2022 Air Quality Annual Status Report (ASR)

In fulfilment of Part IV of the Environment Act 1995 Local Air Quality Management

Date: June 2022

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Executive Summary: Air Quality in Our Area

Air Quality in Cherwell District

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 28,000 to 36,000 deaths at typical ages[3], with a total estimated healthcare cost to the NHS and social care of £157 million in 2017[4].

Of the seven pollutants for which an air quality objective has been set only Nitrogen Dioxide (NO_2) is monitored by Cherwell District Council.

Cherwell District Council has identified four areas where air quality does not meet national air quality objectives for NO_2. The locations of these four Air Quality Management Areas (AQMAs) can be found on our website. A full list of AQMAs across the country can be found on DEFRA website. There are two in Banbury, one in Bicester and one in Kidlington. These concentrations are largely related to road traffic emissions. Cherwell developed an Air Quality Action Plan (AQAP) in March 2017. .

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

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

3 Defra. Air quality appraisal: damage cost guidance, July 2021

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

The monitoring results in 2021 showed background NO_2 concentrations remining very consistent with the results from 2020. Many monitoring locations showed very small increases when compared with 2020, however this was consistent with the very slight increases observed at the urban background sites. This indicates that the return to conditions as they were before Covid has not had an adverse impact on air quality.

In AQMA No.1 (Hennef Way, Banbury) Nitrogen Dioxide concentrations remained at roughly the same level as was measured in 2020. The annual mean objective for long-term exposure is still being exceeded, but for the second year in a row the concentrations are below 60 µg/m^3, which indicates that the short-term exposure limit is not likely to be exceeded.

In AQMA No.2 (Central Banbury) all monitoring locations showed very small (below 1 µg/m^3) increases in Nitrogen Dioxide concentrations when compared with the results from 2020. All the monitoring locations remained a significant amount below the annual mean objective.

In AQMA No.3 (Bicester Road, Kidlington) the measured concentrations remained similar to 2020 levels, with a measured reduction at one of the three monitoring locations. Nitrogen Dioxide levels remain more than 10% below the objective for a third year. This is indicative of a long-term drop below the annual mean objective, and during 2022 Cherwell District Council may now review the AQMA to assess whether it should remain in place or be revoked.

In AQMA No.4 (Bicester) the annual mean Nitrogen Dioxide concentration at all monitoring locations remained consistent with the levels measured in 2020, and all locations within the AQMA were lower than the annual mean objective for the second year running.

The Nitrogen Dioxide levels across the district have remained broadly the same as the levels measured in the previous year, signalling a halt to the previous trend of year-on-year reductions. This could still be considered as significant progress as the measured concentrations did not increase upon the return to normal conditions after the lockdowns in 2020 due to Covid-19.

Monitoring locations and the latest monitoring data can be found using this interactive map on the Oxfordshire air quality website.

Whilst air quality has improved significantly in recent decades and will continue to improve due to national policy decisions, there are some areas where local action is needed to improve air quality further.

The 2019 Clean Air Strategy5 sets out the case for action, with goals to reduce exposure to harmful pollutants. The Road to Zero6 sets out 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.

The Air Quality Action Plan was approved in 2017 and outlines measures which are aimed at improving air quality in the four AQMAs and the wider district.

The priorities set out in the action plan are

- Priority 1 – Strengthening local policy to improve air quality and its role in protecting health;
- Priority 2 – Reducing NOx emissions from cars in all AQMAs;
- Priority 3 – Ensuring new developments encourage and facilitate low emission and alternative transport;
- Priority 4 – Ensuring transport infrastructure delivery takes account of air quality improvement potential within AQMAs;
- Priority 5 – Raising awareness of poor air quality and encouraging improvement actions by vehicle users and fleet managers.

There have been continued developments in improving levels of active travel around Bicester, which should help to improve conditions in the AQMA. Cherwell has supported this with ongoing campaigns to raise public awareness around air quality, particularly on social media.

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5 Defra. Clean Air Strategy, 2019

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

Conclusions and Priorities

The latest monitoring data for 2021 confirms there are exceedances of the annual mean Nitrogen Dioxide objective in one of the four AQMAs and this should therefore be retained. The exceedances are associated with traffic emissions.

The overall trend for the district has been year-on-year reductions on pollutants, however in 2021 the measured levels were broadly comparable to 2020. This can be explained by the impact of the Covid-19 lockdowns in 2020, which led to a considerable reduction in road traffic pollution. If this trend continues and no developments in the area increase the likelihood of an increase in road traffic emissions, the AQMA in Kidlington may be eligible for revocation in the next 12 to 24 months. Cherwell District Council will consider the likelihood of future air pollution increases before deciding on this.

Significant development is planned for the District, including further industrial developments around the AQMA at Hennef Way and commercial development to the south of Bicester near the Kings End/Queens Avenue AQMA, it is therefore recommended that measures in the AQAP relating to development control are considered a priority to ensure potential further adverse impacts are adequately monitored, measured and mitigated at an early stage. Further mitigation measures are planned using money obtained from damage cost calculations associated with some of these developments.

Communication and awareness raising activities relating to air quality actions should be continued where possible.

Local Engagement and How to get Involved

Cherwell District Council has had some success securing funds from developers through the planning process that can be used to implement further mitigation measures which will help to further reduce pollution levels at AQMAs.

If you have thoughts, comments or suggestions on any measures within these tables, please contact us using the details at the front of this report. If you would like to learn more about air quality and how we monitor, there is information on the Oxfordshire air quality website or our website – air quality management

The national clean air day website has advice on how to reduce air pollution. There are also free toolkits available to download for schools, workplaces, communities and healthcare organisations at

A large proportion of road vehicles are private car users. If you can reduce car journeys by using alternatives such as walking, cycling, public transport or sharing car journeys, this will help to improve air quality. This is especially important in areas such as school or hospital drop off points, where the likelihood of exposure is higher for vulnerable people such as children, elderly or those with chronic conditions.

Local Responsibilities and Commitment

This ASR was prepared by the Regulatory Services and Community Safety Department of Cherwell District Council with the support and agreement of the following officers and departments:

Jim Guest – Environmental Protection and Enforcement, Cherwell District Council
Trevor Dixon – Environmental Protection and Enforcement, Cherwell District Council

Jacqui Cox – Highways, Oxfordshire County Council

This ASR has been approved by:

The report will be presented to a meeting of the Councils Overview and Scrutiny Committee on the 6 September 2022 for their information and comment.

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

If you have any comments on this ASR please send them to Jim Guest at:

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1 Local Air Quality Management

This report provides an overview of air quality in Cherwell during 2021. It fulfils the requirements of Local Air Quality Management (LAQM) as set out in Part IV of the Environment Act (1995) and the relevant Policy and Technical Guidance documents.

The LAQM process places an obligation on all local authorities to regularly review and assess air quality in their areas, and to determine whether or not the air quality objectives are likely to be achieved. Where an exceedance is considered likely the local authority must declare an Air Quality Management Area (AQMA) and prepare an Air Quality Action Plan (AQAP) setting out the measures it intends to put in place in pursuit of the objectives. This Annual Status Report (ASR) is an annual requirement showing the strategies employed by Cherwell District Council to improve air quality and any progress that has been made.

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

2 Actions to Improve Air Quality

2.1 Air Quality Management Areas

Air Quality Management Areas (AQMAs) are declared when there is an exceedance or likely exceedance of an air quality objective. After declaration, the authority should prepare an Air Quality Action Plan (AQAP) within 12 months setting out measures it intends to put in place in pursuit of compliance with the objectives.

Amend the following as necessary:

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

- Nitrogen Dioxide annual mean;

Table 1 – Declared Air Quality Management Areas

AQMA Name	Date of Declaration	Pollutants and Air Quality Objectives	One Line Description	Is air quality in the AQMA influenced by roads controlled by National Highways?	Level of Exceedance: Declaration	Level of Exceedance: Current Year	Name and Date of AQAP Publication
AQMA No. 1	17/01/2011	NO_2 Annual Mean and 1 Hour Mean	Three residential property facades backing onto Hennef Way between roundabouts with Ermont Way and Concorde Avenue.	Yes	86.4 µg/m^3	52.2 µg/m^3	Cherwell District Council Air Quality Action Plan
AQMA No. 2	29/10/2014	NO_2 Annual Mean	The South Bar junction with Oxford Road to the North Bar junction with Southam Road, including a section of High Street.	Yes	48.4 µg/m^3	30.4 µg/m^3	Cherwell District Council Air Quality Action Plan
AQMA No. 3	29/102/2014	NO_2 Annual Mean	Five residential properties on Bicester Road, Kidlington to the north of the Water Eaton Lane signalled junction.	Yes	47.5 µg/m^3	26.6 µg/m^3	Cherwell District Council Air Quality Action Plan
AQMA No. 4	9/10/2015	NO_2 Annual Mean	The North Street / Filed Street mini roundabout, through Queens Avenue to the mini roundabout on Kings End, including St Johns.	Yes	46.9 µg/m^3	34.9 µg/m^3	Cherwell District Council Air Quality Action Plan

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

☒ **Cherwell District Council confirm that all current AQAPs have been submitted to Defra**

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

Defra's appraisal of last year's ASR concluded

1. The Council have provided a detailed and comprehensive ASR. Trends are presented and discussed, and a robust comparison to air quality objectives is provided.

2. Reductions in NO_2 levels due to COVID-19 were observed at most monitoring sites. The Council reported reductions of NO_2 concentrations at their roadside monitoring sites ranging from 16% to 34% across their four AQMAs. The Council should take this as an opportunity to reflect on the importance of traffic measures listed on the action plans.

3. There was one exceedance recorded at Site 16, Hennef Way in AQMA No.1. From the map provided, only one monitoring location is present in this AQMA. It is strongly recommended to deploy additional monitors in this AQMA to identify further hotspots.

   Cherwell District Council has now added a second monitoring location within the AQMA and has also installed an Earthsense Zephyr live air quality monitor to assess the pattern of pollution levels within the AQMA.

4. The Council has presented a detailed list of action plan measures along with measures for each AQMA and appropriate measures for tackling $PM_{2.5}$ emissions. This is commended.

5. Following last year's appraisal. The Council has included an example for calculating the distance correction. Consideration to fall-off with distance correction should be given as per the guidance provided in paragraph 7.78 of LAQM TG(16). A specific NO_2 fall-off with distance calculator has been developed for local authority use and this tool is also incorporated within the Diffusion Tube Data Processing Tool to allow the complete processing of diffusion tube data to be undertaken within the one tool.

