North Warwickshire Borough Council

2024 Air Quality Annual Status Report (ASR)

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

Date: 28 June, 2024

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Executive Summary: Air Quality in Our Area

Air Quality in North Warwickshire Borough Council

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

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

A significant concern for the Council is indoor air pollution as both short and long-term exposure can lead to noncommunicable diseases including chronic obstructive pulmonary disease (COPD), lung cancer and stroke.[3]

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

Table ES 1 - Description of Key Pollutants

Pollutant	Description
Nitrogen Dioxide (NO_2)	Nitrogen dioxide is a gas which is generally emitted from high-temperature combustion processes such as road transport or energy generation.
Sulphur Dioxide (SO_2)	Sulphur dioxide (SO_2) is a corrosive gas which is predominantly produced from the combustion of coal or crude oil.
Particulate Matter	Particulate matter is everything in the air that is not a gas.

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

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

[3] World Health Organization. Household Air Pollution December 2023

(PM_{10} and $PM_{2.5}$)	Particles can come from natural sources such as pollen, as well as human made sources such as smoke from fires, emissions from industry and dust from tyres and brakes. PM_{10} refers to particles under 10 micrometres. Fine particulate matter or $PM_{2.5}$ are particles under 2.5 micrometres.

As established in the Environment Act 2021, legally binding regulations were released on Particle Matter.

The Environmental Targets (Fine Particulate Matter) (England) Regulations 2023 require that in England by the end of 2040:

- An annual average of 10 µg/m3 for PM2.5 is not exceeded at any monitoring station.
- Population exposure to PM2.5 is at least 35% less than in 2018.

The Environmental Improvement Plan 2023 for England has set intermit targets that by January 2028:

- An annual average of 12 µg/m3 for PM2.5 is not exceeded at any monitoring station.
- Population exposure to PM2.5 is at least 22% less than in 2018.

Local Authorities are now required to take preventative action thorough a local Air Quality Strategy. North Warwickshire Borough Council are in the process of producing their strategy.

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[4] sets out actions that will drive continued improvements to air quality and to meet the new national interim and long-term targets for fine particulate matter ($PM_{2.5}$), the pollutant most harmful to human health. The Air

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

Quality Strategy[5] provides more information on local authorities' responsibilities to work towards these new targets and reduce fine particulate matter in their areas.

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

The Warwickshire Local Cycling and Walking Infrastructure Plan (LCWIP) is a long-term, county-wide plan for investment in walking, wheeling and cycling routes and Active Travel Zones. It was approved by Warwickshire County Council in February 2024[7].

North Warwickshire Borough Council is continuing to work in partnership through the Coventry and Warwickshire Air Quality Alliance, which is made up of the Borough, Districts County Council and City Council as well as and Public Health England.

In Partnership with Public Health at County Council, North Warwickshire Borough council are funding air quality monitoring systems with a focus on monitoring fine particulate matter.

Conclusions and Priorities

Monitoring over the past 12 months has shown levels of nitrogen dioxide for all monitoring sites to be below the national objective. It is not considered necessary to declare an Air Quality Management Area (AQMA) at the current time.

Local Engagement and How to get Involved

If further information is required a copy of the previous Annual Status Report for North Warwickshire can be seen at Air Quality Annual Status Report ASR downloads | North Warwickshire (northwarks.gov.uk). Also, if you have any questions relating to air quality

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

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

[7] Warwickshire County Council Warwickshire Local Cycling and Walking Infrastructure Plan (LCWIP) 2024

please contact the Environmental Health Department at North Warwickshire Borough Council on 01827 715341 or via e-mail at environmentalhealth@northwarks.gov.uk.

Local Responsibilities and Commitment

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

Milen Woldeab, Senior Pollution Control Officer

This ASR has been approved by:

Sharon Gallagher, Environmental Health Manager

If you have any comments on this ASR please send them to Milen Woldeab at:

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1 Local Air Quality Management

This report provides an overview of air quality in North Warwickshire Borough Council during 2023. It fulfils the requirements of Local Air Quality Management (LAQM) as set out in Part IV of the Environment Act (1995), as amended by the Environment Act (2021), and the relevant Policy and Technical Guidance documents.

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

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

2 Actions to Improve Air Quality

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 Warwickshire Borough Council currently does not have any declared AQMAs. A local Air Quality Strategy is under development to prevent and reduce polluting activities. The council are in the process of producing The Local Air Quality Strategy.

2.2 Progress and Impact of Measures to address Air Quality in North Warwickshire Borough Council

Defra's appraisal of last year's ASR provided the following conclusion. A response to each of the points is provided below where required.

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

1. The Council include comments from last year's ASR appraisal, along with responses to these (where required), in the report. This is welcomed and is encouraged to be included in future reports.

2. Although the Council provide the data used to calculate the annualisation factors and resultant annualised means in Table C.1, the automatic monitoring sites are not named in the table. Although this information is included in the accompanying DTDES spreadsheet submitted, this should also be presented in the report, so that it provides clarity surrounding the derivation/calculation of the annualisation factor. The Council should include the names of the sites in Table C.1 bin future reports, should annualisation be required.

3. There are formatting errors throughout the report, with several instances of missing sub- and superscripts within the text (e.g. "PM2.5" rather than "PM2.5"). There is also a referencing error, with the text "Error" Reference source not found" on page 22. The Council is encouraged to check for and rectify such errors prior to submitting future reports.

4. The Council provide graphs showing the trends in annual mean NO2 concentrations from 2018 to 2022 and comparisons with the air quality objectives. These graphs are well-presented, and the Council are encouraged to continue including these in future reports.

5. The Council is encouraged to provide some discussion around the trends in NO2 concentrations in future reports, alongside the graphs presenting the data.

6. Typographical errors have been identified within the report, with repetition of a paragraph beginning "The Borough Council is continuing to work in partnership…" on page 4. Prior to future submissions, the Council should review their report for such errors and rectify them.

7. The report refers to the Public Health Outcomes Framework and makes an explicit reference to the local indicator D01, with the Council comparing it to the reginal and national indicator values. The Council have some measures which specifically target PM2.5 concentrations, including exploration of PM2.5 air quality monitoring apparatus, in partnership with Public Health at County Council. They are also looking to improve knowledge of fine particulate matter levels, as well as quantifying and aiming to reduce the number of complaints about smoke. This highlights the Council's dedicated and pro-active approach to addressing air quality within their jurisdiction and is very much welcomed.

The Borough Council is continuing to work in partnership through the Coventry and Warwickshire Air Quality Alliance, which is made up of the Borough, Districts County Council and City Council as well as and Public Health England.

An Air Quality Supplementary Planning Document[8] was also approved by the Council in September 2019 in a bid to help reduce air pollution issues at the planning stage. This has helped to ensure the council are considering air quality with every development that requires planning consent. As part of the Coventry and Warwickshire Air Quality Alliance a review of the Air Quality SPD is being considered to address Particulate Matter in additional detail.

In September 2021, the Council adopted a new Local Plan[9] which includes an emphasis on air quality when considering development within the borough.

Warwickshire County Council has produced Warwickshire Local Transport Plan in 2023[10]. The plan supports County Council’s response to the climate emergency and the county’s moves towards Net Zero carbon.

Several activities within the borough are a source of air quality. This includes active quarries, and construction activities. The High Speed 2 (HS2) project has intensified in this reporting year and has been identified as a potential source of air pollution. The effect could see a change in NO2 concentrations and fine particulate matter. HS2 release monthly reports for North Warwickshire Borough Council which are carefully monitored by Environmental Health Team.

[8] North Warwickshire Borough Council. Supplementary Planning Documents, September 2019.

[9] North Warwickshire Borough Council. Adopted Local Plan 2021

[10] Warwickshire County Council. Warwickshire's Local Transport Plan, July 2023.

