2022 Air Quality Annual Status Report (ASR)

In fulfilment of Part IV of the Environment Act 1995

Local Air Quality Management

Date: December, 2022

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Executive Summary: Air Quality in Our Area

Air Quality in Stroud 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].

The single most significant influence on air quality within the Stroud district is road traffic emissions. The main pollutant of concern from road traffic is Nitrogen Dioxide (NO_2). Stroud District Council locates diffusion tubes across the District in order to measure prevailing NO_2. The tubes are replaced each month and the collected tubes are sent away for analysis. In 2021, there were marginal increases in NO_2 concentrations at most locations compared with concentrations found in 2020. Despite this, air quality across the district remains very good and it should be noted that there has been a general overall downward trend in NO_2 concentrations across the district over the past few years. This reflects a national trend outlined in national statistics, “Roadside NO_2 pollution has reduced in the long-term and in recent years, having been stable for most of the 2000s” (https://www.gov.uk/government/statistics/air-quality-statistics/ntrogen-dioxide#:~:text=The%20average%20annual%20mean%20concentration%20of%20NO2%20at%20rural%20background,%25)%20each%20year%20since%201997).

[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

As a result of the impending requirements for monitoring of particulate matter, particularly $PM_{2.5}$, as a result of the Environment Act 2021, Stroud District Council has been investigating options available to it in order to fulfil its duties. There has been a lot of work undertaken with neighbouring authorities as part of a Gloucestershire wide network co-ordinated by Gloucestershire County Council to develop a strategy for monitoring and reporting particulate data, as well as ensuring its availability to the public.

Additionally, Stroud District Council has taken part in diffusion tube monitoring for Schools Streets trials. This forms part of countywide monitoring of closed streets where schools are located, for ThinkTravel. Information from this is to be used to support the promotion of anti-idling initiatives across the Gloucestershire.

Actions to Improve Air Quality

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 Strategy[5] sets out the case for action, with goals to reduce exposure to harmful pollutants. The Road to Zero[6] 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.

Conclusions and Priorities

In 2021, 35 of the 40 monitoring locations reported marginal increases in annual mean concentrations of NO_2 against those reported in 2020. None of the monitoring locations indicated exceedances of the annual air quality objective of 40µg/m^3 and none were within 10% of the objective (36.0µg/m^3). One location reported the same annual mean in both 2020 and 2021 and four locations reported decreases in concentrations against those reported in 2020.

[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

In the context of the last five years, the 2021 data continues the downward trend in NO_2 concentrations, despite the slight overall increase over concentrations reported in 2020. The slight increase against 2020 data seems likely to have been a result of the gradual release of commuters and motorists from restrictions imposed during the Covid pandemic.

Looking forward, Stroud District Council is working closely with neighbouring local authorities and Gloucestershire County Council on providing a digital solution to make air quality and related health data available to the public. In addition, Stroud District Council has been working with Gloucestershire County Council and other neighbouring authorities to explore options for monitoring particulates; particularly $PM_{2.5}$, in preparation for the Government setting the long-term and short-term air quality targets to reduce $PM_{2.5}$ in ambient air.

Local Engagement and How to get Involved

Local engagement with decision makers and the public by Stroud District Council is made through several forums. The Gloucestershire Pollution Group is made up of environmental protection professionals from each of the Gloucestershire local authorities, as well as air quality representatives from Gloucestershire County Council (GCC). This forum allows officers to share good practice and ideas for improving air quality.

Stroud District Council is involved with the Air Quality and Behaviour Change group which is made up of professionals and electoral representatives from across Gloucestershire. The group is finalising the Gloucestershire Air Quality and Health Strategy as well as brokering a coordinated approach to the monitoring and reporting of particulate matter across Gloucestershire.

Stroud District Council also assists a Community Liaison Group which was set up to research air quality issues associated with an energy from waste facility. The group is made up of local electoral representatives, Environment Agency representatives, representatives from the operator as well as members of the public.

Interest in air quality issues remains quite high across the Stroud district and this is also reflected in the political composition of the Council. All Councillors actively engage in a whole range of environmental issues, including air quality. Officers regularly brief members of Environment Committee on air quality and the Council's monitoring work.

The public can help to improve air quality across the Stroud District by reducing unnecessary vehicular travel. In addition, disposal of household and garden waste by means other than burning would be very beneficial.

Copies of the latest air quality report for Stroud District can be found on the Council's website at https://www.stroud.gov.uk/environment/environmental-health/pollution-and-nuisance/air-quality.

Queries relating to air quality should be directed to the Environmental Protection team at Stroud District Council.

Local Responsibilities and Commitment

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

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

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1 Local Air Quality Management

This report provides an overview of air quality in Stroud District 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 Stroud 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.

Stroud District Council currently does not have any declared AQMAs.

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

Defra's appraisal of last year's ASR concluded: QA/QC procedures have been applied with a national bias adjustment factor used.

- Annualisation for diffusion tubes was carried for 28 of the Council's 38 monitoring locations due to poor data capture as the Council was unable to complete its diffusion tube changeovers between March and June of 2020 due to COVID-19 lockdowns.
- Hardwicke was only operable for seven months, and therefore required annualisation. Supporting evidence of the annualisation calculations have been provided, however Table C.2 has been filled out incorrectly.
- Evidence of calculated data has been provided. Distance correction was not required.
- On the basis of the evidence provided by the local authority the conclusions reached are acceptable for all sources and pollutants.

Stroud District Council has taken forward a number of direct measures during the current reporting year of 2022 in pursuit of improving local air quality. Details of all measures completed, in progress or planned are set out in Table 2.1. Ten measures are included within Table 2.1, with the type of measure and the progress Stroud District Council has made during the reporting year of 2022 presented. Where there have been, or continue to be, barriers restricting the implementation of the measure, these are also presented within Table 2.1.

More detail on these measures can be found in their respective Action Plans. Key completed measures are: initial implementation of the Local Transport Plan, initial implementation of the Connecting Places Strategy, completed sections on the extension to the Cotswold Canal, installation of water heat pumps at Stroud District Council offices as part of the Carbon Neutral commitment and the ongoing regulation of industry through environmental permitting.

Stroud District Council expects the following measures to be completed over the course of the next reporting year: anti-idling initiatives around schools as part of the Gloucestershire Air Quality and Health Strategy, further work towards the extension of the Cotswold

Canals project, further work towards Stroud District Council's Carbon Neutral commitment and ongoing regulation of installations holding environmental permits.

Stroud District Council's priorities for the coming year are to work with all Gloucestershire local authorities and the County Council to integrate air quality data with other sources by identifying opportunities to join up data to improve the understanding of the relationship between air quality and health. In addition, Stroud District Council is prioritising work with all Gloucestershire local authorities and the County Council in setting up a digital solution to make air quality and related health data available to the public, as well as working to expand the extent of particulate monitoring across the County.

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

- Neighbouring local authorities
- Gloucestershire County Council

The principal challenges and barriers to implementation that Stroud District Council anticipates facing are initially waiting on the Government to set the new air quality target for $PM_{2.5}$ followed by agreeing a countywide strategy with all Gloucestershire local authorities on how to implement the strategy and then obtaining the funding for the necessary measurement apparatus.

Progress on improving public accessibility to air quality data has been slower than expected due to competing workflows as a result of the Covid pandemic.

