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**Herefordshire
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: October 2024

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Executive Summary: Air Quality in Our Area

Air quality in Herefordshire is improving and there have been no exceedances of the air quality standards set for the protection of human health since 2019. In 2020 and 2021 there was reduced traffic during the Covid-19 pandemic, which resulted in a reduction in pollution levels. Traffic levels have since increased although it is likely that they have not generally returned to the 2019 levels as travel patterns have changed since the pandemic. This combined with a cleaner vehicle fleet has reduced air pollution from 2021 to 2022 in most areas where it is measured. This trend has continued further allowing for a reduction from 2022 to 2023.

There are two air quality management areas in Herefordshire, declared due to high levels of nitrogen dioxide. In both air quality management areas, the levels of nitrogen dioxide detected achieved the air quality objective, with most sites in those locations being well below the objective.

The Council has been keeping a watching brief over air pollution in its district and will continue to do so in the future. It has invested in new monitoring equipment including updating the monitoring station in the Hereford air quality management area in 2022 and installing a new continuous monitoring station in the Bargates (Leominster) air quality management area in 2023.

If concentrations continue to remain below the nitrogen dioxide objective the Council will consider revoking its two air quality management areas. Update of the air quality action plans for these areas will also be kept under review.

Further information on the Council's air quality management areas is available on our website <https://www.herefordshire.gov.uk/business-1/environment-pollution> and Defra's website https://uk-air.defra.gov.uk/aqma/local-authorities?la_id=126.

Air Quality in Herefordshire Council

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 year¹.

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 pollution².

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})	<p>Particulate matter is everything in the air that is not a gas.</p> <p>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.</p> <p>PM₁₀ refers to particles under 10 micrometres. Fine particulate matter or PM_{2.5} are particles under 2.5 micrometres.</p>

Herefordshire is located in the West Midlands region of England. It is bordered by five counties: Shropshire, Worcestershire, Gloucestershire, Powys and Monmouthshire. As of mid-2020, Herefordshire's resident population was estimated to be 193,615, which has increased by 1,340 since 2019. Herefordshire is one of the least densely populated areas of the United Kingdom, with residents scattered across 842 square miles.

The main pollutant of concern within Herefordshire is nitrogen dioxide (NO₂). The major source of this pollutant in Herefordshire is vehicle emissions, specifically the emissions

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

from the A49 Road through Hereford, and from the A44 at the Bargates Road junction in Leominster.

Concentrations of NO₂ have decreased at all monitoring locations in Herefordshire since 2019 where data was available, and these trends have continued from 2021 to 2023 at most locations. Measured NO₂ concentrations at 37 of the 53 monitoring sites in Herefordshire reduced in 2023 from 2022 levels. At 4 monitoring sites concentrations increased (see Appendix A: Monitoring Results for more information). Although there have been some increases in NO₂ concentrations between 2021 and 2022 this is attributed to a return in traffic levels following COVID-19 lockdowns. There were no exceedances of the air quality objective for NO₂ recorded in 2023, with many monitoring locations recording NO₂ results well below this level. There is considered to be little risk of these sites exceeding the national standards.

In Herefordshire, there are two Air Quality Management Areas (AQMA's) declared due to levels of NO₂ exceeding national standards (40µg/m³). The AQMAs cover parts of the A49 Road through Hereford and the Bargates Road junction in Leominster.

In 2023, the ratified continuous monitored NO₂ annual mean concentration was 29µg/m³ in the Hereford AQMA (site HRD1, in Victoria Street) and 20µg/m³ in the Bargate AQMA (Site LEO1, in Leominster). NO₂ is also measured in the Hereford AQMA using passive diffusion tubes. This is an indicative method which is less accurate than the continuous monitor. The maximum concentration measured using diffusion tubes in the Hereford AQMA was 34.7 µg/m³ (site 121, Eign Street South, Hereford (Brother Barbers)).

NO₂ concentrations in the Bargates AQMA are monitored at 7 locations. The highest annual mean concentration in 2023 was 33.8µg/m³ (35 Bargates, Leominster (A44)).

Further information related to Herefordshire's declared AQMAs can be found on our website <https://www.herefordshire.gov.uk/business-1/environment-pollution> and Defra's website https://uk-air.defra.gov.uk/aqma/local-authorities?la_id=126.

Actions to Improve Air Quality

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](#)³ 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](#)⁴ 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](#)⁵ 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 Hereford Air Quality Action Plan (Herefordshire Council, 2008) was published in 2008. The action plan includes road improvements, traffic management, park and ride schemes, parking strategies, increased cycling routes and facilities, increased pedestrian enhancement, behavioural change and increased public awareness regarding the benefits of active travel.

When the action plan was agreed the maximum measured concentration of NO₂ in the AQMA was 47.0µg/m³. In 2023, the maximum measured concentration within the AQMA was 34.7µg/m³.

The Bargates Air Quality Action Plan (Herefordshire Council, 2014) was published in 2014. The main action was to improve the traffic light sequencing at the junction to reduce congestion, increase throughput, help disperse queues more effectively and therefore reduce emissions from idling vehicles at the traffic lights.

The Council has been keeping a watching brief over air pollution in its district and will continue to do so in the future. It has invested in new monitoring equipment including updating the monitoring station in the Hereford air quality management area in 2022 and has installed a new continuous monitoring station in the Bargates (Leominster) air quality management area in 2023.

³ Defra. Environmental Improvement Plan 2023, January 2023

⁴ Defra. Air Quality Strategy – Framework for Local Authority Delivery, August 2023

⁵ DfT. The Road to Zero: Next steps towards cleaner road transport and delivering our Industrial Strategy, July 2018

If concentrations continue to remain below the nitrogen dioxide objective the Council will consider revoking its two air quality management areas. It will wait until there is sufficient monitoring data to be confident that in a poor meteorological year for air quality that the objective will not be exceeded.

It will also keep under review the need for an update of the air quality action plans for the two AQMAs.

Herefordshire Council is a Unitary Authority which enables close working between all relevant Council teams involved in managing air quality. These include the Sustainability and Climate Change Team Transportation team and Public Health. There is also close working with the Environment Agency through various mechanisms including permit consultations.

Conclusions and Priorities

Herefordshire Council continue to monitor air quality throughout the county. The review of the concentrations measured indicates that the annual mean NO₂ objective was achieved in 2023 throughout Herefordshire including in both AQMAs.

Herefordshire Council is committed to working towards revoking the AQMAs at the earliest possible occasion, including commissioning a review and assessment of the data and considering possible future work to produce dispersion modelling and assess the status of the AQMAs. Should revocation be possible an Air Quality Strategy will be produced.

A number of major housing developments have been identified to meet Herefordshire's housing need along with the need to ensure appropriate infrastructure such as the Hereford Relief Road and the Leominster Relief Road. The potential impact of these developments, both individually and cumulatively, on air quality will need to be considered during the planning application stages.

Other priorities for Herefordshire include:

- Identifying and review locations in Herefordshire that may benefit from additional monitoring including considering identified sites in the core strategy.
- Review the Air Quality Plans for Herefordshire.
- Comment on planning applications for major housing road schemes in relation to air quality; and
- Continue to inspect Local Authority permitted installations.

Local Engagement and How to get Involved

The major source of air pollution in Herefordshire is from vehicle emissions.

Herefordshire is sparsely populated with over half the population living in rural areas which presents challenges for sustainable transport. However, over half of all car journeys in Hereford at peak time are less than two miles (Herefordshire Council, 2016).

Therefore, the best way for members of the public to help improve air quality is to adjust their normal travel patterns to more sustainable options where possible. This will improve air quality, public health and reduce congestion.

There is some scope to change how people travel, particularly in Hereford. By making short trips and journeys on foot or by bike instead of by car or using public transport. Car sharing with colleagues, or with other parents on the school run, are some other examples of ways to reduce traffic congestion.

Other examples include:

- Purchasing low-emission electric and/or hybrid vehicles.
- Upgrading boilers to newest and most efficient gas condensing boilers with lowest NOx (and carbon) emissions.

The Choose How You Move webpage:

[Choose how you move – Herefordshire Council](#) is a good place to find information on ways to travel sustainably and help to reduce vehicle emissions.

Further schemes run by Herefordshire Council:

[Electric vehicle charging – Herefordshire](#)

[Cycling – Herefordshire Council](#)

[Cycling – Herefordshire Council](#) – Beryl bikes

[Cycling – Herefordshire Council](#) – Dr bike

[Walks and trails – Herefordshire Council](#) -

[Walks and trails – Herefordshire Council](#)

[Walks and trails – Herefordshire Council](#)

[Walks and trails – Herefordshire Council](#)

Hereford City Council – Nov 2023 - Hereford City Council has purchased three electric buses that will run daily across Hereford city centre, providing free journeys for residents

and visitors courtesy of Stronger Towns Funding. [Hereford Zipper Bus Service – Hereford City Council](#)

Local Responsibilities and Commitment

This ASR was prepared by the Environmental Health and Trading Standards Department of Herefordshire Council.

If you have any comments on this ASR, please send them to Environmental Health and Trading Standards Team at:

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1 Local Air Quality Management

This report provides an overview of air quality in Herefordshire 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 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 Herefordshire 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 Herefordshire Council can be found in Table 2.1. The table presents a description of the two AQMAs that are currently designated within Herefordshire. 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:

- NO₂ annual mean.

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
Hereford AQMA	Declared 23/11/2001	NO ₂ Annual Mean	The A49(T) corridor in Hereford, extending from Holmer Road in the north to Belmont Road in the south and extending east along New Market/Blue School Street and west along Eign Street as far as Barton Yard.	YES	47	32	6 years	Hereford Action Plan January 2008	https://aqma.defra.gov.uk/action-plans/HC%20AQAP%202008.pdf
Bargates AQMA	Declared 01/03/2006	NO ₂ Annual Mean	An area encompassing the junction between the A44 Bargates and B4361 Dishley Street/Cursneh Road in Leominster.	YES	61	34	5 years	Bargates Action Plan January 2014	https://www.herefordshire.gov.uk/downloads/file/11220/bargates-air-quality-action-plan-2014

Note: The NO₂ concentrations shown in the table above are from the monitoring sites, within the AQMAs, where the highest concentration was reported in the year of declaration and the current year.

- Herefordshire Council confirm the information on UK-Air regarding their AQMA(s) is up to date.
- Herefordshire Council confirm that all current AQAPs have been submitted to Defra.

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

Defra's appraisal of last year's ASR concluded that the next steps for Herefordshire Council are to:

1. The two AQAPs are now nine (i.e., Hereford) and fifteen (i.e., Bargates) years old and are therefore due for review. The Council should also consider the revocation of the existing AQMAs which are between four and five years compliant. If it is determined by the Council that the AQMA is no longer required, an AQS should be prepared.
2. All graphs are well presented and are clear to read, with the addition of the AQO allowing for visual analysis of the monitoring data. Formatting is consistent between all charts. The Council have also provided a detailed discussion of these trends.
3. In Table A.1, the PM_{2.5} is missing from the 'Pollutants Monitored' column. In 2022, PM_{2.5} was also measured by HRD1 automatic monitor with a 37.7% data capture.
4. The formatting of Table B.1 is not consistent between pages 58, 59 and 60.
5. The council should have mentioned the technique (e.g., 50% Tea in acetone, etc) that has been followed to analyse of the tubes.
6. On page 63, the ASR is called '2022 ASR' instead of '2023 ASR'.
7. HC have applied a national bias adjustment factor of 0.84. A screenshot of the tool should be added so the factor can be verified.
8. HC have not discussed health outcomes attributable to particulate air pollution. It would be beneficial to include the D01-Fraction of Mortality Attributable to Particulate Air Pollution, which can be found at: <http://fingertips.phe.org.uk/public-health-outcomes-framework>.
9. The maps of monitoring locations and AQMAs are informative and well presented.
10. Overall, the report provides a good insight into the work that the Council are doing and all the current and future measures to improve local air quality.

Following this appraisal steps have been made by Herefordshire Council to ensure consistency of formatting and reporting. Discussions have been opened with the LAQM helpdesk regarding the status of the AQMAs in order to assess the status of these into the future.

Herefordshire Council has taken forward a number of direct measures during the current reporting year of 2024 in pursuit of improving local air quality. Details of all measures completed, in progress or planned are set out in Table 2.2. 25 measures are included within Table 2.2, with the type of measure and the progress Herefordshire Council have

made during the reporting year of 2024 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 Hereford Action Plan (Herefordshire Council, 2008) and Bargates Action Plan (Herefordshire Council, 2014). Key completed measures are:

- Review of air monitoring locations, consideration of the proposed development locations in the Core Strategy and assessing potential air quality impact of any development.
- Review of poultry sites referenced in Defra Policy Guidance LAQM.TG22 (Defra, 2022).

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

- Continue to monitor and review both the Hereford and Leominster AQMAs.
- Identify and review other locations in Herefordshire that may benefit from additional monitoring considering identified sites in the core strategy.
- Review the Air Quality Action Plans for Herefordshire including setting emission reduction targets and providing more discussion on the progress of each measure.
- Comment on planning applications for major housing, road schemes and industrial installations in relation to air quality.
- Continue to inspect Local Authority Permitted installations.

Herefordshire Council's priorities for the coming year are:

- Consider revocation for Herefordshire AQMA
- Review the Air Quality Action Plans for Herefordshire
- Contribute to the emerging local plan development

Herefordshire Council worked to implement these measures in partnership with the following stakeholders during 2023:

- Planners
- Sustainability and Climate Management Team
- Highways and Transportation<etc>

The principal challenges that Herefordshire Council anticipates facing are the potential impacts of major housing and infrastructure developments arising from emerging Local Plan these impacts will need to be considered during plan development and the planning application stages.

Herefordshire Council anticipates that the measures stated above and in Table 2.2 will achieve compliance in Hereford and Leominster AQMAs.

Whilst the measures stated above and in Table 2.2 will help to contribute towards compliance, Herefordshire Council anticipates being able to revoke its AQMAs in two or three years, but will continue to identify measures that will further improve air quality within its administrative area.

