2013 Air Quality Progress Report for Forest of Dean District Council

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

September 2013

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Executive Summary

The 2013 Progress Report provides an update on the air quality issues affecting Forest of Dean district, including results of pollutant monitoring and information on new residential, industrial and transport developments that might affect air quality in the district.

In 1995, the Environment Act provided for a National Air Quality Strategy requiring local authorities to carry out Reviews and Assessments of the air quality in their area for seven specific pollutants. These are; carbon monoxide (CO), benzene, 1, 3-butadiene, nitrogen dioxide (NO_2), lead, sulphur dioxide (SO_2) and PM_{10} (Particles under 10µm in diameter).

The Air quality Progress Report concluded the following:

- Seven locations were identified where the annual mean objective of 40µg/m^3 for NO2 was exceeded in 2012. These locations are all within the Lydney Air Quality Management Area which was declared in July 2010. All other monitoring locations were below the annual mean objectives. None of the sites outside Lydney Air Quality Management Area are close to an annual mean of 60µg/m^3 suggesting that there are no concerns for the 1-hour objective. Forest of Dean District Council will not be undertaking a Detailed Assessment for nitrogen dioxide in 2013.
- The Forest of Dean District Council confirms that there are no new or newly identified local developments, which may have an impact on air quality within the Local Authority area.
- Apart from within the Lydney AQMA, there are no sources of concern within Forest of Dean District Council's administrative area from the following:-
    - road traffic sources,
    - other transport sources,
    - industrial sources,
    - commercial and domestic sources,
    - new developments with fugitive or uncontrolled sources.
- Progress Reports are required in the intervening years between the three-yearly Updating and Screening Assessment reports. Their purpose is to maintain continuity in the Local Air Quality Management process.

Table of Contents

Executive Summary **2**

Copyright Statement **5**

1 Introduction **6**

1.1 Description of Local Authority Area 6

1.2 Purpose of Progress Report 7

1.3 Air Quality Objectives 8

1.4 Summary of Previous Review and Assessments 9

2 New Monitoring Data **12**

2.1 Summary of Monitoring Undertaken 12

2.1.1 Automatic Monitoring Sites 12

2.1.2 Non-Automatic Monitoring Sites 12

2.2 Comparison of Monitoring Results with Air Quality Objectives 15

2.2.1 Nitrogen Dioxide (NO_2) 15

2.2.2 Particulate Matter (PM_{10}) 19

2.2.3 Sulphur Dioxide (SO_2) 19

2.2.4 Benzene 19

2.2.5 Other Pollutants Monitored 19

2.2.6 Summary of Compliance with AQS Objectives 19

3 New Local Developments **20**

4 Local / Regional Air Quality Strategy **21**

5 Planning Applications **23**

6 Air Quality Planning Policies **24**

7 Local Transport Plans and Strategies **25**

8 Climate Change Strategies **26**

9 Conclusions and Proposed Actions **27**

9.1 Conclusions from New Monitoring Data 27

9.2 Conclusions relating to New Local Developments 27

9.3 Proposed Actions 27

10 Bibliography **29**

11 Appendix A: QA:QC Data **31**

12 Appendix B: List of Part A1 Permitted Processes **39**

13 Appendix C: List of Part A2 Permitted Processes **41**

14 Appendix D: List of Part B Permitted Processes **42**

15 Appendix E: Diffusion tube locations **45**

List of Figures

Figure 1 - Forest of Dean District Boundary map 6

Figure 2 – Map of Lydney AQMA Boundary 11

Figure 3 - Nitrogen dioxide diffusion tube sites 13

Figure 4 - Trends in annual mean Nitrogen dioxide concentrations measured at diffusion tube monitoring sites 18

List of Tables

Table 1 - Air Quality Objectives included in Regulations for the purpose of LAQM in England 8

Table 2 - Conclusions of previous rounds of review and assessment 10

Table 3 - Details of Non- Automatic Monitoring Sites 14

Table 4 - Results of NO_2 Diffusion Tubes 2012 16

Table 5 - Results of NO_2 Diffusion Tubes (2009 to 2012) 17

Table 6 - 2012 Bias correction factor for NO_2 diffusion tube data co-location studies (LAQM Review and Assessment support website) – version 07/13 32

Table 7 - 2011 bias correction factor for NO_2 diffusion tube data co-location studies (LAQM Review and Assessment support website) - version 03/12 33

Table 8 - 2010 Bias correction factor for NO_2 diffusion tube data co-location studies (LAQM Review and Assessment support website) - version 03/12 33

Table 9 - Laboratories that have demonstrated satisfactory performance in the WASP scheme for analysis of NO_2 diffusion tubes, April 2009 – April 2010 38

Table 10 - List of Part A1 Permitted Processes 39

Table 11 - List of Poultry Farms 40

Table 12 - List of Part A2 Permitted Processes 41

Table 13 - List of Part B Permitted Processes 42

Table 14 - List of Petrol Stations 44

Table 15 - Change of diffusion tube locations from 2011-2012 45

Copyright Statement

1 Introduction

1.1 Description of Local Authority Area

The Forest of Dean is a rural community situated in Gloucestershire, covering 585 square kilometres. It is made up of four major towns (Lydney, Coleford, Cinderford and Newent) surrounded by numerous villages, with the remainder of the District comprising wooded areas and open space.

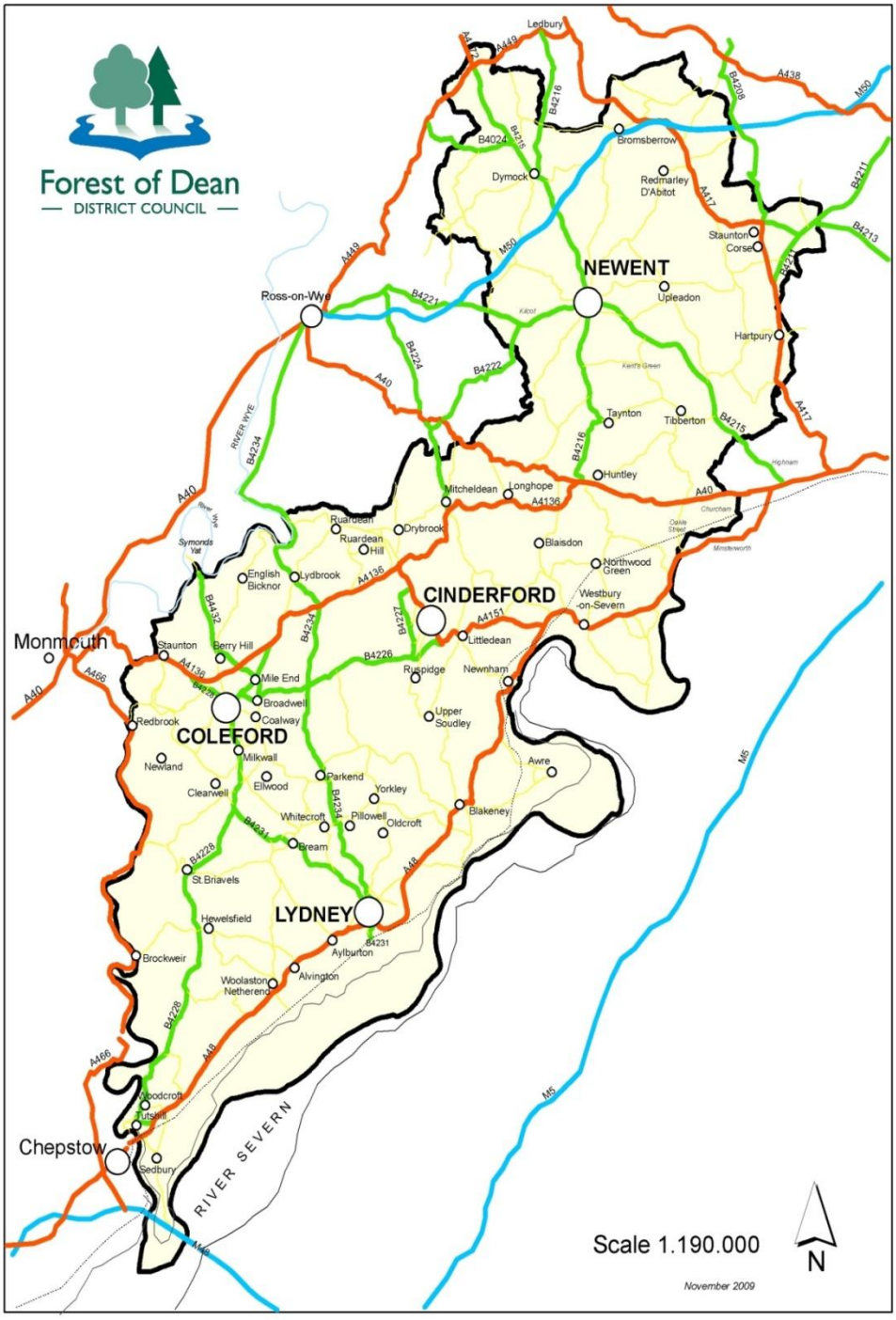

Figure 1 - Forest of Dean District Boundary map

The main industry is still manufacturing, having moved from iron and steel to advanced electronics and IT with light engineering, tourism and local ceramics also providing much of the employment in the District. The population is just around 82,000. The main routes through the District include the M50 in the north of the District and numerous A-roads (e.g. A48 and the A40).

There are no major industrial areas within the district or close-by that significantly impact on air quality. The industries within the District that emit any of the prescribed pollutants are not located close to relevant public exposure. The scale on which they operate does not produce emissions that significantly affect local air quality.

1.2 Purpose of Progress Report

This report fulfils the requirements of the Local Air Quality Management process as set out in Part IV of the Environment Act (1995)[1], the Air Quality Strategy for England, Scotland, Wales and Northern Ireland 2007[2] and the relevant Policy and Technical Guidance documents[3]. 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.

Progress Reports are required in the intervening years between the three-yearly Updating and Screening Assessment reports. Their purpose is to maintain continuity in the Local Air Quality Management process.

They are not intended to be as detailed as Updating and Screening Assessment Reports, or to require as much effort. However, if the Progress Report identifies the risk of exceedence of an Air Quality Objective, the Local Authority (LA) should undertake a Detailed Assessment immediately, and not wait until the next round of Review and Assessment.

[1] Part IV of the Environment Act (1995)
[2] Air Quality Strategy for England, Scotland, Wales and Northern Ireland 2007
[3] Local Air quality Management, 2009 Technical Guidance LAQM.TG(09)

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)[4], The Air Quality (England) (Amendment) Regulations 2002 (SI 3043), and are shown in Table 1. This table shows the objectives in units of micrograms per cubic metre µg/m^3 (milligrammes per cubic metre, mg/m^3 for carbon monoxide) with the number of exceedences in each year that are permitted (where applicable).

Table 1 - Air Quality Objectives included in Regulations for the purpose of LAQM in England

Pollutant	Air Quality Objective		Date to be achieved by
	Concentration	Measured as	
Benzene	16.25 µg/m^3	Running annual mean	31.12.2003
	5.00 µg/m^3	Annual mean	31.12.2010
1,3-Butadiene	2.25 µg/m^3	Running annual mean	31.12.2003
Carbon monoxide	10 mg/m^3	Running 8-hour mean	31.12.2003
Lead	0.50 µg/m^3	Annual mean	31.12.2004
	0.25 µg/m^3	Annual mean	31.12.2008
Nitrogen dioxide	200 µg/m^3 not to be exceeded more than 18 times a year	1-hour mean	31.12.2005
	40 µg/m^3	Annual mean	31.12.2005
Particulate Matter (PM_{10}) (gravimetric)	50 µg/m^3, not to be exceeded more than 35 times a year	24-hour mean	31.12.2004
	40 µg/m^3	Annual mean	31.12.2004
Sulphur dioxide	350 µg/m^3, not to be exceeded more than 24 times a year	1-hour mean	31.12.2004
	125 µg/m^3, not to be exceeded more than 3 times a year	24-hour mean	31.12.2004
	266 µg/m^3, not to be exceeded more than 35 times a year	15-minute mean	31.12.2005

[4] Air Quality (England) (Amendment) Regulations 2002 (SI3043)

1.4 Summary of Previous Review and Assessments

The Forest of Dean District Council has previously undertaken the Updating and Screening Assessment 2012[5] - submitted in May 2012.

This Updating and Screening Assessment concluded the following:

- Three sites in the town of Lydney exceeded the nitrogen dioxide annual mean objective of 40µg/m^3. These sites are within the Lydney Air Quality Management Area, which was declared in July 2010.
- There are no road traffic sources, other transport sources, industrial sources, commercial or domestic sources, fugitive or uncontrolled sources.
- No detailed assessment is required for any pollutants within Forest of Dean District Council's administrative area.
- Lydney draft Air Quality Action Plan will be submitted in late 2013.

[5] Updating and Screening Assessment 2012, submitted to Defra May 2012

Table 2 - Conclusions of previous rounds of review and assessment

Report	Exceedences Identified	AQMA declared	Additional Comments
Progress Report 2011[6] (Report Submitted May 2011)	Five sites in the town of Lydney exceeded the nitrogen dioxide annual mean objective of 40µg/m^3. These sites are within the Lydney Air Quality Management Area, which was declared in July 2010. No other pollutants exceeded their respective annual mean concentrations.	Yes	In July 2011, the Lydney Air Quality Management Area Further assessment was produced, in early 2012. In April 2012, the Updating and Screening Assessment Report (Round 5) which forms part of the Local Air Quality Management (LAQM) will be submitted.
Progress Report 2010[7] (Report Submitted Aug 2010)	Four sites in the town of Lydney exceeded the nitrogen dioxide annual mean objective of 40µg/m^3. These sites will be within the Lydney Air Quality Management Area, which was declared in July 2010. No other pollutants exceeded their respective annual mean concentrations. Measured NO_2 levels are within 10% of the air quality objective at one location in Newnham-on-Severn. If the trends in this area indicate that the NO_2 levels are increasing, the Forest of Dean District Council will undertake a Detailed Assessment when required. There are no concerns from the following sources - other road traffic; other transport; industrial; commercial or domestic; fugitive or uncontrolled.	Yes	Lydney AQMA was declared in July 2010. See – figure 1.2
Updating & Screening Assessment 2009[8]	NO_2 annual mean objective exceeded at three sites in Lydney in 2008. (Report submitted November 2009)	Yes	Lydney AQMA will be declared at end of 2009, beginning of 2010.
Detailed Assessment 2008[9]	Detailed Assessment: Exceedances of annual mean NO_2 objective for Lydney Town Centre. (Report submitted February 2009)	No	Need for an AQMA for Lydney identified.
Progress Report 2007	Potential exceedance of annual mean objective for NO_2 in Lydney	No	A Detailed Assessment for Lydney to be submitted.
Updating & Screening Assessment 2006	(Submitted Aug 2006) None	No	Pemeroy Pressroom Products Ltd (new A1 industrial development in the District).

