

# Stroud District Council

## 2015 Updating and Screening Assessment



In fulfillment of Part IV of the  
Environment Act 1995  
Local Air Quality Management  
January 2016

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## Executive Summary

This report fulfils the requirements of the Local Air Quality Management process as set out in Part IV of the Environment Act 1995, the Air Quality Strategy for England, Scotland, Wales and Northern Ireland 2007 and the relevant Policy and Technical Guidance documents.

The primary pollutant of concern for the District continues to be NO<sub>2</sub> resulting from traffic. Stroud District Council undertook diffusion tube monitoring at 25 locations in 2014.

The 2014 report identified two areas where NO<sub>x</sub> levels were of concern.

### Bowbridge

Automatic Continuous NO<sub>2</sub> monitoring was installed at the Bowbridge site between December 2013 and October 2014. Continuous monitoring is recognised as being more accurate than diffusion tubes and in this instance indicated an annual mean NO<sub>2</sub> concentration of 26.87µg/m<sup>3</sup>. This is significantly below the annual limit of 40 µg/m<sup>3</sup>. In addition the diffusion tube readings dropped from 39.6 µg/m<sup>3</sup> in 2013 to 35.6 µg/m<sup>3</sup> in 2014. Given these results it is not necessary at this time to progress to a detailed assessment.

### Dudbridge Hill

Two diffusion tubes at the Dudbridge Hill location marginally exceeded the annual mean NO<sub>2</sub> limits. Other tubes at this location however showed a reduction in NO<sub>2</sub> levels. Further consideration of the two locations showing exceedances of the annual limit indicated that both locations were on the corners of a building and one site was within 10 metres of a boiler flue. It is recognised in the technical guidance that these factors could result in the tubes over reading. These tubes will be moved to alternative locations which still reflect the relevant exposure but are sited away from corners and flues. An assessment of the levels returned from 12 months monitoring will then be made

### Updating Screening and Assessment

An updating screening and assessment was carried out in accordance with “Local Air Quality Management Technical Guidance LAQM .TG(09).” This assessment indicated that there had been no significant changes to air quality nor had there been any significant changes to sources of airborne pollutants which impact upon local air quality. As a result there was no need to carry out detailed assessments in relation to any of the relevant air quality emission limits.

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# 1 Introduction

## 1.1 Description of Local Authority Area

The Stroud District has an area of 453km<sup>2</sup>, a population of approximately 108,000 and lies in South West England immediately to the south of Gloucester City, bordering the River Severn on its western edge. The district is divided from the south west to the north east by the M5 motorway. It shares boundaries with Gloucester City Council, Tewkesbury Borough Council, Cotswold District Council, South Gloucestershire Council and across the Severn, The Forest Of Dean District Council. It contains 6 distinct market towns – Berkeley, Dursley, Nailsworth, Stonehouse, Stroud and Wotton under Edge. The city of Bristol is located some 15 miles beyond the southern boundary.

It is predominantly a rural area and thus attracts tourists and wealthy migrants, often retirees. Three quarters of its population live in the settlements of the Stroud Valleys and the market towns of Cam, Dursley and Wotton under Edge. It also has an industrial heritage, originally based on wool, which has left a strong engineering and manufacturing legacy albeit with no heavy industry.

The most significant influence on air quality within the district is from local road traffic. There are also a number of 'prescribed processes' located within the district. These are industrial activities regulated by the Environment Agency (Part A (1)) and by the District Council Part (A(2) and Part B). These are listed in Appendices B, C and D. None are considered to be of any major influence on local air quality.

A major restoration scheme of a 6 mile stretch of canal between Stonehouse via Stroud to Brimscombe is under way with associated housing developments and regeneration of adjacent industrial sites.



Figure 1.1: Map of Stroud District Council's Location



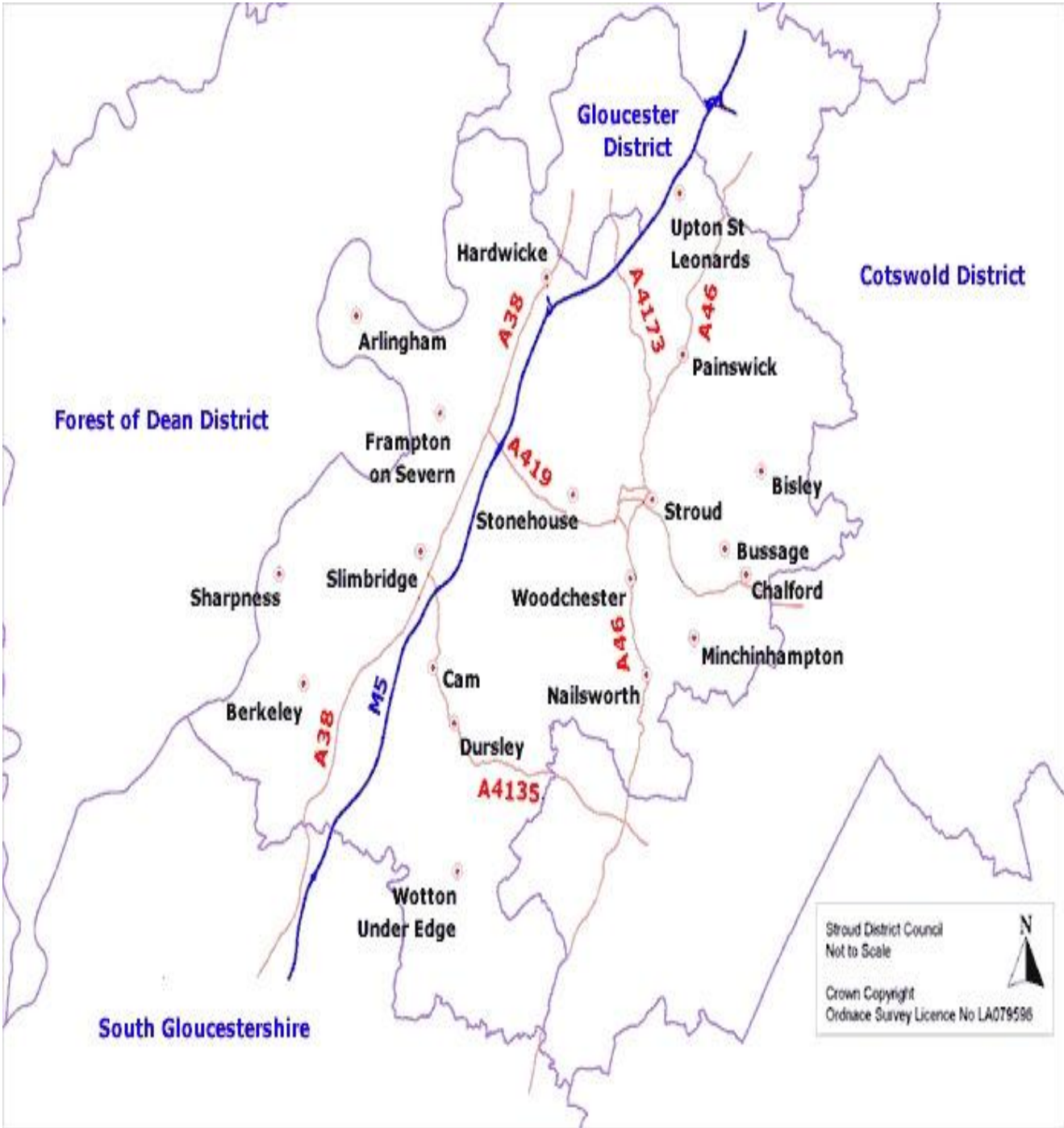


Figure 1.2: Map of Stroud District Council's Boundaries

## 1.2 Purpose of Report

This report fulfils the requirements of the Local Air Quality Management process as set out in Part IV of the Environment Act (1995), the Air Quality Strategy for England, Scotland, Wales and Northern Ireland 2007 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 exceedences are considered likely, the local authority must then 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.

The objective of this Updating and Screening Assessment is to identify any matters that have changed which may lead to risk of an air quality objective being exceeded. A checklist approach and screening tools are used to identify significant new sources or changes and whether there is a need for a Detailed Assessment. The USA report provides an update of any outstanding information requested previously in Review and Assessment reports.

## 1.3 Air Quality Objectives

The air quality objectives applicable to LAQM in England are set out in the Air Quality (England) Regulations 2000 (SI 928), The Air Quality (England) (Amendment) Regulations 2002 (SI 3043), and are shown in Table 1.1. This table shows the objectives in units of microgrammes per cubic metre  $\mu\text{g}/\text{m}^3$  (milligrammes per cubic metre,  $\text{mg}/\text{m}^3$  for carbon monoxide) with the number of exceedences in each year that are permitted (where applicable).

Pollutant	Air Quality Objective		Date to be achieved by
	Concentration	Measured as	
Benzene	16.25 µg/m <sup>3</sup>	Running annual mean	31.12.2003
	5.00 µg/m <sup>3</sup>	Running annual mean	31.12.2010
1,3-Butadiene	2.25 µg/m <sup>3</sup>	Running annual mean	31.12.2003
Carbon monoxide	10.0 mg/m <sup>3</sup>	Running 8-hour mean	31.12.2003
Lead	0.5 µg/m <sup>3</sup>	Annual mean	31.12.2004
	0.25 µg/m <sup>3</sup>	Annual mean	31.12.2008
Nitrogen dioxide	200 µg/m <sup>3</sup> not to be exceeded more than 18 times a year	1-hour mean	31.12.2005
	40 µg/m <sup>3</sup>	Annual mean	31.12.2005
Particles (PM <sub>10</sub> ) (gravimetric)	50 µg/m <sup>3</sup> , not to be exceeded more than 35 times a year	24-hour mean	31.12.2004
	40 µg/m <sup>3</sup>	Annual mean	31.12.2004
Sulphur dioxide	350 µg/m <sup>3</sup> , not to be exceeded more than 24 times a year	1-hour mean	31.12.2004
	125 µg/m <sup>3</sup> , not to be exceeded more than 3 times a year	24-hour mean	31.12.2004
	266 µg/m <sup>3</sup> , not to be exceeded more than 35 times a year	15-minute mean	31.12.2005

Table 1.1 Air Quality Objectives included in Regulations for the purpose of LAQM in England.

