# North Northamptonshire Council

# 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: September, 2023

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|---|---|
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# Executive Summary: Air Quality in Our Area

## Air Quality in North Northamptonshire

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].

In April 2021, Corby Borough Council, Kettering Borough Council, East Northamptonshire District Council and Borough Council of Wellingborough merged to become North Northamptonshire Council, a new unitary authority. This will bring new opportunities to how air quality is managed in the area with the intention of harmonising and uniting the diffusion tube network and ASR process.

In North Northamptonshire, sources of air pollution include recent developments, industry and transportation. There has been notable growth and regeneration in the Corby area in recent years, including the demolition of coal fire power station and former steelworks and the several residential developments. The area surrounding Wellingborough has also experienced high levels of residential development in recent years. The eastern part of the district is predominantly rural. In this area, as well as across the entire district, Nitrogen dioxide ($NO_2$) is the key pollutant of concern in the borough, which is primarily produced by road traffic. In 2022, pollutant concentrations were compliant in Kettering, Corby,

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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, March 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

Wellingborough and East Northamptonshire and as such there are no plans to introduce an AQMA in any of these areas.

In 2022, North Northamptonshire undertook monitoring at 107 non-automatic (diffusion tube) sites. This report includes the latest $NO_2$ results from diffusion tube monitoring carried out across the whole area and shows the trends over the last five years. The results of the monitoring highlight an overall decreasing trend in that time. However, the trend between 2020 and 2022 can often contradict this, with some increases in concentrations monitored in some locations. This is likely due to an increase in traffic in 2021 and 2022 compared to the restrictions on activity in 2020 due to the COVID-19 pandemic. 2022 concentrations are however below pre-pandemic levels. No concentrations exceeding the AQS objective value of 40 μg/m$^3$ were recorded in North Northamptonshire 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[5] 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[6] provides more information on local authorities' responsibilities to work towards these new targets and reduce PM$_{2.5}$ in 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.

As North Northamptonshire Council (NNC) does not have any AQMAs, there is no requirement for a formal AQAP. However, in line with policy guidance, the council are in the process of drafting a Local Air Quality Strategy and several actions have already been

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

[6] Defra. Air quality strategy: framework for local authority delivery, April 2023

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

taken by the Council to improve air quality. Actions taken chiefly relate to decreasing traffic related $NO_2$ pollution through promoting alternative travel, and as a consequence of action on climate change.

The Voi Scooter project successfully replaced 201,812 car trips with trips using electric scooters in 2022, which resulted in a reduction in 87,200 Kg of carbon equivalent. Voi also supported Clean Air Day on 15th June by offering a free 30 minutes of free travel by e-scooters.

North Northamptonshire also continues to support projects which aim to reduce emissions and improve air quality, such as the East Northamptonshire Greenway Project. The East Midlands Air Quality Network (EMAQN) 'Air Quality and Emissions Mitigation - Guidance for Developers' also continues to be implemented. The EMAQN guidance is technical planning guidance which aims to improve air quality across the East Midlands, through preventing new emission sources and encouraging emissions reductions.

## Conclusions and Priorities

The air quality in North Northamptonshire is generally good and concentrations remain below the AQS objectives. Although the five-year trend decreases overall, some increases in concentrations can be seen between 2020 and 2022. This is not unexpected, with the increases in traffic after the 2020 COVID-19 pandemic.

As there are no plans to introduce an AQMA in North Northamptonshire, there remains no requirement to publish an AQAP. That said, the Council are in the process of developing a Local Air Quality Strategy and measures to improve air quality continue to be implemented, with a focus on emission reduction through development control and working with partner authorities and agencies to encourage electric vehicle and electric bicycle usage. Moving forward, the priorities for North Northamptonshire are:

- To continue monitoring and the review of air quality in line with national air quality objectives;
- Develop and adopt a Local Air Quality Strategy;
- Continue the streamlining process commenced since the creation of the unitary authority to improve air quality reporting and actions;

- Work together with other departments of the Council i.e. planning and Highways, to manage local air quality and raise awareness on its role in achieving a sustainable environment;
- Work with other agencies and authorities to minimise the impact of developments on neighbouring authorities;
- Raise awareness and reduce the impacts of $PM_{2.5}$ on air quality and health in cooperation with Defra;
- Continue to review all planning applications that are referred to the Environmental Protection team in terms of national and EMAQN guidance, ensuring any impacts upon local air quality are quantified;
- Ensure new developments encourage and facilitate low emission and alternative/active transport; and
- Promote initiatives to reduce emissions of air pollution across the district through partnerships with schools, businesses and communities.
- As several areas within North Northamptonshire are developing rapidly it will remain important to monitor air quality and any new sources of pollution.

## Local Engagement and How to get Involved

Air quality continues to move up the political agenda as there is a greater understanding of the issues and complexities around the quality of the air we all breathe. Industry, agriculture, transport, planning and individuals are being encouraged to look at interventions, behavioural changes and practical actions to improve air quality.

The primary source of air pollution in the North Northamptonshire is $NO_2$ arising from transport sources. There are many transport alternatives the public can use to help improve air quality:

- **Walking, cycling or electric scooter** – these are the most environmentally friendly modes of transport as well as the added benefit of keeping fit and healthy;
- **Public transport** – the use of public transport reduces the number of private vehicles on the roads, easing congestion therefore reducing concentrations of roadside pollutants;
- **Car-sharing** – if a similar journey is shared with another individual car-sharing is a good way at reducing the number of private vehicles as well as reducing the cost of

commuting, if sharing fuel costs This can be promoted via travel plans through the workplace and within schools; and

- **Alternative fuel / more efficient vehicles** – Choosing a vehicle that meets the specific needs of the owner, fully electric, hybrid fuel and more fuel-efficient cars are available. If residents are considering swapping to an electric vehicle, the government offers up to 75% grant funding towards the cost of installing electric vehicle charge points at domestic properties through the Electric Vehicle Home charge Scheme (EVHS). For information on how to apply, please see the gov.uk website.

An additional way to improve air quality is by considering alternatives to garden waste disposal other than burning and burning smokeless fuels.  The public can also assist by reporting pollution incidents within the North Northamptonshire area.

For more information on what the Council is doing to improve air quality in the North Northamptonshire, please get in contact with the local Environmental Health Officer, or go to https://www.northnorthants.gov.uk/environment

## Local Responsibilities and Commitment

This ASR was prepared by the Environmental Health Department of North Northamptonshire Council with the support and agreement of the following officers and departments:

Catherine Clooney (Environmental Health)

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

If you have any comments on this ASR please send them to Catherine Clooney at:

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# 1 Local Air Quality Management

This report provides an overview of air quality in North Northamptonshire 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 North Northamptonshire 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.

North Northamptonshire Council currently does not have any declared AQMAs. A local Air Quality Strategy is under development to prevent and reduce polluting activities.

Maps of North Northamptonshire Council's monitoring locations are available in Appendix D.

## 2.2 Progress and Impact of Measures to address Air Quality in North Northamptonshire

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

- Despite there being no AQMA in the North Northamptonshire, measures to improve air quality have still been implemented with a high level of detail. This has been through the Northamptonshire Transportation Plan and the Northamptonshire Climate Change Strategy. This is commended and measures to improve air quality should continue to be developed and reported.

- The additional report containing a review of LAQM within the former administrative areas of Corby, East Northamptonshire, Kettering and Wellingborough is provided. This report includes recommendations that the LA should extend their diffusion tube network and include particulate monitoring and continue to develop measures to improve air quality. Trends are clearly presented and discussed and a robust comparison with air quality objectives is provided.

- Minimal measures have been included within the ASR to improve PM2.5. Future ASR's should include additional measures and review the climate change strategy and transport plan to review measures that have the potential to improve PM2.5 emissions.

- When reviewing table B.1, it is noted that the monthly monitoring result in January for C11 is much higher than the remaining periods in the month. Data should be reviewed for anomalous data and commentary provided as to whether there was a reason concentration were higher.

- The ASR does not indicate if changes were made to the monitoring network in 2021. 2021 Appraisal indicated that additional monitoring sites should be deployed on silver street in Wellingborough, however there is no indication that this has been addressed in the 2022 ASR. Future ASR's should address all comments made during the appraisal.

- It is not clear if all monitoring has been undertaken in accordance with Defra calendar. One of the monitoring sites in Corby is stated to have been exposed longer than the calendar dates, but it is assumed the rest have been undertaken in accordance with the calendar. This should be made clear in future ASR's

North Northamptonshire has no active AQMAs and subsequently has produced no AQAPs to date. In line with policy guidance, NNC in the process of drafting a Local Air Quality

Strategy. Local authorities are encouraged to take early preventative action to improve local air quality, avoid exceedances and reduce the long-term health impacts associated with air pollution. Local authorities should consider prevention and reduction of polluting activities in preference to only taking steps to reduce air pollution once exceedances have been identified. This approach may also enable local authorities to adopt measures that reduce the need for costly interventions at a later date.

Despite not having a formal AQAP, North Northamptonshire 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 2.1. 21 measures are included within Table 2.1, with the type of measure and the progress North Northamptonshire 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 2.1.

Although an AQAP does not exist, air quality in the district is addressed through the Northamptonshire Transportation Plan (2012) and the Northamptonshire Climate Change Strategy (2020-2023). Since forming in 2021 North Northamptonshire has committed to becoming carbon neutral by 2030.

The Council's Environmental Protection team has air pollution regulatory responsibilities which they will continue to enforce, including:

- Inspect all its permitted processes under the Environmental Permitting (England and Wales) Regulations 2016, (EPR) to ensure compliance, that these permits are updated as and when appropriate' and operation conditions are up-to-date with the latest guidance.

- Enforce the Clean Air Act 1993 and to encourage local businesses to dispose of waste in a responsible manner, in order to prevent or minimise the emissions of dark smoke. All complaints regarding smoke or associated odour are investigated, enforced and / or information is provided to the perpetrator.

As the primary source of pollution in North Northamptonshire Council is traffic related $NO_2$, a number of air quality measures relate to promoting transport alternatives.

Physical activity and healthy lifestyle choices are encouraged; and Development mitigation measures encourage active travel. Work has been undertaken on the East Northamptonshire Greenway, which makes for attractive and safer walking and cycling routes in the heart of the Nene Valley. The Kettering Local Cycling and Walking

Infrastructure Plan (LCWIP) provides a long-term, evidence-based approach to developing local cycling and walking networks over a 10-year period, and the report was completed in June 2022. Further LCWIPs covering Corby, Wellingborough and Higham Ferrers & Rushden LCWIP's are expected in 2023.

Electric Vehicle (EV) charging points continue to be installed throughout the council area. Many car parks already have EV charging points and in addition Liberty Charge, funded by Innovate UK has installed on-street charging sockets in towns across North Northamptonshire through the Virgin Media Park and Charge project. The Office for Low Emission Vehicles (OLEZ) project has also successfully installed electric vehicles charging points across the borough and additional funding has been secured in 2023 for more charging points.

The Council have also enabled the installation of on-street charging points at 12 locations across 6 towns as well as in some of its car parks. Further work is planned with an additional 18 locations scheduled to go ahead this year. Development of a strategy is underway which will set out plans for a step-change in charging infrastructure to keep pace with expected growth in EV ownership.

The Voi Scooter project aims to expanded electric scooter use in UK towns to encourage tan uptake in this mode of transport with a focus on replacing car journeys in North Northamptonshire. The Voi Scooter project successfully replaced 201,812 car trips with trips using electric scooters in 2022, which resulted in a reduction in 87,200 Kg of carbon equivalent. The areas where this project is ongoing is Corby, Kettering, Rushden and Higham Ferrers and Wellingborough. To coincide with Clean Air Day, Voi offered 30 minutes of free travel by e-scooters to users across the UK.

An additional project to reduce the need for road transport is the Starship Delivery Robots, that utilises fully electronic autonomous robotic technology for neighbourhood delivery services in parts of the Higham Ferrers, Rushden, and Wellingborough areas. The project started in July 2022 and as of May 2023 have saved 16,500 vehicle miles attributing to 6,700 Kg $CO_2e$.

All new planning applications continue to be directed to the requirements of the EMAQN 'Air Quality and Emissions Mitigation - Guidance for Developers'. The requirements of EMAQN ensure there is a consistent and thorough approach to the impact the proposed development may have on air quality and recommends mitigation measures to offset any development.

A Joint Strategic Needs Assessment (JSNA) was undertaken by the former Northamptonshire County Council, which concluded that air pollution is estimated to account for 3.9% of number of years lost due to ill-health, disability or early death (DALYs) in Northamptonshire. An estimated £2,569 per person per year is spent on dealing with $NO_2$ in the health and social care system. This rises to £7,569 per person per year for PM. A 'plan on a page' was produced.

A 'plan on a page' prioritises: securing clean growth and innovation that tackle emissions from industry, vehicles, products, combustion and agriculture and support both improvements in air quality and decarbonisation; protecting the environment by monitoring the impacts of air pollution on natural habitats; reduce nitrogen oxides emissions from transport; reduce $PM_{2.5}$, Sulphur dioxide and Non-methane volatile organic compounds emissions at home; reduce emissions of ammonia from farming; and reduce emissions from industry.

**Figure 2.1 - County JSNA 'Plan on a Page'**

| Public Health Plan on a Page: Commissioning for Outcomes (Air Quality) | | | |
|---|---|---|---|
| **Vision**:<br><br>• Improving air quality to reduce hazardous health impacts that air pollution can have across a person's lifetime, the associated health inequalities, and its burden on NHS social care costs<br><br>• To ensure that local air quality action plan to reduce air pollution remains robust and relevant to make Northamptonshire cleaner and healthier and attractive place to live, visit, work and play. | | | |
| **Priorities**: Secure clean growth and innovation that tackle emissions from industry, vehicles, products, combustion and agriculture and support both improvements in air quality and decarbonisation; protecting the environment by monitoring the impacts of air quality on natural habitats; reduce nitrogen dioxide emissions from transport; reduce PM2.5, Sulphur dioxide and non-methane volatile organic compounds emissions at home; reduce emissions of ammonia from farming; and reduce emissions from industry | | | |
| **Our Approach** | | | |
| **Whole System Approach**:<br>Air quality is just one factor influencing the management of urban environments and travel patterns. Others include: economic development and retail, planning, tourism,/visitor strategies, access to services including healthcare and access to education. | **Addressing existing problems and preventing new ones**:<br>A number of areas in the county have identified/designated Air Quality Management Areas, where air quality is worse than the recommended legal limits. Further such areas may be created due to future housing | **Behavioural change**:<br>Assist relevant partners to address air quality and increase sustainable travel, including: environmental health teams, planning departments, transport and highways and major organisations/employers | **Evidence based approach**:<br>There is increasing scientific evidence of the health impacts of air quality, particularly for vulnerable people such as the elderly, the very young and those with certain health conditions, even at pollution levels within legal limits. Explore new evidence of |

| | growth/development and the associated increase in travel | | effective approaches to reduce and mitigate risks |
|---|---|---|---|
| **Achieved through**:<br>• Partnership working (health, local government, roads, planning, workplaces, schools) across the system and for all ages.<br>• Clear leadership on air quality issues | **Achieved through**:<br>• Targeted efforts in known problem areas.<br>• Preventative measures to avoid further Air Quality Management Areas being required | **Achieved through**:<br>• Social marketing<br>• Influencing policy<br>• Partnership creation and advocacy<br>• Health Promotion<br>• Northamptonshire Heath Protection Committee to monitor air quality issues | **Achieved through**:<br>• Joint Strategic Needs Assessment (JSNA)<br>• Return on Investment (ROI) tools<br>• Evaluation |

| Our Commitment/Enablers | | | | |
|---|---|---|---|---|
| **Reducing inequalities:** services which mitigate inequalities and work to overcome variation-by location, approach and policy | **System partnerships:** engage and co-produce with partners/stakeholders e.g. NHS, schools, prisons, workplaces and local government | **Continued investment in advocacy** and policy and programmes to increase active travel and use of green spaces | **Engagement and co-production** of research aligning with evidence, evaluation to monitor service delivery and quality | **Embed Health in all Policies***:* a common way of influencing the wider determinants of health: transport policy, economic development policy, fuel and poverty management and town centre management |

| Measures of Success | | |
|---|---|---|
| • All areas meet legal air quality limit values Adoption of sustainability policies and actions among partners | • Improved infrastructure for cycling/ walking<br>• Increased rates of active/sustainable travel<br>• Reductions in traffic congestion | • Improved air quality measures at key sampling sites<br>• Increased awareness in organisations and the public<br>• Reduced respiratory disease in high traffic areas |

With the merger of the four authorities in 2021, a review was conducted into the air quality reporting conducted within each area to ascertain the strengths and weakness of the respective authorities' LAQM work, so that best practices could be taken forward with North Northamptonshire. This review has resulted in the addition of new monitoring sites with the East Northamptonshire and Wellingborough areas.

**Table 2.1 – Progress on Measures to Improve Air Quality**

| Measure No. | Measure | Category | Classification | Year Measure Introduced | Estimated / Actual Completion Year | 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 | Transport plan to promote walking, cycling and public transport in order to support the modal shift away from the private car. | Policy Guidance and Development Control | Other Policy | 2020 | 2025 | NNC | - | - | - | - | Ongoing | - | Publish a cycle strategy, decrease transport $CO_2$ emissions | Cycling Strategy has Local Government $CO_2$ Emissions published on Gov.UK. Kettering Local Cycling and Walking Infrastructure Plan (LCWIPs) | Council's 'Action on Climate Change' 2020-2025; Kettering Local Cycling and Walking Infrastructure Plan (LCWIPs) Public Consultation |
| 2 | Encourage lower carbon transport alternatives and increase the proportion of low carbon fuelled vehicles. | Promoting Low Emission Transport | Public Vehicle Procurement - Prioritising uptake of low emission vehicles | 2020 | 2025 | NNC | - | - | - | - | Ongoing | - | Measure occurrences of charging | 2020/21 charging episodes had decreased by 27.5% from 2019/20, which we believe is due to the restrictions imposed by the COVID-19 lockdowns. Starship Delivery Robots started in July 2022 and as of May 2023 have saved 16,500 vehicle miles attributing to 6,700 Kg CO2e. | Council's 'Action on Climate Change' 2020-2025 |
| 3 | Work with taxi companies and licence holders to consider low carbon vehicles | Promoting Low Emission Transport | Taxi emission incentives | 2020 | 2025 | NNC | - | - | - | - | Ongoing | $CO_2/NO_2$ | Number of Electric vehicles | There are now 6 LEVC Hackney Carriages licenced in Corby. There was previously 9 in 2019, we estimate this has been reduced due to lack of business through COVID-19. | Council's 'Action on Climate Change' 2020-2025 |
| 4 | Promote low carbon fleet and staff vehicles schemes in the business sector | Promoting Low Emission Transport | Company Vehicle Procurement - Prioritising uptake of low emission vehicles | 2020 | 2025 | NNC | - | - | - | - | Ongoing | $CO_2/NO_2$ | Number of Electric/hybrid vehicles | Corby Borough Council had 1 Hybrid and 18 electric vehicles in their fleet at the end of 2020 | Council's 'Action on Climate Change' 2020-2025 |
| 5 | Measure home energy conservation act requirements as part of statutory Home Energy Conservation Act 1995 | Policy Guidance and Development Control | Other Policy | 2017 | 2023 | NNC | - | - | - | - | Ongoing | - | Home energy conservation measures | Report published May 2021 – next report due 2023 | Council's HECA Report |
| 6 | East Midlands Air Quality Network – Engaged | Policy Guidance and Development Control | Regional Groups Co- ordinating programmes to develop Area wide Strategies to reduce emissions and improve air quality | 2016 | 2016 | Regional local authorities – environmental health, planning, public health and transport colleagues; Public Health England | - | NO | Funded | < £10k | Completed - Ongoing | Reduced emissions from transport; reduced exposure to air pollution | Attendance at regional meetings. Completion of Work Plan - health improvement, source reduction, exposure reduction | Ongoing – meet twice per year and share information in between meeting dates | - |
| 7 | Implement East Midlands Air Quality Planning Guidance; link to other local and regional policies | Policy Guidance and Development Control | Air Quality Planning and Policy Guidance | 2018 | 2018 | Regional local authorities – environmental health, planning, public health and transport colleagues; Public Health England | - | NO | Funded | < £10k | Ongoing | Reduced emissions from transport; reduced exposure to air pollution | Guidance embedded in local and regional policy | Document has been approved and published by PHE. Local implementation now required. Ongoing discussions with | COVID-19 presented issues to implementation timeframes but now in development. NNC currently revising this supplementary |