Table 2.1 – Progress on Measures to Improve Air Quality

Measure No.	Measure	Category	Classification	Year Measure Introduced	Estimated / Actual Completion Year	Organisations Involved	Funding Source	Defra AQ Grant Funding	Funding Status	Estimated Cost of Measure	Measure Status	Reduction in Pollutant / Emission from Measure	Key Performance Indicator	Progress to Date	Comments / Barriers to Implementation
1	Gloucestershire Local Transport Plan 2020 - 2041	Promoting Travel Alternatives	Intensive active travel campaign & infrastructure	2020	2041	SDC and County Council	County Council/Government	No	Partially Funded		Implementation	Reduced vehicle emissions	NOx	Implementation ongoing	Lengthy timescale
2	Connecting Places Strategy - Stroud	Transport Planning and Infrastructure	Public transport improvements- interchanges stations and services	2020	2041	SDC and County Council	County Council	No	Partially Funded		Implementation	Reduced vehicle emissions	NOx	Implementation ongoing	Lengthy timescale
3	Gloucestershire Air Quality and Health Strategy	Policy Guidance and Development Control	Regional Groups Co-ordinating programmes to develop Area wide Strategies to reduce emissions and improve air quality			SDC and County Council	SDC and County Council	No			Planning	Reduced emissions	PM	Still in planning	Cost
4	Gloucestershire Air Quality and Health Strategy	Promoting Low Emission Transport	Other			SDC and County Council	SDC and County Council	No			Planning	Reduced vehicle emissions	NOx	Still in planning	
5	Gloucestershire Air Quality and Health Strategy	Traffic management	Anti-idling enforcement			SDC and County Council	SDC and County Council	No			Planning	Reduced vehicle emissions	NOx	Still in planning	Public and schools' engagement
6	Gloucestershire Air Quality and Health Strategy	Public information	Via the internet			SDC and County Council	SDC and County Council	No			Planning	Reduced vehicle emissions	NOx	Still in planning	
7	Extension of Cotswold Canals	Promoting Travel Alternatives	Promote use of rail and inland waterways			SDC and charity	SDC and heritage lottery fund	No	Funded	£1 million - £10 million	Implementation	Reduced vehicle emissions	NOx	Implementation ongoing	Lengthy timescale
8	SDC carbon neutral commitment by 2030	Other	Other	2019	2030	SDC	SDC	No	Partially Funded		Implementation	Carbon Neutral	CO_2	Implementation ongoing	Lengthy timescale
9	Improve air quality	Environmental Permits	Measures to reduce pollution through IPPC Permits going beyond BAT			SDC		No			Implementation	Reduced emissions		Implementation ongoing	
10	Reducing transport carbon emissions	Promoting low emission transport	Taxi emission incentives			Gloucestershire local authorities		No			Planning	Reduced emissions		Still in planning	Cost

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.

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

In Gloucestershire, there is uneven monitoring of particulate matter. Given the evidence for the negative impact of particulate matter on health, Stroud District Council has been working with Gloucestershire County Council and other neighbouring authorities to explore options for monitoring particulates; particularly $PM_{2.5}$. To achieve this, all Gloucestershire local authorities have started working with Gloucestershire County Council's Sustainability Team on creating a bidding process to access funds for air quality monitoring of particulate matter and projects in line with Gloucestershire's Air Quality and Health Strategy.

Gloucestershire's Air Quality and Health Strategy identified the need to engage the public in monitoring as it has a key role in contributing to the understanding of air quality. However, the public has limited access to data on air quality throughout Gloucestershire, so a digital solution (through a countywide website) to make air quality and related health data available to the public is to be explored. The website will be interactive and provide a visual interpretation of data, in addition to a page dedicated to breaking down air quality into simple chunks of information.

In order to improve the understanding of the relationship between air quality and health, the aim is to integrate air quality data with other data sources, such as health outcomes, healthcare activity, road traffic information, road safety information and, policy and planning decisions.

It is hoped that this page will go live before the end of 2022, with the aim of making data available, so that members of the public can use it to make decisions to protect themselves and to reduce negative impacts on air quality as a result of their own actions.

Air quality is a key outcome in the draft Gloucestershire Health Protection Strategy which is led by the Public Health team at Gloucestershire County Council. The links between air

quality and health outcomes is accessed through the Public Health Outcomes Framework; specifically, the fraction of mortality that is attributable to particulate air pollution indicator (new method, 2020). This indicator identifies that Gloucestershire's fraction of mortality that is attributable to particulate air pollution is 5.4%. This is 0.2% worse than the Southwest average (at 5.2%) and 0.2% better than the national average at 5.4%.

Monitoring of particulates is undertaken in Stroud District. Unfortunately, in 2021, data was not captured for the full year, and it was necessary to undertake annualisation calculations. Despite this, the Pm_{10} concentrations reported at Hardwicke and Haresfield were well below the annual air quality objective. For Pm_{10} at Hardwicke, the concentration was 8.48µg/m^3 and at Haresfield it was 7.74µg/m^3. For $Pm_{2.5}$ at Hardwicke, the concentration was 6.35µg/m^3 and at Haresfield it was 4.93µg/m^3. In general, there has been a downward trend in particalute concentrations over the last few years.

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

This section sets out the monitoring undertaken within 2021 by Stroud 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 Automatic Monitoring Sites

Stroud District Council undertook automatic (continuous) monitoring at two sites during 2021. Table A.1 in Appendix A shows the details of the automatic monitoring sites. The Monitoring Networks page presents automatic monitoring results for Stroud District Council, with automatic monitoring results also available through the UK-Air website.

3.1.2 Non-Automatic Monitoring Sites

Stroud District Council undertook non-automatic (i.e., passive) monitoring of NO_2 at 40 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 (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)

Error! Reference source not found. and Table A.3 in Appendix A compare the ratified and adjusted monitored NO_2 annual mean concentrations for the past five years with the air quality objective of 40µg/m^3. Note that the concentration data presented represents the concentration at the location of the monitoring site, following the application of bias adjustment and annualisation, as required (i.e., the values are exclusive of any consideration to fall-off with distance adjustment).

For diffusion tubes, the full 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.

In 2021, 35 monitoring locations displayed marginal increases in concentrations of annual mean NO_2 against those reported in 2020. None of the monitoring locations indicated exceedances of the annual air quality objective of 40 µg/m^3 and none were within 10% of the objective (36.0µg/m^3). One location (Diffusion tube 43; Slad Brook) had exactly the same annual mean of 29.0µg/m^3 in both 2020 and 2021. Four locations demonstrated very slight decreases in concentrations:

- Diffusion tube 34; 50 Woodland Green. In 2020, the annual mean concentration reported was 16.7µg/m^3 and in 2021 the annual mean concentration was 16.6µg/m^3; a decrease of 0.1µg/m^3.
- Diffusion tube 35; Trevose. In 2020, the annual mean concentration reported was 25.9µg/m^3 and in 2021 the annual mean concentration was 25.2µg/m^3; a decrease of 0.7µg/m^3.
- Diffusion tube 41; Westward Road. In 2020, the annual mean concentration reported was 21.4µg/m^3 and in 2021 the annual mean concentration was 21.1µg/m^3; a decrease of 0.3µg/m^3.
- Diffusion tube 55; Locking Hill surgery. In 2020, the annual mean concentration reported was 20.9µg/m^3 and in 2021 the annual mean concentration was 19.0µg/m^3; a decrease of 1.9µg/m^3. It should be noted that Locking Hill surgery had diffusion tube coverage of only seven months in 2021 and thus had less than the 75% data capture necessary to be valid and so required annualisation. This was achieved using data from the three closest continuous monitors at Swindon Walcot, Bristol St Paul's and Oxford St Ebbes. Given that these locations are likely to be buisier than Stroud, it is not known why there has been a slight increase reported at Locking Hill surgery.

In 2020, the monitoring location reporting the highest annual level of NO_2 was diffusion tube 27 at Bowbridge. The level was 30.93µg/m^3. In 2021, the concentration reported at Bowbridge was 33.4µg/m^3, an increase of 2.47µg/m^3. However, in 2021, the monitoring location reporting the highest annual level of NO_2 was diffusion tube 29, at 1 Signal House. The level was 34.7µg/m^3 which is 1.3µg/m^3 less than 10% of the annual air quality objective. In 2020, 1 Signal House had an annual mean concentration of 29.8µg/m^3 so, there has been an increase of 4.9µg/m^3, or nearly 17%, since 2020. Not only did 1 Signal House have the highest annual mean concentration of NO_2 in 2021, it was also the monitoring location where the largest increase in annual mean concentration between 2020 and 2021 occurred.

