national database of diffusion tube co-location surveys provides bias factors for the relevant laboratory and preparation method.

Preston City Council have applied a local bias adjustment factor of 0.82 to the 2023 monitoring data to be consistent with the approach in previous years. A summary of bias adjustment factors used by Preston City Council over the past five years is presented in Table C.2. The local factor (0.82) is slightly higher than the National Bias Adjustment Factor for 2023 (0.81 - see below), providing a worst-case approach to bias adjustment.

Table C.2 – Bias Adjustment Factor

Monitoring Year	Local or National	If National, Version of National Spreadsheet	Adjustment Factor
2023	Local	-	0.82
2022	Local	-	0.87

2021	Local	-	0.89
2020	Local	-	0.87
2019	Local	-	0.94

Table C.3 – Local Bias Adjustment Calculation

	Local Bias Adjustment Input 1
Periods used to calculate bias	11
Bias Factor A	0.82 (0.76 - 0.88)
Bias Factor B	22% (13% - 31%)
Diffusion Tube Mean (µg/m^3)	22
Mean CV (Precision)	2
Automatic Mean (µg/m^3)	18
Data Capture	99%
Adjusted Tube Mean (µg/m^3)	18 (17 – 20)

Notes:

A single local bias adjustment factor has been used to bias adjust the 2023 diffusion tube results.

National Diffusion Tube Bias Adjustment Spreadsheet Studies for 2023 (Gradko / 20% TEA in water) (Spreadsheet Version Number: 09/24)

National Diffusion Tube Bias Adjustment Factor Spreadsheet — Spreadsheet Version Number: 09/24

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 spreadsheet 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 March 2025

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	Step 2: Select a Preparation Method from the Drop-Down List	Step 3: Select a Year from the Drop-Down List	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 shown in blue at the foot of the final column. If you have your own co-location study then see footnote. If uncertain what to do then contact the Local Air Quality Management Helpdesk at LAQMHelpdesk@bureauveritas.com or 0800 0327953							
Analysed By	Method	Year	Site Type	Local Authority	Length of Study (months)	Diffusion Tube Mean Conc. (Dm) (µg/m3)	Automatic Monitor Mean Conc. (Cm) (µg/m3)	Bias (B)	Tube Precision	Bias Adjustment Factor (A) (Cm/Dm)
Gradko	20% TEA in Water	2023	R	Monmouthshire County Council	11	33	26	26.5%	G	0.79
Gradko	20% TEA in water	2023	R	Blackburn With Darwen Bc	12	23	16	43.8%	G	0.70
Gradko	20% TEA in water	2023	R	Lancaster City Council	10	35	27	28.6%	G	0.78
Gradko	20% TEA in water	2023	R	Eastleigh Borough Council	12	33	26	26.4%	G	0.79
Gradko	20% TEA in water	2023	R	Eastleigh Borough Council	12	22	19	12.5%	G	0.89
Gradko	20% TEA in water	2023	R	Plymouth City Council	12	35	26	38.3%	S	0.72
Gradko	20% TEA in water	2023	R	Plymouth City Council	10	39	31	24.2%	S	0.80
Gradko	20% TEA in water	2023	UC	Belfast City Council	10	26	19	38.3%	G	0.72
Gradko	20% TEA in water	2023	R	Cheshire West And Chester	12	35	32	10.0%	G	0.91
Gradko	20% TEA in water	2023	R	Cheshire West And Chester	10	32	28	14.6%	G	0.87
Gradko	20% TEA in water	2023	R	Dudley Mbc	12	27	23	17.1%	G	0.85
Gradko	20% TEA in water	2023	UB	Dudley Mbc	12	19	13	45.4%	G	0.69
Gradko	20% TEA in water	2023	R	Dudley Mbc	12	40	37	7.7%	G	0.93
Gradko	20% TEA in water	2023	R	Gateshead Council	12	23	20	17.7%	G	0.85
Gradko	20% TEA in water	2023	R	Gateshead Council	11	23	18	26.9%	G	0.79
Gradko	20% TEA in water	2023	R	Gateshead Council	12	27	22	20.7%	G	0.83
Gradko	20% TEA in water	2023	R	Gateshead Council	12	29	23	25.9%	G	0.79
Gradko	20% TEA in water	2023	R	Gateshead Council	12	30	33	-7.8%	G	1.08
Gradko	20% TEA in water	2023	KS	Marylebone Road intercomparison	11	45	38	20.3%	G	0.83
Gradko	20% TEA in water	2023	B	South Holland District Council	10	8	7	12.4%	G	0.89
Gradko	20% TEA in water	2023	R	Worcestershire	12	12	12	3.3%	G	0.97
Gradko	20% TEA in Water	2023	R	Ards And North Down Borough Council	12	33	21	60.2%	G	0.62
Gradko	20% TEA in Water	2023	R	Lisburn & Castlereagh City Council	11	24	20	22.1%	G	0.82
Gradko	20% TEA in water	2023	R	Nottingham City Council	11	30	21	41.8%	G	0.71
Gradko	20% TEA in water	2023	R	Belfast City Council	12	46	35	29.3%	G	0.77
Gradko	20% TEA in water	2023	R	Belfast City Council	12	25	21	18.6%	G	0.84
Gradko	20% TEA in water	2023	R	Belfast City Council	12	37	28	30.2%	G	0.77
Gradko	20% TEA in water	2023		Overall Factor (27 studies)					Use	0.81

