2016 Air Quality Annual Status Report (ASR)

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

October 2016

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Executive Summary: Air Quality in Our Area

The primary influence on Air Quality within Stroud District remains road traffic with the primary pollutant of concern being Nitrogen Dioxide. Air quality across the district generally remains very good with measured levels of Nitrogen Dioxide generally well below national limits. The overall trend is for measured levels to be following a general downward trend indicating that Air Quality is getting better across the district.

There are a few areas which have shown a slight increase in levels however, these increases are marginal and well within the accepted accuracy of measurements made with diffusion tubes.

The general improvement in air quality is as predicted nationally and due to the tighter emission standards of modern engines.

Two sites were at or slightly above annual limits for the 2014 monitoring period. For the 2015 monitoring period reported on in this document, these levels have now fallen below the national emission limits. There still remains concern that due to the siting of these diffusion tubes they may be artificially high. One Tube is located on the corner of a building which can restrict air movement while another tube is sited near the outlet of a balanced flue which can also result in artificially higher readings. For the 2016 period these tubes will be moved slightly in order to minimise the influence of the corners of buildings and balanced flues. This will give a better indication of relevant exposure and will be reported on in the 2016 report.

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 and older people, and those with heart and lung conditions. There is also often a strong correlation with equalities issues, because areas with poor air quality are also often the less affluent areas[1,2].

[1] Environmental equity, air quality, socioeconomic status and respiratory health, 2010
[2] Air quality and social deprivation in the UK: an environmental inequalities analysis, 2006

The annual health cost to society of the impacts of particulate matter alone in the UK is estimated to be around £16 billion[3].

The main pollutant of concern within Stroud District is Nitrogen Dioxide from road traffic. Levels of Nitrogen Dioxide have been steadily falling over the years. There are currently no Air Quality Management Areas within the District.

There are a number of Diffusion Tubes located across the District, measuring Nitrogen Dioxide. These are collected and sent off for analysis on a monthly basis. Two of the tubes located at Dudbridge have shown readings on or slightly above the annual average. These tubes however have shown a general downward trend over the last few years.

Actions to Improve Air Quality

Gloucestershire County Council is responsible for strategies relating to traffic management across the County. Further details of these strategies can be found at http://www.gloucestershire.gov.uk/ltp3.

The Overarching Transport Strategy is supported through the following policy documents:

Bus
Cycle
Freight
Highways
Rail
Think Travel

Local Priorities and Challenges

Two diffusion tubes located at Dudbridge have for the past few years been at or slightly above the annual mean nitrogen dioxide levels. Levels at these sites have shown a downward trend over the last few years. In 2015 a review of the location of these tubes was carried out to confirm they were representative of relevant exposure. This review indicated that the diffusion tubes were located on the corner of a building and near the outlet from a boiler. Given the potential for the location of these sites to influence the results from the tubes they were relocated in January 2016 to areas where they will give more representative data.

[3] Defra. Abatement cost guidance for valuing changes in air quality, May 2013

How to Get Involved

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.

Any queries about Air Quality should be directed to the Environmental Protection Team within Stroud District Council.

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1 Local Air Quality Management

This report provides an overview of air quality in Stroud District during 2015. 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 can be found in Table E.1 in Appendix E.

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 must prepare an Air Quality Action Plan (AQAP) within 12-18 months setting out measures it intends to put in place in pursuit of the objectives.

Stroud District Council currently does not have any AQMAs.

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

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

- Relocation of .Diffusion tubes 25 C and 25 D located at Dudbridge to locations where the readings will not be influenced by the corners of buildings or boiler outlets
- Introduction of additional Nitrogen Dioxide diffusion tubes across the district to provide background levels of Nitrogen Dioxide prior to the commissioning of the Javelin Park Incinerator, and ongoing levels following commissioning.

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 $PM_{2.5}$:

- Work with Gloucester County Council to identify areas within the Local Transport Plan that will contribute towards a reduction in $PM_{2.5}$
- Review Stroud Districts Councils Health and Well being plan with a view to identifying and incorporating measures which will reduce $PM_{2.5}$

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

3.1 Summary of Monitoring Undertaken

3.1.1 Automatic Monitoring Sites

Stroud District Council has not carried out any Automatic monitoring during 2015.

3.1.2 Non-Automatic Monitoring Sites

Stroud District Council undertook non- automatic (passive) monitoring of NO_2 at 25 sites during 2015.Table A.1 in Appendix A shows the details of the sites.

Maps showing the location of the monitoring sites are provided in Appendix D. Further details on Quality Assurance/Quality Control (QA/QC) and bias adjustment for the diffusion tubes are included in Appendix C.

3.2 Individual Pollutants

The air quality monitoring results presented in this section are, where relevant, adjusted for "annualisation" and bias. Further details on adjustments are provided in Appendix C.