## 1.4 Summary of Previous Review and Assessments

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](http://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 (Ref1)

- Progress Report 2007 (Ref 2)
- Progress Report 2008 (Ref 3)
- Updating and Screening Assessment 2009 (Ref 4)
- Progress Report 2010 (Ref 5)
- Progress Report 2011 (Ref 6)
- Updating and Screening Assessment 2012 (Ref 7)
- Progress Report 2013 (Ref 8)
- Progress Report 2014 (Ref 9)

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<sub>2</sub> 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, PM<sub>10</sub>, SO<sub>2</sub> 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<sub>2</sub> 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<sub>10</sub>, SO<sub>2</sub> 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<sub>2</sub> 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<sub>10</sub>, SO<sub>2</sub> 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<sub>2</sub> 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<sub>10</sub>, SO<sub>2</sub> 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<sub>2</sub> 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<sub>10</sub>, SO<sub>2</sub> 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<sub>2</sub> 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<sub>10</sub>, SO<sub>2</sub> and Ozone.

### **Conclusions of Progress Report 2014**

- 2013 diffusion tube results show one marginal exceedance of the 40 µg/m<sup>3</sup> annual objective for NO<sub>2</sub>. This was at Dudbridge.
- Realtime NO<sub>2</sub> 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<sub>2</sub> levels have fallen in 2013 such that there is only one marginal exceedance out of the ten NO<sub>x</sub> 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<sub>10</sub>, SO<sub>2</sub> and Ozone.

## 2 New Monitoring Data

### 2.1 Summary of Monitoring Undertaken

#### 2.1.1 Automatic Monitoring Sites

Automatic NO<sub>2</sub> Monitoring was installed at Bowbridge the exact location is shown below.



Figure 2.1 Map of Automatic Monitoring Sites



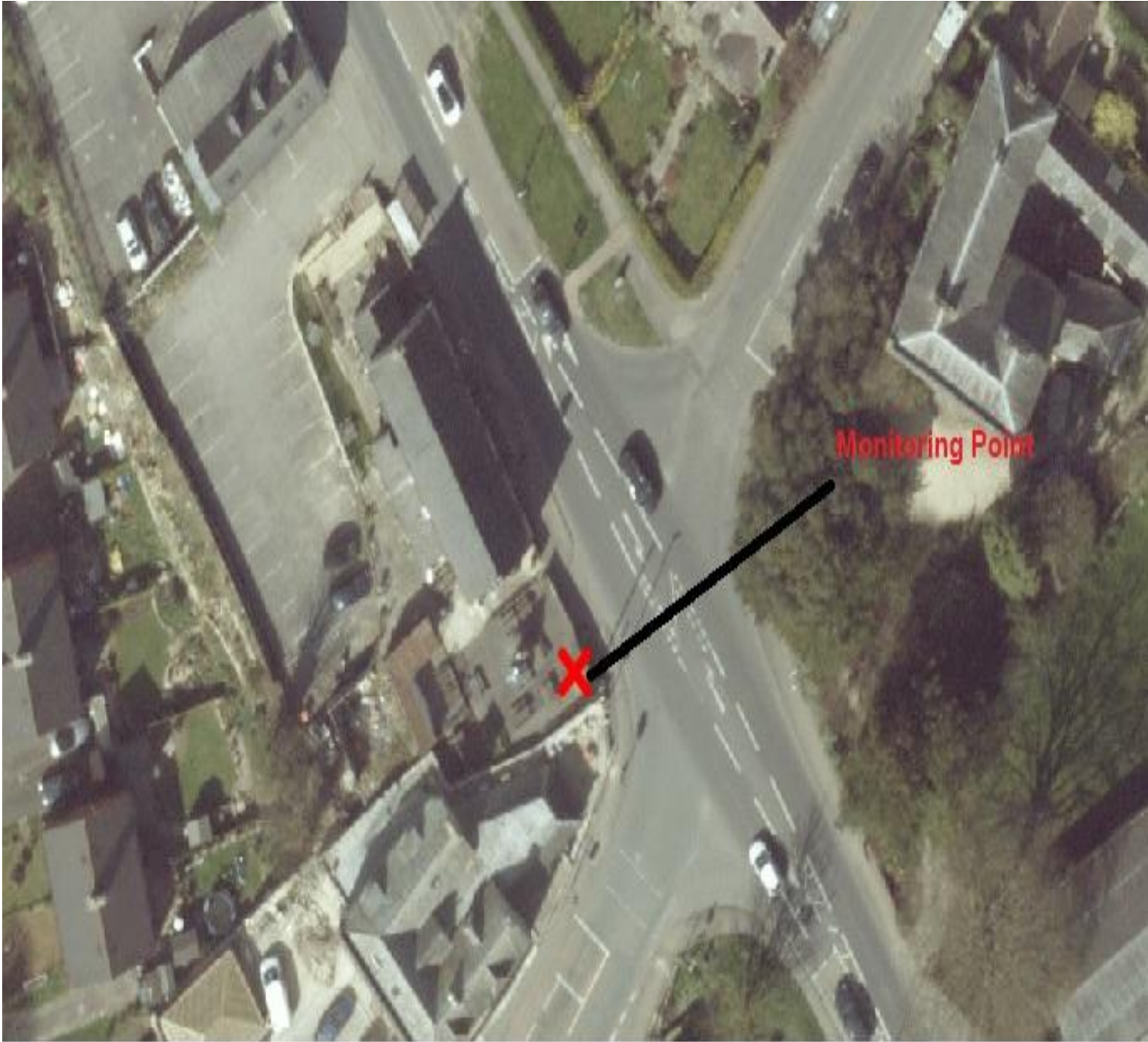


Figure 2.2 Location of Continuous Monitoring Point

Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In AQMA?	Monitoring Technique	Relevant Exposure? <i>(Y/N with distance (m) to relevant exposure)</i>	Distance to kerb of nearest road <i>(N/A if not applicable)</i>	Does this location represent worst-case exposure?
Bowbridge	Urban background	385795	204349	NO <sub>2</sub>	N	Chemiluminescence	Y (1m)	2m	Y

**Table 2.1 Details of Automatic Monitoring Sites**

### 2.1.2 Non-Automatic Monitoring Sites

Stroud District Council undertook NO<sub>2</sub> monitoring with diffusion tubes at 25 sites in 2014.

Tubes were prepared using 50µl of 20% triethanolamine in water. Tube preparation and subsequent analysis follow the procedures in the harmonised "Practical Guidance" document (Ref1). All diffusion tubes are stored, handled and exposed in accordance with the relevant guidance. All diffusion tubes have a monthly exposure period.

Stroud District Council does not undertake any co-location studies, so bias adjustment factor for 2014 was obtained from the National Bias Adjustment Factor Spreadsheet.

- 2006 – 0.90 for 5 studies
- 2007 – 0.77 for 5 studies
- 2008 – 0.87 for 4 studies
- 2009 – 0.86 for 2 studies
- 2010 – 0.85 for 7 studies
- 2011 – 0.82 for 10 studies
- 2012 – 0.95 for 2 studies
- 2013 – 0.90 for 3 studies
- 2014 – 0.89 for 8 studies