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	Edgar Street Grid Re-development	Traffic Management	Reduction of speed limits, 20mph zones	2009	2025	Herefordshire Council & Advantage West Midlands formed ESG Herefordshire Ltd	Mostly developer funded, along with Herefordshire Council	NO			Completed	NO2 levels at the city centre sites have been gradually reducing since 2007, although this cannot be attributed to the actual re-development,	Trends in diffusion tube results	"Old Market" retail area development completed 2015	
2	Improvement of A4103 road west of Herefordshire	Transport Planning and Infrastructure	Other	2003	2008	Herefordshire Council - Highways and Transportation Service	Herefordshire Council - Highways and Transportation Service	NO			Completed	Since 2007 NO2 levels along the Roman Road have been below the objective. Annual Average Daily Flow trends (AADT) along the Roman Road indicate a continuing increase of traffic since the completion of the improved road and an increase in HGVs until 2008 with a slight reduction in 2009.	Not Applicable	Road completed 2005	
3	Rotherwas Access Road Link	Transport Planning and Infrastructure	Other	2003	2008	Herefordshire Council - Highways and Transportation Service	Herefordshire Council - Highways and Transportation Service and Advantage West Midlands	NO			Completed	Annual Average Daily Flow trends (AADT) show a reduction in HGVs from 1045 in 2008 to 964 in 2009 however total motor vehicles has increased.	Annual Average Daily Flow trends (AADT) and diffusion tubes	Completed June 2008	
4	City Link Road Hereford	Transport Planning and Infrastructure	Other	2008	Construction complete December 2017.	Herefordshire Council - Highways and Transportation Service	Herefordshire Council	NO			Completed	NO2 levels at City centre sites have been gradually reducing since 2007	Annual Average Daily Flow trends (AADT) and diffusion tubes	Completed in 2017	

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
5	New Outer Distributer Road (3rd Link) Hereford Relief Road	Transport Planning and Infrastructure	Other	2006	Constructed by 2031	Herefordshire Council – Highways and Transportation Service	Herefordshire Council	NO			Implementation	Not Applicable	Annual Average Daily Flow trends (AADT) and diffusion tubes	Work ongoing	
6	Install and implement a new transport system on A49 and its feeder roads	Transport Planning and Infrastructure	Other	2005	Ongoing	Highway Agency and Herefordshire Council – Highways and Transportation Service	Herefordshire Council	NO			Implementation	Not Applicable	Annual Average Daily Flow trends (AADT) and diffusion tubes	Ongoing	
7	Alteration of traffic management at the Belmont Round-about Hereford	Traffic Management	Other	2005	Complete	Highway Agency	s.106	NO			Completed	The diffusion tube measurements at this roundabout were showing exceedances of the NO2 objective in 2006 and 2007 although levels were falling. However, a noticeable reduction occurred in 2008 and 2009, to a level well below the objective level.	Diffusion tube at the roundabout	Completed in 2006. New signals are now fully integrated into the Council's SCOOT system and the infrastructure improvements have greatly improved traffic movements	
8	"North & South" Park and ride Scheme in Hereford	Alternatives to private vehicle use	Bus based Park & Ride	2001	Not Applicable	Herefordshire Council – Highways and Transportation Service	Herefordshire Council	NO			Aborted	Not Applicable	Annual Average Daily Flow trends (AADT) and diffusion tubes	No longer being taken forward.	
9	Parking Strategy in Hereford to reduce commuter parking	Traffic Management	Other	2001	Not Applicable	Herefordshire Council – Highways and Transportation Service and Planning Services	Herefordshire Council	NO			Aborted	Not Applicable	Annual Average Daily Flow trends (AADT) and diffusion tubes	No longer being taken forward. Alternative parking strategy in place.	
10	Improve and increase number of cycle routes and facilities in Hereford	Transport Planning and Infrastructure	Cycle network	2004	Rotherwas Cycle Link currently in progress – Completed Dec 2013	Herefordshire Council – Highways and Transportation Service	Herefordshire Council	NO			Completed	NO2 levels at the city centre sites have been gradually reducing since 2007	Diffusion tubes	1.5km of the Great Western Way was completed in 2008 along with a cycle lane along Aylestone Hill. Connect 2 Rotherwas	

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
														Cycle Link completed.	
11	City Centre Pedestrian Enhancement in Hereford	Traffic Management	Strategic highway improvements, Re-prioritising Road space away from cars, including Access management, Selective vehicle priority, bus priority, high vehicle occupancy lane	2005	Complete	Herefordshire Council - Highways and Transportation Service	Herefordshire Council	NO			Completed	NO2 levels at Site 6 (Broad Street) and Site 59 (Widemarsh St) have remained at or below 75% of the objective for the last 5-year trend, following the introduction of the scheme. Sites 12, 13 and 14 (Edgar Street) are no longer monitored.	Diffusion tubes at Widemarsh Street, Broad Street and Edgar Street sites	Completed in 2006	
12	Behavioural Change Programme Countywide	Promoting Travel Alternatives	Workplace Travel Planning	2004	Ongoing	Herefordshire Council - Highways and Transportation Service	Herefordshire Council	NO			Implementation	Not Applicable	Diffusion tubes	Ongoing programme of promotions and initiatives. Examples include Bike ability Training and the promotion of TwoShare, Destination Herefordshire.	
13	Designation of a Traffic manager for network management Duties along the A49 in Hereford	Traffic Management	Other	2007	Complete	Highway Agency and Herefordshire Council	Herefordshire Council	NO			Completed	NO2 levels at the sites along the A49 have been gradually reducing since 2007	Diffusion tubes along A49 corridor	Completed in 2008.	
14	Continue to implement Vehicle Emission Testing in Hereford	Traffic Management	Testing Vehicle Emissions	2008	This project has been completed. No plans for further testing.	Herefordshire Council - Environmental Health and Trading Standards. Liaison with Vehicle and Operator Services Agency (VOSA)	Herefordshire Council and VOSA	NO			Completed	A continual improvement in exhaust emissions within the Hereford AQMA noted each year since 2006 / 2007.	Review of project dependent upon number of vehicles failing /	Commenced in 2000 and was carried out every year until 2007. A dramatic continual improvement in exhaust emissions within the Hereford AQMA noted each year. No	

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
														failures / 100% compliance in 2006 and 2007.	
15	Information and awareness training	Public Information	Via the Internet	2008	Ongoing	Herefordshire Council - Environmental Health and Trading Standards. Liaison with Herefordshire PCT	Herefordshire Council	NO			Implementation	Not Applicable	Number of hits on the website.	Ongoing	
16	Improvements to the traffic light sequencing at the A44/B4361 junction at Bargates Leominster	Transport Planning and Infrastructure	Other	2013	2016	Herefordshire Council - Highways and Transportation Service	Herefordshire Council, s.106	NO			Completed	No improvements	Reduction of NO2 levels at diffusion tubes	Report commissioned reviewing the best options for the junction arrangement.	
17	Improvements to cycle facilities/ routes between Morrisons Store and the Town centre Leominster	Transport Planning and Infrastructure	Cycle network	2014	2014-2016	Herefordshire Council - Highways and Transportation Service	Herefordshire Council	NO			Completed	No improvements	Reduction of NO2 levels at diffusion tubes		
18	Improvements to the public transport facilities between Morrisons Store and the Town centre Leominster	Transport Planning and Infrastructure	Other	2014	2016	Herefordshire Council - Highways and Transportation Service	Herefordshire Council, s. 106	NO			Completed	No improvements	Reduction of NO2 levels at diffusion tubes		
19	Improve and increase number of pedestrian routes and facilities in Leominster	Transport Planning and Infrastructure	Other	2014	Not Applicable	Herefordshire Council - Highways and Transportation Service	Herefordshire Council	NO			Implementation	Not Applicable	Reduction of NO2 levels at diffusion tubes	Awaiting S106 monies.	

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
20	Behavioural Change Programme	Promoting Travel Alternatives	Promotion of walking	2014	Ongoing	Herefordshire Council - Sustainability & climate change team, Nordic Walking UK	Herefordshire Council	NO	Funding specific to each project	Funding specific to each project	Implementation	Not Applicable	Reduction of NO2 levels at diffusion tubes	Work ongoing	
21	Behavioural Change Programme	Promoting Travel Alternatives	Promotion of cycling	2014	Ongoing	Herefordshire Council - Sustainability & climate change team, BikeRight!	Herefordshire Council	NO	Funding specific to each project	Funding specific to each project	Implementation	Not Applicable	Reduction of NO2 levels at diffusion tubes	Work ongoing	
22	Development of the southern Relief Road	Transport Planning and Infrastructure	Other	2011	Not set	Herefordshire Council	Herefordshire Council	NO			Implementation	Not Applicable	Reduction of NO2 levels at diffusion tubes	Ongoing	
23	Beryl Bikes Hereford	Promoting Travel Alternatives	Promotion of cycling	2019	ongoing	Herefordshire Council - Sustainability & climate change team, Beryl	Herefordshire Council	NO	Council revenue		Implementation	Not Applicable	Reduction of NO2 levels at diffusion tubes	200 Beryl Bikes 100 beryl e-bikes, 70 parking bays	
24	Support EV Charging provision Countywide	Promoting Low Emission Transport	Procuring alternative Refuelling infrastructure to promote EV recharging	2013	ongoing	Herefordshire Council - Sustainability & climate change team, consortium of LA's and Midlands Connect	Herefordshire Council	NO	Private investment, public grant (LEVI)		ongoing	Not Applicable	Reduction of NO2 levels at diffusion tubes	30 Public charge points	
25	Herefordshire's Declaration of a Climate Emergency Countywide	Policy Guidance and Development Control	other policy	2019	ongoing	Herefordshire Council - Sustainability & climate change team,	Herefordshire Council	NO	Funding specific to each project	individual measures funded on project-by project basis	ongoing		Carbon management Plan and Action Plan published	75% reduction in carbon emissions from the baseline level in 2008/09, by the end of the financial year 2025/26.	

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 Strategy⁶, 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.

There are many different sources of PM_{2.5} from natural and anthropogenic sources. Anthropogenic sources include industrial sources, road transport, off-road transport, residential sources (such as burning solid fuels and bonfires) and polluted air traveling from the continent (AQEG, 2012).

Concentrations of PM_{2.5} in Herefordshire are low. Annualised PM_{2.5} concentrations at the Leominster Bargates Road monitoring site in 2023 was 7 µg/m³. For further information on the annualisation calculations please refer to [Appendix A: Monitoring Results](#).

Defra's background mapping of total PM_{2.5} estimates concentrations between 5.7µg/m³ and 9.2µg/m³ for 2023 in Herefordshire.

Herefordshire Council is taking the following measures to address PM_{2.5}:

- Ensure PM_{2.5} is considered at the planning application stage for relevant development.
- Inspection of Local Authority permitted installations.
- Review the AQAPs to include additional actions for PM_{2.5}.
- Consider the need for background monitoring of PM_{2.5}.

It should be noted that actions 1-6, 9-11, 13-15 of the Hereford AQAP, and Action points 1-7 of the Leominster AQAP also deal with PM_{2.5} as well as NO₂.

The approach being taken in terms of PM_{2.5} assessment and possible further monitoring has been considered Further work is to be undertaken in this area.

⁶ Defra. Air Quality Strategy – Framework for Local Authority Delivery, August 2023

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

This section sets out the monitoring undertaken within 2023 by Herefordshire 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

Herefordshire Council undertook automatic (continuous) monitoring at two sites during 2023. Table A.1 in Appendix A shows the details of the automatic monitoring sites. NB. Local authorities do not have to report annually on the following pollutants: 1,3 butadiene, benzene, carbon monoxide and lead, unless local circumstances indicate there is a problem. The <https://uk-air.defra.gov.uk/> page presents automatic monitoring results for Herefordshire 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.

The 2023 annual mean NO₂ level was 29µg/m³ (data capture 75%) at Hereford automatic monitoring site (HRD1) and 20µg/m³ at Bargate monitoring site (LEO1). Maps showing the location of the monitoring sites within Hereford AQMA and local area are shown in Figure D.1 – General map of monitoring sites within Hereford AQMA and local area

Maps showing the location of monitoring sites within Leominster AQMA and local area are shown in Figure D.6 – Map of monitoring sites in within and in vicinity of Bargates Non-Automatic Monitoring Sites

Herefordshire Council undertook non- automatic (i.e. passive) monitoring of NO₂ at 53 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: Map(s) of Monitoring Locations and AQMAs. 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: Supporting Technical Information / Air Quality Monitoring Data QA/QC](#).

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: Supporting Technical Information / Air Quality Monitoring Data QA/QC](#).

3.2.1 Nitrogen Dioxide (NO₂)

[Table A.3](#) and [Table A.4](#) in Appendix A compare the ratified and adjusted monitored NO₂ annual mean concentrations for the past five years with the air quality objective of 40µg/m³. 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: Full Monthly Diffusion Tube Results for 2023](#). Note that the concentration data presented in [Table B.1](#) includes distance corrected values, only where relevant.

[Table A.5](#) in Appendix A compares the ratified continuous monitored NO₂ hourly mean concentrations for the past five years with the air quality objective of 200µg/m³, not to be exceeded more than 18 times per year. During 2023, the NO₂ hourly mean limit (200 µg/m³) was not exceeded.

During 2023, the annual mean NO₂ levels were 29µg/m³ at the Hereford automatic monitoring site (HRD1) and 20µg/m³ at the Bargate monitoring site (LEO1), which are below the air quality objective (40µg/m³). In the last five years, there have been no breaches of the annual mean NO₂ objective (40µg/m³) at site HRD1 and none recorded at LEO1 as there is no previous data. Herefordshire Council will continue to review the monitoring data before making any decision to revoke the Hereford AQMA.

There are 17 non-automatic monitoring sites within Hereford AQMA (sites 9, 10, 22, 53, 57, 59, 87, 88, 89, 91, 94, 95, 96, 104, 112, 113, and 114). None of these sites have exceeded the objective since 2019.

The boundaries of the Hereford AQMA have been monitored to identify whether the AQMA needs to be extended (sites 65, 97, 101 and 102). In 2023 none of these monitoring sites exceeded the annual mean NO₂ air quality objective. Herefordshire Council therefore will not be extending the boundary of Hereford AQMA.