| Measure No. | Measure | Category | Classification | Year Measure Introduced | Estimated / Actual Completion Year | 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 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | | Planners to see how this will be done | planning document to cover the whole area. |
| 8 | Installing Electric Vehicle Charging Points | Promoting Low Emission Transport | Other | 2018 | 2023 | Local Authority Environmental Health | OLEZ | NO | Funded | £10k - 50k | Ongoing | Reduced emissions from transport | Number of EV charging points | OLEV application has been approved Procurement completed and installation is underway | - |
| 9 | Environmental Permitting – Risk Rating Inspections | Environmental Permits | Introduction/increase of environment charges through permit systems and economic instruments | 2016 | 2017 | Local Authority Environmental Health | Permitting Annual Fees | NO | Funded | £10k - 50k | Ongoing | Reduced industrial emissions | Inspection frequency dependant on risk – higher risk premises are inspected more frequently. Penalty in risk rating for contributing to local air quality issues | Implementation ongoing | Staff numbers and competence/skills for higher risk installations |
| 10 | Enforcement of Environmental Permit Conditions | Environmental Permits | Other measure through permit systems and economic instruments | 2016 | 2016 | Local Authority Environmental Health | Permitting Annual Fees | NO | Funded | £10k - 50k | Ongoing | Reduced industrial emissions | Enforcement of conditions of permits as required | Implementation ongoing | Staff numbers and competence/skills for higher risk installations |
| 11 | Planning conditions requiring construction/demolition management plans to include dust suppression AND enforce dust/mud controls where no planning condition exists through legislation | Policy Guidance and Development Control | Other Policy | 2016 | 2016 | Local Authority Environmental Health and Planning | - | NO | Funded | < £10k | Ongoing | Improved dust mitigation reducing $PM_{10}$ , $PM_{2.5}$ locally and reducing nuisance complaints | Planning conditions/Interaction with developers in response to complaints or proactive visits | Implementation on-going | |
| 12 | Age policy for Taxis | Promoting Low Emission Transport | Taxi licensing conditions | 2016 | 2016 | Local Authority Environmental Health | - | NO | Not Funded | < £10k | Completed - Ongoing | Reduced traffic emissions including $PM_{10}$ and $PM_{2.5}$ | Number of taxis licensed | Ongoing. Hackney cabs and private hire vehicles are restricted by an age policy that requires vehicles to be less than four years old | Waiting for Government Guidance to be issued that will require more stringent emission controls - EURO 6 |
| 13 | Health and Wellbeing Officer/Sports Development Officer in Post | Alternatives | Promotion of cycling and walking | 2016 | 2016 | NNC | - | NO | Funded | £10k - 50k | Ongoing | Reduced emissions from transport; reduced exposure to air pollution | Increased physical activity | Healthy Walks Programme - volunteer lead monthly walk. Promotion of physical activity on website. Supporting One-You PHE Campaign | - |
| 14 | VOI Scooter Project | Promoting Low Emission Transport | Public Vehicle Procurement Prioritising uptake of low emission vehicles | - | - | VOI technology | VOI technology | No | Funded | - | Implemented | 1.84kg $PM_{2.5}$ | - | Total number of rides since launch is approximately 70k. | - |
| 15 | East Northamptonshire Greenway Project | Promoting Travel Alternatives | Promotion of cycling | - | - | NNC | - | No | - | - | Implemented | - | - | Begun to develop walking and cycling routes in the Nene Valley | - |
| 16 | Northamptonshire Climate Change Strategy | Policy Guidance and Development Control | Low Emissions Strategy | - | - | NNC | - | No | - | - | Implemented | - | - | Completed | - |
| 17 | Climate Task and Finish Group | Policy Guidance and Development Control | Other policy | - | - | NNC | - | - | - | - | - | - | - | Group set up by NNC to facilitate actions to improve climate change. | - |
| 18 | Joint Strategic Needs Assessment (JSNA) | Policy Guidance and Development Control | Other policy | 2020 | 2021 | NNC | County | No | Funded | Unknown | Ongoing | Exposure to pollutants | 'Plan on a Page' outcomes | Completed, recommendations to be followed up | Brings together information from many different sources and partners relating to |

| Measure No. | Measure | Category | Classification | Year Measure Introduced | Estimated / Actual Completion Year | 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 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | | | the population of Northamptonshire |
| 19 | LAQM Audit & Streamlining Air Quality Processes & AQ Strategy | Policy Guidance and Development Control | Other policy | 2021 | 2022 | NNC | Internal | No | Funded | <£10k | Implemented | N/a | Implementing audit recommendations | Completed audit. Now producing AQ Strategy. | Facilitating merger of processes |
| 20 | Air Quality Officer post | Policy Guidance and Development Control | Other policy | 2020 | 2023 | NNC | AQ Grant | Yes | Funded | £20-40k | Ongoing | N/a | Officers in post | Still recruiting | Availability of staff |
| 21 | SAMHE: Schools' air quality monitoring for health and education | Public Information | Via other mechanisms | 2022 | Ongoing | NNC | Internal | No | Funded | Unknown | Ongoing | $NO_2$ | Monitors indoor schools, Idling Vehicles outside Schools / enforcement notices | The project wants to establish a network of air quality monitors in schools across the UK to help us better understand schools' indoor air quality. Includes anti-idling campaign too. | Parent buy-in |

## 2.3 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.

North Northamptonshire does not currently monitor for concentrations of PM$_{2.5}$ or PM$_{10}$. However, the following measures address PM$_{2.5}$:

- Environmental Protection team are consulted and comment on planning applications in respect to potential air quality issues generated by traffic, dust and construction.
- Investigation of nuisance complaints for dust and smoke and encouragement of smokeless fuels.
- Encouragement of the planting of trees for new transport developments to reduce concentrations of PM$_{2.5}$ in certain areas.
- Good practice advice is provided on how to operate open house fire or log-burners, promoting the Woodsure Ready to Burn Scheme.
- Local highways and roads are wet swept as part of a proactive maintenance scheme to reduce the amount of dust build up that could become mobile in warmer weather;
- There are smoke control areas (SCA) in Corby. Environmental Health enforce reduction in PM$_{2.5}$ concentrations from chimney smoke. Trading standards regulate non-compliance for these declared smoke control areas. Should smoke be emitted from a residential chimney within an SCA, nuisance procedures continue to operate under Part 3 of the Environmental Protection Act 1990.

NNC has a webpage dedicated to smoke control covering both domestic and industrial burning: https://www.northnorthants.gov.uk/environment/smoke-and-bonfires.

The Public Health Outcomes Framework (PHOF) indicator DO1 – Fraction of mortality attributable to particulate (PM$_{2.5}$) is a useful indicator to determine the impact of PM$_{2.5}$ in a region. The D01 value for 2021 was 5.95% for North Northamptonshire, slightly higher than

the average D01 value for England at 5.50%, indicating the fraction of mortality caused by particulate air pollution in North Northamptonshire is slightly above average.

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

This section sets out the monitoring undertaken within 2022 by North Northamptonshire 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.

## 3.1 Summary of Monitoring Undertaken

### 3.1.1 Automatic Monitoring Sites

North Northamptonshire Council did not undertake any automatic (continuous) monitoring in 2022.

### 3.1.2 Non-Automatic Monitoring Sites

North Northamptonshire Council undertook non-automatic (i.e. passive) monitoring of $NO_2$ at 107 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. Further details on Quality Assurance/Quality Control (QA/QC) for the diffusion tubes, including bias adjustments and any other adjustments applied (e.g. annualisation and/or distance correction), are included in Appendix C.

## 3.2 Individual Pollutants

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

### 3.2.1 Nitrogen Dioxide ($NO_2$)

Table A. 2 in Appendix A compares 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). The Data trends are shown for each diffusion tube in Figures A. 1 – A. 12., ENC 34-40 have been excluded from these figures due to the lack of historical data meaning there is as yet no trend.

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 does not include any distance corrected values, which were not required.

During the monitoring period of 2022, no sites recorded annual concentrations above the objective value of 40 µg/m$^3$. As no sites have monitored concentrations greater than 60 µg/m$^3$, it is considered unlikely that the 1-hour mean objective was exceeded at any sites within North Northamptonshire.

The highest recorded raw monthly mean $NO_2$ concentration, prior to bias adjustment, in 2022 was 51.5 µg/m$^3$, which occurred at Site RW4 in Kettering. The highest bias annual mean concentration occurred at the same site, at 32.1 µg/m$^3$. The overall trend between 2018 and 2022 is a decreasing one. However, there is an overall increase in $NO_2$ concentrations between 2020 and 2021 with an average increase of 1.4 µg/m$^3$. As previously mentioned, this is likely due to the recovery of vehicular traffic numbers post COVID-19 lockdowns. After 2021, the decreasing trend continues into 2022, though some sites experienced an increase in $NO_2$ of up to 10.4 µg/m$^3$, the average change in concentration was a decrease of 0.5 µg/m$^3$. Versus 2020, 2022 concentrations have increased on average by 0.9 µg/m$^3$, which is by no means a return to pre-pandemic concentrations.

### 3.2.2  Particulate Matter (PM$_{10}$)

No PM$_{10}$ monitoring was carried out in North Northamptonshire during 2022.

### 3.2.3  Particulate Matter (PM$_{2.5}$)

No PM$_{2.5}$ montioring was carried out in North Northamptonshire during 2022.

# 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) |
|---|---|---|---|---|---|---|---|---|---|---|
| 1N | Elizabeth Street | Roadside | 488424 | 288706 | $NO_2$ | No | 22.0 | 1.0 | No | 3.4 |
| 2N | Occupation Road | Roadside | 488354 | 289329 | $NO_2$ | No | 0.0 | 11.0 | No | 3.1 |
| 3N | High Street, Old Village | Roadside | 489380 | 288833 | $NO_2$ | No | 0.0 | 6.0 | No | 3.6 |
| 4N | Scott Road | Roadside | 489399 | 288605 | $NO_2$ | No | 7.0 | 1.0 | No | 2.0 |
| 5N | Weldon Road | Roadside | 489997 | 288821 | $NO_2$ | No | 0.0 | 15.0 | No | 3.1 |
| 6N | Little Stanion/A43/A6116 Roundabout | Roadside | 490981 | 287322 | $NO_2$ | No | 180.0 | 3.0 | No | 3.3 |
| 7N | Priots Hall/A43 Roundabout | Roadside | 492992 | 289919 | $NO_2$ | No | 168.0 | 1.0 | No | 3.3 |
| 8N | Kirby Road, Gretton | Urban Background | 490063 | 294032 | $NO_2$ | No | 0.0 | 15.0 | No | 3.5 |
| 9N | Berryfield Road, Cottingham | Urban Background | 484133 | 290194 | $NO_2$ | No | 0.0 | 13.0 | No | 3.4 |
| 10N | Danesholm Road/A6003 | Urban Background | 485788 | 287272 | $NO_2$ | No | 89.0 | 5.6 | No | 3.3 |
| 11N | Oldland Road | Roadside | 487675 | 287373 | $NO_2$ | No | 68.0 | 2.3 | No | 3.4 |
| 12N | Beanfield Avenue | Roadside | 487039 | 288292 | $NO_2$ | No | 5.0 | 2.0 | No | 3.4 |
| 13N | Lakeside Health Centre | Roadside | 487546 | 288816 | $NO_2$ | No | 317.0 | 1.5 | No | 3.4 |
| 14N | George Street | Roadside | 488135 | 288494 | $NO_2$ | No | 84.0 | 1.0 | No | 3.2 |
| 15N | Westcott Way | Roadside | 488180 | 288325 | $NO_2$ | No | 9.0 | 7.0 | No | - |
| 16N | Shannon Court | Roadside | 488122 | 287817 | $NO_2$ | No | 0.0 | 10.0 | No | 3.4 |
| 17N | Gainsborough Rd | Roadside | 488387 | 288122 | NO2 | No | 12.0 | 1.0 | No | 3.2 |
| ENC 1 | Oakleas Rise (no.37) Thrapston | Urban Background | 499867 | 278066 | $NO_2$ | No | 1.0 | 1.5 | 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) |
|---|---|---|---|---|---|---|---|---|---|---|
| ENC 2 | Traffic light on bridge, Bridge St (no.34) | Roadside | 499161 | 278629 | $NO_2$ | No | 3.0 | 1.7 | No | 2.5 |
| ENC 3 | Huntingdon Rd | Roadside | 500208 | 278510 | $NO_2$ | No | 18.0 | 3.0 | No | 2.8 |
| ENC 4 | Market Rd, corner of Grove Road (no.32) | Roadside | 499573 | 278515 | $NO_2$ | No | 1.0 | 1.5 | No | 2.7 |
| ENC 5 | Junction Way (no.36) | Urban Background | 499792 | 277873 | $NO_2$ | No | N/A | 1.6 | No | 2.5 |
| ENC 6 | Brick Kiln Road | Roadside | 499119 | 273561 | $NO_2$ | No | 14.0 | 2.0 | No | 2.3 |
| ENC 7 | Wheelwright Close (no. 8) | Urban Background | 500193 | 273219 | $NO_2$ | No | 5.0 | 1.0 | No | 2.9 |
| ENC 8 | London Road adj to 60 Titty Ho | Roadside | 499103 | 272329 | $NO_2$ | No | 2.0 | 2.4 | No | 2.5 |
| ENC 9 | High Street | Roadside | 494525 | 270591 | $NO_2$ | No | 5.0 | 1.6 | No | 2.5 |
| ENC 10 | Kestrel Close (opp no.23) | Urban Background | 496068 | 269885 | $NO_2$ | No | 5.0 | 37.0 | No | 2.6 |
| ENC 11 | Elizabeth Way (no.34) | Roadside | 496320 | 269420 | $NO_2$ | No | 8.0 | 1.6 | No | 3.0 |
| ENC 12 | High St | Roadside | 495920 | 268317 | $NO_2$ | No | 6.0 | 1.3 | No | 2.9 |
| ENC 13 | High St outside 18/20 | Kerbside | 495962 | 268388 | $NO_2$ | No | 6.0 | 0.9 | No | 2.7 |
| ENC 14 | Higham Rd (no.16)/Washbrook Rd junction | Roadside | 495587 | 267402 | $NO_2$ | No | 7.0 | 1.9 | No | 2.5 |
| ENC 15 | Beaconsfield Terrace | Roadside | 495711 | 267120 | $NO_2$ | No | 3.0 | 1.6 | No | 2.6 |
| ENC 16 | Newton Road (no.42) | Roadside | 496039 | 266643 | $NO_2$ | No | 7.0 | 1.8 | No | 2.4 |
| ENC 17 | Newton Road (no.18) | Roadside | 495924 | 266621 | $NO_2$ | No | 1.0 | 1.5 | No | 2.7 |
| ENC 18 | Park Place (nr entrance) | Roadside | 495883 | 266560 | $NO_2$ | No | 3.0 | 1.5 | No | 2.9 |
| ENC 19 | Newton Rd | Roadside | 495849 | 266613 | $NO_2$ | No | 2.0 | 1.3 | No | 2.9 |
| ENC 20 | Newton Road Country | Roadside | 497127 | 266143 | $NO_2$ | No | 13.0 | 2.3 | No | 2.4 |

| 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) |
|---|---|---|---|---|---|---|---|---|---|---|
| ENC 21 | A6/Spire Way Roundabout | Roadside | 496682 | 267872 | $NO_2$ | No | N/A | 3.3 | No | 2.2 |
| ENC 22 | Hayden Road | Urban Background | 496772 | 266967 | $NO_2$ | No | 10.0 | 1.6 | No | 2.6 |
| ENC 23 | Farnham Drive (no.64) | Roadside | 494895 | 265669 | $NO_2$ | No | 12.0 | 2.1 | No | 2.8 |
| ENC 24 | Washbrook Road crossroads (217 Wellingborough Road) | Roadside | 494963 | 266988 | $NO_2$ | No | 3.0 | 1.7 | No | 2.5 |
| ENC 25 | Washbrook Road crossroads (218 Wellingobrough Rd) | Roadside | 494936 | 267014 | $NO_2$ | No | 5.0 | 1.6 | No | 2.6 |
| ENC 26 | Ditchford Road | Roadside | 493108 | 267347 | $NO_2$ | No | N/A | 1.5 | No | 2.2 |
| ENC 27 | Wentworth Drive (opp no.19) | Roadside | 503209 | 289307 | $NO_2$ | No | 10.0 | 1.5 | No | 2.6 |
| ENC 28 | North St (no.58) | Roadside | 504272 | 288433 | $NO_2$ | No | 3.0 | 1.8 | No | 2.8 |
| ENC 29 | St Osyths Lane | Roadside | 504222 | 288110 | $NO_2$ | No | 1.3 | 1.1 | No | 2.8 |
| ENC 30 | 5 Laamas Cottages | Roadside | 497862 | 289284 | $NO_2$ | No | 7.0 | 1.3 | No | 2.8 |
| ENC 31 | Top Road Glapthorn | Roadside | 501961 | 290525 | $NO_2$ | No | 15.0 | 1.5 | No | 2.1 |
| ENC 32 | Woodfield, Collyweston | Urban Background | 499960 | 302429 | $NO_2$ | No | 6.0 | 1.9 | No | 2.4 |
| ENC 33 | 123 Northampton Road | Roadside | 494761 | 267915 | $NO_2$ | No | 3.0 | 1.5 | No | 2.5 |
| ENC 34 | 23 Woodpecker Way Thrapston | Kerbside | 500479 | 278305 | $NO_2$ | No | 1.0 | 1.8 | No | 2.6 |
| ENC 35 | 179 Finedon Road | Roadside | 493887 | 271326 | $NO_2$ | No | 2.0 | 1.4 | No | 2.6 |
| ENC 36 | Opp 194a Bedford Road | Roadside | 496732 | 264589 | $NO_2$ | No | 8.0 | 1.2 | No | 2.5 |
| ENC 37 | Fox Pub entrance lamppost | Roadsite | 502420 | 281455 | $NO_2$ | No | 17.0 | 2.7 | No | 2.6 |
| ENC 38 | Clopton Roundabout | Roadside | 503390 | 282825 | $NO_2$ | No | 21.0 | 1.2 | No | 2.6 |
| ENC 39 | A605, 1 Elmington Cottages | Roadside | 505177 | 289583 | $NO_2$ | No | 6.0 | 1.6 | No | 2.6 |

| 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) |
|---|---|---|---|---|---|---|---|---|---|---|
| ENC 40 | Slate Drift Collyweston | Urban Background | 500094 | 303197 | $NO_2$ | No | 7.0 | 7.5 | No | 2.5 |
| KT1 | Newlands Street O/S Wilko's | Façade | 486783 | 278948 | $NO_2$ | No | 2.7 | 2.7 | No | 2.4 |
| KT2 | London Road juncBowling Green Road | Roadside | 486887 | 278246 | $NO_2$ | No | 2.3 | 2.6 | No | 2.4 |
| KT3 | Victoria Street | Roadside | 486974 | 278895 | $NO_2$ | No | 1.7 | 1.5 | No | 2.7 |
| KT4 | London Road cemetery | Urban background | 486956 | 278338 | $NO_2$ | No | 69.9 | 2.0 | No | 2.5 |
| KT5 | Eden Street/Eskdail St | Roadside | 486925 | 279028 | $NO_2$ | No | 1.9 | 1.6 | No | 2.4 |
| KT6 | Montagu St o/s Pauls | Roadside | 486951 | 278904 | $NO_2$ | No | 3.1 | 0.5 | No | 2.3 |
| KT7 | Montagu Street o/sBostons Diner | Roadside | 486869 | 278877 | $NO_2$ | No | 1.3 | 0.4 | No | 2.3 |
| KT8 | Stamford Road o/s J. Witness | Roadside | 487049 | 278942 | $NO_2$ | No | 3.2 | 2.6 | No | 2.4 |
| KT9 | Bowling Green Road o/s no 9 | Roadside | 486793 | 278254 | $NO_2$ | No | 10.7 | 1.3 | No | 2.4 |
| KT10 | London Road/Southlands | Roadside | 486954 | 278099 | $NO_2$ | No | 3.9 | 0.5 | No | 2.4 |
| KT11 | Woodcroft Way by flats | Roadside | 487406 | 277653 | $NO_2$ | No | 5.7 | 2.0 | No | 2.1 |
| KT12 | Bowling Green Road o/s Council offices | Roadside | 486787 | 278276 | $NO_2$ | No | 7.3 | 0.6 | No | 2.4 |
| KT13 | Sheep Street O/S Westfield Kitchens | Roadside | 486648 | 278233 | $NO_2$ | No | 6.4 | 3.4 | No | 2.4 |
| KT14 | o/s 47 Bowling Green Road | Roadside | 486718 | 278236 | $NO_2$ | No | 3.7 | 1.7 | No | 2.4 |
| KT15 | O/S Simpson & Partners | Roadside | 486799 | 278850 | $NO_2$ | No | 5.6 | 2.0 | No | 2.4 |
| KT16 | St Mary's Road Junc Bowling Green Road | Roadside | 486929 | 278204 | $NO_2$ | No | 18.4 | 1.4 | No | 2.4 |