3.2.1 Nitrogen Dioxide (NO_2)

Table A.2 - Results of Nitrogen Dioxide Diffusion Tubes in 2015

Site ID	Location	Site Type	Within AQMA?	Triplicate or Co-located Tube	Data Capture 2015 Number of Months	Data with less than 9 months has been annualised (Y/N)	Confirm if data has been distance corrected (Y/N)	Annual mean concentration (Bias Adjustment factor = 0.87) 2015 (µg/m^3)
3	Brooktho rpe – North View	Roadsi de	N	N	12	N/A	N	25.9
4b	Cainscro ss – 2 The Rosaries	Roadsi de	N	N	12	N/A	Y	27.5
4a	Cainscro ss – 22 Westwar d Road	Kerbsi de	N	N	12	N/A	N	25.7
10a	Hardwick e – Westland Road	Roadsi de	N	N	11	N/A	N	18.1
15	Nailswort h – Bath Road	Kerbsi de	N	N	12	N/A	N	24.9

Site ID	Location	Site Type	Within AQMA?	Triplicate or Co-located Tube	Data Capture 2015 Number of Months	Data with less than 9 months has been annualised (Y/N)	Confirm if data has been distance corrected (Y/N)	Annual mean concentration (Bias Adjustment factor = 0.87) 2015 ($\mu g/m^3$)
16a	Painswick – St Marys House	Kerbside	N	N	10	N/A	N	24.2
16	Painswick – High Street lights	Kerbside	N	N	12	N/A	Y	29.5
16b	Painswick – Traffic Camera	Kerbside	N	N	12	N/A	Y	31.3
16c	Painswick - Melrose	Roadside	N	N	12	N/A	N	23.8
20a	Stonehouse – 10 Bristol Road	Kerbside	N	N	12	N/A	N	20.9
21a	Stroud - Bowbridge	Roadside	N	N	11	N/A	Y	37.6
25a	Stroud – Signal House, Dudbridge Hill	Roadside	N	N	11	N**	Y	36.2
25c	Stroud – 1 Signal House, Dudbridge Hill	Roadside	N	N	11	Y	N	39.5
25d	Stroud – 2 Signal House, Dudbridge Hill	Roadside	N	N	10	Y	N	38.2

Site ID	Location	Site Type	Within AQMA?	Triplicate or Co-located Tube	Data Capture 2015 Number of Months	Data with less than 9 months has been annualised (Y/N)	Confirm if data has been distance corrected (Y/N)	Annual mean concentration (Bias Adjustment factor = 0.87) 2015 ($\mu g/m^3$)
25e	Stroud – 3 Signal House, Dudbridge Hill	Roadside	N	N	12	Y	N	37.9
25f	Stroud – 4 Signal House, Dudbridge Hill	Roadside	N	N	12	N	N	25.0
25g	Stroud – 5 Signal House, Dudbridge Hill	Roadside	N	N	10	N	N	26.7
25h	Stroud – 6 The Junction, Dudbridge Hill	Roadside	N	N	10	N	N	25.7
25i	Stroud – 7 The Junction, Dudbridge Hill	Roadside	N	N	12	N	N	20.5
25j***	Stroud – 8 The Junction, Dudbridge Hill	Roadside	N	N	8	Y	N	22.5
25k	Stroud – 9 The Junction, Dudbridge Hill	Roadside	N	N	12	N	N	27.3
29	Upton St Leonards – 96 The Ash Path	Kerbside	N	N	11	N	N	22.8

Site ID	Location	Site Type	Within AQMA?	Triplicate or Co-located Tube	Data Capture 2015 Number of Months	Data with less than 9 months has been annualised (Y/N)	Confirm if data has been distance corrected (Y/N)	Annual mean concentration (Bias Adjustment factor = 0.87) 2015 (µg/m^3)
30	Upton St Leonards – 26 Woodland Green	Roadside	N	N	12	N/A	N	22.3
31	Upton St Leonards –50 Woodland Green	Kerbside	N	N	12	N/A	N	24.6
32	Upton St Leonards – 10 Ash Grove	Kerbside	N	N	12	N/A	N	17.8

Table A.1 in Appendix A compares the ratified and adjusted monitored NO_2 annual mean concentrations for the past 5 years with the air quality objective of 40µg/m^3.

There are no results which exceed the national annual mean NO_2 limit.

For diffusion tubes, the full 2015 dataset of monthly mean values is provided in Appendix B.

Appendix A: Monitoring Results

Table A.1 – Details of Non-Automatic Monitoring Sites

Site I.D	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In AQMA?	Is monitoring co-located with a Continuous Analyser (Y/N)	Relevant Exposure? *(Y/N with distance (m) to relevant exposure)*	Distance to kerb of nearest road *(N/A if not applicable)*	Does this location represent worst-case exposure?
3	Brookthorpe – North View	Roadside	383410	212570	NO_2	N	N	Y(19.8m)	1m	Y
4b	Cainscross – 2 The Rosaries	Roadside	385308	205044	NO_2	N	N	Y(4.0m)	2.0m	Y
4a	Cainscross – 22 Westward Road	Kerbside	308471	204988	NO_2	N	N	Y(0.0m)	4.4m	Y
10a	Hardwicke – Westland Road	Roadside	380124	213183	NO_2	N	N	Y(4.6m)	1.5m	Y
15	Nailsworth – Bath Road	Kerbside	385016	199727	NO_2	N	N	N	3.4m	Y
16a	Painswick – St Marys House	Kerbside	386492	209473	NO_2	N	N	Y(3.3m)	2.0m	Y
16	Painswick – High Street Lights	Kerbside	386677	209768	NO_2	N	N	Y(3.2m)	0.5m	Y
16b	Painswick – Traffic Camera	Kerbside	386700	209794	NO_2	N	N	Y(0.5m)	1.0m	Y
16c	Painswick – Melrose	Roadside	386810	209992	NO_2	N	N	Y(2.8m)	4.8m	Y
20a	Stonehouse – 10 Bristol Road	Kerbside	308295	204998	NO_2	N	N	Y(2.3m)	1.0m	Y
21a	Stroud – British Oak Bowbridge	Roadside	385785	204370	NO_2	N	N	Y(1m)	2.0m	Y
25a	Stroud – Signal House, Dudbridge Hill	Roadside	383652	204557	NO_2	N	N	Y(5.0m)	2.7m	N
25c	Stroud – 1 Signal House, Dudbridge Hill	Roadside	383655	204551	NO_2	N	N	Y(1.6m)	1.4m	Y