[6] Progress Report 2011, submitted to Defra May 2011
[7] Progress Report 2010, submitted to Defra Aug 2011
[8] Updating & Screening Assessment, submitted to Defra Nov 2009
[9] Detailed Assesment – Lydney Town Centre, submitted to Defra Feb 2009

Lydney Air Quality Management Area

In July 2010, an Air Quality Management Area was designated in Lydney Town area due to the exceedance of nitrogen dioxide levels from traffic emissions source.

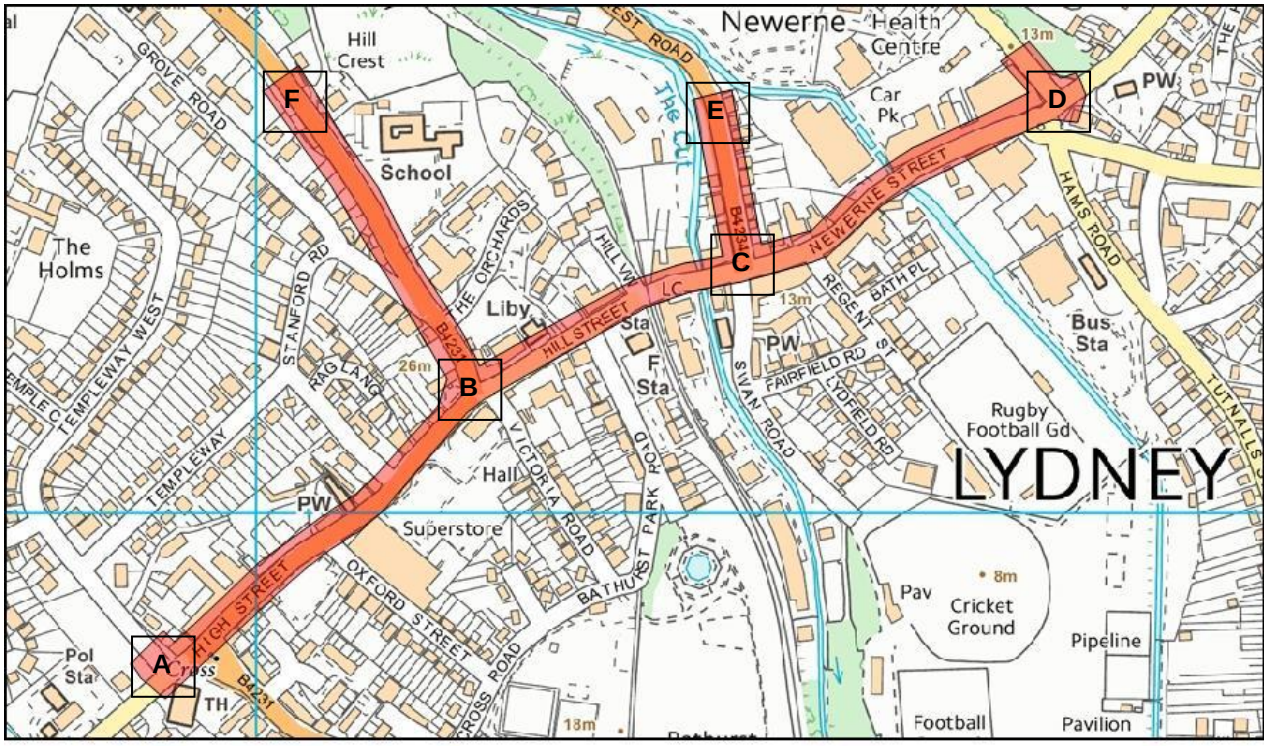

Figure 2 – Map of Lydney AQMA Boundary

Figure 2 shows the designated area which incorporates roads affronting residential properties in High Street, Hill Street and Newerne Street from Temple Way junction (A) to Albert Street Junction (D); and Bream Road from High Street junction (B) to approximately 75m past the entrance to Lydney C of E Primary School (F); and Forest Road from Hill Street (C) to just past 17 Forest Road (E).

Continued monitoring has being undertaken in order to progress in the production of Lydney Air Quality Action Plan. A three month consultation period during August to November 2012 was carried out in order to consult on the available options being proposed within the Action Plan.

In November 2012, the Forest of Dean District Council was successful in securing DEFRA funding 'Air Quality Grant 2012/2013' to carry out detailed traffic surveys in and around Lydney Town. Data collection and modelling will be undertaken in 2013 to assist in assessing options being currently proposed to reduce nitrogen dioxide levels within Lydney Air Quality Management Area.

2 New Monitoring Data

2.1 Summary of Monitoring Undertaken

2.1.1 Automatic Monitoring Sites

Forest of Dean District Council does not undertake any continuous monitoring within its administrative area.

2.1.2 Non-Automatic Monitoring Sites

The Forest of Dean District Council has been undertaking NO2 monitoring with diffusion tubes at 30 sites in 2012 (Appendix E - Map of monitoring locations). The diffusion tubes were supplied and analysed by Gradko Environmental Services (QA/QC data can be found in Appendix A). Tubes were prepared using 50µl of 20% Triethanolamine in Water. The tube preparation and subsequent analysis follow the procedures in the harmonised "Practical Guidance" document. All diffusion tubes are stored, handled and exposed in accordance with the relevant guidance. All diffusion tubes have a monthly exposure period.

Where necessary diffusion tubes with less that 75% (nine months) data has been annualised using the methodology outlined in Box 3.2 of the Technical Guidance (LAQM.TG(09)[10] There have been no sites with less than 9 months of data capture during 2012; therefore no sites have been annualised.

The Forest of Dean District Council does not undertake any co-location studies; so bias adjustment factors were obtained from the National Bias Adjustment Factor Spreadsheet (Version 07/13) (Appendix D).

- 2012 – 0.97 for 34 studies
- 2011 – 0.89 for 26 studies
- 2010 – 0.85 for 7 studies
- 2009 – 0.79 for 4 studies

Table 3 shows non-automatic (diffusion tube) monitoring sites for 2012.

[10] Local Air quality Management, 2009 Technical Guidance LAQM.TG(09)

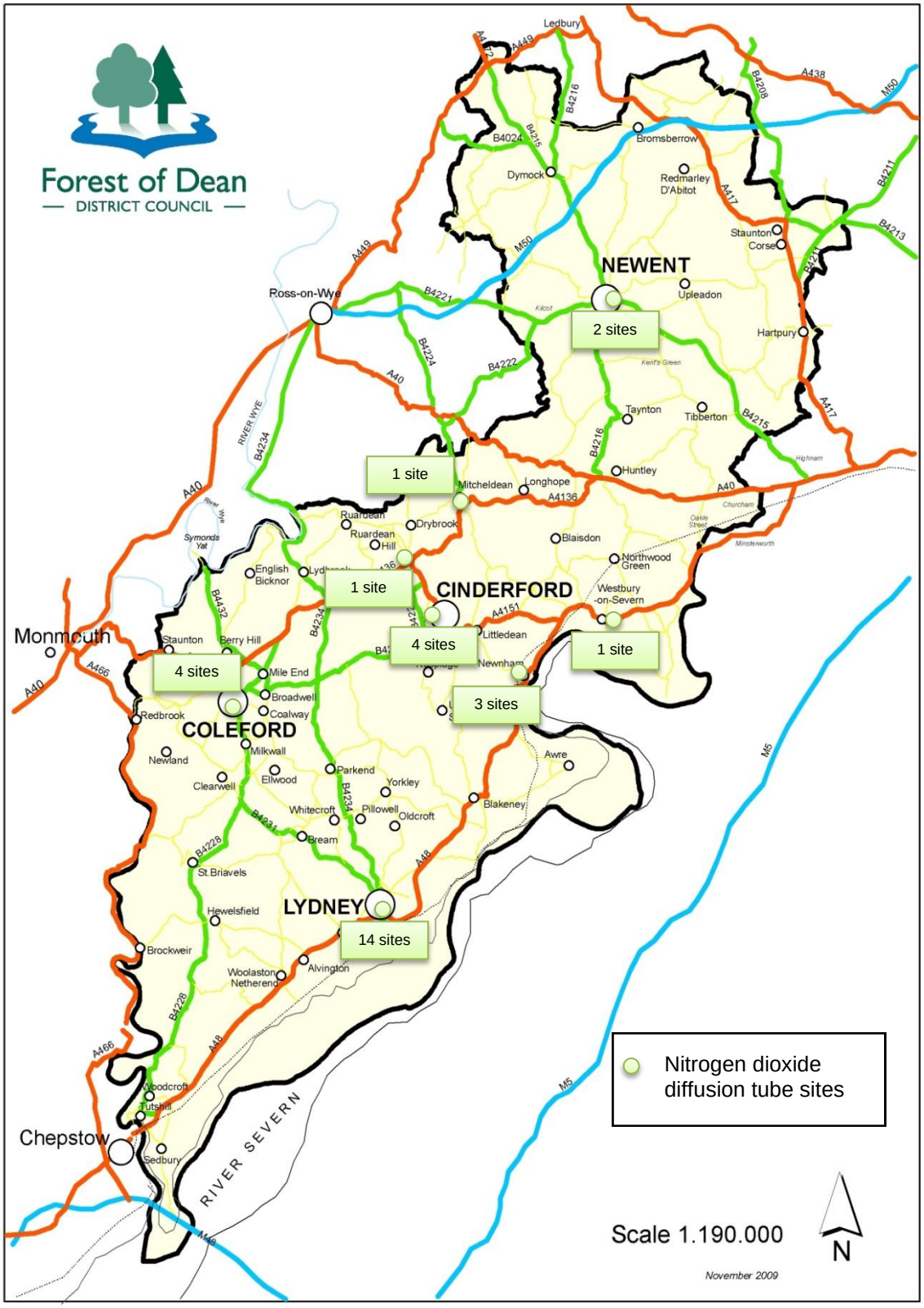

Figure 3 - Nitrogen dioxide diffusion tube sites

Table 3 - Details of Non- Automatic Monitoring Sites

Site ID	Site Name	Site Type	X OS Grid Reference	Y OS Grid Reference	Pollutants Monitored	In AQMA?	Relevant Exposure?	Distance to Kerb of Nearest Road (m)	Worst-Case Exposure?
CIN01	Cinderford – St Whites Terrace	Roadside	365458	212855	NO_2	No	Y (<1m)	4m	Yes
CIN02	Cinderford – Berisford Court	Urban Centre	365814	214014	NO_2	No	Y (2m)	1m	Yes
CIN03	Cinderford – Bottom High St	Roadside	365291	214732	NO_2	No	Y (2<1m)	1m	Yes
COL01	Coleford –Gloucester Road	Suburban	357629	210787	NO_2	No	Y (<1m)	2m	Yes
COL02	Coleford – Market Place	Suburban	357553	210757	NO_2	No	Y (<1m)	7m	Yes
COL03	Coleford – Old Vicarage Court	Suburban	357742	210580	NO_2	No	Y (<1m)	7m	Yes
HUN02	Huntley - The Red Lion junction	Roadside	372198	219359	NO_2	No	N (<1m)	1m	Yes
LYD01	Lydney – Top High St	Roadside	363142	203074	NO_2	Yes	Y (<1m)	2m	Yes
LYD02	Lydney – Newerne Street	Urban Centre	363523	203261	NO_2	Yes	Y (<1m)	4m	Yes
LYD03	Lydney – Mid High St	Suburban	363025	202964	NO_2	Yes	Y (<1m)	1m	Yes
LYD04	Lydney – Bottom High St	Suburban	362964	202909	NO_2	Yes	Y (<1m)	1m	Yes
LYD05	Lydney - Regents Arcade	Urban Centre	363443	203206	NO_2	Yes	Y (1m)	1m	Yes
LYD06	Lydney – Bream Junction (Triplicate 1of3)	Suburban	363189	203110	NO_2	Yes	N (1m)	1m	Yes
LYD08	Lydney – Mid Bream Road	Roadside	363107	203217	NO_2	Yes	Y (<1m)	2m	Yes
LYD09	Lydney – Top Bream Road	Kerbside	363046	203322	NO_2	Yes	Y (<1m)	<1m	Yes
LYD10	Lydney – Old Chip Shop, Forest Road	Roadside	363405	203237	NO_2	Yes	Y (<1m)	2m	Yes
LYD11	Lydney – Forest Road	Kerbside	363391	203337	NO_2	Yes	Y (<1m)	<1m	Yes
LYD12	Lydney –Newerne Street	Urban Centre	363607	203322	NO_2	Yes	Y (<1m)	2m	Yes
LYD13	Lydney – Bream Junction (Triplicate 2of3)	Suburban	363189	203110	NO_2	Yes	N (1m)	1m	Yes
LYD14	Lydney – Bream Junction (Triplicate 3of3)	Suburban	363189	203110	NO_2	Yes	N (1m)	1m	Yes
LYD15	Lydney – Highfield Lane	Suburban	364087	204137	NO_2	Yes	N (1m)	1m	Yes
MIT01	Mitcheldean –The Merrin	Roadside	366483	218277	NO_2	No	Y (2m)	1m	Yes
NAI01	Nailbridge – Crossroads	Roadside	364555	216226	NO_2	No	N (<1m)	1m	Yes
NEW01	Newent – opposite Clifton House, High Street	Suburban	372058	226159	NO_2	No	N (1m)	1m	Yes
NEW02	Newent – Church Street	Urban Centre	372288	225852	NO_2	No	Y (<1m)	2m	Yes
NOS02	Newnham-on-Severn - High St	Roadside	369038	211590	NO_2	No	Y (<1m)	2m	Yes
NOS03	Newnham-on-Severn - High St	Roadside	369135	211870	NO_2	No	Y (<1m)	3m	Yes
NOS04	Newnham-on-Severn - High St	Roadside	369200	211929	NO_2	No	Y (<1m)	3m	Yes
NOS05	Newnham-on-Severn - High St	Roadside	369040	211679	NO_2	No	Y (<1m)	12m	Yes
WOS01	Westbury-on-Severn - High St - bus stop	Roadside	371649	214054	NO_2	No	N (5m)	2m	Yes

2.2 Comparison of Monitoring Results with Air Quality Objectives

2.2.1 Nitrogen Dioxide (NO_2)

Table 4 indicates seven locations where the annual mean objective of 40μg/m^3 for NO_2 was exceeded in 2012 (highlighted) - High Street, Lydney (LYD01); High Street, Lydney (LYD03); High Street, Lydney (LYD04); Top Bream Road, Lydney (LYD09); Mid Bream Road (LYD08); Art/Picture Gallery, Hill Street, Lydney (LYD06, LYD13, LYD14); and Regents Arcade (LYD05). These locations are all within the Lydney Air Quality Management Area which was declared in July 2010. All other monitoring locations were below the annual mean objectives.

