

# FOREST OF DEAN DISTRICT COUNCIL



## 2010 Air Quality Progress Report for Forest of Dean District

2010

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

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# Executive Summary

The 2010 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<sub>2</sub>), lead, sulphur dioxide (SO<sub>2</sub>) and PM<sub>10</sub> (Particles under 10µm in diameter).

This Air Quality Progress Report concluded the following:

- Four sites in the town of Lydney exceeded the nitrogen dioxide annual mean objective of 40µg/m<sup>3</sup>. These sites will be within the Lydney Air Quality Management Area, which will be declared in July 2010. No other pollutants exceeded their respective annual mean concentrations.
- Measured NO<sub>2</sub> 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<sub>2</sub> levels are increasing, the Forest of Dean District Council will undertake a Detailed Assessment when required.
- There are no other road traffic sources of concern within Forest of Dean District Council's administrative area.
- There are no other transport sources of concern within Forest of Dean District Council's administrative area.
- There are no industrial sources of concern within Forest of Dean District Council's administrative area.
- There are no commercial or domestic sources of concern within Forest of Dean District Council's administrative area.
- There are no fugitive or uncontrolled sources of concern within Forest of Dean District Council's administrative area.
- In July 2010, the Lydney Air Quality Management Area will be declared. A Further Assessment and Air Quality Action Plan will be developed in 2011. In April 2011, a Progress Report which forms part of the Local Air Quality Management (LAQM) will be submitted.

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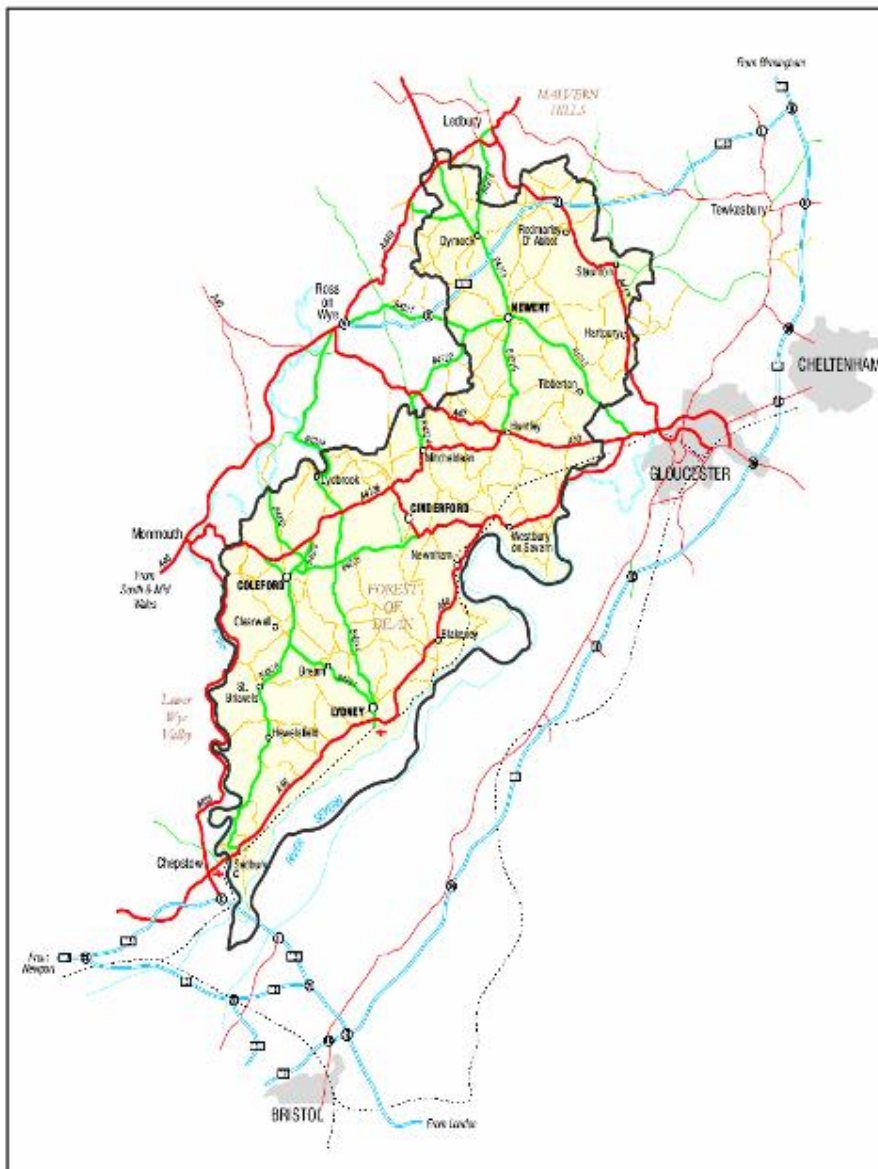
# 1 Introduction

## 1.1 Description of Local Authority Area

The Forest of Dean is a rural community situated in Gloucestershire. 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. 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 over 81,000 with approximately 32,000 households. 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) (see map - Figure 1.1).