| 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) |
|---|---|---|---|---|---|---|---|---|---|---|
| KT17 | opp 1 St Mary's Road | Roadside | 486972 | 278223 | $NO_2$ | No | 5.9 | 1.0 | No | 2.3 |
| KT18 | London Rd o/s pocket park | Roadside | 486910 | 278240 | $NO_2$ | No | 42.3 | 2.9 | No | 2.4 |
| KT19 | London Rd o/s cemetery | Roadside | 486890 | 278322 | $NO_2$ | No | 14.1 | 2.0 | No | 2.4 |
| KT20 | o/s 15 London Road | Roadside | 486846 | 278497 | $NO_2$ | No | 6.1 | 0.4 | No | 2.4 |
| KT21 | Horsemarket Bus Stop | Roadside | 486786 | 278599 | $NO_2$ | No | 19.5 | 0.8 | No | 2.3 |
| KT22 | Silver Street opp Café Culture | Roadside | 486778 | 278779 | $NO_2$ | No | 4.0 | 0.8 | No | 2.3 |
| KT23 | 112 London Road | Roadside | 487146 | 277860 | $NO_2$ | No | 4.1 | 2.8 | No | 2.4 |
| KT24 | O/S 157 St Marys Rd | Roadside | 487718 | 278679 | $NO_2$ | No | 6.2 | 1.5 | No | 2.2 |
| KT25 | O/S 144 Windmill Ave | Roadside | 487751 | 278505 | $NO_2$ | No | 19.5 | 2.3 | No | 2.3 |
| KT26 | O/S 141 Windmill Ave | Roadside | 487725 | 278388 | $NO_2$ | No | 11.3 | 0.8 | No | 2.2 |
| KT27 | Windmill Ave Junc Barton Rd | Roadside | 487893 | 277471 | $NO_2$ | No | 18.4 | 1.7 | No | 2.1 |
| KT28 | Lower St O/S flats junc Northfield Ave | Roadside | 486153 | 278930 | $NO_2$ | No | 8.0 | 3.2 | No | 2.4 |
| KT29 | O/S St Edwards Church London Rd | Roadside | 486894 | 278216 | $NO_2$ | No | 5.0 | 2.3 | No | 2.5 |
| KT30 | Pytchley Road o/s No 6 | Roadside | 487563 | 277433 | $NO_2$ | No | 24.0 | 3.0 | No | 2.5 |
| KT31 | Northfield Av opp Carpet Right | Roadside | 486161 | 279067 | $NO_2$ | No | 7.1 | 1.2 | No | 2.6 |
| KT32 | Northampton Road/Drill Hall Court flats | Roadside | 486398 | 278274 | $NO_2$ | No | 1.3 | 4.0 | No | 2.5 |
| KT33 | Hawthorn Road o/s School | Roadside | 486871 | 277840 | $NO_2$ | No | 3.0 | 2.4 | No | 2.3 |
| BL1 | Higham Rd junc Finedon Rd | Roadside | 490048 | 274399 | $NO_2$ | No | 2.0 | 5.4 | No | 2.4 |

| 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) |
|---|---|---|---|---|---|---|---|---|---|---|
| RW1 | Opposite Old Bank | Roadside | 481465 | 281208 | $NO_2$ | No | 2.1 | 1.6 | No | 2.3 |
| RW2 | Post Office High St | Façade | 481550 | 281233 | $NO_2$ | No | 1.8 | 1.8 | No | 2.4 |
| RW3 | O/S Wheelwright House Squires Hill | Roadside | 481498 | 281096 | $NO_2$ | No | 1.5 | 2.8 | No | 2.3 |
| RW4 | O/S ST Flooring | Façade | 481481 | 281149 | $NO_2$ | No | 0.3 | 2.1 | No | 2.4 |
| RW5 | O/S Something Special Bridge St | Roadside | 481515 | 281217 | $NO_2$ | No | 2.5 | 0.5 | No | 2.3 |
| W1 | Silver Street | Urban Centre | 489131 | 267820 | $NO_2$ | No | 0.0 | 2.9 | No | 2.9 |
| W2 | Alma Street | Kerbside | 489382 | 266144 | $NO_2$ | No | 0.3 | 1.7 | No | 2.5 |
| W3 | Northampton Road | Roadside | 487831 | 267169 | $NO_2$ | No | 2.4 | 3.8 | No | 2.6 |
| W4 | Finedon Road | Kerbside | 489868 | 268204 | $NO_2$ | No | 2.3 | 1.5 | No | 2.4 |
| W5 | Butlin Court | Roadside | 490336 | 266433 | $NO_2$ | No | 0.5 | 1.5 | No | 2.6 |
| W6 | Mill Road | Urban Background | 490002 | 268946 | $NO_2$ | No | 0.0 | 3.1 | No | 2.6 |
| W7 | Ultra Close | Roadside | 490351 | 267400 | $NO_2$ | No | 4.5 | 2.8 | No | 2.9 |
| W8 | Kettering Road | Roadside | 488431 | 274049 | $NO_2$ | No | 0.0 | 3.4 | No | 2.5 |
| W9 | Market Street | Urban Background | 489226 | 267829 | $NO_2$ | No | N/A | 3.4 | No | 2.9 |
| W10 | Irthlingborough Road | Roadside | 492372 | 271928 | $NO_2$ | No | 2.3 | 1.5 | No | 2.4 |
| W11 | Broad Green | Roadside | 488788 | 268215 | $NO_2$ | No | - | 2.3 | No | 2.7 |

**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. 2 - 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 2022 (%) [2] | 2018 | 2019 | 2020 | 2021 | 2022 |
|---|---|---|---|---|---|---|---|---|---|---|
| 1N | 488424 | 288706 | Roadside | 100.0 | 100.0 | 33.8 | 21.6 | 17.6 | 16.8 | 17.6 |
| 2N | 488354 | 289329 | Roadside | 100.0 | 100.0 | 18.3 | 15.5 | 13.1 | 12.3 | 12.9 |
| 3N | 489380 | 288833 | Roadside | 100.0 | 100.0 | 20.6 | 20.2 | 16.4 | 16.9 | 17.1 |
| 4N | 489399 | 288605 | Roadside | 100.0 | 100.0 | 25.9 | 24.6 | 24.3 | 15.1 | 15.1 |
| 5N | 489997 | 288821 | Roadside | 100.0 | 100.0 | 26.2 | 24.3 | 20.3 | 19.8 | 20.2 |
| 6N | 490981 | 287322 | Roadside | 100.0 | 100.0 | - | 20.9 | 17.6 | 17.8 | 16.4 |
| 7N | 492992 | 289919 | Roadside | 100.0 | 100.0 | - | 17.9 | 16.1 | 16.7 | 16.7 |
| 8N | 490063 | 294032 | Urban Background | 92.3 | 92.3 | 12.6 | 14.5 | 9.8 | 9.4 | 8.0 |
| 9N | 484133 | 290194 | Urban Background | 100.0 | 100.0 | 9.6 | 9.3 | 6.7 | 6.6 | 6.9 |
| 10N | 485788 | 287272 | Urban Background | 100.0 | 100.0 | - | 18.4 | 19.2 | 15.8 | 18.5 |
| 11N | 487675 | 287373 | Roadside | 100.0 | 100.0 | - | 25.5 | 21.9 | 26.9 | 22.6 |
| 12N | 487039 | 288292 | Roadside | 100.0 | 100.0 | - | 17.2 | 14.3 | 14.7 | 15.9 |
| 13N | 487546 | 288816 | Roadside | 100.0 | 100.0 | - | 18.6 | 16.7 | 16.4 | 17.5 |
| 14N | 488135 | 288494 | Roadside | 100.0 | 100.0 | 31.9 | 28.7 | 22.0 | 24.4 | 24.0 |
| 15N | 488180 | 288325 | Roadside | 82.7 | 82.7 | 17.8 | 15.3 | 22.1 | 23.9 | 25.4 |
| 16N | 488122 | 287817 | Roadside | 100.0 | 100.0 | 20.0 | 17.5 | 14.1 | 14.2 | 14.2 |
| 17N | 488387 | 288122 | Roadside | 100.0 | 100.0 | 22.6 | 20.9 | 16.0 | 16.4 | 16.5 |
| ENC 1 | 499867 | 278066 | Urban Background | 100.0 | 100.0 | 17.5 | 16.3 | 12.3 | 12.9 | 12.5 |
| ENC 2 | 499161 | 278629 | Roadside | 100.0 | 100.0 | 22.2 | 20.8 | 14.5 | 14.9 | 15.5 |
| ENC 3 | 500208 | 278510 | Roadside | 100.0 | 100.0 | 20.8 | 21.8 | 16.0 | 18.4 | 18.0 |
| ENC 4 | 499573 | 278515 | Roadside | 92.3 | 92.3 | 17.1 | 16.9 | 11.4 | 12.0 | 12.0 |
| ENC 5 | 499792 | 277873 | Urban Background | 100.0 | 100.0 | 19.7 | 20.2 | 14.0 | 15.0 | 14.2 |
| ENC 6 | 499119 | 273561 | Roadside | 100.0 | 100.0 | 29.8 | 29.8 | 19.2 | 23.7 | 20.5 |
| ENC 7 | 500193 | 273219 | Urban Background | 100.0 | 100.0 | 13.5 | 13.2 | 12.1 | 9.8 | 10.6 |
| ENC 8 | 499103 | 272329 | Roadside | 100.0 | 100.0 | 16.8 | 16.0 | 12.1 | 13.5 | 12.7 |
| ENC 9 | 494525 | 270591 | Roadside | 100.0 | 100.0 | 20.3 | 20.1 | 14.9 | 15.8 | 14.7 |
| ENC 10 | 496068 | 269885 | Urban Background | 100.0 | 100.0 | 21.4 | 19.9 | 14.3 | 15.6 | 15.1 |
| ENC 11 | 496320 | 269420 | Roadside | 100.0 | 100.0 | 18.3 | 18.1 | 13.0 | 13.6 | 13.5 |
| ENC 12 | 495920 | 268317 | Roadside | 100.0 | 100.0 | 32.8 | 32.1 | 24.4 | 25.3 | 24.9 |
| ENC 13 | 495962 | 268388 | Kerbside | 100.0 | 100.0 | 36.4 | 36.3 | 26.4 | 26.6 | 26.2 |
| ENC 14 | 495587 | 267402 | Roadside | 100.0 | 100.0 | 33.3 | 32.3 | 23.7 | 25.6 | 25.4 |
| ENC 15 | 495711 | 267120 | Roadside | 100.0 | 100.0 | 28.0 | 26.1 | 20.9 | 23.6 | 23.6 |
| ENC 16 | 496039 | 266643 | Roadside | 100.0 | 100.0 | 22.1 | 20.6 | 15.1 | 16.1 | 15.6 |
| ENC 17 | 495924 | 266621 | Roadside | 100.0 | 100.0 | 33.4 | 32.6 | 26.0 | 28.0 | 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 2022 (%) [2] | 2018 | 2019 | 2020 | 2021 | 2022 |
|---|---|---|---|---|---|---|---|---|---|---|
| ENC 18 | 495883 | 266560 | Roadside | 100.0 | 100.0 | 16.6 | 17.9 | 11.9 | 12.9 | 20.1 |
| ENC 19 | 495849 | 266613 | Roadside | 100.0 | 100.0 | 33.2 | 29.9 | 24.1 | 25.7 | 16.0 |
| ENC 20 | 497127 | 266143 | Roadside | 92.3 | 92.3 | 15.7 | 16.1 | 11.5 | 11.0 | 14.8 |
| ENC 21 | 496682 | 267872 | Roadside | 90.4 | 90.4 | 23.2 | 21.4 | 16.3 | 18.0 | 19.2 |
| ENC 22 | 496772 | 266967 | Urban Background | 100.0 | 100.0 | 16.6 | 16.6 | 12.0 | 12.4 | 12.2 |
| ENC 23 | 494895 | 265669 | Roadside | 92.3 | 92.3 | 15.5 | 14.8 | 9.8 | 11.0 | 10.0 |
| ENC 24 | 494963 | 266988 | Roadside | 90.4 | 90.4 | 36.8 | 36.8 | 26.9 | 29.7 | 26.6 |
| ENC 25 | 494936 | 267014 | Roadside | 92.3 | 92.3 | 34.6 | 32.3 | 24.4 | 27.1 | 26.9 |
| ENC 26 | 493108 | 267347 | Roadside | 100.0 | 100.0 | 24.0 | 21.0 | 15.6 | 17.3 | 16.9 |
| ENC 27 | 503209 | 289307 | Roadside | 100.0 | 100.0 | 11.2 | 10.9 | 7.6 | 7.7 | 8.0 |
| ENC 28 | 504272 | 288433 | Roadside | 100.0 | 100.0 | 21.4 | 19.5 | 13.5 | 15.0 | 14.7 |
| ENC 29 | 504222 | 288110 | Roadside | 100.0 | 100.0 | 21.2 | 17.3 | 12.2 | 12.6 | 13.1 |
| ENC 30 | 497862 | 289284 | Roadside | 90.4 | 90.4 | 13.3 | 11.8 | 9.1 | 9.5 | 9.8 |
| ENC 31 | 501961 | 290525 | Roadside | 100.0 | 100.0 | 9.9 | 10.0 | 6.9 | 7.1 | 6.9 |
| ENC 32 | 499960 | 302429 | Urban Background | 100.0 | 100.0 | 11.5 | 10.7 | 8.2 | 8.2 | 8.4 |
| ENC 33 | 494761 | 267915 | Roadside | 100.0 | 100.0 | - | 20.1 | 15.9 | 19.0 | 15.8 |
| ENC 34 | 500479 | 278305 | Kerbside | 92.3 | 92.3 | - | - | - | - | 13.8 |
| ENC 35 | 493887 | 271326 | Roadside | 84.6 | 84.6 | - | - | - | - | 14.1 |
| ENC 36 | 496732 | 264589 | Roadside | 84.6 | 84.6 | - | - | - | - | 15.8 |
| ENC 37 | 502420 | 281455 | Roadside | 92.3 | 92.3 | - | - | - | - | 16.3 |
| ENC 38 | 503390 | 282825 | Roadside | 92.3 | 92.3 | - | - | - | - | 15.9 |
| ENC 39 | 505177 | 289583 | Roadside | 92.3 | 92.3 | - | - | - | - | 17.9 |
| ENC 40 | 500094 | 303197 | Urban Background | 92.3 | 92.3 | - | - | - | - | 11.0 |
| KT1 | 486783 | 278948 | Façade | 100.0 | 100.0 | 28.1 | 24.4 | 18.0 | 20.4 | 18.3 |
| KT2 | 486887 | 278246 | Roadside | 92.3 | 92.3 | 38.3 | 37.3 | 26.9 | 30.9 | 28.2 |
| KT3 | 486974 | 278895 | Roadside | 100.0 | 100.0 | 26.6 | 27.3 | 19.9 | 23.3 | 22.4 |
| KT4 | 486956 | 278338 | Urban background | 100.0 | 100.0 | 15.6 | 15.2 | 11.4 | 13.2 | 12.3 |
| KT5 | 486925 | 279028 | Roadside | 100.0 | 100.0 | 21.8 | 26.1 | 20.7 | 22.8 | 23.4 |
| KT6 | 486951 | 278904 | Roadside | 100.0 | 100.0 | 28.0 | 30.0 | 22.1 | 24.8 | 25.0 |
| KT7 | 486869 | 278877 | Roadside | 90.4 | 90.4 | 29.4 | 30.0 | 23.4 | 26.6 | 24.9 |
| KT8 | 487049 | 278942 | Roadside | 92.3 | 92.3 | 27.3 | 29.6 | 22.0 | 25.3 | 24.9 |
| KT9 | 486793 | 278254 | Roadside | 100.0 | 100.0 | 38.0 | 35.0 | 26.4 | 29.8 | 27.5 |
| KT10 | 486954 | 278099 | Roadside | 100.0 | 100.0 | 35.8 | 32.9 | 23.9 | 28.6 | 27.3 |
| KT11 | 487406 | 277653 | Roadside | 100.0 | 100.0 | 22.7 | 22.0 | 15.3 | 17.9 | 17.8 |
| KT12 | 486787 | 278276 | Roadside | 100.0 | 100.0 | - | 34.1 | 23.9 | 30.1 | 28.5 |
| KT13 | 486648 | 278233 | Roadside | 100.0 | 100.0 | - | 25.3 | 18.8 | 22.2 | 20.9 |

| 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 |
|---|---|---|---|---|---|---|---|---|---|---|
| KT14 | 486718 | 278236 | Roadside | 100.0 | 100.0 | - | 29.9 | 21.9 | 25.6 | 23.9 |
| KT15 | 486799 | 278850 | Roadside | 100.0 | 100.0 | - | 26.3 | 20.0 | 22.9 | 24.1 |
| KT16 | 486929 | 278204 | Roadside | 100.0 | 100.0 | - | 30.4 | 20.7 | 24.6 | 22.6 |
| KT17 | 486972 | 278223 | Roadside | 100.0 | 100.0 | - | 25.7 | 18.6 | 22.9 | 21.7 |
| KT18 | 486910 | 278240 | Roadside | 100.0 | 100.0 | - | 28.3 | 22.5 | 24.6 | 24.1 |
| KT19 | 486890 | 278322 | Roadside | 100.0 | 100.0 | - | 29.1 | 22.6 | 25.9 | 24.1 |
| KT20 | 486846 | 278497 | Roadside | 90.4 | 90.4 | - | 25.1 | 18.9 | 22.3 | 21.4 |
| KT21 | 486786 | 278599 | Roadside | 76.9 | 76.9 | - | 28.8 | 18.9 | 22.7 | 22.1 |
| KT22 | 486778 | 278779 | Roadside | 100.0 | 100.0 | - | 30.2 | 22.2 | 25.0 | 24.6 |
| KT23 | 487146 | 277860 | Roadside | 100.0 | 100.0 | - | 28.6 | 21.3 | 23.4 | 22.1 |
| KT24 | 487718 | 278679 | Roadside | 100.0 | 100.0 | - | 28.5 | 18.9 | 22.6 | 20.6 |
| KT25 | 487751 | 278505 | Roadside | 90.4 | 90.4 | - | 24.6 | 17.9 | 19.3 | 19.3 |
| KT26 | 487725 | 278388 | Roadside | 100.0 | 100.0 | - | 25.8 | 17.7 | 21.7 | 19.7 |
| KT27 | 487893 | 277471 | Roadside | 50.0 | 50.0 | - | 39.5 | 25.4 | 20.5 | 30.9 |
| KT28 | 486153 | 278930 | Roadside | 100.0 | 100.0 | - | - | 23.3 | 23.9 | 23.3 |
| KT29 | 486894 | 278216 | Roadside | 90.4 | 90.4 | - | - | 24.3 | 23.6 | 23.4 |
| KT30 | 487563 | 277433 | Roadside | 100.0 | 100.0 | - | - | 22.9 | 21.1 | 20.2 |
| KT31 | 486161 | 279067 | Roadside | 100.0 | 100.0 | - | - | 24.7 | 23.2 | 22.5 |
| KT32 | 486398 | 278274 | Roadside | 84.6 | 84.6 | - | - | 26.5 | 26.8 | 23.9 |
| KT33 | 486871 | 277840 | Roadside | 82.7 | 82.7 | - | - | 16.5 | 14.6 | 15.2 |
| BL1 | 490048 | 274399 | Roadside | 92.3 | 92.3 | - | - | 16.3 | 15.4 | 14.8 |
| RW1 | 481465 | 281208 | Roadside | 100.0 | 100.0 | 34.8 | 32.6 | 21.7 | 26.1 | 26.1 |
| RW2 | 481550 | 281233 | Façade | 100.0 | 100.0 | 29.9 | 28.5 | 21.3 | 25.8 | 23.9 |
| RW3 | 481498 | 281096 | Roadside | 100.0 | 100.0 | - | 28.2 | 18.4 | 21.5 | 21.1 |
| RW4 | 481481 | 281149 | Façade | 100.0 | 100.0 | - | **42.0** | 28.8 | 33.4 | 32.1 |
| RW5 | 481515 | 281217 | Roadside | 100.0 | 100.0 | - | 29.9 | 19.8 | 22.3 | 21.9 |
| W1 | 489131 | 267820 | Urban Centre | 100.0 | 99.2 | 35.8 | **42.3** | 30.2 | 32.2 | 30.2 |
| W2 | 489382 | 266144 | Kerbside | 100.0 | 99.2 | 22.7 | 28.6 | 20.5 | 22.9 | 20.8 |
| W3 | 487831 | 267169 | Roadside | 84.0 | 83.8 | 22.8 | 25.8 | 18.8 | 20.5 | 20.0 |
| W4 | 489868 | 268204 | Kerbside | 100.0 | 99.2 | 18.9 | 25.2 | 16.1 | 16.0 | 15.3 |
| W5 | 490336 | 266433 | Roadside | 100.0 | 99.2 | 20.2 | 21.4 | 15.9 | 16.5 | 16.5 |
| W6 | 490002 | 268946 | Urban Background | 100.0 | 99.2 | 15.7 | 18.7 | 13.8 | 14.0 | 13.5 |
| W7 | 490351 | 267400 | Roadside | 100.0 | 99.2 | 25.1 | 27.8 | 20.6 | 22.0 | 22.0 |
| W8 | 488431 | 274049 | Roadside | 100.0 | 99.2 | 21.6 | 24.2 | 17.0 | 17.0 | 15.1 |
| W9 | 489226 | 267829 | Urban Background | 100.0 | 99.2 | 21.0 | 23.3 | 15.8 | 17.0 | 18.4 |
| W10 | 492372 | 271928 | Roadside | 87.6 | 87.4 | 25.6 | 31.6 | 21.1 | 24.0 | 22.7 |

| Diffusion Tube ID | X OS Grid Ref (Easting) | Y OS Grid Ref (Northing) | Site Type | Valid Data Capture for Monitoring Period (%) [1] | Valid Data Capture 2022 (%) [2] | 2018 | 2019 | 2020 | 2021 | 2022 |
|---|---|---|---|---|---|---|---|---|---|---|
| W11 | 488788 | 268215 | Roadside | 100.0 | 99.2 | 24.3 | 29.8 | 21.4 | 24.3 | 22.3 |

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

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

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

**Notes:**

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

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

$NO_2$ annual means exceeding $60\mu g/m^3$, 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%). Wellingborough tubes started a week later in January, hence difference in data captures.