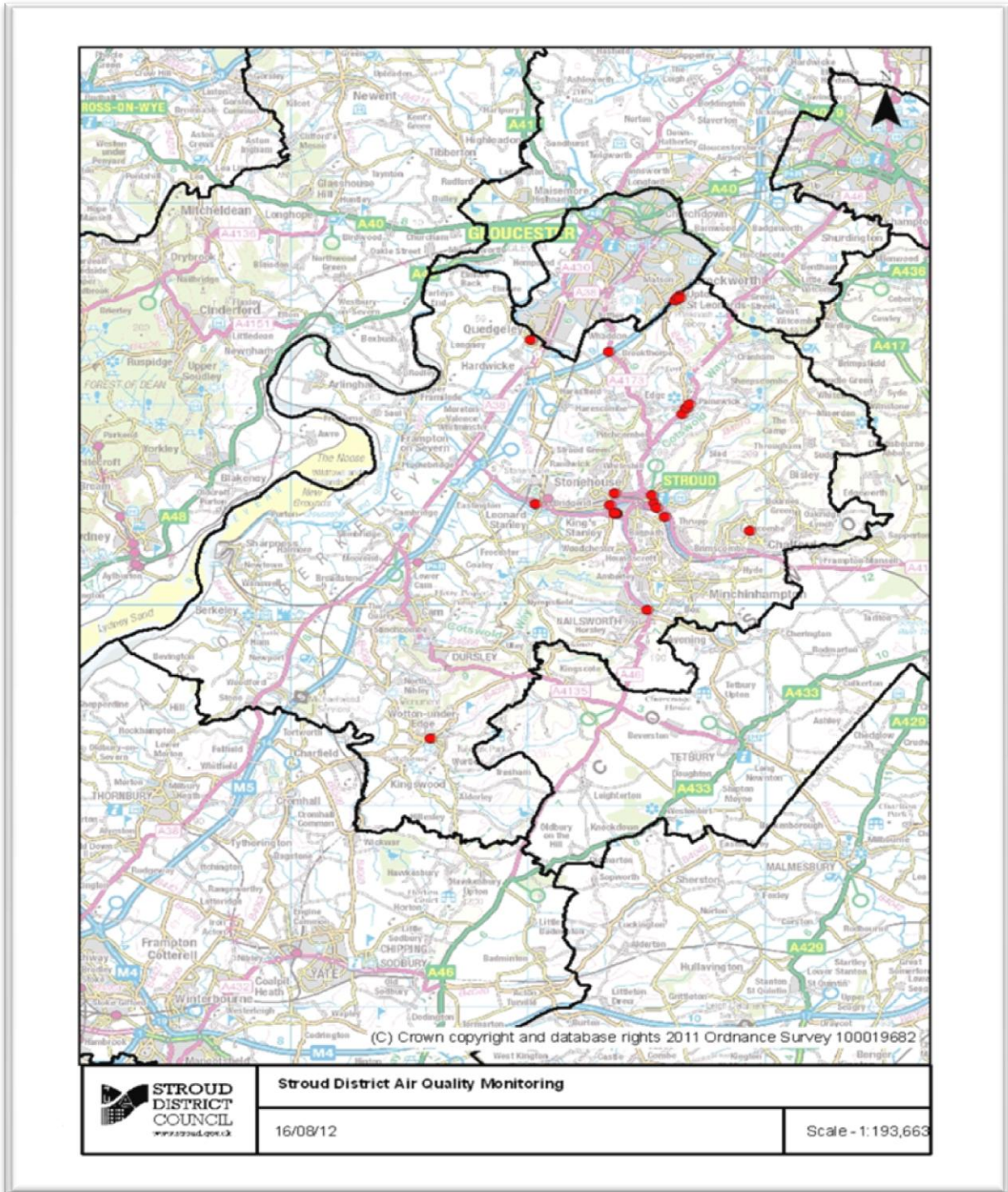


Figure 2.3 Map of Non-Automatic Monitoring Sites

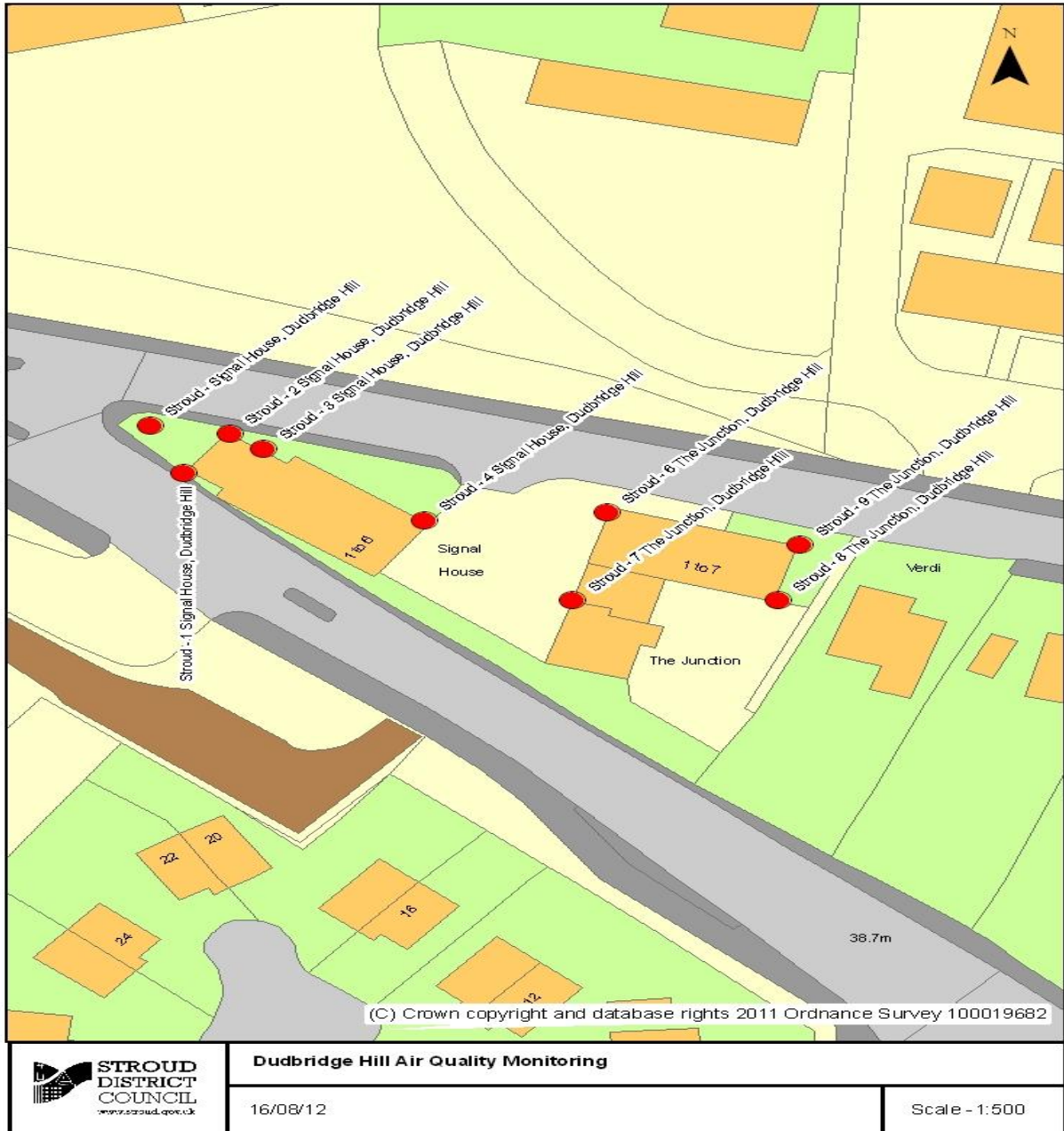


Figure 2.4 Detailed Map of Dudbridge Hill Diffusion Tube Sites

Stroud District Council

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 <sub>2</sub>	N	N	Y(19.8m)	1m	Y
4b	Cainscross – 2 The Rosaries	Roadside	385308	205044	NO <sub>2</sub>	N	N	Y(4.0m)	2.0m	Y
4a	Cainscross – 22 Westward Road	Kerbside	308471	204988	NO <sub>2</sub>	N	N	Y(0.0m)	4.4m	Y
10a	Hardwicke – Westland Road	Roadside	380124	213183	NO <sub>2</sub>	N	N	Y(4.6m)	1.5m	Y
15	Nailsworth – Bath Road	Kerbside	385016	199727	NO <sub>2</sub>	N	N	N	3.4m	Y
16a	Painswick – St Marys House	Kerbside	386492	209473	NO <sub>2</sub>	N	N	Y(3.3m)	2.0m	Y
16	Painswick – High Street Lights	Kerbside	386677	209768	NO <sub>2</sub>	N	N	Y(3.2m)	0.5m	Y
16b	Painswick – Traffic Camera	Kerbside	386700	209794	NO <sub>2</sub>	N	N	Y(0.5m)	1.0m	Y
16c	Painswick – Melrose	Roadside	386810	209992	NO <sub>2</sub>	N	N	Y(2.8m)	4.8m	Y
20a	Stonehouse – 10 Bristol Road	Kerbside	308295	204998	NO <sub>2</sub>	N	N	Y(2.3m)	1.0m	Y
21a	Stroud – British Oak Bowbridge	Roadside	385785	204370	NO <sub>2</sub>	N	N	Y(1m)	2.0m	Y
25a	Stroud – Signal House, Dudbridge Hill	Roadside	383652	204557	NO <sub>2</sub>	N	N	Y(5.0m)	2.7m	N
25c	Stroud – 1 Signal House, Dudbridge Hill	Roadside	383655	204551	NO <sub>2</sub>	N	N	Y(1.6m)	1.4m	Y
25d	Stroud – 2 Signal House, Dudbridge Hill	Roadside	383659	204556	NO <sub>2</sub>	N	N	Y(2.3m)	1.7m	Y
25e	Stroud – 3 Signal House, Dudbridge Hill	Roadside	383662	204554	NO <sub>2</sub>	N	N	Y(4.2m)	3.1m	Y

Stroud District Council

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?
25f	Stroud – 4 Signal House, Dudbridge Hill	Roadside	383676	204545	NO <sub>2</sub>	N	N	Y(0.0m)	8.0m	Y
25g	Stroud – 5 Signal House, Dudbridge Hill	Roadside	383672	205538	NO <sub>2</sub>	N	N	Y(0.0m)	2.5m	Y
25h	Stroud – 6 The Junction, Dudbridge Hill	Roadside	383692	204546	NO <sub>2</sub>	N	N	Y(0.0m)	2.7m	Y
25i	Stroud – 7 The Junction, Dudbridge Hill	Roadside	383689	204535	NO <sub>2</sub>	N	N	Y(0.0m)	10.2m	Y
25j	Stroud – 8 The Junction, Dudbridge Hill	Roadside	383707	204535	NO <sub>2</sub>	N	N	Y(0.0m)	9.7	Y
25k	Stroud – 9 The Junction, Dudbridge Hill	Roadside	383709	204542	NO <sub>2</sub>	N	N	Y(0.0m)	2.6m	Y
29b	Upton St Leonards – 96 The Ash Path	Roadside	386199	215160	NO <sub>2</sub>	N	N	Y(0.0m)	7.9m	Y
30	Upton St Leonards – 26 Woodland Green	Kerbside	386386	215378	NO <sub>2</sub>	N	N	Y(12.5m)	0.6m	Y
31	Upton St Leonards – 50 Woodland Green	Kerbside	386301	215294	NO <sub>2</sub>	N	N	Y(8.8m)	0.5m	Y
32	Upton St Leonards – 10 Ash Grove	Roadside	386389	215222	NO <sub>2</sub>	N	N	Y(4.6m)	1.4m	Y

Table 2.2 Details of Non-Automatic Monitoring Sites

## **2.2 Comparison of Monitoring Results with Air Quality Objectives**

### **2.2.1 Nitrogen Dioxide**

#### **Automatic Monitoring Data**

##### **Bowbridge**

Automatic Monitoring was carried out for the period 16/12/13 to 22/10/14 at Bowbridge. The monitor was installed on the 16/12/13 however it developed a fault on the 24/12/13 and was not operational again until 10/01/14. Given the limited data available for December 2013 this has not been included in the results in tables 2.3 and 2.4 below.