Over the past five years, with the exception of 2018 (when it was considered that the bias adjustment factor may have increased NO_2 concentrations reported against previous years), there has been a general downward trend in NO_2 concentrations. The bias adjustment factor used in conjunction with 2020's data was 0.85 compared with 0.86 used in conjunction with 2021's data. This very moderate increase would not account for the increases identified at the majority of monitoring locations. It therefore seems likely that the increased concentrations may have occurred as a result of the gradual release of commuters and motorists from restrictions imposed during the Covid pandemic.

3.2.2 Particulate Matter (PM_{10})

Table A.4 in Appendix A: Monitoring Results compares the ratified and adjusted monitored PM_{10} annual mean concentrations for the past five years with the air quality objective of 40µg/m^3.

Error! Reference source not found. in Appendix A compares the ratified continuous monitored PM_{10} daily mean concentrations for the past five years with the air quality objective of 50µg/m^3, not to be exceeded more than 35 times per year.

The two automatic monitoring locations within Stroud District were set up by a Community Liasion Group interested in the emissions from an energy from waste plant commissioned in 2019. Stroud District Council provides assistance in downloading and interpreting data captured by the units. Unfortunately, both monitoring locations failed to obtain sufficient data as a result of equipment failure. At Hardwicke, the equipment operated between January and July and at Haresfield the equipment operated between January and

October. Therefore, both required annualisation utilising sites at Oxford St Ebbes and Bristol St Paul's.

Both locations have reported concentrations well below the annual air quality objective of 40µg/m^3. In 2020, the equipment at Hardwicke reported concentrations of 10.19µg/m^3 compared with 8.48µg/m^3 in 2021; a reduction of 1.71µg/m^3. At Haresfield, there was no data for PM_{10} in 2020 but the reported concentration in 2019 was 8.58µg/m^3 and in 2021 it was 7.74µg/m^3. Over the period of time that the equipment has been installed, there has been a general downward trend in PM_{10} at both locations.

It should be noted that the monitors have not been calibrated so the data can be viewed as indicative only.

3.2.3 Particulate Matter ($PM_{2.5}$)

Table A.5 in Appendix A presents the ratified and adjusted monitored $PM_{2.5}$ annual mean concentrations for the past five years.

As with the PM_{10} data, the $PM_{2.5}$ data was impacted by equipment failure but, it has been possible to undertake annualisation using data from Oxford St Ebbes and Bristol St Paul's locations. In 2020, the equipment at Hardwicke reported concentrations of 6.16µg/m^3 compared with 6.35µg/m^3 in 2021; an increase of 0.19µg/m^3. At Haresfield, there was no data for $PM_{2.5}$ in 2020 but the reported concentration in 2019 was 5.82µg/m^3 and in 2021 it was 4.93µg/m^3; a decrease of 0.89µg/m^3. Despite the slight increase at Hardwicke, there has been a general downward trend across the four years equipment has been installed. This overall trend is replicated in the reported $PM_{2.5}$ at Haresfield.

It should be noted that the monitors have not been calibrated so the data can be viewed as indicative only.

Appendix A: Monitoring Results

Table A.1 – Details of Automatic Monitoring Sites

Site ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA? Which AQMA?	Monitoring Technique	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Inlet Height (m)
Hardwicke	Hardwicke	Suburban	380203	212842	PM10, PM2.5	No	Particulate monitor	N/A	N/A	1.5
Haresfield	Haresfield	Rural	381324	210015	PM10, PM2.5	No	Particulate monitor	N/A	N/A	1.5

Table A.2 – Details of Non-Automatic Monitoring Sites

Diffusion Tube ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA? Which AQMA?	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Tube Co-located with a Continuous Analyser?	Tube Height (m)
24	Nailsworth - Bath Rd	Roadside	385023	199749	NO2	No	11.7	4.1	No	1.5
25	Painswick - High St Lights	Kerbside	386686	209781	NO2	No	3.2	0.5	No	2.0
26	Painswick - Traffic Camera	Kerbside	386740	209821	NO2	No	1.0	0.5	No	2.4
27	Stroud - Bowbridge	Roadside	385784	204367	NO2	No	1.9	1.3	No	2.4
28	Signal House, Dudbridge	Roadside	383652	204557	NO2	No	5.7	2.7	No	2.4
29	Stroud - 1, Signal House	Kerbside	383657	204549	NO2	No	0.9	0.7	No	1.5
30	Stroud - 2, Signal House	Roadside	383665	204553	NO2	No	0.0	3.9	No	2.4
31	Stroud - 3, Signal House	Roadside	383666	204552	NO2	No	0.0	2.9	No	2.4
32	Stroud - 4, Signal House	Roadside	383676	204544	NO2	No	0.0	8.0	No	2.4
33	Stroud - 5, Signal House	Roadside	383672	204538	NO2	No	0.0	2.5	No	5.0
34	Upton St Leonards - 50, Woodland Green	Kerbside	386301	215294	NO2	No	8.0	0.5	No	2.4
35	Trevose, Hardwicke	Roadside	380188	211951	NO2	No	21.7	4.7	No	2.4
36	30, Hunts Grove Drive, Hardwicke	Kerbside	381140	212269	NO2	No	23.7	0.1	No	2.4
37	The Lodge, Haresfield	Other	380232	210421	NO2	No	N/A	N/A	No	2.4
38	Rodborough - Bath Road	Roadside	384448	204934	NO2	No	4.2	1.9	No	2.4
40	London Road, Stroud	Roadside	383471	204988	NO2	No	5.1	3.7	No	2.4
41	Westward Road, Ebley	Roadside	382846	204722	NO2	No	1.4	2.2	No	2.4
42	Russell Street, Stroud	Kerbside	382845	204720	NO2	No	2.9	1.3	No	2.4
43	Stroud - Slad Brook	Roadside	385009	205178	NO2	No	7.6	0.4	No	2.4
45	Moreton Hill	Rural	381872	206279	NO2	No	N/A	N/A	No	2.4
46	Standish Lane	Rural	379342	208604	NO2	No	N/A	1.2	No	2.4
47	Little Haresfield	Rural	380374	209112	NO2	No	N/A	0.4	No	2.4
48	Haresfield Village Hall	Rural	381349	210005	NO2	No	7.0	0.2	No	2.4
49	Haresfield Beacon	Rural	382295	209217	NO2	No	N/A	0.2	No	2.4
50	Hiltmead Lane	Rural	380110	211214	NO2	No	N/A	N/A	No	2.4
51	Hardwicke Village Hall	Suburban	380217	212821	NO2	No	N/A	0.6	No	2.4

Diffusion Tube ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA? Which AQMA?	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Tube Co-located with a Continuous Analyser?	Tube Height (m)
52	Merrywalks Bus Station - Lamp Post 64	Roadside	384991	205352	NO2	No	N/A	2.5	No	2.7
53	Merrywalks South - Lamp Post 60	Roadside	384868	205260	NO2	No	N/A	1.5	No	2.8
54	Cainscross Rd - Junction With Gannicox Road	Kerbside	384389	205185	NO2	No	9.5	1.8	No	3.0
55	Locking Hill Surgery	Roadside	385145	205414	NO2	No	N/A	1.6	No	2.7
56	Beeches Green - Lamp Post 76	Roadside	384934	205516	NO2	No	N/A	1.9	No	2.9
57	A46 / Grove Cottages	Roadside	384669	206344	NO2	No	23.9	1.3	No	2.7
58	A46 Bath Road	Roadside	384717	205057	NO2	No	N/A	2.9	No	3.1
59	Station Forecourt	Kerbside	384973	205152	NO2	No	N/A	0.3	No	2.7
60	STC Offices - 58, London Road	Kerbside	385112	205085	NO2	No	N/A	0.3	No	2.7
61	Parliament Street/Cornhill/Nelson Street Mini Roundabout	Roadside	385282	205159	NO2	No	N/A	1.1	No	2.7
62	Box Road, Cam	Roadside	374895	201519	NO2	No	4.1	1.2	No	2.4
63	Silver Street, Dursley	Roadside	375642	198095	NO2	No	1.5	1.2	No	2.4
64	Old Town, Wotton	Kerbside	375854	193389	NO2	No	2.3	0.3	No	2.4
65	Knotgrass Way, Hardwicke	Roadside	381378	211760	NO2	No	9.5	0.4	No	2.4

Notes:

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

(2) N/A if not applicable.