NO_2 Fall-off with Distance from the Road

Wherever possible, monitoring locations are representative of exposure. However, where this is not possible, the NO_2 concentration at the nearest location relevant for exposure has been estimated using the Diffusion Tube Data Processing Tool/NO_2 fall-off with distance calculator available on the LAQM Support website. Where appropriate, non-automatic annual mean NO_2 concentrations corrected for distance are presented in Table B.1.

No diffusion tube NO_2 monitoring locations within Preston City Council required distance correction during 2023 as all sites not representative of exposure were below 36µg/m^3.

QA/QC of Automatic Monitoring

Bootle Street AURN – DEFRA, through the use of its designated contractors, carry out the QA/QC function for this air quality station. Preston City Council was the contracted Local Site Operative in 2023 and carried out calibrations on a monthly basis.

Meadow Street – Air Quality Data Management are contracted to carry out the QA/QC of the raw data and Enviro Technology Services maintain the air quality station. Preston City Council carries out calibrations of the monitor on a monthly basis.

Live and historic data are available at the http://www.ukairquality.net/ web site.

PM_{10} and $PM_{2.5}$ Monitoring Adjustment

The type of PM_{10} and $PM_{2.5}$ monitors utilised within Preston City Council do not currently require the application of a correction factor.

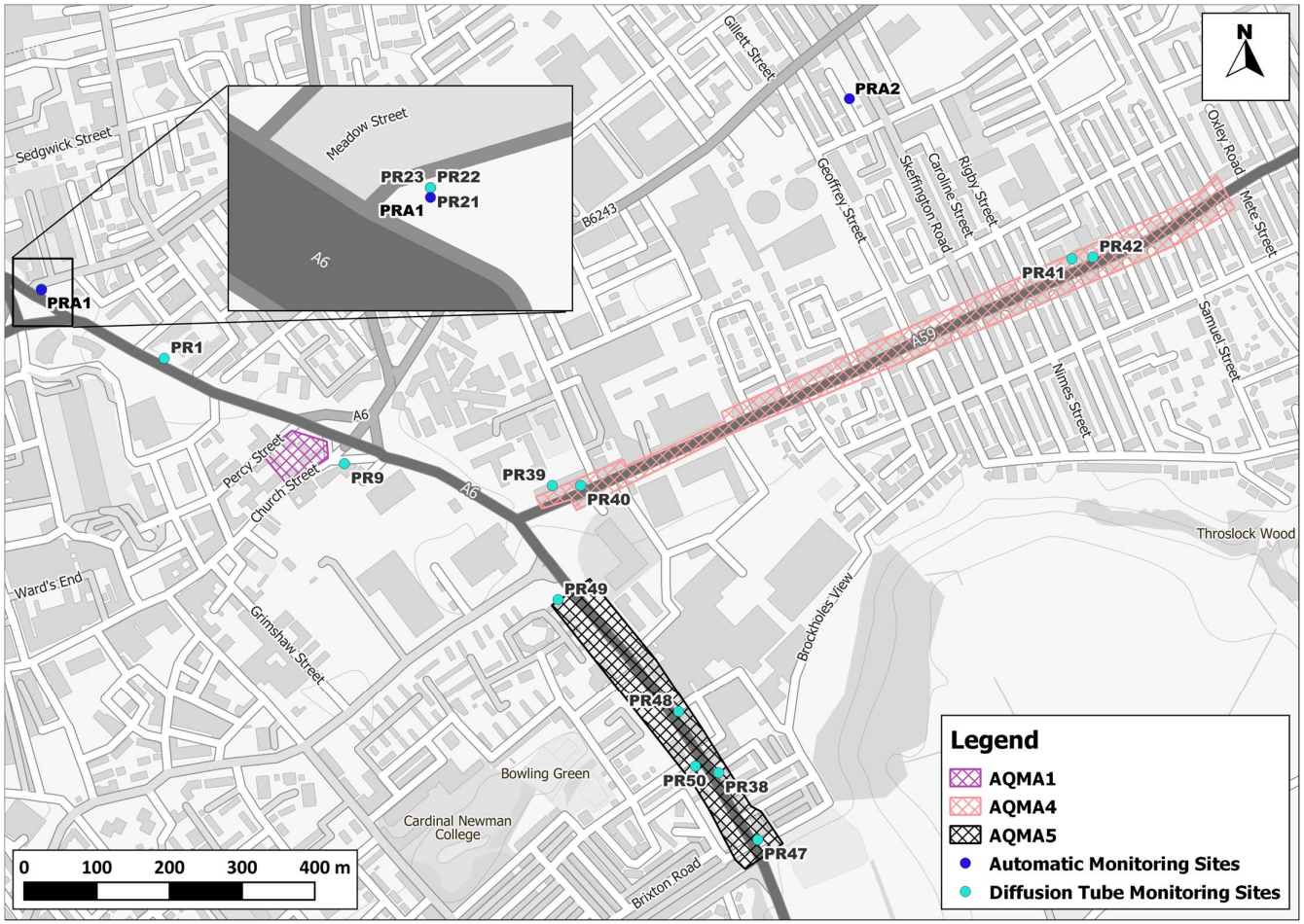
Automatic Monitoring Annualisation

All automatic monitoring locations within Preston recorded data capture of at least 75% therefore annualisation was not required.

