Broxbourne Borough Council

Annual Status Report 2023

Bureau Veritas

July 2023

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Document Control Sheet

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BOROUGH OF BROXBOURNE

2023 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: July, 2023

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Report Reference Number	Broxbourne 2023 ASR
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Executive Summary: Air Quality in Our Area

Air Quality in Broxbourne Borough Council

Air pollution is associated with a number of adverse health impacts. It is recognised as a contributing factor in the onset of heart disease and cancer. Additionally, air pollution particularly affects the most vulnerable in society: children, the elderly, and those with existing heart and lung conditions. There is also often a strong correlation with equalities issues because areas with poor air quality are also often less affluent areas[1,2].

The mortality burden of air pollution within the UK is equivalent to 29,000 to 43,000 deaths at typical ages[3], with a total estimated healthcare cost to the NHS and social care of £157 million in 2017[4].

Broxbourne is a unitary council is the Southeast of England, with a population of approximately 99,007[5] (2021). It is located at the southeast of Hertfordshire.

There are currently three Air Quality Management Areas (AQMAs) declared within the borough. All have been designated due to exceedances of the annual mean air quality objective (AQO) for nitrogen dioxide (NO_2) and NO_2 1 hour mean AQO. The elevated concentrations are caused primarily by road traffic emissions. The AQMAs are:

- AQMA 1 Arlington Crescent to Abbey Road, first declared in February 2004 and amended in March 2016;
- AQMA 4 Eleanor Cross Road/Monarchs Way, declared in March 2016; and
- AQMA 6 Great Cambridge Road (A10) & College Road, declared in May 2017.

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[1] Public Health England. Air Quality: A Briefing for Directors of Public Health, 2017

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

[3] Defra. Air quality appraisal: damage cost guidance, January 2023

[4] Public Health England. Estimation of costs to the NHS and social care due to the health impacts of air pollution: summary report, May 2018

[5] ONS. Estimates of the population for the UK, England, Wales, Scotland and Northern Ireland. Available at: https://www.ons.gov.uk/peoplepopulationandcommunity/populationandmigration/populationestimates/datasets/populationestimatesforukenglandandwalesscotlandandnorthernireland

In 2022, Broxbourne Borough Council undertook passive monitoring (non-automatic monitoring) for nitrogen dioxide (NO_2) at 44 sites across the district. No automatic monitoring was carried out. Three sites reported an annual mean NO_2 concentration exceeding the AQS objective of 40µg/m^3. These were BB51 (40.9µg/m^3) and BB54 (43.0µg/m^3), located within AQMA No.4 (Eleanor Cross Road / Monarchs Way) and BB28 (42.2µg/m^3), located in AQMA 6 (Great Cambridge Road). No other site reported a concentration within 10% of the AQS objective (36µg/m3). BB51, BB28 and BB54 are not located at relevant exposure, therefore fall-off with distance calculations are required to predict the annual mean NO_2 concentration at the point of nearest relevant exposure. From doing this, none of these sites were shown to be exceeding at the nearest relevant exposure; 34.8µg/m^3 (BB51), 31.0µg/m^3 (BB28) and 36.4µg/m^3 (BB54) but the predicted concentration at the closest receptor of BB54 was still within 10% the AQS objective.

Most monitoring locations have reported 2022 annual mean NO_2 concentrations below the 2021 reported concentrations, with only ten sites showing a slight increase (BB04, BB07, BB16, BB18, BB19, BB22, BB25, BB31, BB34 and BB37). The current monitoring locations are constantly reviewed with respect to any hotspot area(s) of pollution being identified.

No sites reported a concentration in excess of 60µg/m^3, in line with LAQM guidance there was no risk of breaching the 1-hour NO_2 AQS objective in 2022.

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[6] sets out actions that will drive continued improvements to air quality and to meet the new national interim and long-term $PM_{2.5}$ targets. The National Air Quality Strategy, published in 2023, provides more information on local authorities' responsibilities to work towards these new targets and reduce $PM_{2.5}$ in

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

their areas. The Road to Zero[7] details the approach to reduce exhaust emissions from road transport through a number of mechanisms; this is extremely important given that the majority of Air Quality Management Areas (AQMAs) are designated due to elevated concentrations heavily influenced by transport emissions.

Key measures in 2022 were:

- Recommencement of Broxbourne Borough Council's anti-idling campaign. The Council has actively participated with the Herts & Beds & Neighbouring Authorities sub group. The overarching objectives of the sub group are to increase knowledge on:
    1. How air pollution can impact resident's health,
    2. How individuals can reduce their pollution footprint through positive air quality practice, and
    3. How Hertfordshire residents can reduce personal exposure to air pollutants (focus on vulnerable groups/individuals).

Conclusions and Priorities

AQMA 1 Arlington Crescent to Abbey Road and AQMA 6 Great Cambridge Road (A10) & College Road have been compliant for the past three years (2020 to 2022). During 2022, the maximum reported NO_2 annual mean concentration within the AQMA 1 was within 10% of the AQO (36.2µg/m^3) and within AQMA 6 it was below 10% of the AQO (31.3µg/m^3). Due to the nature of 2020, 2021 and the impact of the COVID-19 pandemic restrictions on traffic volumes and air quality, there is uncertainty with regard to whether 2020 and 2021 monitoring data will be considered an outlier when compared to the normal pollution trends until the long-term impacts are better understood. AQMA 4 Eleanor Cross Road/Monarchs Way has been compliant for the past four years and the reported NO_2 annual mean concentration in 2022 at a relevant receptor was 36.8µg/m^3, which is within 10% of the AQO. There are no revocations being considered within the Broxbourne Borough Council (BBC) and preparing an Air Quality Action Plan (AQAP) is a priority. No

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

exceedances were identified outside the current AQMAs, thus no new AQMAs will be declared.

Broxbourne Borough Council are in the process of preparing an AQAP for the AQMAs.

Broxbourne Borough Council will continue to assess new developments submitted through the planning process to ensure that any proposed developments are not detrimental to local air quality specially within the AQMAs. In addition, any new industrial processes will be regulated in line with The Environmental Permitting (England and Wales) Regulations 2016 (as amended).

Priorities and future commitments are:

- Prepare the AQAP for the AQMAs;
- Continue to provide electric vehicles (EV) charging points that are accessible and efficient by maintaining the existing 27 EV charging points;
- Consider air quality as part of planning procedures and policy. The Council's Planning Team have incorporated air quality into the Local plan.
- Encourage sustainable methods of travel by engaging with the workforce.
- Provide clear communication around sustainable travel to the residents.
- Actively engage with residents on Social media to encourage behaviour change to help improve air quality.
- Encourage remote/flexible working to reduce car usage.
- Engage with National campaigns, where appropriate to do so, such as Clean Air Day.
- Conduct anti-idle interventions around local schools. Continue working with local schools in the Borough to raise the profile of poor air quality and respiratory health impacts.
- Reduce idling at taxi ranks. Taxi ranks are regularly inspected, a newsletter goes out to remind the trade.
- Review the taxi licensing policy to consider sustainability.
- Collaborating with bus operators to introduce ultra-low emission vehicles into the bus fleet (new or retrofit). Target use of ULEV into the problem areas.
- Procure low emission vehicles for use by staff.
- Alternative fuel (EV) infrastructure development.
- Install rapid EV charging points within all Council-owned Car Parks.

- City link shuttle service to key towns, e.g. various proposals from the Broxbourne Transport Strategy (High Leigh, Brookfield/Cheshunt Lakeside, Park Plaza enhancements), Broxbourne borough – Enfield cross-boundary services; extending one or more TfL services to Park Plaza; extending the Brookfield service down into Enfield.
- Incentivise public transport usage, by provision of information about existing services, campaigns, season ticket loan/discounts and subsidised tickets. To provide the public with clear information, so that informed choices can be made.

Local Engagement and How to get Involved

Informing people about local air quality, in particular when pollution is elevated can help to protect those members of the community who are most sensitive to the health impacts associated with air pollution. Increasing public understanding of the sources and effects of air pollution can also motivate lifestyle changes which can help improve air quality, for example promoting sustainable travel as method of reducing air pollution.

Real-time monitoring data throughout Hertfordshire and Bedfordshire can be accessed via the Herts+Beds Air Quality Network. Free subscription to the Hertfordshire and Bedfordshire Air Pollution Alert System can also be carried out on the website, whereby alert messages will be sent to registered users if the air pollution in their area is forecast or measured to be moderate, high, or very high (based upon the UK's Air Quality Banding System).

Further information on Air Quality within Broxbourne, but also the ability to submit a nuisance report, is available on the Broxbourne Borough Council website. Broxbourne Borough Council also operates a Twitter account, whereby live updates are frequently posted.

There are numerous simple measures which the public may adopt in order to improve the air quality around them. Such measures include:

- 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;
- Avoid Idling whilst your vehicle is stationary;
- Purchasing low-emission electric and/or hybrid vehicles, with government funding and grants available;

- Upgrading boilers to newest and most efficient gas condensing boilers with lowest NO_x (and carbon) emissions;
- Conserving fuel efficiency of vehicles through ensuring correct tyre pressure is maintained;
- Ensuring your home is sufficiently insulated; and
- Installing sources of renewable energy such as solar panel electricity systems, also known as solar photovoltaics or wind turbines.

Local Responsibilities and Commitment

This ASR was prepared by Bureau Veritas on behalf of the Environmental Health Department of Broxbourne Borough Council with the support and agreement of the following officers and departments:

Peter Linkson - Director of Environmental Services

John Rekoumis - Environmental Health Technical Officer ACIEH

This ASR has been approved by:

Rebecca Broadbelt - Head of Environmental Health & Licensing

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 Environmental Health at:

Address: Environmental Health, Broxbourne Borough Council, Bishops' College Churchgate, Cheshunt, EN8 9XQ

Telephone: 01992 785 555

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1 Local Air Quality Management

This report provides an overview of air quality in Broxbourne Borough Council during 2022. 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 Broxbourne Borough 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

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 Broxbourne Borough Council can be found in Table 2.1. The table presents a description of the three AQMAs that are currently designated within Broxbourne Borough Council. Appendix D: Maps 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:

- NO_2 annual mean; and
- NO_2 1-hour 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
AQMA 1 Arlington Crescent to Abbey Road	Declared 04/02/2004 Amended 10/03/2016	NO2 Annual Mean	Within a residential Cul-de- sac adjacent to the M25. The AQMA was further extended in March 2016 to include residential properties along Lodge Crescent, Abbey Rd and High Street.	YES	63µg/m^3	36.2 µg/m^3	3 years	The Borough of Broxbourne's Single Air Quality Action Plan (in progress)	N/A
AQMA 4 Eleanor Cross Road/Monarchs Way	Declared 10/03/2016	NO2 Annual Mean	An area encompassing residential properties on Abbey Rd, King's Rd and Queen's Rd and including the Monarch's Way and Eleanor Cross Rd roundabout.	NO	78µg/m^3	43.5 (36.8)* µg/m^3	4 years	The Borough of Broxbourne's Single Air Quality Action Plan (in progress)	N/A

AQMA 6 Great Cambridge Road (A10) & College Road	Declared 05/05/2017	NO2 1 Hour Mean and Annual Mean	Encompassing dozens of residential properties and a school along the (A10) and College Rd, from Theobalds Lane junction up to the Brookfield Centre (B156 Flyover and B156/A10 Slip Rd.	NO	Exceedances of the 60µg/m^3 Hourly Mean and the 40µg/m^3 Annual Mean	42.7 (31.3)* µg/m^3	3 years	The Borough of Broxbourne's Single Air Quality Action Plan (in progress)	N/A

*Predicted concentration at the nearest receptor using the Fall off with Distance calculator (see Appendix C: Supporting Technical Information / Air Quality Monitoring Data QA/QC for further information).

☒ **Broxbourne Borough Council confirm the information on UK-Air regarding their AQMAs is up to date.**

☒ **Broxbourne Borough Council confirm that all current AQAPs have been submitted to Defra.**

Progress and Impact of Measures to address Air Quality in Broxbourne Borough Council

Defra's appraisal of last year's ASR concluded that:

The report is well structured, detailed, and provides the information specified in the Guidance. The following comments are designed to help inform future reports.