Table A.3 – Annual Mean 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
24	385023	199749	Roadside	100	100.0	22.1	25.5	20.4	17.5	18.2
25	386686	209781	Kerbside	100	100.0	35.5	37.3	31.8	25.9	26.6
26	386740	209821	Kerbside	100	100.0	28.6	32.2	25.5	23.6	24.0
27	385784	204367	Roadside	100	100.0	38.6	**42.2**	34.6	30.9	33.4
28	383652	204557	Roadside	91.6	92.6	31.0	**42.5**	31.4	25.8	28.9
29	383657	204549	Kerbside	100	100.0	39.0	**43.1**	35.4	29.8	34.7
30	383665	204553	Roadside	100	100.0	34.0	38.8	31.8	29.0	31.7
31	383666	204552	Roadside	100	100.0	36.0	**40.3**	33.1	28.6	30.7
32	383676	204544	Roadside	100	100.0	25.5	27.7	22.2	19.1	22.0
33	383672	204538	Roadside	100	100.0	24.8	29.0	23.5	20.0	22.5
34	386301	215294	Kerbside	100	100.0	21.4	22.5	18.7	16.7	16.6
35	380188	211951	Roadside	100	100.0	30.2	32.8	28.0	25.9	25.2
36	381140	212269	Kerbside	100	100.0				11.3	11.8
37	380232	210421	Other	100	100.0	20.0	21.4	19.2	15.3	17.4
38	384448	204934	Roadside	100	100.0				25.5	27.6
40	383471	204988	Roadside	91.6	90.1				25.4	26.1
41	382846	204722	Roadside	83.3	84.4		27.1	23.3	21.4	21.1
42	382845	204720	Kerbside	100	100.0				17.4	18.8
43	385009	205178	Roadside	100	100.0		25.2	30.9	29.0	29.0
45	381872	206279	Rural	100	100.0			7.9	7.1	7.9
46	379342	208604	Rural	100	100.0			10.9	9.1	10.3
47	380374	209112	Rural	100	100.0			10.9	9.3	10.4
48	381349	210005	Rural	83.3	84.4			10.3	8.5	9.8
49	382295	209217	Rural	100	100.0			9.0	7.8	8.2
50	380110	211214	Rural	100	100.0			18.5	13.8	15.1
51	380217	212821	Suburban	100	100.0			13.1	11.5	12.4
52	384991	205352	Roadside	83.3	84.4				24.0	25.6
53	384868	205260	Roadside	83.3	84.4				29.7	30.3

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
54	384389	205185	Kerbside	83.3	84.4				20.1	21.4
55	385145	205414	Roadside	58.3	57.3				20.9	19.0
56	384934	205516	Roadside	83.3	84.4				29.0	31.6
57	384669	206344	Roadside	91.6	92.3				17.2	21.3
58	384717	205057	Roadside	83.3	84.4				15.4	17.3
59	384973	205152	Kerbside	83.3	84.4				13.8	14.1
60	385112	205085	Kerbside	83.3	84.4				19.3	22.2
61	385282	205159	Roadside	83.3	84.4				14.3	14.6
62	374895	201519	Roadside	100	100.0					15.7
63	375642	198095	Roadside	100	100.0					25.5
64	375854	193389	Kerbside	100	100.0					14.0
65	381378	211760	Roadside	100	100.0					16.7

☒ **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

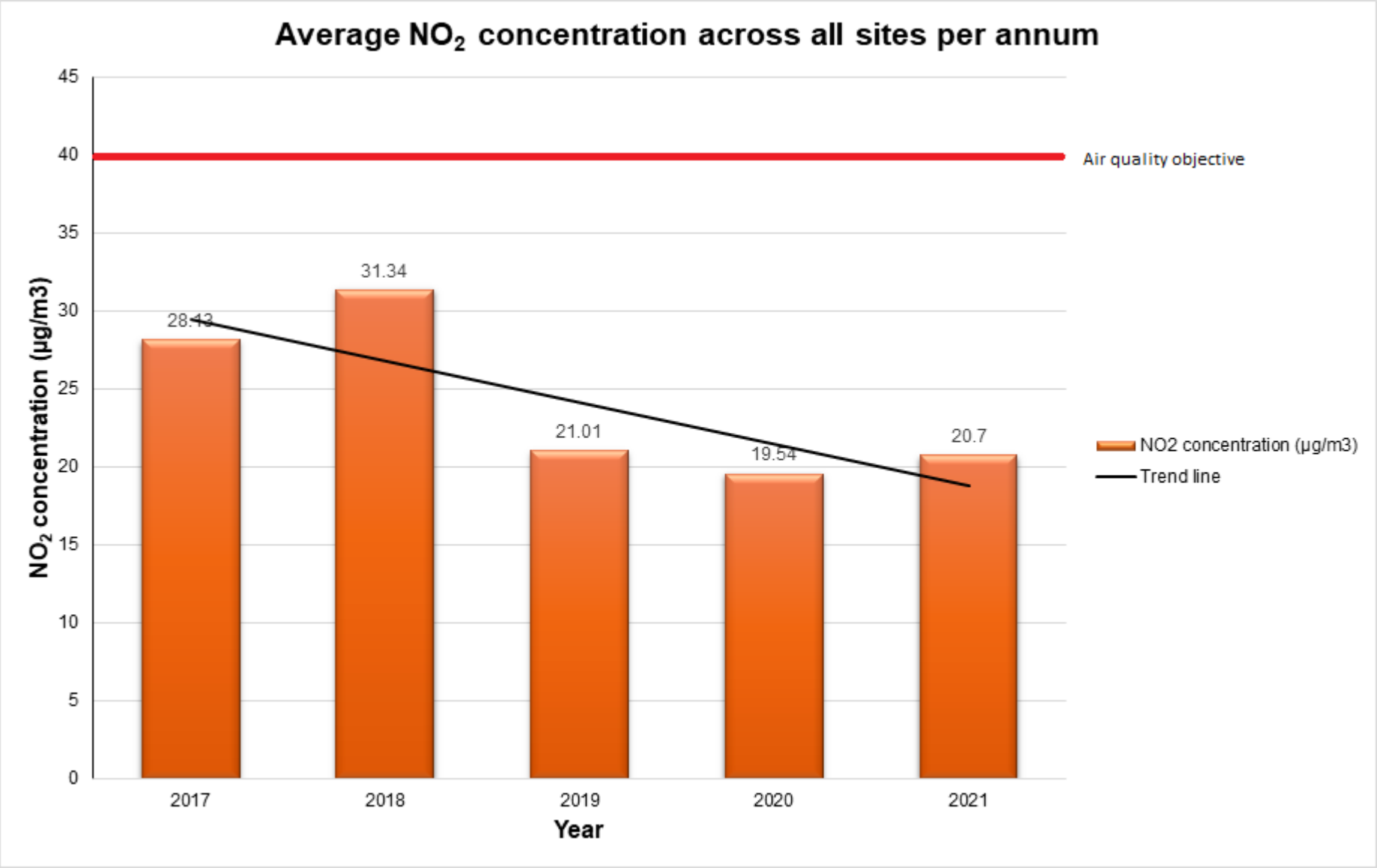


Table A.4 – Annual Mean PM_{10} Monitoring Results (µg/m^3)

Site 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
Hardwicke	380203	212842	Suburban	100	53		**9.85**	**10.1**	**10.19**	**8.48**
Haresfield	381324	210015	Rural	100	73		9.9	8.58		7.74

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

Notes:

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

Exceedances of the PM_{10} annual mean objective of 40µg/m^3 are shown in **bold**.