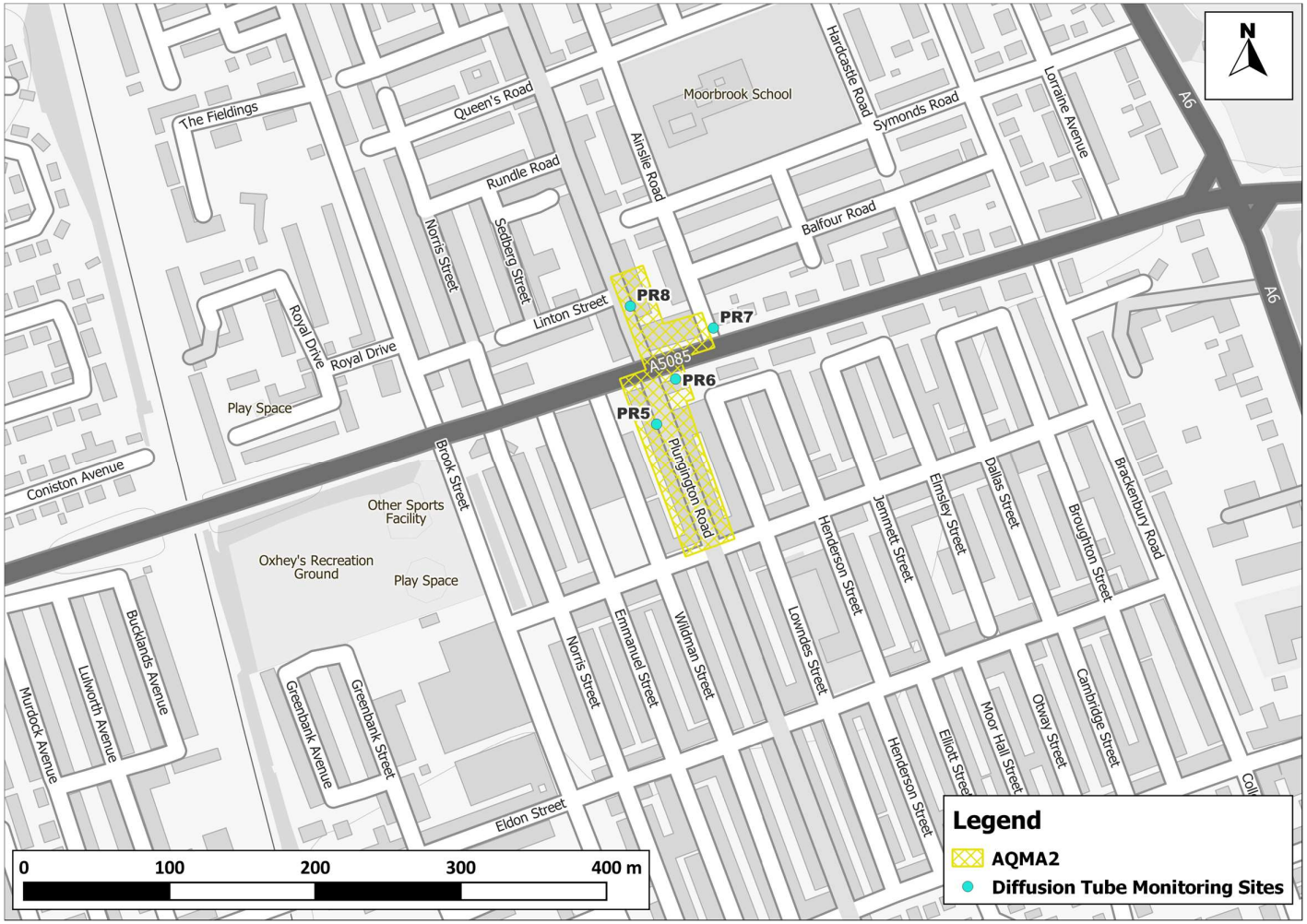
NO_2 Fall-off with Distance from the Road

No automatic NO_2 monitoring locations within Preston City Council required distance correction during 2023.

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



Additional data sourced from third parties, including public sector information licensed under the Open Government Licence v3.0.