There are six monitoring sites in the Leominster AQMA (site 46, 61a, 61b, 115, 116, and 117). In 2023 all sites were below the annual mean NO₂ annual mean objective. 2019 to 2023 trend data for the monitoring sites in the Leominster AQMA shows an overall decrease, with expected increases observed from 2020 to 2022 due to increasing traffic following COVID-19. Site 61b recorded an annual mean NO₂ concentration of 46.0µg/m³ in 2019, falling to 33.8µg/m³ in 2023.

There are 35 monitoring sites which are located outside of the AQMAs. All of these locations were below the NO₂ annual mean objective in 2023.

As a whole sites that have data available over a five-year period from 2019 to 2022 show an average decrease in NO₂ concentration of 6.46 µg/m³.

Monitoring is no longer undertaken at sites 75, 86, 87, 101 (Widemarsh St – tube has been redeployed elsewhere), 102 (Widemarsh St – tube has been redeployed elsewhere), and 104 (Wall St – tube has been redeployed elsewhere). However, monitoring commenced at sites 118, 119, 120, 121, 122, and 123 the first two in Leominster and tubes 120-123 in Hereford. Due to concerns of residents, new receptors in AQMA locations and standing traffic concerns.

3.2.2 Particulate Matter (PM₁₀)

PM₁₀ was previously measured by the Council at the automatic monitoring station at Edgar Street in Hereford. The site was decommissioned in 2011 due to redevelopment of the site where it was located. The monitor was repositioned in Victoria Street and PM₁₀ concentrations for this site have been available since 2017.

Table A.6 in Appendix A: Monitoring Results compares the ratified and adjusted monitored PM₁₀ annual mean concentrations for the past five years with the air quality objective of 40µg/m³. In 2023, the PM₁₀ levels were 18µg/m³ and 12µg/m³ at the Hereford (HRD1) and Bargate (LEO1) monitoring sites respectively which are below the air quality objective (40µg/m³).

Table A.7 in Appendix A: Monitoring Results compares the ratified continuous monitored PM₁₀ daily mean concentrations for the past five years with the air quality objective of

50 $\mu\text{g}/\text{m}^3$, not to be exceeded more than 35 times per year. The gravimetric PM₁₀ daily mean limit (50 $\mu\text{g}/\text{m}^3$) was exceeded on 3 days in 2023 at the Hereford (HRD1) monitoring site. The annual allowance for this limit value is 35 days, therefore this objective was not exceeded.

3.2.3 Particulate Matter (PM_{2.5})

PM_{2.5} is also measured by the Council at the automatic monitoring station in Leominster Bargates Road, Bargate (site LEO1).

Table A.8 in Appendix A presents the ratified and adjusted monitored PM_{2.5} annual mean concentrations for the past five years with the air quality objective of 20 $\mu\text{g}/\text{m}^3$. As shown in Table A.8, the monitored PM_{2.5} annual mean concentrations at Leominster Bargates Road in 2023 was 7 $\mu\text{g}/\text{m}^3$ which is below the air quality objective.

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)
HRD1	Victoria Street	Roadside	350271	239791	NO ₂ , PM ₁₀	Yes - Hereford	Chemiluminescent and PM ₁₀	10	5	1.9
LEO1	Leominster Bargates Road	Roadside	349372	259010	NO ₂ , PM ₁₀ , PM _{2.5}	Yes - Bargate	Chemiluminescent and PM ₁₀	5	5	1.9

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)
6	Broad Street, Hereford	Urban Background	350889	239994	NO ₂	No	1.5	0.8	No	2.8
9	Bus stop, Victoria St, Hereford (A49)	Roadside	350668	239863	NO ₂	Yes-Hereford	1.1	2.8	No	2.9
59	Façade, Widemarsh St, Town Hfd	Urban Centre	350986	240173	NO ₂	Yes-Hereford	0.0	5.2	No	2.4
65	96 Whitecross Road, Hfd (A438)	Urban Background	350085	240298	NO ₂	No	0.0	1.8	No	2.2
87	Nr Cemetery, Victoria St, Hfd(A49)	Roadside	350693	239819	NO ₂	Yes-Hereford	1.2	2.6	No	2.5
88	Adj 34 Victoria St, Hfd (A49)	Roadside	350683	239899	NO ₂	Yes-Hereford	0.6	2.9	No	2.3
94	Edgar St opp Nolan Rd, Hfd (A49)	Roadside	350932	240802	NO ₂	Yes-Hereford	0.4	2.5	No	2.4
95	Edgar St. nr Prior St. Hfd (A49)	Roadside	360875	240674	NO ₂	Yes-Hereford	0.7	2.1	No	1.7
101	Widemarsh St, opp Garrick CP, Hfd	Roadside	351057	240299	NO ₂	No	0.0	2.6	No	1.7
104	Wall Street, Hereford	Roadside	350984	240215	NO ₂	Yes-Hereford	0.8	2.9	No	1.3
106	Commercial Road, Hfd	Roadside	351461	240313	NO ₂	No	-0.9	2.5	No	2.9

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)
10	Victoria Street, Hereford (A49)	Roadside	350676	240018	NO ₂	Yes-Hereford	0.0	3.0	No	2.5
112, 113, 114	Hereford AQMS Triplicate 3	Roadside	350720	239792	NO ₂	Yes-Hereford	0.2	0.5		2.3
118	Porters Mill Close, Leominster (outside No. 11)	Roadside	349687	259528	NO ₂	No	0.2	0.3	No	2.1
119	Corner Ports Mill/Mill Street Leominster (by ESS box)	Roadside	349720	259527	NO ₂	No	0.2	0.1	No	2.2
120	Eign Street North, Hereford (outside No. 134)	Roadside	350610	240087	NO ₂	No	0.2	0.3	No	2.3
121	Eign Street South, Hereford (Brother Barbers)	Roadside	350637	240063	NO ₂	No	0.2	0.2	No	2.4
122	Barton Road North, Hereford (outside No. 9)	Roadside	350625	239735	NO ₂	No	0.2	0.8	No	2.3
123	Barton Road South, Hereford (outside No. 22)	Roadside	350514	239741	NO ₂	No	0.2	0.2	No	2.3
32	Weir End, Ross. (A40)	Roadside	357724	223747	NO ₂	No	-1.0	5.0	No	2.0
33	House façade, Wilton (A40)	Roadside	358494	224213	NO ₂	No	0.1	4.1	No	1.9
46	Bengry's Lights, Leominster (A44)	Roadside	349400	259012	NO ₂	Yes- Bar-Minster	-0.9	4.3	No	2.1

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)
61A	29 Bargates, Leominster (A44)	Roadside	349358	259016	NO ₂	Yes-Bargates	0.0	2.7	No	2.2
61b	35 Bargates, Leominster (A44)	Roadside	349349	259016	NO ₂	Yes- Bar-Minster	0.0	3.4	No	2.2
82	Cantilupe Road 1 (Flats), Ross-on-Wye	Urban Background	360200	224176	NO ₂	No	1.6	1.6	No	2.3
92	Rotherwas Industrial Estate, Hfd	Urban Background	352916	237844	NO ₂	No	0.0	2.4	No	2.3
93	Rotherwas Relief Road, Hfd (B4399)	Roadside	351881	239984	NO ₂	No	0.0	5.5	No	2.2
109	Bargates, opp Perseverance Rd Leominster	Roadside	349173	259023	NO ₂	No	0.0	2.2	No	1.0
115, 116, 117	117 - Leominster AQMS Triplicate 3	Roadside	349390	259020	NO ₂	Yes-Bargates	2.0	4.6	No	2.3
22	Façade Edgar/Moor St, Hfd (A49)	Roadside	350858	240610	NO ₂	Yes-Hereford	-0.7	2.3	No	2.3
53	Façade, Belmont Rd/Asda Junc Hfd	Roadside	350716	239163	NO ₂	Yes-Hereford	0.0	2.9	No	2.1
54	House Façade, Holmer Rd, Hfd (A49)	Urban Background	350600	241093	NO ₂	No	0.0	12.2	No	1.7
57	Eign Street, Hereford (A438)	Urban Background	350512	240104	NO ₂	Yes-Hereford	1.4	0.9	No	2.2
74	140 Whitecross Rd, Hfd (A438)	Roadside	349984	240335	NO ₂	No	0.0	8.5	No	2.1

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)
75	22 Barton Road, Hfd	Roadside	350651	239753	NO ₂	No	13.4	4.0	No	2.4
79	76 Belmont Road, Hfd (A465)	Roadside	350478	239000	NO ₂	No	6.4	2.0	No	2.3
84	Kings Acre Rd, Hfd (A438)	Suburban	347865	241237	NO ₂	No	4.4	5.6	No	2.6
85	Huntington Lane, Hfd	Rural	348753	241942	NO ₂	No	0.0	3.0	No	2.1
86	Three Elms Rd, Hfd (A4110)	Roadside	349065	241909	NO ₂	No	4.6	2.4	No	1.7
89	Edgar St/Blackfriars St Junc, Hfd (A49)	Roadside	350799	240443	NO ₂	Yes-Hereford	4.3	2.8	No	2.1
91	Ross Road/Asda Traffic Island, Hfd (A49)	Roadside	350758	239125	NO ₂	Yes-Hereford	3.5	1.5	No	2.2
96	Edgar St. nr Junc Newtown Rd (A49)	Roadside	350942	240861	NO ₂	Yes-Hereford	2.4	2.9	No	2.2
97	Newtown Rd, nr Post-box, Hfd	Kerbside	351017	240880	NO ₂	No	0.0	3.1	No	2.4
98	Link Road A, Hereford	Urban Background	350945	240659	NO ₂	No	0.0	2.1	No	1.8
99	Link Road B, Hereford	Urban Background	351036	240669	NO ₂	No	0.0	3.8	No	2.4
100	Link Road C, Hereford	Urban Background	351448	240535	NO ₂	No	0.0	3.9	No	3.0

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)
102	Widemarsh St. nr juct Link Road, Hfd	Roadside	351057	240642	NO ₂	No	0.1	2.1	No	1.3
107	St Mary's Church, Grandstand Rd, Hfd (A49)	Roadside	350410	241165	NO ₂	No	1.7	2.7	No	1.5
108	Roman Road, Hereford (A4103)	Urban Background	350193	241175	NO ₂	No	5.1	2.9	No	1.7

Notes:

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

(2) N/A if not applicable.

Table A.3 – Annual Mean NO₂ Monitoring Results: Automatic Monitoring (µg/m³)

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
HRD1	350271	239791	Roadside	97.7	97.7	38	31	33	31	29.1
LEO1	349372	259010	Roadside	98.2	98.2	-	-	-	-	20.3

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

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

Where exceedances of the NO₂ annual mean objective occur at locations not representative of relevant exposure, the fall-off with distance concentration has been calculated and reported concentration provided in brackets for 2023.

Notes:

The annual mean concentrations are presented as µg/m³.

Exceedances of the NO₂ annual mean objective of 40µg/m³ 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 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
6	350889	239994	Urban Background	100	100.0	24.4	18.3	18.5	18.7	15.8
9	350668	239863	Roadside	90.7	90.7	34.4	27.1	30.0	29.3	28.1
59	350986	240173	Urban Centre	100	100.0	19.7	14.1	15.1	16.7	14.1
65	350085	240298	Urban Background	100	100.0	30.9	22.9	26.1	24.5	23.1
87	350693	239819	Roadside	100	57.7	29.8	25.6	27.2	24.5	26.0
88	350683	239899	Roadside	100	100.0	31.6	24.4	28.7	26.9	24.2
94	350932	240802	Roadside	100	100.0	29.4	24.7	24.9	25.7	22.8
95	360875	240674	Roadside	100	100.0	37.0	25.1	26.5	28.1	29.2
101	351057	240299	Roadside	82.9	48.1	32.4	24.5	25.6	26.0	24.6
104	350984	240215	Roadside	100	57.7	31.9	24.3	25.6	26.7	23.9
106	351461	240313	Roadside	100	100.0	31.1	25.6	29.1	28.7	24.8
10	350676	240018	Roadside	100	100.0	39.3	30.3	34.7	33.3	31.5

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
112, 113, 114	350720	239792	Roadside	100	92.3	0.0	0.0	0.0	0.0	29.8
118	349687	259528	Roadside	100	42.3	0.0	0.0	0.0	0.0	19.1
119	349720	259527	Roadside	100	42.3	0.0	0.0	0.0	0.0	15.7
120	350610	240087	Roadside	100	42.3	0.0	0.0	0.0	0.0	23.1
121	350637	240063	Roadside	100	42.3	0.0	0.0	0.0	0.0	34.7
122	350625	239735	Roadside	100	42.3	0.0	0.0	0.0	0.0	27.3
123	350514	239741	Roadside	100	42.3	0.0	0.0	0.0	0.0	18.1
32	357724	223747	Roadside	100	100.0	24.9	19.3	21.3	21.3	19.2
33	358494	224213	Roadside	100	100.0	25.0	18.5	20.4	20.7	18.4
46	349400	259012	Roadside	100	100.0	33.4	26.7	27.2	28.0	25.3
61A	349358	259016	Roadside	92.6	92.6	39.8	34.4	35.6	34.7	33.2
61b	349349	259016	Roadside	100	100.0	46.0	35.4	37.8	36.4	33.8
82	360200	224176	Urban Background	100	100.0	20.1	16.1	17.4	17.1	15.6
92	352916	237844	Urban Background	100	100.0	13.5	9.8	10.6	10.2	9.2

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
93	351881	239984	Roadside	100	100.0	10.5	9.3	9.0	7.8	6.5
109	349173	259023	Roadside	82.4	82.4	32.4	24.9	25.4	25.1	25.0
115, 116, 117	349390	259020	Roadside	100	92.3	0.0	0.0	0.0	0.0	21.5
22	350858	240610	Roadside	100	100.0	27.7	21.4	24.0	23.1	21.3
53	350716	239163	Roadside	90.7	100.0	30.5	24.5	26.5	24.3	25.1
54	350600	241093	Urban Background	100	100.0	23.1	17.0	20.4	21.2	19.6
57	350512	240104	Urban Background	100	100.0	28.8	21.1	23.7	23.7	22.0
74	349984	240335	Roadside	100	100.0	17.4	14.0	13.6	14.2	13.1
75	350651	239753	Roadside	100	57.7	22.3	18.3	20.5	18.3	18.5
79	350478	239000	Roadside	100	100.0	28.6	23.4	24.0	22.5	20.6
84	347865	241237	Suburban	100	100.0	10.5	8.5	9.2	8.9	7.9
85	348753	241942	Rural	92.3	92.3	8.0	6.2	6.7	6.7	6.0
86	349065	241909	Roadside	100	57.7	14.9	11.2	13.0	12.8	10.8
89	350799	240443	Roadside	90.7	90.7	36.9	29.3	30.3	29.7	27.0

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
91	350758	239125	Roadside	90.7	100.0	38.7	27.6	30.7	30.3	27.6
96	350942	240861	Roadside	100	100.0	36.9	32.5	35.5	32.9	24.9
97	351017	240880	Kerbside	100	100.0	25.6	19.6	21.5	20.5	19.1
98	350945	240659	Urban Background	100	100.0	19.9	15.8	17.2	16.3	14.7
99	351036	240669	Urban Background	100	100.0	19.3	14.5	15.5	15.3	14.0
100	351448	240535	Urban Background	100	100.0	22.5	18.2	18.9	19.7	17.1
102	351057	240642	Roadside	100	57.7	25.9	19.3	21.7	21.2	20.0
107	350410	241165	Roadside	100	100.0	24.7	18.4	18.8	19.4	18.2
108	350193	241175	Urban Background	100	100.0	22.6	16.9	17.3	16.7	15.4

☒ **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:

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

Exceedances of the NO_2 annual mean objective of $40\mu\text{g}/\text{m}^3$ are shown in **bold**.