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.

(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.2 – Trends in Annual Mean PM_{10} Concentrations

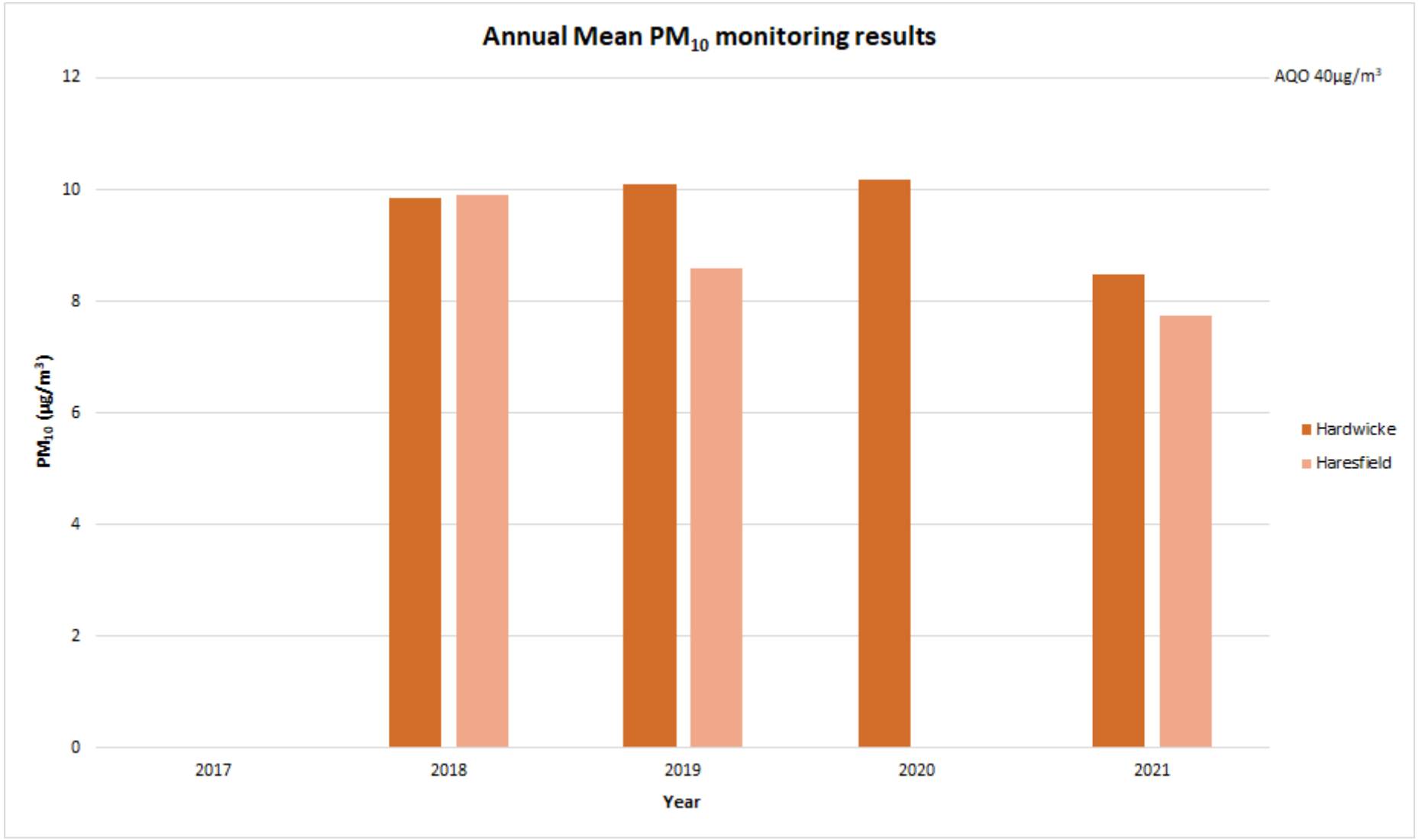


Table A.5 – Annual Mean $PM_{2.5}$ Monitoring Results ($\mu g/m^3$)

Site 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
Hardwicke	380203	212842	Suburban	100	53		7.14	6.4	6.16	6.35
Haresfield	381324	210015	Rural	100	73		7.16	5.82		4.93

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

Notes:

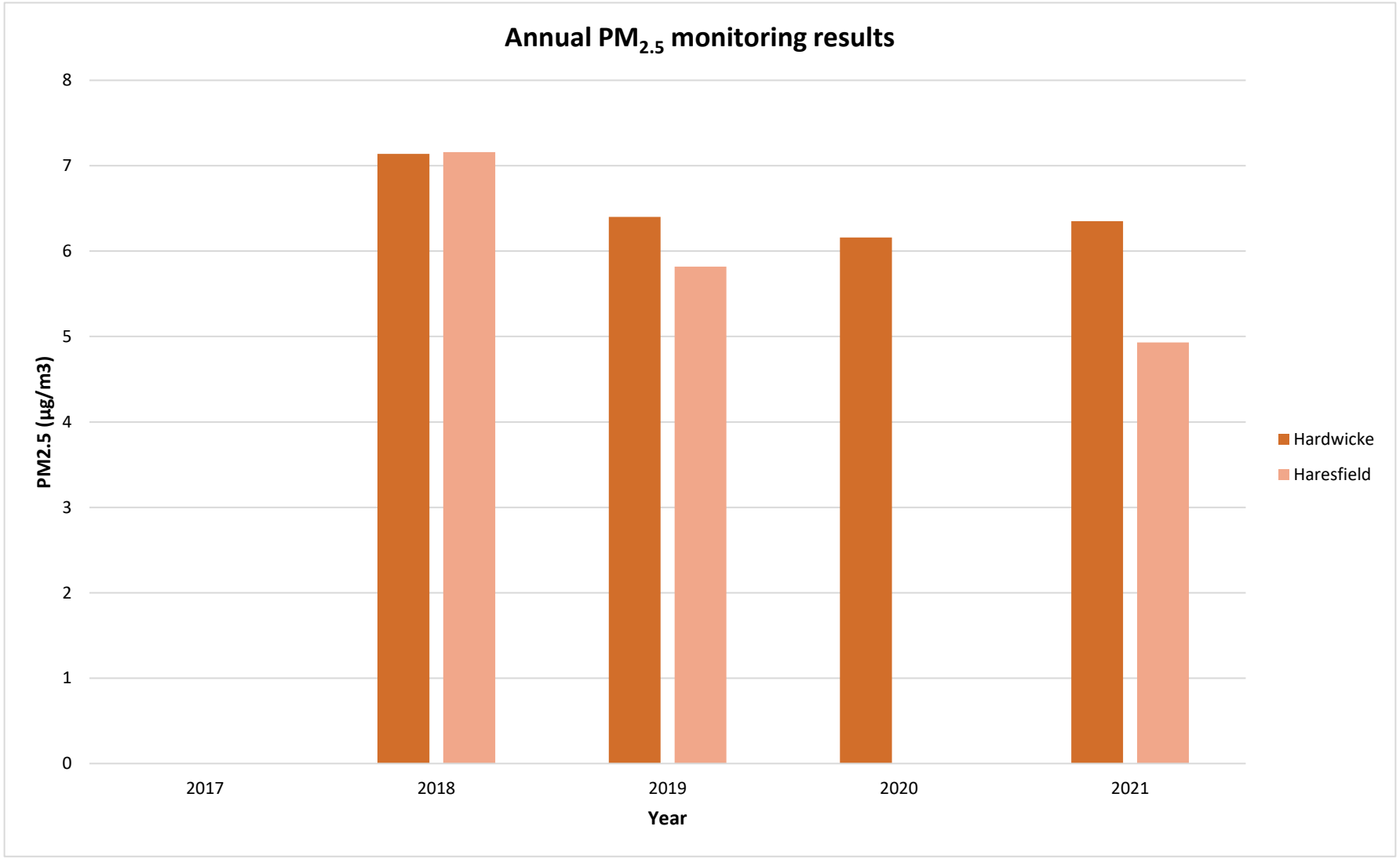
The annual mean concentrations are presented as $\mu g/m^3$.