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.

**Figure 1.1 Map of Forest of Dean District Council**



## 1.2 Purpose of Progress Report

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.

## 1.3 Air Quality Objectives

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

**Table 1.1 Air Quality Objectives for the Purpose of LAQM in England.**

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



## 1.4 Summary of Previous Review and Assessments

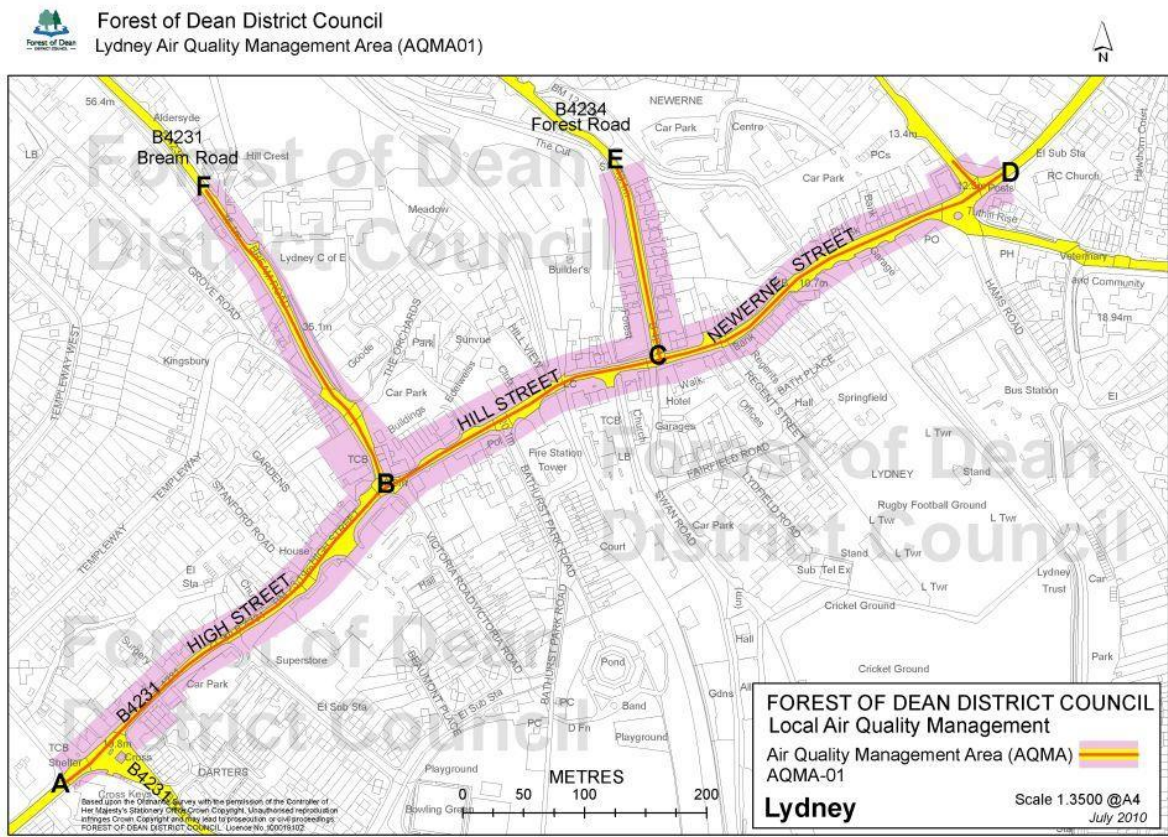
The Forest of Dean District Council has previously undertaken the following review and assessment reports:

- Updating and Screening Assessment 2003 (USA 2003)<sup>Ref 1</sup>
- Progress Report 2004 (PR 2004)<sup>Ref 2</sup>
- Progress Report 2005 (PR2005)<sup>Ref 3</sup>
- Updating and Screening Assessment 2006 (USA 2006)<sup>Ref 4</sup>
- Progress Report 2007 (PR 2007)<sup>Ref 5</sup>
- Detailed Assessment 2009 (DA 2009)<sup>Ref 6</sup>
- Updating and Screening Assessment 2009 (USA 2009)<sup>Ref 7</sup>