In the year 2023, Environmental Health at North Warwickshire Borough Council received 67 smoke complaints. This is down from 73 complaints in 2022 and 106 complaints received in 2021. The team also received 7 complaints regarding dust from commercial and construction sites in 2023.

North Warwickshire Borough Council are currently exploring measures to improve Air Quality as part of the Air Quality Strategy. Details of all measures planned are set out in Table 2.1. Two measures are included within Table 2.1, with the type of measure and the progress North Warwickshire Borough Council have made during the reporting year of 2023 presented. Where there have been, or continue to be, barriers restricting the implementation of the measure, these are also presented within Table 2.1.

Table 2.1 – Progress on Measures to Improve Air Quality

Measure No.	Measure Title	Category	Classification	Year Measure Introduced in AQAP	Estimated / Actual Completion Date	Organisations Involved	Funding Source	Defra AQ Grant Funding	Funding Status	Estimated Cost of Measure	Measure Status	Reduction in Pollutant / Emission from Measure	Key Performance Indicator	Progress to Date	Comments / Barriers to Implementation
1	Installation of Air Quality Sensors	Public Information	Via the Internet	2023	2026	Local Authority Environmental Health, Public Health County Council.	County Council, Local Authority	NO	Funded	£10k - 50k	Planning	Monitoring of PM and awareness	Traffic count, measured concentration at X	A report has been shared with the Health and Wellbeing group who have part funded the project. Implementation on-going.	Waiting for 3rd parties to install sensors
2	Promote green waste services and discourage the use of bonfires	Public Information	Via the Internet	2023	2025	Local Authority Environmental Health	N/A	NO	Not Funded	< £10k	Planning	Increase use of green services and less bonfire complaints	Reduction in smoke complaints	Early stages of discussions with the Communication team	
3	Promote the use of Electric vehicles as part of Taxi and Private Hire Licensing Policy	Public Information	Other	2023	2025	Local Authority Environmental Health	N/A	NO	Not Funded	< £10k	Planning	Increase in Electric or Hybrid vehicles which are Licensed by the Council	Increase the number of Electric and Hybrid Vehicles	Draft Taxi Licensing Policy encourages the use of electric and hybrid vehicles and no upper age limit for use of these vehicles is included.	Draft Policy

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

As detailed in Policy Guidance LAQM.PG22 (Chapter 8) and the Air Quality Strategy[11], local authorities are expected to work towards reducing emissions and/or concentrations of fine particulate matter ($PM_{2.5}$)). There is clear evidence that $PM_{2.5}$ (particulate matter smaller 2.5 micrometres) has a significant impact on human health, including premature mortality, allergic reactions, and cardiovascular diseases.

North Warwickshire Borough Council is taking the following measures to address $PM_{2.5}$:

The Public Health Outcomes Framework[12] includes a new indicator relating to the impact of particulate pollution on human health relating to the period 2022 which is the most recent period available. Indicator D01 – Fraction of mortality attributable to particulate air pollution (new method) provides an estimation of the mortality burden associated with long-term exposure to $PM_{2.5}$ as a percentage of the annual deaths from all causes in those aged 30+. The D01 indicator for North Warwickshire is 5.7% for 2022. This is comparable to the Counties average Warwickshire which is (5.5%) and the national English average (6.2%).

The modelled background level provided by Defra for North Warwickshire are modelled to be between 7.3µg/m^3 and 9.95µg/m^3 for 2023, with the annual mean for 2023 being 8.1µg/m^3.

The WHO guideline value are more stringent for $PM_{2.5}$. WHO updated their Global Air Quality Guidelines on 22 September 2021. The new update includes interim targets intended to guide reduction, as well as revised guideline levels, including (as annual mean concentrations):

• PM2.5 Interim targets of 35 / 25 / 15 / 10, and a guideline level of 5 µg/m^3

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

[12] Public Health England. Public Health Outcomes Framework, 2022.

As established in the Environment Act 2021, legally binding regulations were released on Particle Matter.

The Environmental Targets (Fine Particulate Matter) (England) Regulations 2023 require that in England by the end of 2040:

- An annual average of 10 µg/m3 for PM2.5 is not exceeded at any monitoring station.
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- Population exposure to PM2.5 is at least 22% less than in 2018.

Local Authorities are now required to take preventative action thorough a local Air Quality Strategy. North Warwickshire Borough Council are in the process of producing their strategy.

North Warwickshire Borough Council is taking the following measures to address $PM_{2.5}$:

• Quantify and aim to reduce the number of complaints about smoke and dust.

• When appropriate include planning conditions to limit dust from construction sites as part of planning process.

• Seek to improve knowledge of levels of fine particulate matter and implement behaviour change, pollution reduction and strategies to reduce exposure where applicable.

• Link air quality to any new transport and climate change strategies.

• The Council will continue to inspect processes with environmental permits as per DEFRA guidance.

North Warwickshire Borough council have various Smoke Control Areas within the Council's boundary. In these areas, only authorised and smokeless fuels are allowed to be burnt, unless being used in an exempt appliance. These areas are considered when investigating smoke complaints. This helps control and reduce PM2.5 emissions in these areas. The council are in the initial stages of reviewing the smoke control areas.

In Partnership with Public Health at County Council, North Warwickshire Borough council have funded 8 air quality monitoring systems with a focus on monitoring fine particulate matter.

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

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

3.1 Summary of Monitoring Undertaken

3.1.1 Non-Automatic Monitoring Sites

North Warwickshire Borough Council undertook non- automatic (i.e. passive) monitoring of NO_2 at 31 sites during 2023. Table A.1 in Appendix A presents the details of the non-automatic sites. Tube 33 was added following concerns raised by residents about the air quality in the area.

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 and Table A.2 in Appendix A compare the ratified and adjusted monitored NO_2 annual mean concentrations for the past five years with the air quality objective of 40µg/m^3. The concentration data presented represents the concentration at the location of the monitoring site, following the application of bias adjustment and annualisation, as

required (i.e. the values are exclusive of any consideration to fall-off with distance adjustment).

For diffusion tubes, the full 2023 dataset of monthly mean values is provided in Appendix B. Note that the concentration data presented in Table B.1 includes distance corrected values, only where relevant.

North Warwickshire Borough Council have taken direct measure to gather a better understanding of air quality issues in the area. An additional 10 diffusion tube locations were monitored during 2020 and a further 2 diffusion tube locations were monitored in 2021 increasing the number of tube locations from 19 in 2019 to 31 in 2022. Following a complaint in 2022, The council deployed a diffusion tube on Coton Road, Coleshill.

In 2023 all monitoring sites have reported an annual mean NO2 concentration less than the annual mean NO2 AQS objective of 40µg/m3.

An exceedance of the air quality objective for nitrogen dioxide was identified between 2019 – 2022 for Tube 8 A5 Watling Street, Dordon (11). The level in 2023 was below the objective but this location will be closely monitored. The Council are surveying this location for an automatic Air Quality Sensor.

The data shows there has been a reduction at 29 out of 31 locations in 2023. Dordon and Coleshill are areas in which the annual mean concentration remains the highest.

Data capture from Tubes 3 and 4 was insufficient and has been omitted from the DTDES report. The council had one result for 2023 at this location of 0.5 ug/m3, suggesting there was an issue with the tube e.g. the caps were left on when deployed. No data was captured for Tube 4 as the tubes were stolen for all 12 months of the 2023 monitoring period.

Based on the trends highlighted in Figure A.1, North Warwickshire Borough Council are reviewing the tube locations to ensure we are capturing new areas.