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.

(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.3 – Trends in Annual Mean $PM_{2.5}$ Concentrations



Appendix B: Full Monthly Diffusion Tube Results for 2021

Table B.1 – NO_2 2021 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 (0.86)	Annual Mean: Distance Corrected to Nearest Exposure	Comment
24	385023	199749	21.5	21.4	21.0	19.8	19.2	17.3	18.4	19.2	19.6	22.1	26.9	27.2	21.1	18.2		
25	386686	209781	28.4	21.6	29.0	33.2	28.6	32.1	30.6	27.8	21.6	34.4	45.9	37.5	30.9	26.6		
26	386740	209821	27.9	21.8	25.8	29.2	26.8	26.4	24.8	25.3	29.3	27.9	38.4	31.7	27.9	24.0		
27	385784	204367	39.5	35.8	40.5	35.3	39.4	38.9	37.8	35.2	43.1	38.0	41.3	40.9	38.8	33.4		
28	383652	204557	37.3	36.2	35.1	44.3	26.5	31.2	30.4	27.3	37.8	26.1		37.6	33.6	28.9		
29	383657	204549	37.2	40.1	38.0	46.9	40.1	35.6	42.1	39.3	42.5	36.6	43.3	42.8	40.4	34.7		
30	383665	204553	37.2	33.3	39.4	38.8	42.3	38.7	40.7	31.0	33.4	34.1	38.2	35.3	36.9	31.7		
31	383666	204552	43.8	34.2	35.4	35.6	38.9	35.8	36.7	31.3	32.2	32.3	38.4	33.8	35.7	30.7		
32	383676	204544	27.4	21.9	24.9	27.5	24.1	24.9	25.8	23.3	23.8	24.8	31.8	26.6	25.6	22.0		
33	383672	204538	28.3	24.1	28.5	28.0	24.2	24.5	25.9	25.6	28.2	14.7	34.1	27.9	26.2	22.5		
34	386301	215294	23.3	17.9	19.4	19.7	12.4	17.1	16.9	20.7	17.0	18.2	27.1	21.8	19.3	16.6		
35	380188	211951	34.4	25.2	33.4	25.5	27.4	27.2	29.2	26.9	29.5	30.5	34.5	28.3	29.3	25.2		
36	381140	212269	18.6	15.6	15.0	13.0	9.2	8.3	10.2	11.7	11.0	14.3	19.9	17.5	13.7	11.8		
37	380232	210421	22.6	18.8	20.5	19.9	17.5	16.5	17.6	19.0	20.9	18.9	26.0	24.5	20.2	17.4		
38	384448	204934	39.6	29.3	33.8	29.9	27.0	25.9	29.7	30.0	34.3	30.8	39.1	36.2	32.1	27.6		
40	383471	204988	38.3	30.0	31.4	27.8	28.7	24.7	29.2	25.9	31.4		35.7	31.3	30.4	26.1		
41	382846	204722		20.4	23.2	22.9		20.7	22.4	19.1	25.6	25.1	33.2	32.7	24.5	21.1		
42	382845	204720	24.1	22.0	23.3	17.7	19.3	17.5	19.7	18.7	22.9	22.7	29.9	24.0	21.8	18.8		
43	385009	205178	34.3	27.2	35.0	29.6	32.7	31.2	30.8	32.5	35.2	39.3	37.7	39.6	33.8	29.0		
45	381872	206279	13.3	9.2	8.9	7.1	5.3	6.4	7.2	7.1	7.2	8.8	14.0	16.3	9.2	7.9		
46	379342	208604	15.9	12.9	12.4	11.5	7.2	9.0	9.0	10.4	10.2	11.9	16.5	16.6	12.0	10.3		
47	380374	209112	14.8	11.6	11.1	10.6	6.9	9.1	10.3	11.0	11.2	13.6	17.1	17.5	12.1	10.4		
48	381349	210005	13.9	10.8	10.7	10.2		8.3	7.9	10.5		11.2	15.9	14.8	11.4	9.8		
49	382295	209217	12.8	9.9	9.0	8.5	7.3	8.6	7.9	8.5	8.5	9.0	11.7	12.4	9.5	8.2		
50	380110	211214	20.1	21.9	17.8	19.7	15.0	11.6	14.1	14.8	18.3	17.8	18.7	20.5	17.5	15.1		
51	380217	212821	19.9	19.1	15.0	13.5	12.0	9.6	9.9	11.4	12.9	14.2	17.7	18.0	14.4	12.4		
52	384991	205352			24.6	25.3	30.8	19.0	26.0	37.4	33.0	37.2	31.0	33.3	29.8	25.6		
53	384868	205260			41.0	36.4	36.7	23.8	32.4	25.8	35.5	40.1	40.7	40.2	35.3	30.3		
54	384389	205185			22.4	26.8	23.0	18.4	22.5	22.3	26.6	26.7	32.2	28.2	24.9	21.4		
55	385145	205414			24.3	18.1	19.8	20.0			22.7	26.3	27.4		22.7	19.0		
56	384934	205516			33.5	34.2	42.7	21.1	41.0	35.4	41.4	42.6	38.6	37.0	36.8	31.6		
57	384669	206344		42.8	19.6	19.4	22.1	38.7	20.4	19.9	10.8	26.3	27.6	24.8	24.8	21.3		
58	384717	205057			20.4	21.7	17.5	17.0	18.3	16.6	20.8	22.8	23.6	21.9	20.1	17.3		
59	384973	205152			17.7	15.4	13.7	12.7	15.2	15.2	10.6	18.2	23.9	20.8	16.3	14.1		
60	385112	205085			22.6	22.1	26.0	20.3	24.8	20.6	26.6	33.6	34.1	27.0	25.8	22.2		

☒ **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.**

☒ **Stroud 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 Stroud District During 2021

Stroud District Council has not identified any such new sources relating to air quality within the reporting year of 2022.

Additional Air Quality Works Undertaken by Stroud District Council During 2021

Stroud District Council has not completed any additional works within the reporting year of 2022.

QA/QC of Diffusion Tube Monitoring

For monitoring air quality in its district, Stroud District Council uses diffusion tubes that have been prepared in 20% TEA in water by Somerset Scientific Services (SSS). SSS participates in an external laboratory scheme called the Air & Stack Emissions Scheme in order to obtain laboratory accreditation to undertake the analysis of diffusion tubes. This is a proficiency testing scheme operated through the Laboratory of the Government Chemist (LGC). SSS is required to undertake four rounds of testing per year which must be confirmed as accurate before SSS can be ratified to undertake analysis. SSS is included in the annual field inter-comparison exercise from which the bias adjustment factor is obtained.

Analysis of diffusion tubes by SSS is undertaken using the colorimetry method. This method requires a solution to be added to the diffusion tubes so that the nitrite collected on the grids within the tubes is dissolved. The solution reacts with nitrite collected in the tube to produce a coloured compound. The intensity of the colour produced is then measured using spectrophotometry and is calibrated against a set of standard nitrite solutions to identify the concentration of nitrite present in the sample. The concentration is

then used to calculate the mass of nitrite collected by the tube from which an average ambient concentration of NO_2 is calculated for the exposure period.

Diffusion tube monitoring has been undertaken in accordance with the 2021 Diffusion Tube Monitoring Calendar.

Diffusion Tube Annualisation

Only one non-automatic monitoring location obtained less than 75% data capture in 2021; diffusion tube location 55, Locking Hill surgery. In order to undertake the necessary calculation, data was required from a minimum of two, ideally four, of the nearest continuous monitoring locations. In this case, the following three nearby continuous monitoring locations were used to undertake the calculation: Swindon Walcot, Bristol St Paul's and Oxford St Ebbes. An annualisation factor was calculated for each continuous location, with the three factors then averaged, and the annualised NO_2 mean concentration was then calculated using the averaged annualisation factor and the raw data mean from Locking Hill surgery.