Site I.D	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In AQMA?	Is monitoring co-located with a Continuous Analyser (Y/N)	Relevant Exposure? *(Y/N with distance (m) to relevant exposure)*	Distance to kerb of nearest road *(N/A if not applicable)*	Does this location represent worst-case exposure?
25d	Stroud – 2 Signal House, Dudbridge Hill	Roadside	383659	204556	NO_2	N	N	Y(2.3m)	1.7m	Y
25e	Stroud – 3 Signal House, Dudbridge Hill	Roadside	383662	204554	NO_2	N	N	Y(4.2m)	3.1m	Y
25f	Stroud – 4 Signal House, Dudbridge Hill	Roadside	383676	204545	NO_2	N	N	Y(0.0m)	8.0m	Y
25g	Stroud – 5 Signal House, Dudbridge Hill	Roadside	383672	205538	NO_2	N	N	Y(0.0m)	2.5m	Y
25h	Stroud – 6 The Junction, Dudbridge Hill	Roadside	383692	204546	NO_2	N	N	Y(0.0m)	2.7m	Y
25i	Stroud – 7 The Junction, Dudbridge Hill	Roadside	383689	204535	NO_2	N	N	Y(0.0m)	10.2m	Y
25j	Stroud – 8 The Junction, Dudbridge Hill	Roadside	383707	204535	NO_2	N	N	Y(0.0m)	9.7	Y
25k	Stroud – 9 The Junction, Dudbridge Hill	Roadside	383709	204542	NO_2	N	N	Y(0.0m)	2.6m	Y
29b	Upton St Leonards – 96 The Ash Path	Roadside	386199	215160	NO_2	N	N	Y(0.0m)	7.9m	Y
30	Upton St Leonards – 26 Woodland Green	Kerbside	386386	215378	NO_2	N	N	Y(12.5m)	0.6m	Y
31	Upton St Leonards – 50 Woodland Green	Kerbside	386301	215294	NO_2	N	N	Y(8.8m)	0.5m	Y
32	Upton St Leonards – 10 Ash Grove	Roadside	386389	215222	NO_2	N	N	Y(4.6m)	1.4m	Y

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

(2) N/A if not applicable.

Table A.2 - Results of Nitrogen Dioxide Diffusion Tubes in 2015

Site ID	Location	Site Type	Within AQMA?	Triplicate or Co-located Tube	Data Capture 2015 Number of Months	Data with less than 9 months has been annualised (Y/N)	Confirm if data has been distance corrected (Y/N)	Annual mean concentration (Bias Adjustment factor = 0.87) 2015 (μg/m^3)
3	Brookthorpe – North View	Roadside	N	N	12	N/A	N	25.9
4b	Cainscross – 2 The Rosaries	Roadside	N	N	12	N/A	Y	27.5
4a	Cainscross – 22 Westward Road	Kerbside	N	N	12	N/A	N	25.7
10a	Hardwicke – Westland Road	Roadside	N	N	11	N/A	N	18.1
15	Nailsworth – Bath Road	Kerbside	N	N	12	N/A	N	24.9
16a	Painswick – St Marys House	Kerbside	N	N	10	N/A	N	24.2
16	Painswick – High Street lights	Kerbside	N	N	12	N/A	Y	29.5
16b	Painswick – Traffic Camera	Kerbside	N	N	12	N/A	Y	31.3

Site ID	Location	Site Type	Within AQMA?	Triplicate or Co-located Tube	Data Capture 2015 Number of Months	Data with less than 9 months has been annualised (Y/N)	Confirm if data has been distance corrected (Y/N)	Annual mean concentration (Bias Adjustment factor = 0.87) 2015 (μg/m^3)
16c	Painswick - Melrose	Roadside	N	N	12	N/A	N	23.8
20a	Stonehouse – 10 Bristol Road	Kerbside	N	N	12	N/A	N	20.9
21a	Stroud - Bowbridge	Roadside	N	N	11	N/A	Y	37.6
25a	Stroud – Signal House, Dudbridge Hill	Roadside	N	N	11	N**	Y	36.2
25c	Stroud – 1 Signal House, Dudbridge Hill	Roadside	N	N	11	Y	N	39.5
25d	Stroud – 2 Signal House, Dudbridge Hill	Roadside	N	N	10	Y	N	38.2
25e	Stroud – 3 Signal House, Dudbridge Hill	Roadside	N	N	12	Y	N	37.9
25f	Stroud – 4 Signal House, Dudbridge Hill	Roadside	N	N	12	N	N	25.0

Site ID	Location	Site Type	Within AQMA?	Triplicate or Co-located Tube	Data Capture 2015 Number of Months	Data with less than 9 months has been annualised (Y/N)	Confirm if data has been distance corrected (Y/N)	Annual mean concentration (Bias Adjustment factor = 0.87) 2015 (μg/m^3)
25g	Stroud – 5 Signal House, Dudbridge Hill	Roadside	N	N	10	N	N	26.7
25h	Stroud – 6 The Junction, Dudbridge Hill	Roadside	N	N	10	N	N	25.7
25i	Stroud – 7 The Junction, Dudbridge Hill	Roadside	N	N	12	N	N	20.5
25j***	Stroud – 8 The Junction, Dudbridge Hill	Roadside	N	N	8	Y	N	22.5
25k	Stroud – 9 The Junction, Dudbridge Hill	Roadside	N	N	12	N	N	27.3
29	Upton St Leonards – 96 The Ash Path	Kerbside	N	N	11	N	N	22.8
30	Upton St Leonards – 26 Woodland Green	Roadside	N	N	12	N/A	N	22.3