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)
Tube 1	Rowland Way Atherstone	Roadside	430762	298747	NO2	No	2.0	2.0	No	2.0
Tube 2	Penmere Close Grendon	Roadside	427374	299431	NO2	No	2.0	2.0	No	2.0
Tube 3	Spon Lane Grendon	Kerbside	427835	299652	NO2	No	2.0	1.0	No	2.0
Tube 4	Bridge St Polesworth	Kerbside	426183	302564	NO2	No	2.0	1.0	No	2.0
Tube 5	(Top) Long St Dordon	Kerbside	426195	300310	NO2	No	2.0	1.0	No	2.0
Tube 6	(Bottom) Long St Dordon	Kerbside	426178	300108	NO2	No	2.0	0.0	No	2.0
Tube 7	New St Dordon	Roadside	426055	300164	NO2	No	2.0	7.0	No	2.0
Tube 8	11 Watling St	Roadside	426136	300075	NO2	No	2.0	2.0	No	2.0
Tube 9	55 Watling St Dordon	Roadside	426025	300135	NO2	No	2.0	2.0	No	2.0
Tube 10	65 Watling St Dordon	Roadside	425943	300172	NO2	No	2.0	3.0	No	2.0
Tube 11	Old Ambulance Stn Dordon	Roadside	425811	300263	NO2	No	2.0	14.0	No	2.0
Tube 12	Kingsbury Water Park	Rural	420380	295902	NO2	No	2.0	N/A	No	2.0

Diffusion Tube ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA? Which AQMA?	Distance to Relevant Exposure (m) [1]	Distance to kerb of nearest road (m) [2]	Tube Co-located with a Continuous Analyser?	Tube Height (m)
Tube 13	Farthing Lane Curdsworth	Kerbside	418186	292959	NO2	No	2.0	0.0	No	2.0
Tube 14	Maud Rd Water Orton	Kerbside	418060	290943	NO2	No	2.0	0.0	No	2.0
Tube 15	Coleshill Heath Rd Coleshill	Other	419854	287041	NO2	No	2.0	N/A	No	2.0
Tube 16	Coventry Rd Coleshill	Kerbside	420027	287360	NO2	No	2.0	0.0	No	2.0
Tube 17	Parkfield Road Coleshill	Roadside	420120	288627	NO2	No	2.0	2.0	No	2.0
Tube 18	Church Hil Coleshill	Kerbside	420042	289079	NO2	No	2.0	1.0	No	2.0
Tube 19	High St Coleshill	Roadside	419983	289095	NO2	No	2.0	3.0	No	2.0
Tube 20	55 High St Coleshill	Kerbside	419969	289197	NO2	No	2.0	0.0	No	2.0
Tube 21	Blythe Rd Coleshill	Kerbside	420024	289176	NO2	No	2.0	1.0	No	2.0
Tube 22	Blythe Rd Coleshill	Roadside	420040	289199	NO2	No	2.0	2.0	No	2.0
Tube 23	Coleshill Rd Furnace End	Kerbside	424876	291320	NO2	No	2.0	1.0	No	2.0
Tube 24	Coventry Rd Fillongley	Kerbside	428051	287239	NO2	No	2.0	1.0	No	2.0
Tube 25	Victoria Rd Hartshill	Kerbside	432733	293402	NO2	No	2.0	1.0	No	2.0
Tube 26	Church Rd Hartshill	Kerbside	432560	293767	NO2	No	2.0	1.0	No	2.0
Tube 27	Coleshil Rd Atherstone	Kerbside	430940	297759	NO2	No	2.0	1.0	No	2.0
Tube 28	Taxi Rank Atherstone	Kerbside	430717	297825	NO2	No	2.0	1.0	No	2.0

Diffusion Tube ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA? Which AQMA?	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Tube Co-located with a Continuous Analyser?	Tube Height (m)
Tube 31	Coleshill Rd Curdworth	Kerbside	417832	292974	NO2	No	2.0	1.0	No	2.0
Tube 32	Kingsbury Rd Curdworth	Kerbside	417920	293071	NO2	No	2.0	1.0	No	2.0
Tube 33	Coton Rd Coleshill	Kerbside	421889	293090	NO2	No	2.0	1.0	No	2.0

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 2023 (%) [2]	2019	2020	2021	2022	2023
Tube 1	430762	298747	Roadside		87.1	19.8	14.0	14.7	14.3	11.8
Tube 2	427374	299431	Roadside		92.1	17.3	13.8	14.6	12.5	12.2
Tube 3	427835	299652	Kerbside		9.6	18.0	13.6	14.0	14.2	0.4
Tube 4	426183	302564	Kerbside		0.0	24.9	20.6	19.8	-	-
Tube 5	426195	300310	Kerbside		90.7	29.4	22.5	23.5	19.6	20.4
Tube 6	426178	300108	Kerbside		88.8		25.2	26.0	25.0	22.5
Tube 7	426055	300164	Roadside		98.4	28.6	20.6	20.9	21.3	17.4
Tube 8	426136	300075	Roadside		98.4	**46.8**	35.0	**42.7**	**40.6**	36.4
Tube 9	426025	300135	Roadside		98.4		35.1	35.5	36.7	29.7
Tube 10	425943	300172	Roadside		98.4		35.4	38.1	36.3	30.8
Tube 11	425811	300263	Roadside		98.4		23.7	20.7	22.9	18.6
Tube 12	420380	295902	Rural		98.4	20.1	14.1	15.0	15.3	13.3
Tube 13	418186	292959	Kerbside		80.8	18.6	15.4	16.7	14.9	12.7
Tube 14	418060	290943	Kerbside		98.4	26.8	20.9	22.2	21.9	19.9
Tube 15	419854	287041	Other		87.1	34.1	27.8	29.9	30.1	27.9
Tube 16	420027	287360	Kerbside		98.4	28.2	19.7	21.3	23.8	18.3
Tube 17	420120	288627	Roadside		90.7		19.1	22.0	25.4	19.9
Tube 18	420042	289079	Kerbside		90.7		18.5	20.0	19.7	16.2
Tube 19	419983	289095	Roadside		98.4		26.5	28.7	30.3	26.7
Tube 20	419969	289197	Kerbside		88.8		24.7	25.4	26.9	22.1
Tube 21	420024	289176	Kerbside		98.4	39.5	29.2	31.6	31.4	35.0
Tube 22	420040	289199	Roadside		98.4		35.8	37.7	37.9	24.8
Tube 23	424876	291320	Kerbside		98.4	28.5	21.0	22.6	24.8	21.7
Tube 24	428051	287239	Kerbside		90.7	22.8	15.7	17.8	17.4	14.4
Tube 25	432733	293402	Kerbside		81.1	26.1	20.4	22.0	22.1	15.2
Tube 26	432560	293767	Kerbside		65.8	20.2	17.4	16.7	19.4	16.1
Tube 27	430940	297759	Kerbside		98.4	26.0	19.0	20.5	21.1	16.8
Tube 28	430717	297825	Kerbside		90.7		13.3	13.9	14.3	10.3
Tube 31	417832	292974	Kerbside		90.7			21.9	21.8	19.5
Tube 32	417920	293071	Kerbside		98.4			30.5	30.9	24.3
Tube 33	421889	293090	Kerbside		88.8					11.0

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

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

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

Notes:

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

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

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

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

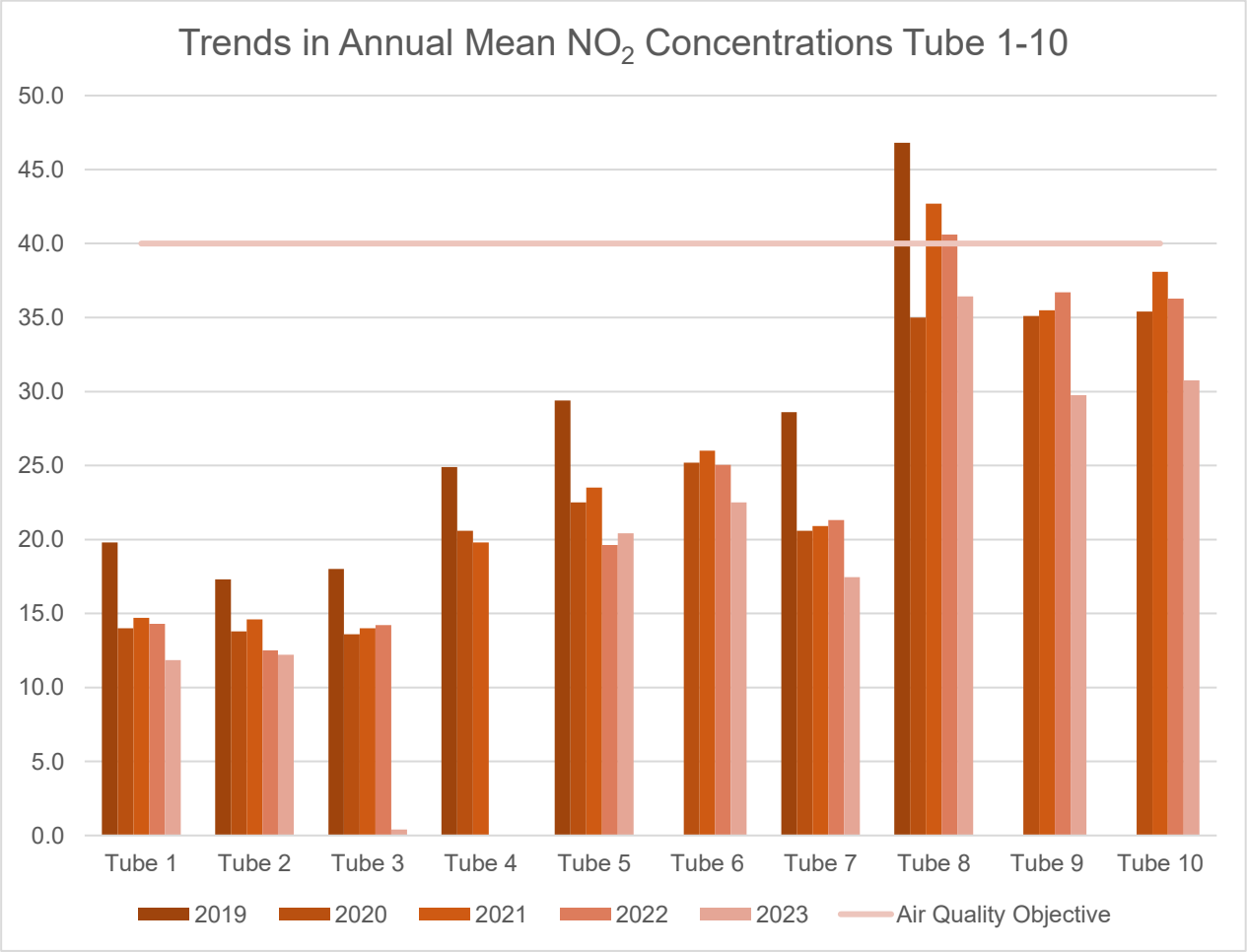
Concentrations are those at the location of monitoring and not those following any fall-off with distance adjustment.

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

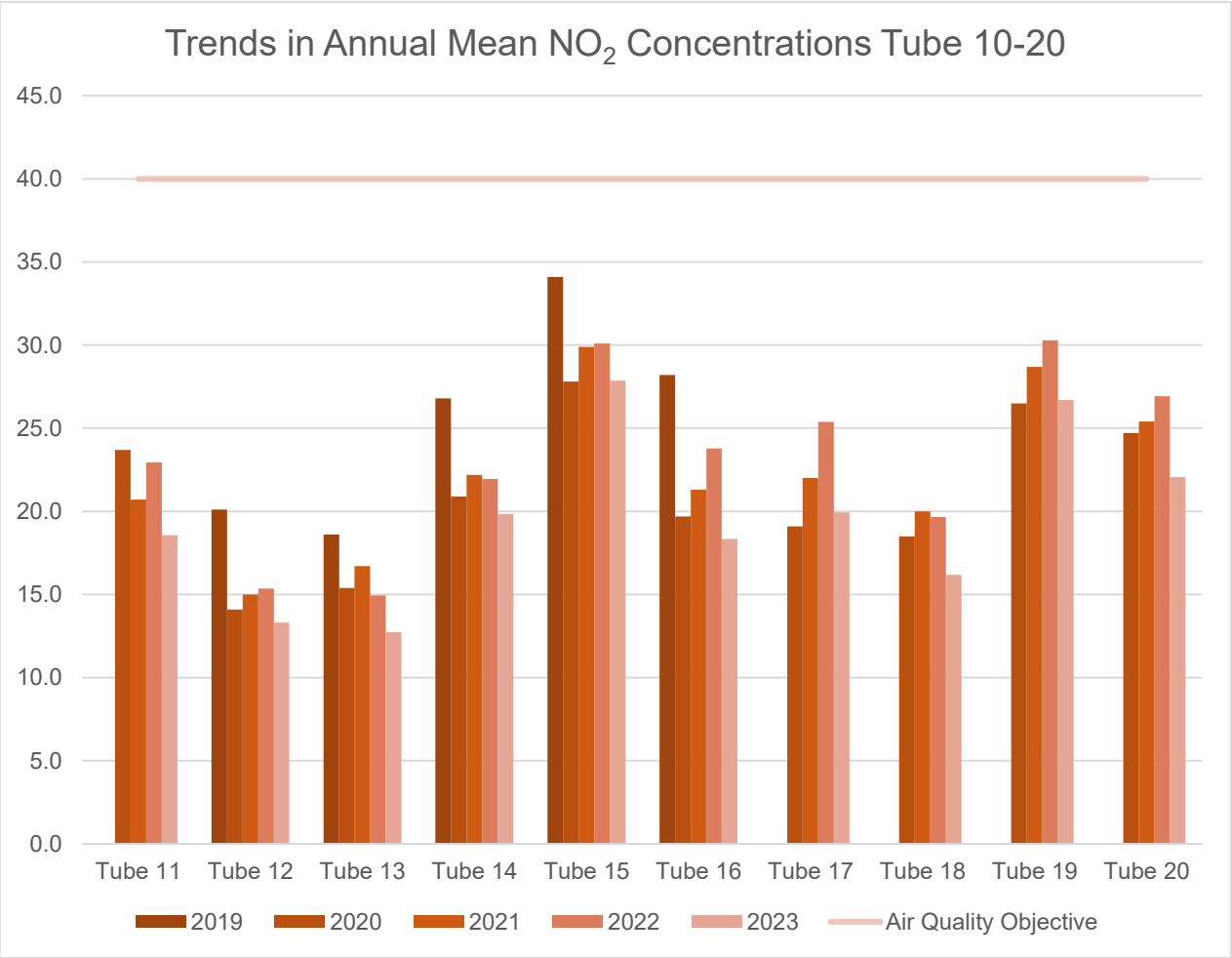
(2) Data capture for the full calendar year (e.g. if monitoring was carried out for 6 months, the maximum data capture for the full calendar year is 50%).