**Figure A. 1 – Trends in Annual Mean NO₂ Concentrations in Corby (1)**
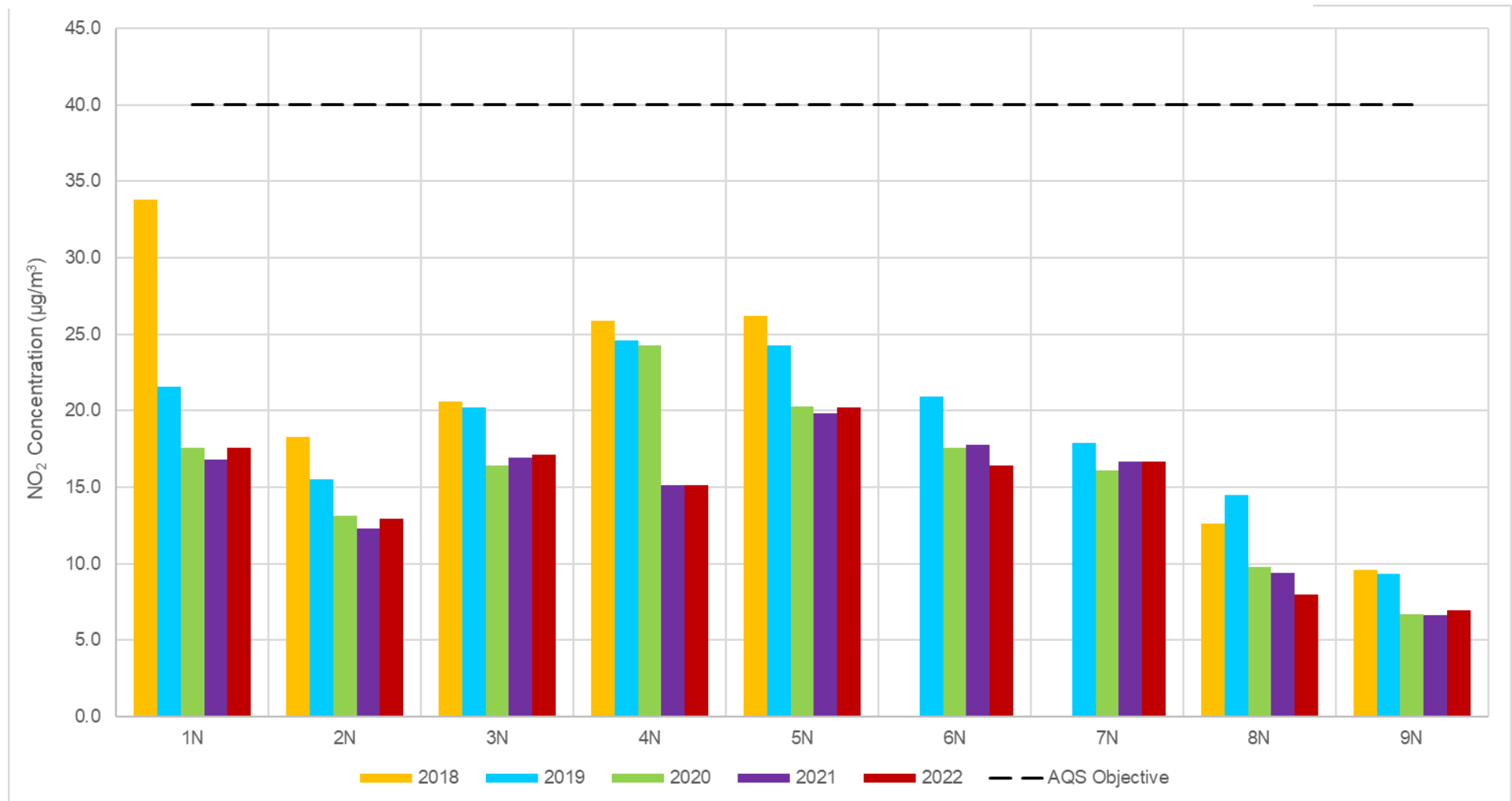
**Figure A. 2 – Trends in Annual Mean NO₂ Concentrations in Corby (2)**
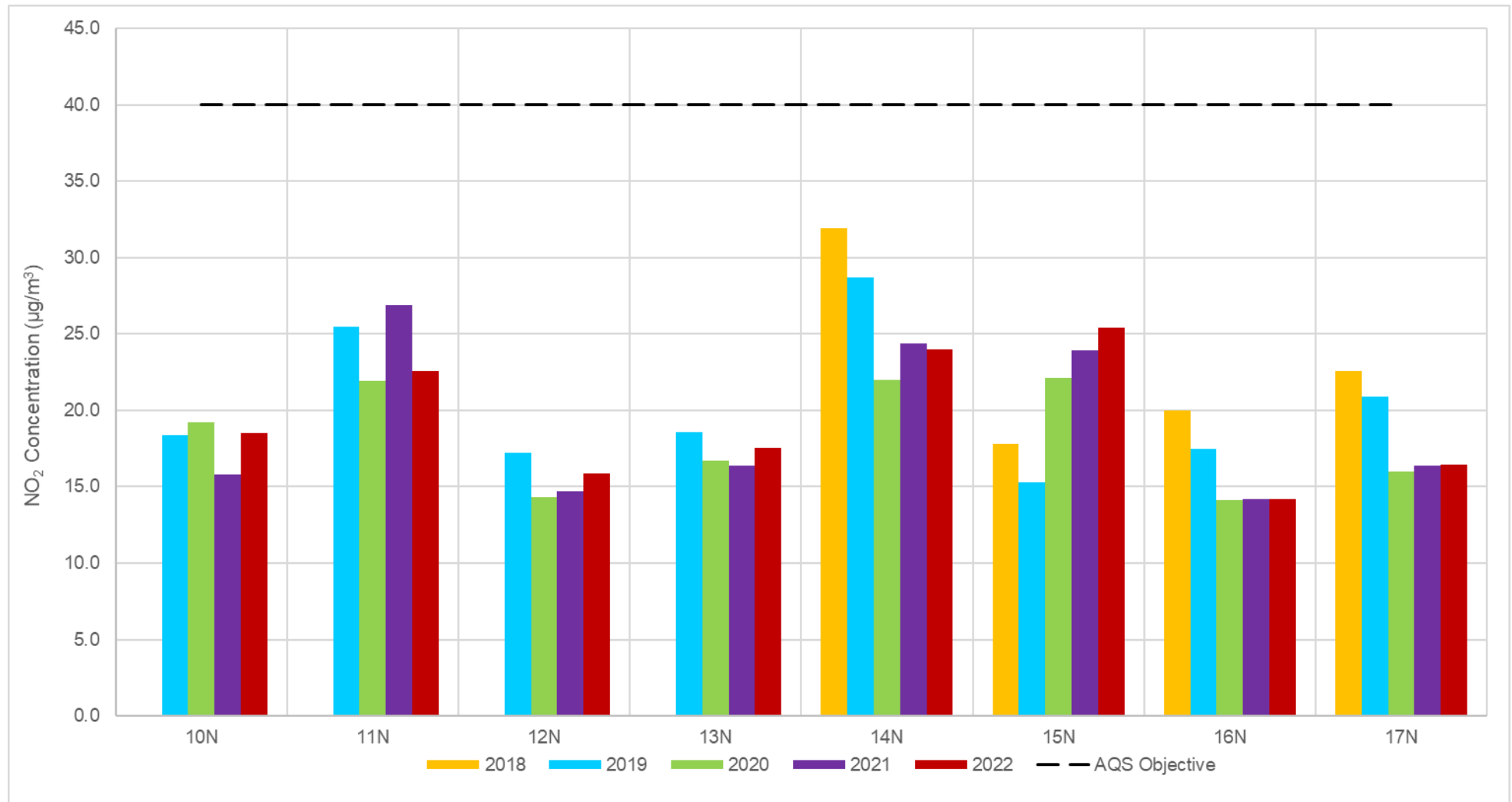
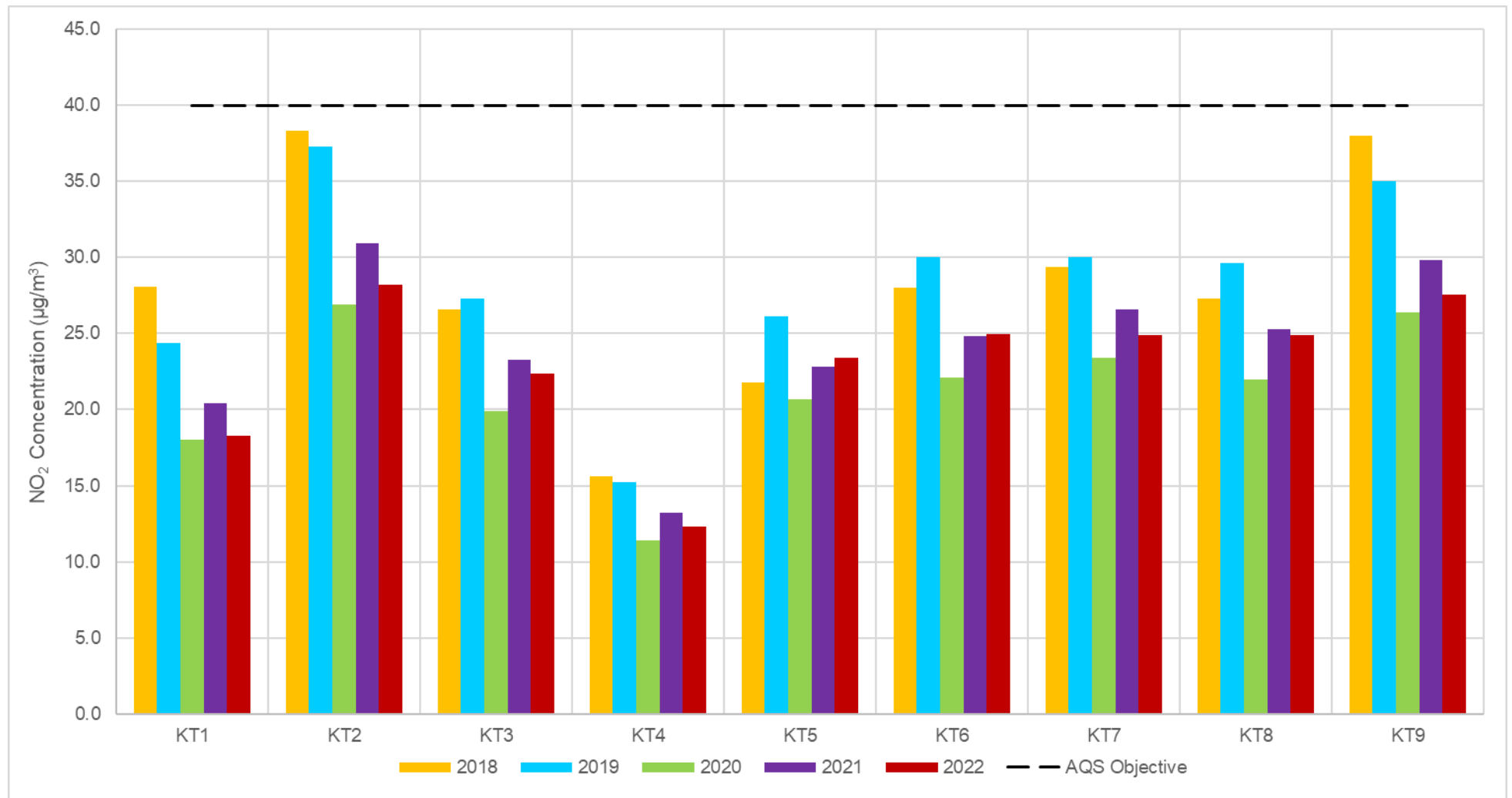**Figure A. 3 – Trends in Annual Mean NO$_2$ Concentrations in Kettering (1)**

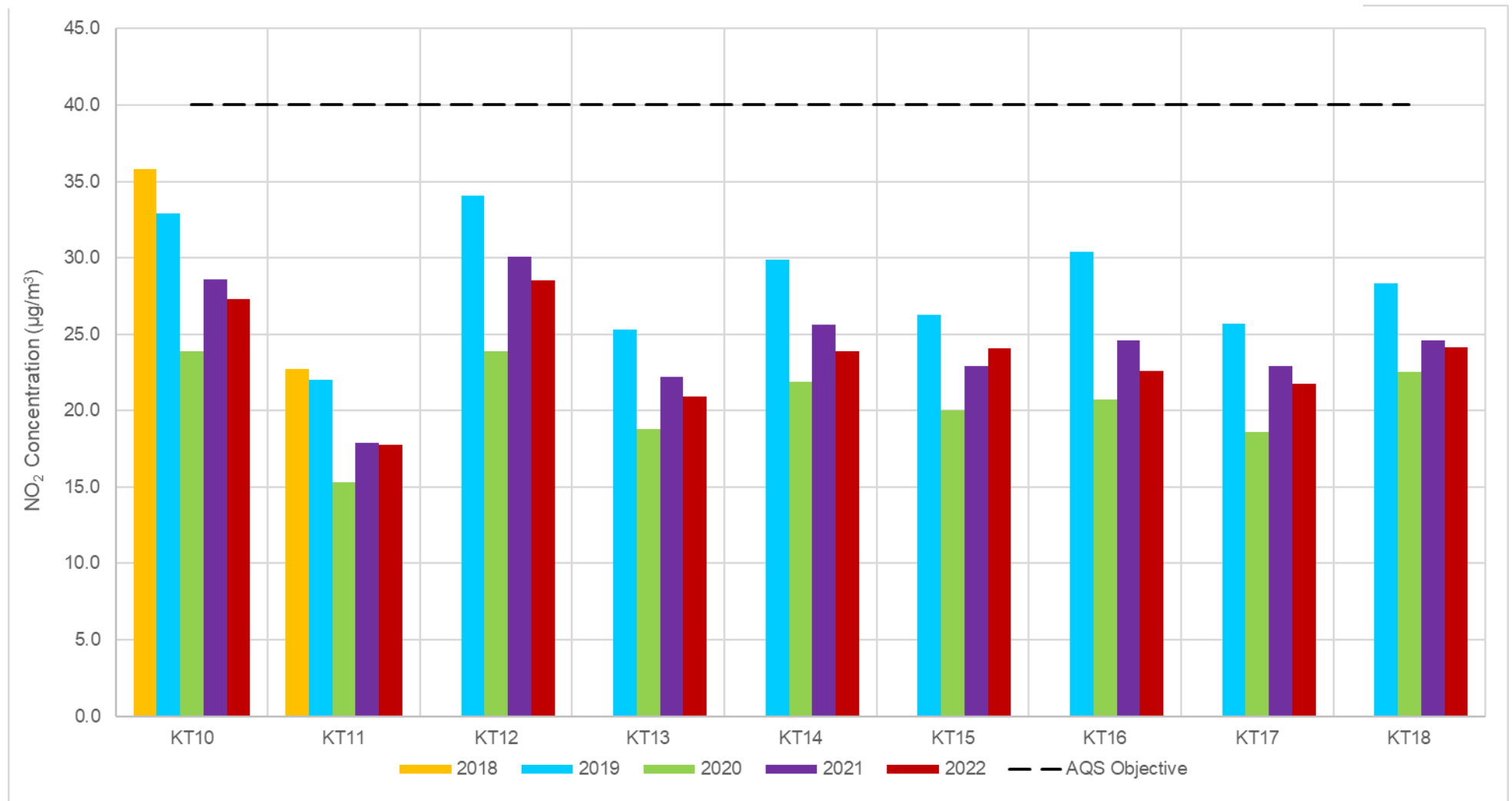**Figure A. 4 – Trends in Annual Mean NO₂ Concentrations in Kettering (2)**