   For the 2022 ASR, Cherwell District Council has used the Diffusion tube data processing tool provided

Cherwell District Council has taken forward a number of direct measures during the current reporting year of 2021 in pursuit of improving local air quality. Details of all measures completed, in progress or planned are set out in Table 2.2. with the type of measure and the progress Cherwell District Council have made during the reporting year of 2021 presented. Where there have been, or continue to be, barriers restricting the implementation of the measure, these are also presented within Table 2.2.

More detail on these measures can be found in their respective Action Plans. Key completed measures are:

- Air Quality actions are included in the Local Transport Plan
- Schools have been identified and participation has been agreed for a targeted anti-idling and air pollution awareness campaign, using site specific data obtained with portable air quality monitors.
- Council has switched to Agile working, reducing the amount of car travel undertaken by employees

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

- Completion of schools air quality project using both Earthsense Zephyr sensors and portable sensors designed by Blenheim Palace.

Cherwell District Council's priorities for the coming year are utilising the increased public awareness of air quality issues during the COVID-19 lockdown in 2020 to promote active travel and reduced personal car use throughout the district through communications campaigns. This will be supported with data taken from specific sites using portable air quality monitors.

Cherwell District Council worked to implement these measures in partnership with the following stakeholders during 2021:

- Oxfordshire County Council
- Public Health
- County Highways

The principal challenges and barriers to implementation that Cherwell District Council anticipates facing are that the topography in Banbury is not ideal for cycling or walking, there is a need for people to get back to work after the lockdown and there are limitations to the effectiveness of these campaigns unless the cost and convenience is conducive to making the desired changes to travel habits.

Progress on the following measures has been slower than expected due to: Delays in designing and manufacture of the portable air quality sensors provided by Blenheim Palace.

- Completion of the school air quality project using both Earthsense Zephyr sensors and portable sensors designed by Blenheim Palace.

Whilst the measures stated above and in Table 2.2 will help to contribute towards compliance, Cherwell District Council anticipates that further additional measures not yet prescribed will be required in subsequent years to achieve compliance and enable the revocation of AQMA No. 1 – Hennef Way

Table 2 – Progress on Measures to Improve Air Quality

Air Quality Action Plan General Measures

Measure No.	Measure	EU Category	EU Classification	Organisations involved and Funding Source	Planning Phase	Implementation Phase	Reduction in Pollutant / Emission from Measure	Progress to Date	Estimated / Actual Completion Date	Comments / Barriers to implementation
G.1	Explore the Local Plan including Low Emission Vehicle uptake measures being incorporated into new developments	Policy Guidance and Development Control	Air Quality Planning and Policy Guidance	CDC	2022	2023/24	Medium	Ongoing	Ongoing	Local Plan Part 2, which was being developed in line with the OCC local plan 2050 is now defunct. A new plan is to go to a working group starting in September 2022 and will consider measures to encourage low emission vehicle take-up through development management policy.
G.2	All major developments to include Emission statements and mitigation strategies within an appropriate air quality assessment submitted at the application stage.	Policy Guidance and Development Control	Air Quality Planning and Policy Guidance	CDC	2022	2023/24	Medium	Ongoing	Ongoing	Emission statements and mitigation strategies will required in air quality assessments. To be included in development management policies as part of development of a new local planning policy.
G.3	Damage cost calculations to be included in air quality assessments to show the financial impact of developments	Policy Guidance and Development Control	Air Quality Planning and Policy Guidance	CDC	2022	2023/24	Low	Ongoing	Ongoing	Damage Cost calculations will be required in air quality assessments. To be included in development management policies as part of planning policy development.

Measure No.	Measure	EU Category	EU Classification	Organisations involved and Funding Source	Planning Phase	Implementation Phase	Reduction in Pollutant / Emission from Measure	Progress to Date	Estimated / Actual Completion Date	Comments / Barriers to implementation
G.4	Travel plans submitted with development proposals will make reference to their contribution to an air quality mitigation strategy. Progress will be reported to OCC post development completion.	Policy Guidance and Development Control	Air Quality Planning and Policy Guidance	OCC	n/a	In place	Low	Ongoing	Ongoing	OCC officers do currently check that travel plans reference air quality action plans for the towns that have a AQAP in place. Most of the actions in a Travel Plan should help to improve air quality.
G.5	Air Quality actions to be included in the Local Transport Plan	Policy Guidance and Development Control	Air Quality Planning and Policy Guidance	OCC	2019	2020	Medium	Ongoing	Ongoing	Transport measures to reduce air quality issues will be a key part of area transport strategies within LTCP. The timetable for LTCP is as follows: • **Spring – Summer 2022** – Development of area and corridor strategies and engagement with local councillors • **Autumn-Winter 2022** – Consultation and adoption of area strategies
G.6	Low emission vehicles to be included in taxi licensing policy to encourage their take up and use within the district.	Policy Guidance and Development Control	Other Policy	CDC	2017/18	2020	Low	Ongoing	Complete	Measures to encourage Low emission vehicles are included in the Taxi Licensing Policy.

Measure No.	Measure	EU Category	EU Classification	Organisations involved and Funding Source	Planning Phase	Implementation Phase	Reduction in Pollutant / Emission from Measure	Progress to Date	Estimated / Actual Completion Date	Comments / Barriers to implementation
G.7	Low emission plant, vehicle, delivery and fleet requirements to be included in sustainable procurement section of CDC procurement policy.	Policy Guidance and Development Control	Sustainable procurement guidance	CDC/OCC	2017	2020	Medium	Ongoing	Ongoing	Energy Savings Truest has been engaged to carry of a Green Fleet Review for CDC fleet. The OCC 'One Fleet' programme has now been extended to include Cherwell District Council's fleet. OCC and CDC Business Travel / Grey fleet programme - A low carbon staff business travel (grey fleet) programme is being developed for both OCC and CDC that would help reduce carbon emissions associated with business travel. This would involve engaging with high mileage teams and individuals to identify bespoke travel solutions, the accurate capture of staff travel data and promotion of the travel hierarchy and green travel options. Energy Savings Trust has been engaged to carry of a Grey Fleet Review for CDC's business travel.
G.8	Low emission plant, vehicle, delivery and fleet requirements to be included in OCC procurement policy.	Policy Guidance and Development Control	Sustainable procurement guidance	OCC	2019	On-going	Medium	Ongoing	Ongoing	OCC has begun the transition of its fleet to low emission vehicles – currently 21 fully electric vans and cars operating, a further 4 on order, and several trials taking place in a number of service areas within the County Council. A programme 'One Fleet' has been agreed to bring all fleet into one centralised management function within the County Council. This will be a key supporting element in delivering County Council's ambition towards low emission fleet OCC and CDC Business Travel / Grey fleet programme – as above

Measure No.	Measure	EU Category	EU Classification	Organisations involved and Funding Source	Planning Phase	Implementation Phase	Reduction in Pollutant / Emission from Measure	Progress to Date	Estimated / Actual Completion Date	Comments / Barriers to implementation
G.9	Air pollution and action measures awareness raising campaign	Public Information	Via other mechanisms	CDC	2019	2019	Low	Ongoing	Ongoing	Participated in National Clean Air Day 2021, which included sending messages via social media and on our website outlining the actions individuals can take to reduce air pollution. CDC will continue to participate in awareness raising campaigns in 2021, supporting these with the data on air pollution reduction during the COVID-19 lockdown as well as data obtained as part of the schools project below.
G.10	Electric Vehicle Charging in CDC owned car parks	Promoting Low Emission Transport	Procuring alternative Refuelling infrastructure to promote Low Emission Vehicles, EV recharging, Gas fuel recharging	CDC	2019	ongoing	Low	Ongoing	Ongoing	Charging infrastructure has been installed at 18 OCC sites in 2018-20. The OLEV workplace charge point grant scheme has been used to part fund the installation of these charge points.
G.11	CDC Schools Air Quality Project	Public Information	Via other mechanisms	CDC	2020	2022-23	Low	Ongoing	Ongoing	DEFRA air quality grant funding was secured to run an engagement project with local schools. Earthsense Zephyr air quality monitors will be used to monitor the air pollution levels at school drop off points. This data will then be used to communicate to parents the current short-term exposure levels caused by car idling outside the schools. This is to be complemented by student engagement using “Build your own” PM monitors provided by Blenheim Palace that can be built and carried around by students and compared with the data from the Zephyr monitors. Sensors are now installed outside participating schools, the full campaign will commence in September and run in line with the school year.

AQMA No.1 Hennef Way Air Quality Action Plan Measures

Measure No.	Measure	EU Category	EU Classification	Organisations involved and Funding Source	Planning Phase	Implementation Phase	Reduction in Pollutant / Emission from Measure	Progress to Date	Estimated / Actual Completion Date	Comments / Barriers to implementation
1.1	Banbury Park and Ride Bus service around M40 junction	Alternatives to private vehicle use	Bus based Park & Ride	OCC	2020-21	Not agreed yet	Medium	Ongoing	Ongoing	The feasibility of a Park and Ride needs to be part of a project to tackle the severe air quality issues on Hennef Way. This needs to consider sites to both the north and the south of the town.
1.2	Lift share scheme	Alternatives to private vehicle use	Car & lift sharing schemes	OCC	current	current	Low	Ongoing	Ongoing	OCC to update as developments occur
1.3	Corporate policy encouraging home working where possible and equipment provision.	Promoting Travel Alternatives	Encourage / Facilitate home-working	CDC	current	current	low	Ongoing	Ongoing	CDC transport policy encourages home working as part of the transition to agile working.
1.4	North facing slips on M40	Promoting Travel Alternatives	UTC, congestion management, traffic reduction	OCC	current	current	Medium	Ongoing	Ongoing	Optioneering study starts in Oct 2019. HS2 and developer funding will also improve the operation of Junction 11 through the installation of the MOVA traffic light operation system.

AQMA No.2 Banbury Air Quality Action Plan Measures

Measure No.	Measure	EU Category	EU Classification	Organisations involved and Funding Source	Planning Phase	Implementation Phase	Reduction in Pollutant / Emission from Measure	Progress to Date	Estimated / Actual Completion Date	Comments / Barriers to implementation
2.1	Banbury Park and Ride Bus service around M40 junction	Alternatives to private vehicle use	Bus based Park & Ride	OCC	2017/18	2019/20	Medium	Ongoing	Ongoing	See above under 1.1 – LTCP review is to include provision for this.
2.2	Banbury wide car club	Alternatives to private vehicle use	Car Clubs	Banbury CAG	2017	tbc	low	Ongoing	Ongoing	Ongoing with Banbury CAG.
2.3	Corporate policy encouraging home working where possible and equipment provision.	Promoting Travel Alternatives	Encourage / Facilitate home-working	CDC	current	current	low	Ongoing	Ongoing	CDC transport policy encourages home working and regularly reviews work travel. Following the COVID-19 lockdowns, CDC has transitioned to Agile working.