Figure A.1 – Trends in Annual Mean NO_2 Concentrations

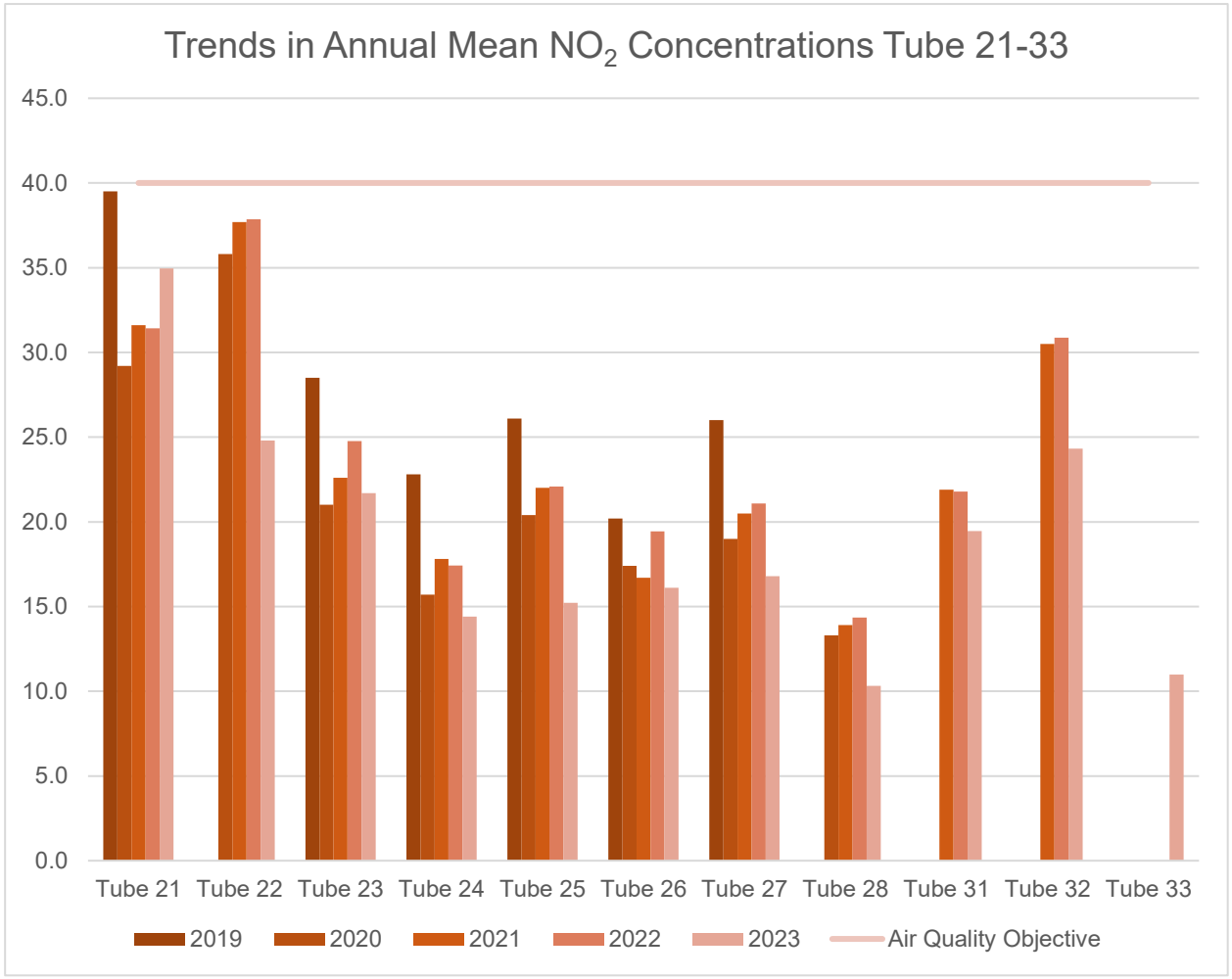
Tubes 1 to 10



Tubes 10 to 20



Tubes 21 to 33



Appendix B: Full Monthly Diffusion Tube Results for 2023

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

DT ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean: Raw Data	Annual Mean: Annualised and Bias Adjusted (0.81)	Annual Mean: Distance Corrected to Nearest Exposure	Comment
Tube 1	430762	298747	21.8	20.1	14.9	14.3	12.0	13.1	12.9	11.9	18.2	19.6		0.8	14.6	11.8	-	
Tube 2	427374	299431	18.9	19.5	14.8	14.9	14.4	14.2	8.5	11.9	13.3	16.1	18.8		15.1	12.2	-	
Tube 3	427835	299652								0.5					0.5	0.4	-	
Tube 4	426183	302564														-	-	
Tube 5	426195	300310	32.1	33.6	29.8	24.7	23.1		19.1	21.0	27.8	29.4	30.7	0.8	25.2	20.4	-	
Tube 6	426178	300108	35.7	35.6	27.9	25.1	22.0	24.3	22.7		28.3	27.1	30.2	27.2	27.8	22.5	-	
Tube 7	426055	300164	32.7	30.3	22.5	15.1	14.6	18.0	20.0	19.8	26.6	25.9	27.7	0.8	21.5	17.4	-	
Tube 8	426136	300075	58.9	54.3	43.2	43.1	39.2	44.6	41.8	41.1	44.6	47.5	40.9	44.7	45.0	36.4	32.0	
Tube 9	426025	300135	48.1	44.4	38.9	32.6	40.9	37.7	34.0	34.8	40.2	42.2	38.2	0.8	36.7	29.7	-	
Tube 10	425943	300172	45.9	45.8	38.8	40.4	36.3	42.1	31.7	37.3	44.0	42.1	42.5	0.8	38.0	30.8	-	
Tube 11	425811	300263	34.4	31.7	23.8	20.7	13.8	17.8	20.1	19.9	22.9	24.8	24.6	23.0	22.9	18.6	-	
Tube 12	420380	295902	27.4	24.3	18.1	13.5	10.4	12.1	12.5	13.6	18.7	18.6	23.2	0.8	16.4	13.3	-	
Tube 13	418186	292959	21.3	19.9	16.2	15.6	13.3	13.6	10.7	13.3	16.0	18.4			15.7	12.7	-	
Tube 14	418060	290943	33.1	31.9	27.1	26.1	22.2	22.2	16.6	21.4	28.5	30.1	29.0	0.8	24.5	19.9	-	
Tube 15	419854	287041	50.5	40.7	32.4	29.9	21.9	34.0	29.2	31.4	37.7	39.5		35.5	34.4	27.9	-	
Tube 16	420027	287360	33.3	31.2	24.8	13.1	14.7	20.3	24.0	21.4	27.8	27.9	28.1	0.8	22.6	18.3	-	
Tube 17	420120	288627	43.9	34.8	27.4	22.1	18.4	20.4		19.2	26.3	26.3	28.1	0.8	24.6	19.9	-	
Tube 18	420042	289079		28.8	25.5	18.0	17.1	19.1	15.9	3.6	28.5	26.5	31.7	0.8	20.0	16.2	-	
Tube 19	419983	289095	45.2	41.2	31.8	30.2	29.0	30.1	28.6	25.1	33.7	32.8	36.3	32.8	33.0	26.7	-	
Tube 20	419969	289197	35.8	38.0	31.9	30.4		23.1	23.5	21.9	29.2	27.4	31.9	0.8	27.2	22.1	-	
Tube 21	420024	289176	49.2	48.9	45.0	47.8	40.1	48.7	36.6	35.6	47.4	45.8	39.3	36.8	43.2	35.0	-	
Tube 22	420040	289199	43.6	38.7	30.3	30.7	27.7	31.8	26.8	26.3	34.4	38.0	33.6	0.8	30.6	24.8	-	
Tube 23	424876	291320	31.9	33.4	27.2	30.2	30.4	31.0	20.2	23.8	28.7	29.6	28.6	0.8	26.8	21.7	-	
Tube 24	428051	287239	23.8		20.1	19.8	18.2	19.3	12.7	15.4	19.0	19.9	22.0	0.8	17.8	14.4	-	