NO_2 annual means exceeding $60\mu\text{g}/\text{m}^3$, 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%).

Figure A.1 – Trends in Annual Mean NO₂ Concentrations from Diffusion Tubes in Hereford AQMA and within close vicinity of the AQMA

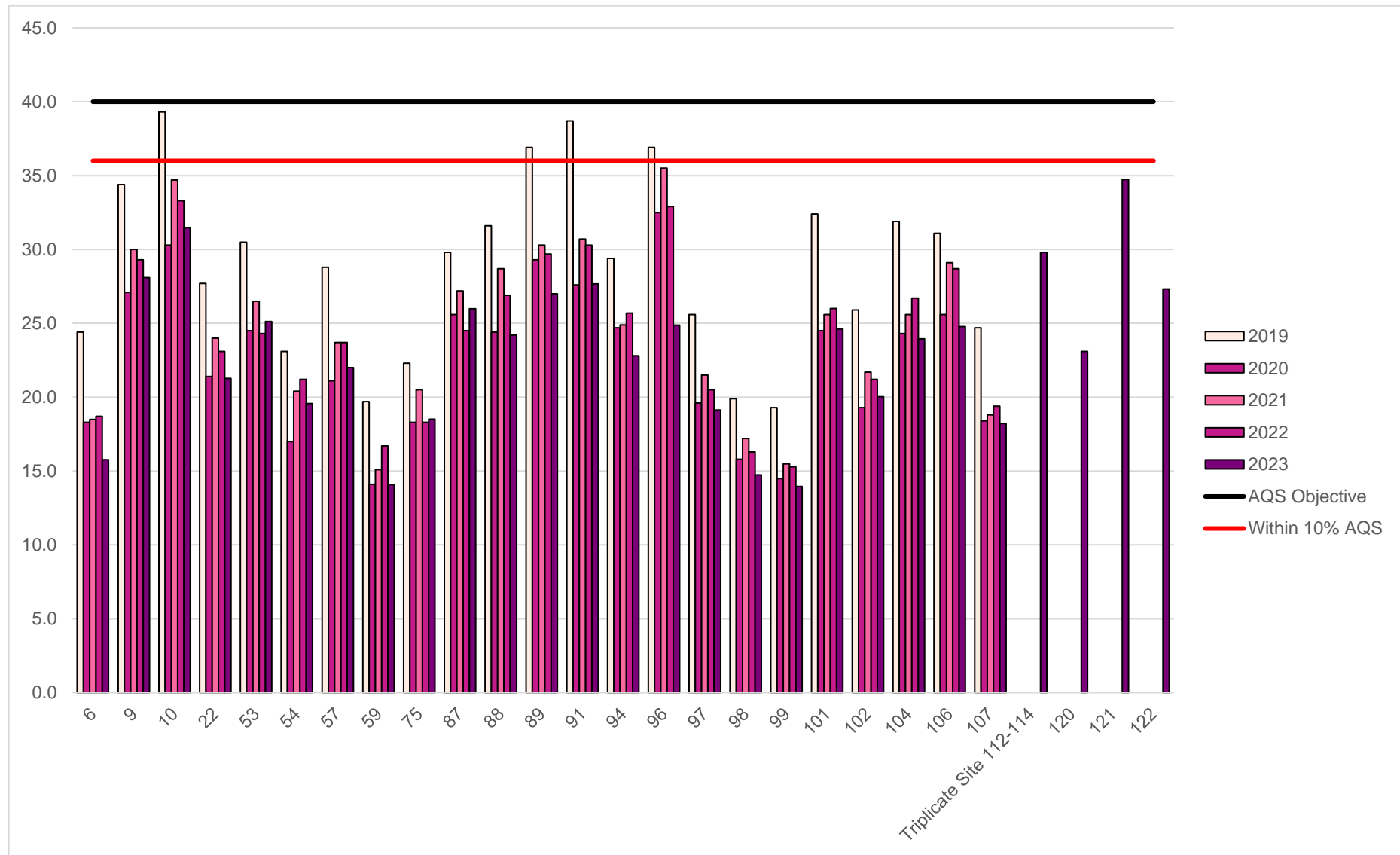


Figure A.2 – Trends in Annual Mean NO₂ Concentrations in Bargates Leominster AQMA and within close vicinity of the AQMA

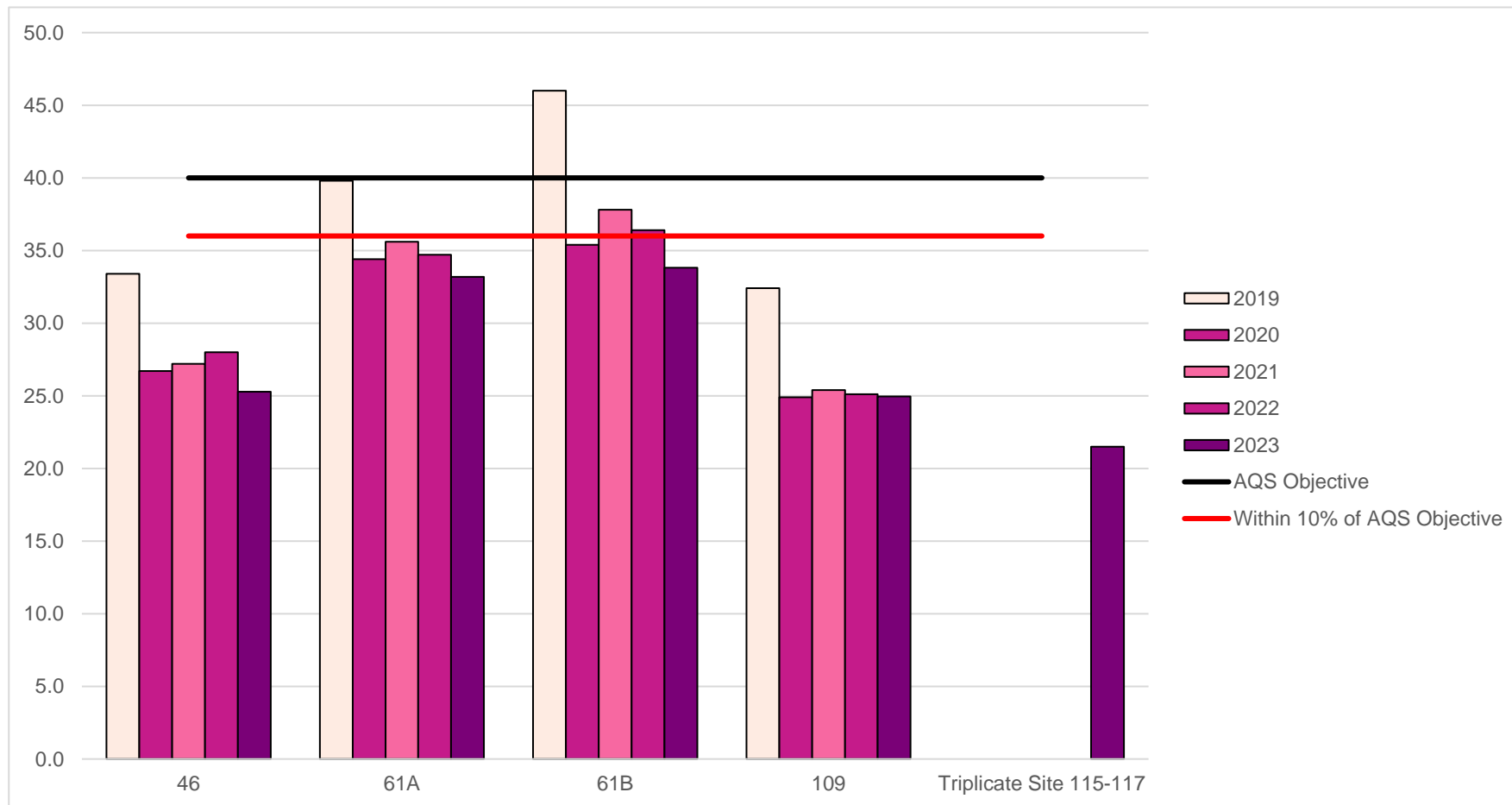


Figure A.3 – Trends in Annual Mean NO₂ Concentrations not within close vicinity of an AQMA

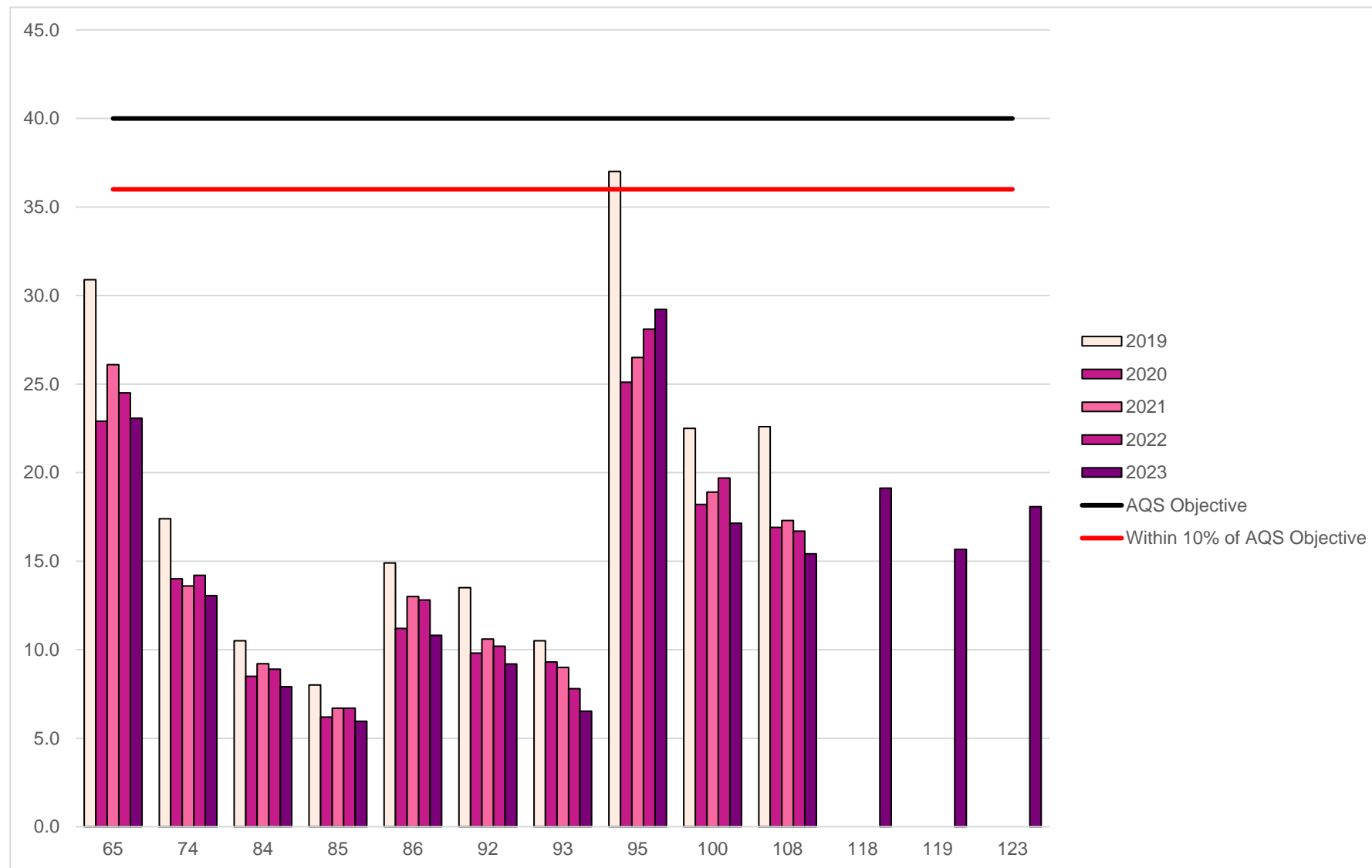


Table A.5 – 1-Hour Mean NO₂ Monitoring Results, Number of 1-Hour Means > 200µg/m³

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
HRD1	350271	239791	Roadside	97.7	97.7	1	0	0	0 (103)	0
LEO1	349372	259010	Roadside	98.2	98.2	-	-	-	-	0

Notes:

Results are presented as the number of 1-hour periods where concentrations greater than 200µg/m³ have been recorded.

Exceedances of the NO₂ 1-hour mean objective (200µg/m³ 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%).