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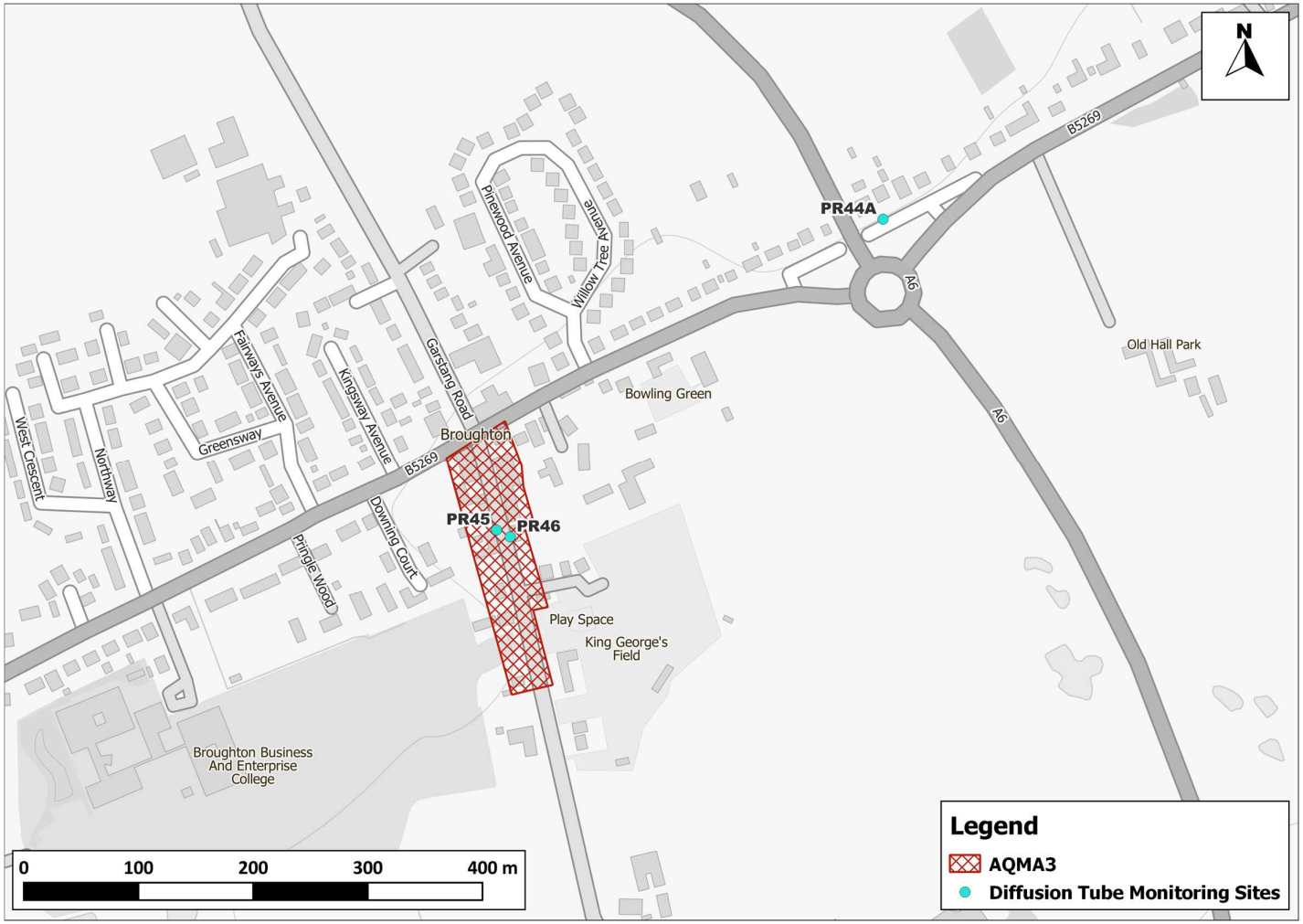
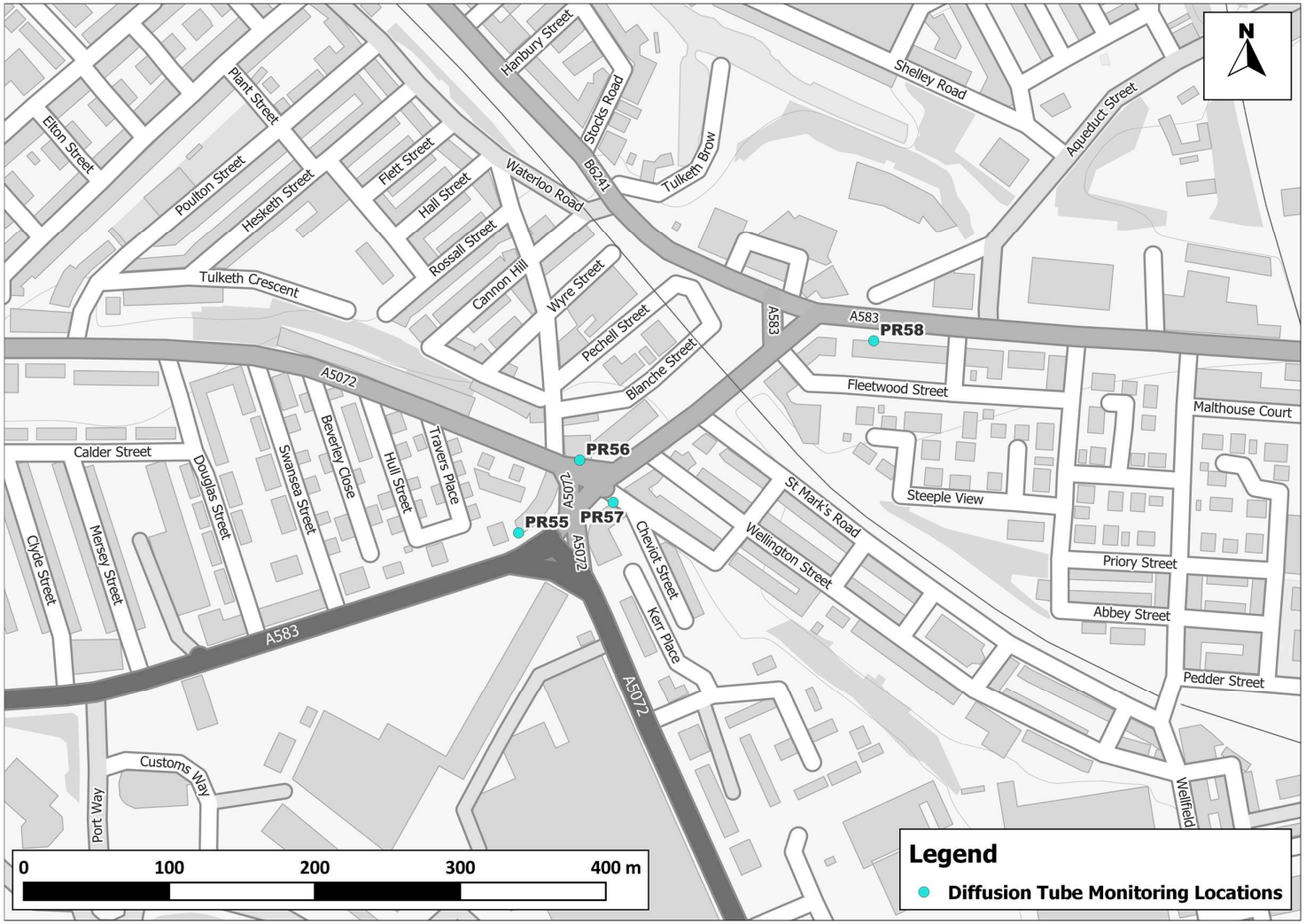