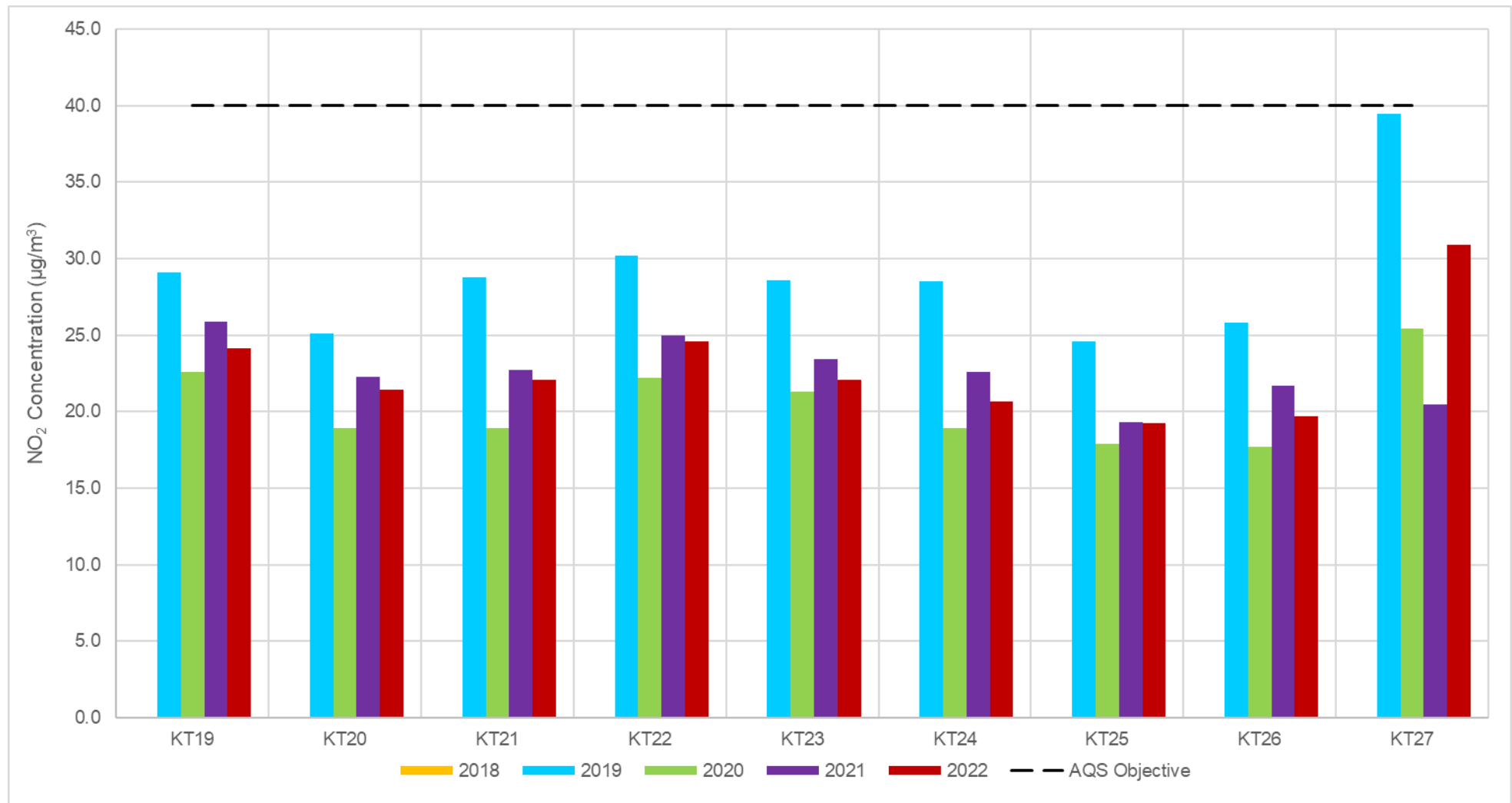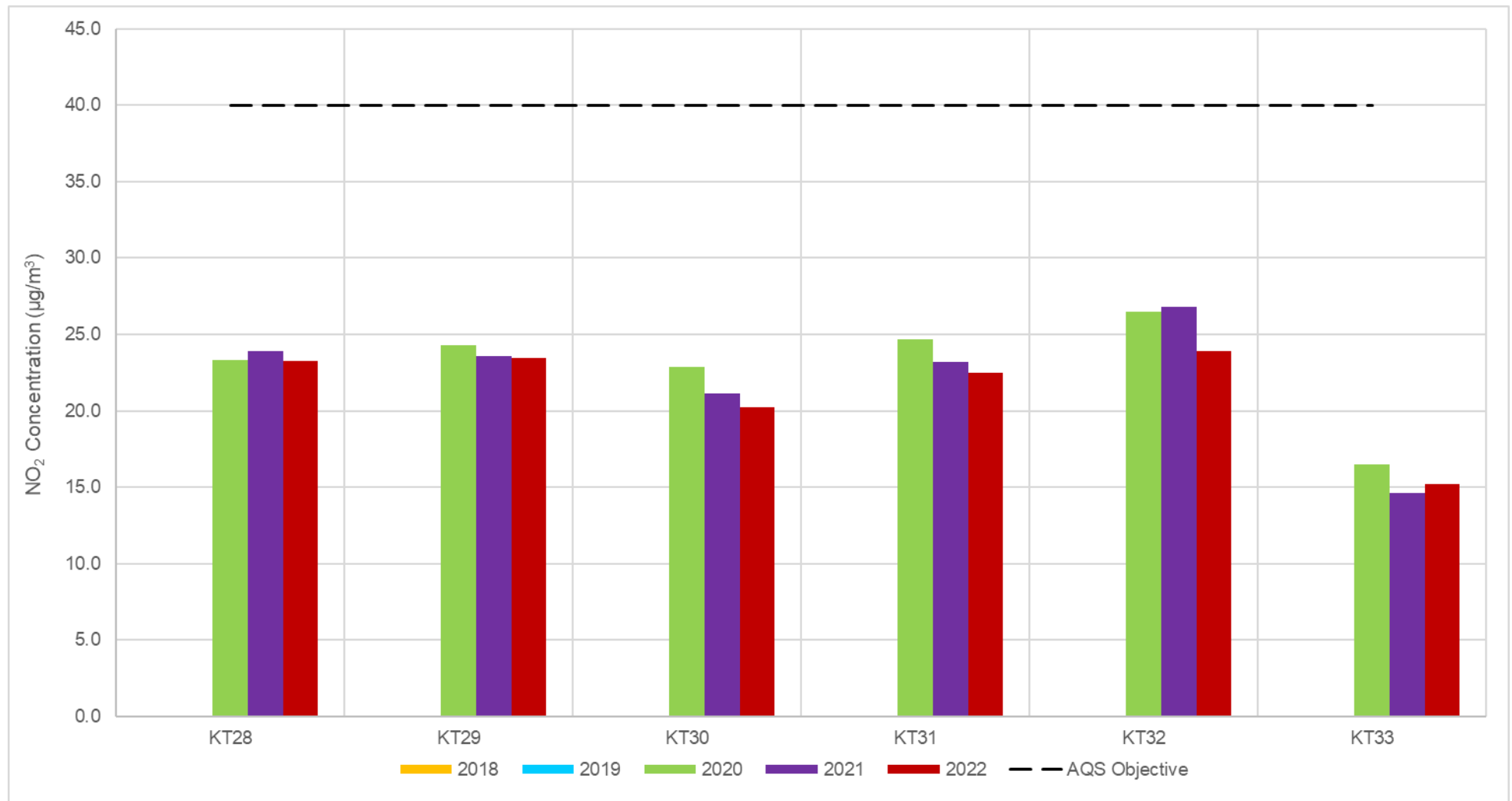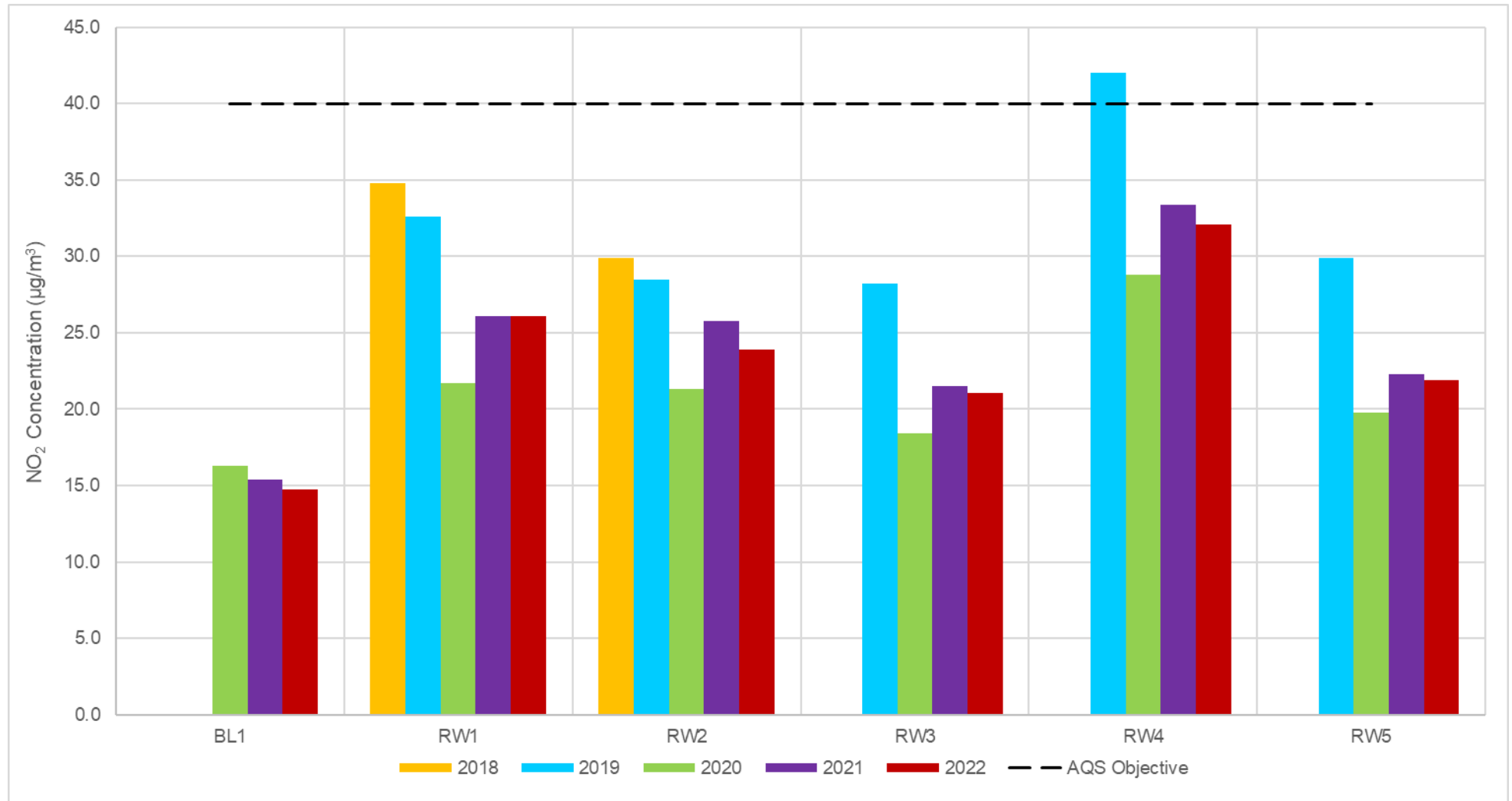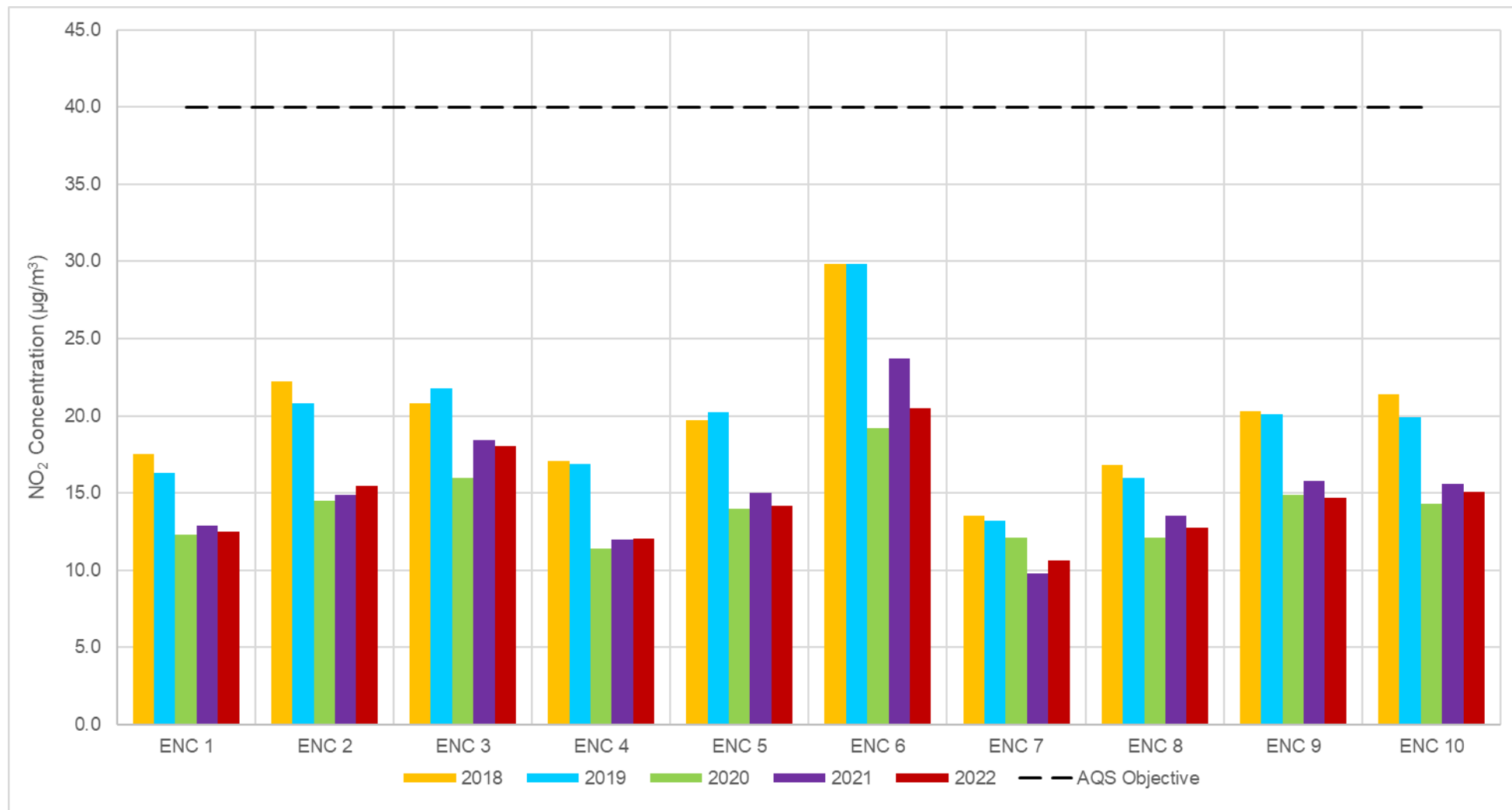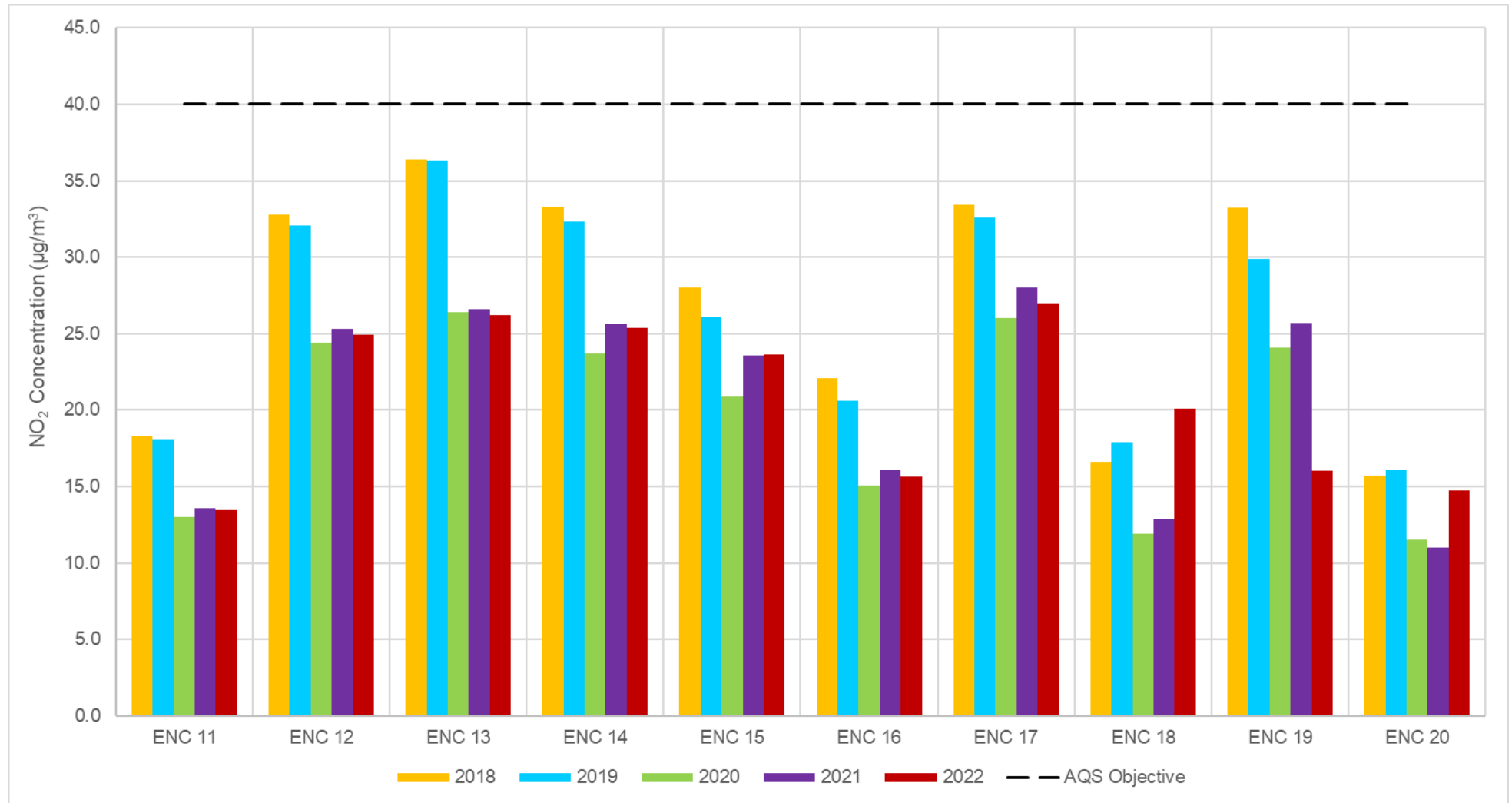**Figure A. 5 – Trends in Annual Mean NO₂ Concentrations in Kettering (3)**