**Table 1.2 Conclusions of Previous Rounds of Review and Assessment**

Report	Exceedences identified	AQMA declared	Additional Comments
USA 2006	None	No	Pemeroy Pressroom Products Ltd (new A1 industrial development in the District).
PR 2007	Potential exceedance of annual mean objective for NO <sub>2</sub> in Lydney	No	A Detailed Assessment for Lydney to be submitted.
DA 2009	Exceedances of annual mean NO <sub>2</sub> objective	No	Need for an AQMA for Lydney identified.
USA 2009	NO <sub>2</sub> annual mean objective exceeded at three sites in Lydney in 2008	Yes	Lydney AQMA will be declared at end of 2009, beginning of 2010.

**Figure 1.2 Map of AQMA Boundaries**



## 2 New Monitoring Data

### 2.1 Summary of Monitoring Undertaken

#### 2.1.1 Automatic Monitoring Sites

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

#### 2.1.2 Non-Automatic Monitoring.

The Forest of Dean District Council has undertaken NO<sub>2</sub> monitoring with diffusion tubes at 25 sites in 2009. The diffusion tubes were supplied and analysed by Bristol Scientific 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 (Ref. 09). All diffusion tubes are stored, handled and exposed in accordance with the relevant guidance. All diffusion tubes have a monthly exposure period.

Where less than 75% (nine months) worth of data is collected from diffusion tubes, the data has been annualised using the methodology outlined in Box 3.2 of the Technical Guidance (LAQM.TG(09)) (Ref. 08).

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 03/10) (Appendix A).

- 2007 – 0.77 for 5 studies
- 2008 – 0.87 for 4 studies
- 2009 – 0.84 for 2 studies

In 2008/09, a Detailed Assessment was undertaken in Lydney from the evidence of the progress report 2007 which identified a potential exceedence of the NO<sub>2</sub> annual mean objective of 40µg/m<sup>3</sup>. Results of 2007 NO<sub>2</sub> monitoring data showed that two sites in High Street, Lydney exceeded the annual mean objective (bias adjusted), with three sites (High Street, Hill Street and Newerne street) within 10% of the annual mean objective.

Further nitrogen dioxide diffusion tubes were added in April 2009 in various sites to provide further details of air quality levels within Lydney. In July 2010, Lydney Air Quality Management Area will be declared.

Table 2.1 shows details of the non-automatic (diffusion Tube) monitoring sites.