1. *BBC have presented NO_2 trends for monitoring locations both inside the AQMAs and outside of the AQMAs. This is extremely useful as it allows the reader to easily understand trends relating to NO_2 within the borough. This approach to data/trend presentation is encouraged for future reports.*
2. *The maps of the AQMA boundaries and the locations of the monitoring sites are clearly shown and labelled. This is good practice and should be continued for future reports.*
3. *In future reports, it would be good to have a section where planning applications are discussed and assessed, and whether they would have an impact on AQMA's.*
4. *The results of the monitoring sites inside the AQMA's are put together in Figure A.1. It would be good to separate this out so that there is a separate figure for each AQMA so that the reader can more clearly see if there are any exceedances within these AQMA's.*
5. *There is no discussion about whether the current AQMA's should be amended or revoked, and whether any new AQMA's should be declared. This is strongly recommended for future reports to ensure that the air quality monitoring in the local authority (LA) remains fit for purpose.*
6. *In Appendix D, it is recommended that any AQMA's that are included in all figures are labelled to ensure that the figures show the locations of the monitoring sites in relation to any AQMA's as clearly as possible.*

Based on Defra's appraisal of last year's ASR, BBC will continue to provide detailed ASRs in accordance with relevant Policy and Technical Guidance documents incorporating the comments from the previous year. The Council continues to assess new developments through the planning department to ensure that any proposed developments are not detrimental to local air quality. In addition, any new industrial processes will be regulated in line with The Environmental Permitting (England and Wales) Regulations 2016 (as amended).

Broxbourne Borough Council has taken forward a number of direct measures during the current reporting year of 2022 in pursuit of improving local air quality. Details of all measures completed, in progress or planned are set out in Table 2.2. Seven measures are included within Table 2.2, with the type of measure and the progress Broxbourne Borough Council have made during the reporting year of 2022 presented. Where there have been, or continue to be, barriers restricting the implementation of the measure, these are also presented within Table 2.2.

AQMA 1 Arlington Crescent to Abbey Road and AQMA 6 Great Cambridge Road (A10) & College Road have been compliant for the past three years (2020 to 2022). During 2022, the maximum reported NO_2 annual mean concentration within AQMA 1 was within 10% of the AQO (36.2µg/m^3) and within AQMA 6 it was below 10% of the AQO (31.3µg/m^3). Due to the nature of 2020, 2021 and the impact of the COVID-19 pandemic restrictions on traffic volumes and air quality, there is uncertainty with regard to whether 2020 and 2021 monitoring data will be considered an outlier when compared to the normal pollution trends until the long-term impacts are better understood. AQMA 4 Eleanor Cross Road/Monarchs Way has been compliant for the past four years and the reported NO_2 annual mean concentration in 2022 at a relevant receptor was 36.8µg/m^3, which is within 10% of the AQO. There are no revocations being considered within the Broxbourne Borough Council (BBC) and preparing an AQAP is a priority. No exceedances were identified outside the current AQMAs, thus no new AQMAs will be studied or declared.

Broxbourne Borough Council is in the process of preparing an Air Quality Action Plan for the AQMAs.

Broxbourne Borough Council will continue to assess new developments submitted through the planning process to ensure that any proposed developments are not detrimental to local air quality specially within the AQMAs. BBC has not identified any major sources relating to air quality within the reporting year of 2022. In addition, any new industrial processes will be regulated in line with The Environmental Permitting (England and Wales) Regulations 2016 (as amended).

Table 2.2 – Progress on Measures to Improve Air Quality

Measure No.	Measure	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	Disseminate up to date information about air quality.	Public Information	Via the Internet			Borough of Broxbourne		NO			Implementation	N/A	Number of visits to Broxbourne's air quality webpages and email and telephone queries.	Results of the NO_2 Diffusion tube network are updated annually on the air quality England	N/A
2	Anti-Idling Campaign	Other	Other	2022	2023	Local Authority & Local Schools	The Borough of Broxbourne	NO	Partially Funded	<£10k	Planning	N/A	Reduced nitrogen dioxide	Implementation on-going	N/A
3	Air Pollution Alert System	Public Information	Via other mechanisms	2022	2023	Borough of Broxbourne	Hertfordshire	NO	Fully Funded	<£10k	Implementation	N/A	Increase number of registered	Implementation on-going	N/A
4	AQ initiatives / awareness raising through SAA. Continuing to build on the schools programme to promote behaviour change for improved air quality and more active travel.	Public Information	Other	2022	2023	Borough of Broxbourne	Borough of Broxbourne	NO	Partially Funded	<£10k	Planning	N/A		Implementation on-going	Broxbourne Council, along with Herefordshire Council (Let's clean the Air) , are working to deliver and help facilitate a range of schools programmes and initiatives to raise awareness about Air Quality and change behaviours to reduce emissions to air.
5	Installation of EV Car Charging Points within Council car parks	Transport Planning and Infrastructure	Other	2021	2021	Local Authority & Office for Low Emission Vehicles (OLEV)	Office for Low Emission Vehicles (OLEV)	NO	Funded	£50k - £100k	Implementation	Reduced vehicle emissions	Installation of three Charging Points at five locations including the Council offices, Waltham Cross High Street and Eleanor Cross Road in Waltham Cross, Newnham Parade and Windmill Lane in Cheshunt	Completed	Logistical & Engineering challenges

Measure No.	Measure	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
6	Installation of EV Car Charging Points within Council car parks	Transport Planning and Infrastructure	Other	2021	2021	Local Authority & Office for Low Emission Vehicles (OLEV)	Office for Low Emission Vehicles (OLEV)	NO	Funded	£50k - £100k	Implementation	Reduced vehicle emissions	Installation of three Charging Points at five locations including the Council offices, Waltham Cross High Street and Eleanor Cross Road in Waltham Cross, Newnham Parade and Windmill Lane in Cheshunt	Implementation on-going	Logistical & Engineering challenges
7	Development of a Service Level Agreement between the Borough of Broxbourne and Yorkshire Energy Services CIC T/A YES Energy Solutions in determining resident's eligibility for Grants for Insulation and Heating	Promoting Low Emission Plant	Other Policy	2022	2023	Borough of Broxbourne and YES Energy Solutions	Government's Energy Company Obligations (ECO) scheme.	NO	Funded	-	Implementation	Reduced emissions of nitrogen dioxide	Reduced nitrogen dioxide	Ongoing	N.A.

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

As detailed in Policy Guidance LAQM.PG22 (Chapter 8), local authorities are expected to work towards reducing emissions and/or concentrations of $PM_{2.5}$ (particulate matter with an aerodynamic diameter of 2.5µm or less). There is clear evidence that $PM_{2.5}$ has a significant impact on human health, including premature mortality, allergic reactions, and cardiovascular diseases.

Currently there is no monitoring of $PM_{2.5}$ or PM_{10} completed within Broxbourne Borough Council, therefore no concentration values can be reported or estimated using the method as described in Box 7.7 of LAQM.TG(16), which provides a method for estimating $PM_{2.5}$ concentrations from PM_{10} measurements.

The Defra 2022 background maps (based on 2018 monitored concentrations) can be used to identify the predicted background $PM_{2.5}$ concentrations across the UK. For Broxbourne Borough Council, all predicted $PM_{2.5}$ background concentrations are well below the annual mean limit value for $PM_{2.5}$ (20µg/m^3)[8]. The maximum predicted concentration is 11.2µg/m^3, located within the 1 x 1km grid square with the centroid grid reference of 535500, 200500. This is an area to the southwest of Cheshunt and includes a section of the M25 and junction 25, the A10, some light industrial units, and a section of the West Anglia Main Line railway. It is important to note that these estimations do not take into consideration any impacts as a result of the COVID-19 pandemic. The background maps also provide a breakdown of sources. For this grid square, the majority of the $PM_{2.5}$ concentrations is estimated to arise from secondary $PM_{2.5}$ formation, which forms following chemical reactions of other gaseous atmospheric pollutants, such as NO_x, ammonia (NH_3), and volatile organic compounds (VOCs).

The Public Health Outcomes Framework data tool[9] compiled by Public Health England quantifies the mortality burden of $PM_{2.5}$ within England on a county and local authority scale. The 2021 fraction of mortality attributable to $PM_{2.5}$ pollution (indicator D01) across

[8] Defra. National air quality objectives. Available at: https://uk-air.defra.gov.uk/assets/documents/Air_Quality_Objectives_Update.pdf

[9] Public Health Outcomes Framework. Available at: https://fingertips.phe.org.uk/profile/public-health-outcomes-framework

England is 5.5%, and in contrast the fraction within Broxbourne is significantly above the national average at 6.0%. The regional average for the East of England is 5.5%. The 2021 estimates of the fraction of mortality attributable to $PM_{2.5}$ pollution range from 3.5% in the Isles of Scilly to 7.2% in the City of London.

Measures to improve air quality often have shared wins with other public health indicators, a good example being the encouragement of active travel and commuting leading to increased physical activity and increased wellbeing.

LAQM.TG(22) Table A.1 Action toolbox presents a list of measures that can be implemented to help reduce concentrations of $PM_{2.5}$. Some of the actions carried out by Broxbourne Borough Council which are shown in Table 2.2, and will likely be updated and included within the forthcoming AQAP, focus on reducing traffic volumes, improving traffic flow, switching to alternative modes of transport, and promoting the uptake of alternative fuels. Although not designed specifically for the reduction of $PM_{2.5}$, improvements in NO_2 concentrations will lead to a net reduction of $PM_{2.5}$ concentrations from combustion-based sources where both pollutants arise.

Whilst no specific measures have been acted upon in 2021 specifically focusing on $PM_{2.5}$, the Council is looking to include a number of measures to address $PM_{2.5}$ concentrations within the updated AQAP.

The majority of the borough of Broxbourne is designated as a smoke control area. Smoke control areas are a defined geographical region within which smoke cannot be legally emitted from a chimney, unless using authorised fuels or using exempt appliances. Broxbourne Council does not recommend bonfires in any circumstance. You can be fined if smoke drifts onto roads, action can be taken against nuisance odours, and all fires have a risk of spreading and causing a danger to life. Under new smoke control area rules, Broxbourne Borough Council is able to issue fixed penalty charge notices up to £300 to owners of chimneys where it is deemed too much smoke is being emitted, as well as issuing fines up to £1,000 where it is identified that unauthorised fuels are being burnt without an exempt appliance. The Defra has published a practical guide on these rules.

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

This section sets out the monitoring undertaken within 2022 by Broxbourne Borough Council and how it compares with the relevant air quality objectives. In addition, monitoring results are presented for a five-year period between 2018 and 2022 to allow monitoring trends to be identified and discussed.

Summary of Monitoring Undertaken

3.1.1 Automatic Monitoring Sites

Broxbourne Borough Council did not undertake any automatic monitoring during 2022.

3.1.2 Non-Automatic Monitoring Sites

Broxbourne Borough Council undertook non- automatic (i.e. passive) monitoring of NO_2 at 44 sites during 2022. Table A.1 in Appendix A presents the details of the non-automatic sites.

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

In 2022, six new non-automatic monitoring locations were installed. Three (BB54 to BB56) are in the AQMA 4, BB53 is north to the M25 near Teresa Gardens, BB58 by the B156 near Athenia Close and BB57 on Church Lane between AQMA 6 and Whitefields Road. Additionally, in site BB28, in the AQMA 6, a triplicate was collocated to increase the precision of the measurement.

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.

3.1.3 Nitrogen Dioxide (NO_2)

Table A.1 and Table A 2 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 2022 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.

During 2022, there were three monitoring locations within AQMA No.1: BB11, BB48, and BB52. BB52 reported a concentration of 36.5 µg/m^3, which is within 10% of the NO_2 annual mean AQS objective (36µg/m^3). Concentrations have decreased over the past five years, with a substantial decrease reported in 2020 and is attributed to the impacts of the COVID-19 pandemic.

Three additional monitors (BB54 to BB56) were located in AQMA No.4 in 2022, as there was only one monitoring site (BB51) in operation during previous years. In consequence, there were a total of 4 diffusion tubes within AQMA No.4 in 2022. BB51 and BB54 reported annual mean NO_2 concentrations above the AQS objective, 41.4µg/m^3 and 43.5µg/m^3 respectively. These sites are however not at a site of relevant exposure, and following fall-off with distance correction calculations, there is a predicted concentration of 35.1µg/m^3 and 36.8µg/m^3, which are below the AQS objective but within 10% of the AQS objective at the predicted receptor for site BB54) respectively at the nearest relevant receptors. BB55 and BB56 reported concentrations below 10% of the NO_2 annual mean AQS objective.