Three sites, Newerne Street, Lydney (LYD12); Nailbridge (NAI01); and Mornington Terrace, Newnham-on-Severn (NOS04) are within the 10% annual mean of 40μg/m^3. These sites will continue to be monitored closely during 2013/14.

None of the sites outside Lydney Air Quality Management Area are close to an annual mean of 60µg/m^3 suggesting that there are no concerns for the 1-hour objective. Forest of Dean District Council will not be undertaking a Detailed Assessment for nitrogen dioxide in 2013.

Diffusion Tube Monitoring Data

Table 4 - Results of NO_2 Diffusion Tubes 2012

Site ID	Location	Within AQMA?	Data Capture 2012	2012 Annual Mean Concentration (µg/m^3) Bias Adjusted
CIN01	Cinderford – St Whites Terrace	No	100	25.1
CIN02	Cinderford – Berisford Court	No	100	26.0
CIN03	Cinderford – Bottom High St	No	100	25.0
COL01	Coleford –Gloucester Road	No	91	37.8††
COL02	Coleford – Market Place	No	100	25.8
COL03	Coleford – Old Vicarage Court	No	100	29.0
HUN02	Huntley - The Red Lion junction	No	82	26.0
LYD01	Lydney – Top High St	Yes	**100**	**49.7†**
LYD02	Lydney – Newerne Street	Yes	100	24.7
LYD03	Lydney – Mid High St	Yes	**100**	**45.1†**
LYD04	Lydney – Bottom High St	Yes	**100**	**44.1†**
LYD05	Lydney - Regents Arcade	Yes	**91**	**42.5†**
LYD06	Lydney – Bream Junction (Triplicate 1of 3)	Yes	**100**	**45.7†**
LYD08	Lydney – Mid Bream Road	Yes	**100**	**44.5†**
LYD09	Lydney – Top Bream Road	Yes	**100**	**47.5†**
LYD10	Lydney – Old Chip Shop, Forest Road	Yes	100	30.0
LYD11	Lydney – Forest Road	Yes	100	20.3
LYD12	Lydney –Newerne Street	Yes	100	36.0††
LYD13	Lydney – Bream Junction (Triplicate 2of 3)	Yes	**100**	**46.4†**
LYD14	Lydney – Bream Junction (Triplicate 3of 3)	Yes	**100**	**44.3†**
LYD15	Lydney – Highfield Lane	No	91	15.5
MIT01	Mitcheldean –The Merrin	No	100	31.7
NAI01	Nailbridge - Crossroads	No	100	37.1††
NEW01	Newent – opp. Clifton House, High Street	No	100	24.3
NEW02	Newent – Church Street	No	100	27.9
NOS02	Newnham-on-Severn - High St	No	100	33.8
NOS03	Newnham-on-Severn - High St	No	100	31.1
NOS04	Newnham-on-Severn - High St	No	100	35.5††
NOS05	Newnham-on-Severn - High St	No	100	27.9
WOS01	Westbury-on-Severn - High St - bus stop	No	82	24.3

†Concentrations exceeding Air Quality Objectives (>40µg/m^3)
††Concentrations within 10% of Air Quality Objectives (40µg/m^3)

Table 5 - Results of NO_2 Diffusion Tubes (2009 to 2012)

Site ID	Site Name	Within AQMA?	Annual Mean Concentration ($\mu g/m^3$) - Adjusted for Bias				
			2009	2010	2011	2012	2012-2011 ±
CIN01	Cinderford – St Whites Terrace	No	21.3	27.8	22.8	25.1	**+(2.3)**
CIN02	Cinderford – Berisford Court	No	20.8	24.4	22.5	26.0	**+(3.5)**
CIN03	Cinderford – Bottom High St	No	20.7	26.5	21.7	25.0	**+(3.3)**
COL01	Coleford –Gloucester Road	No	28.5	36.5	35.4	37.8	**+(2.4)**
COL02	Coleford – Market Place	No	-	-	-	25.8	**-**
COL03	Coleford – Old Vicarage Court	No	-	-	-	29.0	**-**
HUN02	Huntley - The Red Lion junction	No	23.0	25.6	20.2	26.0	**+(5.8)**
LYD01	Lydney – Top High St	Yes	44.3	46.4	40.8	49.7	**+(8.9)**
LYD02	Lydney – Newerne Street	Yes	20.6	23.9	22.8	24.7	**+(1.9)**
LYD03	Lydney – Mid High St	Yes	39.9	46.9	39.2	45.1	**+(5.9)**
LYD04	Lydney – Bottom High St	Yes	-	40.7	34.6	44.1	**+(9.5)**
LYD05	Lydney - Regents Arcade	Yes	35.7	39.8	38.2	42.5	**+(4.3)**
LYD06	Lydney – Bream Junction (Triplicate 1of3)	Yes	40.7	46.6	41.5	45.7	**+(4.2)**
LYD08	Lydney – Mid Bream Road	Yes	-	39.7	39.6	44.5	**+(4.9)**
LYD09	Lydney – Top Bream Road	Yes	41.8	46.0	44.6	47.5	**+(2.9)**
LYD10	Lydney – Old Chip Shop, Forest Road	Yes	-	31.9	26.3	30.0	**+(3.7)**
LYD11	Lydney – Forest Road	Yes	-	24.8	16.5	20.3	**+(3.8)**
LYD12	Lydney –Newerne Street	Yes	-	-	32.0	36.0	**+(4.0)**
LYD13	Lydney – Bream Junction (Triplicate 2of3)	Yes	-	-	40.1	46.4	**+(6.3)**
LYD14	Lydney – Bream Junction (Triplicate 3of3)	Yes	-	-	39.0	44.3	**+(5.3)**
LYD15	Lydney – Highfield Lane	No	-	-	-	15.5	**-**
MIT01	Mitcheldean –The Merrin	No	26.8	31.5	26.2	31.7	**+(5.5)**
NAI01	Nailbridge - Crossroads	No	-	35.0	35.4	37.1	**+(1.7)**
NEW01	Newent – opposite Clifton House, High St	No	23.2	27.4	22.3	24.3	**+(2.0)**
NEW02	Newent – Church Street	No	25.0	28.4	26.2	27.9	**+(1.7)**
NOS02	Newnham-on-Severn - High St	No	-	35.7	32.2	33.8	**+(1.6)**
NOS03	Newnham-on-Severn - High St	No	-	30.0	32.1	31.1	**-(1.0)**
NOS04	Newnham-on-Severn - High St	No	-	37.3	30.4	35.5	**+(5.1)**
NOS05	Newnham-on-Severn - High St	No	-	35.4	26.1	27.9	**+(1.8)**
WOS01	Westbury-on-Severn - High St - bus stop	No	24.3	27	23.6	24.3	**+(0.7)**

Table 5 shows there has been an average of an 11% increase between the 2011 and 2012 annual mean NO_2 concentration.

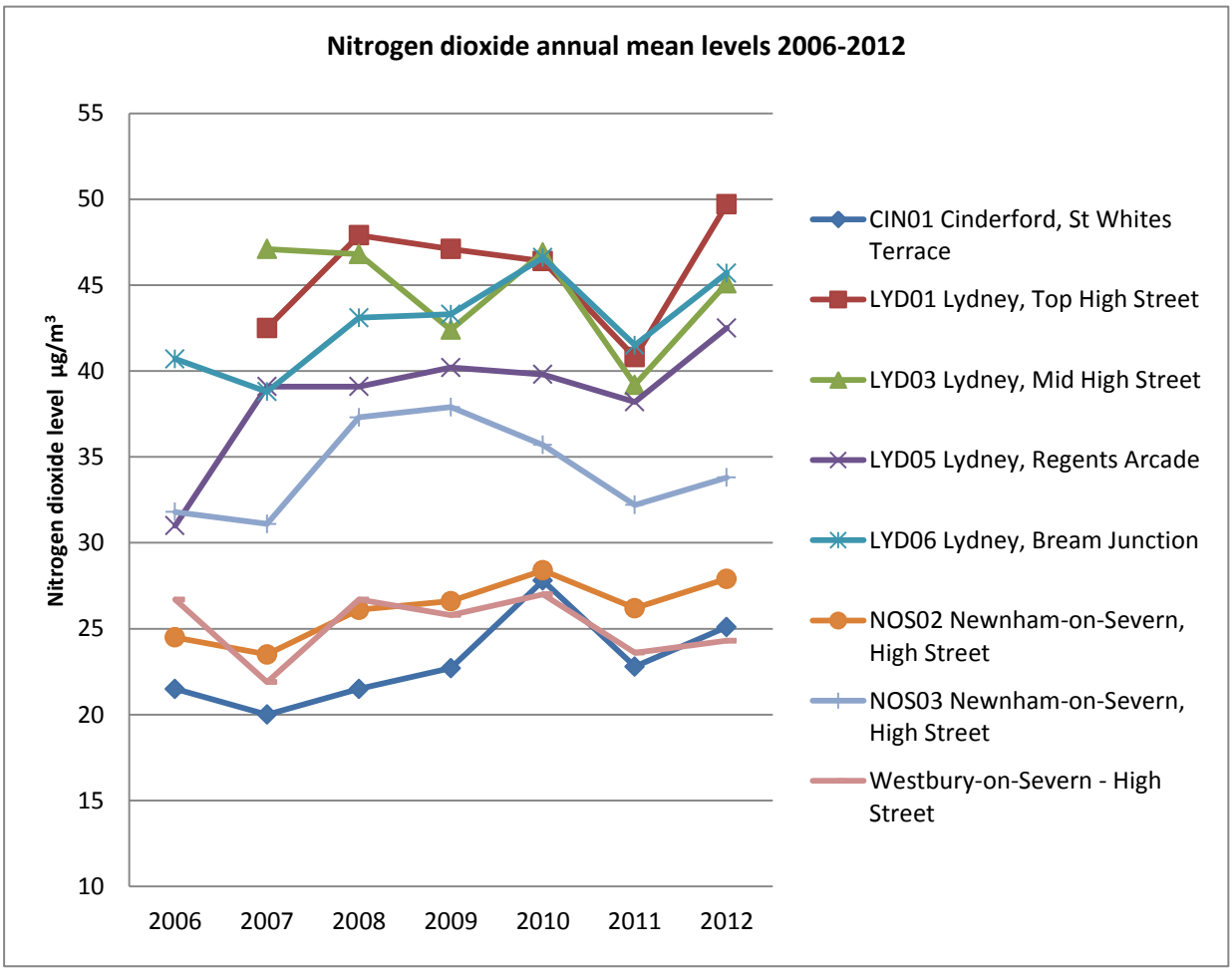

Figure 4 - Trends in annual mean Nitrogen dioxide concentrations measured at diffusion tube monitoring sites

Figure 4 shows a trend chart providing NO_2 annual mean results over the past 6-7 years. From the dataset there is no significant trend. A larger dataset would be required in order to make an accurate assessment of any trend significance.

2.2.2 Particulate Matter (PM_{10})

The Forest of Dean District Council has not undertaken any PM10 monitoring within their administrative area since the Updating and Screening Assessment in 2006.

2.2.3 Sulphur Dioxide (SO_2)

The Forest of Dean District Council has not undertaken any sulphur dioxide monitoring within their administrative area since Progress Report 2010. The usefulness of the data obtained is negligible as the results are in no way comparable to the sulphur dioxide air quality objective.

2.2.4 Benzene

The Forest of Dean District Council has not undertaken any benzene monitoring within their administrative area since the Updating and Screening Assessment in 2006.

2.2.5 Other Pollutants Monitored

Forest of Dean District Council has not undertaken any carbon monoxide, lead and1,3-Butadiene monitoring within their administrative area since the last Updating and Screening Assessment in 2009.

2.2.6 Summary of Compliance with AQS Objectives

Forest of Dean District Council has examined the concentrations from all monitoring locations. Concentrations of NO_2 outside of the Lydney AQMA are all below the objective at relevant locations; therefore, there is no need to proceed to a Detailed Assessment at this stage.

Concentrations within the AQMA still exceed the objective for NO_2 at seven locations within Lydney town centre and the AQMA should remain.

3 New Local Developments

Forest of District Council confirms that there are no new or newly identified local developments which may have an impact on air quality within the Local Authority area.

Forest of Dean District Council confirms that all the following have been considered:

- **Road traffic sources**
- **Other transport sources**
- **Industrial sources**
- **Commercial and domestic sources**
- **New developments with fugitive or uncontrolled sources.**

4 Local / Regional Air Quality Strategy

The National Air Quality Strategy recognises that every local authority can make a contribution to continued improvements in air quality by the development of their own strategies. By developing and implementing local air quality strategies, an integrated approach to air quality can be obtained.

The Forest of Dean District Council does not have a Local Air Quality Strategy at present, but is, however, part of a partnership that has developed a County-wide Strategy for Gloucestershire. All six local authorities in Gloucestershire (operating as the Gloucestershire Pollution Group) together with the County and the University of the West of England's Air Quality Management Resource Centre (AQMRC, UWE) published a county-wide strategy in 2005. The county-wide strategy was adopted by the Forest of Dean District Council in 2005. In 2011, Gloucestershire Pollution Group revised this publication.