**Figure A. 6 – Trends in Annual Mean NO$_2$ Concentrations in Kettering (4)**

**Figure A. 7 – Trends in Annual Mean NO₂ Concentrations in Burton Latimer and Rothwell**

**Figure A. 8 – Trends in Annual Mean NO₂ Concentrations in East Northamptonshire (1)**

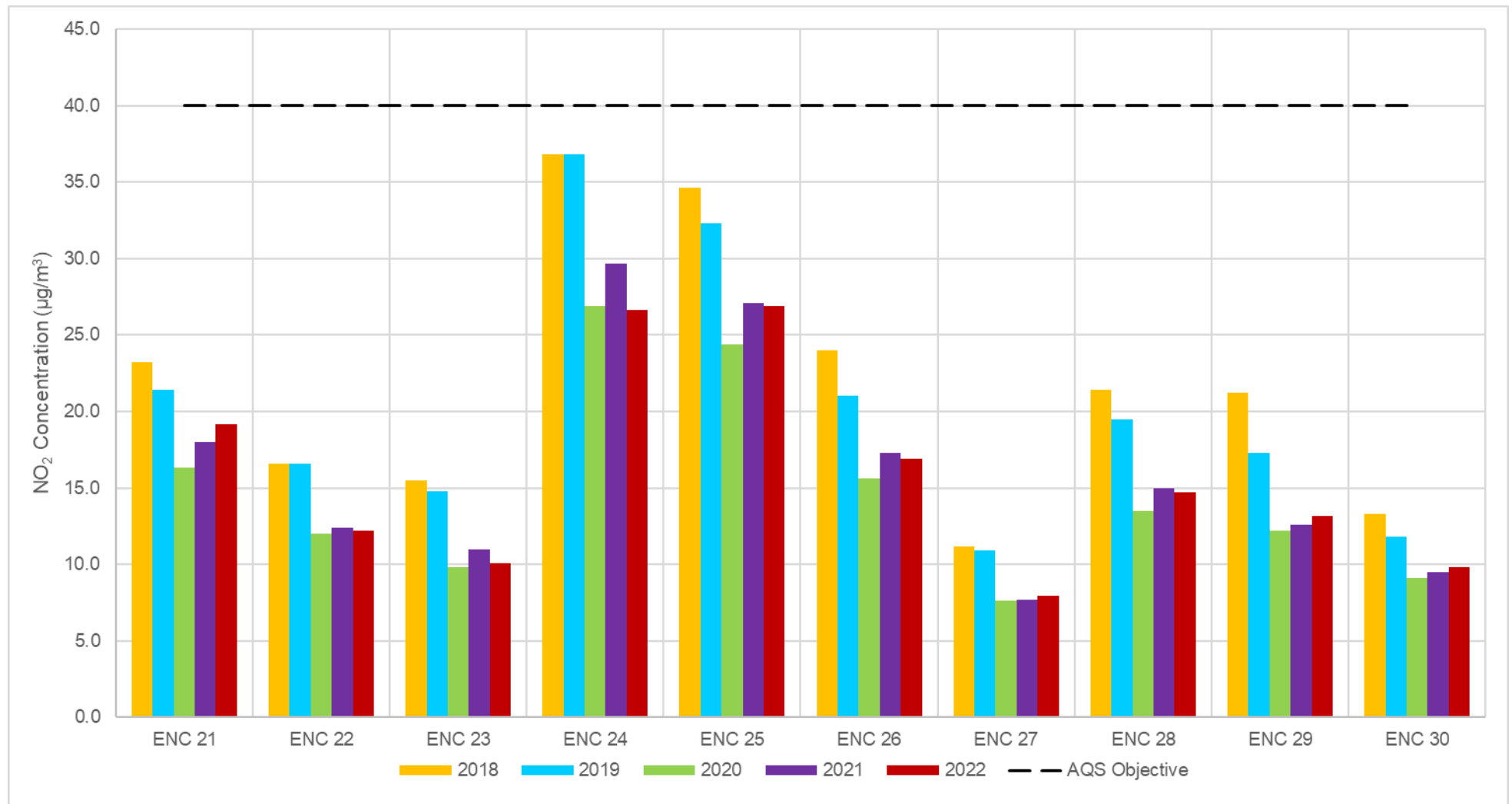**Figure A. 9 – Trends in Annual Mean NO₂ Concentrations in East Northamptonshire (2)**
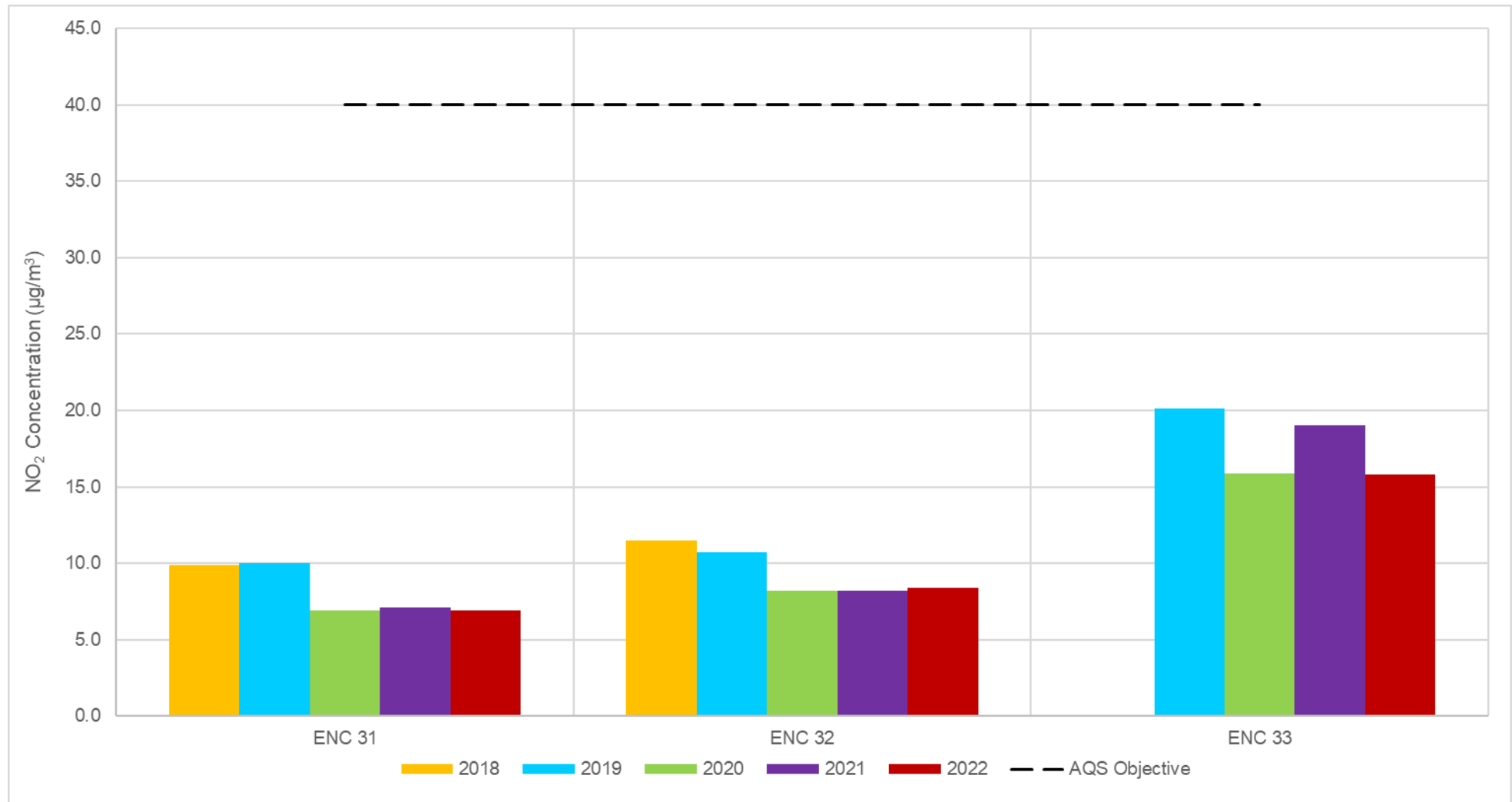
**Figure A. 10 – Trends in Annual Mean NO₂ Concentrations in East Northamptonshire (3)**

**Figure A. 11 – Trends in Annual Mean NO$_2$ Concentrations in East Northamptonshire (4)**
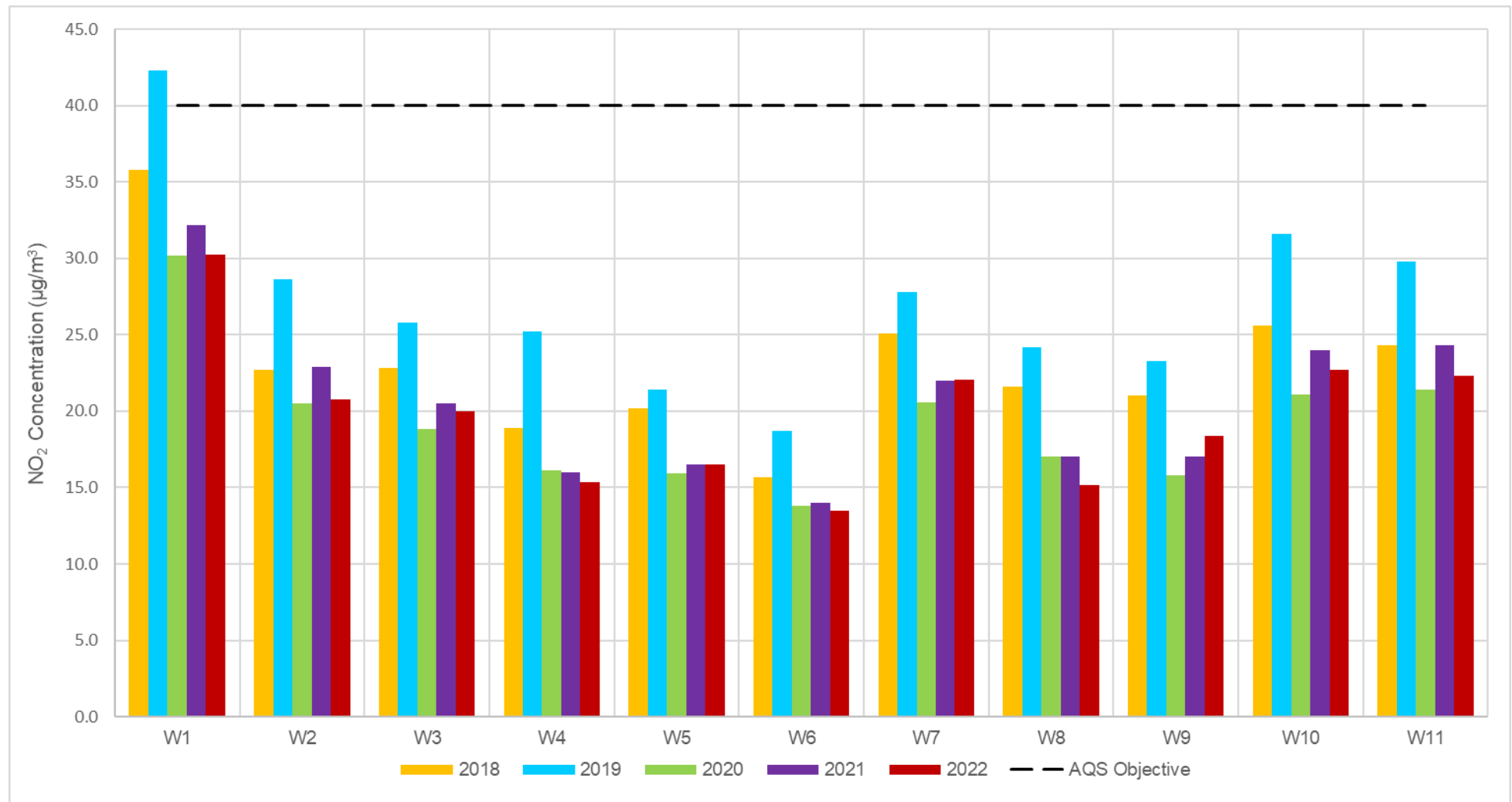
**Figure A. 12 – Trends in Annual Mean NO$_2$ Concentrations in Wellingborough (1)**

# Appendix B: Full Monthly Diffusion Tube Results for 2022

**Table B.1 – NO₂ 2022 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 (0.83) | Comment |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1N | 488424 | 288706 | 31.4 | 23.3 | 26.4 | 10.0 | 16.4 | 18.0 | 17.1 | 16.9 | 20.3 | 23.6 | 23.1 | 27.6 | 21.2 | 17.6 | |
| 2N | 488354 | 289329 | 22.9 | 13.6 | 20.8 | 7.1 | 12.6 | 11.5 | 13.1 | 12.1 | 16.2 | 17.4 | 18.8 | 20.6 | 15.6 | 12.9 | |
| 3N | 489380 | 288833 | 28.6 | 19.5 | 25.9 | 10.2 | 16.8 | 17.1 | 16.8 | 18.0 | 21.5 | 22.8 | 24.7 | 25.5 | 20.6 | 17.1 | |
| 4N | 489399 | 288605 | 27.9 | 19.4 | 25.4 | 7.9 | 12.4 | 11.2 | 13.9 | 13.0 | 16.7 | 21.7 | 23.3 | 25.9 | 18.2 | 15.1 | |
| 5N | 489997 | 288821 | 38.8 | 26.5 | 27.9 | 11.4 | 20.4 | 20.2 | 20.5 | 18.9 | 22.9 | 26.4 | 29.7 | 28.6 | 24.4 | 20.2 | |
| 6N | 490981 | 287322 | 27.9 | 19.5 | | 9.9 | 15.8 | 15.9 | 15.0 | 19.8 | 20.6 | 22.5 | 24.6 | 26.0 | 19.8 | 16.4 | |
| 7N | 492992 | 289919 | 31.5 | 20.2 | 23.5 | 6.1 | 16.9 | 15.8 | 14.8 | 12.9 | 19.1 | 25.0 | 28.6 | 26.8 | 20.1 | 16.7 | |
| 8N | 490063 | 294032 | 19.8 | 9.9 | 13.4 | 4.9 | 7.1 | 5.5 | 6.1 | 6.3 | 9.2 | 10.0 | 13.2 | | 9.6 | 8.0 | |
| 9N | 484133 | 290194 | 15.7 | 7.9 | 10.5 | 3.3 | 5.5 | 4.7 | 5.7 | 5.2 | 7.5 | 7.9 | 9.9 | 16.5 | 8.4 | 6.9 | |
| 10N | 485788 | 287272 | 30.6 | 19.2 | 23.1 | 9.3 | 20.5 | 22.2 | 20.0 | 19.2 | 23.3 | 26.8 | 27.3 | 26.5 | 22.3 | 18.5 | |
| 11N | 487675 | 287373 | 39.4 | 29.2 | 31.7 | 12.9 | 24.8 | 24.3 | 25.6 | 24.0 | 29.9 | 26.7 | 27.3 | 31.0 | 27.2 | 22.6 | |
| 12N | 487039 | 288292 | 28.3 | 16.5 | 23.5 | 7.8 | 11.8 | 9.6 | 10.7 | 12.8 | 17.1 | 45.4 | 20.8 | 25.4 | 19.1 | 15.9 | |
| 13N | 487546 | 288816 | 31.5 | 23.6 | 26.4 | 9.2 | 16.4 | 16.5 | 17.2 | 16.2 | 18.9 | 24.2 | 25.9 | 27.2 | 21.1 | 17.5 | |
| 14N | 488135 | 288494 | 37.2 | 24.5 | 38.4 | 17.0 | 26.0 | 23.7 | 26.2 | 31.0 | 31.4 | 27.7 | 30.1 | 34.0 | 28.9 | 24.0 | |
| 15N | 488180 | 288325 | 33.6 | 24.2 | 33.7 | 16.2 | 30.9 | 32.5 | 31.5 | 30.8 | | 36.5 | 36.6 | | 30.6 | 25.4 | |
| 16N | 488122 | 287817 | 20.3 | 14.3 | 25.0 | 8.5 | 13.8 | 12.9 | 14.3 | 14.8 | 17.3 | 20.0 | 20.8 | 22.9 | 17.1 | 14.2 | |
| 17N | 488387 | 288122 | 31.4 | 18.8 | 27.4 | 9.9 | 15.7 | 13.7 | 15.5 | 15.5 | 18.5 | 21.8 | 23.9 | 26.1 | 19.8 | 16.5 | |
| ENC 1 | 499867 | 278066 | 24.1 | 15.2 | 19.7 | 11.1 | 11.2 | 9.8 | 9.9 | 10.1 | 12.8 | 17.1 | 18.9 | 20.7 | 15.1 | 12.5 | |
| ENC 2 | 499161 | 278629 | 26.5 | 15.9 | 20.5 | 17.7 | 16.2 | 16.4 | 16.2 | 14.8 | 17.8 | 18.4 | 19.9 | 23.0 | 18.6 | 15.5 | |
| ENC 3 | 500208 | 278510 | 29.1 | 22.1 | 26.6 | 18.9 | 15.4 | 17.4 | 16.9 | 17.3 | 21.9 | 23.2 | 26.5 | 25.3 | 21.7 | 18.0 | |
| ENC 4 | 499573 | 278515 | 24.7 | 13.9 | 17.4 | 11.0 | 9.9 | 9.8 | 8.3 | 9.5 | | 15.9 | 17.6 | 21.2 | 14.5 | 12.0 | |
| ENC 5 | 499792 | 277873 | 23.7 | 18.4 | 21.4 | 13.0 | 14.2 | 15.2 | 14.4 | 13.0 | 12.6 | 18.9 | 21.6 | 18.1 | 17.1 | 14.2 | |
| ENC 6 | 499119 | 273561 | 36.4 | 11.1 | 31.8 | 24.8 | 21.4 | 6.8 | 24.8 | 27.9 | 27.2 | 24.2 | 28.3 | 31.8 | 24.7 | 20.5 | |
| ENC 7 | 500193 | 273219 | 21.9 | 12.3 | 12.7 | 9.0 | 7.4 | 20.5 | 6.9 | 7.5 | 10.9 | 12.1 | 14.0 | 18.5 | 12.8 | 10.6 | |
| ENC 8 | 499103 | 272329 | 22.7 | 14.7 | 17.1 | 12.8 | 10.9 | 11.0 | 11.3 | 12.0 | 14.8 | 16.3 | 18.0 | 22.5 | 15.3 | 12.7 | |
| ENC 9 | 494525 | 270591 | 26.3 | 16.6 | 24.0 | 16.0 | 13.2 | 11.3 | 12.0 | 13.6 | 15.9 | 19.9 | 19.8 | 23.6 | 17.7 | 14.7 | |
| ENC 10 | 496068 | 269885 | 28.6 | 16.0 | 21.3 | 16.5 | 13.9 | 12.0 | 13.9 | 18.3 | 20.0 | 16.8 | 17.6 | 23.4 | 18.2 | 15.1 | |
| ENC 11 | 496320 | 269420 | 26.7 | 14.8 | 21.6 | 14.4 | 10.6 | 9.9 | 9.7 | 12.0 | 16.1 | 17.0 | 19.6 | 22.2 | 16.2 | 13.5 | |
| ENC 12 | 495920 | 268317 | 42.1 | 28.8 | 31.1 | 27.8 | 24.1 | 23.6 | 24.3 | 23.6 | 33.8 | 30.9 | 32.1 | 38.3 | 30.0 | 24.9 | |
| ENC 13 | 495962 | 268388 | 43.7 | 34.3 | 27.5 | 25.4 | 25.6 | 27.6 | 27.8 | 25.2 | 29.2 | 34.5 | 37.0 | 40.8 | 31.6 | 26.2 | |
| ENC 14 | 495587 | 267402 | 34.6 | 25.3 | 37.0 | 31.6 | 24.9 | 26.1 | 26.9 | 30.7 | 31.8 | 29.6 | 32.8 | 35.9 | 30.6 | 25.4 | |
| ENC 15 | 495711 | 267120 | 34.4 | 23.3 | 34.8 | 26.3 | 21.4 | 22.6 | 23.7 | 24.5 | 31.6 | 31.2 | 31.9 | 35.9 | 28.5 | 23.6 | |
| ENC 16 | 496039 | 266643 | 28.0 | 19.3 | 22.6 | 15.8 | 12.6 | 12.3 | 13.5 | 13.4 | 17.6 | 19.1 | 24.1 | 27.6 | 18.8 | 15.6 | |
| ENC 17 | 495924 | 266621 | 42.4 | 37.3 | 31.8 | 26.6 | 26.0 | 31.0 | 29.0 | 26.6 | 30.5 | 30.1 | 40.4 | 37.9 | 32.5 | 27.0 | |
| ENC 18 | 495883 | 266560 | 26.4 | 25.7 | 33.1 | 28.1 | 24.8 | 25.8 | 9.6 | 30.4 | 34.0 | 14.3 | 16.5 | 21.9 | 24.2 | 20.1 | |
| ENC 19 | 495849 | 266613 | 39.0 | 14.3 | 14.5 | 10.2 | 9.5 | 8.2 | 25.2 | 9.2 | 13.6 | 26.0 | 28.6 | 33.6 | 19.3 | 16.0 | |
| ENC 20 | 497127 | 266143 | 23.7 | | 23.0 | 16.6 | 19.6 | 21.5 | 9.5 | 17.0 | 25.5 | 14.6 | 17.0 | 7.8 | 17.8 | 14.8 | |
| ENC 21 | 496682 | 267872 | 35.2 | 21.3 | 28.1 | 20.2 | 18.3 | 17.9 | 17.8 | 19.4 | 23.2 | 25.8 | 26.8 | | 23.1 | 19.2 | |
| ENC 22 | 496772 | 266967 | 26.8 | 14.3 | 16.8 | 11.4 | 9.1 | 10.0 | 9.0 | 10.2 | 13.3 | 15.4 | 18.1 | 22.1 | 14.7 | 12.2 | |
| ENC 23 | 494895 | 265669 | | 11.0 | 19.5 | 10.9 | 8.0 | 7.3 | 7.9 | 9.3 | 11.3 | 12.8 | 14.3 | 20.9 | 12.1 | 10.0 | |
| ENC 24 | 494963 | 266988 | 21.1 | 34.3 | 42.0 | 29.7 | 26.4 | 28.6 | 30.1 | 25.9 | 36.3 | | 40.6 | 38.2 | 32.1 | 26.6 | |
| ENC 25 | 494936 | 267014 | 42.0 | 31.0 | 35.3 | 26.2 | 25.8 | 28.2 | 32.8 | 28.3 | 38.0 | 31.0 | | 38.0 | 32.4 | 26.9 | |
| ENC 26 | 493108 | 267347 | 30.5 | 17.7 | 26.6 | 15.4 | 13.2 | 15.3 | 16.1 | 15.5 | 19.6 | 21.4 | 26.1 | 26.9 | 20.4 | 16.9 | |
| ENC 27 | 503209 | 289307 | 18.3 | 10.3 | 14.1 | 6.9 | 5.5 | 5.3 | 5.0 | 5.4 | 7.8 | 9.6 | 12.2 | 14.6 | 9.6 | 8.0 | |
| ENC 28 | 504272 | 288433 | 23.9 | 17.3 | 20.8 | 14.3 | 13.2 | 13.9 | 13.4 | 12.9 | 16.9 | 19.5 | 22.9 | 23.7 | 17.7 | 14.7 | |
| ENC 29 | 504222 | 288110 | 23.4 | 14.7 | 19.9 | 13.7 | 11.2 | 11.8 | 12.0 | 12.2 | 14.8 | 15.2 | 19.7 | 21.4 | 15.8 | 13.1 | |
| ENC 30 | 497862 | 289284 | 20.3 | 12.2 | 12.5 | 7.9 | | 12.4 | 7.7 | 7.5 | 10.0 | 12.0 | 13.1 | 14.9 | 11.8 | 9.8 | |