Within AQMA No.6, there are 8 monitoring sites: BB09, BB28, BB34, BB35, BB39, BB40, BB41 and BB42. As BB28 is the only site, within the AQMA No.6, where the reported NO_2 annual mean exceeds the AQS objective since 2020. At this site, two new diffusion tubes (BB59 and BB60) were added in 2022 to increase the precision of the measurement. In 2022, BB28 reported an exceedance of the NO_2 annual mean AQS objective, with a concentration of 42.7µg/m^3. BB28 is not located at a site of relevant exposure, and following fall-off with distance correction calculations, there is a predicted concentration of 31.3µg/m^3 at the nearest relevant receptor. All other sites reported concentrations lower than 36µg/m^3 (10% of the AQS objective). Annual mean concentrations reported in 2022

show a decrease in all sites of up to 2.7µg/m^3, except at site BB34, which shows an increase of 0.7µg/m^3 compared to 2021. Concentrations have decreased over the past five years, with a substantial decrease reported in 2020, attributed to the impacts of the COVID-19 pandemic.

At monitoring locations outside of any of the declared AQMAs, all NO_2 annual mean concentrations are below the AQS objective of 40µg/m^3, with the maximum being 33.2µg/m^3 reported at BB37. These show a similar pattern to the other monitoring locations, where the annual mean NO_2 concentrations reported in 2022 are slightly lower to those of 2021, and significantly lower than that reported in 2019.

It is hypothesised that the impacts of COVID-19 on traffic levels and patterns and local NO_2 concentrations are still present in 2022 having long-standing impacts on local air quality but further studies into the long-term impacts are required to fully determine the influence of the Covid-19 pandemic on air quality.

As per LAQM.TG(22), an annual mean NO_2 concentration greater than 60µg/m^3 can be used as a proxy to indicate whether there is an exceedance of the NO_2 1-hour mean AQS objective (no more than 18 hourly mean concentrations in exceedance of 200µg/m^3). None of the monitoring locations reported an annual mean concentration greater than 60µg/m^3, therefore it is not believed that there has been an exceedance of the hourly objective within Broxbourne.

Appendix A: Monitoring Results

Table A.1 – 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)
BB04	43 Winford Drive	Background	537000	206400	NO_2	No	5	2	No	2.3
BB07	Molesworth Hoddesdon	Background	537300	210500	NO_2	No	9	1	No	2.3
BB09	100 Great Cambridge Rd	Kerbside	535300	202300	NO_2	Y - AQMA 6 Great Cambridge Road	12.4	3.5	No	2.3
BB10	Teresa Gardens Waltham Cross	Background	535400	200100	NO_2	No	5	69	No	2.3
BB11	35 High Street Waltham Cross	Kerbside	536100	200100	NO_2	Y - AQMA 1 Arlington Crescent to Abbey Road	6.5	7.8	No	2.3
BB12	15 High Rd Wormley	Kerbside	536610	205823	NO_2	No	12.5	2	No	2.3
BB16	10 Colthurst Gardens	Background	535860	209590	NO_2	No	7	1	No	2.3
BB18	20 Mylne Close Cheshunt	Background	535500	203740	NO_2	No	8.5	2.5	No	2.3
BB19	10 Great Stockwood Road	Background	533010	203740	NO_2	No	11	1.5	No	2.3
BB20	1 The Chase Goffs Oak	Background	531900	203050	NO_2	No	10	0.3	No	2.3
BB22	Sturlas Way Waltham Cross	Kerbside	536000	200750	NO_2	No	3	3	No	2.3
BB23	Wickes Car Park	Background	536000	200680	NO_2	No	13	20	No	2.4
BB25	Jones Road	Kerbside	531500	201000	NO_2	No	68	41	No	2.3

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)
BB27	59 College Road, Cheshunt	Kerbside	535526	202276	NO_2	No	3	1.5	No	2.3
BB29	Brookfield Allotments, Halfhide Lane	Kerbside	535881	204198	NO_2	No	N/A	2	No	2.3
BB30	Winnipeg Way, Turnford	Kerbside	536008	204805	NO_2	No	24	1	No	2.3
BB31	Wormley Sports Club, Church Lane	Kerbside	536037	205815	NO_2	No	360	68	No	2.3
BB32	11 Baas Hill Close, Broxbourne	Kerbside	536042	206769	NO_2	No	14	1	No	2.3
BB33	High Leigh Farm, Box Lane	Kerbside	536070	209021	NO_2	No	22	4	No	1
BB34	Farm Close, Cheshunt	Kerbside	535315	202091	NO_2	Y - AQMA 6 Great Cambridge Road	5.8	16	No	2.3
BB35	86 College Road, Cheshunt	Kerbside	535727	202236	NO_2	Y - AQMA 6 Great Cambridge Road	10	3.5	No	2.3
BB36	Essex Rd at the rear of 6 Parrotts Field,	Roadside	537747	209054	NO_2	No	15	2	No	2.4
BB37	Junction of Burford St/Dinant Link Rd	Kerbside	537448	209135	NO_2	No	19.5	0.5	No	2.3
BB39	College Rd/Goffs Churchgate Academy, Cheshunt	Kerbside	535107	202160	NO_2	Y - AQMA 6 Great Cambridge Road	40.5	1	No	2.4
BB40	A10/College Rd Junction, Cheshunt	Roadside	535314	202244	NO_2	Y - AQMA 6 Great Cambridge Road	6.5	2	No	2.3
BB41	37 Beltona Gardens, Cheshunt	Roadside	535910	203822	NO_2	Y - AQMA 6 Great Cambridge Road	4	17	No	2.5
BB42	48 Hobbs Close, Cheshunt	Kerbside	535516	202989	NO_2	Y - AQMA 6 Great Cambridge Road	3	22	No	2.3
BB43	24 Westside, Turnford	Roadside	536434	205004	NO_2	No	11	1.5	No	2.5
BB44	High Rd/Bell Lane Roundabout (163 High Rd) Broxbourne	Kerbside	536673	206608	NO_2	No	2	8	No	2

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)
BB45	High Rd/Station Rd Junction, Broxbourne	Kerbside	536847	207237	NO_2	No	5	0.5	No	2
BB46	High Rd/Springfields Junction, Broxbourne	Kerbside	536883	207545	NO_2	No	5.9	1.3	No	2.4
BB47	Turners Hill 2, Cheshunt	Kerbside	535900	202200	NO_2	No	8	0.9	No	2.3
BB48	Parkside, outside Greenwich Court (Flats 13-24),Waltham Cross	Background	536190	200100	NO_2	Y - AQMA 1 Arlington Crescent to Abbey Road	7	22.7	No	2.2
BB49	Winston Churchill Way/High Street	Kerbside	535990	200800	NO_2	No	11	0.7	No	2.3
BB50	St Catherines School, Hoddesdon	Urban Background	537646	208979	NO_2	No	N/A	21.6	No	2
BB51	28 Eleanor Cross Road Waltham Cross	Kerbside	536265	200375	NO_2	Y - AQMA 4 Eleanor Cross Road / Monarchs Way	4.6	2.5	No	1.8
BB52	27/28 Arlington Crescent, Waltham Cross	Roadside	536224	200027	NO_2	Y - AQMA 1 Arlington Crescent to Abbey Road	0	13	No	2.2
BB53	Lamp Post 22: Outside Block 33-36 Teresa Gardens, Waltham Cross, EN8 8EQ	Urban Background	535434	200090	NO_2	No	7	3	No	2.3
BB54	Post outside Waltham House, Eleanor Road, Waltham Cross, EN8	Kerbside	536250	200391	NO_2	Y - AQMA 4 Eleanor Cross Road / Monarchs Way	5	3	No	2.3
BB55	Traffic Light No 4, Monarchs Way/Eleanor Cross Road Roundabout, Waltham Cross	Kerbside	536312	200436	NO_2	Y - AQMA 4 Eleanor Cross Road / Monarchs Way	5	3	No	2.3

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)
BB56	Sign Post 1, York Road/Eleanor Road Junction, Waltham Cross	Roadside	536414	200399	NO_2	Y - AQMA 4 Eleanor Cross Road / Monarchs Way	7	3	No	2.3
BB57	53 Church Lane, Cheshunt, Lampost 13	Roadside	535325	202913	NO_2	No	5	3	No	2.3
BB58	Lamp post by Athenia Close - Cuffley Hill	Roadside	531516	202874	NO_2	No	5	3	No	2.3
BB28, BB59, BB60	214 Great Cambridge Road, Cheshunt (3)	Kerbside	535466	202982	NO_2	Y - AQMA 6 Great Cambridge Road	11.5	3	No	2.3

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 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 2022 (%) (2)	2018	2019	2020	2021	2022
BB04	537000	206400	Background	100.0	100.0	38.3	32.7	26.7	27.8	13.3
BB07	537300	210500	Background	100.0	100.0	18.2	18.6	13.8	13.0	14.3
BB09	535300	202300	Kerbside	100.0	100.0	-	-	-	36.5	31.7
BB10	535400	200100	Background	100.0	100.0	19.4	18.0	14.8	13.9	21.1
BB11	536100	200100	Kerbside	100.0	100.0	**47.4**	**43.8**	34.5	34.2	30.6
BB12	536610	205823	Kerbside	82.7	82.7	30.1	28.5	22.3	21.0	26.2
BB16	535860	209590	Background	92.3	92.3	**41.3**	39.2	30.3	31.2	16.6
BB18	535500	203740	Background	100.0	100.0	33.2	31.7	24.6	26.9	13.3
BB19	533010	203740	Background	100.0	100.0	20.5	20.3	16.2	15.4	13.5
BB20	531900	203050	Background	100.0	100.0	39.0	34.1	25.5	26.5	13.8
BB22	536000	200750	Kerbside	100.0	100.0	18.3	17.4	13.3	13.0	29.8
BB23	536000	200680	Background	100.0	100.0	21.5	19.1	14.0	13.2	22.2
BB25	531500	201000	Kerbside	100.0	100.0	19.3	18.5	14.0	13.7	16.5

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 2022 (%) (2)	2018	2019	2020	2021	2022
BB27	535526	202276	Kerbside	100.0	100.0	-	-	39.4	**41.3**	26.2
BB29	535881	204198	Kerbside	90.4	90.4	38.6	33.1	27.9	28.4	23.6
BB30	536008	204805	Kerbside	92.3	92.3	31.8	31.9	22.4	22.2	16.7
BB31	536037	205815	Kerbside	100.0	100.0	**46.9**	37.3	32.6	34.4	15.4
BB32	536042	206769	Kerbside	100.0	100.0	23.8	21.7	18.4	15.0	15.8
BB33	536070	209021	Kerbside	84.6	84.6	37.0	33.6	24.8	26.5	11.7
BB34	535315	202091	Kerbside	100.0	100.0	35.2	27.7	22.7	24.4	23.5
BB35	535727	202236	Kerbside	92.3	92.3	24.3	23.0	17.5	17.5	22.3
BB36	537747	209054	Roadside	82.7	82.7	21.5	21.7	15.4	14.6	18.5
BB37	537448	209135	Kerbside	92.3	92.3	21.9	21.9	15.6	15.7	33.2
BB39	535107	202160	Kerbside	92.3	92.3	17.8	13.8	12.5	11.8	19.5
BB40	535314	202244	Roadside	100.0	100.0	34.5	30.6	25.0	22.7	32.4
BB41	535910	203822	Roadside	100.0	100.0	33.4	31.9	23.5	23.6	24.1
BB42	535516	202989	Kerbside	92.3	92.3	34.7	31.4	26.4	20.6	21.2

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 2022 (%) (2)	2018	2019	2020	2021	2022
BB43	536434	205004	Roadside	82.7	82.7	**46.9**	**42.0**	33.5	32.8	24.0
BB44	536673	206608	Kerbside	92.3	92.3	31.2	27.2	20.8	19.8	21.5
BB45	536847	207237	Kerbside	82.7	82.7	**48.6**	**42.5**	33.7	35.1	21.2
BB46	536883	207545	Kerbside	92.3	92.3	35.7	31.8	25.3	24.8	24.1
BB47	535900	202200	Kerbside	100.0	100.0	33.8	30.4	23.9	22.2	27.3
BB48	536190	200100	Background	100.0	100.0	35.3	32.5	26.0	31.7	26.4
BB49	535990	200800	Kerbside	100.0	100.0	30.3	27.1	21.5	21.5	30.1
BB50	537646	208979	Urban Background	100.0	100.0	30.2	26.4	21.4	22.8	19.3
BB51	536265	200375	Kerbside	90.4	90.4	35.6	29.1	26.5	26.0	**41.4**
BB52	536224	200027	Roadside	100.0	100.0	**-**	**-**	18.6	20.2	36.2
BB53	535434	200090	Urban Background	76.9	76.9					17.2
BB54	536250	200391	Kerbside	67.3	67.3					**43.5**
BB55	536312	200436	Kerbside	76.9	76.9					28.2
BB56	536414	200399	Roadside	76.9	76.9					31.4

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 2022 (%) (2)	2018	2019	2020	2021	2022
BB57	535325	202913	Roadside	100.0	100.0					24.0
BB58	531516	202874	Roadside	100.0	100.0					22.1
BB28, BB59, BB60	535466	202982	Kerbside	100.0	100.0	**63.3**	**61.8**	**43.2**	**44.1**	**42.7**

☒ **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 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%).