Site ID	Location	Site Type	Within AQMA?	Triplicate or Co-located Tube	Data Capture 2015 Number of Months	Data with less than 9 months has been annualised (Y/N)	Confirm if data has been distance corrected (Y/N)	Annual mean concentration (Bias Adjustment factor = 0.87) 2015 (µg/m^3)
31	Upton St Leonards –50 Woodland Green	Kerbside	N	N	12	N/A	N	24.6
32	Upton St Leonards – 10 Ash Grove	Kerbside	N	N	12	N/A	N	17.8

Table A.1 – Results of Nitrogen Dioxide Diffusion Tubes (2011 to 2015)

Site ID	Site Type	Within AQMA?	Annual Mean Concentration (µg/m^3) - Adjusted for Bias [a]				
			2011 (Bias Adjustment Factor = 0.82)	2012 (Bias Adjustment Factor = 0.95)	2013 (Bias Adjustment Factor = 0.90)	2014 (Bias Adjustment Factor = 0.89)	2015 (Bias Adjustment Factor = 0.87)
3	Roadside	N	30.2	35.3	28.6	25.07	25.9
4b	Roadside	N	37.2	38.9*	32.5*	29.5	27.5
4a	Kerbside	N	32.5	37.5	30.6	28.40	25.7
7	Roadside	N	15.0	N/A	N/A	N/A	N/A
10a	Roadside	N	17.0	22.4	20.8	21.58	18.1
15	Kerbside	N	26.4	32.3	26.5	27.76	24.9
16a	Kerbside	N	24.1	29.0	28.9	26.85	24.2
16	Kerbside	N	29.5*	36.3*	31.3*	29.3	29.5
16b	Kerbside	N	34.8	38.5*	33.7*	36.5	31.3
16c	Roadside	N	25.8	28.5	25.8	25.07	23.8

Site ID	Site Type	Within AQMA?	Annual Mean Concentration (µg/m^3) - Adjusted for Bias [a]				
			2011 (Bias Adjustment Factor = 0.82)	2012 (Bias Adjustment Factor = 0.95)	2013 (Bias Adjustment Factor = 0.90)	2014 (Bias Adjustment Factor = 0.89)	2015 (Bias Adjustment Factor = 0.87)
20a	Kerbside	N	21.1	26.1	22.7	20.43	20.9
21a	Roadside	N	**40.0***	**44.3***	39.5*	35.6	37.6
24	Kerbside	N	18.4	N/A	N/A	N/A	N/A
25a	Roadside	N	**45.8***	**49.8***	37*	37.8	36.2
25c	Roadside	N	37.2**	**48.8**	39.8	**42.00**	**39.5**
25d	Roadside	N	**49.8****	**46.3**	**40.8**	**41.7**	**38.2**
25e	Roadside	N	**50.0****	**46.0**	39.9	37.2	37.9
25f	Roadside	N	26.0	35.2	28.7	27.96	25.0
25g	Roadside	N	27.0	34.2	31.0	29.52	26.7
25h	Roadside	N	24.3	32.7	30.0	26.65	25.7
25i	Roadside	N	20.6	28.0	24.3	22,28	20.5
25j	Roadside	N	22.0	28.6	24.4	24.87	22.5
25k	Roadside	N	27.3	35.0	30.8	29.49	27.3
29b	Kerbside	N	26.5	31.9	27.3	21.67	22.8
30	Roadside	N	23.4	29.2	25.1	19.93	22.3
31	Kerbside	N	26.9	33.7	26.9	22.91	24.6
32	Kerbside	N	19.6	23.0	20.6	17.78	17.8
36	Roadside	N	19.8	N/A	N/A	N/A	N/A

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.**

(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%).

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

Table A.4 – Distance Attenuation Data

Site ID	Raw Data µg/m^3	Bias Adjusted (0.87) µg/m^3	Background level µg/m^3	Tube to kerb m	Receptor to kerb m	Predicted level µg/m^3
4b	37.53	32.6	12.77962	2.0	6.0	27.5
16	45.28	39.4	9.351623	0.5	3.2	29.5
16b	38.25	33.3	9.351623	1.0	1.5	31.3
21a	48.57	42.3	12.2128	2.7	5.0	37.6
25a	46.94	40.8	13.75205	2.7	5.0	36.2
25c	46.38	40.3	13.75205	1.4	1.6	**39.5**
25d	45.98	40.0	13.75205	1.7	2.3	**38.2**
25e	45.98	40.0	13.75205	3.1	4.2	37.9