| 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 (0.83) | Comment |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ENC 31 | 501961 | 290525 | 14.8 | 8.2 | 10.7 | 6.0 | 6.1 | 5.3 | 5.5 | 5.4 | 7.4 | 8.9 | 10.9 | 11.2 | 8.4 | 6.9 | |
| ENC 32 | 499960 | 302429 | 18.0 | 10.2 | 12.8 | 7.2 | 7.1 | 5.7 | 6.5 | 6.1 | 8.9 | 10.6 | 12.2 | 15.5 | 10.1 | 8.4 | |
| ENC 33 | 494761 | 267915 | 28.5 | 18.8 | 21.4 | 17.8 | 15.5 | 13.0 | 15.1 | 18.0 | 21.0 | 17.3 | 18.8 | 23.9 | 19.1 | 15.8 | |
| ENC 34 | 500479 | 278305 | | 17.2 | 21.4 | 14.3 | 13.0 | 13.1 | 12.0 | 13.0 | 15.9 | 19.2 | 21.4 | 22.1 | 16.6 | 13.8 | |
| ENC 35 | 493887 | 271326 | | | 21.5 | 16.9 | 12.4 | 13.1 | 13.6 | 14.0 | 19.9 | 16.6 | 18.1 | 23.3 | 17.0 | 14.1 | |
| ENC 36 | 496732 | 264589 | | 24.0 | 18.8 | 14.5 | 9.3 | 8.1 | | 10.7 | 15.6 | 25.5 | 31.8 | 32.1 | 19.0 | 15.8 | |
| ENC 37 | 502420 | 281455 | | 22.3 | 24.3 | 15.7 | 15.4 | 15.9 | 13.7 | 16.2 | 17.8 | 22.6 | 26.5 | 26.2 | 19.7 | 16.3 | |
| ENC 38 | 503390 | 282825 | | 17.0 | 25.3 | 18.4 | 15.6 | 15.8 | 15.7 | 17.8 | 18.9 | 20.7 | 21.9 | 23.5 | 19.2 | 15.9 | |
| ENC 39 | 505177 | 289583 | | 20.2 | 21.7 | 19.6 | 18.7 | 18.8 | 19.0 | 20.8 | 24.0 | 24.1 | 24.8 | 25.6 | 21.6 | 17.9 | |
| ENC 40 | 500094 | 303197 | | 15.7 | 18.2 | 9.9 | 10.5 | 8.5 | 8.6 | 9.3 | 11.9 | 17.2 | 18.4 | 17.6 | 13.3 | 11.0 | |
| KT1 | 486783 | 278948 | 30.8 | 22.4 | 25.3 | 19.8 | 17.5 | 16.6 | 17.9 | 20.0 | 24.6 | 21.9 | 22.6 | 24.5 | 22.0 | 18.3 | |
| KT2 | 486887 | 278246 | 45.2 | 33.7 | 34.8 | 27.0 | 28.0 | 31.5 | 29.8 | 31.3 | | 35.8 | 36.7 | 40.0 | 34.0 | 28.2 | |
| KT3 | 486974 | 278895 | 31.2 | 25.8 | 30.8 | 26.8 | 20.4 | 21.4 | 22.5 | 26.5 | 29.1 | 27.7 | 29.9 | 31.7 | 27.0 | 22.4 | |
| KT4 | 486956 | 278338 | 25.7 | 15.8 | 16.0 | 11.8 | 11.3 | 11.1 | 9.8 | 10.4 | 14.8 | 16.6 | 15.9 | 19.4 | 14.9 | 12.3 | |
| KT5 | 486925 | 279028 | 34.5 | 30.6 | 26.3 | 22.2 | 24.6 | 25.9 | 22.4 | 21.7 | 29.7 | 33.4 | 33.0 | 33.8 | 28.2 | 23.4 | |
| KT6 | 486951 | 278904 | 34.1 | 26.9 | 31.9 | 28.5 | 23.7 | 26.3 | 22.4 | 30.8 | 29.6 | 35.4 | 35.3 | 36.2 | 30.1 | 25.0 | |
| KT7 | 486869 | 278877 | 38.9 | 28.0 | 32.3 | 28.5 | 25.7 | 24.5 | 26.7 | 29.7 | 29.1 | | 33.8 | 33.1 | 30.0 | 24.9 | |
| KT8 | 487049 | 278942 | 35.8 | 30.3 | 32.7 | 29.1 | 25.1 | 24.4 | 24.8 | 29.0 | 30.0 | 33.6 | | 35.1 | 30.0 | 24.9 | |
| KT9 | 486793 | 278254 | 42.4 | 32.2 | 36.8 | 32.0 | 27.4 | 29.0 | 27.5 | 32.8 | 35.0 | 34.4 | 32.1 | 36.7 | 33.2 | 27.5 | |
| KT10 | 486954 | 278099 | 41.5 | 31.5 | 34.3 | 30.4 | 27.8 | 28.7 | 30.6 | 29.1 | 38.7 | 33.7 | 33.9 | 34.2 | 32.9 | 27.3 | |
| KT11 | 487406 | 277653 | 29.5 | 21.1 | 25.0 | 18.4 | 15.5 | 16.7 | 17.5 | 17.7 | 22.6 | 23.1 | 22.8 | 27.0 | 21.4 | 17.8 | |
| KT12 | 486787 | 278276 | 44.8 | 31.0 | 39.0 | 32.8 | 28.6 | 29.5 | 30.6 | 32.0 | 36.5 | 35.8 | 35.1 | 37.0 | 34.4 | 28.5 | |
| KT13 | 486648 | 278233 | 34.9 | 19.7 | 29.6 | 22.5 | 19.8 | 17.4 | 22.1 | 22.5 | 31.0 | 28.0 | 23.5 | 31.0 | 25.2 | 20.9 | |
| KT14 | 486718 | 278236 | 37.0 | 22.1 | 32.5 | 28.8 | 22.6 | 23.9 | 26.8 | 28.3 | 35.7 | 29.0 | 28.6 | 30.6 | 28.8 | 23.9 | |
| KT15 | 486799 | 278850 | 40.0 | 25.8 | 33.1 | 27.6 | 21.6 | 19.3 | 24.4 | 29.4 | 29.8 | 31.1 | 32.9 | 33.2 | 29.0 | 24.1 | |
| KT16 | 486929 | 278204 | 42.3 | 19.8 | 29.8 | 19.9 | 24.7 | 23.5 | 24.2 | 22.1 | 33.5 | 29.4 | 25.3 | 32.0 | 27.2 | 22.6 | |
| KT17 | 486972 | 278223 | 36.9 | 23.5 | 30.0 | 21.1 | 20.2 | 21.0 | 22.4 | 18.0 | 33.2 | 29.2 | 27.2 | 31.5 | 26.2 | 21.7 | |
| KT18 | 486910 | 278240 | 37.4 | 29.3 | 28.4 | 28.8 | 25.1 | 24.6 | 25.7 | 24.5 | 33.4 | 28.4 | 27.7 | 35.7 | 29.1 | 24.1 | |
| KT19 | 486890 | 278322 | 44.4 | 31.4 | 26.4 | 22.9 | 24.7 | 23.9 | 24.2 | 21.3 | 33.4 | 31.0 | 29.5 | 36.1 | 29.1 | 24.1 | |
| KT20 | 486846 | 278497 | 38.1 | 22.3 | 28.1 | 19.9 | | 20.1 | 21.0 | 21.0 | 29.2 | 28.2 | 26.4 | 29.6 | 25.8 | 21.4 | |
| KT21 | 486786 | 278599 | 29.5 | 18.8 | | 29.7 | 22.1 | 19.9 | | | 29.1 | 28.1 | 30.0 | 32.0 | 26.6 | 22.1 | |
| KT22 | 486778 | 278779 | 40.2 | 31.2 | 28.8 | 25.8 | 24.6 | 24.2 | 22.7 | 24.7 | 28.1 | 32.7 | 34.7 | 37.5 | 29.6 | 24.6 | |
| KT23 | 487146 | 277860 | 33.7 | 26.8 | 28.4 | 24.3 | 21.3 | 21.1 | 24.1 | 21.2 | 31.1 | 27.5 | 27.3 | 32.2 | 26.6 | 22.1 | |
| KT24 | 487718 | 278679 | 37.1 | 23.4 | 26.7 | 24.1 | 19.1 | 19.1 | 16.9 | 19.0 | 27.2 | 27.1 | 27.5 | 31.3 | 24.9 | 20.6 | |
| KT25 | 487751 | 278505 | 31.1 | 18.8 | 27.8 | 23.8 | | 17.2 | 14.9 | 17.2 | 23.7 | 24.6 | 26.3 | 30.2 | 23.2 | 19.3 | |
| KT26 | 487725 | 278388 | 35.3 | 25.6 | 24.5 | 20.7 | 19.5 | 19.2 | 17.3 | 14.4 | 27.9 | 25.5 | 24.1 | 30.9 | 23.8 | 19.7 | |
| KT27 | 487893 | 277471 | | 29.0 | | 23.6 | 25.2 | 29.2 | | 28.5 | | | 35.1 | | 28.4 | 30.9 | |
| KT28 | 486153 | 278930 | 36.4 | 25.2 | 28.7 | 23.8 | 25.8 | 24.6 | 26.8 | 25.7 | 34.0 | 28.1 | 27.3 | 30.2 | 28.0 | 23.3 | |
| KT29 | 486894 | 278216 | 35.3 | 21.8 | 35.6 | 27.1 | 22.5 | 22.7 | 24.4 | 28.1 | 30.4 | | 30.0 | 32.7 | 28.2 | 23.4 | |
| KT30 | 487563 | 277433 | 28.2 | 18.4 | 29.4 | 25.1 | 18.6 | 18.4 | 20.9 | 25.9 | 26.7 | 26.9 | 24.5 | 28.9 | 24.3 | 20.2 | |
| KT31 | 486161 | 279067 | 37.9 | 25.8 | 29.0 | 25.5 | 21.3 | 19.7 | 22.2 | 25.5 | 29.9 | 28.0 | 28.8 | 31.7 | 27.1 | 22.5 | |
| KT32 | 486398 | 278274 | | | 33.2 | 27.0 | 23.5 | 24.6 | 21.6 | 29.5 | 32.6 | 34.5 | 37.3 | 23.7 | 28.8 | 23.9 | |
| KT33 | 486871 | 277840 | 27.5 | 16.8 | 21.4 | 15.3 | | 10.4 | | 12.8 | 18.7 | 18.5 | 19.1 | 22.8 | 18.3 | 15.2 | |
| BL1 | 490048 | 274399 | 27.5 | 16.0 | | 17.4 | 13.5 | 12.3 | 14.2 | 15.2 | 21.8 | 17.3 | 17.3 | 23.1 | 17.8 | 14.8 | |
| RW1 | 481465 | 281208 | 41.3 | 32.2 | 34.5 | 29.0 | 26.2 | 24.1 | 30.5 | 27.8 | 37.0 | 29.7 | 33.5 | 31.1 | 31.4 | 26.1 | |
| RW2 | 481550 | 281233 | 37.1 | 23.4 | 32.2 | 32.4 | 25.0 | 22.6 | 25.8 | 31.4 | 32.1 | 28.9 | 26.3 | 28.6 | 28.8 | 23.9 | |
| RW3 | 481498 | 281096 | 30.0 | 22.9 | 29.0 | 23.9 | 19.5 | 20.2 | 20.6 | 26.0 | 27.5 | 27.3 | 29.6 | 25.4 | 25.4 | 21.1 | |
| RW4 | 481481 | 281149 | 51.5 | 37.6 | 36.2 | 32.6 | 35.2 | 36.5 | 34.5 | 32.4 | 43.6 | 41.2 | 40.5 | 42.6 | 38.7 | 32.1 | |
| RW5 | 481515 | 281217 | 32.3 | 25.3 | 30.3 | 28.0 | 20.7 | 20.2 | 21.2 | 26.5 | 24.3 | 27.9 | 29.8 | 30.4 | 26.4 | 21.9 | |
| W1 | 489131 | 267820 | 44.8 | 33.3 | 42.3 | 31.6 | 32.5 | 36.5 | 37.7 | 31.3 | 39.5 | 26.4 | 48.8 | 37.7 | 36.4 | 30.2 | |
| W2 | 489382 | 266144 | 35.3 | 26.7 | 30.9 | 18.0 | 22.6 | 19.0 | 19.7 | 22.0 | 27.4 | 28.1 | 27.8 | 27.9 | 25.0 | 20.8 | |
| W3 | 487831 | 267169 | | | 29.4 | 20.6 | 19.8 | 20.2 | 22.4 | 19.7 | 27.0 | 30.9 | 28.9 | 26.9 | 24.1 | 20.0 | |
| W4 | 489868 | 268204 | 25.2 | 20.8 | 23.5 | 16.2 | 12.8 | 15.4 | 11.9 | 14.2 | 16.5 | 25.2 | 20.0 | 23.4 | 18.5 | 15.3 | |
| W5 | 490336 | 266433 | 24.5 | 20.6 | 26.7 | 17.7 | 15.8 | 14.9 | 16.8 | 21.2 | 22.3 | 17.9 | 20.2 | 20.0 | 19.9 | 16.5 | |

| 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 (0.83) | Comment |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| W6 | 490002 | 268946 | 22.4 | 17.6 | 22.4 | 13.6 | 12.1 | 10.8 | 11.4 | 13.3 | 17.6 | 17.4 | 19.2 | 19.5 | 16.3 | 13.5 | |
| W7 | 490351 | 267400 | 35.5 | 27.6 | 28.8 | 21.4 | 23.8 | 23.5 | 23.2 | 24.0 | 30.4 | 27.5 | 31.7 | 26.5 | 26.5 | 22.0 | |
| W8 | 488431 | 274049 | 22.7 | 19.3 | 21.4 | 16.0 | 13.0 | 14.5 | 15.2 | 15.7 | 18.1 | 21.8 | 21.0 | 21.7 | 18.2 | 15.1 | |
| W9 | 489226 | 267829 | 26.4 | 22.6 | 27.4 | 14.9 | 16.0 | 14.4 | 15.9 | | 20.0 | 48.0 | 25.6 | 22.4 | 22.2 | 18.4 | |
| W10 | 492372 | 271928 | 30.6 | 24.5 | 34.4 | 27.4 | 26.1 | 23.4 | 26.3 | 28.9 | 29.8 | 25.3 | 25.4 | 25.4 | 27.3 | 22.7 | |
| W11 | 488788 | 268215 | 30.8 | 26.5 | 35.3 | 23.5 | 23.0 | 23.2 | 24.2 | 24.3 | 28.2 | 28.7 | 29.8 | 29.0 | 26.9 | 22.3 | |

☒ **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.**

☒ **North Northamptonshire confirm that all 2022 diffusion tube data has been uploaded to the Diffusion Tube Data Entry System**.

**Notes:**

Exceedances of the NO₂ annual mean objective of 40µg/m$^3$ are shown in **bold**.

NO₂ annual means exceeding 60µg/m$^3$, 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 North Northamptonshire During 2022

North Northamptonshire has not identified any new sources relating to air quality within the reporting year of 2022.

## Additional Air Quality Works Undertaken by North Northamptonshire During 2022

North Northamptonshire has not completed any additional works within the reporting year of 2022 that have not already been mentioned.

## QA/QC of Diffusion Tube Monitoring

Diffusion tubes were provided by Gradko during the 2022 monitoring year with the preparation method of 20% TEA in Water. Gradko international laboratory takes part in the LAQM Air PT scheme. Their most recent received score was 100% for May to June 2022 (AR050).

The diffusion tube survey has been completed in adherence with the 2022 Diffusion Tube Monitoring Calendar. However, diffusion tubes in Wellingborough were exposed for slightly longer than the Defra recommended timescales. This is due to the changes to the fixings as a result of health and safety risk assessments.

**Diffusion Tube Annualisation**

Annualisation is required for any site with data capture less than 75% but greater than 25%. In addition, any sites with a data capture below 25% do not require annualisation.

Annualisation was required for one site in North Northamptonshire; KT27. Annualisation was undertaken in line with LAQM.TG22 with the calculation method detailed in Table C.2.

The following urban background automatic monitors were used to the inform the annualisation process:

- Coventry;
- Leamington Spa;
- Leicester University; and
- Northampton.

All other diffusion tube monitoring locations within North Northamptonshire recorded data capture of 75% therefore annualisation was not required.

**Table C. 1 - Annualisation Summary (concentrations presented in µg/m³)**

| Site ID | Annualisation Factor Leamington Spa | Annualisation Factor Northampton Spring Park | Annualisation Factor Leicester University | Annualisation Factor Coventry Allesley | Average Annualisation Factor | Raw Data Annual Mean | Raw Annualised Annual Mean |
|---------|------|------|------|------|------|------|------|
| KT27 | 1.3431 | 1.2531 | 1.2916 | 1.3448 | 1.3082 | 28.4 | 37.2 |

## 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.

North Northamptonshire have applied a national bias adjustment factor of 0.83 to the 2022 monitoring data, as no local factors could be calculated, and as per Figure C. 1. A summary of bias adjustment factors used by North Northamptonshire over the past five years is presented in Table C. 2**Error! Reference source not found.** Version 3/23 of the national bias adjustment factor spreadsheet was used in 2022. Prior to 2021, the separate borough areas of Corby, Kettering, East Northamptonshire and Wellingborough used the same diffusion tubes and used national bias adjustment factors.

## Table C. 2 – Bias Adjustment Factor

| Monitoring Year | Local or National | If National, Version of National Spreadsheet | Adjustment Factor |
|---|---|---|---|
| **2022** | National | 03/23 | 0.83 |
| **2021** | National | 03/22 | 0.84 |
| **2020** | National | 03/21 | 0.81 |
| **2019** | - | - | - |
| **2018** | - | - | - |

## Figure C. 1 – National Diffusion Tube Bias Adjustment Factor Spreadsheet, 2022



## NO₂ 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.

No diffusion tube NO$_2$ monitoring locations within North Northamptonshire required distance correction during 2022, due to the low concentrations monitored.

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

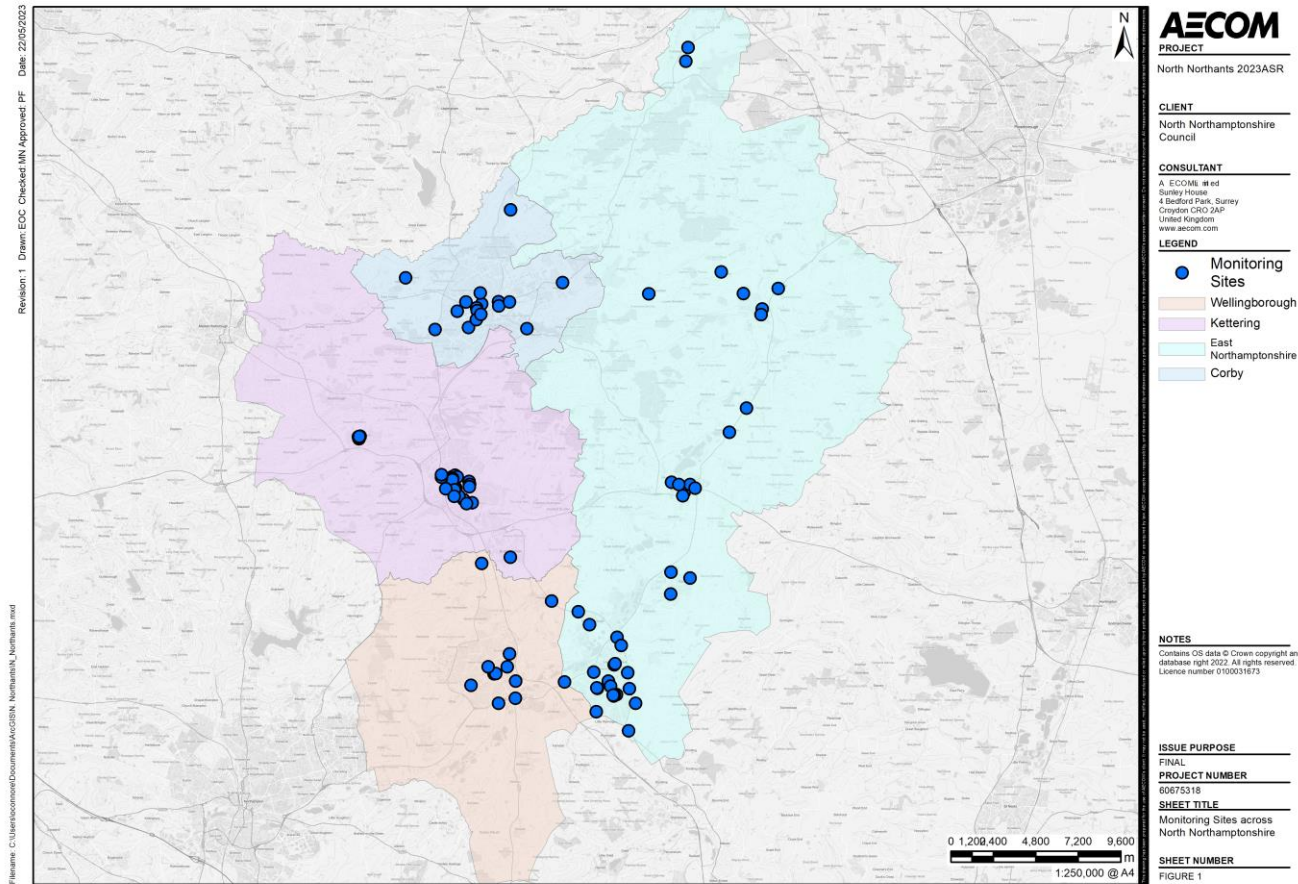**Figure D.1 – Map of Non-Automatic Monitoring Sites across North Northamptonshire**