Figure A.1 – Trends in Annual Mean NO_2 Concentrations in AQMA No.1

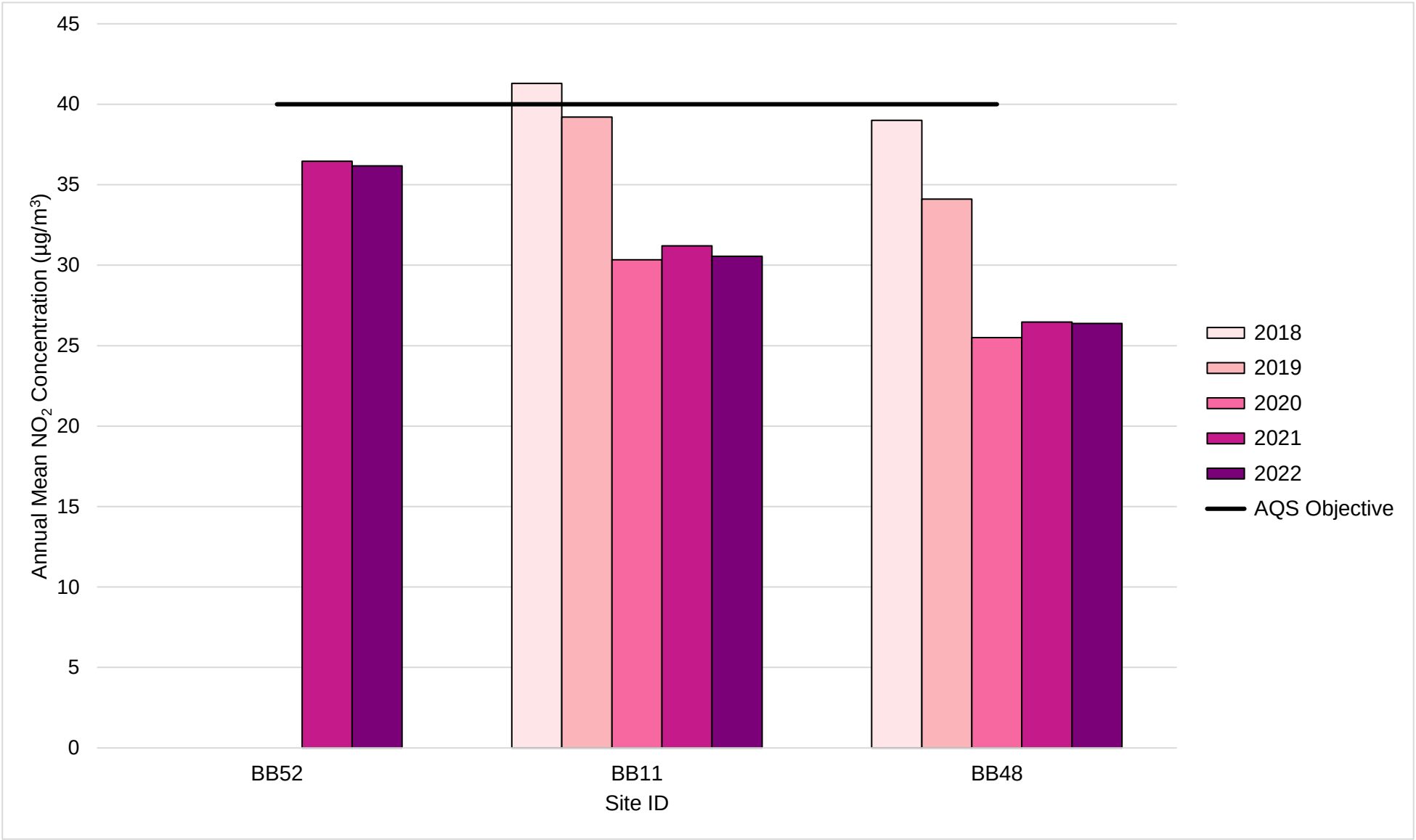


Figure A.2 – Trends in Annual Mean NO_2 Concentrations in AQMA No.4

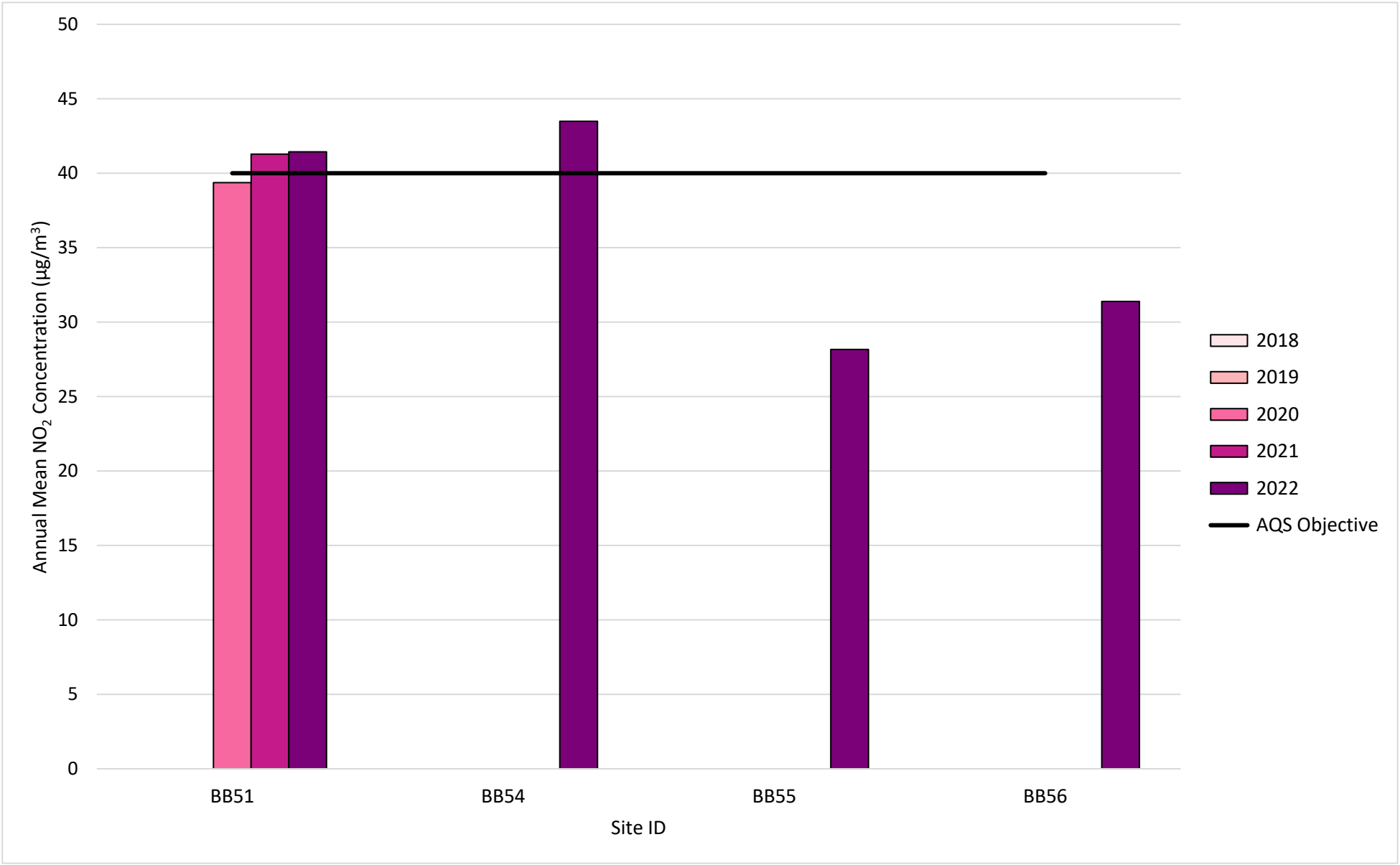


Figure A.3 – Trends in Annual Mean NO_2 Concentrations in AQMA No.6

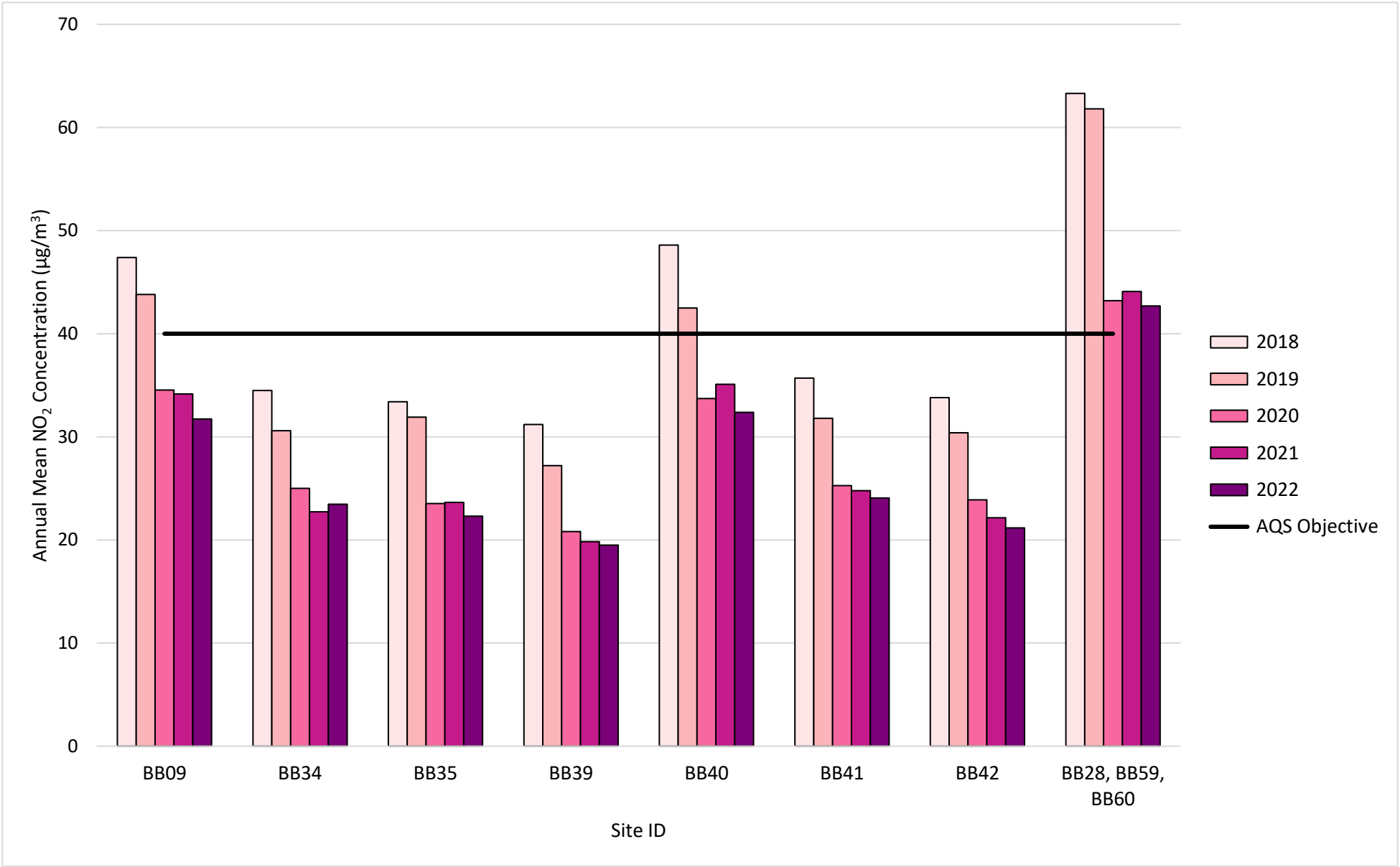
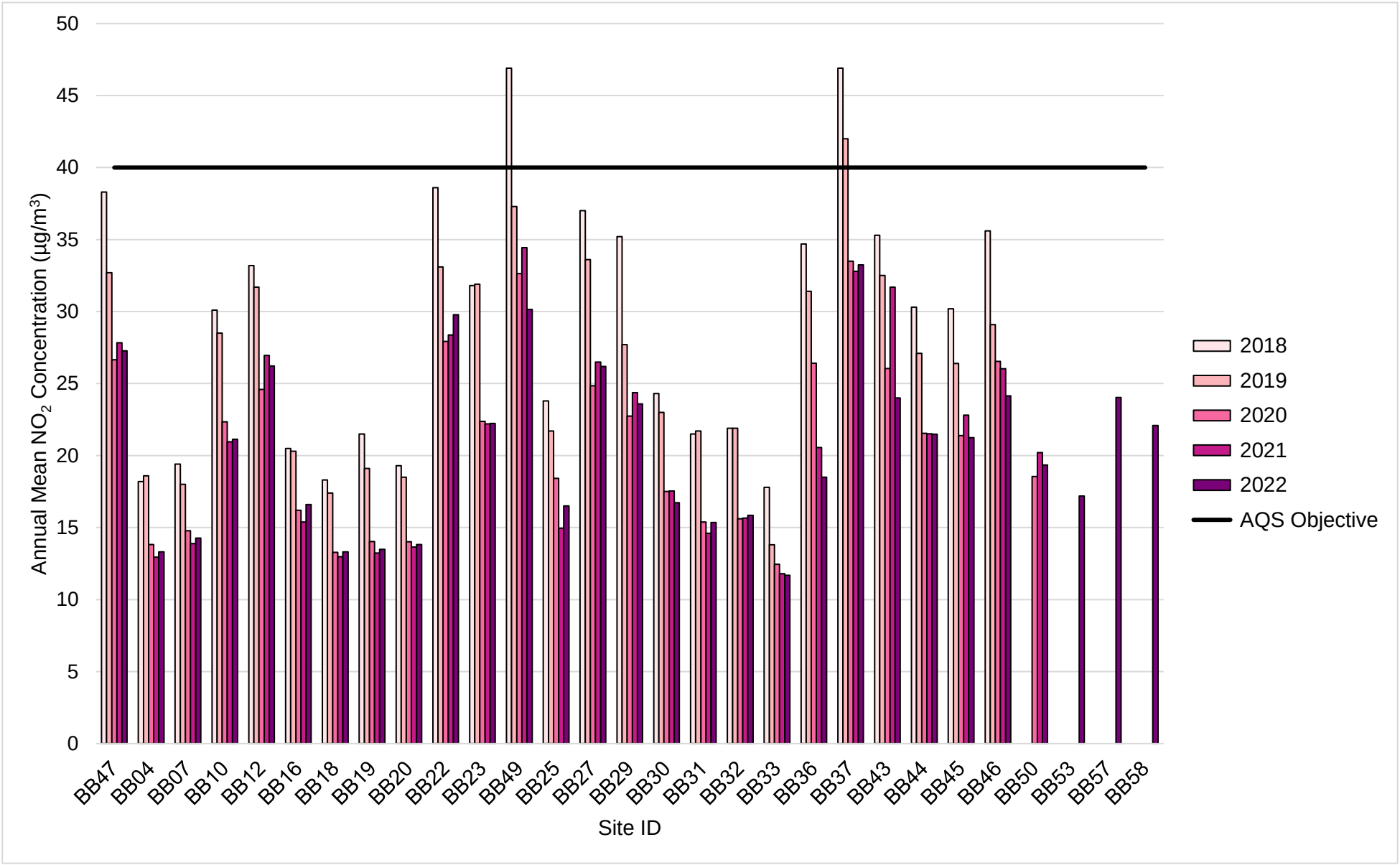


Figure A.4 – Trends in Annual Mean NO_2 Concentrations Outside any AQMA



Appendix B: Full Monthly Diffusion Tube Results for 2022

Table B.1 – NO_2 2022 Diffusion Tube Results (µg/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 (0.84)	Annual Mean: Distance Corrected to Nearest Exposure	Comment
BB04	537000	206400	26.5	16.0	19.2	10.9	10.9	10.1	10.2	11.5	13.6	18.2	20.6	22.4	15.9	13.3	-	
BB07	537300	210500	27.0	17.2	20.8	12.4	11.1	10.5	11.0	12.1	15.7	19.2	21.6	25.3	17.0	14.3	-	
BB09	535300	202300	47.1	33.1	47.2	37.2	15.5	33.3	38.2	42.3	41.0	38.3	35.7	44.5	37.8	31.7	-	
BB10	535400	200100	39.3	31.8	25.9	17.4	22.0	18.9	17.5	19.6	19.4	28.8	29.0	32.4	25.2	21.1	-	
BB11	536100	200100	47.9	32.8	49.0	31.2	29.6	27.4	33.5	34.5	36.1	37.0	38.7	38.9	36.4	30.6	-	
BB12	536610	205823	45.1		34.1	25.5		24.3	28.4	11.1	28.9	32.7	44.3	37.7	31.2	26.2	-	
BB16	535860	209590	27.0	20.1	23.2	12.8	13.3	10.8	13.6	14.5	16.0	22.8		43.3	19.8	16.6	-	
BB18	535500	203740	23.9	15.7	21.7	12.3	11.4	10.0	10.3	11.7	13.3	17.9	19.9	22.1	15.9	13.3	-	
BB19	533010	203740	26.2	15.7	20.7	11.2	11.8	10.2	11.9	11.0	14.4	18.3	19.7	21.7	16.1	13.5	-	
BB20	531900	203050	26.9	16.4	21.5	10.9	10.7	10.2	10.9	11.1	13.6	20.4	22.3	22.6	16.5	13.8	-	
BB22	536000	200750	43.3	31.6	39.3	26.6	25.6	28.0	34.3	36.0	38.0	38.5	44.1	40.2	35.4	29.8	-	
BB23	536000	200680	37.5	25.3	34.2	21.1	20.6	18.5	21.2	20.4	25.4	27.8	32.4	33.1	26.5	22.2	-	
BB25	531500	201000	23.9	21.7	21.6	12.8	16.5	18.5	16.4	16.7	17.9	22.5	26.1	21.1	19.6	16.5	-	
BB27	535526	202276	44.9	27.2	40.0	26.8	24.2	22.6	26.0	27.3	30.9	32.1	36.3	35.8	31.2	26.2	-	
BB28	535466	202982	58.8	44.6	46.0	42.7	46.4	40.0	47.5	46.5	50.7	43.6	53.9	48.4	-	-	-	Triplicate Site with BB28, BB59 and BB60 - Annual data provided for BB60 only
BB29	535881	204198	33.6	27.6	30.5	22.5	22.2	23.1	22.3	23.4	24.3		43.5	35.8	28.1	23.6	-	
BB30	536008	204805	28.8	18.3	23.0	15.7	14.9		14.2	16.2	17.2	20.6	24.1	25.9	19.9	16.7	-	
BB31	536037	205815	28.2	16.7	20.0	12.5	15.1	17.3	13.1	14.8	17.5	20.4	19.3	24.6	18.3	15.4	-	

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 (0.84)	Annual Mean: Distance Corrected to Nearest Exposure	Comment
BB32	536042	206769	30.8	17.3	23.9	13.1	14.0	12.8	12.9	14.8	17.1	21.7	21.5	26.6	18.9	15.8	-	
BB33	536070	209021	22.4		18.6	11.7	10.3	9.8	10.9	13.2		14.9	16.6	10.7	13.9	11.7	-	
BB34	535315	202091	39.9	27.3	27.4	22.1	23.1	21.9	23.8	24.1	28.9	29.8	32.2	34.7	27.9	23.5	-	
BB35	535727	202236		27.9	31.4	23.0	23.9	21.2	20.9	22.2	25.7	29.4	33.0	33.7	26.6	22.3	-	