AQMA No.3 Kidlington Air Quality Action Plan Measures

Measure No.	Measure	EU Category	EU Classification	Organisations involved and Funding Source	Planning Phase	Implementation Phase	Reduction in Pollutant / Emission from Measure	Progress to Date	Estimated / Actual Completion Date	Comments / Barriers to implementation
3.2	HGV Weight Restriction on Bicester Road, Kidlington	Traffic Management	UTC, Congestion management, traffic reduction	OCC	2020	2021	Low			This would prevent HGVs from cutting through the centre of Kidlington to avoid congestion on A34. Currently under review by OCC as an option for the spending of development funds in the area.

AQMA No.4 Bicester Air Quality Action Plan

Measure No.	Measure	EU Category	EU Classification	Organisations involved and Funding Source	Planning Phase	Implementation Phase	Reduction in Pollutant / Emission from Measure	Progress to Date	Estimated / Actual Completion Date	Comments / Barriers to implementation
4.1	Bicester Park and Ride Bus service	Alternatives to private vehicle use	Bus based Park & Ride	OCC	2019	Medium term	Medium	Ongoing	Ongoing	Annual survey shows that bus passenger numbers continue to increase. OCC is also considering an alternative fuel station when the park & ride expands.
4.4	Central corridor works in LTP	Traffic Management	Strategic highway improvements, re-prioritising road space away from cars, inc. access management, selective vehicle priority, bus priority, high vehicle occupancy lane	OCC	2019	2022	Low	Ongoing	Ongoing	Plans to install a shared footpath/cycleway were put on hold pending the more comprehensive review of the corridor. In addition, funding has been secured by CDC through the HNT programme to carry out landscape improvements which will seek to reduce the impact of vehicle emissions. The timing of these works is aimed to fit with the OCC works.

Measures without commitment and / or funding

Measure No.	Measure	EU Category	EU Classification	Organisations involved and Funding Source	Planning Phase	Implementation Phase	Reduction in Pollutant / Emission from Measure	Progress to Date	Estimated / Actual Completion Date	Comments / Barriers to implementation
UF.1	Targeted Banbury - Brackley employee journeys and local industrial estates i.e. Wildmere and Overthorpe workplace travel plan promotion	Promoting Travel Alternatives	Workplace Travel Planning	n/a	n/a	n/a	Low	n/a	n/a	There is consideration at OCC to pick this area of work back up.
UF.2	Priority parking for lift share permit holders in CDC owned car parks	Alternatives to private vehicle use	Car & lift sharing schemes	n/a	n/a	n/a	Low	n/a	n/a	The council has produced a strategy looking at On-street EV charging fund from the EST, surveyed applicable residents and intending to produce an options paper in order to guide the council's actions.
UF.3	Bicester wide car club	Alternatives to private vehicle use	Car Clubs	n/a	n/a	n/a	Low	n/a	n/a	No funding identified
UF.4	Create Clean Air Zones which encompass the AQMA's	Promoting Low Emission Transport	Low Emission Zone (LEZ)	n/a	n/a	n/a	Medium	n/a	n/a	No funding identified

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

As detailed in Policy Guidance LAQM.PG16 (Chapter 7), 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.

The local indicators on the Public Health Outcomes website shows that in 2017 fine particulate matter in Oxfordshire was at a level of 9.8 µg/m3, while 5.5% of mortality was associated with fine particulates in 2018, however it is important to note the comparative rurality of Cherwell in comparison to the south of Oxfordshire.

$PM_{2.5}$ is not monitored in Cherwell and the trans-boundary nature of these very fine particles limits the scope to control concentrations inside Cherwell. Concentrations can be determined using Defra $PM_{2.5}$ background maps. These, alongside developing measures to reduce $PM_{2.5}$ emissions within Cherwell will form our approach.

Further inclusion of local air quality and $PM_{2.5}$ in Cherwell District Council Local Planning Policy can be developed and features in the Air Quality Action Plan.

Partnership working between Cherwell District Council and Oxfordshire County Council to include local air quality in the Joint Strategic Needs Assessment and the Local Transport Plan is already in place. The strengthening of these Public Health and Local Transport Authority partnerships is anticipated through the measures within the AQAP.

Cherwell District Council is taking the following measures to address $PM_{2.5}$:

- Planning conditions are imposed on planning consents requiring the submission and approval of construction/demolition environmental management plans (CEMPs) where the development is likely to generate dust near to an existing residential area. The CEMP includes dust and mud control such as damping down road areas, proactively planning mitigation measures in response to weather forecasts and proactively carrying out site inspections regularly to assess if further mitigation is needed in response to local conditions. In addition, the Environmental Protection team actively engage with developers in the event of complaints to ensure that the required controls are in place and taking enforcement action where necessary;

- The Council has no smoke control zones, however, when enquires are received regarding the installation of wood burners, the Environmental Protection team encourage the use of smokeless fuels or approved appliances.
- The Environmental Protection team actively responds to complaints about the burning of waste, and dust from construction sites, and takes steps, where necessary through enforcement, to ensure that there is an adequate level of control.
- Taxi licensing – Hackney carriages and private hire vehicles are restricted by an age policy that requires vehicles to be less than 6 years old at first licence. Thereafter vehicles over 10 years old will not be licensed unless they are in exceptional condition which is determined by inspection.

Environmental Permitting – installations such as incinerators, paint spray booths are inspected regularly to ensure that they are compliant with permit conditions that require the control and abatement of total particulate matter to the atmosphere.

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

This section sets out the monitoring undertaken within 2021 by Cherwell District Council and how it compares with the relevant air quality objectives. In addition, monitoring results are presented for a five-year period between 2017 and 2021 to allow monitoring trends to be identified and discussed.

3.1 Summary of Monitoring Undertaken

3.1.1 Non-Automatic Monitoring Sites

Cherwell District Council undertook non- automatic (ie passive) monitoring of Nitrogen Dioxide at 42 sites during 2021. Table A.2 in Appendix A presents the details of the non-automatic sites.

Maps showing the location of the monitoring sites are provided in Appendix D. Further details on Quality Assurance/Quality Control (QA/QC) for the diffusion tubes, including bias adjustments and any other adjustments applied (eg 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.3 and Table A.4 in Appendix A compare the ratified and adjusted monitored NO_2 annual mean concentrations for the past five years with the air quality objective of 40µg/m^3. Note that the concentration data presented represents the concentration at the location of the monitoring site, following the application of bias adjustment and annualisation, as required (ie the values are exclusive of any consideration to fall-off with distance adjustment).

For diffusion tubes, the full 2021 dataset of monthly mean values is provided in Appendix B. Note that the concentration data presented in Table B.1 includes distance corrected values, only where relevant.

Table A.5 in Appendix A compares the ratified continuous monitored NO_2 hourly mean concentrations for the past five years with the air quality objective of 200µg/m^3, not to be exceeded more than 18 times per year.

The monitoring locations in AQMAs 1, 2 and 4 all showed very small increases in concentrations when compared with the 2020 data, these increases were all between 0.3 and 0.8 µg/m^3. These increases are very minor and broadly speaking maintain the significant year on year drop that was seen during the Covid-19 lockdowns of 2020, even though all these restrictions have now been lifted.

In AQMA No. 3 the monitoring results for 2021 show a significant drop, taking the annual level lower than the annual mean target by 13µg/m^3.

AQMA No. 1 – Hennef Way continues to show exceedances of the annual mean objective. However, for the second year in a row, the nitrogen dioxide concentrations in the AQMA are below 60 µg/m^3, which indicates that the 1-hour mean objective is unlikely to be exceeded.

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)
1	Banbury - Oxford Road 2014	Roadside	446774	237620	NO2	No	0.0	0.0	No	
2	Banbury- Middleton Road	Kerbside	446250	240716	NO2	No	1.0	5.0	No	
3	Banbury- Bridge Street	Kerbside	445961	240595	NO2	No	1.0	1.0	No	
4	Banbury- Bankside	Roadside	446377	239620	NO2	No	2.0	8.0	No	
5	Banbury- High Street	Kerbside	445407	240421	NO2	AQMA No. 2	1.0	1.0	No	
6	Banbury- North Bar	Kerbside	445352	240774	NO2	AQMA No. 2	1.0	1.5	No	
7	Banbury- Cherwell Street	Roadside	445932	240499	NO2	No	0.0	0.0	No	
8	Banbury- Warwick Road North	Roadside	443905	241392	NO2	No	0.0	0.0	No	
9	Banbury- Ruscote Avenue	Roadside	444611	241172	NO2	No	0.0	0.0	No	
10	Banbury- Oxford Rd/South Bar	Kerbside	445333	240100	NO2	AQMA No. 2	1.0	1.0	No	
11, 12, 13	Banbury- Horsefair/North Bar 3/3	Roadside	445351	240578	NO2	AQMA No. 2	2.0	2.0	No	
14	Banbury- Sinclair Avenue	Urban Background	444274	241289	NO2	No	0.0	0.0	No	

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)
15	Banbury- Cranleigh Close	Urban Background	444366	239654	NO2	No	0.0	0.0	No	
16	Banbury - Hennef Way	Roadside	446535	241721	NO2	AQMA No. 1	2.0	3.0	No	
17	Bicester - London Road 2016	Roadside	458721	222115	NO2	No	0.0	0.0	No	
18	Bicester - Shakespeare Drive 2016	Roadside	456937	223586	NO2	No	0.0	0.0	No	
19	Banbury - Stroud Close 1	Roadside	446334	241676	NO2	No	0.0	0.0	No	
20	Bloxham - Bloxham Hill 2016	Roadside	443006	235744	NO2	No	2.0	2.0	No	
21	Banbury- Ermont Way 1	Roadside	446828	241591	NO2	No	2.0	11.0	No	
22	Banbury - Ermont Way 2	Roadside	446997	241315	NO2	No	2.0	12.0	No	
23	Bloxham - Church Street 2015	Kerbside	442940	235593	NO2	No	1.0	1.0	No	
24	A361 Crossroads Bloxham	Roadside	443045	236118	NO2	No	0.0	1.5	No	
25	Bicester - Villers Road	Urban Background	457619	222535	NO2	No	0.0	0.0	No	
26	A41, Oxford Road (Premier Inn)	Kerbside	458419	222334	NO2	No	34.0	4.0	No	
27	Bicester - Kings End South	Roadside	458006	222404	NO2	AQMA No. 4	1.5	1.5	No	
28	Bicester - St Johns	Kerbside	458310	222720	NO2	AQMA No. 4	1.0	1.5	No	
29	Bicester - Field Street	Kerbside	458214	222836	NO2	AQMA No. 4	1.0	1.5	No	