**Table 2.1 Details of Non- Automatic Monitoring Sites**

Site Code	Site Name	Site Type	OS Grid Ref		Pollutants Monitored	In AQMA?	Relevant Exposure? (Y/N with distance (m) to relevant exposure)	Distance to kerb of nearest road (N/A if not applicable)	Worst case Location
BRO01	Bromsberrow Heath (M50)	Rural / Background	373228	232844	NO <sub>2</sub>	No	N (80m)	1m	Yes
CIN01	Cinderford - St Whites Rd	Town / Roadside	365458	212855	NO <sub>2</sub>	No	Y (<1m)	4m	Yes
CIN02	Cinderford – Berisford Court	Town / Roadside	365814	214014	NO <sub>2</sub>	No	Y (<2m)	1m	Yes
CIN03	Cinderford –High St	Town / Roadside	365291	214732	NO <sub>2</sub>	No	Y (2m)	1m	Yes
COL01	Coleford – Gloucester Road	Town / Roadside	357629	210787	NO <sub>2</sub>	No	Y (1m)	2m	Yes
FIV01	Five Acres – Beech Avenue	Rural / Roadside	358032	212301	NO <sub>2</sub>	No	N (5m)	2m	Yes
HUN01	Huntley – T- Junction	Rural / Roadside	371727	219387	NO <sub>2</sub>	No	N (5m)	1m	Yes
HUN02	Huntley - The Red Lion junction	Rural / Roadside	372198	219359	NO <sub>2</sub>	No	N (5m)	1m	Yes
LYD01	Lydney - High St	Town / Roadside	363142	203074	NO <sub>2</sub>	Yes	Y (<1m)	2m	Yes
LYD02	Lydney – Bridge House, Newerne Street	Town / Roadside	363523	203261	NO <sub>2</sub>	Yes	Y (<1m)	4m	Yes
LYD03	Lydney - High St	Town / Roadside	363025	202964	NO <sub>2</sub>	Yes	Y (<1m)	1m	Yes
LYD04	Lydney - High St	Town / Roadside	362994	202939	NO <sub>2</sub>	Yes	Y (<1m)	1m	Yes
LYD05	Lydney - Regents Arcade	Town / Roadside	363443	203206	NO <sub>2</sub>	Yes	Y (1m)	1m	Yes
LYD06	Lydney - Art/picture gallery	Town / Roadside	363189	203110	NO <sub>2</sub>	Yes	N (1m)	1m	Yes
LYD07	Lydney Bypass	Rural / Background	363474	202431	NO <sub>2</sub>	No	N (200m)	1m	No
LYD08	Lydney – Mid Bream Road	Town / Roadside	363107	203217	NO <sub>2</sub>	Yes	Y (<1m)	2m	Yes
LYD09	Lydney – Top Bream Road	Town / Roadside	363046	203322	NO <sub>2</sub>	Yes	Y (<1m)	<1m	Yes
MIT01	Mitcheldean – opposite Lamb Inn, The Merrin	Rural / Roadside	366483	218277	NO <sub>2</sub>	No	N (2m)	1m	Yes
NAI01	Nailbridge - Crossroads	Rural / Roadside	364555	216226	NO <sub>2</sub>	No	N (5m)	1m	Yes
NEW01	Newent – High Street	Town / Roadside	372058	226159	NO <sub>2</sub>	No	N (1m)	1m	Yes
NEW02	Newent – Church Street	Town / Roadside	372288	225852	NO <sub>2</sub>	No	N (<1m)	2m	Yes
NOS01	Newnham-on-Severn - High St	Rural / Background	369036	211589	NO <sub>2</sub>	No	Y (2m)	1m	Yes
SED01	Sedbury – A48	Rural / Background	354266	194166	NO <sub>2</sub>	No	N (10m)	1m	Yes
STB01	St Briavels - Grove House	Rural / Background	355192	205129	NO <sub>2</sub>	No	N (<1 m)	60m	No
WOS01	Westbury-on-Severn - High St - bus stop timetable	Rural / Background	371649	214054	NO <sub>2</sub>	No	N (5m)	2m	Yes
STB02	St Briavels, Grove House	Rural / Roadside	355192	205129	Ozone	No	N (<1 m)	60m	No
WHI01	Whitecroft, Park Hill	Rural / Roadside	361778	206140	SO <sub>2</sub>	No	Y (5m)	1m	Yes

## 2.2 Comparison of Monitoring Results with Air Quality Objectives

### 2.2.1 Nitrogen Dioxide

Table 2.2 indicates four locations where the annual mean objective of  $40\mu\text{g}/\text{m}^3$  for  $\text{NO}_2$  was exceeded in 2009 (highlighted in bold – High Street (Ref. LYD01 and LYD03) and Hill Street (Ref. LYD05 and LYD06)). These locations are all within the Lydney AQMA, which will be declared in July 2010.

All other monitoring locations were below the annual mean objectives, however, Newnham-on-Severn (Ref. NOS01) results show that there is a need for further monitoring, as the calculated  $\text{NO}_2$  concentration at  $37.9\mu\text{g}/\text{m}^3$  is within 10% of the annual mean objective of  $40\mu\text{g}/\text{m}^3$ . Two further diffusion tube sites will be added in the 2010 monitoring round (NOS02 and NOS03).

The Forest of Dean District Council will continue to monitor the results from the three  $\text{NO}_2$  diffusion tube locations in Newnham-on-Severn and if deemed necessary, will undertake a Detailed Assessment for  $\text{NO}_2$  when required.