Key objectives of County-wide strategy Gloucestershire 2011:

- To work towards meeting the national air quality objectives, as regulated by the current Air Quality Regulations. This is a statutory requirement for all six local authorities in Gloucestershire, for carbon monoxide, lead, 1,3-butadiene, benzene, sulphur dioxide, particulates (PM_{10}, $_{2.5}$) and nitrogen dioxide.
- To continue to work towards reducing ozone concentrations through the reduction of other pollutant concentrations (as precursors to the formation of ozone), even though ozone is not yet regulated by local authorities in the UK;
- To comply with the local air quality management timetable, in the submitting of Updating and Screening Assessments, Detailed Assessments (where appropriate); Progress Reports (submitted annually) and any further reviews, actions plans and action plan progress reports as necessary;
- To provide the framework for designating, revoking and amending air quality management areas within Gloucestershire (as and when

appropriate) and for developing air quality action plans (as appropriate);

- To review the key mechanisms and structures in place regionally to deliver air quality improvements and to seek to improve upon such mechanisms and structures;
- To ensure that improving upon local air quality remains a key objective of all future submissions of Local Transport Plans to central government by the County Council;
- To review the main constraints and barriers to improving air quality locally and to seek to reduce them;
- To reduce air pollution to the lowest levels that can be reasonably achieved, in line with the underlying principles of the European Ambient Air Quality Framework Directive (96/62/EC), and to aim to achieve a minimum of 10% improvement on the basic objectives;
- To maintain good air quality and prevent the deterioration of air quality where already satisfactory;
- To reduce emissions of CO_2 emitted by road transport, through local air quality management initiatives and policies to reduce overall traffic volumes and congestion across Gloucestershire, and,
- To consider subsequent reviews of this County-wide Air Quality Strategy, in conjunction with the regular reviews of Gloucestershire's Local Transport Plan. The Strategy proposed fulfils the local authority obligations to improve air quality locally and will assist with fostering shared and best practice between local authorities across Gloucestershire and with Gloucestershire County Council.

5 Planning Applications

There are a number of planning developments that have been approved within the District and they are at various stages in their development. These include:

- Owen Farm Staunton Road Coleford. Erection of 156 dwellings (application was approved in April 2013)
- Vencel Resil Site, Whitecroft. Permission for 49 dwellings granted in April 2013)
- Highfield Hill Lydney – Erection of 47 dwellings (this was approved in May 2012)
- Land at Angel Farm, Newland Street, Coleford, Gloucestershire, GL16 8NA – Erection of 100 residential units.
- Land at St Whites Farm, St Whites Road, Cinderford, Gloucestershire - Erection of 169 dwellings with associated garaging/parking facilities. Construction of new vehicular and pedestrian accesses.
- Land South of Lakeside Avenue, Tutnalls, Lydney, Gloucestershire – Erection of 200 residential units.
- Land South of Onslow Road, Newent - Erection of 141 dwellings with associated car parking, private amenity space, public open space, landscaping and two vehicular accesses from Onslow Road.

Planning developments that have not been approved and pending within the District are:

- Current application for retail store (Sainsbury's) Land east of Lydney (pending).
- Asda store at Valley Road county-wide strategy in 2005, Cinderford (awaiting outcome of court challenge)

None of these developments have been identified as likely to have an adverse impact on air quality in their area.

6 Air Quality Planning Policies

Core Strategy Policy 1[11] (CSP.1)

Design, environmental protection and enhancement (strategic objective: providing quality environments)

The design and construction of new development must take into account important characteristics of the environment and conserve, preserve or otherwise respect them in a manner that maintains or enhances their contribution to the environment, including their wider context. New development should demonstrate an efficient use of resources. It should respect wider natural corridors and other natural areas, providing green infrastructure where necessary.

In achieving the above, the following will be considered regarding air quality:

- The potential for the development to cause pollution and any mitigation measures to avoid pollution or make environmental improvements where existing problems occur.
- Development that is not able to be satisfactorily accommodated in respect of the above will not be permitted.

In assessing the impact of a development the considerations listed in the policy will be taken into account along with any necessary mitigation or remediation. Where a satisfactory environment cannot be achieved, proposals will not be acceptable. They should prevent pollution.

[11] Forest of Dean District Council Core Strategy – February 2012, pp. 38-41

7 Local Transport Plans and Strategies

The Gloucestershire Local Transport Plan 2011-2026[12] (LTP3), was published in April 2011. The Plan addresses national transport priorities at the local level and have aligned these to four main themes, which are:-

- A greener, healthier Gloucestershire;
- Sustainable Economic Growth;
- A safer, securer transport system;
- Good access to services.

Issues such as noise and air quality will be mitigated where possible by engaging in the noise action planning process and air quality action planning. The LTP3 document includes a Health Impact Assessment (HIA), which indicates that programmes to encourage walking and cycling will have to be sustained in order to ensure that LTP3 policies and actions maintain a positive impact on health.

[12] The Gloucestershire Local Transport Plan 2011-2026

8 Climate Change Strategies

The Forest of Dean District Council developed a carbon management plan in 2008 to reduce the amount of carbon emitted as a direct result of the Council's operations. The Council also worked with the Local Strategic Partnership top highlight the great work being done by Forest of Dean businesses and organisations to mitigate against and adapt to climate change.

The Forest of Dean District Council also has a policy within their Core Strategy:

Core Policy Strategy CSP.2)[13] - Climate Change Adaptation (strategic objective: thriving sustainable communities)

Proposals for development will be required to demonstrate that their design and layout will reduce the impacts of climatic change as identified in national, regional and local predictions over the lifetime of the development concerned. The following should be addressed in an integrated way, demonstrating that one element benefits another:

- Water management
- Heating and cooling
- Biodiversity

[13] Forest of Dean District Council Core Strategy – February 2012, pp. 41-43

9 Conclusions and Proposed Actions

9.1 Conclusions from New Monitoring Data

There are seven locations where the annual mean objective of 40μg/m3 for NO2 was exceeded in 2012 - High Street (LYD01, LYD03 and LYD04), Hill Street (LYD06/13/14), Newerne Street (LYD08) and Bream Road (LYD08, LYD09). These locations are all within the Lydney AQMA, which was declared in July 2010.

The annual levels of NO2 at all other locations within the District in 2012 are generally comparable with levels from the previous three years, however there was a slight increase of the annual levels in 2012 as compared with 2011.

Forest of Dean District Council has examined the concentrations from all monitoring locations. Concentrations of NO_2 outside of the Lydney AQMA are all below the objective at relevant locations; therefore, there is no need to proceed to a Detailed Assessment at this stage.

It is considered that no other pollutants are at levels which will exceed the air quality objectives.

9.2 Conclusions relating to New Local Developments

There are a number of planning developments that have been approved within the District and are at various stages in their development. There are also two supermarket planning developments that have not been approved and pending within the District.

9.3 Proposed Actions

The Forest of Dean District Council will continue to closely monitor the districts NO_2 diffusion tube concentrations, and if deemed necessary, will undertake a Detailed Assessment for NO_2.

Lydney AQMA-01 was declared in July 2010, and a Further Assessment was undertaken July 2011. An Action Plan for Lydney AQMA is currently being developed.

The Forest of Dean District Council has reviewed and updated certain monitoring locations by making them more representative of the impacts of traffic in those areas. In 2014 (Round 5), Progress Report will be undertaken. Progress Reports are required in the intervening years between the three-yearly Updating and Screening Assessment reports. Their purpose is to maintain continuity in the Local Air Quality Management process.

They are not intended to be as detailed as Updating and Screening Assessment Reports, or to require as much effort. However, if the Progress Report identifies the risk of exceedence of an Air Quality Objective, the Local Authority (LA) should undertake a Detailed Assessment immediately, and not wait until the next round of Review and Assessment.

10 Bibliography

Title	Author	Year
Part IV of the Environment Act (1995), document link	Legislation.gov.uk	1995
Air Quality Strategy for England, Scotland, Wales and Northern Ireland 2007, document link	DEFRA	2007
Local Air quality Management, 2009 Technical Guidance LAQM.TG(09) document link	Forest of Dean District Council	2009
Air Quality (England) (Amendment) Regulations 2002 (SI3043), document link	Legislation.gov.uk	2002
Updating and Screening Assessment 2012, USA2012 document	Forest of Dean District Council	2012
Progress Report 2011, PR2011 document	Forest of Dean District Council	2011
Progress Report 2010, PR2010 document	Forest of Dean District Council	2010
Updating & Screening Assessment 2009, USA2009 document	Forest of Dean District Council	2009
Detailed Assesment – Lydney Town Centre, DA2009 document	Forest of Dean District Council	2009
Lydney AQMA – Further assessment, FA2011 document	Forest of Dean District Council	2011
Diffusion Tubes for Ambient NO_2 Monitoring: Practical Guidance for Laboratories & Users document link	AEA for DEFRA	2008
Summary of Laboratory Performance in WASP NO2 Proficiency Testing Scheme for Rounds 112-119, document link	DEFRA	2013
The Gloucestershire Local Transport Plan 2011-2026, document link	Gloucestershire County Council	2011
A County-Wide Air Quality Strategy for Gloucestershire document link	Air Quality Research Group Faculty of Applied Sciences University of the West of England, Bristol	2004
Forest of Dean District Council Core Strategy – February 2012, pp. 38-41 document link	Forest of Dean District Council	2012

Appendices

Appendix A: QA/QC Data

Appendix B: List of Part A1 Permitted Processes

Appendix C: List of Part A2 Permitted Processes

Appendix D: List of Part B Permitted Processes

Appendix E: Diffusion tube locations

11 Appendix A: QA:QC Data

Diffusion Tube Bias Adjustment Factors

Diffusion tube monitoring has inherent errors. In order to minimise these, a bias-adjustment factor is applied to the results. This factor is obtained by collocating three diffusion tubes at a continuous monitoring site. The average values from the monthly exposed tubes for a given year are then compared directly to the corresponding continuously monitored values.

Forest of Dean District Council does not undertake any co-location studies; so bias adjustment factors were obtained from the National Bias Adjustment Factor Spreadsheet (Version v03/13).

- 2012 – 0.97 for 34 studies v.07/13
  Change in factor– 0.00 (v.09/12, total 41 studies)
- 2011 – 0.89 for 26 studies v.03/12
  Change in factor: -0.07 (v.09/11, total 42 studies)
- 2010 – 0.85 for 4 studies v.03/11
  Change in factor: 0.00 (v.09/10, total 7 studies)

Gradko International (diffusion tube supplier and analyst) is UKAS accredited; is assessed annually for compliance to ISO 17025 and participates in other proficiency schemes.

Gradko have confirmed that:

- their procedures have been amended to follow the guidance issued on behalf of Defra (AEA Energy & Environment, Feb 2008) relating to the preparation, extraction, analysis and calculation procedures for passive NO_2 diffusion tubes.
- that most of these procedures were in force before the guidance was introduced and any amendments necessary in achieving compliance were minimal.
- Gradko also participate in a number of QA/QC monitoring systems to demonstrate satisfactory performance:
- The Workplace Analysis Scheme for Proficiency (WASP) programme to ensure uniformity in data throughout the year. Only laboratories

that are in the WASP scheme are used for analysing tubes from the National Nitrogen Dioxide Diffusion Tube Network.

- The monthly field inter-comparison exercise with other laboratories to enable assessment of bias and precision undertaken by AEA Energy & Environment.
- An external QC scheme to check solutions run by AEA Energy & Environment.

Table 6 - 2012 Bias correction factor for NO_2 diffusion tube data co-location studies (LAQM Review and Assessment support website) – version 07/13

Analysed By[1]	Method (To undo your selection, choose (All) from the pop-up list)	Year[2] (To undo your selection, choose (All))	Site Type	Local Authority	Length of Study (months)	Diffusion Tube Mean Conc. (Dm) (µg/m^3)	Automatic Monitor Mean Conc. (Cm) (µg/m^3)	Bias (B)	Tube Precision[4]	Bias Adjustment Factor (A) (Cm/Dm)
Gradko	20% TEA in w ater	2012	R	Wiltshire Council	11	38	40	-4.0%	G	**1.04**
Gradko	20% TEA in Water	2012	R	Dudley MBC	11	39	33	16.0%	G	**0.86**
Gradko	20% TEA in Water	2012	UB	Dudley MBC	10	27	26	3.1%	G	**0.97**
Gradko	20% TEA in Water	2012	R	Dudley MBC	11	43	42	2.0%	G	**0.98**
Gradko	20% TEA in w ater	2012	R	Monmouthshire County Council	9	47	42	12.7%	G	**0.89**
Gradko	20% TEA in w ater	2012	R	Cheshire West & Chester	11	40	45	-10.1%	G	**1.11**
Gradko	20% TEA in Water	2012	UB	East Herts Council	11	21	12	71.9%	G	**0.58**
Gradko	20% TEA in Water	2012	R	Gateshead Council	11	34	34	-1.4%	G	**1.01**
Gradko	20% TEA in Water	2012	R	Gateshead Council	11	36	37	-3.2%	G	**1.03**
Gradko	20% TEA in Water	2012	R	Gateshead Council	11	32	33	-2.6%	G	**1.03**
Gradko	20% TEA in Water	2012	R	Dudley MBC	9	55	60	-7.5%	G	**1.08**
Gradko	20% TEA in Water	2012	UB	Luton Borough Council	11	38	30	29.4%	G	**0.77**
gradko	20% TEA in w ater	2012	UC	Southampton City Council	11	30	33	-8.3%	G	**1.09**
Gradko	20% TEA in w ater	2012	R	Exeter City Council	11	34	34	-0.3%	G	**1.00**
Gradko	20% TEA in w ater	2012	R	Scarborough B C	11	32	37	-11.3%	G	**1.13**
Gradko	20% TEA in Water	2012	KS	Marylebone Road Intercomparison	11	106	94	12.1%	G	**0.89**
Gradko	20% TEA in w ater	2012	KS	New Forest DC	10	46	40	13.4%	G	**0.88**
Gradko	20% TEA in w ater	2012	R	New Forest DC	10	33	29	11.8%	G	**0.89**
Gradko	20% TEA in w ater	2012	R	Brighton & Hove City Council	11	41	37	10.5%	G	**0.91**
Gradko	20% TEA in w ater	2012	R	City of Lincoln Council	11	53	44	18.4%	G	**0.84**
Gradko	20% TEA in w ater	2012	R	Fareham Borough Council	9	38	39	-4.1%	G	**1.04**
Gradko	20% TEA in w ater	2012	R	NOTTINGHAM CITY COUNCIL	10	44	44	-0.2%	G	**1.00**
Gradko	20% TEA in w ater	2012	R	NOTTINGHAM CITY COUNCIL	11	43	41	4.9%	G	**0.95**
Gradko	20% TEA in w ater	2012	R	NOTTINGHAM CITY COUNCIL	10	46	47	-0.3%	G	**1.00**
Gradko	20% TEA in w ater	2012	R	The Highland Council	9	24	32	-24.1%	G	**1.32**
Gradko	20% TEA in w ater	2012	R	Wiltshire Council	10	36	35	3.9%	G	**0.96**
Gradko	20% TEA in Water	2012	UB	LB Waltham Forest	11	33	38	-11.8%	S	**1.13**
Gradko	20% TEA in w ater	2012	R	Pendle	10	39	32	20.6%	G	**0.83**
Gradko	20% TEA in w ater	2012	R	Lancaster City Council	10	46	42	11.3%	G	**0.90**
Gradko	20% TEA in w ater	2012	R	Lancaster City Council	11	37	36	2.1%	G	**0.98**
Gradko	20% TEA in w ater	2012	R	Wokingham Borough Council	9	32	34	-7.4%	G	**1.08**
Gradko	20% TEA in w ater	2012	R	London Borough of Ealing	10	55	54	1.8%	P	**0.98**
Gradko	20% TEA in w ater	2012	R	London Borough of Ealing	10	83	84	-0.3%	P	**1.00**
Gradko	20% TEA in w ater	2012	UB	London Borough of Ealing	9	32	36	-10.8%	G	**1.12**
Gradko	20% TEA in w ater	2012		**Overall Factor[3] (34 studies)**				**Use**		**0.97**

Table 7 - 2011 bias correction factor for NO_2 diffusion tube data co-location studies (LAQM Review and Assessment support website) - version 03/12

National Diffusion Tube Bias Adjustment Factor Spreadsheet — Spreadsheet Version Number: 03/12

Follow the steps below **in the correct order** to show the results of **relevant** co-location studies

Data only apply to tubes exposed monthly and are not suitable for correcting individual short-term monitoring periods

Whenever presenting adjusted data, you should state the adjustment factor used and the version of the spreadsheet

This spreadhseet will be updated every few months: the factors may therefore be subject to change. This should not discourage their immediate use.