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)
30	Bicester - North Street	Kerbside	458274	222935	NO2	AQMA No. 4	1.0	1.5	No	
31, 32, 33	Bicester - Queens Avenue/Kings End 3	Kerbside	458028	222471	NO2	AQMA No. 4	1.0	1.5	No	
34	Bicester - Market Square 2014	Roadside	458539	222381	NO2	No	0.0	0.0	No	
35	Bicester - Tamarisk Gardens	Urban Background	458333	224432	NO2	No	0.0	0.0	No	
36	Bicester - Howes Lane 2014	Roadside	457956	224362	NO2	No	0.0	0.0	No	
37	Bicester - Aylesbury Rd 2014	Roadside	459100	221190	NO2	No	0.0	0.0	No	
38, 39	Kidlington - Bicester Road 2	Roadside	450267	213511	NO2	AQMA No. 3	1.0	1.5	No	
40	Kidlington - Oxford Road	Roadside	449122	213947	NO2	No	1.0	1.5	No	
41	Kidlington - Bramley Close	Roadside	450322	213587	NO2	AQMA No. 3	0.0	0.0	No	
42	Kidlington - Benmead Road	Urban Background	449172	214325	NO2	No	0.0	0.0	No	
43	Kidlington - Langford Ln2014	Roadside	447318	214798	NO2	No	0.0	0.0	No	
44	Middleton 2014	Roadside	453397	223516	NO2	No	0.0	0.0	No	
46	Adderbury - The Green	Kerbside	447403	235723	NO2	No	1.0	1.0	No	
47	Ardley	Roadside	454301	227498	NO2	No	1.5	1.5	No	

Notes:

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

(2) N/A if not applicable.

Table A.2 – Annual Mean NO_2 Monitoring Results: Non-Automatic Monitoring (µg/m^3)

Diffusion Tube ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2021 (%) (2)	2017	2018	2019	2020	2021
1	446774	237620	Roadside	100	100.0	20.3	20.0	17.1	16.8	17.0
2	446250	240716	Kerbside	100	100.0	31.3	28.0	30.8	26.5	26.9
3	445961	240595	Kerbside	80.8	80.8	33.1	32.0	32.3	28.2	28.5
4	446377	239620	Roadside	100	100.0	17.0	18.8	17.2	14.9	15.1
5	445407	240421	Kerbside	90.4	90.4	35.0	32.3	34.6	28.2	28.6
6	445352	240774	Kerbside	100	100.0	36.9	34.5	34.0	27.9	28.2
7	445932	240499	Roadside	92.3	92.3	37.3	36.4	29.9	32.4	32.8
8	443905	241392	Roadside	80.8	80.8	23.3	21.9	20.3	15.8	16.0
9	444611	241172	Roadside	90.4	90.4	20.1	20.6	18.9	16.9	17.1
10	445333	240100	Kerbside	100	100.0	33.4	36.1	35.3	27.2	27.6
11, 12, 13	445351	240578	Roadside	100	100.0	**41.8**	38.7	38.6	30.0	30.4
14	444274	241289	Urban Background	90.4	90.4	14.4	14.3	14.4	11.0	11.2
15	444366	239654	Urban Background	100	100.0	10.7	12.3	11.0	8.5	8.6
16	446535	241721	Roadside	100	100.0	**91.6**	**81.2**	**77.5**	**57.9**	**58.6**
17	458721	222115	Roadside	100	100.0	26.3	25.7	23.6	19.6	19.8
18	456937	223586	Roadside	100	100.0	24.0	23.4	23.2	19.9	20.1
19	446334	241676	Roadside	100	100.0	24.9	25.7	23.5	20.8	21.1
20	443006	235744	Roadside	100	100.0	36.1	34.8	31.5	25.3	25.6
21	446828	241591	Roadside	100	100.0	28.5	30.9	28.0	23.7	24.0
22	446997	241315	Roadside	90.4	90.4	27.2	29.7	27.1	24.1	24.4
23	442940	235593	Kerbside	92.3	92.3	37.5	32.2	32.2	25.3	25.7
24	443045	236118	Roadside	90.4	90.4	22.8	23.3	21.7	18.2	18.5
25	457619	222535	Urban Background	100	100.0	17.9	17.2	17.0	12.3	12.5
26	458419	222334	Kerbside	100	100.0			25.5	20.4	20.7
27	458006	222404	Roadside	90.4	90.4	**41.7**	**41.9**	**41.5**	34.5	34.9
28	458310	222720	Kerbside	100	100.0	37.8	38.6	31.7	25.1	25.5
29	458214	222836	Kerbside	73.1	73.1	33.5	31.6	32.1	25.0	25.3
30	458274	222935	Kerbside	100	100.0	36.5	37.6	35.6	27.6	27.9

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 2021 (%) [2]	2017	2018	2019	2020	2021
31, 32, 33	458028	222471	Kerbside	100	100.0	39.5	35.0	35.6	27.8	28.2
34	458539	222381	Roadside	92.3	92.3	24.7	23.1	22.2	17.9	18.1
35	458333	224432	Urban Background	100	100.0	16.3	15.9	15.0	11.6	11.8
36	457956	224362	Roadside	100	100.0	25.6	24.5	20.7	19.3	19.6
37	459100	221190	Roadside	100	100.0	28.8	29.5	26.7	23.0	23.3
38, 39	450267	213511	Roadside	100	100.0	**41.0**	37.9	33.6	26.6	26.6
40	449122	213947	Roadside	100	100.0	28.8	28.9	24.7	26.0	21.6
41	450322	213587	Roadside	100	100.0	26.7	26.3	24.0	21.3	18.6
42	449172	214325	Urban Background	92.3	92.3	12.6	13.4	13.8	18.4	11.8
43	447318	214798	Roadside	92.3	92.3	21.7	21.5	20.6	11.6	16.0
44	453397	223516	Roadside	82.7	82.7	33.6	33.1	31.3	22.2	22.4
46	447403	235723	Kerbside	76.9	76.9	26.8	25.3	25.5	21.8	22.0
47	454301	227498	Roadside	100	100.0	27.2	26.0	24.4	18.3	18.5

☒ **Annualisation has been conducted where data capture is <75% and >25% in line with LAQM.TG16**

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

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

Notes:

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

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

NO_2 annual means exceeding 60µg/m^3, indicating a potential exceedance of the NO_2 1-hour mean objective are shown in **bold and underlined**.

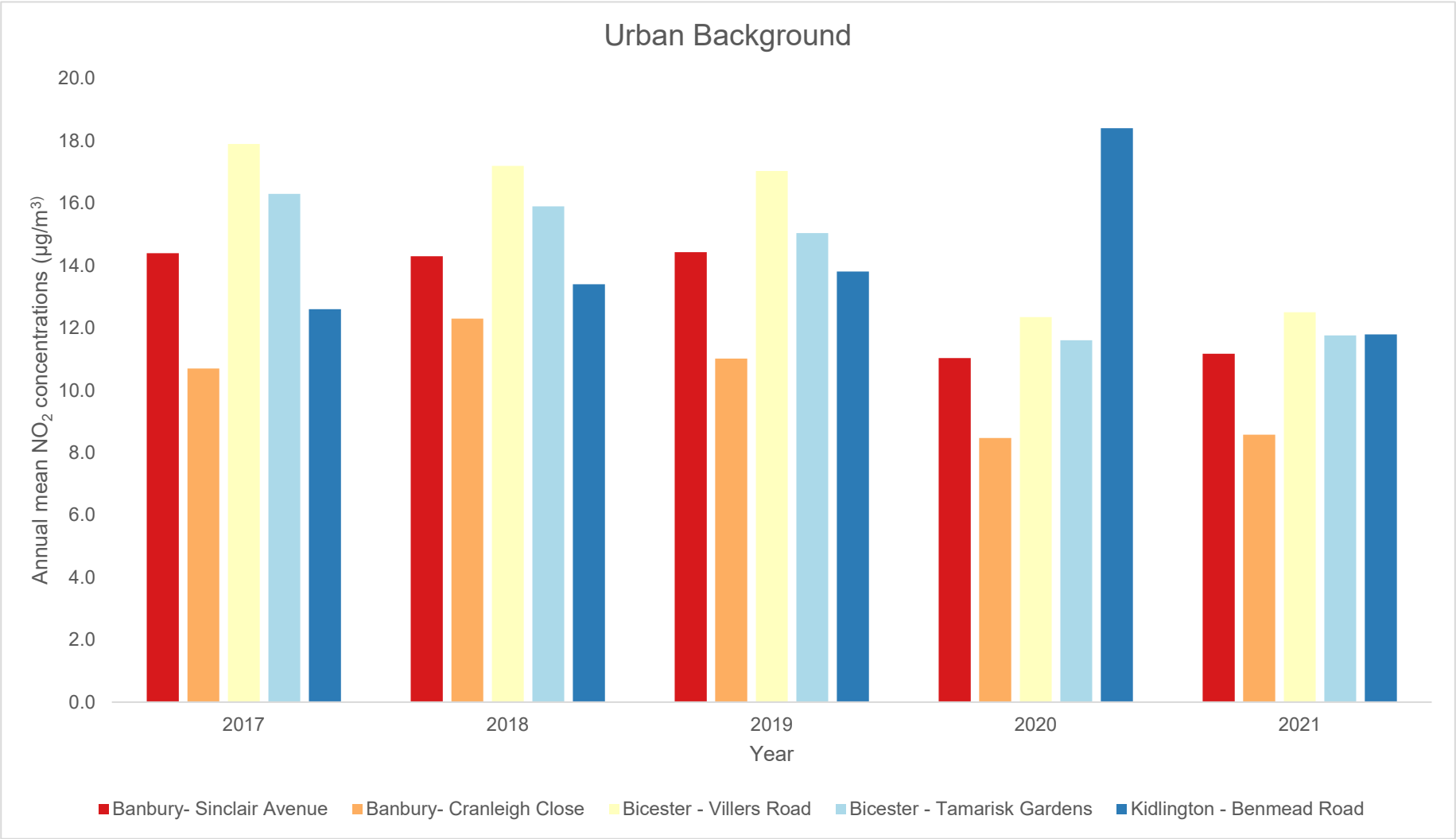
Means for diffusion tubes have been corrected for bias. All means have been "annualised" as per LAQM.TG16 if valid data capture for the full calendar year is less than 75%. See Appendix C for details.