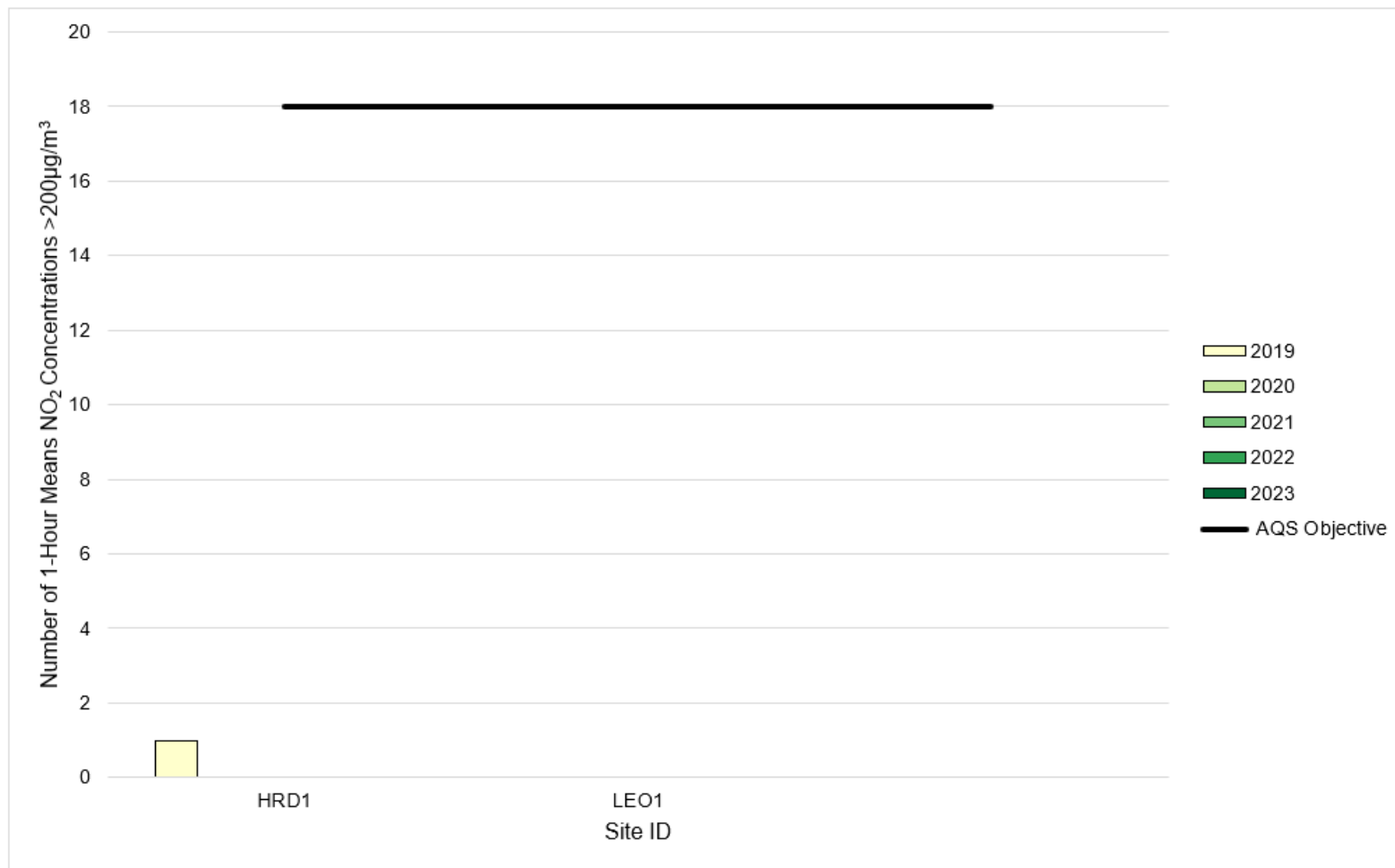
Figure A.4 – Trends in Number of NO₂ 1-Hour Means > 200µg/m³

Table A.6 – Annual Mean PM₁₀ Monitoring Results (µg/m³)

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
HRD1	350271	239791	Roadside	95.2	95.2	21	22	22	18	18
LEO1	349372	259010	Roadside	98.4	98.4	-	-	-	-	12

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

Notes:

The annual mean concentrations are presented as µg/m³.

Exceedances of the PM₁₀ annual mean objective of 40µg/m³ 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.5 – Trends in Annual Mean PM₁₀ Concentrations

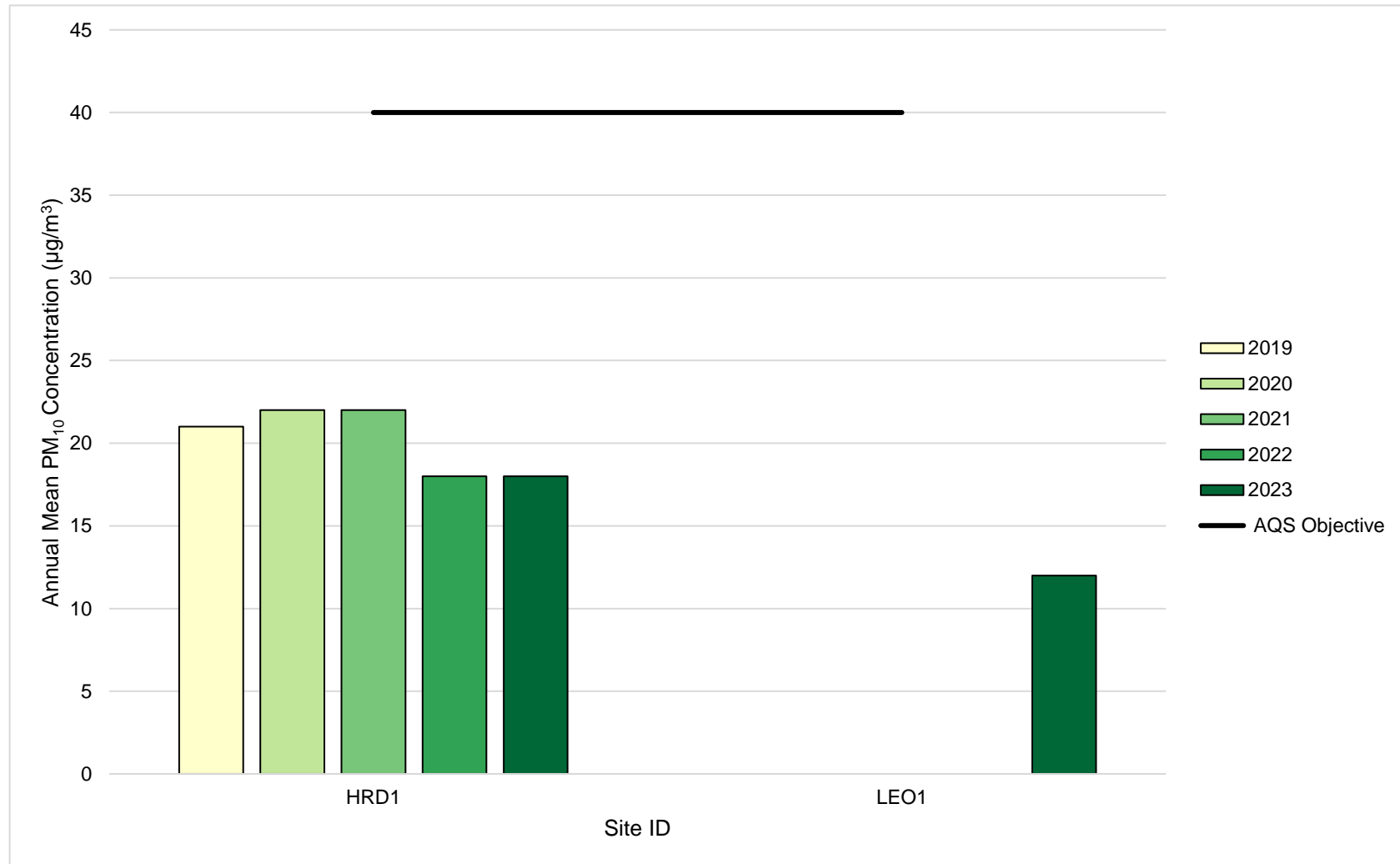


Table A.7 – 24-Hour Mean PM₁₀ Monitoring Results, Number of PM₁₀ 24-Hour Means > 50µg/m³

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
HRD1	350271	239791	Roadside	95.2	95.2	2	0 (7)	-	2 (31)	3
LEO1	349372	259010	Roadside	98.4	98.4	-	-	-	-	0

Notes:

Results are presented as the number of 24-hour periods where daily mean concentrations greater than 50µg/m³ have been recorded.

Exceedances of the PM₁₀ 24-hour mean objective (50µg/m³ 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%).

Figure A.6 – Trends in Number of 24-Hour Mean PM₁₀ Results > 50µg/m³

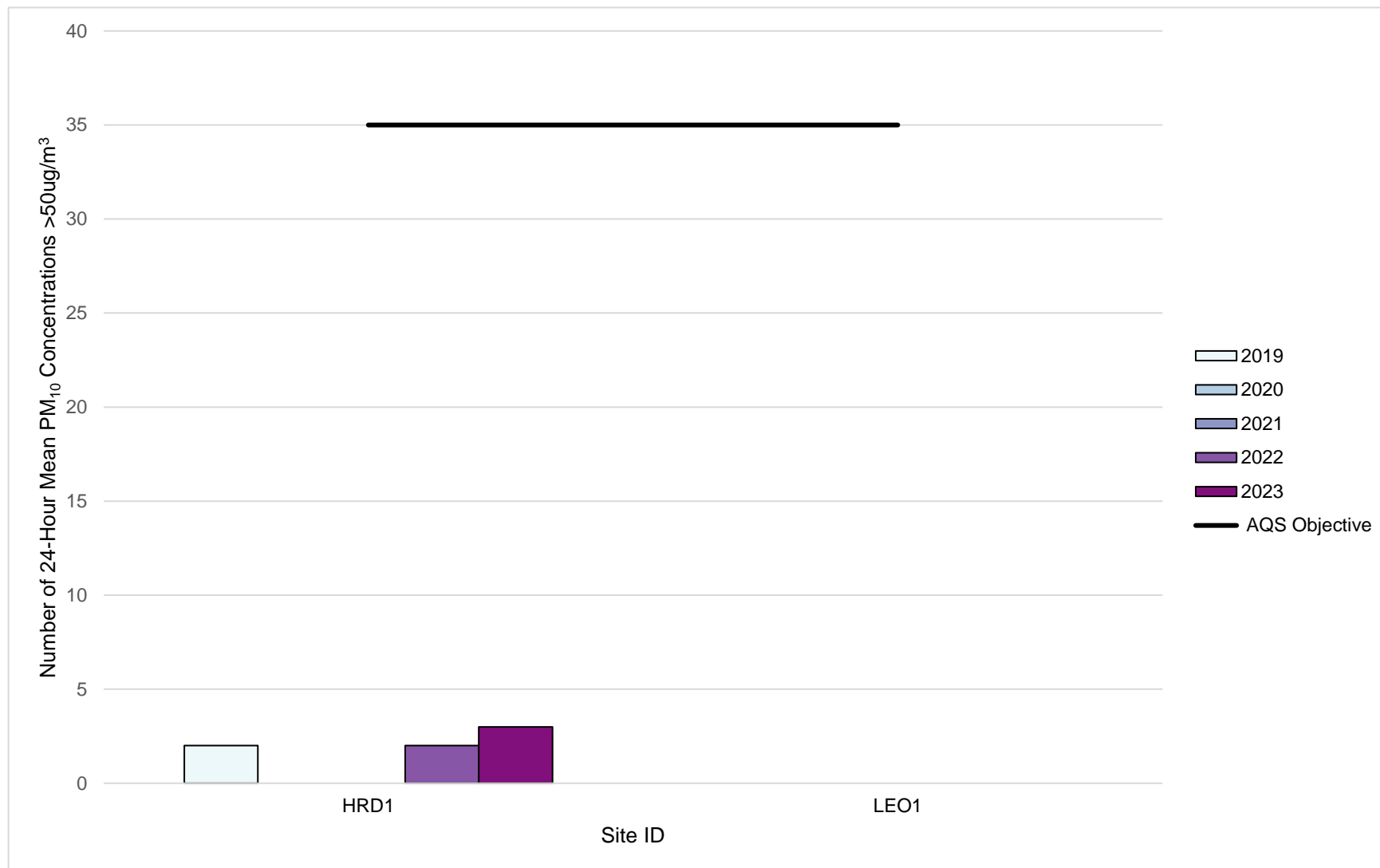


Table A.8 – Annual Mean PM_{2.5} Monitoring Results (µg/m³)

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
HRD1	350271	239791	Roadside	95.3	95.3	-	-	-	9.5	8.4
LEO1	349372	259010	Roadside	95.8	95.8	-	-	-	-	6.9

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

Notes:

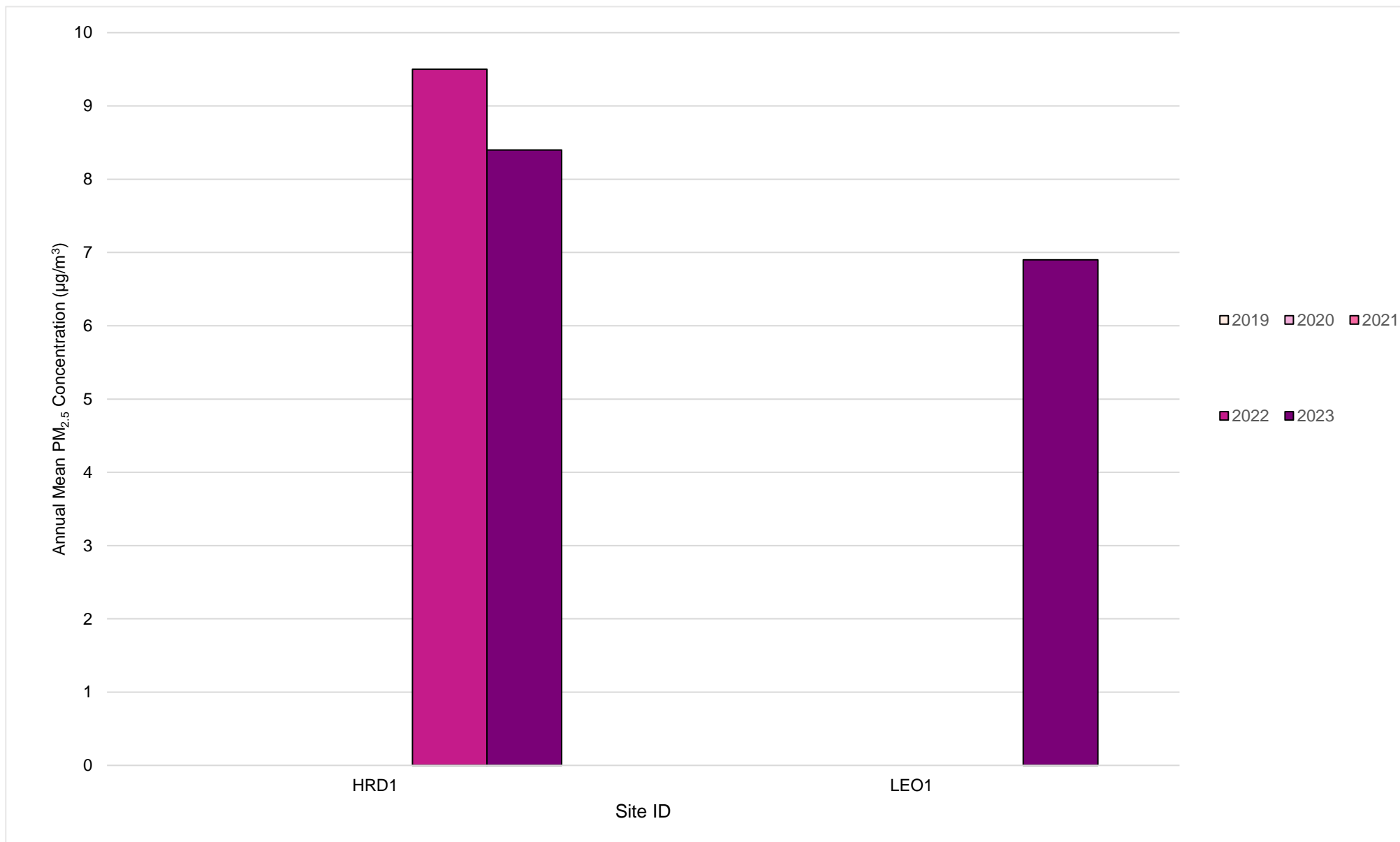
The annual mean concentrations are presented as µg/m³.

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.7 – Trends in Annual Mean PM_{2.5} Concentrations



Appendix B: Full Monthly Diffusion Tube Results for 2023

Table B.1 – NO₂ 2023 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: Annualised and Bias Adjusted (0.81)	Annual Mean: Distance Corrected to Nearest Exposure	Comment
6	350889	239994	25.3	24.4	19.6	18.4	14.5	13.1	14.2	14.9	22.6	22.4	24.4	19.8	19.5	15.8		6
9	350668	239863	37.1	39.3	30.8	40.4	30.2	25.4	22.8	25.2		84.9	30.3	32.9	34.7	28.1		9
10	350676	240018	41.9	47.5	38.2	45.1	37.1	37.9	33.0	34.0	38.9	41.1	38.9	34.2	38.9	31.5		10
22	350858	240610	27.0	32.7	29.7	30.4	25.3	23.7	17.9	20.8	29.0	32.8	28.0	18.9	26.3	21.3	22.0	22
32	357724	223747	29.7	30.3	22.8	21.8	19.1	23.3	17.6	20.7	21.7	25.2	31.4	20.5	23.7	19.2	20.1	32
33	358494	224213	22.2	26.5	20.1	24.7	20.7	25.2	20.2	21.1	26.6	27.6	21.5	16.9	22.7	18.4		33
46	349400	259012	35.7	37.8	31.9	31.7	25.5	24.1	28.0	28.9	33.9	32.2	34.5	31.8	31.2	25.3	26.6	46
53	350716	239163	31.3	36.5	32.7	34.6	32.0	30.5	24.5	25.6		34.8	33.0	26.2	31.0	25.1		53
54	350600	241093	26.5	29.9	22.4	27.2	23.3	23.1	17.6	22.1	23.4	27.5	27.3	19.4	24.2	19.6		54
57	350512	240104	29.9	34.2	24.4	29.8	26.4	26.2	19.4	21.5	28.0	31.5	31.4	23.0	27.2	22.0		57
59	350986	240173	23.0	25.3	16.2	19.7	15.4	12.9	9.2	12.2	17.1	19.7	22.7	16.0	17.4	14.1		59
61A	349358	259016	41.1	44.5	38.2		35.4	39.3	43.0	36.2	45.0	41.3	43.7	44.1	41.0	33.2		61A
61b	349349	259016	44.4	44.5	38.1	44.1	35.4	39.7	39.6	38.4	49.5	43.4	42.5	42.8	41.7	33.8		61b
65	350085	240298	31.6	34.0	25.6	34.4	30.6	27.8	18.4	23.4	26.8	34.3	35.1	22.1	28.5	23.1		65
74	349984	240335	21.4	21.3	15.1	16.6	12.0	12.4	10.8	13.8	15.2	18.6	20.9	15.0	16.1	13.1		74
75	350651	239753	22.0	27.6	20.7	25.2	22.1	22.4	16.4						22.5	18.5		75
79	350478	239000	29.2	32.1	20.7	29.4	24.9	26.0	18.6	20.8	0.5	29.2	27.8	21.6	23.1	18.7		79
82	360200	224176	22.4	23.9	20.4	21.6	18.4	20.4	11.0	15.0	19.7	23.7	20.9	14.9	19.3	15.6		82
84	347865	241237	12.1	13.3	8.1	10.4	9.0	9.1	5.5	9.0	8.1	12.4	13.4	6.4	9.8	7.9		84
85	348753	241942	9.3	10.7	6.5	5.6		4.4	3.2	5.1	7.4	11.8	11.1	6.2	7.3	6.0		85
86	349065	241909	14.0	18.2	14.5	14.5	11.8	10.8	7.7						13.1	10.8		86
87	350693	239819	28.4	36.3	37.5	39.5	28.8	29.5	20.9						31.6	26.0		87
88	350683	239899	31.3	41.9	31.6	39.7	29.1	26.6	18.7	24.3	28.1	33.3	31.4	24.5	29.9	24.2		88
89	350799	240443	36.4	37.6	38.0	36.9	30.7	30.5	27.8	28.0		39.8	33.6	29.4	33.3	27.0		89
91	350758	239125	39.5	42.7	30.1	35.0	31.1	31.3	30.1	29.5		35.3	39.2	30.9	34.2	27.7		91
92	352916	237844	15.4	15.8	11.5	12.2	9.7	10.1	6.5	6.5	10.6	12.8	16.9	9.0	11.3	9.2		92
93	351881	239984	11.7	0.9	9.4	9.1	8.6	7.7	4.9	9.6	7.0	9.2	11.7	5.7	8.1	6.5		93

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 (0.81)	Annual Mean: Distance Corrected to Nearest Exposure	Comment
94	350932	240802	31.0	34.7	26.0	35.7	25.5	24.4	24.5	21.9	30.1	29.8	31.0	25.7	28.2	22.8		94
95	360875	240674	46.2	33.3	33.4	52.9	31.9	36.3	35.1	30.7	42.0	24.2	41.2	27.5	36.1	29.2		95
96	350942	240861	33.9	47.5	32.2	31.1	24.9	24.3	25.5	24.1	31.1	35.6	32.9	24.8	30.7	24.9		96
97	351017	240880	27.4	31.9	21.5	26.1	21.5	21.0	15.2	20.2	23.3	27.0	28.3	19.4	23.6	19.1		97
98	350945	240659	22.5	24.1	18.4	18.4	15.0	13.6	10.7	14.7	19.7	22.0	23.6	15.3	18.2	14.7		98
99	351036	240669	21.6	21.4	16.7	19.1	14.1	14.5	10.3	13.7	17.6	20.0	21.7	16.2	17.2	14.0		99
100	351448	240535	24.8	27.6	20.8	22.4	18.3	16.0	15.1	17.4	17.7	26.6	27.9	20.4	21.2	17.1		100
101	351057	240299	34.2		29.0	29.2	23.4	25.0	22.7						27.2	24.6		101
102	351057	240642	25.8	31.6	22.1	28.0	23.1	24.4	13.8						24.3	20.0		102
104	350984	240215	32.1	32.5	31.1	34.8	24.0	26.1	23.8						29.1	23.9		104
106	351461	240313	37.2	38.6	27.3	32.4	27.5	27.4	24.1	25.9	30.9	32.7	35.0	28.7	30.6	24.8	26.5	106
107	350410	241165	26.4	28.0	23.3	24.7	19.3	19.0	16.4	18.7	21.5	26.5	26.4	20.1	22.5	18.2		107
108	350193	241175	22.8	24.7	17.5	20.4	15.0	16.9	13.1	14.4	19.9	24.5	23.7	15.7	19.0	15.4		108
109	349173	259023	29.8	30.7	28.8	29.7			23.6	30.2	31.3	33.4	37.9	32.2	30.8	25.0		109
112, 113, 114	350720	239792		46.8	39.0	41.6	34.0	31.4	32.3	30.2	41.0	36.9	38.2	32.6	36.7	29.8		112, 113, 114
115, 116, 117	349390	259020		33.0	25.9	27.8	29.0	26.0	17.2	24.3	21.5	26.1	29.4	33.3	26.5	21.5		115, 116, 117
118	349687	259528								21.2	25.6	25.4	27.1	20.6	24.0	19.1		118
119	349720	259527								18.1	20.3	21.1	21.0	17.9	19.6	15.7		119
120	350610	240087								23.6	29.7	34.3	32.5	26.0	28.9	23.1		120
121	350637	240063								34.8	47.5	51.9	44.9	41.6	43.6	34.7		121
122	350625	239735								31.5	37.2	38.0	36.3	28.7	34.3	27.3		122
123	350514	239741								20.6	20.1	27.6	28.8	16.9	22.7	18.1		123

- All erroneous data has been removed from the NO₂ 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.
- Herefordshire Council confirm that all 2023 diffusion tube data has been uploaded to the Diffusion Tube Data Entry System.

Notes:

Exceedances of the NO₂ annual mean objective of 40µg/m³ are shown in **bold**.

NO₂ annual means exceeding 60µg/m³, indicating a potential exceedance of the NO₂ 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 Herefordshire Council During 2023

Herefordshire Council has not identified any new sources relating to air quality within the reporting year of 2023.

Additional Air Quality Works Undertaken by Herefordshire Council During 2023

Herefordshire Council commissioned a data review and assessment on the status of the Air Quality Management Areas within the council's boundaries to establish a route forward for action planning and eventual revocation of the AQMAs. This review determined that it may be possible to revoke one AQMA in the coming year and the other in the years following. Herefordshire council remains committed to revoking the AQMAs and improving air quality across the area.

QA/QC of Diffusion Tube Monitoring

The diffusion tubes used by Herefordshire Council were supplied and analysed by Gradko Environmental Ltd, using a 20% TEA / Water solution. Gradko participate in the AIR NO₂ Proficiency Testing Scheme, and their performance is publicly available on the Defra website. In rounds AR050, 52, 53, 55, 56, 58, 59, 62 and 63 (May 2022 to June 2024) Gradko achieved a satisfactory result of 75% or above.

Monitoring has been completed with slight deviation in some places to the 2023 Diffusion Tube Monitoring Calendar. Data processing and calculation has been conducted separately to ensure that this does not impact the results reported.

Diffusion Tube Annualisation

12 monitoring sites within Herefordshire Council were required to be annualised during 2023. The monitoring locations of Aston Hill, Cwmbran Crownbridge, Leominster and Telford Hollinswood were chosen as the locations for annualisation calculations. Cwmbran

Crownbridge did not have a satisfactory amount of data to allow for annualisation to be completed using it, calculations were completed using the three remaining monitoring sites.

Table C.1 – Annualisation Summary (concentrations presented in $\mu\text{g}/\text{m}^3$)

Site ID	Annualisati on Factor Leominster	Annualisati on Factor Aston Hill	Annualisati on Factor Telford Hollinswo od	Annualisati on Factor Cwmbran Crownbrid ge	Average Annualisati on Factor	Raw Data Annual Mean	Annualised Annual Mean
87	1.0290	0.9570	1.0619		1.0159	31.6	32.1
101	1.1890	1.0054	1.1623		1.1189	27.2	30.4
104	1.0290	0.9570	1.0619		1.0159	29.1	29.6
118	0.9617	1.0646	0.9261		0.9842	24.0	23.6
119	0.9617	1.0646	0.9261		0.9842	19.6	19.3
120	0.9617	1.0646	0.9261		0.9842	28.9	28.5
121	0.9617	1.0646	0.9261		0.9842	43.6	42.9
122	0.9617	1.0646	0.9261		0.9842	34.3	33.7
123	0.9617	1.0646	0.9261		0.9842	22.7	22.3
75	1.0290	0.9570	1.0619		1.0159	22.5	22.9
86	1.0290	0.9570	1.0619		1.0159	13.1	13.4
102	1.0290	0.9570	1.0619		1.0159	24.3	24.7

Diffusion Tube Bias Adjustment Factors

The diffusion tube data presented within the 2023 ASR have been corrected for bias using an adjustment factor. 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.

Herefordshire Council have applied a national bias adjustment factor of 0.81 to the 2023 monitoring data. A summary of bias adjustment factors used by Herefordshire Council over the past five years is presented in Table C.2.

Herefordshire Council does not undertake any reference equivalent automatic monitoring and is thus unable to calculate a local bias adjustment factor. The national bias adjustment factor of 0.81 has therefore been used.

The bias adjustment factors for previous years were 0.93 in 2019, 0.81 in 2020, 0.84 in 2021, and 0.84 in 2022.