BB36	537747	209054	33.4	23.4			16.7	15.3	15.8	15.3	18.9	25.2	28.6	27.7	22.0	18.5	-	
BB37	537448	209135	48.0	36.7	43.7	29.1	34.4		36.4	34.5	40.4	42.1	46.3	43.8	39.6	33.2	-	
BB39	535107	202160	35.6	25.4	27.8	22.3	21.6	8.5	19.8	19.6	23.8	23.3		27.8	23.2	19.5	-	
BB40	535314	202244	46.0	33.7	48.2	36.5	33.3	33.9	37.2	37.5	38.3	35.7	40.6	41.5	38.5	32.4	-	
BB41	535910	203822	41.7	31.9	27.1	22.2	24.9	22.9	22.8	24.5	28.6	28.7	33.0	35.5	28.7	24.1	-	
BB42	535516	202989	36.8	26.6	26.5	21.3	21.0	19.8	20.3	21.4	24.5	27.0		32.2	25.2	21.2	-	
BB43	536434	205004	40.0	31.2	28.0	21.8	24.1		20.4	21.6	25.4		36.0	37.5	28.6	24.0	-	
BB44	536673	206608	34.0	25.3	27.6	18.9	21.3		19.3	22.6	25.2	26.4	28.4	32.3	25.6	21.5	-	
BB45	536847	207237	39.8	21.1	29.9	20.9	18.3	18.0		21.4	20.7		29.5	33.3	25.3	21.2	-	
BB46	536883	207545	41.6	27.5	32.2	24.7	25.4	21.5	25.1	25.2	27.7	29.7		35.5	28.7	24.1	-	
BB47	535900	202200	45.2	32.5	33.8	30.0	27.3	26.0	27.3	29.2	31.0	33.2	37.2	37.1	32.5	27.3	-	
BB48	536190	200100	40.7	30.5	37.2	24.5	25.0	22.8	26.7	27.7	31.3	36.0	37.1	37.5	31.4	26.4	-	
BB49	535990	200800	40.7	37.1	43.3	35.9	33.2	26.7	29.4	28.2	33.6	36.8	42.0	43.8	35.9	30.1	-	
BB50	537646	208979	34.2	17.4	28.8	20.6	17.3	8.6	20.1	22.8	26.2	25.6	25.7	28.9	23.0	19.3	-	
BB51	536265	200375	58.3	42.9	47.8		45.0	41.8	50.1	50.3	49.1	51.3	58.9	47.1	49.3	**41.4**	35.1	
BB52	536224	200027	50.5	48.5	51.8	34.4	32.9	38.3	41.0	37.6	37.9	45.2	52.4	46.5	43.1	36.2	-	
BB53	535434	200090				17.6	18.1	8.8	16.9	17.3	19.3	26.4	29.5	30.3	20.5	17.2	-	

DT ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean: Raw Data	Annual Mean: Annualised and Bias Adjusted (0.84)	Annual Mean: Distance Corrected to Nearest Exposure	Comment
BB54	536250	200391				45.3	46.4	22.6	49.6	48.9	55.8	43.6	46.8		44.9	**43.5**	36.8	
BB55	536312	200436				31.9	38.7	15.9	29.9	30.0	30.0	38.3	43.7	43.4	33.5	28.2	-	
BB56	536414	200399				25.6	32.2	20.1	42.1	36.6	37.4	46.7	58.1	37.6	37.4	31.4	-	
BB57	535325	202913	41.1	29.1	36.0	21.6	23.4	22.1	23.3	24.3	26.2	29.6	34.6	32.0	28.6	24.0	-	
BB58	531516	202874	41.9	24.7	29.9	25.2	22.0	19.4	21.9	22.5	24.4	25.4	28.1	29.9	26.3	22.1	-	
BB59	535466	202982	66.5	49.4	59.9	54.7	47.7	49.6	44.9	49.5	52.5	47.5	54.0	55.2	-	-	-	Triplicate Site with BB28, BB59 and BB60 - Annual data provided for BB60 only
BB60	535466	202982	64.5	51.5	62.9	52.3	52.5		52.3	51.6	50.6	45.8	48.7	51.8	50.8	**42.7**	31.3	Triplicate Site with BB28, BB59 and BB60 - Annual data provided for BB60 only

☒ **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.**

☒ **Broxbourne Borough Council confirm that all 2022 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 Broxbourne Borough Council During 2022

Broxbourne Borough Council has not identified any new sources relating to air quality within the reporting year of 2022.