DT ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean: Raw Data	Annual Mean: Annualised and Bias Adjusted (0.81)	Annual Mean: Distance Corrected to Nearest Exposure	Comment
Tube 25	432733	293402	1.7		23.8	23.8		22.3	10.7	19.5	25.0	25.2	27.4	0.8	18.8	15.2	-	
Tube 26	432560	293767		30.8	22.9	19.2			16.3	17.9		24.1	26.4	0.8	20.5	16.1	-	
Tube 27	430940	297759	1.6	34.5	25.8	22.4	19.1	20.3	18.0	16.3	17.0	25.2	23.8	25.7	20.7	16.8	-	
Tube 28	430717	297825	1.1		15.2	13.3	11.8	13.3	9.9	13.5	15.6	18.5	20.9	0.8	12.7	10.3	-	
Tube 31	417832	292974		33.9	27.4	26.6	21.4	23.6	18.7	19.1	28.0	29.7	29.9	0.8	24.0	19.5	-	
Tube 32	417920	293071	0.0	41.6	36.4	37.3	35.2	32.4	26.2	28.4	34.7	40.5	37.1	0.8	30.0	24.3	-	
Tube 33	421889	293090	1.0	21.8	15.9	14.1	12.4	13.3	10.5		15.4	17.0	21.3	0.8	13.6	11.0	-	

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

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

☒ **Local bias adjustment factor used.**

☒ **National bias adjustment factor used.**

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

☒ **North Warwickshire Borough Council confirm that all 2023 diffusion tube data has been uploaded to the Diffusion Tube Data Entry System.**

Notes:

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

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

See Appendix C for details on bias adjustment and annualisation.

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

New or Changed Sources Identified Within North Warwickshire Borough Council During 2023

North Warwickshire Borough Council have identified construction and attached related to HS2 as a new source relating to air quality within the reporting year of 2023.

Additional Air Quality Works Undertaken by North Warwickshire Borough Council 2023

North Warwickshire Borough Council has not completed any additional works within the reporting year of 2023.

QA/QC of Diffusion Tube Monitoring

Gradko International Ltd were the supplier used for diffusion tubes in 2023 and the method of preparation was 20% TEA in water.

Gradko International Ltd is UKAS accredited (ISO: 17025) and participates in the AIR NO2 PT scheme15. This scheme forms an integral part of the UK NO2 Network's QA/QC and is a useful tool in assessing the analytical performance of those laboratories supplying diffusion tubes to Local Authorities for use in the context of Local Air Quality Management (LAQM). In the most recent AIR NO2 PT rounds AR055 to AR059 for January to October 2023 respectively Gradko International Ltd achieved a 100% satisfactory score for both rounds[13].

Diffusion Tube Annualisation

If annualisation was required for any non-automatic monitoring sites, the sites requiring annualisation should be clearly defined along with details of the calculation method

[13] Summary of Laboratory Performance in AIR NO2 Proficiency Testing Scheme (September 2021 – June 2023). LAQM Helpdesk October 2023

undertaken provided in Table C.1. Annualisation is required for any site with data capture less than 75% but greater than 25%.

Tube 26 required annualisation as the data capture was less than 75% but greater than 25%. The Diffusion Tube Data Processing Tool Version 4.1 was used to calculate annualisation factors.

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

Site ID	Annualisation Factor Walsall Woodlands	Annualisation Factor West Bromwich Kenrick Park	Annualisation Factor Birmingham Ladywood	Annualisation Factor <Site 4 Name>	Average Annualisation Factor	Raw Data Annual Mean	Annualised Annual Mean
Tube 26	0.9657	0.9714	0.9724		0.9698	20.5	19.9

Diffusion Tube Bias Adjustment Factors

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

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

Table C.2 – Bias Adjustment Factor

Monitoring Year	Local or National	If National, Version of National Spreadsheet	Adjustment Factor
2023	National	05/24	0.81
2022	National	06/23	0.84
2021	National	06/22	0.84
2020	National	06/21	0.81
2019	National	03/19	0.92

NO_2 Fall-off with Distance from the Road

Wherever possible, monitoring locations are representative of exposure. However, where this is not possible, the NO_2 concentration at the nearest location relevant for exposure has been estimated using the Diffusion Tube Data Processing Tool/NO_2 fall-off with distance calculator available on the LAQM Support website.

Diffusion tube 8, recorded NO_2 concentrations greater than 36µg/m^3 and were not located at the point of relevant exposure and therefore required a fall-off with distance calculation. The output data from the LAQM NO_2 fall-off with distance calculator, is presented Table C.4.

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

Site ID	Distance (m): Monitoring Site to Kerb	Distance (m): Receptor to Kerb	Monitored Concentration (Annualised and Bias Adjusted	Background Concentration	Concentration Predicted at Receptor	Comments
Tube 8	2.0	4.0	36.4	9.4	32.0	