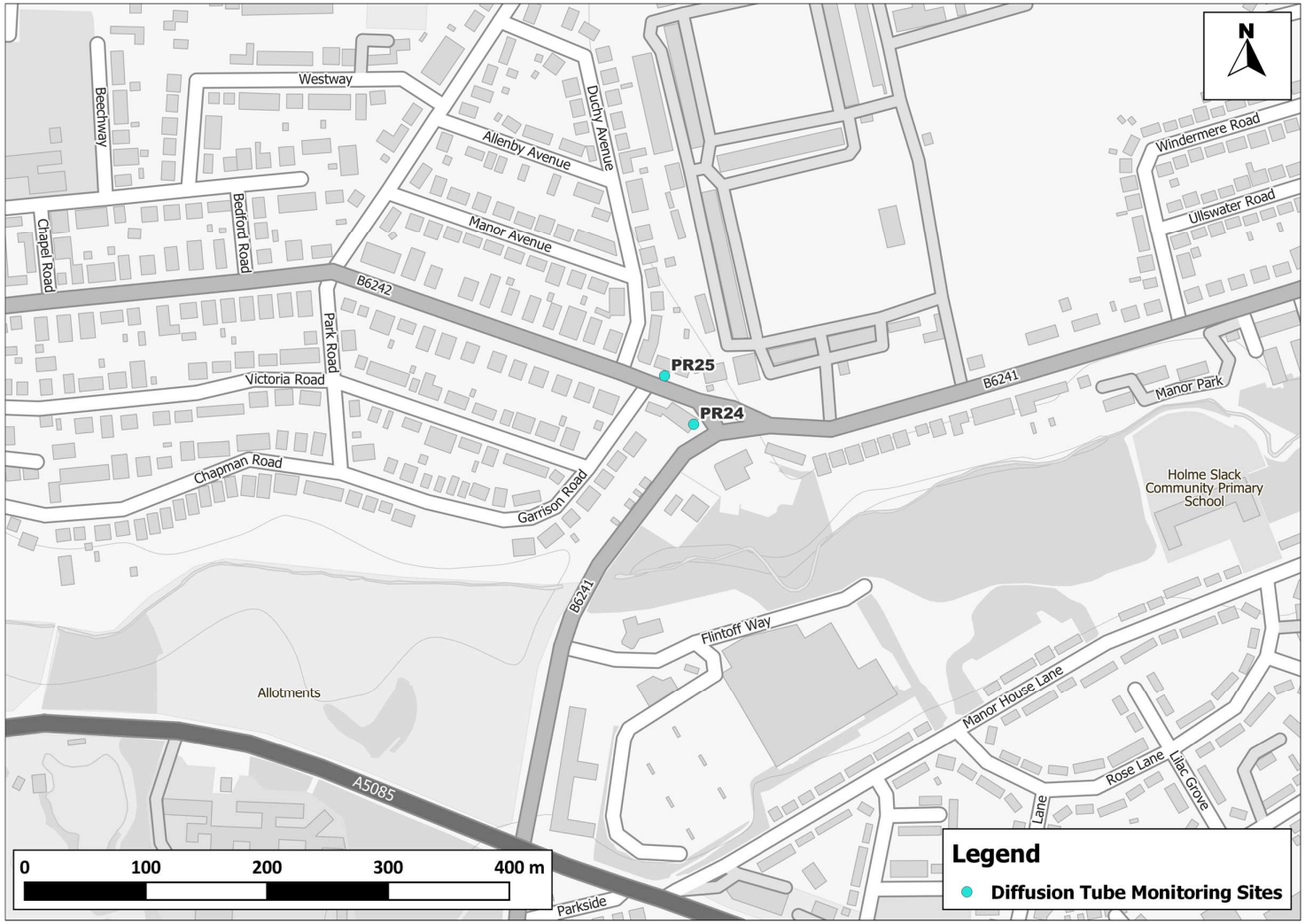