This spreadsheet will be updated at the end of September 2012

LAQM Helpdesk Website

The LAQM Helpdesk is operated on behalf of Defra and the Devolved Administrations by Bureau Veritas, in conjunction with contract partners AECOM and the National Physical Laboratory.

Spreadsheet maintained by the National Physical Laboratory. Original compiled by Air Quality Consultants Ltd.

Step 1: Select the Laboratory that Analyses Your Tubes from the Drop-Down List

If a laboratory is not shown, we have no data for this laboratory

Step 2: Select a Preparation Method from the Drop-Down List

If a preparation method is not shown, we have no data for this method at this laboratory.

Step 3: Select a Year from the Drop-Down List

If a year is not shown, we have no data[2]

Step 4: Where there is only one study for a chosen combination, you should use the adjustment factor shown with caution. Where there is more than one study, use the overall factor[3] shown in blue at the foot of the final column.

If you have your own co-location study then see footnote[4]. If uncertain what to do then contact the Local Air Quality Management Helpdesk at LAQMHelpdesk@uk.bureauveritas.com or 0800 0327953

Analysed By[1]	Method (To undo your selection, choose (All) from the pop-up list)	Year[2] (To undo your selection, choose (All))	Site Type	Local Authority	Length of Study (months)	Diffusion Tube Mean Conc. (Dm) (µg/m^3)	Automatic Monitor Mean Conc. (Cm) (µg/m^3)	Bias (B)	Tube Precision[5]	Bias Adjustment Factor (A) (Cm/Dm)
Gradko	20% TEA in water	2011	R	Scarborough Borough Council	12	35	37	-4.7%	G	**1.05**
Gradko	20% TEA in Water	2011	R	Dudley MBC	12	35	28	23.3%	G	**0.81**
Gradko	20% TEA in Water	2011	UB	Dudley MBC	12	28	25	10.0%	G	**0.91**
Gradko	20% TEA in Water	2011	R	Dudley MBC	11	45	40	11.8%	G	**0.89**
Gradko	20% TEA in water	2011	K	South Lakeland District Council	10	41	38	8.3%	G	**0.92**
Gradko	20% TEA in water	2011	R	Gedling Borough Council	11	43	35	24.5%	G	**0.80**
Gradko	20% TEA in water	2011	R	Gateshead	12	39	37	4.9%	P	**0.95**
Gradko	20% TEA in water	2011	R	Gateshead	12	37	36	1.8%	G	**0.98**
Gradko	20% TEA in water	2011	R	Gateshead	10	33	31	5.1%	G	**0.95**
Gradko	20% TEA in water	2011	R	Gosport Borough Council	10	28	25	11.1%	G	**0.90**
Gradko	20% TEA in water	2011	UC	Southampton City Council	12	31	35	-10.8%	G	**1.12**
Gradko	20% TEA in Water	2011	R	Dudley MBC	9	50	51	-1.5%	G	**1.02**
Gradko	20% TEA in water	2011	K	Marylebone Road Intercomparison	12	111	100	11.4%	G	**0.90**
Gradko	20% TEA in water	2011	R	Boston Borough Council	11	57	36	59.6%	P	**0.63**
Gradko	20% TEA in water	2011	UB	Luton Borough Council	11	39	35	11.1%	G	**0.90**
Gradko	20% TEA in water	2011	R	Exeter City Council	11	37	33	15.1%	S	**0.87**
Gradko	20% TEA in water	2011	UB	Belfast City Council	12	36	29	23.5%	G	**0.81**
Gradko	20% TEA in water	2011	R	Bromsgrove District Council (Worce	10	56	53	6.0%	G	**0.94**
Gradko	20% TEA in water	2011	R	Monmouthshire County Council	11	47	40	17.9%	S	**0.85**
Gradko	20% TEA in water	2011	K	New Forest District Council	10	49	42	16.7%	G	**0.86**
Gradko	20% TEA in water	2011	R	New Forest District Council	12	34	26	29.9%	G	**0.77**
Gradko	20% TEA in water	2011	R	Fareham Borough Council	12	39	33	17.4%	G	**0.85**
Gradko	20% TEA in water	2011	R	Rushcliffe BC	11	35	39	-9.5%	G	**1.10**
Gradko	20% TEA in Water	2011	R	Carlisle City Council	12	35	28	24.8%	G	**0.80**
Gradko	20% TEA in Water	2011	O	North Warwickshire Borough Counc	12	48	39	23.0%	G	**0.81**
Gradko	20% TEA in water	2011	R	Wokingham Borough Council	11	41	38	8.6%	G	**0.92**
Gradko	20% TEA in water	2011		**Overall Factor[3] (26 studies)**				**Use**		**0.89**

Table 8 - 2010 Bias correction factor for NO_2 diffusion tube data co-location studies (LAQM Review and Assessment support website) - version 03/12

National Diffusion Tube Bias Adjustment Factor Spreadsheet — Spreadsheet Version Number: 03/12

Follow the steps below **in the correct order** to show the results of **relevant** co-location studies

Data only apply to tubes exposed monthly and are not suitable for correcting individual short-term monitoring periods

Whenever presenting adjusted data, you should state the adjustment factor used and the version of the spreadsheet

This spreadhseet will be updated every few months: the factors may therefore be subject to change. This should not discourage their immediate use.

This spreadsheet will be updated at the end of September 2012

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Step 1: Select the Laboratory that Analyses Your Tubes from the Drop-Down List

If a laboratory is not shown, we have no data for this laboratory

Step 2: Select a Preparation Method from the Drop-Down List

If a preparation method is not shown, we have no data for this method at this laboratory.

Step 3: Select a Year from the Drop-Down List

If a year is not shown, we have no data[2]

Step 4: Where there is only one study for a chosen combination, you should use the adjustment factor shown with caution. Where there is more than one study, use the overall factor[3] shown in blue at the foot of the final column.

If you have your own co-location study then see footnote[4]. If uncertain what to do then contact the Local Air Quality Management Helpdesk at LAQMHelpdesk@uk.bureauveritas.com or 0800 0327953

Analysed By[1]	Method (To undo your selection, choose (All) from the pop-up list)	Year[2] (To undo your selection, choose (All))	Site Type	Local Authority	Length of Study (months)	Diffusion Tube Mean Conc. (Dm) (µg/m^3)	Automatic Monitor Mean Conc. (Cm) (µg/m^3)	Bias (B)	Tube Precision[5]	Bias Adjustment Factor (A) (Cm/Dm)
Bristol Scientific Services	20% TEA in Water	2010	R	Wiltshire Council	12	40	35	16.5%	G	**0.86**
Bristol Scientific Services	20% TEA in Water	2010	R	Wiltshire Council	9	50	40	24.9%	G	**0.80**
Bristol Scientific Services	20% TEA in Water	2010	R	Wiltshire Council	9	48	42	15.1%	G	**0.87**
Bristol Scientific Services	20% TEA in Water	2010	R	Wiltshire Council	11	45	36	25.7%	G	**0.80**
Bristol Scientific Services	20% TEA in Water	2010	B	LB Waltham Forest	12	40	38	6.7%	S	**0.94**
Bristol Scientific Services	20% TEA in Water	2010	K	Marylebone Road Intercomparison	12	119	93	27.2%	G	**0.79**
Bristol Scientific Services	20% TEA in Water	2010	R	South Gloucestershire	11	34	31	9.1%	G	**0.92**
Bristol Scientific Services	20% TEA in Water	2010		**Overall Factor[3] (7 studies)**				**Use**		**0.85**

QA/QC of Diffusion Tube Monitoring

As part of their provision of support to Local Authorities for air quality management, Defra and the Devolved Administrations provide a set of centralised QA/QC services, to assist Local Authorities using diffusive samplers for monitoring of ambient nitrogen dioxide (NO_2) concentration, as part of their Local Air Quality Management process.

This is aimed at the analytical laboratories that supply and analyse the diffusion tubes, and currently comprises:

- Promotion of the independent Workplace Analysis Scheme for Proficiency (WASP, operated by the Health and Safety Laboratory, with yearly assessment against agreed performance criteria.
- Operation of a field intercomparison exercise, in which diffusion tubes are co-located with an automatic analyser: from January 2006 this is at a roadside site.
- Provision of quality control standard solutions, free of charge to laboratories that prepare and analyse NO_2 diffusion tubes used by Local Authorities for LAQM purposes.

Summary of laboratory performance in WASP NO_2 Proficiency Testing Scheme for Rounds 112-119.

The Workplace Analysis Scheme for Proficiency (WASP) is an independent analytical proficiency-testing (PT) scheme, operated by the Health and Safety Laboratory (HSL). WASP offers a number of test samples designed to test the proficiency of laboratories undertaking analysis of chemical pollutants in workplace and ambient air. One such sample is the WASP NO_2 test sample type that is distributed to participants in a quarterly basis.

WASP NO2 PT forms an integral part of the UK NO_2 Network's QA/QC, and is a useful tool in assessing the analytical performance of laboratories supplying diffusion tubes to Local Authorities for use in the context of Local Air Quality Management (LAQM). With consent from the participating laboratories, HSL provides summary proficiency testing data to the LAQM Helpdesk for hosting on the web-pages at http://laqm.defra.gov.uk/diffusion-tubes/qa-qc-framework.html

The WASP scheme is operated independently by HSL. The cost of operating the WASP is borne by the laboratories, which pay an annual fee to HSL. Defra and the Devolved Administrations advise that diffusion tubes used for Local Air Quality Management should be obtained from laboratories that have demonstrated satisfactory performance in the WASP scheme.

For this reason, although WASP remains an independent proficiency-testing scheme, laboratory performance in WASP is also assessed by NPL in conjunction with separate data from the Field Intercomparison Exercise carried out at Marylebone Road, central London. The information is used to help the laboratories to identify if they have problems and may assist devising measures to improve their performance. This forms part of work for Defra and the Devolved Administrations under the Local Air Quality Management Services Contract.

This information will be updated on a quarterly basis following completion of each WASP PT round. The posting of reports to schedule is dependent on the laboratories sending their results promptly to HSL.

WASP NO_2 PT scheme overview

Purpose of scheme

The WASP performance testing scheme uses artificially spiked Palmes type diffusion tubes to test each participating laboratory's analytical performance on a quarterly basis. Such tubes are not designed to test other parts of the measurement system e.g. sampling. Every quarter, roughly January, April, July and October each year, each laboratory receives four diffusion tubes doped with an amount of nitrite, known to HSL, but not the participants. At least two of the tubes are usually duplicates, which enables precision, as well as accuracy, to be assessed. The masses of nitrite on the spiked tubes are different each quarter, and reflect the typical analytical range encountered in actual NO_2 ambient monitoring in the UK when using such diffusion tubes.

Preparation of test samples

Diffusion tubes are spiked using a working nitrite solution prepared from a stock solution. The concentration of this stock solution is initially assayed using a titrimetric procedure. All steps in the subsequent test sample production

process, involving gravimetric and volumetric considerations, are undertaken using calibrated instruments employing traceable standards. As an additional cross check, 12 spiked Palmes tubes are picked at random from each spike loading level and submitted to a third party laboratory which is accredited to ISO 17025 to undertake this analysis using an ion chromatographic procedure.

In summary, the tube spiking precision is calculated to be better than 0.5 %, expressed as a standard deviation, and this is derived from repeat gravimetric checking of the pipette device used to spike the test samples. The calculated spike values, derived from titrimetric, gravimetric and volumetric considerations, are found to be typically within ± 3 % of results obtained by the third party laboratory using an ion chromatographic analytical procedure.

Scheme operation

The participants analyse the test samples and report the results to HSL. HSL assign a performance score to each laboratory's result, based on how far their results deviate from the reference values for each test samples. The reference values are best estimates of the levels of nitrite doped onto the test sample tubes. At the completion of the round, laboratories receive a report detailing how they have performed and how their results relate to those of their peers.

Performance scoring

Changes to Scoring System as reported on the LAQM website -
The z-score system is used by HSL to assess the performance of laboratories participating in the WASP NO_2 scheme. Information on the interpretation of the z score is provided below.

It was proposed however that HSL would migrate to an alternative scoring scheme, which is commonly used elsewhere in their WASP scheme for other PT services. In anticipation of this proposed migration, laboratory summary performance, previously reported on the LAQM website, has been based upon this WASP scoring system.

HSL has decided, upon review, to maintain the z-score system, primarily due to the fact that it is a more readily understandable scoring system when viewed by

a wider audience. Hence, going forward, laboratory summary performance, to be reported on the LAQM website, will be based upon this z-score system. Key changes to the scoring system include:

- All monthly performance scores are reported and the previous WASP scoring system, which allowed the lowest performing round result (best 4 out of 5) to be dropped, is no longer used.
- The use of the z-score allows new entrants or those leaving the WASP scheme to be assessed as the score is not based on a rolling performance indicator.
- All results from UK laboratories participating in the WASP scheme are now reported (previously laboratories

Assessing the performance of a laboratory

End users that avail of analytical services from laboratories should satisfy themselves that such laboratories meet their requirements. A number of factors ideally need to be considered including:-

- Expertise and skills of staff within the laboratory?
- Does the laboratory follow accepted measurement standards, guidance?
- Does the laboratory operate a robust internal quality control system?
- Is the laboratory third party accredited to relevant standards such as ISO 17025?
- Does the laboratory successfully participation in relevant external proficiency testing schemes?
- How good is their customer care (communication, turnaround times, pricing etc)?