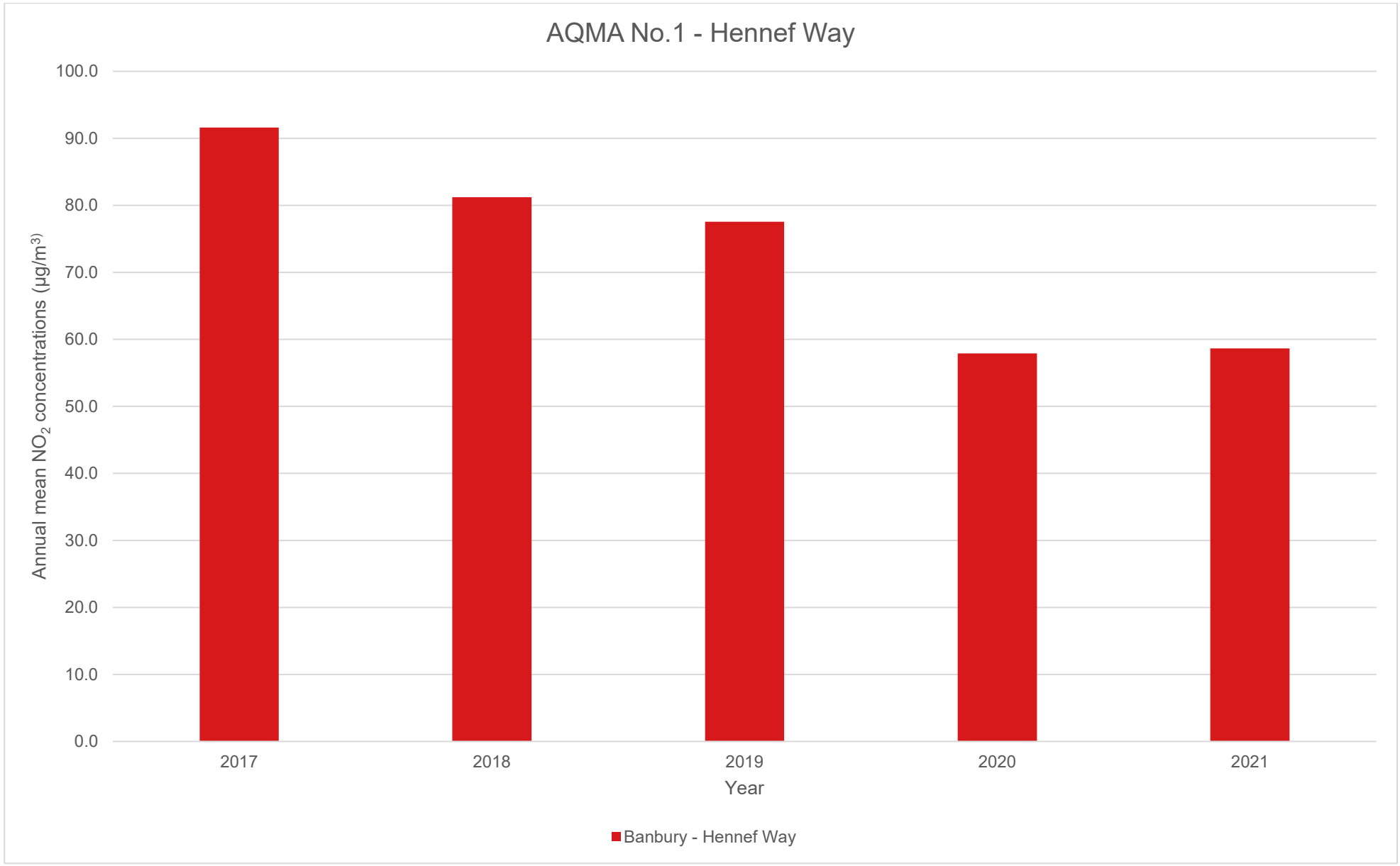
Concentrations are those at the location of monitoring and not those following any fall-off with distance adjustment.

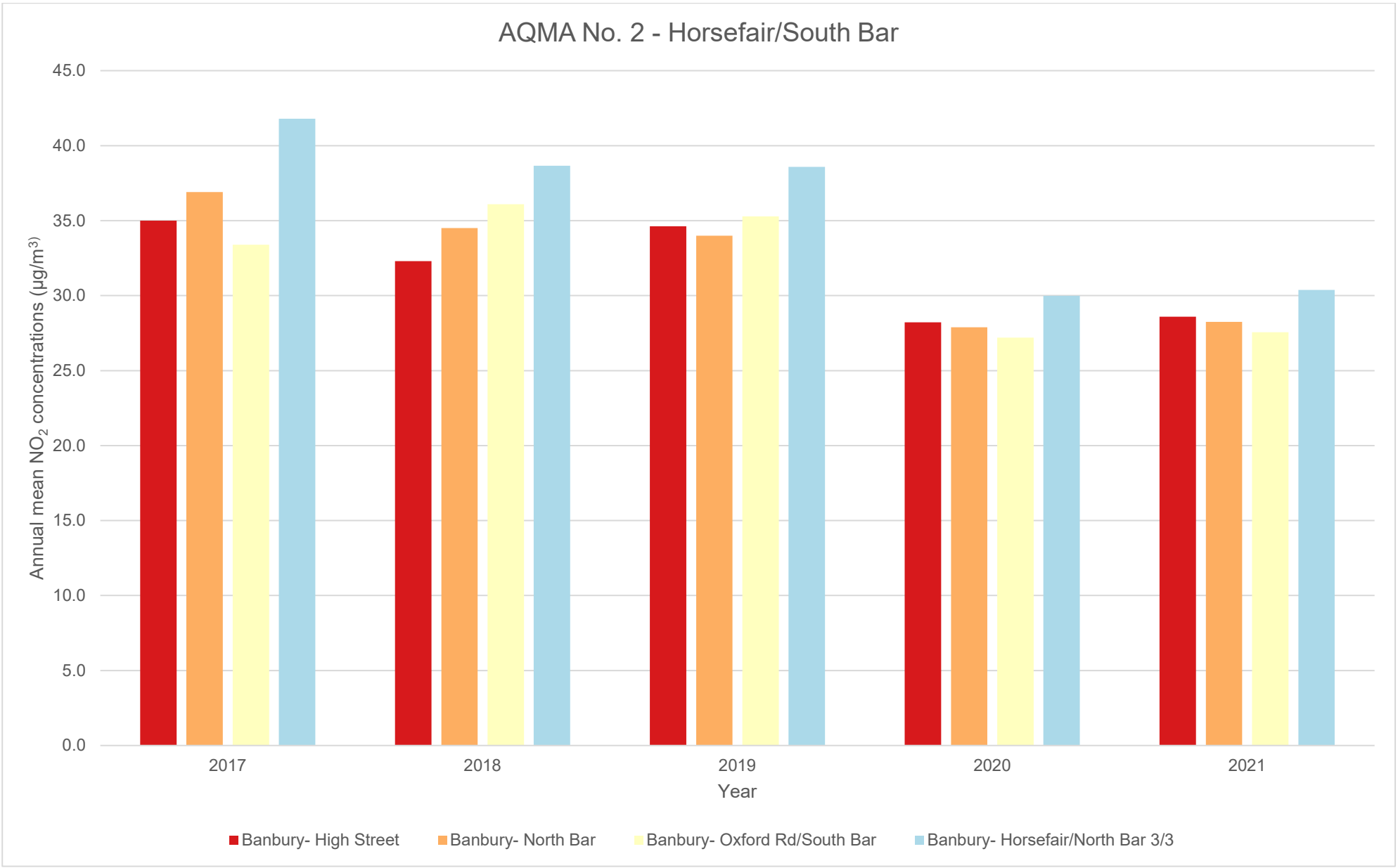
(1) Data capture for the monitoring period, in cases where monitoring was only carried out for part of the year.

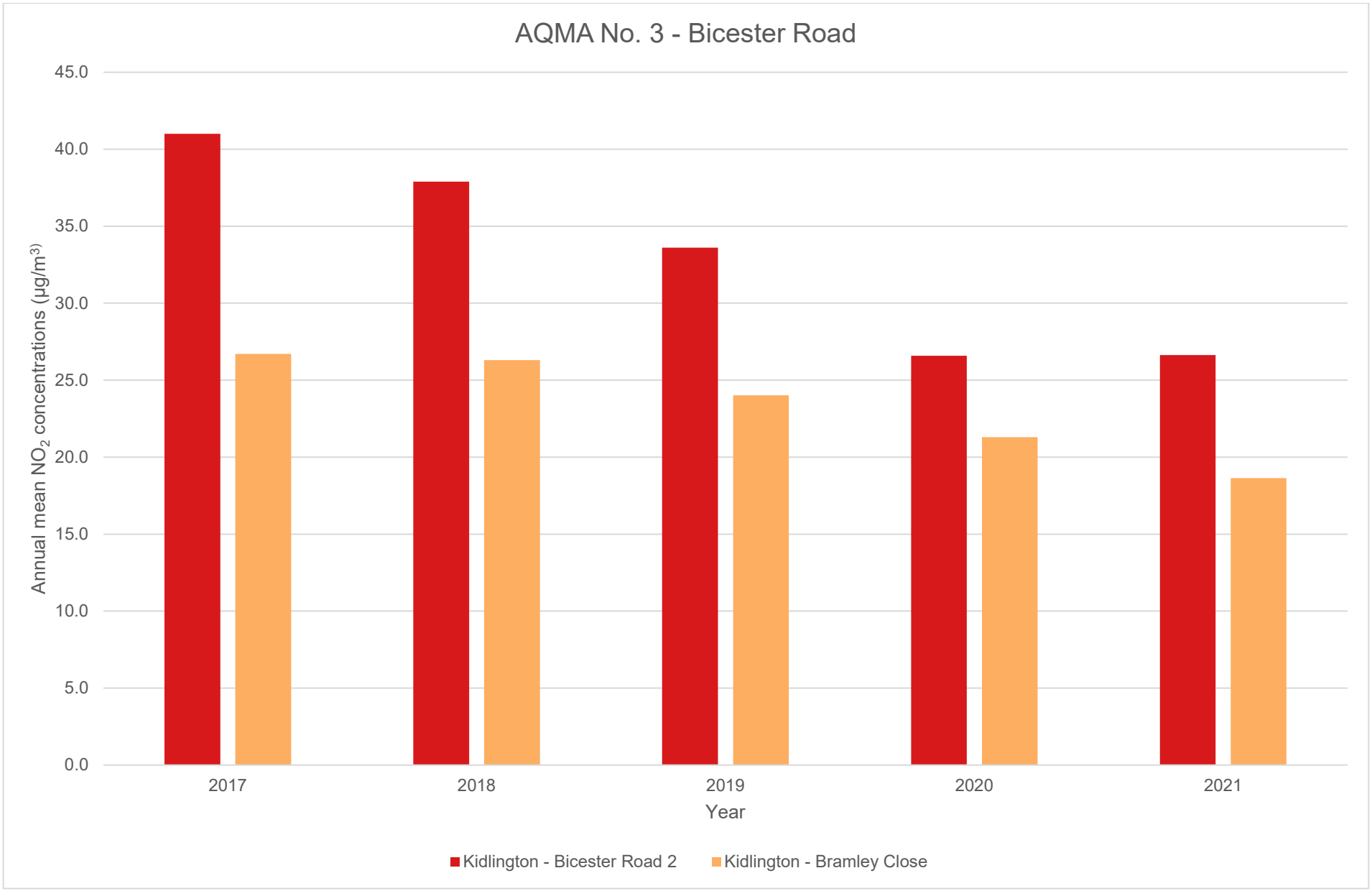
(2) Data capture for the full calendar year (e.g. if monitoring was carried out for 6 months, the maximum data capture for the full calendar year is 50%).