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.

Stroud District Council has applied a national bias adjustment factor of 0.86 to the 2021 monitoring data. A summary of bias adjustment factors used by Stroud District Council over the past five years is presented in Table C.1.

Stroud District Council does not operate any automatic NO_2 monitoring locations, so it is unable to undertake its own co-location studies to determine a local adjustment factor. Therefore, it was necessary to use a national bias adjustment factor. The factor used by Stroud District Council to correct the raw diffusion tube data was 0.86 from spreadsheet version 09/22, as per Table C.1. This factor was developed by the SSS laboratory utilising 11 studies to produce an overall correction factor for diffusion tubes.

Table C.1 – Bias Adjustment Factor

Monitoring Year	Local or National	If National, Version of National Spreadsheet	Adjustment Factor
2021	National	09/22	0.86
2020	National	09/21	0.85
2019	National	03/20	0.78
2018	National	03/19	0.89
2017	National	06/18	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.

No diffusion tube NO_2 monitoring locations within Stroud District required distance correction during 2021.

QA/QC of Automatic Monitoring

As a result of concern about emissions from an energy from waste plant, which commenced operations in 2019, a Community Liaison Group (CLG) was set up on behalf of residents in the local area. The CLG obtained two particulate matter monitors, which were located in areas of potential exposure and Stroud District Council provides support by acting as the local site operator. Each month Stroud District Council downloads the data and changes filters when necessary. The data accrued is not available live but historic data can be obtained at: https://clgglos.wixsite.com/data.

The equipment is supposed to be serviced and calibrated on an annual basis. Unfortunately, the Covid pandemic interrupted this and the equipment has not been serviced and calibrated. As the equipment has not been calibrated, the data captured from it cannot be ratified and should be viewed as indicative only.

PM_{10} and $PM_{2.5}$ Monitoring Adjustment

The type of PM_{10}/$PM_{2.5}$ monitors utilised within Stroud District do not require the application of a correction factor.

Automatic Monitoring Annualisation

Both automatic monitoring locations within Stroud District required annualisation. In order to complete an annualisation calculation, data from nearby automatic sites was needed. Only two continuous monitoring locations for particulates were available; Bristol St Paul's and Oxford St Ebbes. To complete the annualisation, the annual mean was obtained for each surrogate location along with a period mean covering the same period of time that the monitors were operational at Hardwicke and Haresfield. A ratio of those two means was obtained for each surrogate location, and they were then averaged. The averaged ratio was multiplied by the annualised mean data obtained over the period of operation, at both Hardwicke and Haresfield, to produce the annualised mean.

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 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.

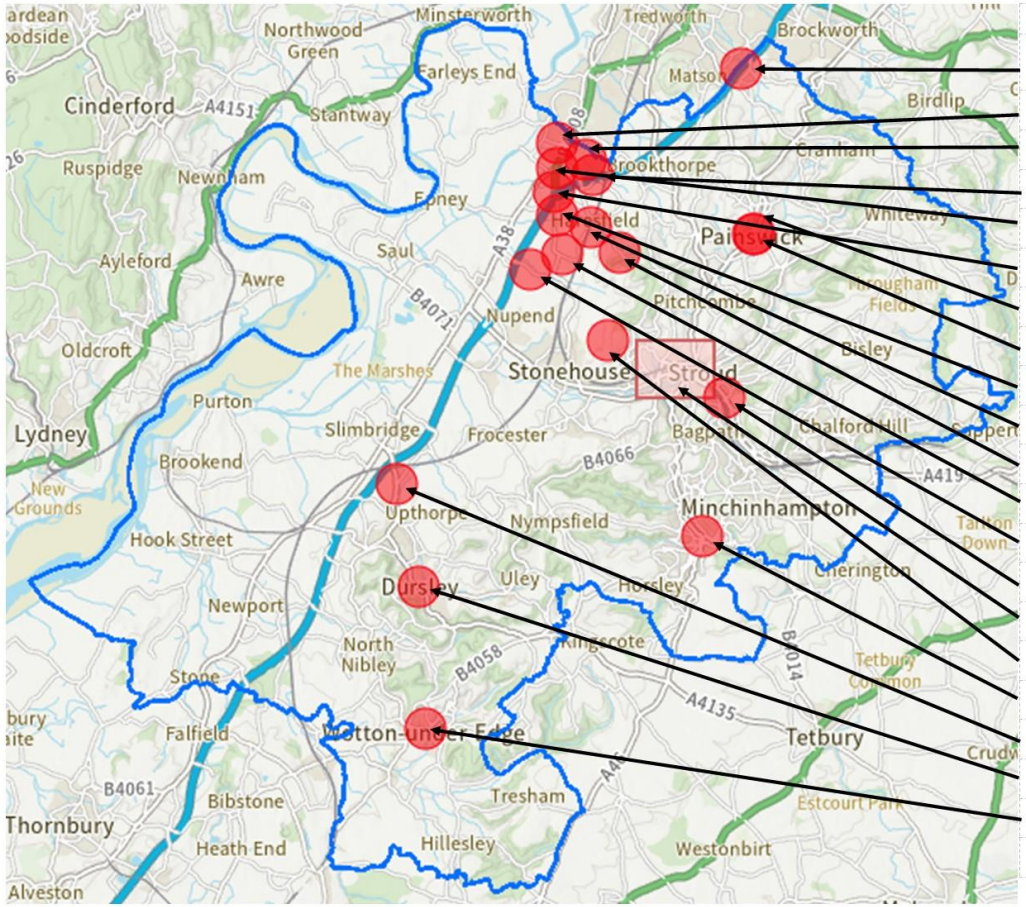
No automatic NO_2 monitoring locations within Stroud District required distance correction during 2021.

Table C.2 – Annualisation Summary (concentrations presented in µg/m^3)