Appendix B: Full Monthly Diffusion Tube Results for 2015

Table B.1 – NO_2 Monthly Diffusion Tube Results - 2015

Site ID	Location	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	AVERAGE
3	**BROOKTHORPE -NORTH VIEW**	26.6	37.4	32.8	31.0	24.9	27.5	26.1	24.4	31.2	40.0	28.8	26.1	29.74
4b	**CAINSCROSS - 2 THE ROSARIES**	39.1	53.7	40.9	37.5	32.6	36.9	29.6	27.2	39.5	43.4	35.8	34.2	37.53
4a	**CAINSCROSS-22 WESTWARD ROAD**	33.8	42.6	35.9	31.5	30.9	11.1	22.5	20.0	32.8	37.5	31.2	24.5	29.53
10a	**HARDWICKE - WESTLAND ROAD**	21.6	29.6	24.2	17.7	11.8	32.9	12.2	14.9	17.9	27.9	18.5		20.83
15	**NAILSWORTH - BATH RD**	33.0	36.6	30.4	25.6	24.4	26.3	21.5	24.4	28.2	34.5	29.6	29.5	28.65
16a	**PAINSWICK -ST MARYS HOUSE**	27.6		34.9	27.9	23.6	28.1	22.3	27.2	32.5	38.4	25.7	17.2	27.77
16	**PAINSWICK -HIGH ST LIGHTS**	48.2	64.0	53.3	40.2	43.6	40.4	39.4	37.0	40.5	52.1	45.3	39.5	45.28
16b	**PAINSWICK -TRAFFIC CAMERA**	41.1	55.1	45.2	37.4	32.9	31.4	30.2	29.8	37.5	50.0	36.6	31.8	38.25
16c	**PAINSWICK -MELROSE**	25.4	35.2	30.8	24.8	23.0	24.2	24.5	21.2	29.3	35.9	28.6	24.8	27.30
20a	**STONEHOUSE - 10 BRISTOL ROAD**	28.5	32.8	26.7	17.6	21.0	19.8	19.5	22.0	25.2	27.5	25.9	22.4	24.08
21a	**STROUD - BOWBRIDGE**	49.1	59.2	50.1	43.4	48.0		47.1	51.0	49.8	48.6	42.8	45.3	48.57
25a	**STROUD - SIGNAL HOUSE, DUDBRIDGE ROAD**	44.7	56.5	47.3	44.3		45.7			45.3	60.4	39.0	39.3	46.94
25c	**1 Signal House**	46.4	59.0	47.2	43.8	42.4	47.3	36.4	42.2	42.0	63.1	45.0	41.8	46.38
25d	**2 Signal House**		54.8	47.7		40.0	46.6	35.6	43.1	45.2	58.6		42.2	45.98
25e	**3 Signal House**	48.6	50.8	46.3	42.7	46.7	48.5	43.5	40.5	44.2	51.4	42.2	46.3	45.98
25f	**4 Signal House**	32.9	39.0	31.8	24.0	25.5	27.1	23.1	25.1	31.2	39.5	26.4	19.9	28.78
25g	**5 Signal House**	32.3	40.8	33.5	29.0	27.3		22.1	27.2	31.4	44.0	28.7	21.3	30.69
25h	**6 The Junction**	29.3	36.2	34.6	28.9	26.2	25.0	23.2	25.9	34.2	43.0	27.3	20.1	29.49
25i	**7 The Junction**		34.0	26.1	24.5	20.2	21.0	16.8	18.5	26.5	35.2	22.2	14.4	23.57
25j	**8 The Junction**	30.9	36.6	29.1	24.8	19.5	23.5	17.6	22.0	26.1	36.0		18.7	25.89
25k	**9 The Junction**	31.4	41.0	34.2	30.2	28.4	29.2	27.0	26.4	30.8	38.6	30.1	29.3	31.38
29b	**UPTON ST LEONARDS- 96 THE ASH PATH**	30.4		30.8	23.2	26.0		22.3	22.8	25.7	31.7	30.9	18.1	26.19
30	**UPTON ST LEONARDS-26 WOODLAND GREEN**	31.1	36.7	31.6	19.3	22.9	21.4	17.4	18.9	25.8	31.8	26.0		25.69
31	**UPTON ST LEONARDS-50 WOODLAND GREEN**	36.1	39.2	36.9	23.2	23.1	27.2	20.3	22.4	30.0	34.6	30.4	15.2	28.22
32	**UPTON ST LEONARDS-10 ASH GROVE**	26.0	31.0	24.9	15.7	16.4	18.5	13.5	13.5	20.8	26.9	24.1	13.7	20.41

NOTES

Bias Adjustment	0.87

(1) See Appendix C for details on bias adjustment

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

Diffusion Tube Bias Adjustment Factors

The diffusion tubes (20% TEA in Acetone) were supplied and analysed by Somerset Scientific Services. The tubes at all locations throughout the area have a monthly exposure period. A bias adjustment factor of 0.87 (being the overall factor based on 8 studies) obtained via the national bias spreadsheet, was applied to all diffusion tubes.

This spreadsheet is available at:

http://laqm.defra.gov.uk/bias-adjustment-factors/national-bias.html

The results for 2 sites with high levels, were distance attenuated using the methodology at:

http://laqm.defra.gov.uk/documents/NO2withDistancefromRoadsCalculatorIssue4.xls

QA/QC of diffusion tube monitoring

The diffusion tubes (20% TEA in Acetone) were supplied and analysed by Somerset Scientific Services. The tubes at all locations throughout the area have a monthly exposure period. A bias adjustment factor of 0.87 obtained via the National Bias Spreadsheet was applied to all diffusion tubes.