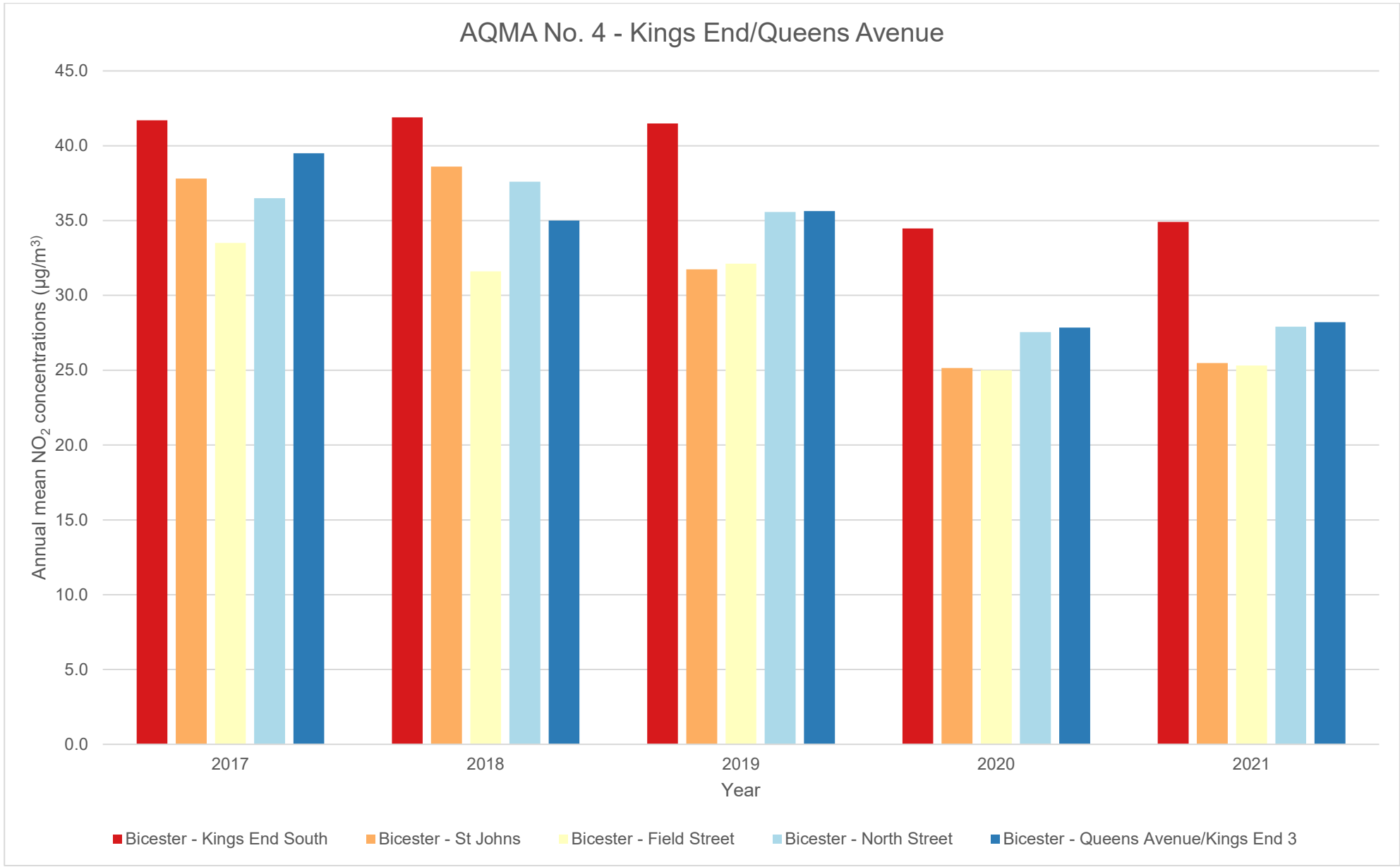
Figure A.1 – Trends in Annual Mean NO_2 Concentrations




AQMA No.1 - Hennef Way
100.0
90.0
80.0
70.0
60.0
50.0
40.0
30.0
20.0
10.0
0.0
Annual mean NO2 concentrations (µg/m3)
2017
2018
2019
2020
2021
Year
Banbury - Hennef Way


AQMA No. 2 - Horsefair/South Bar
45.0
40.0
35.0
30.0
25.0
20.0
15.0
10.0
5.0
0.0
Annual mean NO2 concentrations (µg/m3)
2017
2018
2019
2020
2021
Year
Banbury- High Street
Banbury- North Bar
Banbury- Oxford Rd/South Bar
Banbury- Horsefair/North Bar 3/3


AQMA No. 3 - Bicester Road
45.0
40.0
35.0
30.0
25.0
20.0
15.0
10.0
5.0
0.0
Annual mean NO2 concentrations (µg/m3)
2017
2018
2019
2020
2021
Year
Kidlington - Bicester Road 2
Kidlington - Bramley Close


AQMA No. 4 - Kings End/Queens Avenue
45.0
40.0
35.0
30.0
25.0
20.0
15.0
10.0
5.0
0.0
Annual mean NO2 concentrations (µg/m3)
2017
2018
2019
2020
2021
Year
Bicester - Kings End South
Bicester - St Johns
Bicester - Field Street
Bicester - North Street
Bicester - Queens Avenue/Kings End 3

Appendix B: Full Monthly Diffusion Tube Results for 2021

Table B.1 – NO_2 2021 Diffusion Tube Results (µg/m^3)

Diffusion Tube ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	NO_2 Mean Concentrations (µg/m^3)												Simple Annual Mean (µg/m3)			Comment
			Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Raw Data	Bias Adjusted (0.78)	Distance Corrected to Nearest Exposure	
1	446774	237620	18.5	19.9	23.1	25.9	17.8	29.4	18.3	17.5	26.1	20.4	19.3	25.7	21.8	17.0	-	
2	446250	240716	39.4	32.4	38.3	39.4	28.6	29.4	33.0	16.6	44.7	36.6	38.4	36.3	34.4	26.9	-	
3	445961	240595	39.9	38.6	38.1		31.1	28.0	35.4	24.5	49.5		42.6	38.3	36.6	28.5	-	
4	446377	239620	21.4	25.7	21.6	25.6	11.2	15.9	15.7	14.6	21.1	18.1	22.0	19.9	19.4	15.1	-	
5	445407	240421	40.2	41.0	38.0	32.0	34.1	27.1	30.8	28.4	52.6	37.9	41.1		36.7	28.6	-	
6	445352	240774	45.9	38.6	40.5	33.9	31.0	31.8	30.6	28.5	36.4	37.1	42.6	37.7	36.2	28.2	-	
7	445932	240499	40.5	47.1	44.3	45.2	35.4		39.7	31.8	58.8	37.9	41.7	40.2	42.1	32.8	-	
8	443905	241392	24.3	20.1	24.2	16.2	17.2	17.3	22.2	15.1	23.8		24.6		20.5	16.0	-	
9	444611	241172	23.1	25.1	22.2	29.6	17.8	19.8	14.9	17.5	25.7	20.2	25.3		21.9	17.1	-	
10	445333	240100	35.4	41.7	33.9	42.0	34.8	33.9	38.8	25.3	49.5	25.6	34.1	28.9	35.3	27.6	-	
11	445351	240578	44.6	37.1	39.5	39.3	32.5	34.7	38.5	29.0	42.6	42.2	47.9	36.2	-	-	-	Triplicate Site with 11, 12 and 13 - Annual data provided for 13 only
12	445351	240578	45.4	35.4	44.0	42.0	32.9	33.7	36.8	22.3	40.8	41.1	46.2	43.9	-	-	-	Triplicate Site with 11, 12 and 13 - Annual data provided for 13 only
13	445351	240578	44.7	38.2	46.6	42.8	29.8	35.2	33.3	29.0	42.8	43.6	46.4	41.3	39.0	30.4	-	Triplicate Site with 11, 12 and 13 - Annual data provided for 13 only
14	444274	241289	18.8	18.9	16.5	21.1	10.0	10.6	10.6	6.8	15.1	11.6	17.6		14.3	11.2	-	
15	444366	239654	14.7	15.6	11.7	14.7	7.2	8.2	7.0	7.0	10.3	10.7	12.4	12.5	11.0	8.6	-	
16	446535	241721	84.1	75.7	73.2	76.3	88.7	81.5	78.7	52.0	47.5	86.3	76.4	81.8	75.2	**58.6**	**52.2**	
17	458721	222115	23.0	29.4	23.4	29.0	21.5	18.4	23.6	16.6	27.3	29.2	34.7	29.0	25.4	19.8	-	
18	456937	223586	22.7	21.9	27.9	29.1	19.9	28.7	21.0	22.2	29.1	28.9	33.4	25.0	25.8	20.1	-	