##### **Dudbridge**

Attempts were made to install continuous monitoring at the Dudbridge site. It was not possible however to obtain a suitable power supply.



Site ID	Site Type	Within AQMA?	Valid Data Capture for period of monitoring % <sup>a</sup>	Valid Data Capture 2014 %	Annual Mean Concentration $\mu\text{g}/\text{m}^3$				
					2010	2011	2012	2013	2014
Bowbridge	Roadside	Y	96.5	80.8	N/A	N/A	N/A	N/A	26.87

**Table 2.3 Results of Automatic Monitoring of Nitrogen Dioxide: Comparison with Annual Mean Objective**

Site ID	Site Type	Within AQMA?	Valid Data Capture for period of monitoring % <sup>a</sup>	Valid Data Capture 2014 % <sup>b</sup>	Number of Exceedences of Hourly Mean (200 µg/m <sup>3</sup> )				
					2010	2011	2012	2013	2014 <sup>c</sup>
Bowbridge	Roadside	Y	96.5	80.8	N/A	N/A	N/A	N/A	0

**Table 2.4 Results of Automatic Monitoring for Nitrogen Dioxide: Comparison with 1-hour mean Objective**

## Diffusion Tube Monitoring Data

The results of the diffusion tube monitoring are detailed in the following tables:

Table 2.5 Results of Nitrogen Dioxide Diffusion Tubes in 2014

Table 2.6 Results of Nitrogen Dioxide Diffusion Tubes (2009 – 2014)

Table 2.7 Distance Attenuation Data

The diffusion tubes monitoring results indicate that two sites, 1 Signal House (25c) and 2 Signal House (25d) are marginally above the annual average nitrogen dioxide objective. These results are slightly higher than the previous year's levels however they are still in keeping with the overall general downward trend since 2011. Consideration of the other diffusion tubes located in that area indicate that 6 out of the 8 other tubes located at that site have fallen since last year and are also following a general downward trend. Monitoring points 25a and 25j show a slight increase but these increases are very small and given the inherent margin of error associated with diffusion tubes this cannot be considered to be a true increase.

Monitoring Points 25c and 25d were introduced in 2011 following exceedances in 2010 at monitoring point 25a. Since 2011 however monitoring point 25a has reduced significantly from 51.42 to current levels of 37.8. Given this clear downward trend there are concerns over the validity of monitoring points 25c and 25d. Attempts were made in 2013 to install a continuous NO<sub>2</sub> analyser in order to obtain more accurate real time measurements. A suitable electricity supply could not however be obtained.

Defra guidance "Diffusion Tubes for Ambient NO<sub>2</sub> Monitoring: Practical Guidance for Laboratories and Users" advises that areas of higher than usual turbulence should be avoided when siting diffusion tubes and siting at the corners of buildings should be avoided. Monitoring points 25c and 25d are sited on down pipes close to the corners of the building (See Figures 2.5 & 2.6) below.

Defra guidance "Diffusion Tubes for Ambient NO<sub>2</sub> Monitoring: Practical Guidance for Laboratories and Users" also advises that "Care must be taken to avoid any very localised sources. Close Proximity (less than 10m) to heater flues (particularly low level balanced flues) must be avoided". It can be seen from Figure 5 that monitoring point 25d is within 3m of a low level balanced flue. There is also a second flue just out of camera shot above the one in the picture.

Given the proximity of monitoring point 25d to two balanced flues and the corner of the building there are concerns regarding the accuracy of the data from it. Equally the location of monitoring point 25c to the corner of the building raises concerns regarding the accuracy of the monitoring data from it. In both cases there is the potential for the tubes to be over reading the true NO<sub>2</sub> concentrations at these sites. Where it was suggested in previous reports that it may be appropriate to move to a detailed assessment, given the uncertainty regarding the data from this site it is now proposed that further efforts are made to obtain more accurate representative data for this area. Ideally a continuous monitor would be installed but as already stated in this report attempts have been made to install such a monitor previously but a

suitable power source could not be obtained. It is proposed therefore that these tubes are moved to slightly different positions where they will still be representative of relevant public exposure but will not be influenced by the corners of the building or the balanced flue. These tubes will be moved in January 2016 to new positions that continue to represent relevant public exposure. The results will be reassessed at the end of the 2016 monitoring period.

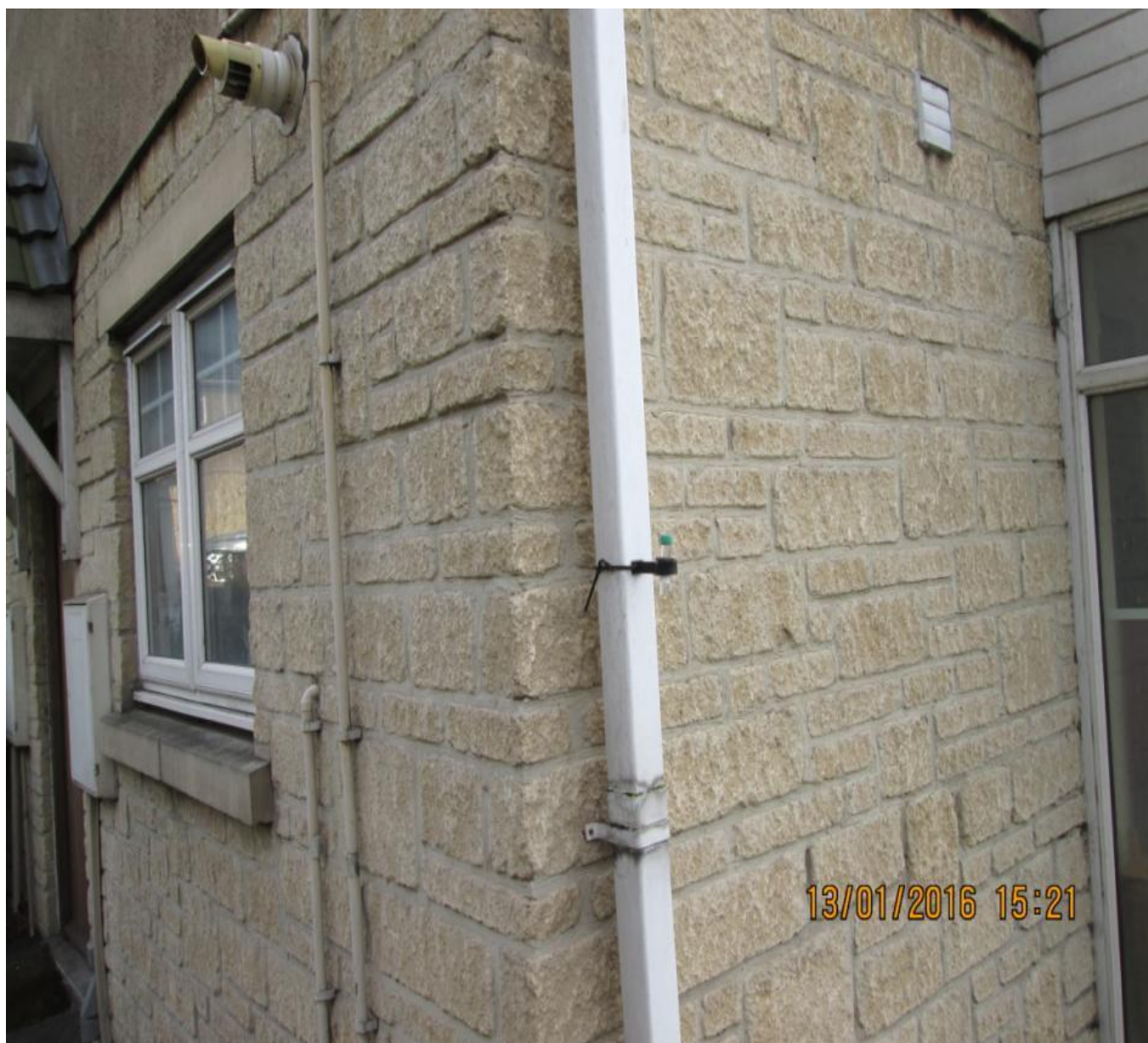


Figure 2.5 Monitoring Point 25d



Figure 2.6 Monitoring Point 25c

Stroud District Council

Site ID	Location	Site Type	Within AQMA?	Triplicate or Co-located Tube	Data Capture 2014 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 = 0.89)
								2014 ( $\mu\text{g}/\text{m}^3$ )
3	Brookthorpe – North View	Roadside	N	N	12	N/A	N	25.07
4b	Cainscross – 2 The Rosaries	Roadside	N	N	12	N/A	Y	29.5*
4a	Cainscross – 22 Westward Road	Kerbside	N	N	12	N/A	N	28.40
10a	Hardwicke – Westland Road	Roadside	N	N	11	N/A	N	21.58
15	Nailsworth – Bath Road	Kerbside	N	N	12	N/A	N	27.76
16a	Painswick – St Marys House	Kerbside	N	N	10	N/A	N	26.85
16	Painswick – High Street lights	Kerbside	N	N	12	N/A	Y	29.3*
16b	Painswick – Traffic Camera	Kerbside	N	N	12	N/A	Y	32.9
16c	Painswick - Melrose	Roadside	N	N	12	N/A	N	25.07