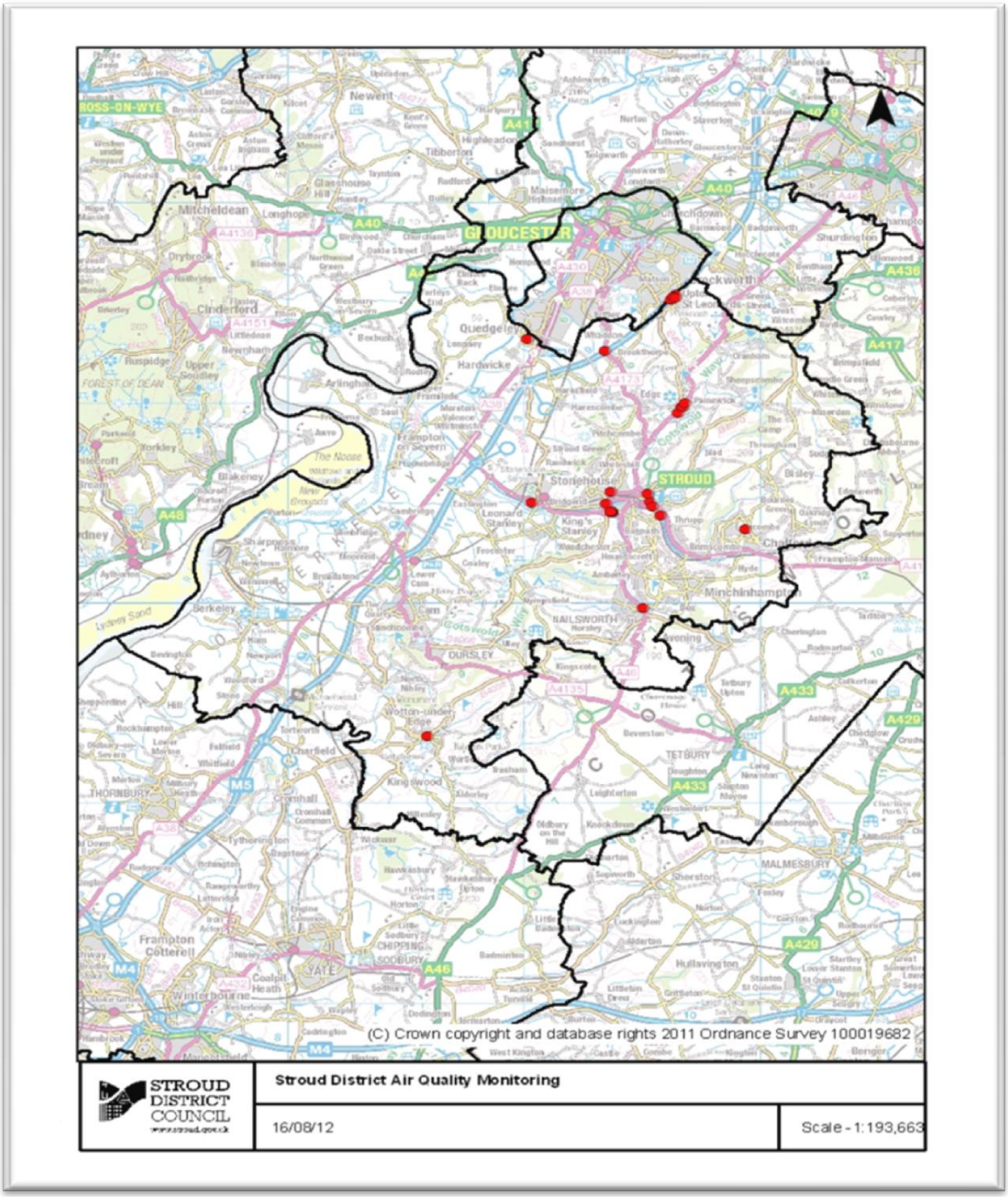
Summary of Laboratory Performance in WASP NO2 Proficiency Testing Scheme for Rounds 121-124

Details are available at:

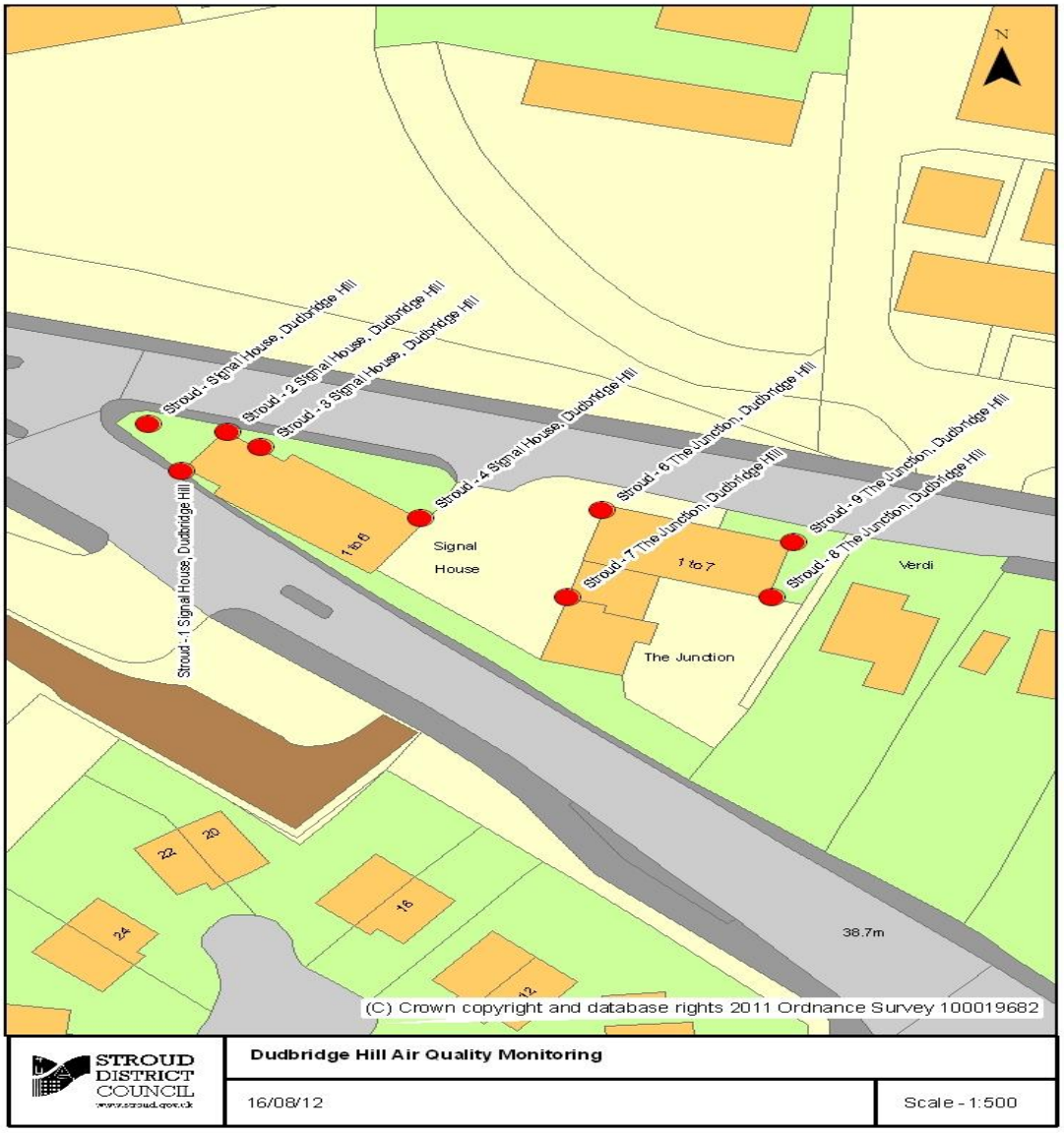
http://laqm.defra.gov.uk/documents/LAQM-WASP-Rounds-121--124-and-AIR-PT-Rounds-1-3-4-6-(April-2013--February-2015)-NO2-report.pdf