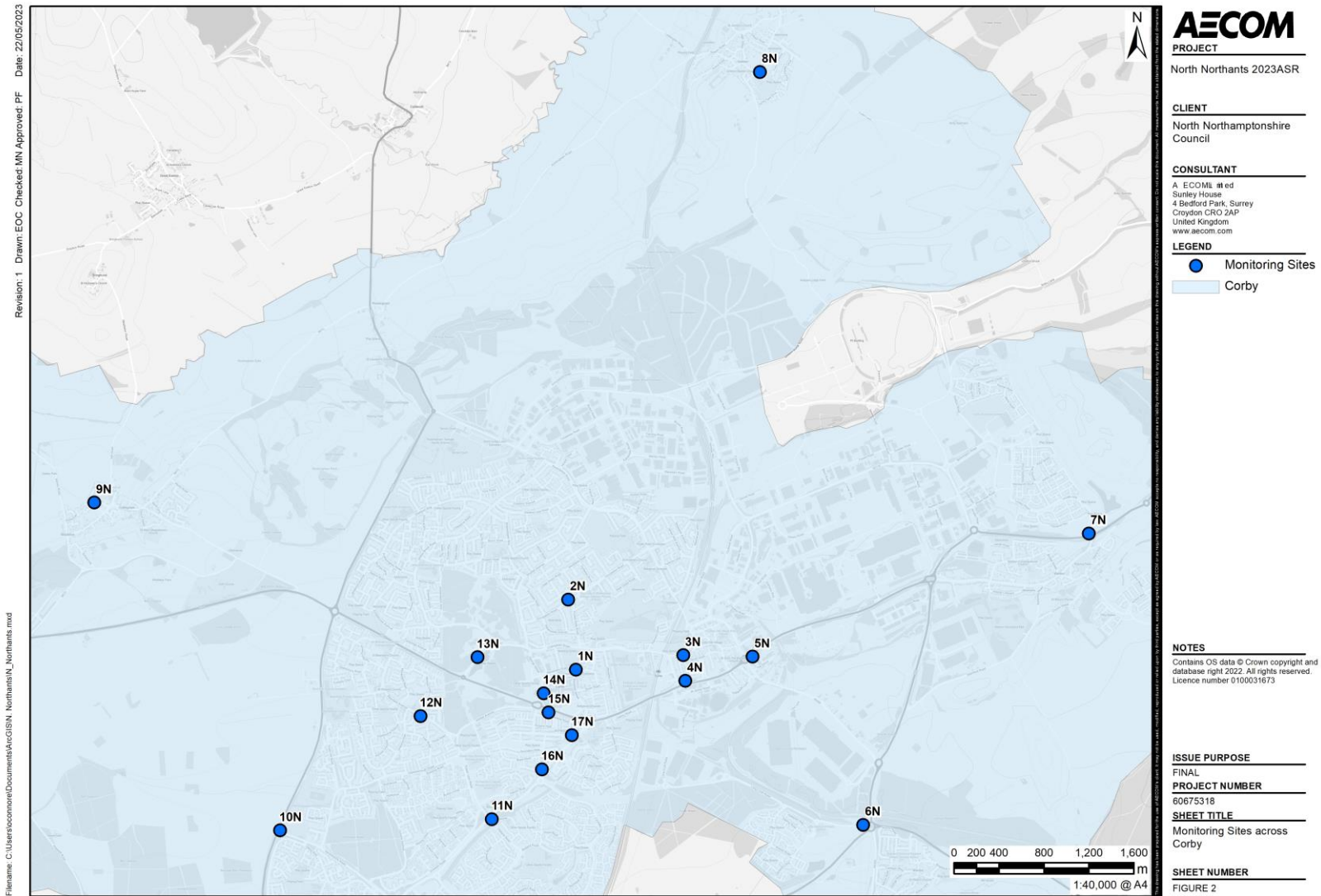**Figure D.2 - Map of Non-Automatic Monitoring Sites in Corby**

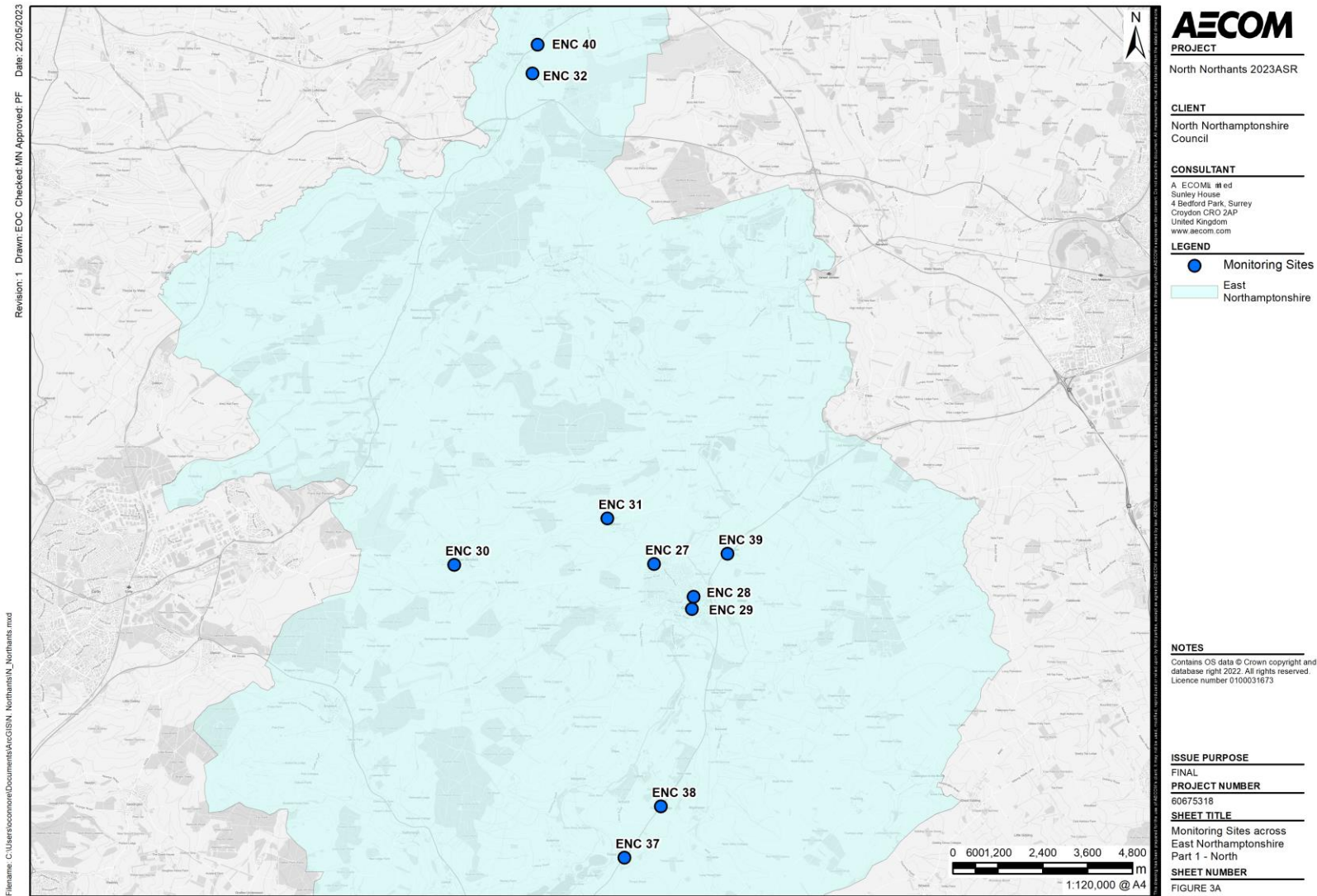**Figure D.3a - Map of Non-Automatic Monitoring Sites in East Northamptonshire (North)**

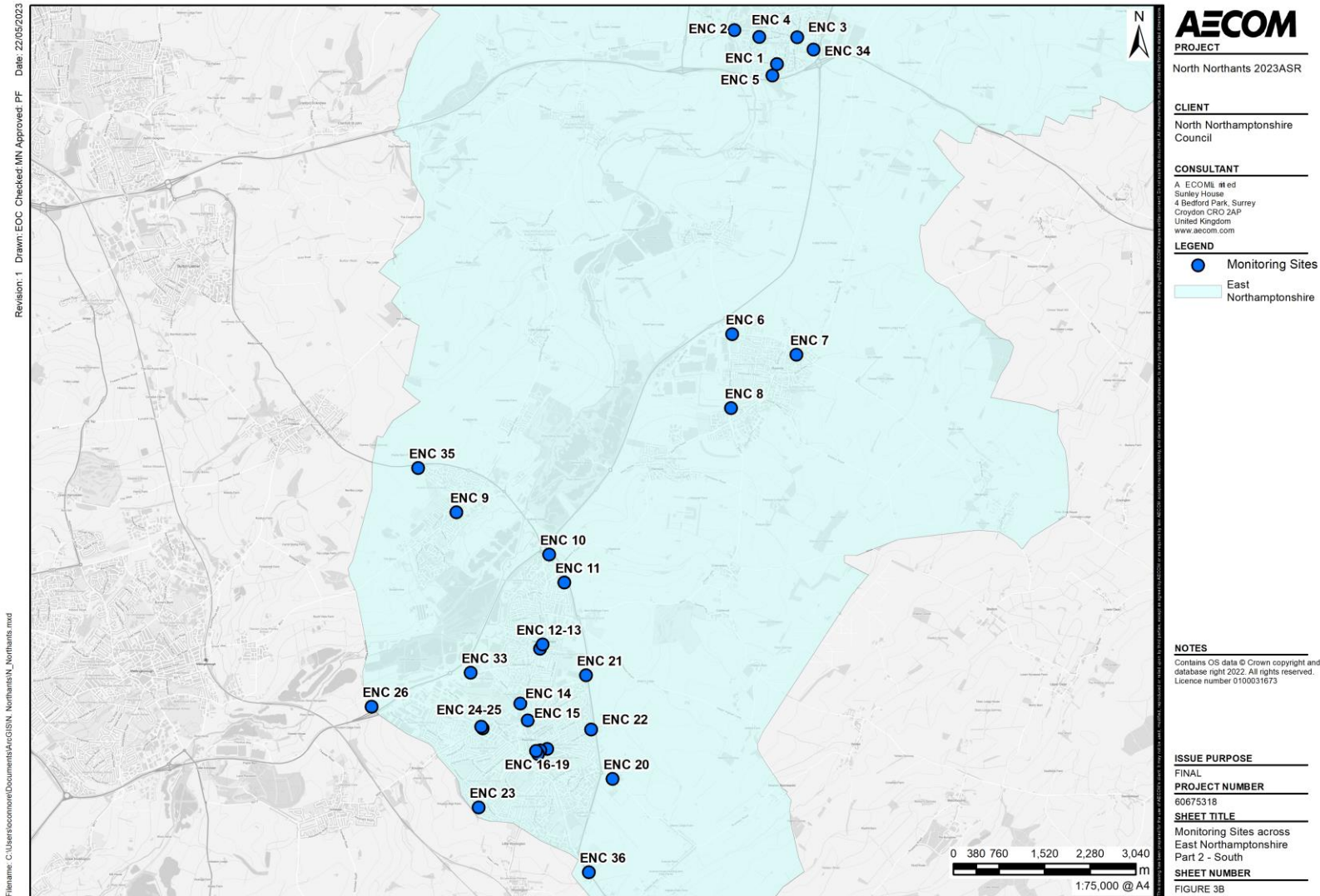**Figure D.4b - Map of Non-Automatic Monitoring Sites in East Northamptonshire (South)**

**Figure D.5a - Map of Non-Automatic Monitoring Sites in Rothwell**

**Figure D.6b - Map of Non-Automatic Monitoring Sites in Kettering Town Centre**
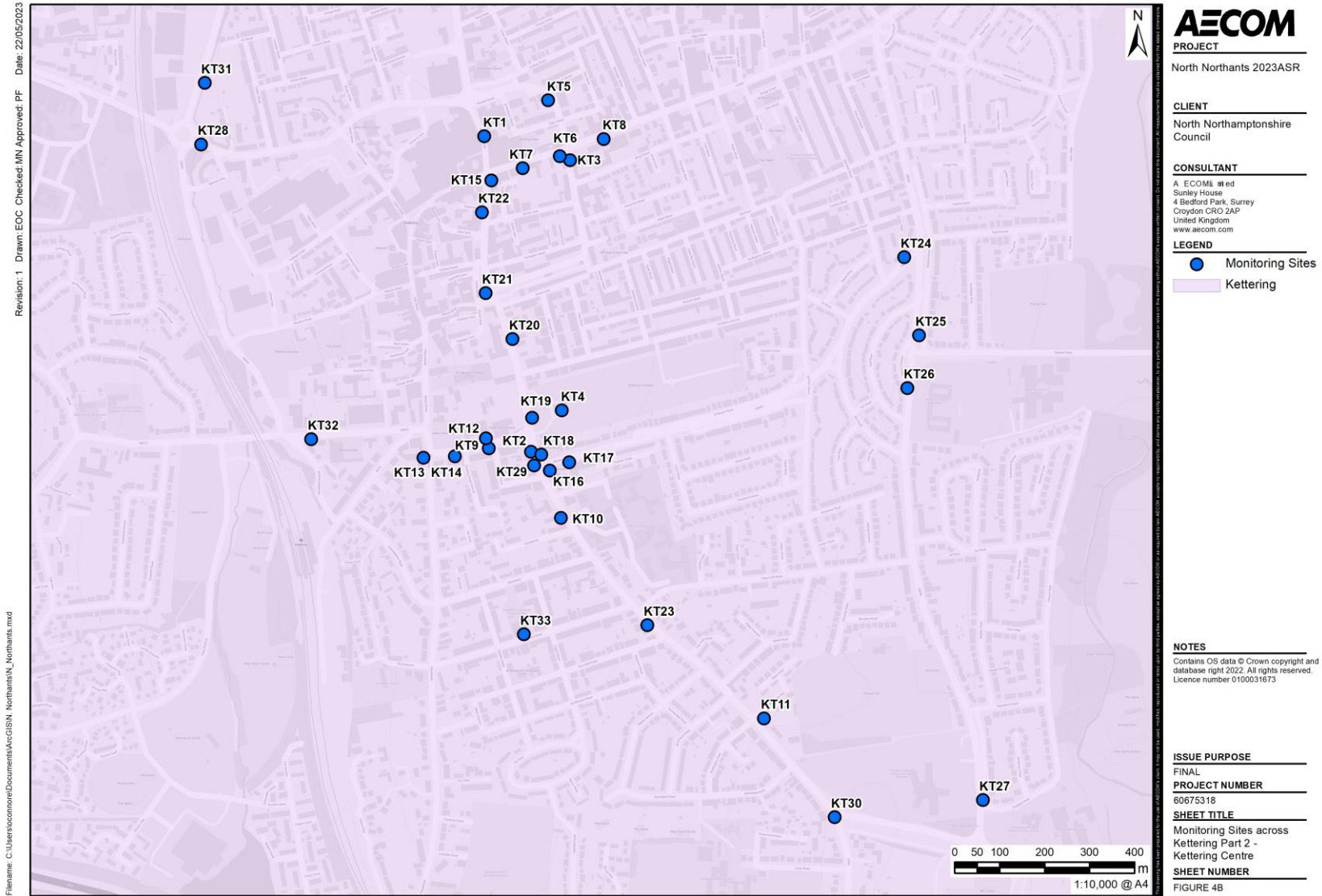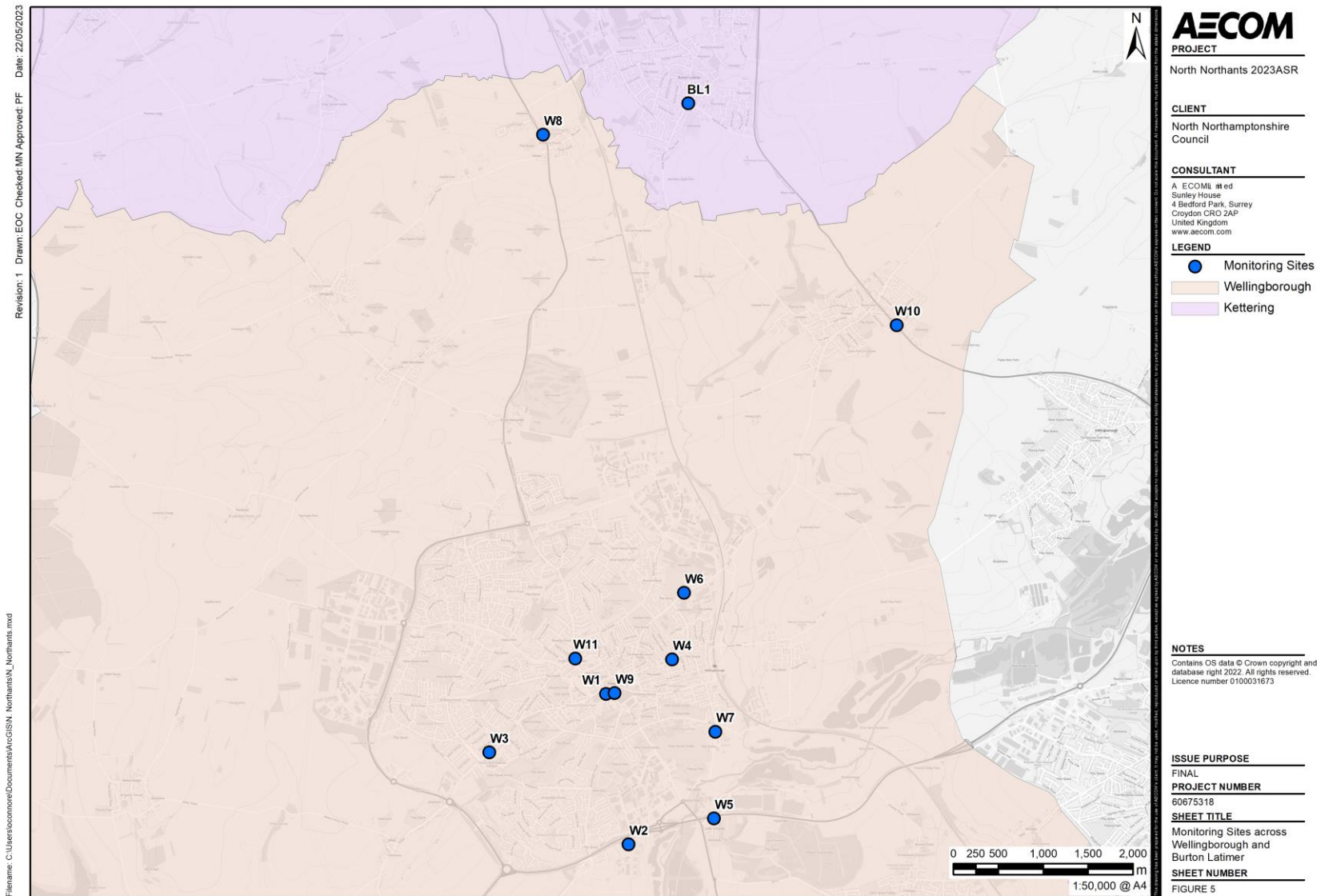
**Figure D.7 - Map of Non-Automatic Monitoring Sites in Wellingborough and Burton Latimer**

# Appendix E: Summary of Air Quality Objectives in England

**Table E.1 – Air Quality Objectives in England[8]**

| 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 |

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

# Glossary of Terms

| Abbreviation | Description |
|---|---|
| AQAP | Air Quality Action Plan - A detailed description of measures, outcomes, achievement dates and implementation methods, showing how the local authority intends to achieve air quality limit values' |
| AQMA | Air Quality Management Area – An area where air pollutant concentrations exceed / are likely to exceed the relevant air quality objectives. AQMAs are declared for specific pollutants and objectives |
| ASR | 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 |
| EMAQN | East Midlands Air Quality Network |
| EU | European Union |
| EVHS | Electric Vehicle Homecharge Scheme |
| FDMS | Filter Dynamics Measurement System |
| JSNA | Joint Strategic Needs Assessment |
| LAQM | Local Air Quality Management |
| NNC | North Northamptonshire Council |
| $NO_2$ | 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

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