Table C.2 – Bias Adjustment Factor

Monitoring Year	Local or National	If National, Version of National Spreadsheet	Adjustment Factor
2023	National	06/24	0.81
2022	National	03/23	0.84
2021	National	03/22	0.84
2020	National	03/21	0.81
2019	National	09/20	0.93

NO₂ Fall-off with Distance from the Road

Wherever possible, monitoring locations are representative of exposure. However, where this is not possible, the NO₂ concentration at the nearest location relevant for exposure has been estimated using the Diffusion Tube Data Processing Tool/NO₂ fall-off with distance calculator available on the LAQM Support website. Where appropriate, non-automatic annual mean NO₂ concentrations corrected for distance are presented in Table B.1. Output from the fall-off with distance calculation can be found in Table C.4 calculated for 4 monitoring locations.

Table C.3 – Non-Automatic NO₂ Fall off With Distance Calculations (concentrations presented in µg/m³)

Site ID	Distance (m): Monitoring Site to Kerb	Distance (m): Receptor to Kerb	Monitored Concentration (Annualised and Bias Adjusted)	Background Concentration	Concentration Predicted at Receptor	Comments
106	2.5	1.6	24.8	9.4	26.5	
32	5.0	4.0	19.2	5.6	20.1	
46	4.3	3.4	25.3	5.5	26.6	
22	2.3	1.6	21.3	12.8	22.0	

QA/QC of Automatic Monitoring

The data for the automatic monitoring site within Herefordshire Council is managed and operated by Air Quality Data Management (AQDM). The automatic sites are calibrated and serviced in line with the instrument's requirements, as required in LAQM TG.22.

The air quality monitoring data has been ratified before being presented within the ASR. Historical data for the automatic monitor is available through the Herefordshire website⁷.

PM₁₀ and PM_{2.5} Monitoring Adjustment

The type of PM₁₀ and PM_{2.5} monitors utilised within Herefordshire Council do not require the application of a correction factor.

⁷ https://www.herefordshire.gov.uk/downloads/download/67/air_quality_documents

Automatic Monitoring Annualisation

LAQM.TG22 states that for automatic monitoring sites for with data capture less than 75% but greater than 25% require to be annualisation. The automatic monitoring site Victoria Street (HRD1) in Hereford had capture rate of 95.2% for PM₁₀ in 2023. Therefore, PM₁₀ monitoring data for Victoria Street in 2023 did not require annualising following the methodology set out in LAQM.TG22. The automatic monitoring site Bargates Road (LEO1) in Leominster had capture rate of 98.4% and 95.8% for PM₁₀ and PM_{2.5} in 2023. Therefore, PM₁₀ and PM_{2.5} monitoring data for Bargates Road in 2023 did not require annualising following the methodology set out in LAQM.TG22.

NO₂ Fall-off with Distance from the Road

Wherever possible, monitoring locations are representative of exposure. However, where this is not possible, the NO₂ concentration at the nearest location relevant for exposure has been estimated using the NO₂ fall-off with distance calculator available on the LAQM Support website. Where appropriate, automatic annual mean NO₂ concentrations corrected for distance are presented in Table A.3.

No automatic NO₂ monitoring locations within Herefordshire Council required distance correcting during 2023.

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

Figure D.1 – General map of monitoring sites within Hereford AQMA and local area

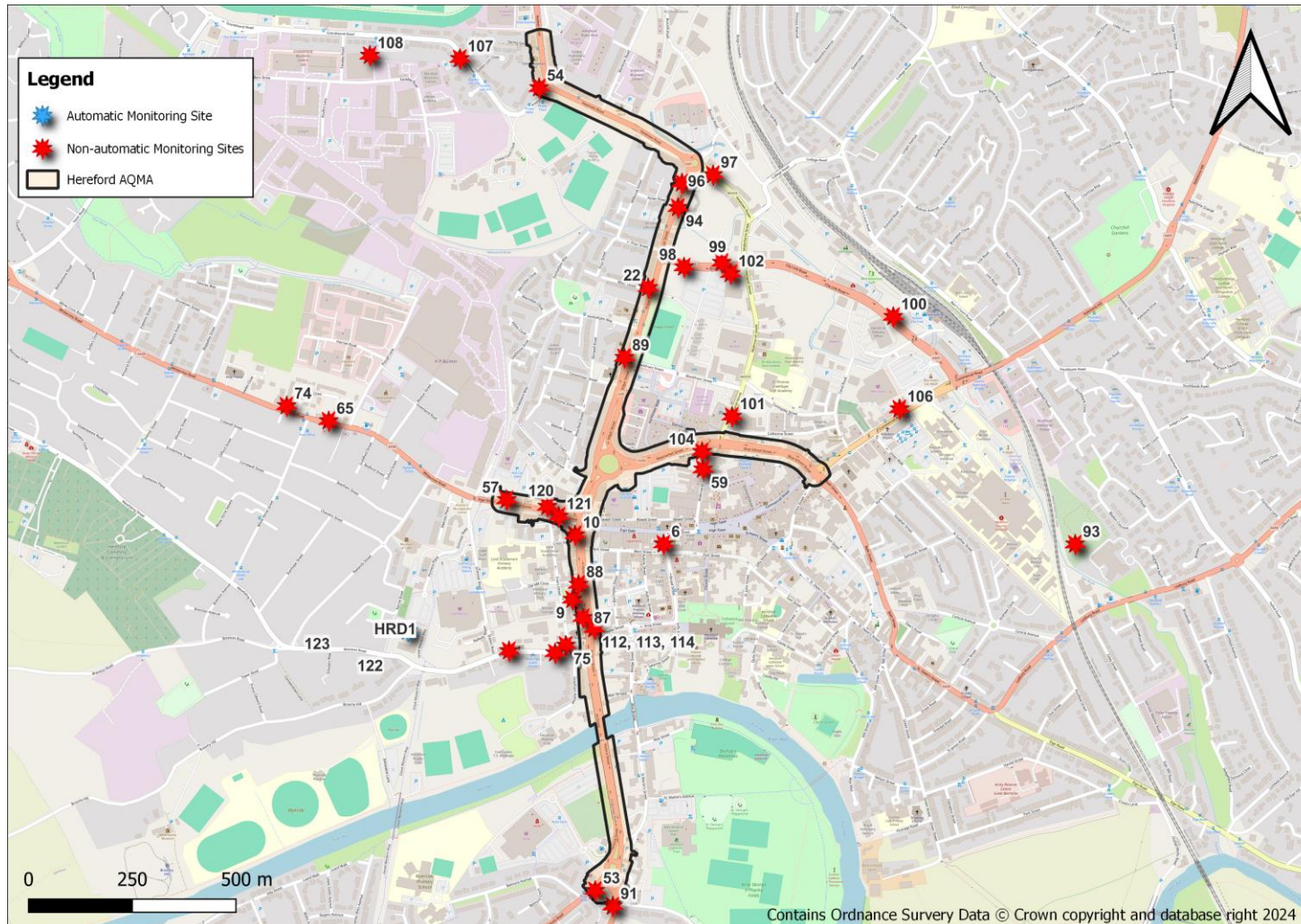


Figure D.2 – Map of monitoring sites in vicinity of Hereford AQMA

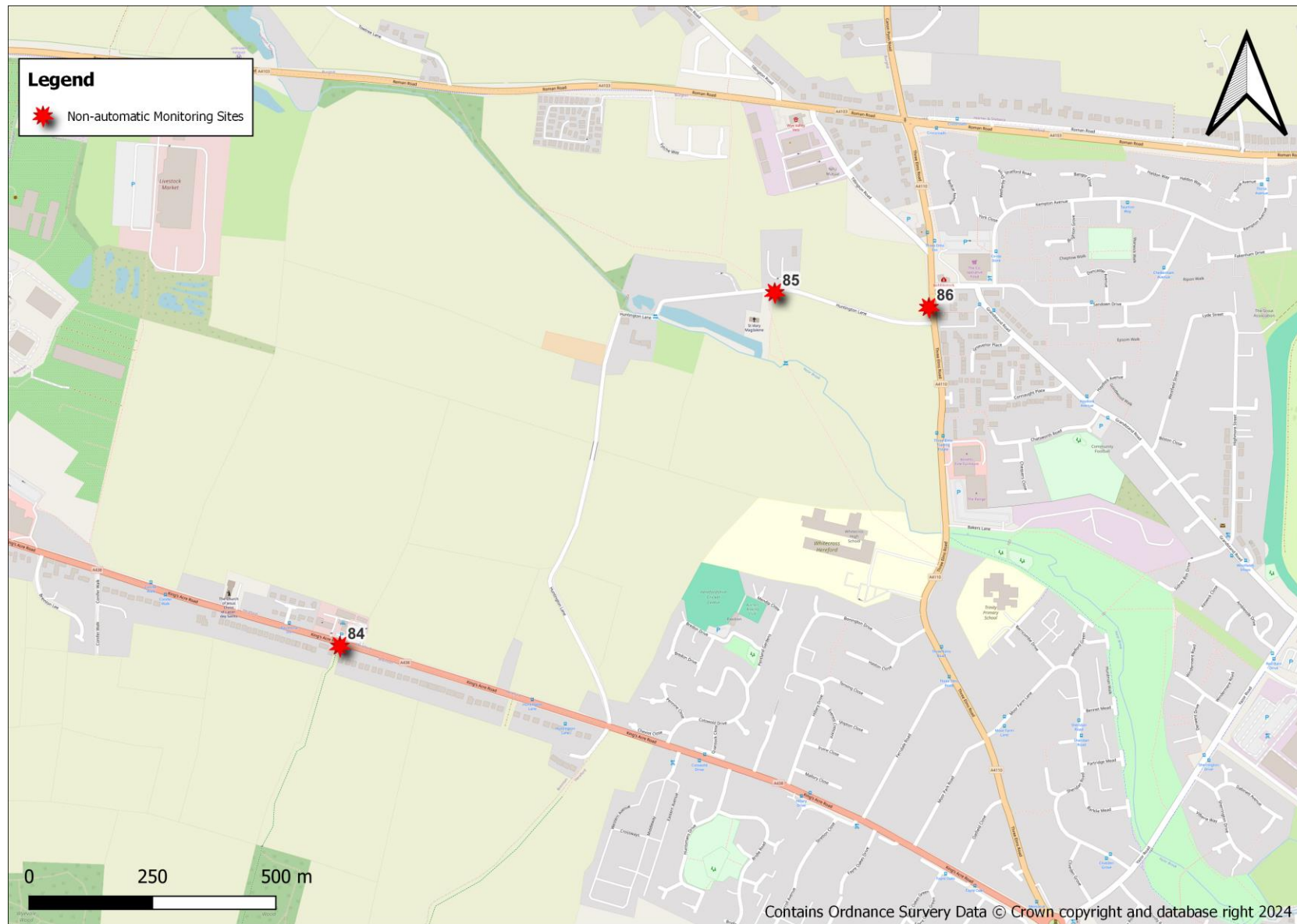


Figure D.3 – Map of monitoring sites in within and in vicinity of Hereford AQMA north end

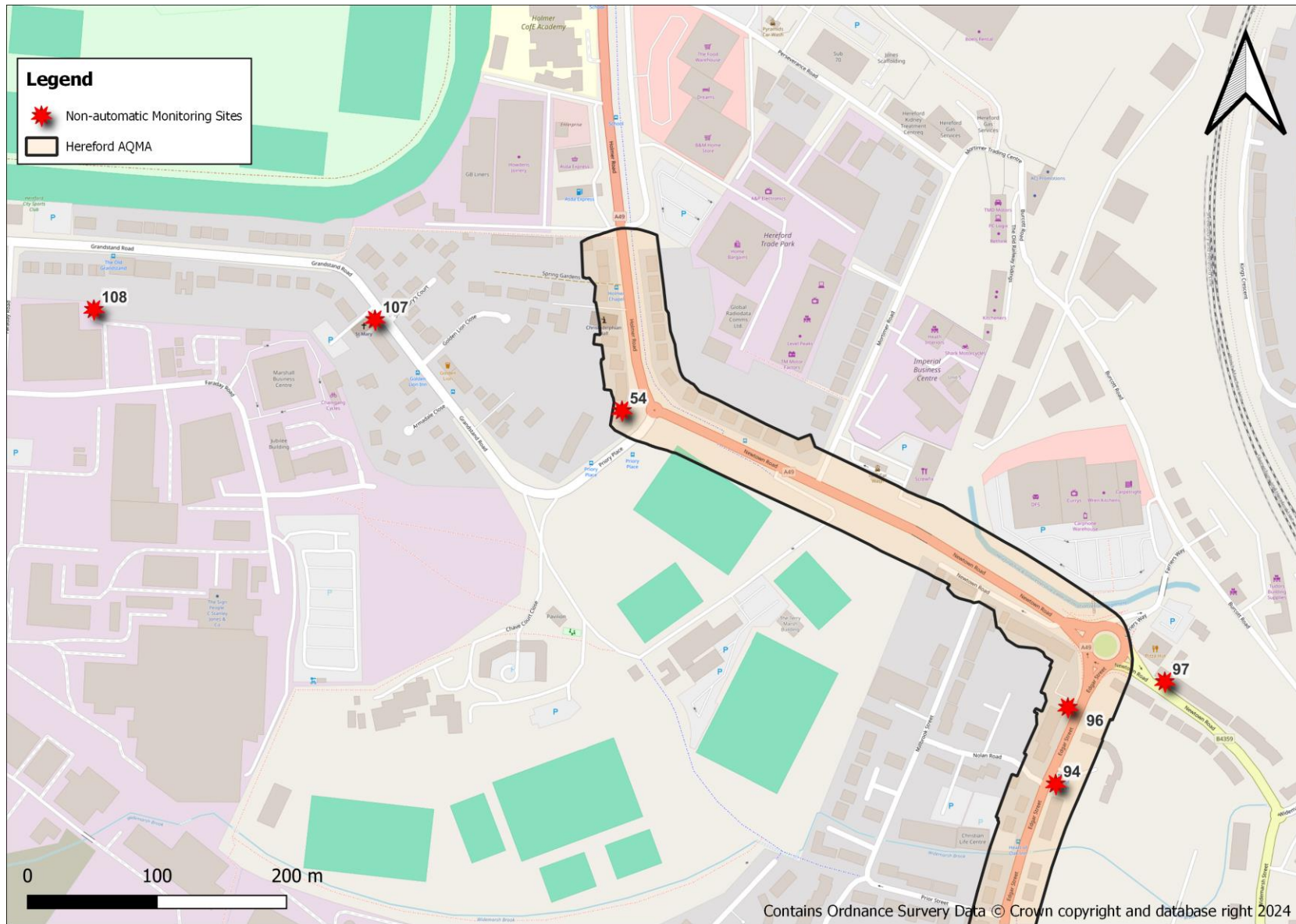


Figure D.4 – Map of monitoring sites in within and in vicinity of Hereford AQMA south end