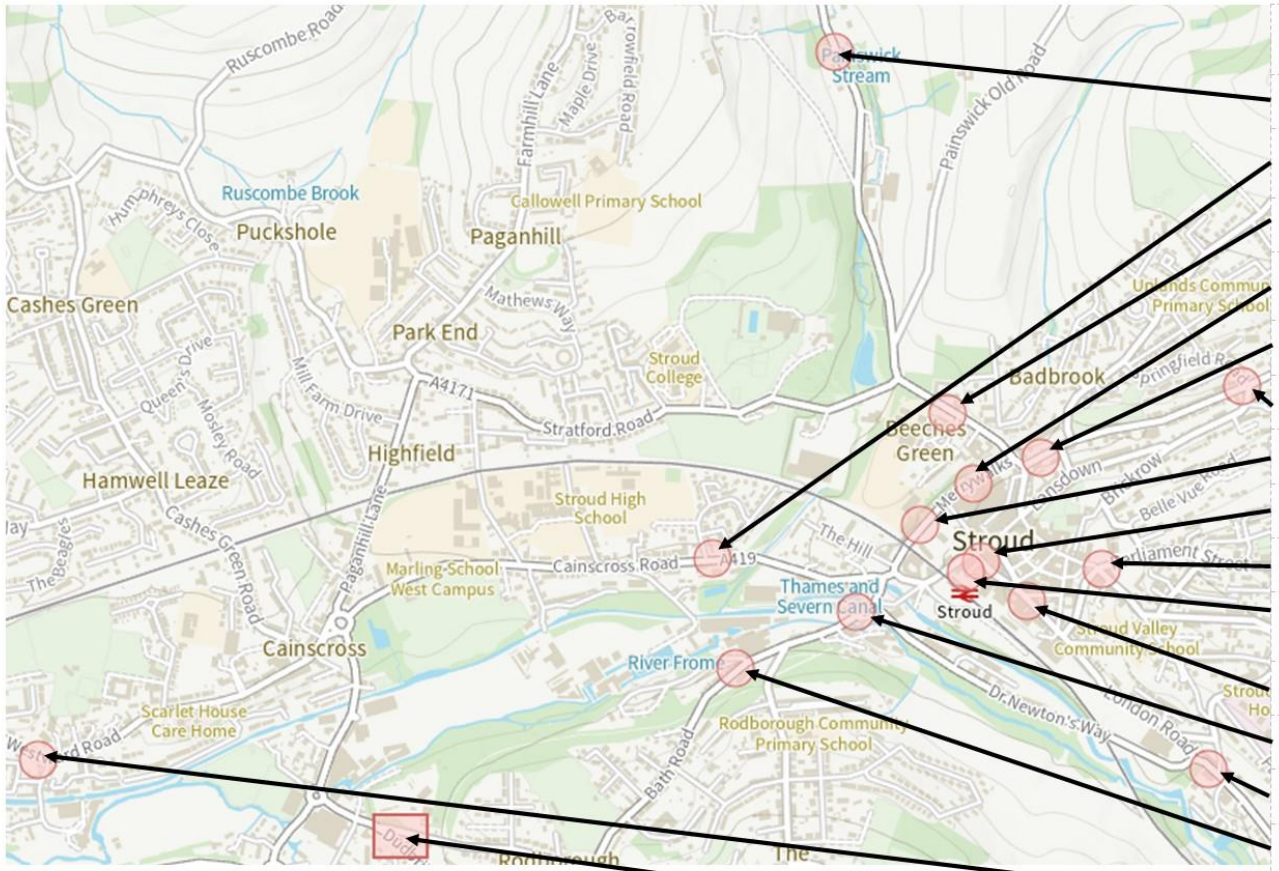
Site ID	Annualisation Factor Swindon Walcot	Annualisation Factor Bristol St Paul's	Annualisation Factor Oxford St Ebbes	Annualisation Factor Site 4 Name	Average Annualisation Factor	Raw Data Annual Mean	Annualised Annual Mean	Comments
55	0.9617	0.9925	0.9661		0.9734	22.7	22.1	
Hardwicke PM_{10}		0.94	0.87		0.905	9.37	8.48	
Haresfield PM_{10}		0.95	0.98		0.965	8.02	7.74	
Hardwicke $PM_{2.5}$		1.05	0.99		1.02	6.23	6.35	
Haresfield $PM_{2.5}$		0.96	1.17		1.065	4.93	5.25	

Appendix D: Maps of Monitoring Locations and AQMAs

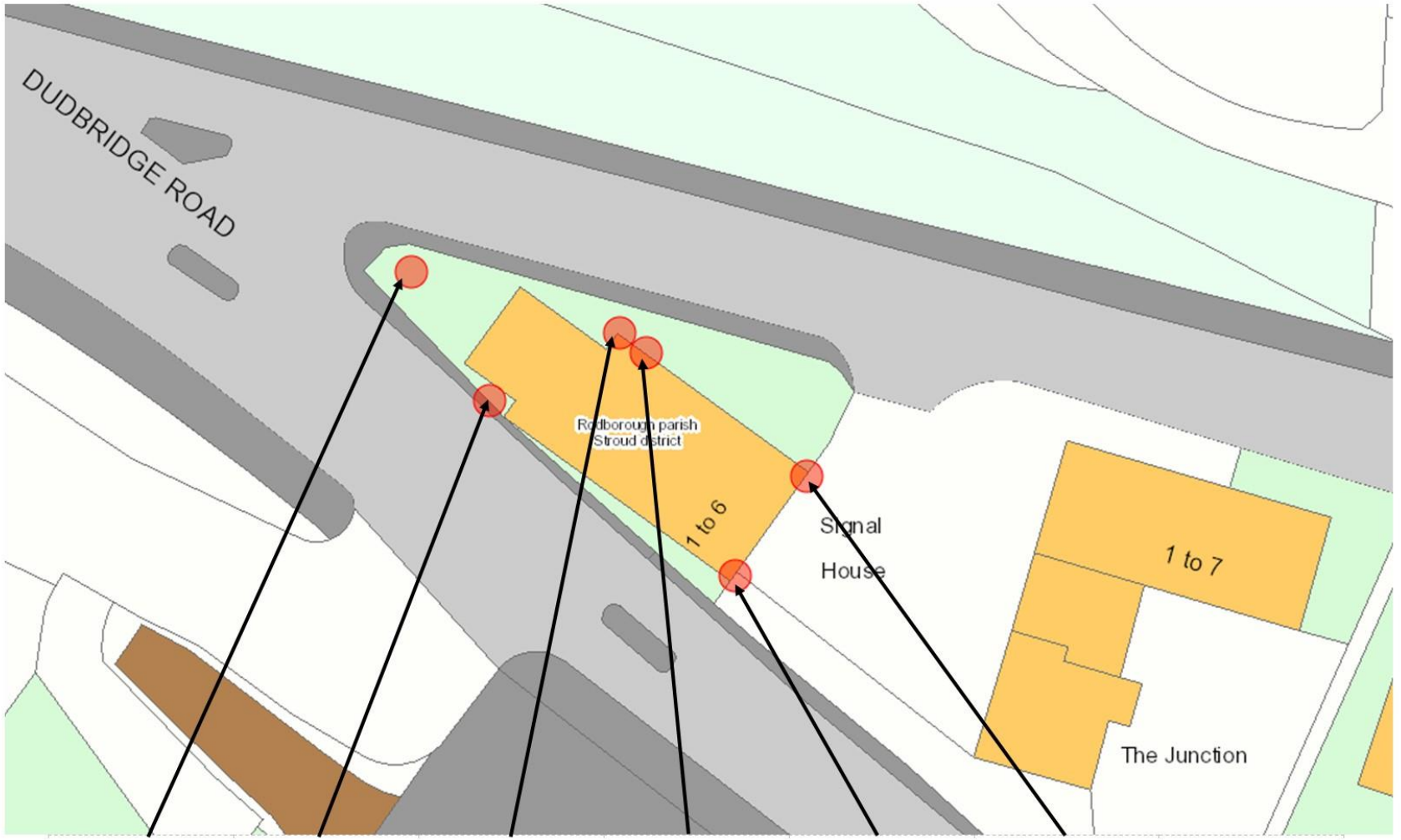
Figure D.1 – Map of Non-Automatic Monitoring Site



ID	Name
34	Upton St Leonards, 50 Woodland Green
51	Hardwicke village hall
36	30, Hunts Grove Drive, Hardwicke
65	Knotgrass Way, Hardwicke
35	Trevose, Hardwicke
50	Hiltmead Lane
25	Painswick, traffic camera
26	Painswick, High Street lights
37	The Lodge, Haresfield
48	Haresfield village hall
49	Haresfield Beacon
47	Little Haresfield
46	Standish Lane
27	Stroud, Bowbridge
	Stroud town centre – see map 2
45	Moreton Hill
24	Bath Road, Nailsworth
62	Box Road, Cam
63	Silver Street, Dursley
64	Old Town, Wotton
	Map 1



ID	Name
57	A46/Grove Cottages
54	Cainscross Road – Junction with Gannicox Road
56	Beeches Green, Lamp post 76
52	Merrywalks bus station, lamp post 64
55	Locking Hill surgery
43	Slad Brook
53	Merrywalks south, lamp post 60
42	Russell street
61	Parliament Street/Cornhill/ Nelson Street
59	Station forecourt
60	STC Offices 58, London Road
58	A46 Bath Road
40	London Road
38	Bath Road, Rodborough
41	Westward Road, Ebley
	Dudbridge – see map 3
	Map 2


DUDBRIDGE ROAD
Rodborough parish
Stroud district
1 to 6
Signal
House
1 to 7
The Junction
Signal House, Dud-bridge
1, Signal House, Dudbridge
2, Signal House, Dudbridge
3, Signal House Dudbridge
5, Signal House, Dudbridge
4, Signal House, Dudbridge
Map 3

Appendix E: Summary of Air Quality Objectives in England

Table E.1 – Air Quality Objectives in England[7]

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.