Diffusion Tube ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	NO_2 Mean Concentrations (µg/m^3)												Simple Annual Mean (µg/m3)			Comment
			Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Raw Data	Bias Adjusted (0.78)	Distance Corrected to Nearest Exposure	
19	446334	241676	27.4	29.8	29.0	30.0	21.9	28.7	22.9	22.0	32.4	26.3	30.3	23.3	27.0	21.1	-	
20	443006	235744	30.0	30.0	32.9	38.5	29.9	34.1	35.2	28.4	44.6	35.7	29.3	25.0	32.8	25.6	-	
21	446828	241591	31.1	35.0	35.3	43.9	21.3	30.3	28.6	21.3	38.0	24.9	33.3	26.1	30.8	24.0	-	
22	446997	241315	36.0	34.0	37.4		24.5	28.1	26.8	24.9	41.4	29.8	34.4	27.2	31.3	24.4	-	
23	442940	235593	28.5	33.5	39.3	34.5	22.2	32.1	31.1	27.6	41.9	35.6		35.7	32.9	25.7	-	
24	443045	236118	23.0	20.0	25.0	27.2	18.7	23.7	10.5	20.7	30.1	24.5	37.1		23.7	18.5	-	
25	457619	222535	21.1	19.3	18.8	15.6	11.0	9.7	10.5	8.9	18.1	18.8	20.0	20.6	16.0	12.5	-	
26	458419	222334	24.7	35.1	21.5	39.3	26.1	25.8	21.1	19.8	24.3	24.9	25.0	30.4	26.5	20.7	-	
27	458006	222404	44.6	57.7	41.1		39.4	42.8	43.1	33.6	49.6	46.5	47.7	46.3	44.8	34.9	-	
28	458310	222720	38.2	28.4	34.7	35.9	23.8	28.1	27.5	23.3	36.0	33.3	45.8	36.9	32.7	25.5	-	
29	458214	222836	35.4	31.4			25.2	29.1		25.2	40.2	36.0	37.2	32.4	32.5	25.3	-	
30	458274	222935	37.0	34.6	38.5	39.0	29.6	29.2	31.9	17.1	40.5	44.8	46.1	41.1	35.8	27.9	-	
31	458028	222471	37.0	22.4	35.0	35.9	28.3	30.9	32.1	26.2	39.7	38.9	48.4	41.3	-	-	-	Triplicate Site with 31, 32 and 33 - Annual data provided for 33 only
32	458028	222471	39.5	31.1	34.1	40.0	29.5	32.3	31.2	28.0	42.9	39.7	46.3	40.6	-	-	-	Triplicate Site with 31, 32 and 33 - Annual data provided for 33 only
33	458028	222471	40.7	32.2	41.8	39.0	25.8	33.4	33.3	29.7	44.7	41.2	49.1	39.7	36.2	28.2	-	Triplicate Site with 31, 32 and 33 - Annual data provided for 33 only
34	458539	222381	28.5	21.5		22.3	18.4	17.5	20.7	15.2	27.7	24.7	28.6	30.5	23.2	18.1	-	
35	458333	224432	20.0	14.8	17.4	18.4	10.2	14.1	10.5	9.4	15.9	17.2	20.1	12.9	15.1	11.8	-	
36	457956	224362	28.5	23.6	24.8	30.6	18.6	23.3	22.5	19.2	27.4	26.3	30.9	25.6	25.1	19.6	-	
37	459100	221190	28.5	33.9	28.5	39.9	24.2	30.4	31.8	21.9	33.1	25.3	31.4	29.0	29.8	23.3	-	
38	450267	213511	39.2	34.2	32.9	37.6	30.3	32.0	31.6	27.4	43.5	30.0	43.5	32.2	-	-	-	Duplicate Site with 38 and 39 - Annual data provided for 39 only

Diffusion Tube ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	NO_2 Mean Concentrations (µg/m^3)												Simple Annual Mean (µg/m3)			Comment
			Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Raw Data	Bias Adjusted (0.78)	Distance Corrected to Nearest Exposure	
39	450267	213511	38.9	33.6	19.5	34.6	29.3	30.3	25.8	27.1	41.0	38.7	45.0	41.4	34.2	26.6	-	Duplicate Site with 38 and 39 - Annual data provided for 39 only
40	449122	213947	26.9	30.8	27.9	31.5	22.8	22.8	24.2	21.9	32.9	30.6	29.6	30.1	27.7	21.6	-	
41	450322	213587	30.9	23.0	26.8	20.7	17.3	18.4	20.3	17.0	28.0	30.6	25.4	28.4	23.9	18.6	-	
42	449172	214325	18.6	14.6	14.7	12.4	8.7	8.4	8.9		14.0	33.7	18.5	13.8	15.1	11.8	-	
43	447318	214798	24.7	20.0	19.9	26.6	17.0	16.8	19.5	14.0	26.5	16.3		24.8	20.6	16.0	-	
44	453397	223516		28.5	30.2	35.9	24.3	27.5	27.2	16.2	36.9	34.9	26.2		28.8	22.4	-	
46	447403	235723	27.8	23.1	24.8	26.1	19.3		34.5		38.4	42.5		17.8	28.3	22.0	-	
47	454301	227498	26.5	25.5	27.1	26.9	18.5	18.2	19.4	19.6	25.9	22.5	29.0	25.7	23.7	18.5	-	

☒ **All erroneous data has been removed from the NO_2 diffusion tube dataset presented in Table B.1**

☒ **Annualisation has been conducted where data capture is <75% and >25% in line with LAQM.TG16**

☐ **Local bias adjustment factor used**

☒ **National bias adjustment factor used**

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

☒ **Cherwell District Council confirm that all 2021 diffusion tube data has been uploaded to the Diffusion Tube Data Entry System**

Notes:

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

NO_2 annual means exceeding 60µg/m^3, indicating a potential exceedance of the NO_2 1-hour mean objective are shown in **bold and underlined**.

See Appendix C for details on bias adjustment and annualisation.

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

New or Changed Sources Identified Within Cherwell District Council During 2021

Cherwell District Council has not identified any new sources relating to air quality within the reporting year of 2021.

Additional Air Quality Works Undertaken by Cherwell District Council During 2021

Cherwell District Council has not completed any additional works within the reporting year of 2021.

QA/QC of Diffusion Tube Monitoring

Diffusion Tube Bias Adjustment Factors

Cherwell District Council's diffusion tubes are prepared and analysed by Environmental Scientifics Group (ESG), Unit 12 Moorbrook, Southmead Industrial Estate, Didcot, Oxfordshire, OX11 7HP

The tubes are prepared by spiking acetone:triethanolamine (50:50) onto the grids prior to the tubes being assembled. The tubes were desorbed with distilled water and the extract analysed using a segmented flow autoanalyser with ultraviolet detection.

The bias adjustment factor used within this Updating and Screening Assessment was derived from the national database of co-location studies (National Physical Laboratory, 2022). The results from this spreadsheet provided a national bias adjustment factor of 0.78.

Diffusion Tube Annualisation

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

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.TG16 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.

Cherwell District Council have applied a national bias adjustment factor of 0.78 to the 2021 monitoring data. A summary of bias adjustment factors used by Cherwell District Council over the past five years is presented in Table C.1.

Table C.1 – Bias Adjustment Factor

Monitoring Year	Local or National	If National, Version of National Spreadsheet	Adjustment Factor
2021	National	03/22	0.78
2020	National	03/21	0.77
2019	National	03/20	0.75
2018	National	03/19	0.76
2017	National	03/18	0.77

NO_2 Fall-off with Distance from the Road

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

The monitoring location in the Hennef Way AQMA required distance correcting to the nearest sensitive receptor. This was calculated using the Diffusion Tube Data Processing Tool version 2.0.

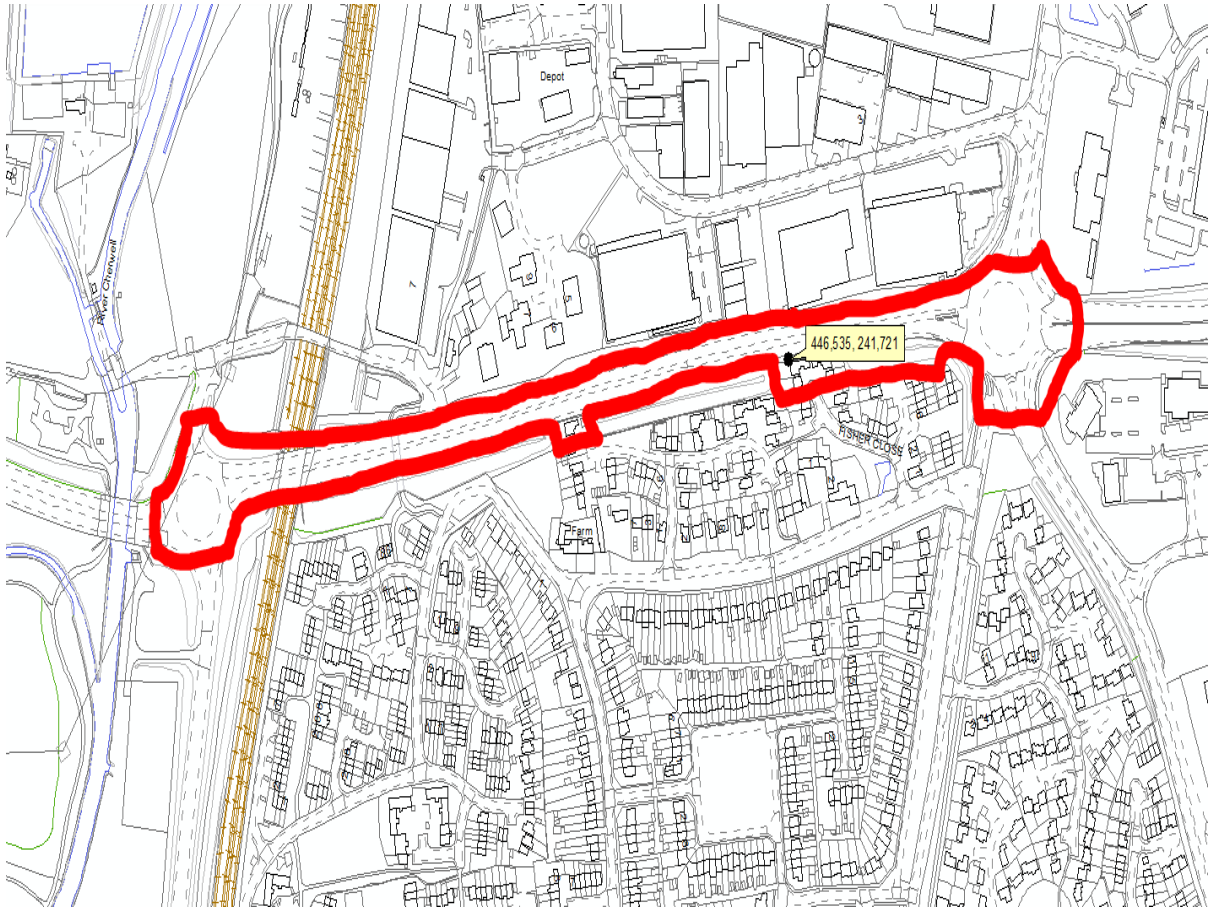
Table C.2 – NO_2 Fall off With Distance Calculations (concentrations presented in $\mu g/m^3$)