Developers should always check with the local authority to determine whether an air quality assessment is required before submitting a planning application. The planning application is assessed by the Environmental Health Officer and in discussion with planning control is checked if an air quality assessment is required.

If an air quality assessment is needed, the Broxbourne authority will make a judgement on whether the proposed development is likely to significantly affect air quality or if it is located in an area of poor air quality ex. AQMAs. If a development is determined to result in a deterioration of air quality, the Broxbourne authority will often work with the developer to offset this impact by securing mitigation measures that will allow the development to progress. Similarly, if a development is of sensitive use and located in an area of poor air quality, the Broxbourne authority will work with the developer to ensure all measures are taken to secure acceptable air quality for new receptors.

Additional Air Quality Works Undertaken by Broxbourne Borough Council During 2022

Broxbourne Borough Council has not completed any additional works within the reporting year of 2022.

QA/QC of Diffusion Tube Monitoring

Broxbourne Borough Council's diffusion tubes in 2022 were supplied and analysed by Gradko International Ltd., using the 20% Triethanolamine (TEA) in water preparation method. Gradko's laboratory is UKAS accredited, participating in the AIR-PT Scheme (a continuation of the Workplace Analysis Scheme for Proficiency (WASP)) for NO_2 tube

analysis and the Annual Field Inter-Comparison Exercise. These provide strict performance criteria for participating laboratories to meet, thereby ensuring NO_2 concentrations reported are of a high calibre. The lab follows the procedures set out in the Harmonisation Practical Guidance. In the latest available AIR-PT results, AIR PT AR042 (January – June 2022), Gradko scored 100%. No results have been published for the rest of 2022 at the time of writing. The percentage score reflects the results deemed to be satisfactory based upon the z-score of < ± 2, which indicates satisfactory laboratory performance.

All local authority 27 co-location studies which use tubes supplied by Gradko with the 20% TEA in water preparation method in 2022 were rated as 'good', as shown by the precision summary results. This precision reflects the laboratory's performance and consistency in preparing and analysing the tubes, as well as the subsequent handling of the tubes in the field. Tubes are considered to have a "good" precision where the coefficient of variation of duplicate or triplicate diffusion tubes for eight or more monitoring periods during a year is less than 20%.

Further information on the precision summary results can be found on the LAQM website.

Monitoring in 2022 had been completed in adherence with the 2022 Diffusion Tube Monitoring Calendar, whereby most changeovers were completed within ±2 days of the specified date.

Diffusion Tube Annualisation

As per LAQM.TG(22), annualisation is required for any site with data capture less than 75% but greater than 25%. One site (BB54) required annualisation in 2022 due to low data capture. Urban background AURN sites used to complete this were London Haringey Priory Park South, London Bloomsbury, London North Kesteven and Borehamwood Meadow Park. These were selected as they were the nearest AURN urban background monitoring locations with greater than 85% data capture in 2022. Annualisation was completed using the latest version of the LAQM Diffusion Tube Data Processing Tool, and the outputs are presented in Table C.1.

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

Site ID	Annualisation Factor London Haringey Priory Park South	Annualisation Factor London Bloomsbury	Annualisation Factor London North Kensington	Annualisation Factor Borehamwood Meadow Park	Average Annualisation Factor	Raw Data Annual Mean	Annualised Annual Mean
BB54	1.1188	1.1538	1.1740	1.1689	1.1539	44.9	51.8

Diffusion Tube Bias Adjustment Factors

The diffusion tube data presented within the 2022 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.

Broxbourne Borough Council have applied a national bias adjustment factor of 0.84 to the 2022 monitoring data. A summary of bias adjustment factors used by Broxbourne Borough Council over the past five years is presented in Table C.2.

No co-location studies are carried out by Broxbourne Borough Council therefore a national factor has been used. The national factor for Gradko 20% TEA in water, as presented in the latest National Diffusion Tube Bias Factors Spreadsheet, was 0.84 based on 33 studies.

Table C.2 – Bias Adjustment Factor

Monitoring Year	Local or National	If National, Version of National Spreadsheet	Adjustment Factor
2022	National	03/23	0.84
2021	National	03/22	0.84
2020	National	03/21	0.81
2019	National	03/20	0.93
2018	National	03/19	0.92

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.

Fall-off with distance calculations were required at three sites where annual mean NO_2 concentrations were greater than 36µg/m^3, and the sites are not located at relevant exposure – BB51, BB54 and BB28. This was completed using the latest version of the LAQM Diffusion Tube Data Processing Tool, and the output from this is presented in Table C.3.

Table C.3 – NO_2 Fall off With Distance Calculations (concentrations presented in µg/m^3)

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
BB51	2.5	7.1	41.4	17.0	35.1	
BB54	3.0	8.0	43.5	17.0	*36.8*	*Predicted concentration at Receptor within 10% the AQS objective.*
BB28, BB59, BB60	3.0	14.5	42.7	14.7	31.3	