This shows 100% efficiency for Somerset Scientific Services for Rounds 121 to 124 covering 2014.

Appendix D: Map(s) of Monitoring Locations



Map of Non-Automatic Monitoring Sites



Detailed Map of Dudbridge Hill Diffusion Tube Sites

Appendix E: Summary of Air Quality Objectives in England

Table E.1 – Air Quality Objectives in England

Pollutant	Air Quality Objective[4]	
	Concentration	Measured as
Nitrogen Dioxide (NO_2)	200 µg/m^3 not to be exceeded more than 18 times a year	1-hour mean
	40 µg/m^3	Annual mean
Particulate Matter (PM_{10})	50 µg/m^3, not to be exceeded more than 35 times a year	24-hour mean
	40 µg/m^3	Annual mean
Sulphur Dioxide (SO_2)	350 µg/m^3, not to be exceeded more than 24 times a year	1-hour mean
	125 µg/m^3, not to be exceeded more than 3 times a year	24-hour mean
	266 µg/m^3, not to be exceeded more than 35 times a year	15-minute mean

[4] 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	Air quality Annual Status Report
Defra	Department for Environment, Food and Rural Affairs
DMRB	Design Manual for Roads and Bridges – Air quality screening tool produced by Highways England
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 (micrometres or microns) 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
…	…

Summary of Previous Reports

Stroud District Council has previously undertaken the following Review and Assessment reports, all of which are available at:
www.stroud.gov.uk/docs/environment/air_quality.asp

Updating and Screening Assessment 2003

- Progress Report 2004
- Progress Report 2005
- Updating and Screening Assessment 2006
- Progress Report 2007
- Progress Report 2008
- Updating and Screening Assessment 2009
- Progress Report 2010
- Progress Report 2011
- Updating and Screening Assessment 2012
- Progress Report 2013
- Progress Report 2014
- Updating and Screening Assessment 2015

There are no current AQMAs within our administrative area. A brief summary of the previous reports are below.

Conclusions of Updating and Screening Assessment 2006:

- This assessed that the objectives for Carbon Monoxide, Benzene, 1,3-butadiene, Lead, PM10, Sulphur Dioxide were unlikely to be exceeded at any location within the administrative area of Stroud District, and therefore no Detailed Assessments were required.
- The assessment has indicated that the 2005 Nitrogen Dioxide annual mean objective will not be exceeded at any location within the administrative area of Stroud District Council, and therefore a Detailed Assessment will not be required. The assessment also indicated that the 2005 NO_2 hourly objective is unlikely to be exceeded, and therefore a Detailed Assessment will not be required with respect to the hourly mean.

- No new roads or roads with significantly changed flows within the administrative area of Stroud District Council were identified since the last round of Review and Assessment.
- Seven additional small waste oil burners (PG 1/1 (95)) had been permitted in Stroud District Council since the last round of Review and Assessment. It is not considered that these processes would have a significant influence on local air quality within the authority.

Conclusions of Review and Assessment Progress Report 2007:

- From the evidence provided in this report, no exceedences of the air quality objectives are likely to occur at any location within Stroud District Council's area. As a result of this it was recommended that Stroud District Council undertake a Progress Report in 2008.
- No other exceedences of the air quality objectives for Ozone and Sulphur Dioxide are likely.
- Stroud District Council currently carries out no monitoring for Carbon Monoxide, Benzene, Lead and 1,3-butadiene.
- There are no new developments of significance that will influence air quality in the Stroud District Council area.