Participation therefore in an external proficiency-testing scheme such as WASP represents but one factor in such considerations.

Participation in a single round of an external proficiency-testing scheme represents but a “snap-shot” in time of the analytical quality that a laboratory can produce. It is more intuitive therefore to consider performance over a number of rounds.

Following on from above, therefore over a rolling five round WASP window, one would expect that 95% of laboratory results should be. ± 2. If this percentage is substantially lower than 95 % for a particular laboratory, within this five round window, then one can conclude that the laboratory in question may have significant systematic sources of bias in their assay.

A summary of the WASP performance for each laboratory participating in the scheme is provided in Table 1. This table provides the percentage of results where the z-score was between -2 and +2 which is deemed to be a satisfactory z-score.

Table 9 - Laboratories that have demonstrated satisfactory performance in the WASP scheme for analysis of NO2 diffusion tubes, April 2009 – April 2010.

WASP Round	WASP R113	WASP R114	WASP R115	WASP R116	WASP R117	WASP R118	WASP R119	WASP R120
Round conducted in the period	Apr - Jun 2011	Jul – Sep 2011	Oct – Dec 2011	Jan – Mar 2012	Apr – Jun 2012	Jul – Sep 2012	Oct – Dec 2012	Jan – Mar 2013
Aberdeen Scientific Services	100 %	100 %	100 %	100 %	100 %	100 %	100 %	100 %
Bristol City Council [4]	100 %	100 %	100 %	-	-	-	-	-
Cardiff Scientific Services	100 %	100 %	75 %	100 %	100 %	100 %	100 %	100 %
Edinburgh Scientific Services	100 %	100 %	0 %	100 %	100 %	100 %	100 %	100 %
Environmental Services Group, Didcot (formerly Bureau Veritas Laboratories, Glasgow and Harwell Scientifics) [1] [2]	100 %	100 %	100 %	100 %	100 %	100 %	100 %	100 %
Exova (formerly Clyde Analytical)	100 %	0 %	75 %	0 %	0 %	100 %	25 %	75 %
Glasgow Scientific Services	100 %	100 %	100 %	100 %	50 %	100 %	100 %	50 %
Gradko International [2]	**100 %**	**100 %**	**37.5 %**	**100 %**	**100 %**	**100 %**	**100 %**	**100 %**
Kent Scientific Services	100 %	100 %	75 %	75 %	100 %	75 %	100 %	50 %
Kirklees MBC	0 %	0 %	50 %	100 %	100 %	75 %	100 %	100 %
Lambeth Scientific Services	25 %	100 %	25 %	75 %	100 %	0 %	100 %	100 %
Milton Keynes Council	75 %	100 %	100 %	100 %	100 %	75 %	100 %	50 %
Northampton Borough Council	100 %	100 %	100 %	100 %	100 %	100 %	100 %	0 %
Somerset Scientific Services [3]	-	-	100 %	100 %	100 %	100 %	100 %	100 %
South Yorkshire Air Quality Samplers	100 %	100 %	100 %	100 %	100 %	100 %	100 %	100 %
Staffordshire County Council	100 %	100 %	100 %	100 %	100 %	75 %	100 %	50 %
Tayside Scientific Services (formerly Dundee CC)	100 %	100 %	100 %	100 %	100 %	100 %	100 %	75 %
West Yorkshire Analytical Services	75 %	100 %	100 %	75 %	75 %	50 %	100 %	100 %

[1] Bureau Veritas laboratory and Harwell Scientific now part of ESG Group.
[2] Participant subscribes to two sets of test samples (2 x 4 test samples) in each WASP PT round.
[3] New participant from R115.
[4] No longer involved in NO_2 diffusion tube measurements from R116.

12 Appendix B: List of Part A1 Permitted Processes

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

Table 10 - List of Part A1 Permitted Processes

Permit	Company Name/Address	Description
XP3039GG	Englehard Sales Ltd Valley Road Cinderford Gloucestershire GL14 2PB	S4.2(A)(1)(b) Unless falling within another Section of this Schedule, any manufacturing activity which is likely to result in the release into the air of any hydrogen halide (other than the manufacture of glass or the coating, plating or surface treatment of metal) or which is likely to result in the release into the air or water of any halogen or any of the compounds mentioned in paragraph (a)(vi) (other than the treatment of water). S2.2A(1)(e) Recovering any of the following elements if the activity may result in their release into the air: gallium; indium; palladium; tellurium; thallium and S5.1(A)(1)(e) Unless carried out as part of any other activity in this Part, the incineration of non-hazardous waste in a plant which is not an incineration plant or a co-incineration plant but which has a capacity of 1 tonne or more per hour.
ZP3036LK	Freemans of Newent Ltd Town Farm Gloucester Road Newent Gloucestershire GL18 1HP	S6.8 A (1) (b) Slaughtering animals at plant with a carcass production capacity of more than 50 tonnes per day and S5.3 A(1) (c) (ii) Disposal of non-hazardous waste in a facility with a capacity of more than 50 tonnes per day by - physico-chemical treatment, not being treatment specified in any paragraph other than paragraph D9 in Annex IIA to Council Directive 75/442/EEC, which results in final compounds or mixtures which are discarded by means of any of the operations numbered D1 to D12 in that Annex (for example, evaporation, drying, calcination, etc) (D9).
BV1305IV	Surotech International Ltd Hafner House 11 Newent Business Park Gloucester Road Newent Gloucestershire GL18 1DZ	S4.1 A(1) (a) (iii) Producing organic chemicals such as organic compounds containing sulphur, such as sulphides, mercaptans, sulphonic acids, sulphonates, sulphates and sulphones and sulphur heterocyclics and (viii) plastic material, such as polymers, synthetic fibres and cellulose based fibres. S4.2 A(1) (a) (iv) Producing inorganic chemicals such as (iv) salts, such as ammonia chloride, potassium chlorate, potassium carbonate, sodium carbonate, perborate, silver nitrate, cupric acetate, ammonia phosphomolybdate and (c) Unless falling within any other Section of the Schedule any manufacturing activity involving the use of hydrogen cyanide or hydrogen sulphide.
BP3236LC	Glatfelter Lydney Ltd, Lydney Paper Mill, Church Road, Lydney, Gloucestershire GL15 5EJ	6.1 A(1) (a) Producing industrial plant pulp from timber or other fibrous materials and S6.1 A(1)(b) producing industrial plant paper and board where the plant has a production capacity of more than 20 tonnes per day.

Permit	Company Name/Address	Description
AP3731SA	Pressroom Products Limited Crucible Close Mushet Industrial Park Coleford Gloucestershire GL16 8RE	Section 5.4 Part A(1)(a) Recovery of waste; by distillation of oil/organic solvent.
BK9326IX	SmithKline Beecham Plc Royal Forest Factory Coleford Gloucestershire GL16 8JB	Section 6.8 A(1)(d)(ii) – Treating and processing materials intended for the production of food products from vegetable raw materials at plant with a finished production capacity of more than 300 tonnes per day. Section 5.3 A(1)(c)(ii) - Disposal of non-hazardous waste in a facility with a capacity of more than 50 tonnes per day by - physico-chemical treatment, not being treatment specified in any paragraph other than paragraph D9 in Annex IIA to Council Directive 75/442/EEC, which results in final compounds or mixtures which are discarded by means of any of the operations numbered D1 to D12 in that Annex (for example, evaporation, drying, calcination, etc.) (D9).

Table 11 - List of Poultry Farms

Premises	Type of Farm	No. of Birds	Type of ventilation
Ploddy House Poultry Unit, Newent	Turkey broilers	52,000	Side vents
Cherry Rock Poultry Unit, Hartpury	Chicken broilers	270,000	Side vents
Woolaston Court Poultry Unit, Woolaston	Pullets	92,000	Roof vents
Cottrells Barn Poultry Unit, Mitcheldean	Pullets	64,000	Half roof & half side vents
Treetops Poultry Unit, Bream	Chicken broilers	318,000	Side vents
St Briavels & Severn View, St Briavels	Chicken layers	100,000 – caged 13,000 free range	Side vents Side vents
Roads Farm, St Briavels	Chicken layers	146,000 - caged	Side vents
Hill Farm, Lydney	Chicken broilers	110,000	Side vents
Stone End Farm, Churcham	Chicken broilers	900,000	Side vents

13 Appendix C: List of Part A2 Permitted Processes

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

Table 12 - List of Part A2 Permitted Processes

Permit	Company Name/Address	Description
PPC(A2)3	Broadmoor Brickworks, Whimsey I.E. Cinderford	Manufacture of Heavy Clay Goods (Bricks)
PPC(A2)4	Coleford Brick & Tile, Royal Forest of Dean Brickworks, Cinderford	Manufacture of Heavy Clay Goods (Bricks)
PPC(A2)19/92	Federal Mogul Camshafts, Tutnalls, Lydney	Ferrous Metal Foundary

14 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.

Table 13 - List of Part B Permitted Processes

Permit	Company Name/Address	Description
PPC/5/01	Severn Valley Woodworks, Northwood Green, Westbury	Timber and Wood Based Products
PPC/10/92	Forest Auto Salvage, Valley Road, Cinderford	Waste Oil Burner
PPC/14/92	Tarmac Western, Stowfield Quarry, Scowles Pitch, Coleford	Quarry Processes/Roadstone Coating/Cement
PPC/16/93	Clearwell Quarry, Stowe Green, St. Briavels	Quarry Processes
PPC/20/92	Bituchem Ltd., Birchwood Close, Forest Vale Industrial Estate, Cinderford	Roadstone Coating & Bitumen/Tar Processes
PPC/62/07	Cannop Foundry, Crabtree Rd, Cinderford	Ferrous & Non Ferrous Metal Foundry
PPC/25/92	P & J Loveridge, 157 High Street, Cinderford	Waste Oil Burner
PPC/32/92	Berwin Industrial Polymers, Church Road, Lydney	Rubber Processes
PPC/37/95	Staunton Service Station, Staunton, Coleford	Respraying of Road Vehicles
PPC/38/95	Rothdean Haulage, Station Street, Cinderford	Respraying of Road Vehicles
PPC/40/95	Formpave Ltd., Tufthorn Avenue, Coleford	Bulk use of Cement
PPC/42/95	Hanson Aggregates, Drybrook Quarry, Drybrook	Quarry Processes
PPC/43/95	Bituchem Ltd., Birchwood Close, Forest Vale I.E. Cinderford	Roadstone Coating & Bitumen/Tar Processes
PPC/65/09	Forest of Dean Asphalt, Clearwell Quarry, Stowe, St. Briavels, Lydney	Roadstone Coating
PPC/48/96	Crematoria Management Ltd., Yew Tree Brake, Cinderford	Cremation of human remains
PPC/50/98	Rackham Housefloors Ltd., Forest Vale I.E. Cinderford	Bulk Use of Cement

Permit	Company Name/Address	Description
PPC/51/00	Buckland Agricultural, Court Farm Workshops Huntley Road, Tibberton	Waste Oil Burner
PPC/53/01	Newspace Containers Ltd., New Dunn Works, Coleford	Coating of Metal and Plastic
PPC/54/02	Bardon Concrete, Clearwell Quarries Ltd., Stowe, St. Briavels, Lydney	Bulk Use of Cement
PPC/55/03	Milbury Precast, Lydney I.E. Harbour Road, Lydney	Bulk Use of Cement
PPC/56/03	C.G. Perrett, Lydney I.E. Harbour Road, Lydney	Mobile Crushing and Screening Plant
PPC/57/03	Paul Jones Motors, Spout Garage, Bank Street, Coleford	Waste Oil Burner
PPC/58/04	Dean Mowers Ltd., Central Garage, Blakeney	Waste Oil Burner
PPC/DC/1/06	Cavendish Dry Cleaners, 4 Cavendish Buildings, Hill St, Lydney	Dry Cleaning
PPC/31/92	Nobel Foods Ltd., (formerly Dean Foods), Clearwell Mill, Clearwell	Animal Feed Compounding
PPC/63/07	Mitcheldean MOT Centre, Mitcheldean, Glos	Waste Oil Burner
PPG/66/11	FAB Recycling Ltd, Broadmoor Road, Cinderford, Gloucestershire GL14 2YL	Waste Oil Burner
PPC/67/11	Beeches Garage, Edge End Road, Mile End, Coleford, Gloucestershire GL16 1OA	

Table 14 - List of Petrol Stations

Permit	Company Name/Address	Description
EPA/DCS/PVR/6/98	Newent Self Serve, Gloucester Road, Newent	Petrol Vapour Recovery
EPA/DCS/PVR/7/98	Cross Hands Garage, Corse, Hartpury, Glos.	Petrol Vapour Recovery
EPA/DCS/PVR/8/98	Abbotswood Garage, Lower High Street, Cinderford	Petrol Vapour Recovery
EPA/JAG/PVR/9/98	Elton Service Station, Elton Corner, Westbury-on-Severn	Petrol Vapour Recovery
EPA/DCS/PVR/10/98	General Garage, Ross Road, Huntley	Petrol Vapour Recovery
EPA/DCS/PVR/11/99	Highleadon Filling Station, Newent	Petrol Vapour Recovery
EPA/JAG/PVR/12/99	Motorhouse Service Station, Old Station Way, Coleford	Petrol Vapour Recovery
EPA/DCS/PVR/14/00	Steam Mills Garage, Steam Mills, Cinderford	Petrol Vapour Recovery
EPA/JAG/PVR/15/00	Tesco Stores Ltd., Hill Street, Lydney, Glos.	Petrol Vapour Recovery
EPA/DCS/PVR/16/02	Mitcheldean Garage, New Road, Mitcheldean, Glos.	Petrol Vapour Recovery
EPA/JAG/PVR/17/02	Chaxhill Service Station, Chaxhill, Westbury-on-Severn	Petrol Vapour Recovery
PVR/18/04	Ken McNally's Auto Services, Cinderford	Petrol Vapour Recovery
EPA/RCB/PVR/1/98	Thompson & Thompson, Cross Hands Garage, Lydney	Petrol Vapour Recovery
EPA/JAG/PVR/2/98	Lower Lane Superstop, Berry Hill, Coleford	Petrol Vapour Recovery
EPA/JAG/PVR/4/98	Alvington Service Station, Gloucester Road, Alvington	Petrol Vapour Recovery
EPA/DCS/PVR/5/98	Brierley Service Station, Brierley, Drybrook, Glos.	Petrol Vapour Recovery