Appendix D: Maps of Monitoring Locations and AQMAs

Figure D.1 – Map of Non-Automatic Monitoring Sites

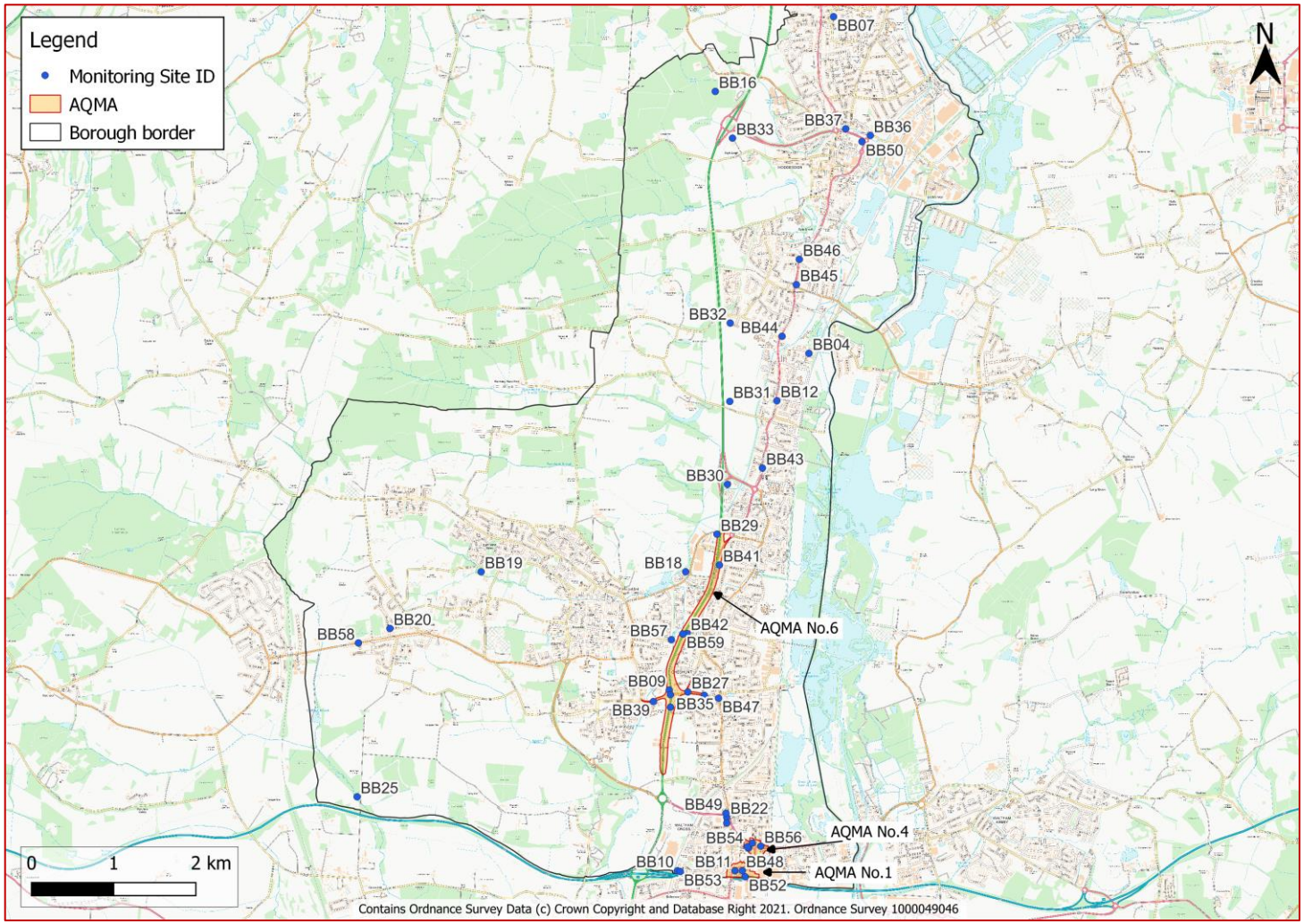


Figure D.2 – Map of Non-Automatic Monitoring Sites at Hoddeson

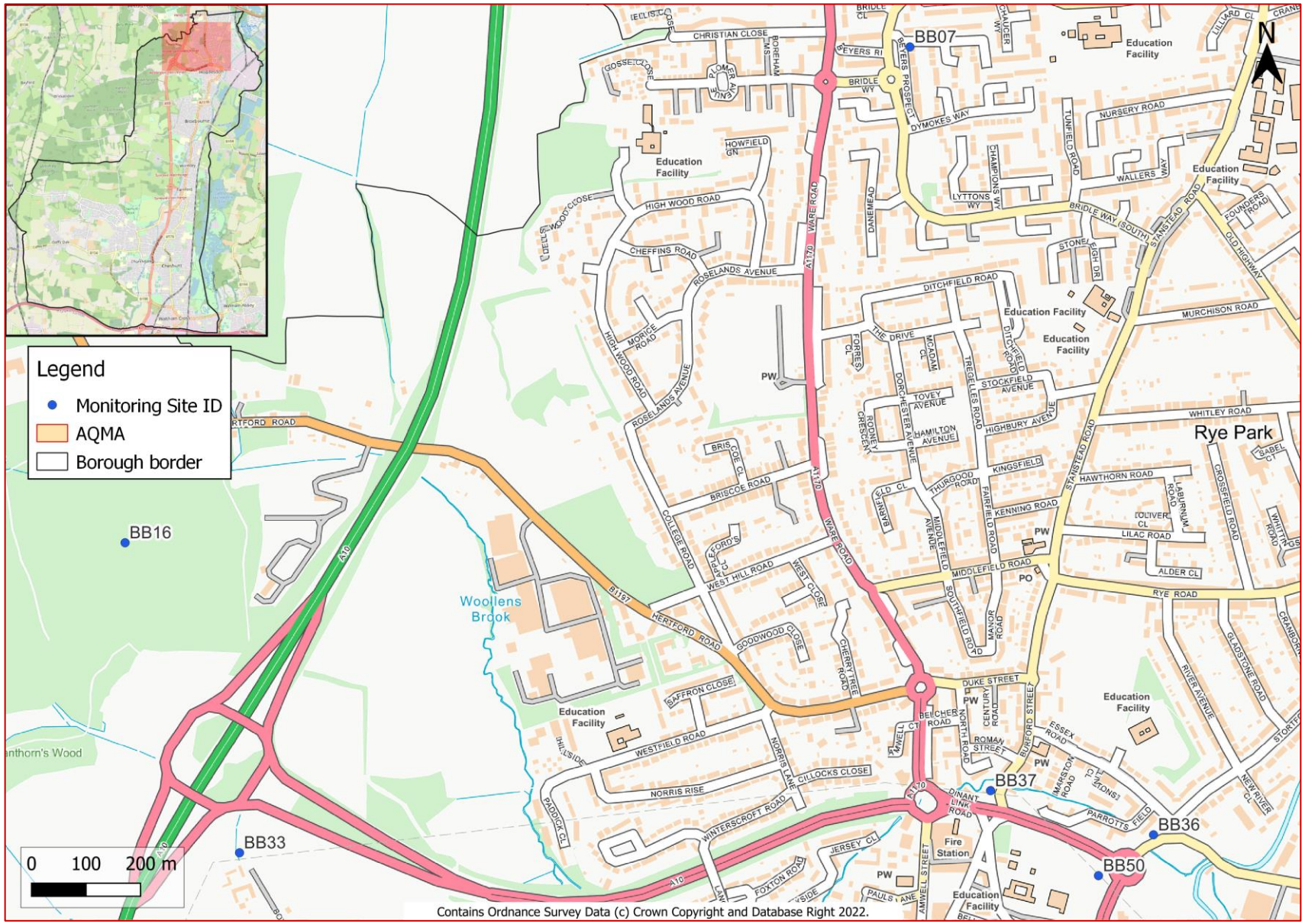


Figure D.3 – Map of Non-Automatic Monitoring Sites at North Broxbourne

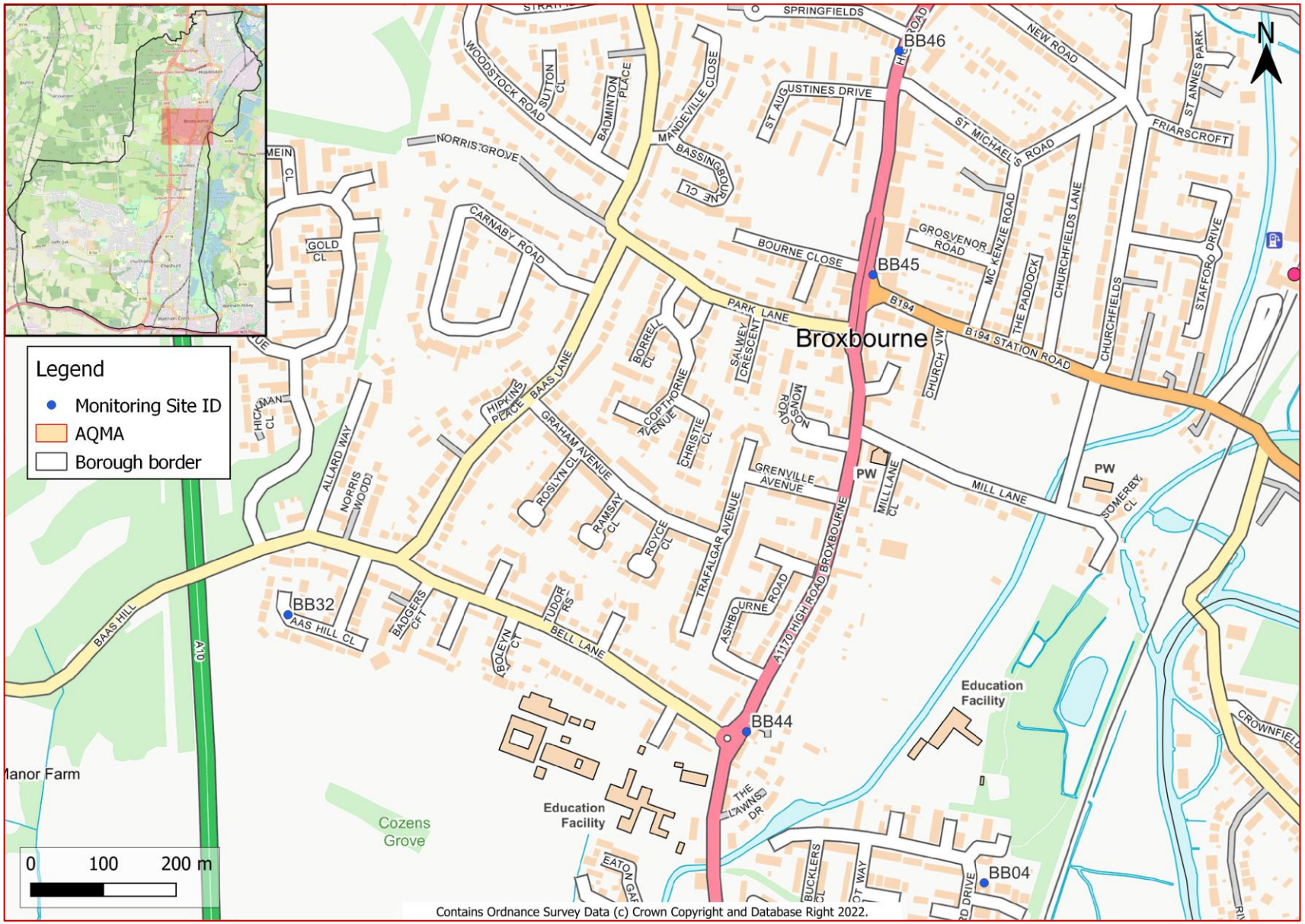


Figure D.4 – Map of Non-Automatic Monitoring Sites at South Broxbourne

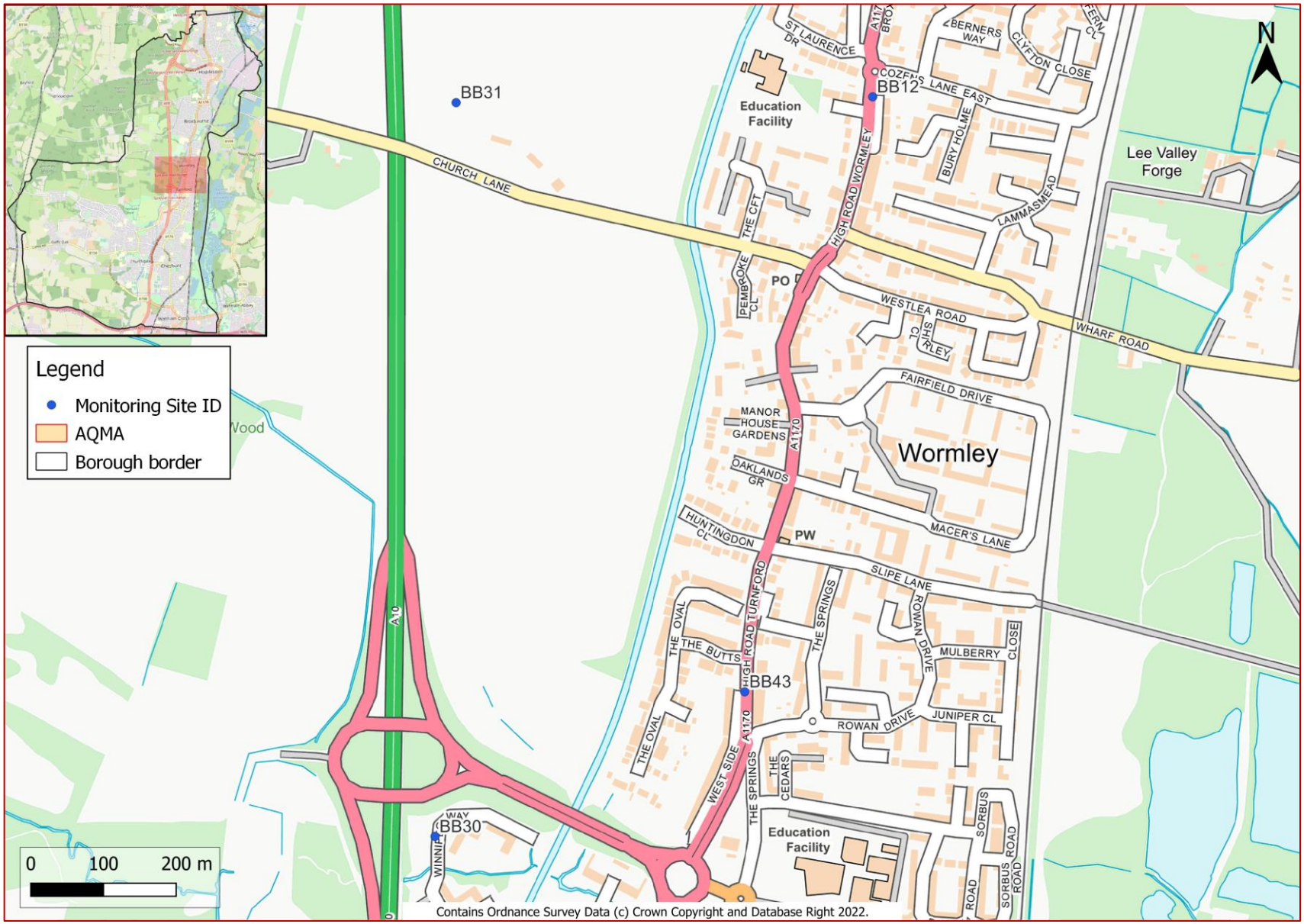


Figure D.5 – Map of Non-Automatic Monitoring Sites at Cheshunt

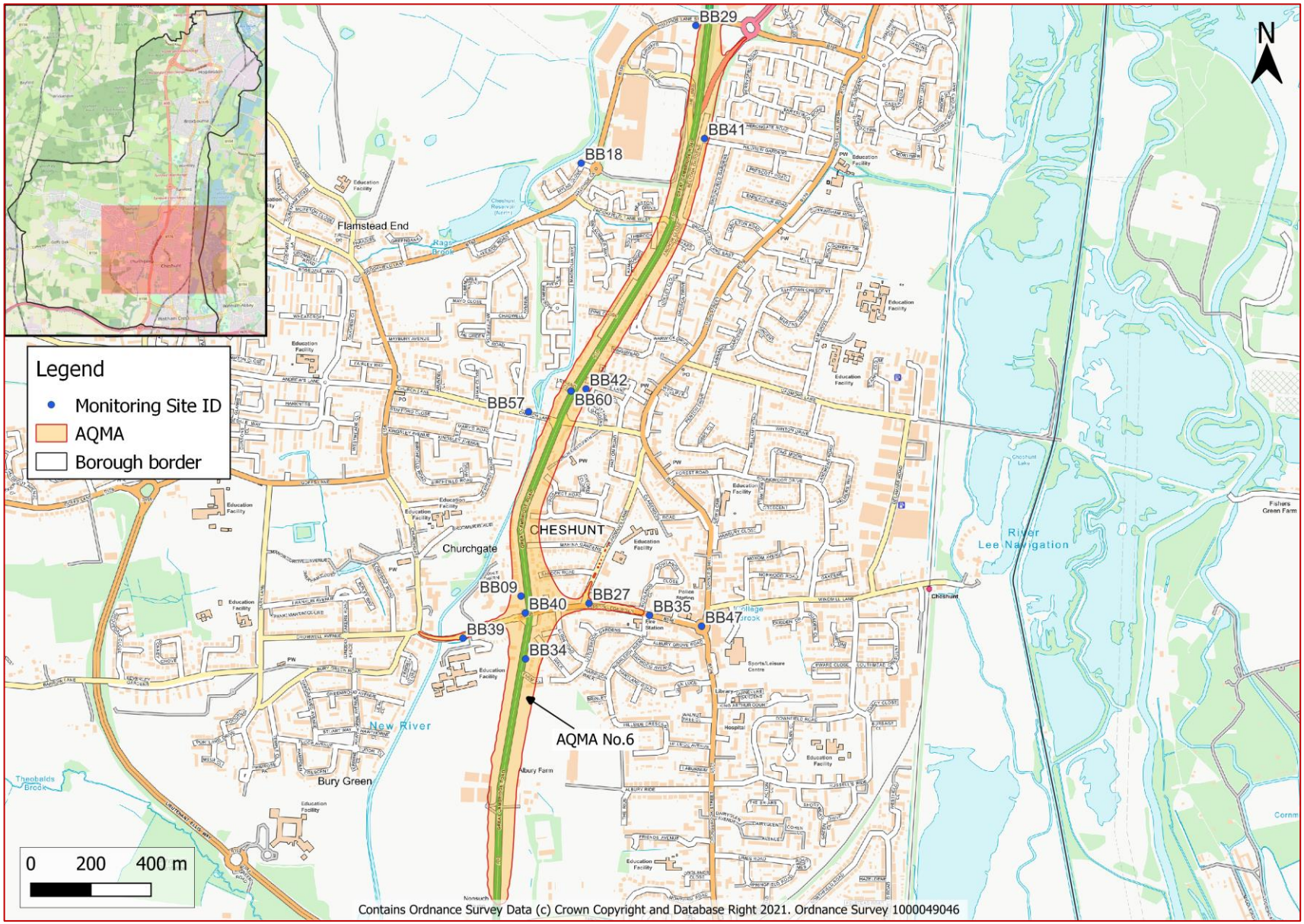


Figure D.6 – Map of Non-Automatic Monitoring Sites at Waltham Cross

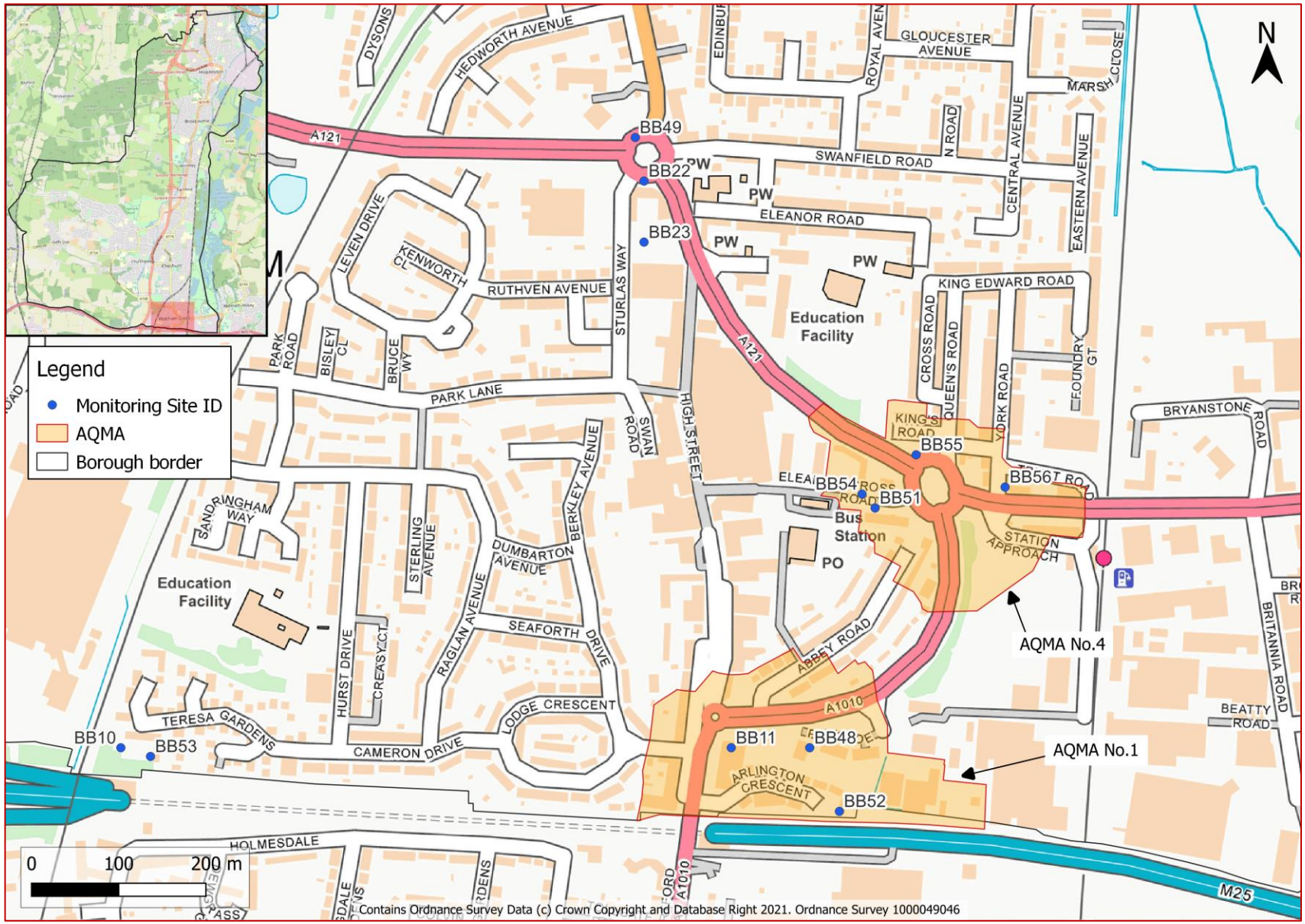


Figure D.7 – Map of Non-Automatic Monitoring Sites at Goff's Oak and Hamond Street

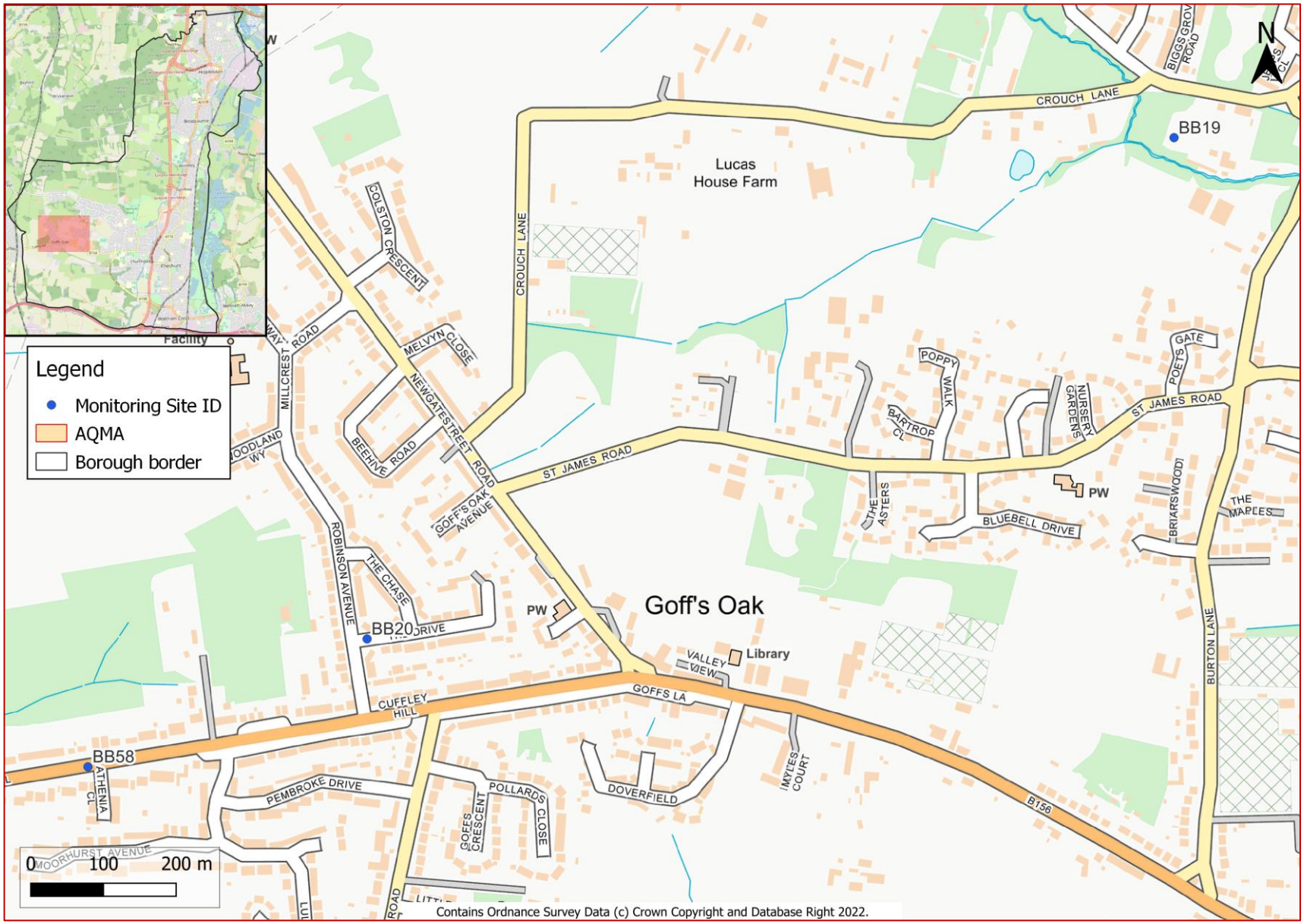
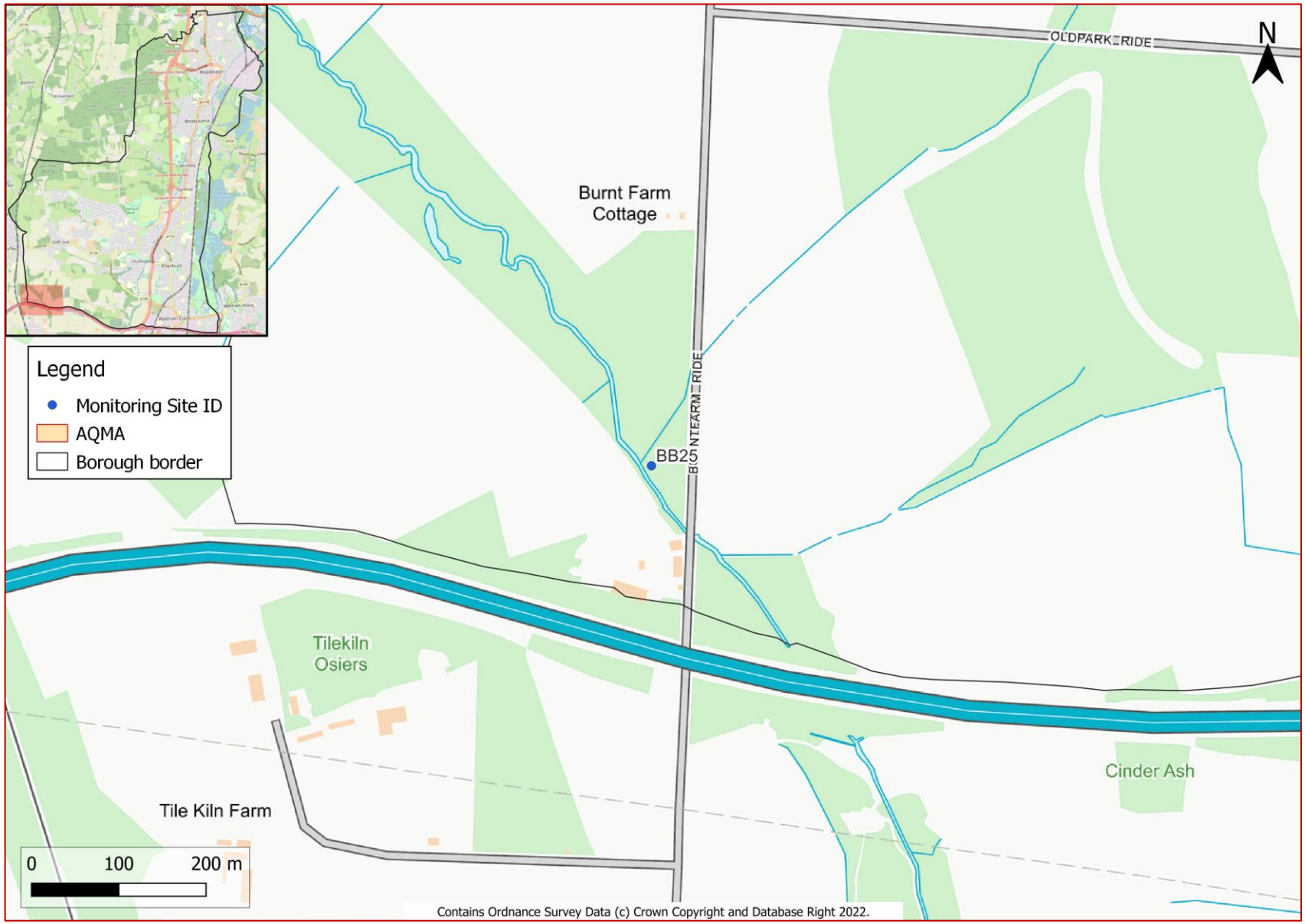


Figure D.8 – Map of Non-Automatic Monitoring Site: BB25



Appendix E: Summary of Air Quality Objectives in England

Table E.1 – Air Quality Objectives in England[10]

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

[10] The units are in micrograms 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
AQO	Air Quality Objectives
ASR	Annual Status Report
BBC	Broxbourne Borough Council
Defra	Department for Environment, Food and Rural Affairs
DMRB	Design Manual for Roads and Bridges – Air quality screening tool produced by National Highways
ECO	Energy Company Obligations
EU	European Union
FDMS	Filter Dynamics Measurement System
LA	Local Authority
LAQM	Local Air Quality Management
NO_2	Nitrogen Dioxide
NO_x	Nitrogen Oxides
OLEV	Office for Low Emission Vehicles
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
VOC	Volatile Organic Compounds

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.
- Broxbourne Borough Council Air Quality Reports – 2019, 2020, 2021, 2022 ASRs. Available at: https://www.broxbourne.gov.uk/airquality
- Broxbourne Borough Council Local Plan 2018-2033. Available at: https://www.broxbourne.gov.uk/planning/local-plan-2018-2033/1
- National Diffusion Tube Bias Adjustment Factor Spreadsheet, version 06/23. Published in June 2023.