Site ID	Distance (m): Monitoring Site to Kerb	Distance (m): Receptor to Kerb	Monitored Concentration (Annualised and Bias Adjusted	Background Concentration	Concentration Predicted at Receptor	Comments
16	3.0	5.0	58.6	9.9	52.2	

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

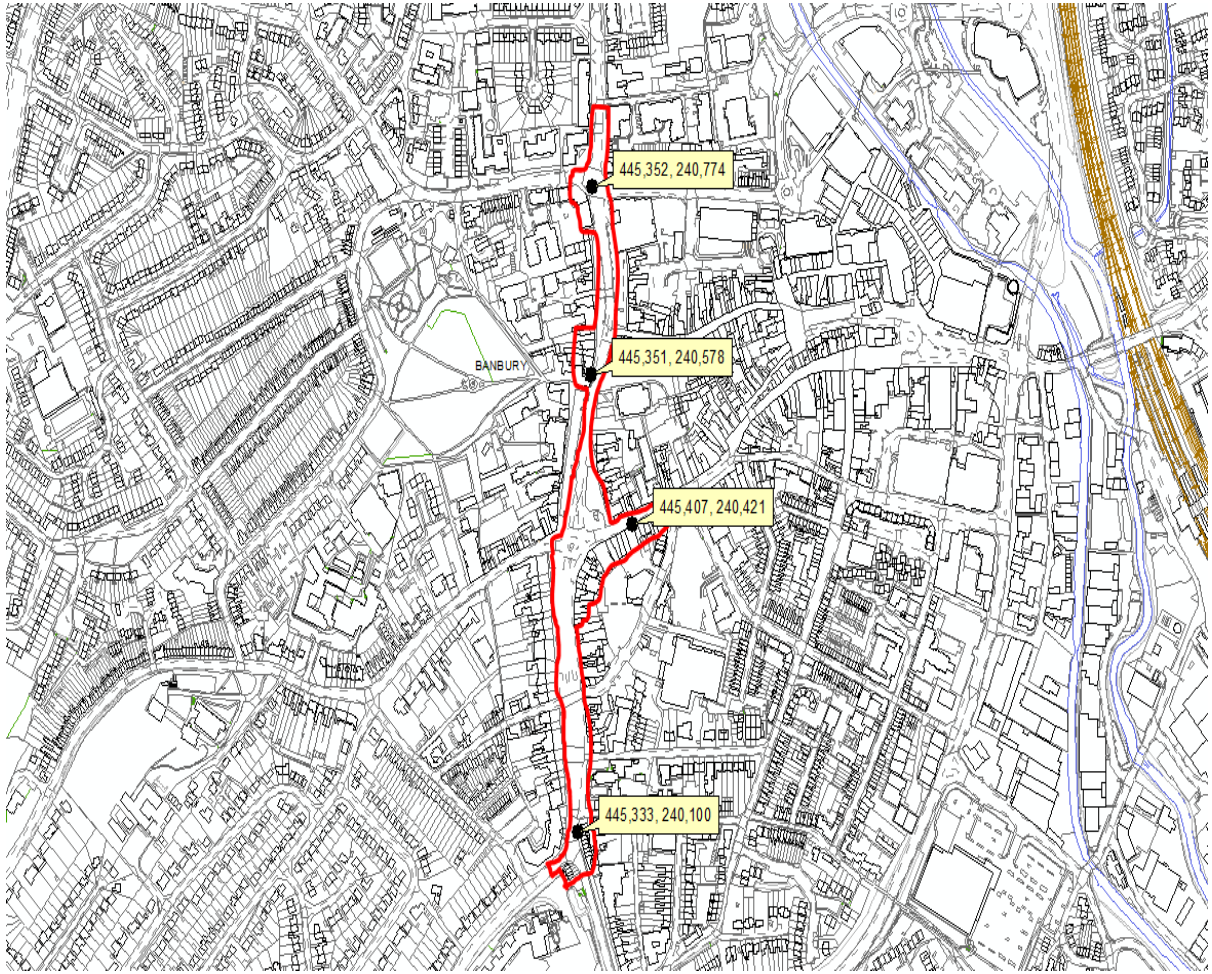
Figure D.1 – Map of Non-Automatic Monitoring Site

Hennef Way Banbury – AQMA No.1 Boundary with monitoring location point at: Hennef Way (446535; 241721)



Horsefair - North Bar Banbury - AQMA No.2 Boundary with monitoring locations at:

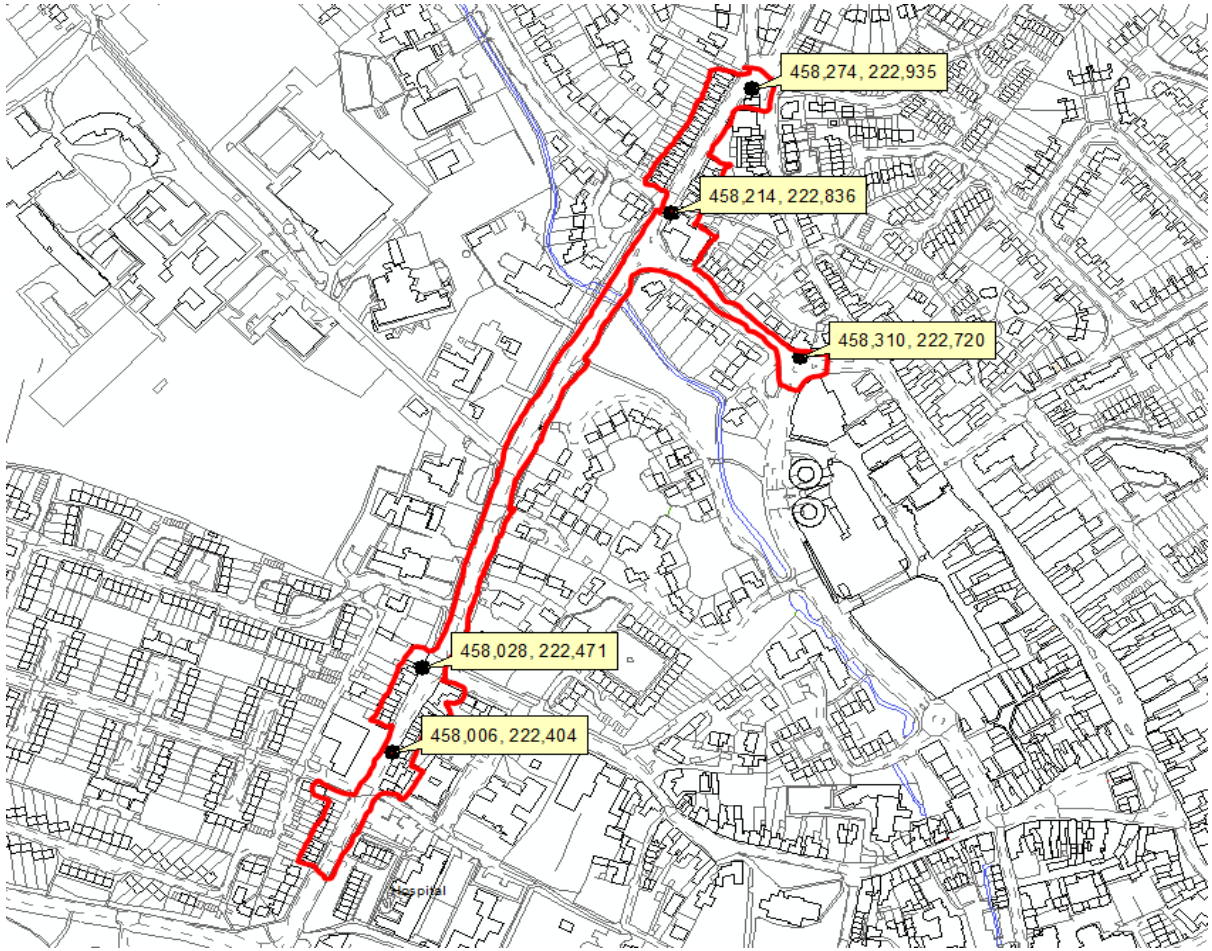
High Street (445407; 240421), North Bar (445352; 240774), Oxford Road/ South Bar (445333; 240100), Horsefair (445351; 240578)



Bicester Road, Kidlington – AQMA No.3 Boundary with monitoring location point at: Bicester Road (2) (450267;213511)

Queens Ave – Kings Head AQMA No.4 Boundary with diffusion tube locations at:

Kings End South (458006; 222404), St Johns 2014 (458310; 222720), Field Street (458214; 222836), North Street (458274; 222935), Queens Avenue (458028; 222471)



Appendix E: Summary of Air Quality Objectives in England

Table E.1 – Air Quality Objectives in England7

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

7 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
EU	European Union
FDMS	Filter Dynamics Measurement System
LAQM	Local Air Quality Management
NO_2	Nitrogen Dioxide
NO_x	Nitrogen Oxides
PM_{10}	Airborne particulate matter with an aerodynamic diameter of 10µm or less
$PM_{2.5}$	Airborne particulate matter with an aerodynamic diameter of 2.5µm or less
QA/QC	Quality Assurance and Quality Control
SO_2	Sulphur Dioxide

References

- Local Air Quality Management Technical Guidance LAQM.TG16. April 2021. Published by Defra in partnership with the Scottish Government, Welsh Assembly Government and Department of the Environment Northern Ireland.
- Local Air Quality Management Policy Guidance LAQM.PG16. May 2016. Published by Defra in partnership with the Scottish Government, Welsh Assembly Government and Department of the Environment Northern Ireland.
- Defra Local Air Quality Management Technical Guidance LAQM TG(16). February 2018
- Defra Local Air Quality Management Policy Guidance LAQM.PG(16). May 2016.
- Cherwell District Council Air Quality Action Plan 2017
- Cherwell District Council Annual Status Report 2018
- Cherwell District Council Annual Status Report 2019
- Cherwell District Council Annual Status Report 2020
- Cherwell District Council Annual Status Report 2021
- Defra National Diffusion Tube Bias Adjustment Factor Spreadsheet 2021.