Stroud District Council

Site ID	Location	Site Type	Within AQMA?	Triplicate or Co-located Tube	Data Capture 2014 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 = 0.89)
								2014 ( $\mu\text{g}/\text{m}^3$ )
20a	Stonehouse – 10 Bristol Road	Kerbside	N	N	12	N/A	N	20.43
21a	Stroud - Bowbridge	Roadside	N	N	11	N/A	Y	35.6*
25a	Stroud – Signal House, Dudbridge Hill	Roadside	N	N	11	N**	Y	37.8*
25c	Stroud – 1 Signal House, Dudbridge Hill	Roadside	N	N	11	Y	N	<b>42*</b>
25d	Stroud – 2 Signal House, Dudbridge Hill	Roadside	N	N	10	Y	N	<b>41.7*</b>
25e	Stroud – 3 Signal House, Dudbridge Hill	Roadside	N	N	12	Y	N	37.2*
25f	Stroud – 4 Signal House, Dudbridge Hill	Roadside	N	N	12	N	N	31.42
25g	Stroud – 5 Signal House, Dudbridge Hill	Roadside	N	N	10	N	N	33.17



Stroud District Council

Site ID	Location	Site Type	Within AQMA?	Triplicate or Co-located Tube	Data Capture 2014 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 = 0.89)
								2014 ( $\mu\text{g}/\text{m}^3$ )
25h	Stroud – 6 The Junction, Dudbridge Hill	Roadside	N	N	10	N	N	29.95
25i	Stroud – 7 The Junction, Dudbridge Hill	Roadside	N	N	12	N	N	25.04
25j***	Stroud – 8 The Junction, Dudbridge Hill	Roadside	N	N	8	Y	N	27.95
25k	Stroud – 9 The Junction, Dudbridge Hill	Roadside	N	N	12	N	N	33.14
29	Upton St Leonards – 96 The Ash Path	Kerbside	N	N	11	N	N	21.67
30	Upton St Leonards – 26 Woodland Green	Roadside	N	N	12	N/A	N	19.93
31	Upton St Leonards –50 Woodland Green	Kerbside	N	N	12	N/A	N	22.91

Site ID	Location	Site Type	Within AQMA?	Triplicate or Co-located Tube	Data Capture 2014 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 = 0.89)
								2014 ( $\mu\text{g}/\text{m}^3$ )
32	Upton St Leonards – 10 Ash Grove	Kerbside	N	N	12	N/A	N	17.78

**Table 2.5 Results of Nitrogen Dioxide Diffusion Tubes in 2014**

\* Distance attenuated see Table 2.7

In **bold**, exceedence of the NO<sub>2</sub> annual mean AQS objective of 40 $\mu\text{g}/\text{m}^3$

Site ID	Site Type	Within AQMA?	Annual Mean Concentration ( $\mu\text{g}/\text{m}^3$ ) - Adjusted for Bias <sup>a</sup>				
			2010 (Bias Adjustment Factor = 0.85)	2011 (Bias Adjustment Factor = 0.82)	2012 (Bias Adjustment Factor = 0.95)	2013 (Bias Adjustment Factor = 0.90)	2014 (Bias Adjustment Factor = 0.89)
3	Roadside	N	33.64	30.2	35.3	28.6	25.07
4b	Roadside	N	<b>42.33</b>	37.2	38.9*	32.5*	29.5
4a	Kerbside	N	37.83	32.5	37.5	30.6	28.40
7	Roadside	N	18.59	15.0	N/A	N/A	N/A
10a	Roadside	N	25.02	17.0	22.4	20.8	21.58
15	Kerbside	N	32.92	26.4	32.3	26.5	27.76
16a	Kerbside	N	18.29	24.1	29.0	28.9	26.85
16	Kerbside	N	<b>43.93</b>	29.5*	36.3*	31.3*	29.3
16b	Kerbside	N	37.68	34.8	38.5*	33.7*	36.5
16c	Roadside	N	30.28	25.8	28.5	25.8	25.07
20a	Kerbside	N	26.29	21.1	26.1	22.7	20.43
21a	Roadside	N		<b>40.0*</b>	<b>44.3*</b>	39.5*	35.6
24	Kerbside	N	23.65	18.4	N/A	N/A	N/A
25a	Roadside	N	<b>51.42</b>	<b>45.8*</b>	<b>49.8*</b>	37*	37.8
25c	Roadside	N		37.2**	<b>48.8</b>	39.8	<b>42.00</b>
25d	Roadside	N		<b>49.8**</b>	<b>46.3</b>	<b>40.8</b>	<b>41.7</b>
25e	Roadside	N		<b>50.0**</b>	<b>46.0</b>	39.9	37.2
25f	Roadside	N		26.0	35.2	28.7	27.96
25g	Roadside	N		27.0	34.2	31.0	29.52
25h	Roadside	N		24.3	32.7	30.0	26.65
25i	Roadside	N		20.6	28.0	24.3	22,28
25j	Roadside	N		22.0	28.6	24.4	24.87
25k	Roadside	N		27.3	35.0	30.8	29.49
29b	Kerbside	N	30.85	26.5	31.9	27.3	21.67
30	Roadside	N	30.06	23.4	29.2	25.1	19.93
31	Kerbside	N	31.38	26.9	33.7	26.9	22.91

Site ID	Site Type	Within AQMA?	Annual Mean Concentration ( $\mu\text{g}/\text{m}^3$ ) - Adjusted for Bias <sup>a</sup>				
			2010 (Bias Adjustment Factor = 0.85)	2011 (Bias Adjustment Factor = 0.82)	2012 (Bias Adjustment Factor = 0.95)	2013 (Bias Adjustment Factor = 0.90)	2014 (Bias Adjustment Factor = 0.89)
32	Kerbside	N	26.51	19.6	23.0	20.6	17.78
36	Roadside	N	17.74	19.8	N/A	N/A	N/A

**Table 2.6 Results of Nitrogen Dioxide Diffusion Tubes (2010 to 2014)**

In bold, exceedence of the  $\text{NO}_2$  annual mean AQS objective of  $40\mu\text{g}/\text{m}^3$

\*Distance attenuated see Table 2.7

\*\*Means as in Box 3.2 of TG(09) (<http://laqm.defra.gov.uk/technical-guidance/index.html?d=page=38>)

Site ID	Raw Data $\mu\text{g}/\text{m}^3$	Bias Adjusted (0.9) $\mu\text{g}/\text{m}^3$	Background level $\mu\text{g}/\text{m}^3$	Tube to kerb m	Receptor to kerb m	Predicted level $\mu\text{g}/\text{m}^3$
4b	39.92	35.52	11.967	2.0	6.0	29.5
16	43.67	38.86	9.68	0.5	3.2	29.3
16b	38.91	34.63	9.68	1.0	1.5	36.5
21a	45.11	40.15	10.94	2.7	5.0	35.6
25a	47.58	42.35	13.1	2.7	5.0	37.8
25c	48.15	42.85	13.1	1.4	1.6	<b>42</b>
25d	49.24	43.82	13.1	1.7	2.3	<b>41.7</b>
25e	44.17	39.32	13.1	3.1	4.2	37.2

**Table 2.7 Distance Attenuation Data**

### **2.2.2 PM<sub>10</sub>**

Stroud District Council has not undertaken any PM<sub>10</sub> monitoring within its administrative area since the last Updating and Screening Report in 2012.

### **2.2.3 Sulphur Dioxide**

Stroud District Council has not undertaken any SO<sub>2</sub> monitoring within its administrative area since the last Updating and Screening Report in 2012.

### **2.2.4 Benzene**

Stroud District Council has not undertaken any benzene monitoring within its administrative area since the last Updating and Screening Report in 2012.

### **2.2.5 Other pollutants monitored**

Stroud District Council has not undertaken monitoring of any other pollutants within its administrative area since the last Updating and Screening Report in 2012

### **2.2.6 Summary of Compliance with AQS Objectives**

Stroud District Council has measured concentrations of Nitrogen Dioxide marginally above the annual mean objective at two locations within the district. There are concerns regarding the monitoring locations where the annual mean NO<sub>2</sub> objectives are exceeded and whether these exceedances truly reflect relevant public exposure.

## 3 Road Traffic Sources

### 3.1 Narrow Congested Streets with Residential Properties Close to the Kerb

Concentrations of NO<sub>2</sub> are often higher where traffic is slow moving, with stop/start driving and where buildings on either side reduce dispersion - Section A.1 of Box 5.3 of LAQM TG(09). High Street Painswick was identified as an area of concern due to the narrowness of the road and the buildings either side restricting dispersion.

This stretch of road exhibits all the characteristics of a canyon with residential properties on each side and the traffic moving very slowly <30mph. The 24hr work day flow is 6000-10000, with only 151-300 HGVs. NO<sub>2</sub> Diffusion tubes are sited at four locations on this road.

The 2014 bias adjusted annual mean concentration for NO<sub>2</sub> is 36.5 µg/m<sup>3</sup> at the Traffic Camera within the canyon, and 29.3 µg/m<sup>3</sup> at the Traffic lights at one end. Monitoring will continue at this location.

Stroud District Council confirms that there are no new/newly identified congested streets with a flow above 5,000 vehicles per day and residential properties close to the kerb, that have not been adequately considered in previous rounds of Review and Assessment.