15 Appendix E: Diffusion tube locations

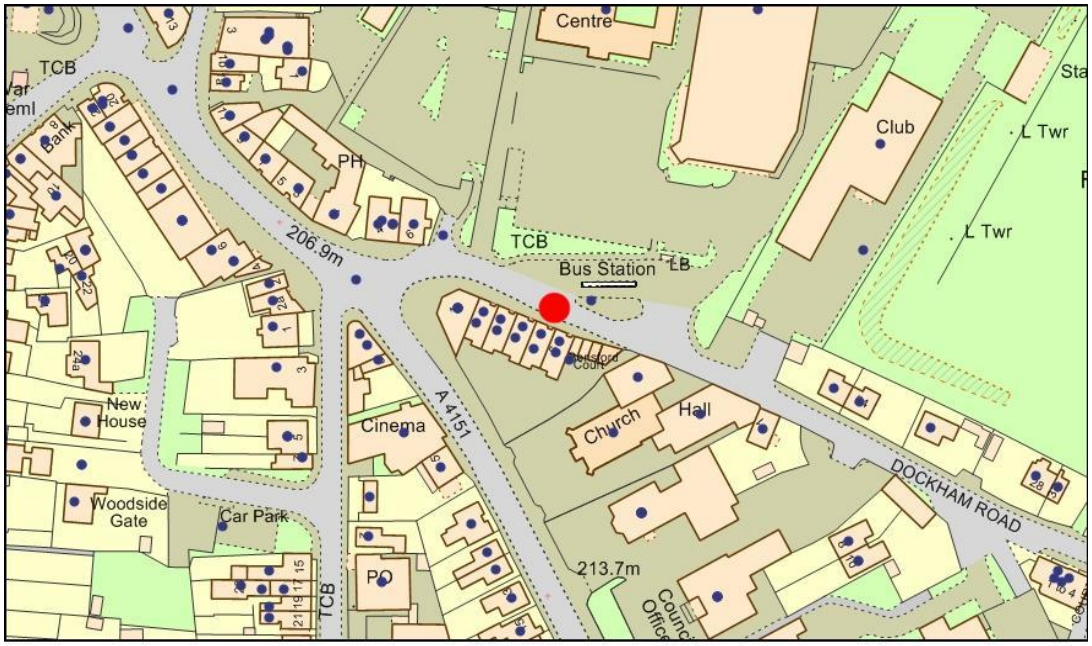
Table 15 - Change of diffusion tube locations from 2011-2012

Ref	Diffusion Tube Location	2011	2012	Comments
CIN01	Cinderford – St Whites Terrace	✓	✓	
CIN02	Cinderford – Berisford Court	✓	✓	
CIN03	Cinderford – Bottom High St	✓	✓	
COL01	Coleford –Gloucester Road	✓	✓	
COL02	Coleford – Market Place (NEW)	-	✓	Added Jan 2012 to assess locality further
COL03	Coleford – Old Vicarage Court (NEW)	-	✓	Added Jan 2012 to assess locality further
HUN02	Huntley - The Red Lion junction	✓	✓	
LYD01	Lydney – Top High St	✓	✓	
LYD02	Lydney – Newerne Street	✓	✓	
LYD03	Lydney – Mid High St	✓	✓	
LYD04	Lydney – Bottom High St	✓	✓	
LYD05	Lydney - Regents Arcade	✓	✓	
LYD06	Lydney – Bream Junction (Triplicate 1of3)	✓	✓	
LYD08	Lydney – Mid Bream Road	✓	✓	
LYD09	Lydney – Top Bream Road	✓	✓	
LYD10	Lydney – Old Chip Shop, Forest Road	✓	✓	
LYD11	Lydney – Forest Road	✓	✓	
LYD12	Lydney –Newerne Street	✓	✓	
LYD13	Lydney – Bream Junction (Triplicate 2of3)	✓	✓	
LYD14	Lydney – Bream Junction (Triplicate 3of3)	✓	✓	
LYD15	Lydney – Highfield Lane (NEW)	-	✓	Added Jan 2012 - monitor background levels
MIT01	Mitcheldean –The Merrin	✓	✓	
NAI01	Nailbridge - Crossroads	✓	✓	
NEW01	Newent – opposite Clifton House, High St	✓	✓	
NEW02	Newent – Church Street	✓	✓	
NOS02	Newnham-on-Severn - High St	✓	✓	
NOS03	Newnham-on-Severn - High St	✓	✓	
NOS04	Newnham-on-Severn - High St	✓	✓	
NOS05	Newnham-on-Severn - High St	✓	✓	
WOS01	Westbury-on-Severn - High St - bus stop	✓	✓	

CIN01 - St Whites Terrace, Cinderford

Site	Annual mean concentrations (µg/m^3) Bias Adjusted		
	2010	2011	2012
CIN01	27.8	22.8	25.1

CIN02 - Berisford Court, Cinderford



Site	Annual mean concentrations (µg/m^3) Bias Adjusted		
	2010	2011	2012
CIN02	24.4	22.5	26.0

CIN03 - Bottom High Street, Cinderford

Site	Annual mean concentrations (µg/m^3) Bias Adjusted		
	2010	2011	2012
CIN03	26.5	21.7	25.0

COL01 - Gloucester Road, Coleford, COL02 – Market Place, Coleford

Site	Annual mean concentrations (µg/m^3) Bias Adjusted		
	2010	2011	2012
COL01	36.5	35.4	37.8
COL02	-	-	25.8

COL03 – Old Vicarage Court, Coleford

Site	Annual mean concentrations (µg/m^3) Bias Adjusted		
	2010	2011	2012
COL03	-	-	29.0

HUN02 - A40 Red Lion Junction, Huntley

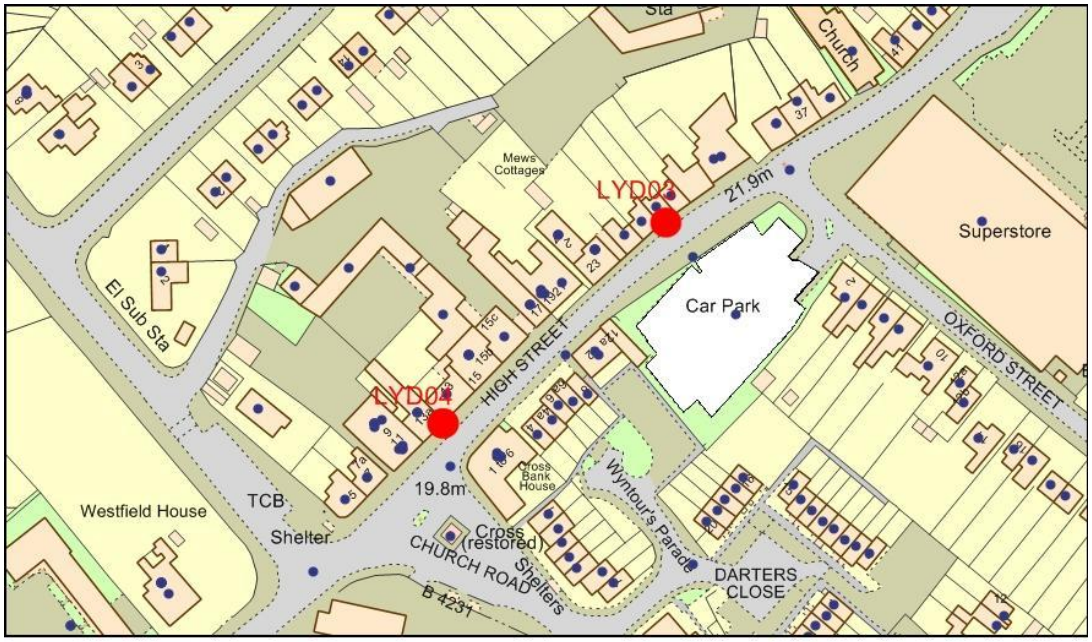
Site	Annual mean concentrations (µg/m^3) Bias Adjusted		
	2010	2011	2012
HUN02	-	24.1	23.2

LYD01 – Top Hill Street, Lydney, LYD06/13/14 – Bottom Hill Street, Lydney

Site	Annual mean concentrations (µg/m^3) Bias Adjusted		
	2010	2011	2012
LYD01	46.4	40.8	49.7
LYD06	46.6	41.5	45.7

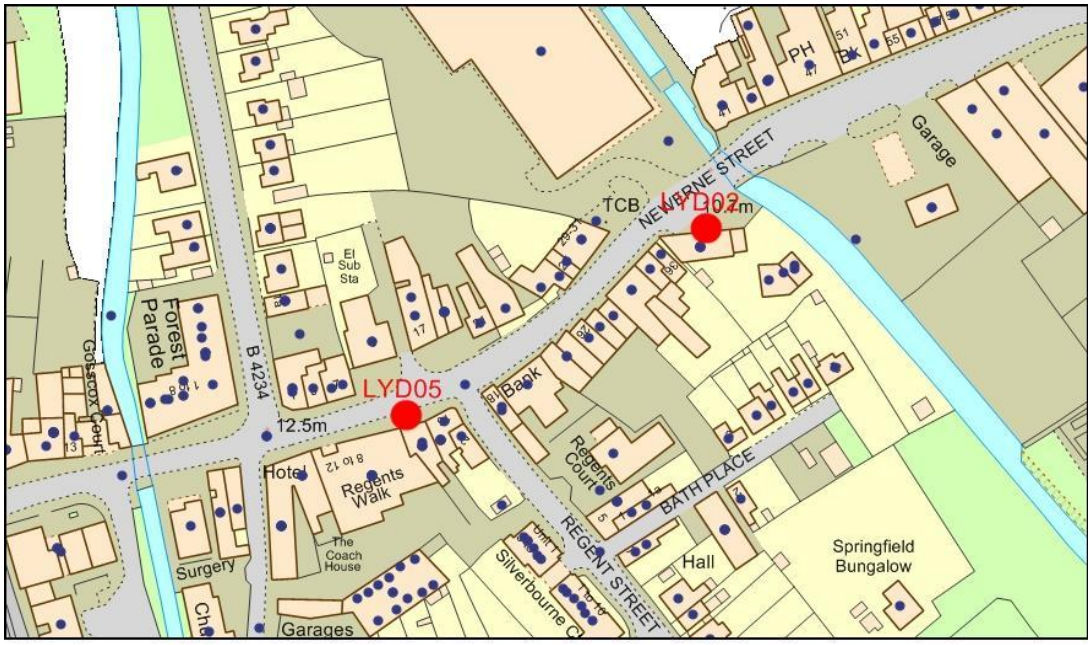
Site	Annual mean concentrations (µg/m^3) Bias Adjusted		
	2010	2011	2012
LYD13	-	40.1	46.4
LYD14	-	39.0	44.5

LYD03 - 29 High Street Lydney, LYD04 - 13 High Street, Lydney



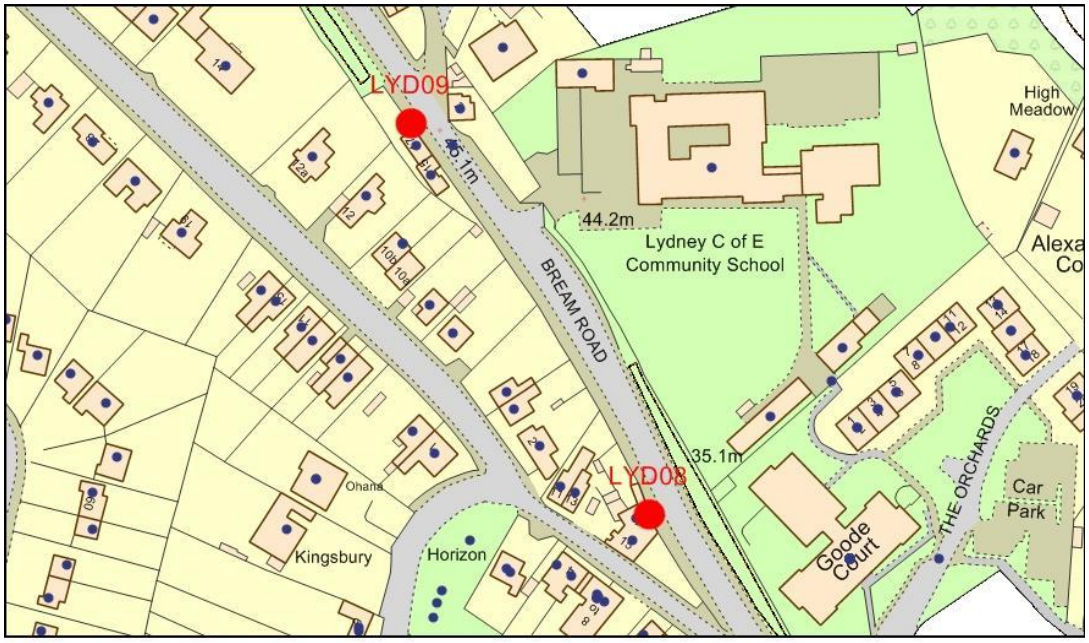
Site	Annual mean concentrations (µg/m^3) Bias Adjusted		
	2010	2011	2012
LYD03	46.9	39.2	45.1
LYD04	40.7	34.6	44.1