Additional data sourced from third parties, including public sector information licensed under the Open Government Licence v3.0.



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Appendix E: Summary of Air Quality Objectives in England

Table E.1 – Air Quality Objectives in England[11]

Pollutant	Air Quality Objective: Concentration	Air Quality Objective: Measured as
Nitrogen Dioxide (NO_2)	200µg/m^3 not to be exceeded more than 18 times a year	1-hour mean
Nitrogen Dioxide (NO_2)	40µg/m^3	Annual mean
Particulate Matter (PM_{10})	50µg/m^3, not to be exceeded more than 35 times a year	24-hour mean
Particulate Matter (PM_{10})	40µg/m^3	Annual mean
Sulphur Dioxide (SO_2)	350µg/m^3, not to be exceeded more than 24 times a year	1-hour mean
Sulphur Dioxide (SO_2)	125µg/m^3, not to be exceeded more than 3 times a year	24-hour mean
Sulphur Dioxide (SO_2)	266µg/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
AURN	Automatic Urban and Rural Network
ASR	Annual Status Report
Defra	Department for Environment, Food and Rural Affairs
LCWIP	Local Cycling and Walking Infrastructure Plans
LAQM	Local Air Quality Management
LCC	Lancashire County Council
NO_2	Nitrogen Dioxide
NO_x	Nitrogen Oxides
PCC	Preston City Council
PM_{10}	Airborne particulate matter with an aerodynamic diameter of 10µm 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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