### 3.2 Busy Streets Where People May Spend 1-hour or More Close to Traffic

There are some street locations where individuals may regularly spend 1-hour or more, for example, streets with many shops and streets with outdoor cafes and bars - Section A.2 of Box 5.3 of TG(09). Having reviewed potential locations within Stroud District Council's administrative area, no busy streets of concern have been identified since the last round of Updating and Screening Assessment in 2012, where people may spend 1-hour or more close to traffic.

Stroud District Council confirms that there are no new/newly identified busy streets where people may spend 1 hour or more close to traffic.

### **3.3 Roads with a High Flow of Buses and/or HGVs.**

Levels of NO<sub>2</sub> and PM<sub>10</sub> need to be considered where there is an unusually high proportion of buses and/or HGVs - Section A.3 of Box 5.3 of LAQM TG(09). Having reviewed potential locations within Stroud District Council's administrative area, no busy streets of concern have been identified since the last round of Updating and Screening Assessment in 2012. For example the two busy roads through the district have 24hr work day flows of approximately 22000, but a heavy delivery vehicle (HDV) flow of approximately 3520 (this equates to 16% HDV, below the screening guidance level of 20%). There are no roads with bus only lanes and no major industrial estates

Stroud District Council confirms that there are no new/newly identified roads with high flows of buses/HDVs.

### **3.4 Junctions**

Levels of NO<sub>2</sub> and PM<sub>10</sub> need to be considered at "busy" junctions due to the combined impact of traffic emissions from more than one road and the resultant higher emissions due to stop/start driving. - Section A.4 of Box 5.3 of TG(09). Having reviewed potential locations within Stroud District Council's administrative area, no busy junctions of concern have been identified since the last round of Updating and Screening Assessment in 2012.

Stroud District Council confirms that there are no new/newly identified busy junctions/busy roads.

### **3.5 New Roads Constructed or Proposed Since the Last Round of Review and Assessment**

Levels of NO<sub>2</sub> and PM<sub>10</sub> need to be considered for newly constructed or proposed roads - Section A.5 of Box 5.3 of LAQM TG(09). Having reviewed potential locations within Stroud District Council's administrative area, no new roads constructed or proposed since the last round of Updating and Screening Assessment in 2012.

Stroud District Council confirms that there are no new/proposed roads likely to have a significant impact upon local air quality since the 2012 Updating and Screening Assessment

### **3.6 Roads with Significantly Changed Traffic Flows**

Levels of NO<sub>2</sub> and PM10 need to be considered for any roads where there has been a “large” increase in traffic flow. An increase of more than 25% is considered “large” - Section A.6 of Box 5.3 of LAQM TG(09). Having reviewed traffic flow data within Stroud District Council’s administrative area, no roads with a large increase in traffic flow have been identified since the last round of Updating and Screening Assessment in 2012.

Stroud District Council confirms that there are no new/newly identified roads with significantly changed traffic flows that would have a significant effect on local air quality.

### **3.7 Bus and Coach Stations**

Levels of NO<sub>2</sub>, both the annual mean and the 1-hour objective, must be considered for bus stations or sections of bus stations that are not enclosed, and where there is relevant exposure, including at nearby residential properties. - Section A.7 of Box 5.3 of LAQM TG(09). Stroud District Council has no bus or coach station that meets the assessment criteria.

Stroud District Council confirms that there are no relevant bus stations in the Local Authority area that would have a significant effect on local air quality.



## 4 Other Transport Sources

### 4.1 Airports

Levels of NO<sub>2</sub> from airports must be considered as aircraft are potentially significant sources of nitrogen oxides (NO<sub>x</sub>) emissions, especially during takeoff - Section B.1 of Box 5.4 of LAQM TG(09). Stroud District Council have no airports within their administrative area.

Stroud District Council confirms that there are no airports in the Local Authority area.

### 4.2 Railways (Diesel and Steam Trains)

Stationary locomotives, both diesel and coal fired, can give rise to high levels of SO<sub>2</sub> close to the point of emission. Recent evidence suggests that moving diesel locomotives, in sufficient numbers, can also give rise to high NO<sub>2</sub> concentrations close to the track. These two potentially significant sources are considered separately below - Section B.2 of Box 5.4 of LAQM TG(09).

#### 4.2.1 Stationary Trains

Measurements were made on the Council's GIS mapping system to establish that there are no relevant exposure sites within 15m of the track at Stroud station. Trains are also not regularly stationary for 15 minutes or more.

Stroud District Council confirms that there are no locations where diesel or steam trains are regularly stationary for periods of 15 minutes or more, with potential for relevant exposure within 15m.

#### 4.2.2 Moving Trains

National Rail's Timetable Map 2015 Ref3 shows that none of the rail lines with a heavy traffic of diesel passenger trains, as listed in Table 1 of the FAQ Guidance on Assessing Emissions from Railway Traffic (Ref4), pass through its district. Nor is Stroud District Council one of the authorities listed in Table 2 of this document.

Stroud District Council confirms that there are no locations with a large number of movements of diesel locomotives within its district which are likely to have a significant impact on local air quality.

### 4.3 Ports (Shipping)

Large ships generally burn oils with a high sulphur content in their main engines (bunker oils). If there are sufficient movements in a port they can give rise to a sufficient number of 15-minute periods above  $266 \mu\text{g}/\text{m}^3$ , as to exceed the 15-minute objective for SO<sub>2</sub>. Auxiliary engines used while berthed (hotelling) usually use a lower sulphur fuel, and are unlikely to be significant. - Section B.3 of Box 5.4 of LAQM TG(09).

Sharpness Docks are located in the south west corner of the district, situated on the River Severn and linked by canal to Gloucester Docks. There are approximately 600 movements per year, none of which are by large ships, as defined in Section B.3 of Box 5.4 of LAQM TG(09).

Stroud District Council confirms that there are no ports or shipping that meet the specified criteria within the Local Authority area.

## 5 Industrial Sources

### 5.1 Industrial Installations

Although Industrial sources are unlikely to make a significant local contribution to annual mean concentrations they may be significant in terms of the short-term objectives, especially if there is an impact from several sources. All of the regulated pollutants need to be considered, although those most at risk of requiring further work are SO<sub>2</sub>, NO<sub>2</sub>, PM10 and benzene – Section C.1 of Box 5.5 of LAQM TG(09).

#### 5.1.1 New or Proposed Installations for which an Air Quality Assessment has been carried Out

The Secretary of State is currently considering a planning application for the siting of a 65.3 MW energy from waste facility at Javelin Park. This application was submitted with an Environmental Statement in which the impact of the facility on Local Air Quality was considered. The Statement concluded that “no significant effects on air quality are predicted as a result of the construction or operation of the proposed facility”. The Environmental Statement was fully reviewed and audited by the Environment Agency who agreed that, the conclusions arrived at in relation to air quality and human health, were acceptable.

Stroud District Council confirms that there are no new or proposed industrial installations for which planning approval has been granted within its area or nearby in a neighbouring authority which would have a significant impact on air quality. .

#### 5.1.2 Existing Installations where Emissions have Increased Substantially or New Relevant Exposure has been Introduced

There are no existing installations with substantially increased emissions and none with any new relevant exposure introduced.

Stroud District Council confirms that there are no industrial installations with substantially increased emissions or new relevant exposure in their vicinity within its area or nearby in a neighbouring authority.

### **5.1.3 New or Significantly Changed Installations with No Previous Air Quality Assessment**

There are no existing installations with substantially increased emissions and none with any new relevant exposure introduced.

Stroud District Council confirms that there are no new or proposed industrial installations for which planning approval has been granted within its area or nearby in a neighbouring authority.

## **5.2 Major Fuel (Petrol) Storage Depots**

Major petrol fuel depots could emit sufficient benzene to put the 2010 objective at risk of being exceeded, especially if combined with higher levels from nearby busy roads – Section 23 C.2 of Box 5.5 of LAQM TG(09).

There are no major fuel (petrol) storage depots within the Local Authority area.

## **5.3 Petrol Stations**

Petrol stations could emit sufficient benzene to put the 2010 objective at risk of being exceeded, especially if combined with higher levels from nearby busy roads - Section C..3 of Box 5.5 of LAQM TG(09).

Stroud District Council has considered busy roads as defined and all petrol stations located on them. None have relevant exposure within 10 metres of the pumps.

Stroud District council confirms that there are no petrol stations meeting the specified criteria.

## **5.4 Poultry Farms**

There is the potential for localised exceedences of the PM10 objectives associated with emissions from certain large poultry farms - Section C.4 of Box 5.5 of LAQM TG(09).

There is one such farm with a permit from the Environment Agency - Appendix A: Faccenda Group Limited, Highwood Farm, Kingswood, Wotton under Edge, Glos, GL12 8JU. However, this farm has mechanically ventilated units which house 158,250 birds. This is well below the specified criteria of 400,000 birds.

Stroud District Council confirms that there are no poultry farms meeting the specified criteria.

## 6 Commercial and Domestic Sources

### 6.1 Biomass Combustion – Individual Installations

Biomass burning can lead to an increase in PM10 emissions, due to the process of combustion – aerosol formation from volatile materials distilled from the wood is also an issue.

Compared to conventional gas-burning, biomass burning can also result in an increase in the overall NO<sub>x</sub> emissions due to the fuel-derived portion that is not present in gas combustion - Section D.1a of Box 5.8 LAQM.TG(09).

Stroud District Council received several enquiries during 2012-2014 regarding biomass boilers between 50kW and 20MW under the Clean Air Act 1993. These were assessed using the “Screening assessment for biomass boilers-ED48673005/R2655”. No boilers were found to individually or in combination have a significant effect on local air quality.

Stroud District Council confirms that there are no biomass combustion plant in the Local Authority area which will have a significant impact on local air quality..