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

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

Tube 1 Atherstone

Tube 2 Grendon

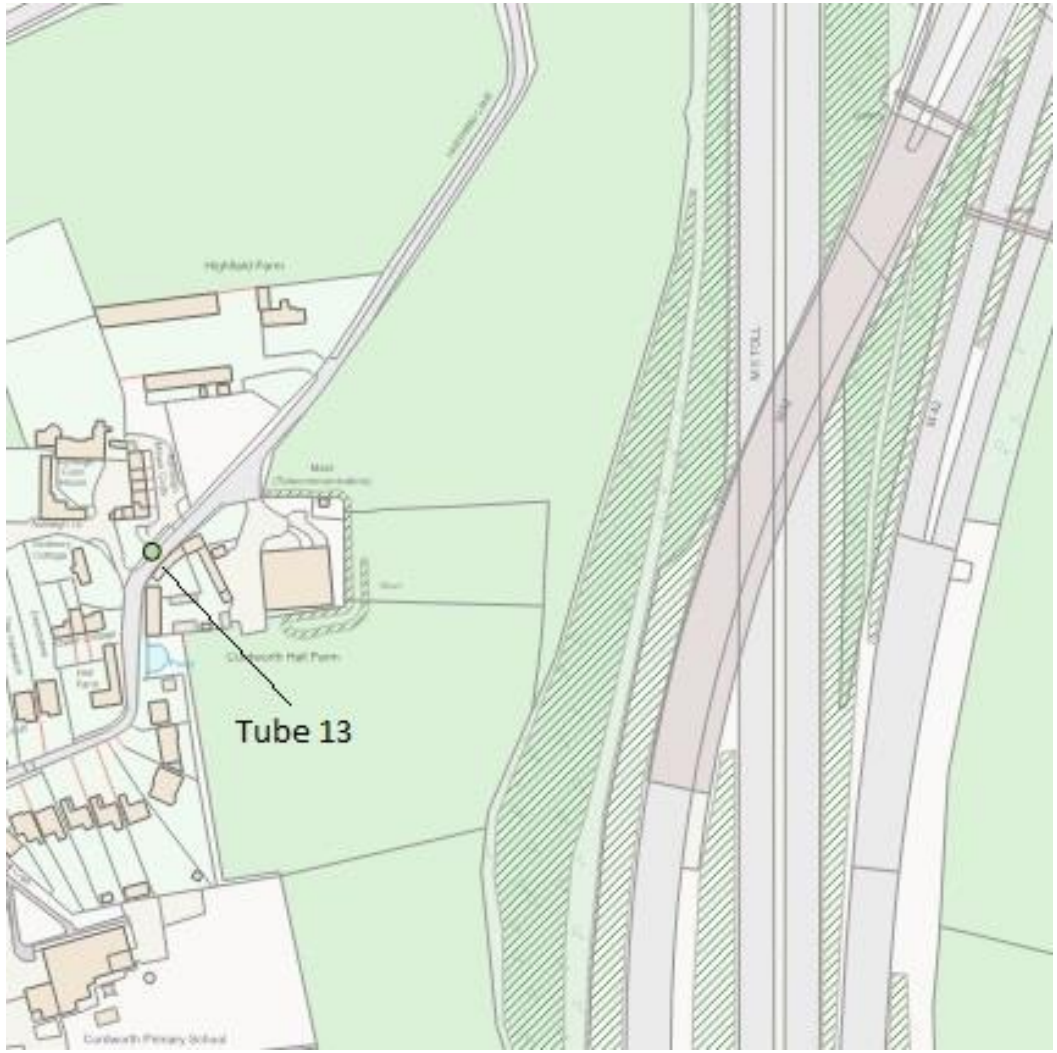
Tube 3 Grendon

Tube 4 Polesworth

Tubes 5 to 11 Dordon

Tube 12 Kingsbury

Tube 13 Curdworth



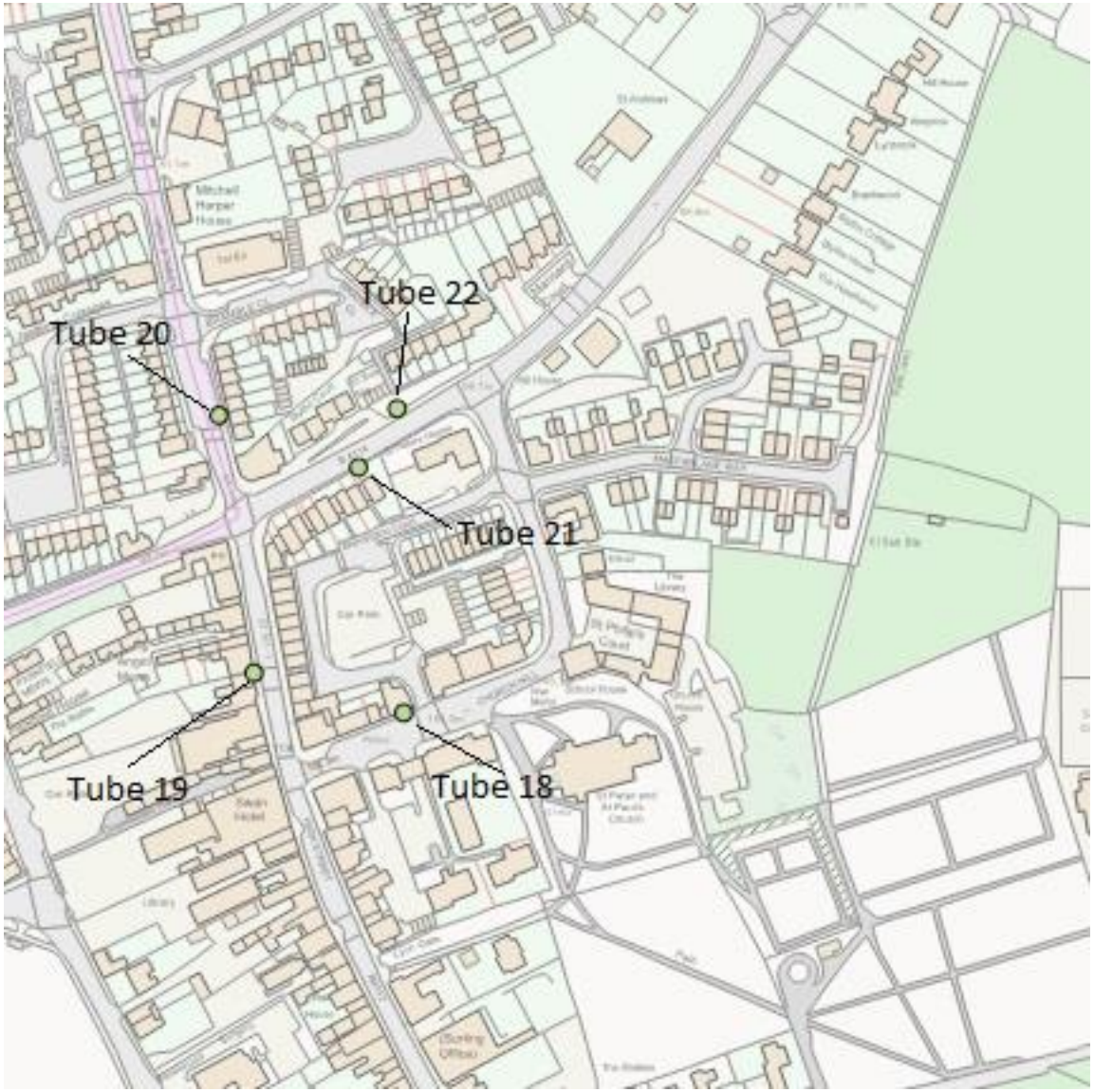
Tube 14 Water Orton

Tube 15 Coleshill

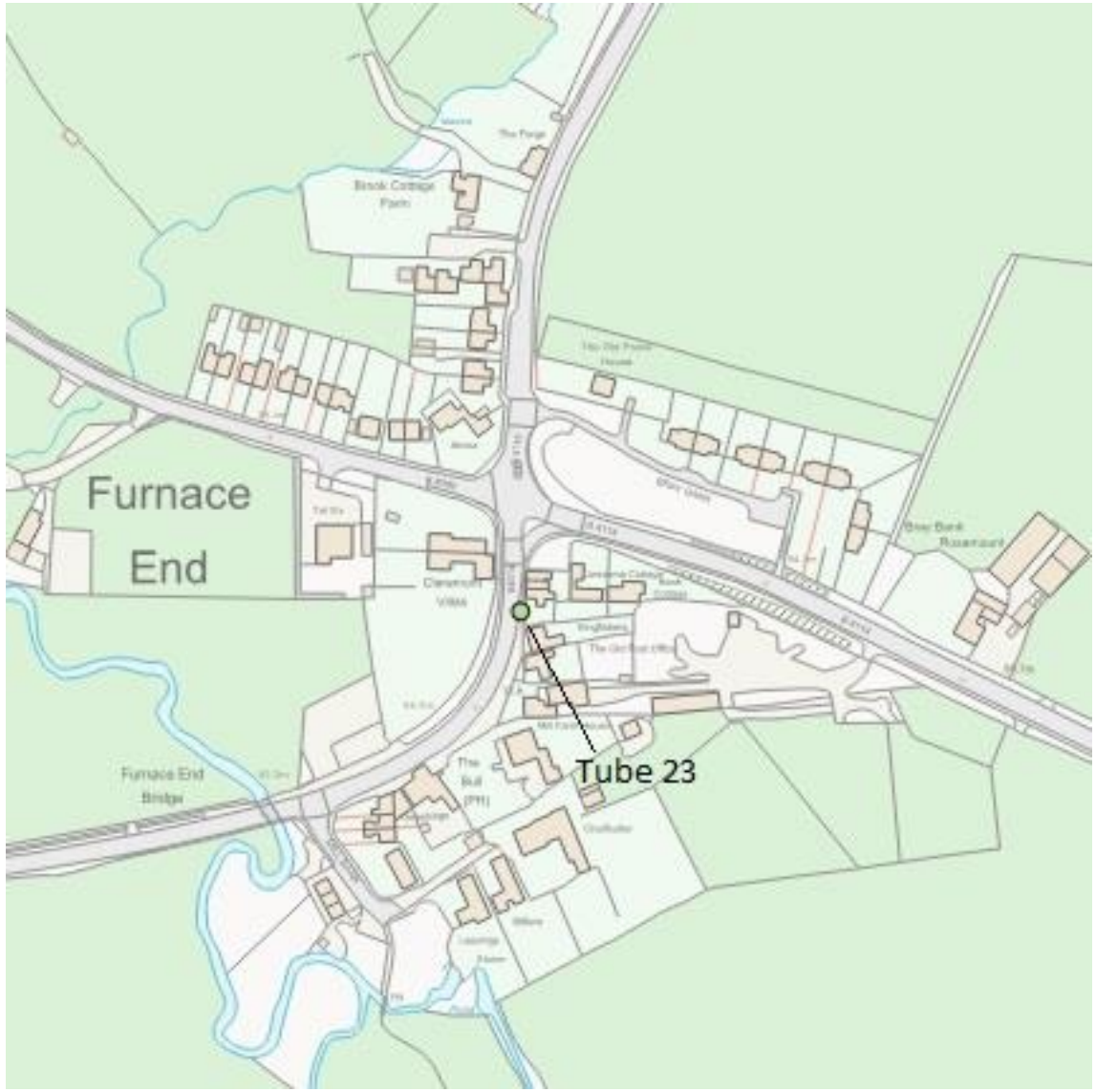
Tube 16 Coleshill

Tube 17 Coleshill

Tubes 18 to 22 Coleshill



Tube 23 Furnace End

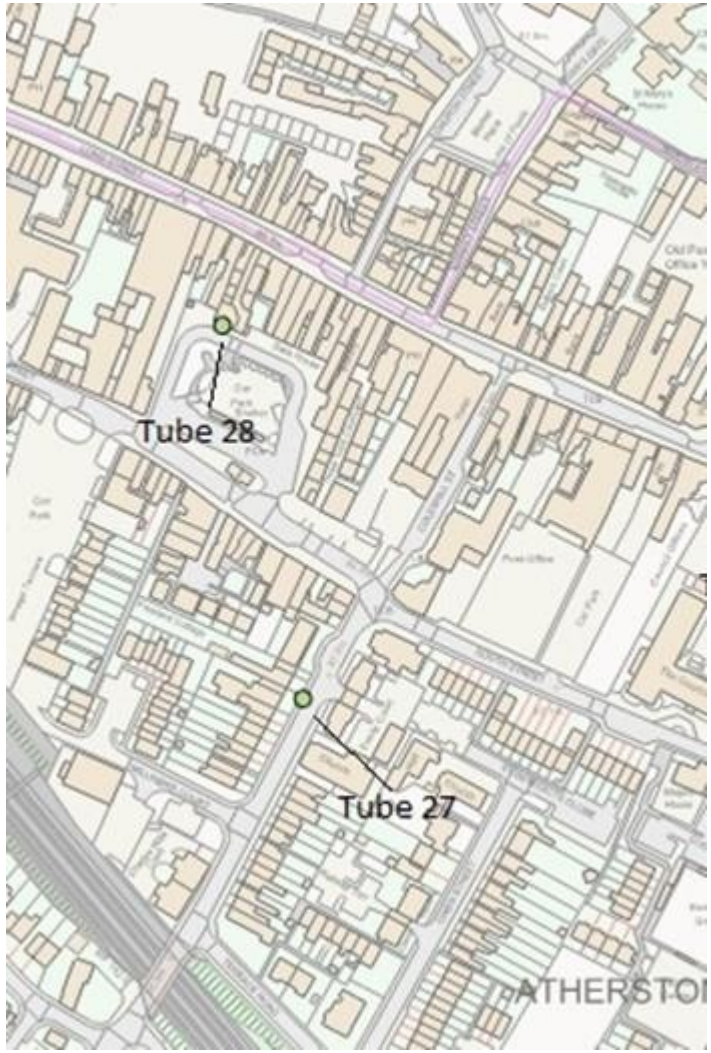


Tube 24 Fillongley

Tube 25 Hartshill

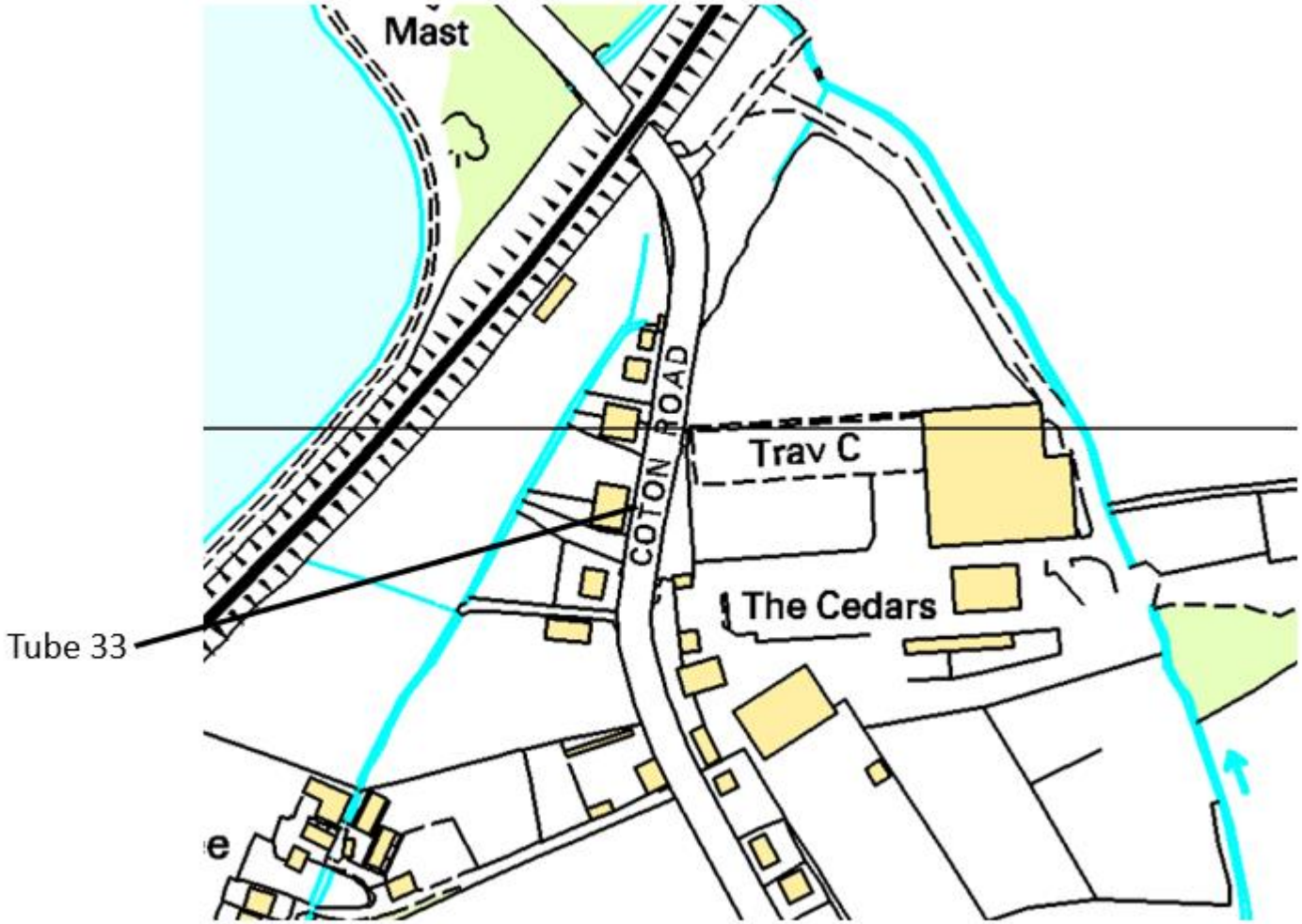
Tube 26 Hartshill

Tube 27 to 28 Atherstone



Tubes 31 and 32 Curdworth

Tube 33, Coleshill



Appendix E: Summary of Air Quality Objectives in England

Table E.1 – Air Quality Objectives in England[14]

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

[14] 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

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- Local Plan 2021. Published by North Warwickshire Borough Council.
- Warwickshire's Local Transport Plan, July 2023. Published by Warwickshire County Council.
- Public Health Outcomes Framework, 2022. Published by Public Health England.