LYD02 - Bridge House, Newerne Street Lydney, LYD05 – Regents Arcade, Lydney



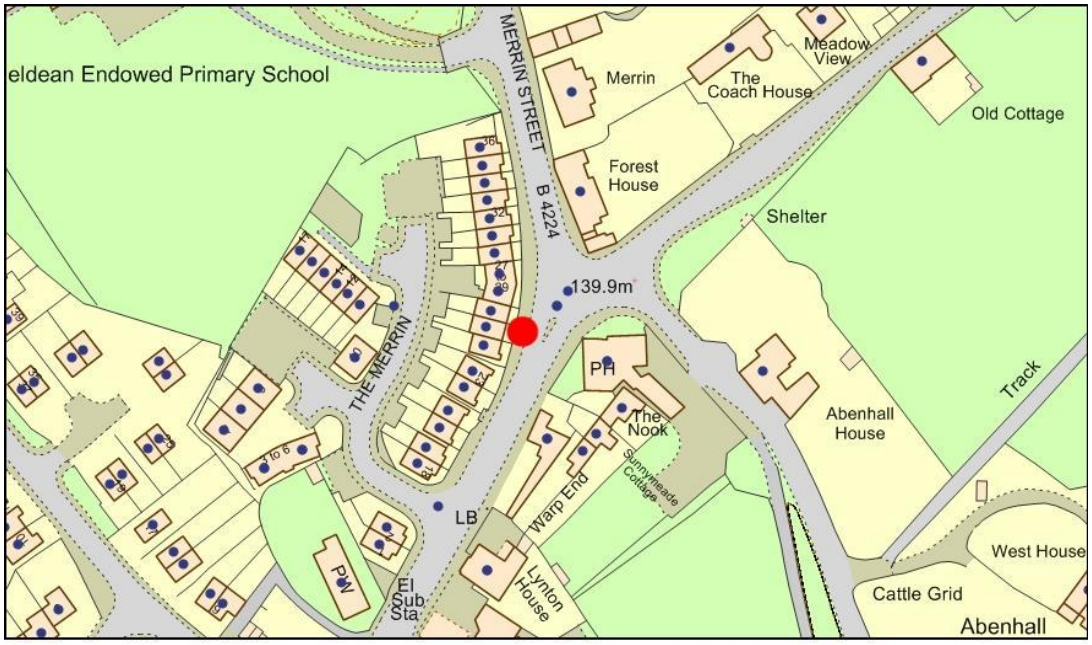
Site	Annual mean concentrations (µg/m^3) Bias Adjusted		
	2010	2011	2012
LYD02	23.9	22.8	24.7
LYD05	39.8	38.2	42.5

LYD08 13 Bream Road, Lydney, LYD09 17 Bream Road, Lydney



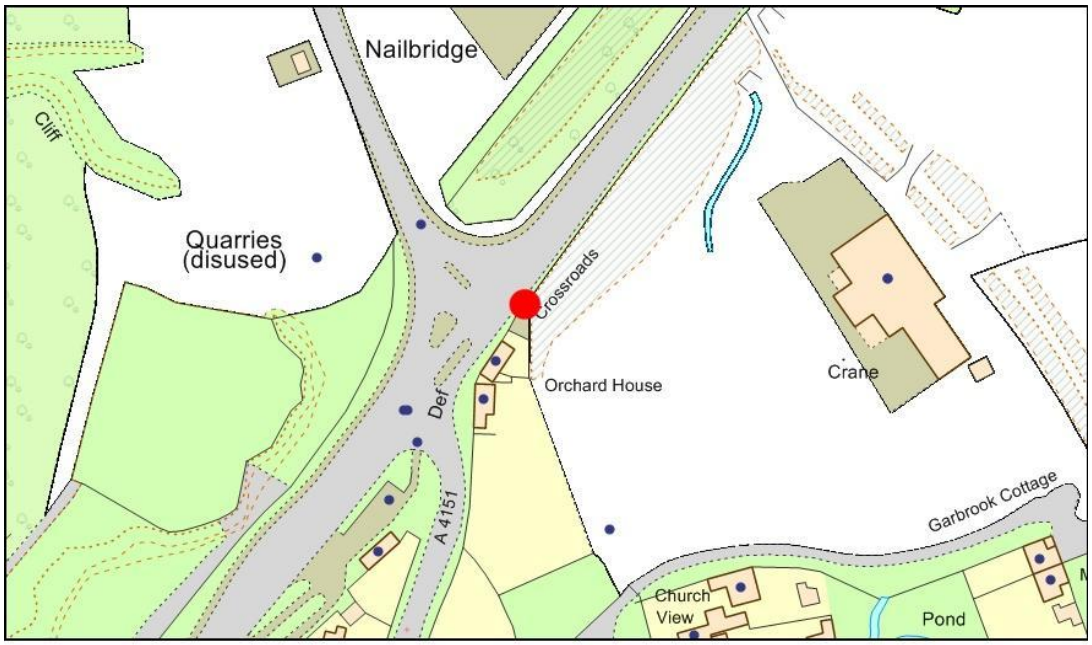
Site	Annual mean concentrations (µg/m^3) Bias Adjusted		
	2010	2011	2012
LYD0	39.7	39.6	44.5
LYD09	46.0	44.6	47.5

MIT01 The Merrin, Mitcheldean



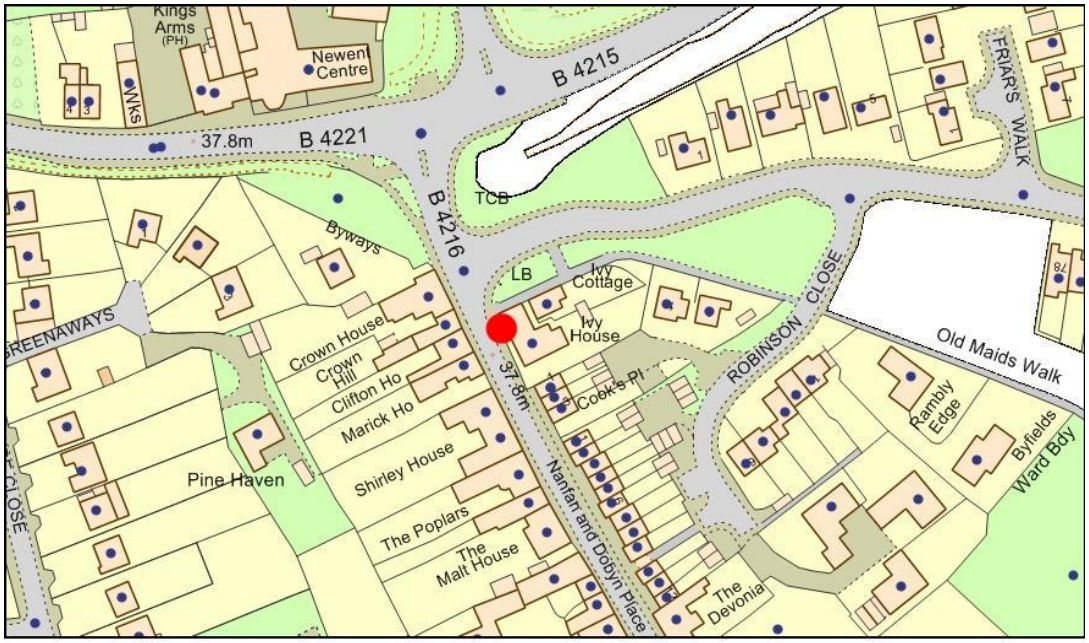
Site	Annual mean concentrations (µg/m^3) Bias Adjusted		
	2010	2011	2012
MIT01	31.5	26.2	31.7

NAI01 Crossroads, Nailbridge



Site	Annual mean concentrations (µg/m^3) Bias Adjusted		
	2010	2011	2012
NAI01	35.0	35.4	37.1

NEW01 High Street, Newent

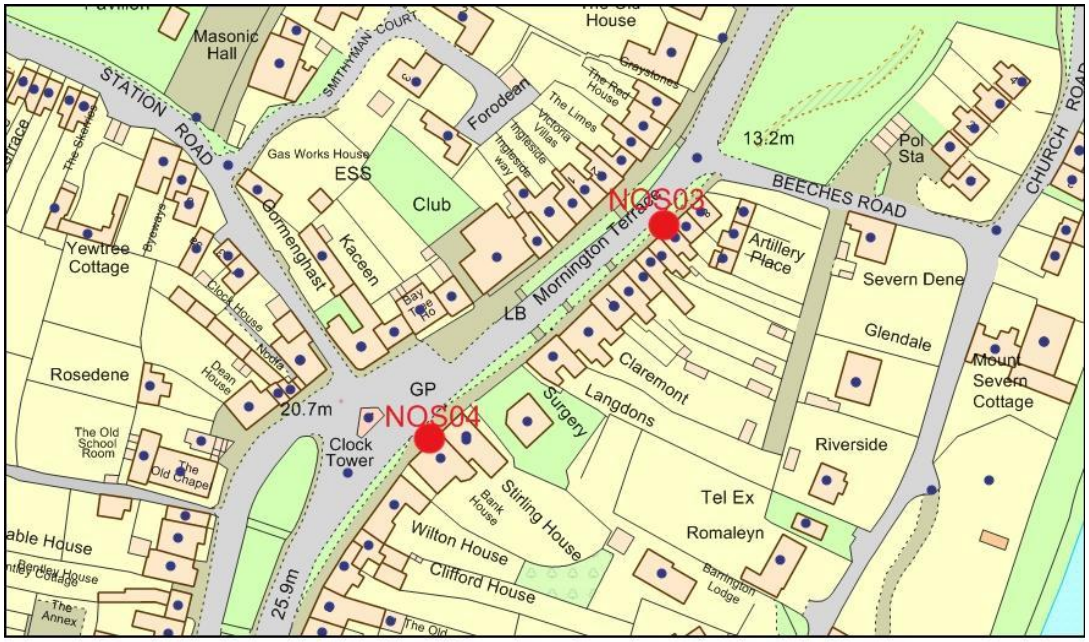


Site	Annual mean concentrations (µg/m^3) Bias Adjusted		
	2010	2011	2012
NEW01	27.4	22.3	24.3

NEW02 Church Street, Newent

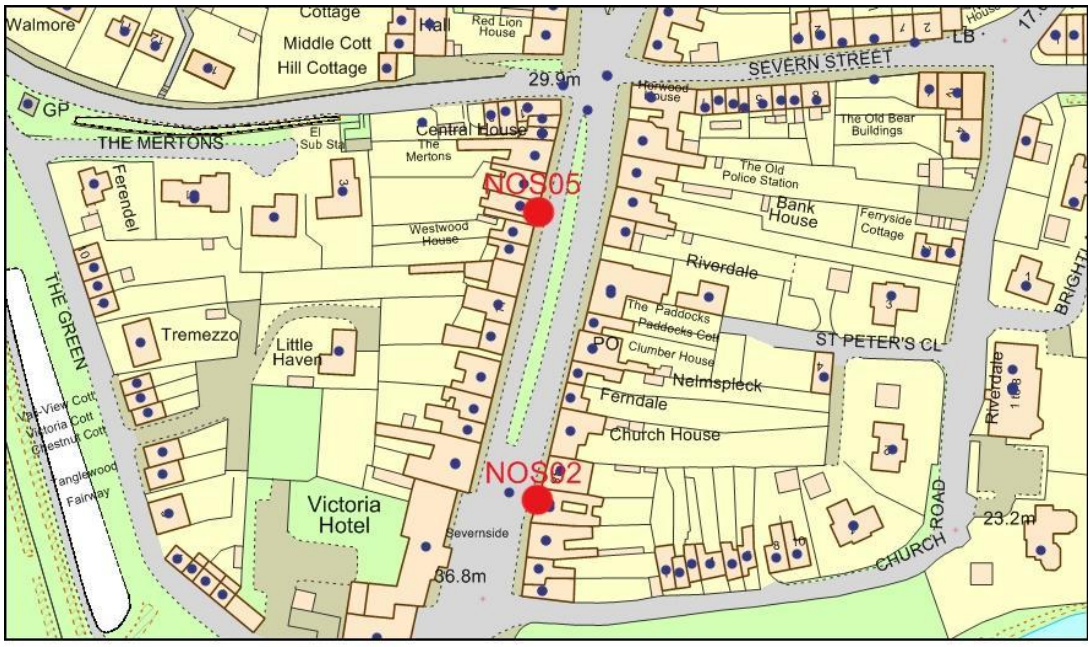
Site	Annual mean concentrations (µg/m^3) Bias Adjusted		
	2010	2011	2012
NEW02	28.4	26.2	27.9

NOS04 opposite Clock Tower, Newnham, NOS03 Mornington Terrace



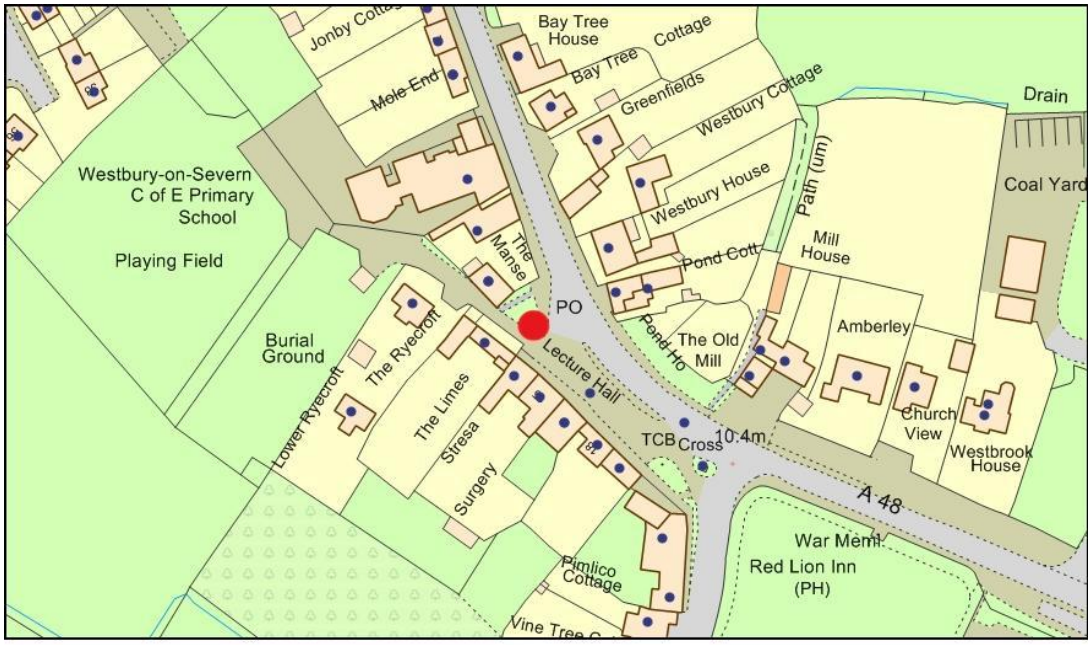
Site	Annual mean concentrations (µg/m^3) Bias Adjusted		
	2010	2011	2012
NOS03	30.0	32.1	31.1
NOS04	37.3	30.4	35.5

NOS02 High Street, Newnham, NOS05 High Street, Newnham



Site	Annual mean concentrations (µg/m^3) Bias Adjusted		
	2010	2011	2012
NOS02	35.7	32.2	33.8
NOS05	35.4	26.1	27.9

WOS01 Bus Stop A48, Westbury-on-Severn



Site	Annual mean concentrations ($\mu g/m^3$) Bias Adjusted		
	2010	2011	2012
WOS01	17.0	23.6	24.3