### 6.2 Biomass Combustion – Combined Impacts

There is the potential that many small biomass combustion installations (including domestic solid-fuel burning), whilst individually acceptable, could in combination lead to unacceptably high PM10 concentrations, particularly in areas where PM10 concentrations are close to or above the objectives.

The impact of domestic biomass combustion in most areas is thought to be small at the time of writing, but could become more important in future - Section D.1b of Box 5.8 LAQM.TG(09).

There are only a few isolated biomass boilers within Stroud District Council. There are no areas that would meet the criteria as set out in the Technical Guidance LAQM.TG(09).

Stroud District Council has assessed the biomass combustion plant, and concluded that it will not be necessary to proceed to a Detailed Assessment.

### **6.3 Domestic Solid-Fuel Burning**

There is the potential in areas where significant coal burning takes place for exceedences of the objectives for SO<sub>2</sub> to occur - Section D.2 of chapter 5 LAQMTG(09). Having reviewed potential locations within Stroud District Councils administrative area, no areas of significant coal burning have been identified since the last round of Updating and Screening Assessment in 2012.

Stroud District Council confirms that there are no areas of significant domestic fuel use in the Local Authority area.

## 7 Fugitive or Uncontrolled Sources

Potentially elevated levels of PM10 can arise from the fugitive emissions from a range of sources including quarrying, stone cutting, gravel extraction and wind-blown dust from stockpiles and dusty surfaces - Section E of Box5.10 LAQM TG(09).

Having reviewed potential locations within Stroud District Council's administrative area, no locations of concern have been identified since the last round of Updating and Screening Assessment in 2012.

Stroud District Council confirms that there are no potential sources of fugitive particulate matter emissions in the Local Authority area.

## **8 Conclusions and Proposed Actions**

### **8.1 Conclusions from New Monitoring Data**

There are two areas at Dudbridge Hill which are marginally above the annual average nitrogen dioxide objective. These are: 1 Signal House (25c) and 2 Signal House (25d). Where other monitoring points in that area indicate an overall reduction in NO<sub>2</sub> levels, these two sites do not appear to be demonstrating the same downward trend. Consideration of these two monitoring points indicates that they are located in positions that may result in overreading NO<sub>2</sub> levels. One tube is located on the corner of a building contrary to the technical guidance and the other as well as being located on a corner is also within 10m of two boiler flues.

### **8.2 Conclusions from Assessment of Sources**

A comprehensive review of any changes to sources that impact on local air quality has been carried out. This review was carried out in accordance with "Local Air Quality Management Technical Guidance LAQM .(TG09).

### **8.3 Proposed Actions**

Monitoring points 25c and 25d will be moved slightly to ensure that they are not on the corner of the building and are not near boiler flues.

Progress Report 2016 will be submitted in April 2016.



## 9 References

1 Diffusion Tubes for Ambient NO<sub>2</sub> Monitoring: Practical Guidance for Laboratories and Users 2008

[http://laqm.defra.gov.uk/documents/0802141004\\_NO2\\_WG\\_PracticalGuidance\\_Issue1a.pdf](http://laqm.defra.gov.uk/documents/0802141004_NO2_WG_PracticalGuidance_Issue1a.pdf)

2 Local Air Quality Management Technical Guidance TG(09)

<http://www.defra.gov.uk/publications/2011/03/25/pb13081-laqm-technical-guidance-tg09/>

3 National Rail Timetable Map 2015

<http://www.networkrail.co.uk/aspx/3828.aspx>

4 Guidance on Assessing Emissions from Railway Locomotives 2009

[http://laqm.defra.gov.uk/documents/Railway\\_Locomotives\\_100209.pdf](http://laqm.defra.gov.uk/documents/Railway_Locomotives_100209.pdf)

5 Summary of Laboratory Performance in WASP NO<sub>2</sub> Proficiency Testing  
Scheme for Rounds 108-115

[http://laqm.defra.gov.uk/documents/WASP-Rounds-108-115-\(January-2010-December-2011\).pdf](http://laqm.defra.gov.uk/documents/WASP-Rounds-108-115-(January-2010-December-2011).pdf)

# Appendices

Appendix A: QA/QC Data

Appendix B: List of A1 Permitted Processes

Appendix C: List of A2 Permitted Processes

Appendix D: List of Part B Permitted Processes

Appendix E: 2014 Diffusion Tube Monthly Dataset

Appendix F: Short Term Adjustment Data

Appendix G: Distance Attenuation Data

## Appendix A: QA/QC Data

### Diffusion Tube Bias Adjustment Factors

The diffusion tubes (20% TEA in Acetone) were supplied and analysed by Bristol Scientific Services. The tubes at all locations throughout the area have a monthly exposure period. A bias adjustment factor of 0.89 (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>

Details are provided in Appendix F.

### 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 0.89 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. (Ref5).

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](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 B: List of A1 Permitted Processes

Environment Agency permitted installations involving Part A1 prescribed activities regulated under the Environmental Permitting (England & Wales) Regulations 2010.

Reference	Premises	Prescribed Activity
BV3146	Stonehouse Battery Factory, Schlumberger WCP Ltd, Brunel Way, Stroudwater Business Park, Stonehouse, Glos, GL10 3SX	Section 4.2 A(1)b) -any manufacturing activity which uses, or which is likely to result in the release to air or into water of, any halogens, hydrogen halides or any compounds mentioned in paragraph (a)(vi) of the PPC Regulations 2000
HP3635PM	RMC Environmental Services Ltd, Frampton Landfill, Perryway, Frampton on Severn, Glos, GL2 7HS	Section 5.2 A(1) – disposal of waste by landfill
XP3938SF	Nu-Pro Surface Treatments Ltd, Eagle Works, London Road, Thrupp, Stroud, Glos, GL5 2BA	Section 4.2 A(1)(h) – unless falling within another section of this schedule, any activity, other than the combustion or incineration or carbonaceous material as defined in the Interpretation of Part A(1) of Section 1.2 of this schedule, which is likely to result in the release into the air of any acid forming oxide of nitrogen
BP3532SW	Sevenside Dairies, Dairy Crest Ltd, Oldends Lane, Stonehouse, Glos, GL10 2DG	Six activities under Section 6.8 Part A(1)(e) – treating and processing of milk and Section 5.3 Part A(1)(c)(A) – disposal of non-hazardous waste
PP3232SB	Norit (UK) Ltd, Purton Carbon Ltd, Purton Water Treatment Works, Riddle Street, Purton, Glos, GL13 9HN	Section 5.4 A(1)(c) – cleaning or regenerating carbon
HP3537ML	Faccenda Group Ltd, Highwood Farm, Kingswood, Wotton under Edge, Glos, GL12 8JU	Section 6.9 A(1)(a)(i) –intensive farming – rearing of poultry in an installation with more than 40,000 poultry
BP3498VC/T001	New Earth Solutions Group Ltd, The Factory, Sharpness Docks, Berkeley, Glos, GL13 9UD	Section 5.3 A(1)(c) – disposal of waste other than by incineration or landfill

## Appendix C: List of A2 Permitted Processes

Local Authority Pollution Prevention and Control (LAPPC) permitted installations involving Part A2 prescribed activities regulated under the Environmental Permitting (England & Wales) Regulations 2010.

Reference	Premises	Prescribed Activity
LA-IPPC/77	Nu-Pro Surface Treatments Ltd, Eagle Works, London Road Thrupp, GL5 2BA	Surface treatment of metals and plastic materials

## Appendix D: List of Part B Permitted Processes

Local Authority Pollution Prevention and Control (LAPPC) permitted installations involving Part B prescribed activities regulated under the Environmental Permitting (England & Wales) Regulations 2010.

Reference	Premises	Prescribed Activity
LAPPC/2	Silvey Brothers Limited, The Garage, Saul, Glos, GL2 7LW	Waste oil burner
LAPPC/6	Fourways Garage, Middle Hill, Chalford, Stroud, Glos, GL6 8BD	Waste oil burner
LAPPC/7	Holbrook Garage, Bisley, Stroud, Glos, GL6 7AX	Waste oil burner
LAPPC/9	D M Foundries, London Road, Stroud, Glos, GL5 2AZ	Foundry
LAPPC/17	Dragon Alfa Cement Ltd, Sharpness Docks, Glos, GL13 9UA	Unloading cement
LAPPC/18	Cullimore Mix Ltd, Netherhills, Whitminster, Glos, GL2 7PQ	Bulk use of cement
LAPPC/20	Olympic Varnish Co Ltd, The Dockyard, Brimscombe, Stroud, Glos, GL5 2TQ	Paper coating
LAPPC/24	Sharpness Docks Ltd, Sharpness Docks, Glos, GL13 9UA	Coal
LAPPC/34	Kellaway Building Supplies Ltd, The Old Ryeford Saw Mills, Stonehouse, Glos, GL10 3HE	Bulk use of cement
LAPPC/38	Snax 24 Ltd, London Road, Stroud, Glos, GL5 2AX	Petrol filling station
LAPPC/39	Tesco Stores Ltd, Stratford Road, Stroud, Glos, GL5 4AG	Petrol filling station
LAPPC/40	Dudbridge Superstop, Dudbridge, Stroud, Glos, GL5 3HP	Petrol filling station
LAPPC/41	Bear Street Garage, Bear Street, Wotton under Edge, Glos, GL12 7DF	Petrol filling station
LAPPC/42	Bristol Street Ford, London Road, Stroud, Glos, GL5 2AX	Petrol filling station
LAPPC/43	Millwood Motor Co Ltd, Cam, Glos, GL11 5DH	Petrol filling station
LAPPC/44	Shell Nailsworth, Stroud Road, Nailsworth, Glos, GL6 0BE	Petrol filling station
LAPPC/45	UMA (UK) Ltd, 14 Ebley Road, Stonehouse, Glos, GL10 2LH	Petrol filling station
LAPPC/46	Cross Keys, Bristol Road, Hardwicke, Glos, GL2 4RQ	Petrol filling station
LAPPC/48	Wild Goose Garage, 27 Kingshill Road, Dursley, Glos, GL11 4BJ	Petrol filling station
LAPPC/50	Shell Oldbury, Westend Roundabout, Stonehouse, Glos, GL10 2SY	Petrol filling station
LAPPC/51	Bridge Service Station 2-6 Gloucester Road, Stonehouse, Glos, GL10 2PB	Petrol filling station
LAPPC/53	Berkeley Heath Motors, A38 Berkeley, Glos GL13 9ET	Petrol filling station
LAPPC/54	Fromebridge Self Service, Whitminster, Glos GL2 7PG	Petrol filling station
LAPPC/55	Michaelwood Services Northbound M5, Lower Wick, Dursley, Glos GL11 6DD	Petrol filling station