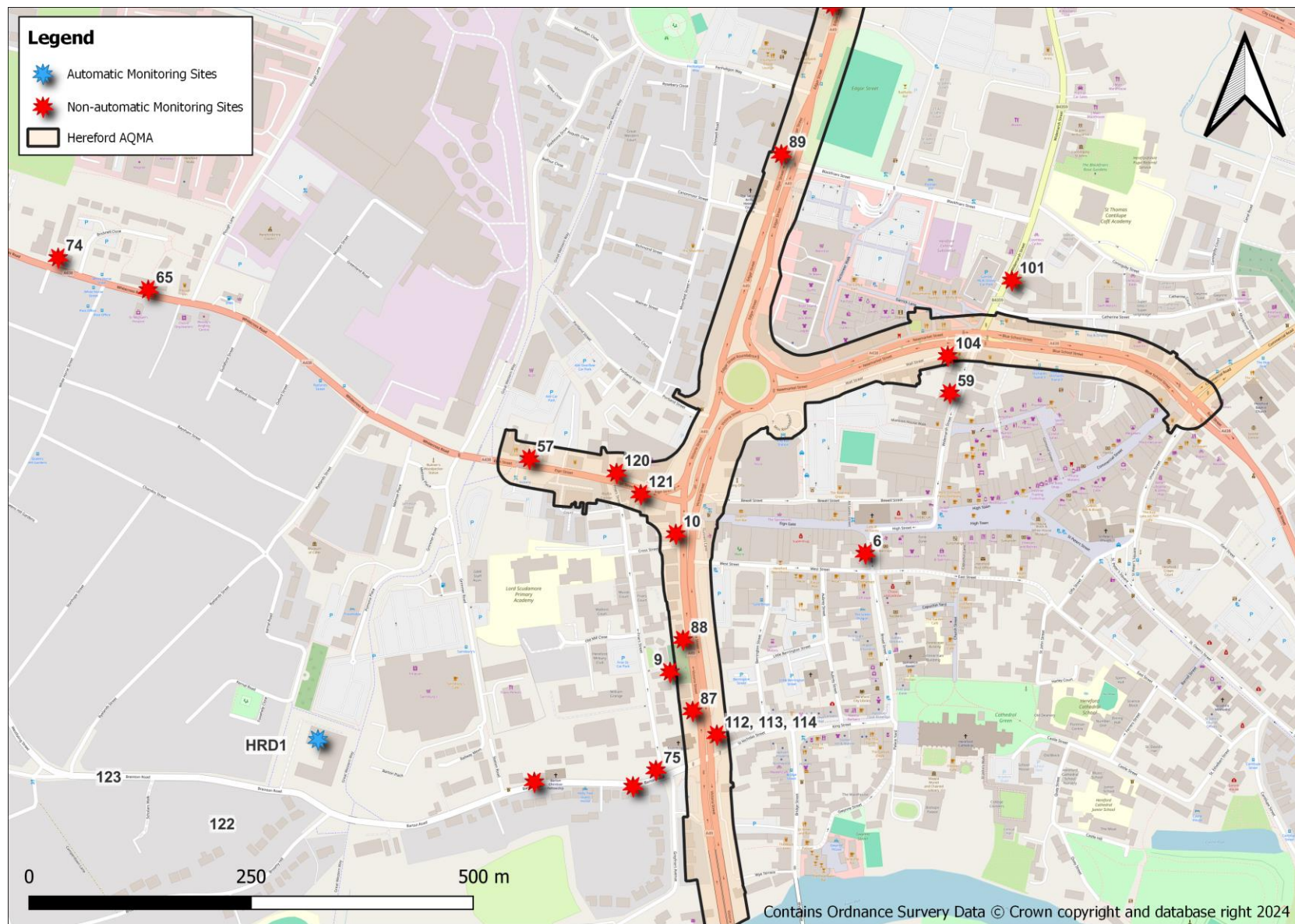


Figure D.5 – Map of monitoring sites in within and in vicinity of Hereford AQMA south of the river Wye

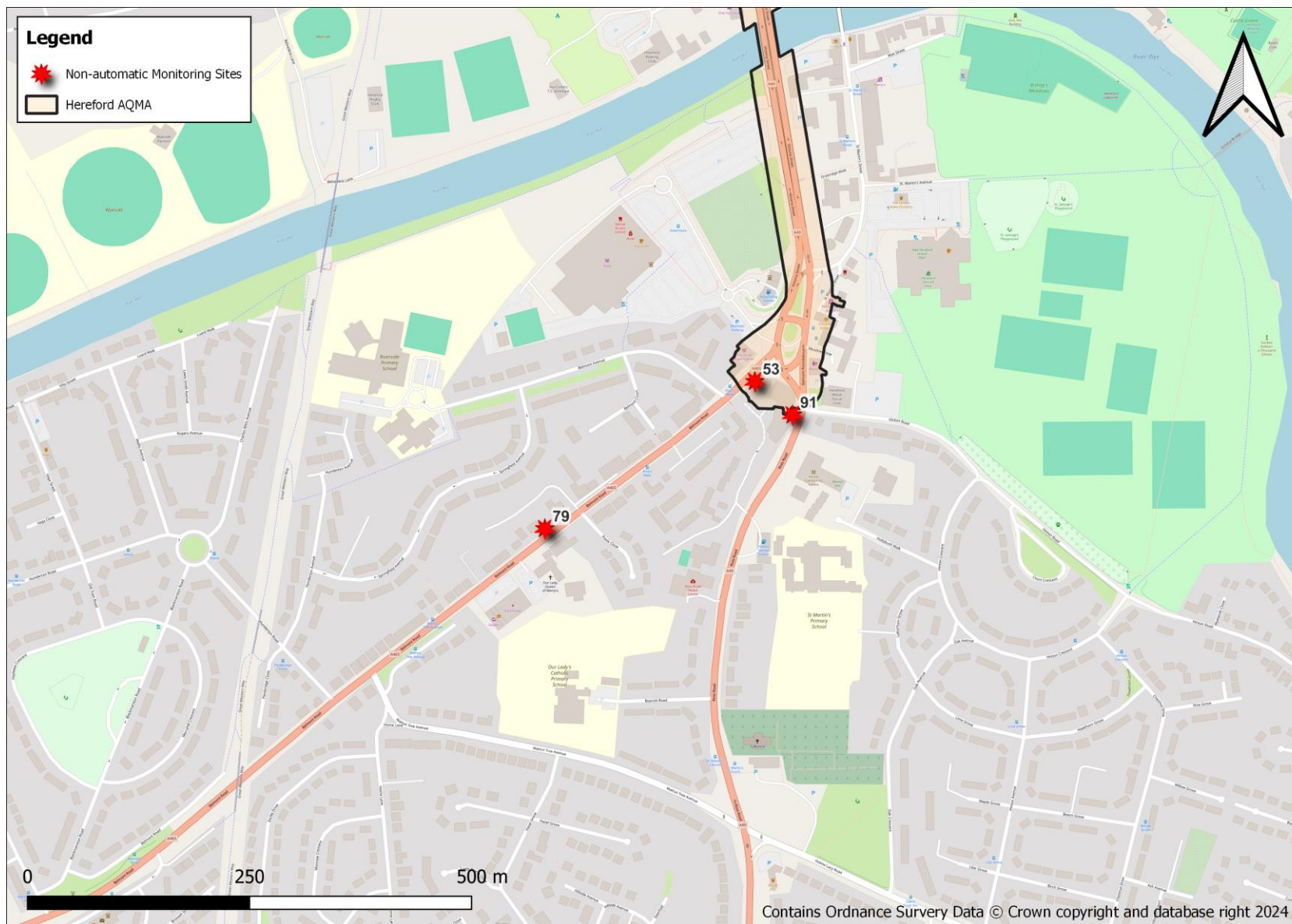


Figure D.6 – Map of monitoring sites in within and in vicinity of Bargates AQMA

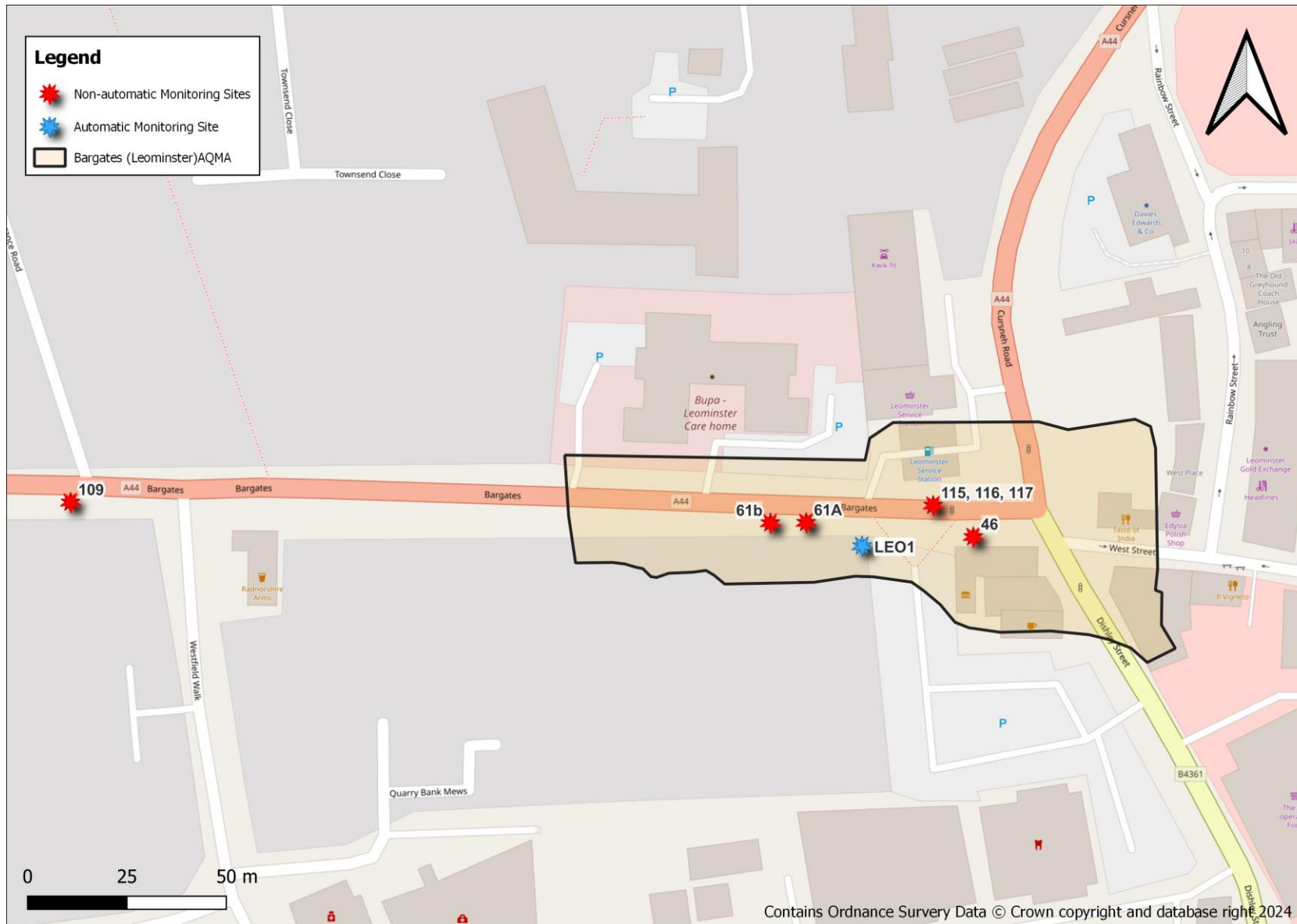


Figure D.7 – Map of monitoring sites north of Bargates AQMA



Appendix E: Summary of Air Quality Objectives in England

Table E.1 – Air Quality Objectives in England⁸

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

⁸ The units are in microgrammes of pollutant per cubic metre of air (µg/m³).

Glossary of Terms

Abbreviation	Description
AQAP	Air Quality Action Plan - A detailed description of measures, outcomes, achievement dates and implementation methods, showing how the local authority intends to achieve air quality limit values'
AQMA	Air Quality Management Area – An area where air pollutant concentrations exceed / are likely to exceed the relevant air quality objectives. AQMAs are declared for specific pollutants and objectives
ASR	Annual Status Report
Defra	Department for Environment, Food and Rural Affairs
DMRB	Design Manual for Roads and Bridges – Air quality screening tool produced by National Highways
EU	European Union
FDMS	Filter Dynamics Measurement System
LAQM	Local Air Quality Management
NO ₂	Nitrogen Dioxide
NO _x	Nitrogen Oxides
PM ₁₀	Airborne particulate matter with an aerodynamic diameter of 10µm or less
PM _{2.5}	Airborne particulate matter with an aerodynamic diameter of 2.5µm or less
QA/QC	Quality Assurance and Quality Control
SO ₂	Sulphur Dioxide

References

- Local Air Quality Management Technical Guidance LAQM.TG22. August 2022. Published by Defra in partnership with the Scottish Government, Welsh Assembly Government and Department of the Environment Northern Ireland.
- Local Air Quality Management Policy Guidance LAQM.PG22. August 2022. Published by Defra in partnership with the Scottish Government, Welsh Assembly Government and Department of the Environment Northern Ireland.
- Chemical hazards and poisons report: Issue 28. June 2022. Published by UK Health Security Agency
- Air Quality Strategy – Framework for Local Authority Delivery. August 2023. Published by Defra.