Conclusions of Review and Assessment Progress Report 2008:

- From the evidence provided in this report, no exceedences of the air quality
- objectives are likely to occur at any location within Stroud District Council's area. Therefore, Stroud District Council will undertake an Updating and Screening Assessment 2009.
- Stroud District Council currently carries out no monitoring for Carbon Monoxide,
- Benzene, Lead, 1,3-butadiene, PM10, SO_2 or Ozone.
- There are no new developments of significance that will influence air quality in the Stroud District Council area.

Conclusions of Updating and Screening Assessment Report 2009:

- From the evidence provided in this report, an exceedence of the air quality objectives for NO_2 was shown to occur at one location within Stroud District Council's area, at Cainscross - Stroud.

- Stroud District Council will undertake a full review of its diffusion tube locations with specific attention to the above location.
- Stroud District Council currently carries out no monitoring for Carbon Monoxide, Benzene, Lead, 1,3-butadiene, PM_{10}, SO_2 and Ozone.
- There are no new developments of significance that will influence air quality in the Stroud District Council area.
- Stroud District council will undertake a Progress Report in 2010.

Conclusions of Progress Report 2010:

- From the evidence provided in this report, no exceedence of the air quality objectives for NO_2 was shown to occur at Cainscross - Stroud.
- Stroud District Council will undertake a Detailed Assessment of the air quality at Dudbridge, Stroud.
- Stroud District Council currently carries out no monitoring for Carbon Monoxide, Benzene, Lead, 1,3-butadiene, PM_{10}, SO_2 and Ozone.
- There are no new developments of significance that will influence air quality in the Stroud District Council area.
- Stroud District council will undertake a Progress Report in 2011

Conclusions of Progress Report 2011:

- From the evidence provided in this report, no exceedence of the air quality objectives for NO_2 was shown to occur at Cainscross - Stroud.
- Increase the monitoring with diffusion tubes at Dudbridge in anticipation of moving to a Detailed Assessment.
- Stroud District Council will undertake a Detailed Assessment of the air quality at Dudbridge, Stroud.
- Stroud District Council currently carries out no monitoring for Carbon Monoxide, Benzene, Lead, 1,3-butadiene, PM_{10}, SO_2 and Ozone.
- There are no new developments of significance that will influence air quality in the Stroud District Council area.

Conclusions of Updating and Screening Assessment Report 2012:

- From the evidence provided in this report, no exceedence of the air quality objectives for NO_2 was shown to occur at Cainscross - Stroud.

- Increase the monitoring with diffusion tubes at Dudbridge in anticipation of moving to a Detailed Assessment.
- Stroud District Council will undertake a Detailed Assessment of the air quality at Dudbridge, Stroud.
- Stroud District Council currently carries out no monitoring for Carbon Monoxide, Benzene, Lead, 1,3-butadiene, PM_{10}, SO_2 and Ozone.
- There are no new developments of significance that will influence air quality in the Stroud District Council area.

Conclusions of Progress Report 2013

- Carry out a period of real time monitoring for NO_2 at Bowbridge and Dudbridge during 2013 to enable detailed assessments of these sites to be made.
- There are no new developments of significance that will influence air quality in the Stroud District Council area.
- Stroud District Council currently carries out no monitoring for Carbon Monoxide, Benzene, Lead, 1,3-butadiene, PM_{10}, SO_2 and Ozone.

Conclusions of Progress Report 2014

- 2013 diffusion tube results show one marginal exceedance of the 40 µg/m^3 annual objective for NO_2. This was at Dudbridge.
- Realtime NO_2 monitoring will be carried out at Bowbridge in 2014 and the results reported back in the 2015 Updating and Screening Report
- Attempts were made to install continuous monitoring at Dudbridge to obtain more precise readings for that area, however a suitable power supply could not be obtained.
- NO_2 levels have fallen in 2013 such that there is only one marginal exceedance out of the ten NOx tubes at the Dudbridge Hill site.
- There are no new developments of significance that will influence air quality in the Stroud District Council area.
- As a result of previous Updating and Screening assessments Stroud District Council does not carry out monitoring for Carbon Monoxide, Benzene, Lead, 1,3-butadiene, PM_{10}, SO_2 and Ozone.

Conclusions of Updating and Screening Report 2015

- There is a general trend of falling emissions levels across the district.
- The Air Quality across the District is generally very good

- The main influence on air quality within Stroud District is road traffic emissions
- The general downward trend in emissions levels is in keeping with that predicted nationally due to newer vehicles with tighter individual emission limits.
- There are two monitoring sites 25C & 25D which are on or slightly over the national average mean SO_2. The levels at these sites, in keeping with the national trend, have fallen slightly since 2014. There are concerns that due to there siting, one being on the corner of a building and the other next to a balanced flue, they may be over reading. The tubes will be resited prior to the next monitoring period (2016) to provide more accurate measurements of relevant exposure.

Conclusions of the 2015 Updating and Screening Report

- The Air Quality across the District is generally very good
- The main influence on air quality within Stroud District is road traffic emissions
- The general downward trend in emissions levels is in keeping with that predicted nationally due to newer vehicles with tighter individual emission limits.
- There are two monitoring sites 25C & 25D which are on or slightly over the national average mean SO_2. The levels at these sites, in keeping with the national trend, have fallen slightly since 2014. There are concerns that due to there siting, one being on the corner of a building and the other next to a balanced flue, they may be over reading. The tubes will be resited prior to the next monitoring period (2016) to provide more accurate measurements of relevant exposure
- The screening assessment did not identify any further areas that required more detailed assessment.
- NO_2 from traffic continues to be the primary pollutant of concern.