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LAPPC/56	Michaelwood Services Southbound M5, Lower Wick, Dursley, Glos GL11 6DD	Petrol filling station
LAPPC/61	Fourways Garage, Fourways Garage (Chalford) Ltd, Middle Hill, Chalford, Stroud, Glos, GL6 8BD	Petrol filling station
LAPPC/64	Holbrook Garage, Bisley, Stroud, Glos, GL6 7AX	Petrol filling station
LAPPC/68	Car Clinic, Kingswood Garage, Kingswood Glos, GL12 8RA	Waste oil burner
LAPPC/69	M & N Motor Services, Davids Lane, Nympsfield, Stonehouse, Glos, GL10 3UG.	Waste oil burner
LAPPC/70	Lakeside Garage, Stroud Road, Nailsworth, Glos GL6 0BE	Waste oil burner
LAPPC/72	Stroud Tyre Co Ltd, Units 5-6 Wallbridge Industrial Estate, Bath Road, Stroud, Glos, GL5 3JU	Waste oil burner
LAPPC/73	Roadspeed Units 5-6 Wallbridge Industrial Estate, Bath Road, Stroud, Glos, GL5 3JU	Waste oil burner
LAPPC/75	Stonehouse Commercials, Unit 9A Ryeford Ind. Estate, Stonehouse, Glos GL10 3HE	Waste oil burner
LAPPC/76	Cotswold Crusher Hire, 24 The Martins, Westrip, Stroud Glos, GL5 4PQ	Mobile crusher
LA-IPPC/77	Nu-Pro Surface Treatments Ltd, Eagle Works, London Road Thrupp, GL5 2BA	Coating aircraft components and Surface treatment of metals
LAPPC/78	The Premier Kitchen Company, Q1, Quadrant Buisness Park, Quedgeley GI2 2RN	Timber activity and combustion
LAPPC/80	Gloucester Composites Ltd, Fox House, Stonedale Road, Stonehouse, GL10 3SA	Manufacture of fibre reinforced plastic
LAPPC/81	STC Services (Stroud) Ltd, Unit L1A, Bath Road Trading Estate, GL5 3QF	Waste oil burner
LAPPC/82	Severn Plywoods Ltd, 14 Gloucester Road, Stonehouse, GL10 2PB	Timber activity and combustion
LAPPC/83	Smith's (Gloucester) Ltd, Alkerton Court, Eastington, Stonehouse, Glos. GL10 3AQ	Mobile crusher
LAPPC/84	Millclean Dry cleaners & Launderers, 35 Westward Road, Cainscross, Stroud, Glos GL5 4JA.	Dry cleaner
LAPPC/85	Johnson The Cleaners, 6 Kendrick Street, Stroud, Glos GL5 1AA	Dry cleaner
LAPPC/86	Atkins Autos, Old Brewery Yard, Cainscross, Stroud, Glos GL5 4JW	Waste oil burner
LAPPC/87	Russells Dry Cleaners, 47 George Street, Mill Yard, Nailsworth, GL6 0AG	Dry cleaner
LAPPC/88	Dry Cleaners at Gerards, 35D Parsonage Street, Dursley, Glos, GL11 4BP	Dry cleaner
LAPPC/90	VMR Autos Unit J1, Drycott Business Park, Cam Dursley, GL11 5DQ	Waste oil burner
LAPPC/93	Smith's (Gloucester) Ltd, Alkerton Court, Eastington, Stonehouse, Glos. GL10 3AQ	Mobile crusher
LAPPC/96	Abbey Surfacing, Parkend Farm, Moreton Valence, Glos, GL2 7NG	Mobile crusher
LAPPC/98	Shires Ltd, Unit B, Quedgeley West Buisness Park, Hardwicke, Gloucester, GL2 4RA	Vehicle refinisher
LAPPC/99	Smith's (Gloucester) Ltd, Alkerton Court, Eastington, Stonehouse, Glos. GL10 3AQ	Mobile crusher
LAPPC/102	Smiths (Gloucester) etc	Mobile Crusher

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LAPPC/103	Moreton C.Cullimore, Fromebridge Lane, Whitminster, Glos, GL2 7PD	Waste Oil Burner
LAPPC/105	Temple Utilities Ltd, Rocksmoor Mills, Bath Road, Woodchester, Gloucester, GL5 5ND	MobileCrusher



## Appendix E: 2014 Diffusion Tube Monthly Dataset

Location	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	AVERAGE
BROOKTHORPE -NORTH VIEW	31.7	30.5	36.2	32.7	25.4	25.8	16.8	21.3	27.2	26.4	33.7	30.3	28.17
CAINSCROSS - 2 THE ROSARIES	45.9	34.2	45.0	46.5	40.9	41.7	36.5	34.9	24.0	38.2	46.7	44.5	39.92
CAINSCROSS-22 WESTWARD ROAD	25.2	23.0	40.0	37.1	30.3		31.7	29.5	28.2	30.7	35.9	39.5	31.91
HARDWICKE - WESTLAND ROAD	23.8	18.0	24.0	20.4	15.4		13.6	54.5	21.3	18.6	32.1	25.0	24.25
NAILSWORTH - BATH RD	35.3	31.1	34.7	33.6	29.2	29.7	25.3		26.5	28.7	37.1	32.0	31.19
PAINSWICK -ST MARYS HOUSE			32.3	30.7	23.5	31.4	30.9	22.8	30.9		34.6	34.6	30.17
PAINSWICK -HIGH ST LIGHTS	39.7	41.1	49.5	46.0	44.4	39.0	43.1	25.8		50.6	48.2	52.9	43.67
PAINSWICK -TRAFFIC CAMERA		29.0		38.6	38.9	38.0	27.2	42.7	39.3	40.8	46.1	48.5	38.91
PAINSWICK -MELROSE	30.1	24.8	24.3	19.7	30.3	25.4	25.8	30.6	32.7		38.8	27.4	28.17
STONEHOUSE - 10 BRISTOL ROAD	26.7	24.2	28.6	23.9	21.9	18.8	13.8	22.8	22.9	28.1	16.5	27.4	22.96
STROUD - BOWBRIDGE	55.5	48.9	53.0	29.6	42.6	46.8	46.2	20.8	43.3	52.1	53.0	49.6	45.11
STROUD - SIGNAL HOUSE, DUDBRIDGE ROAD	47.0	38.2	49.8	51.2		54.6	47.6	46.5	46.3		51.7	42.8	47.58
1 Signal House	46.7		49.1	53.9	48.0	55.1	47.7	39.8	43.9	45.4	53.3	46.7	48.15
2 Signal House			48.0	51.9		56.3	43.4	40.8	48.6	51.2	54.7	48.3	49.24
3 Signal House	51.7	47.2	28.8	31.6	49.8	51.7	45.5	39.8	43.2	47.7	47.0	46.1	44.17
4 Signal House	30.7		31.0	33.6	26.4	30.1	20.8	42.9	31.3	28.1	34.8	35.9	31.42
5 Signal House	30.4		39.3	35.0		36.3	28.2	26.2	33.2	29.3	37.9	36.0	33.17
6 The Junction	21.5	24.5	37.2	33.4	31.2	35.3	17.0	26.6	35.0	26.1	37.5	34.2	29.95
7 The Junction	25.2		31.1	21.3	24.4		24.7	20.3	23.2	21.0	31.8	27.4	25.04
8 The Junction	27.2	25.1	33.1	38.5	21.5	23.2	25.6	22.5	27.9	23.2	33.6	34.1	27.95
9 The Junction	33.6	33.0	37.7	31.6	34.2	32.6	25.8	28.8	34.3	30.8	37.8	37.4	33.14
UPTON ST LEONARDS- 96 THE ASH PATH	19.7	22.0	30.4	23.1	24.7	17.0		25.5	22.0	21.7	25.7	36.2	24.35
UPTON ST LEONARDS-26 WOODLAND GREEN	20.3	20.5	19.2	26.7	20.8	15.2	19.8	19.6	22.3	20.1	28.8	35.5	22.39
UPTON ST LEONARDS-50 WOODLAND GREEN	22.4	22.0	28.5	31.6	25.1	18.2	22.0	24.1	23.3	22.1	30.6	39.0	25.74
UPTON ST LEONARDS-10 ASH GROVE	18.9	19.2	20.5	23.2	10.4	14.0	15.9		19.5	18.9	25.7	33.7	19.98

## Appendix F: Distance Attenuation Data

Background levels were obtained for the nearest grid reference to the three sites from the dataset for Stroud District Council obtained via:

<http://laqm.defra.gov.uk/maps/maps2010.html#2010BackgroundMaps>

All relevant data was then input into the calculator available at:

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

to obtain the predicted levels at each of these sites as shown in Table 2.7.