**Table 2.2 Nitrogen dioxide diffusion tube concentrations in 2009**

Reference	Monitoring Locations	Within AQMA	2009 Data Capture %	2009 $\text{NO}_2$ Concentrations ( $\mu\text{g}/\text{m}^3$ ) Adjusted for bias
BRO01	Bromsberrow Heath (M50)	No	100	21.4
CIN01	Cinderford - St Whites Rd	No	100	22.7
CIN02	Cinderford – Berisford Court	No	100	22.1
CIN03	Cinderford –High St	No	100	22.0
COL01	Coleford – Gloucester Road	No	100	30.3
FIV01	Five Acres – Beech Avenue	No	83	23.7
HUN01	Huntley – T- Junction	No	92	26.6
HUN02	Huntley - The Red Lion junction	No	100	24.4
LYD01	Lydney - High St	Yes	100	<b>47.1</b>
LYD02	Lydney – Bridge House, Newerne Street	Yes	67	16.1 (Adj)*
LYD03	Lydney - High St	Yes	100	<b>42.4</b>
LYD04	Lydney - High St	Yes	100	38.0
LYD05	Lydney - Regents Arcade	Yes	92	<b>40.2</b>
LYD06	Lydney - Art/picture gallery	Yes	100	<b>43.3</b>
LYD07	Lydney Bypass	Yes	83	18.3
LYD08	Lydney – Mid Bream Road	Yes	67	14.4 (Adj)*
LYD09	Lydney – Top Bream Road	Yes	67	32.7 (Adj)*
MIT01	Mitcheldean – opposite Lamb Inn, The Merrin	No	100	28.5
NAI01	Nailbridge - Crossroads	No	92	30.2
NEW01	Newent – High Street	No	92	24.7
NEW02	Newent – Church Street	No	92	26.6
NOS01	Newnham-on-Severn - High St	No	100	37.9
SED01	Sedbury – A48	No	83	23.1
STB01	St Briavels - Grove House	No	100	6.5
WOS01	Westbury-on-Severn - High St - bus stop	No	100	25.8

Table 2.3 provides the results of all nitrogen dioxide monitoring undertaken since the last Progress Report in 2007.

\*Where monitoring is for 9 months or less, the mean has been annualised (see Appendix D).

**Table 2.3 Nitrogen dioxide diffusion tube concentrations 2007-2009**

Site	Monitoring Locations	Within AQMA?	Annual mean concentrations ( $\mu\text{g}/\text{m}^3$ ) Bias Adjusted		
			2007	2008	2009
BRO01	Bromsberrow Heath (M50)	No	-	-	21.4
CIN01	Cinderford - St Whites Rd	No	20.0	21.5	22.7
CIN02	Cinderford – Berisford Court	No	16.1	22.1	22.1
CIN03	Cinderford –High St	No	-	-	22.0
COL01	Coleford – Gloucester Road	No	-	-	30.3
FIV01	Five Acres – Beech Avenue	No	19.9	22.5	23.7
HUN01	Huntley – T- Junction	No	-	-	26.6
HUN02	Huntley - The Red Lion junction	No	-	-	24.4
LYD01	Lydney - High St	Yes	42.5	47.9	<b>47.1</b>
LYD02	Lydney – Bridge House, Newerne Street	Yes	-	-	16.1 (Adj)
LYD03	Lydney - High St	Yes	47.1	46.8	<b>42.4</b>
LYD04	Lydney - High St	Yes	37.2	37.1	38.0
LYD05	Lydney - Regents Arcade	Yes	39.1	39.1	<b>40.2</b>
LYD06	Lydney - Art/picture gallery	Yes	38.8	43.1	<b>43.3</b>
LYD07	Lydney Bypass	Yes	14	18	18.3
LYD08	Lydney – Mid Bream Road	Yes	-	-	14.4 (Adj)
LYD09	Lydney – Top Bream Road	Yes	-	-	32.7 (Adj)
MIT01	Mitcheldean – opposite Lamb Inn, The Merrin	No	-	-	28.5
NAI01	Nailbridge - Crossroads	No	29.5	33.5	30.2
NEW01	Newent – High Street	No	-	-	24.7
NEW02	Newent – Church Street	No	23.5	26.1	26.6
NOS01	Newnham-on-Severn - High St	No	31.1	37.3	37.9
SED01	Sedbury – A48	No	23.3	16.1	23.1
STB01	St Briavels - Grove House	No	6.6	6.8	6.5
WOS01	Westbury-on-Severn - High St - bus stop timetable	No	21.9	26.7	25.8

- indicates the location which were not monitored during that period. Monitoring locations were reviewed and updated during the 2009 monitoring round.

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

The Forest of Dean District Council has not undertaken any PM<sub>10</sub> monitoring within their administrative area since the Updating and Screening Assessment in 2006.

## 2.2.3 Sulphur Dioxide

The Forest of Dean District Council monitors concentrations of SO<sub>2</sub> at one site within the local authority using a monthly exposed diffusion tube. The usefulness of this data is negligible as the results are in no way comparable to the SO<sub>2</sub> air quality objectives. However, the annual mean result may be compared to previous year's results to study annual trends – see Table 2.4. Since 2003, the diffusion tube concentrations have shown little variation, therefore SO<sub>2</sub> monitoring will cease in July 2010. The Forest of Dean District Council does not undertake any automatic monitoring for SO<sub>2</sub>.

**Table 2.4 Sulphur dioxide diffusion tube monitoring data 2007-2009**

Monitoring Locations	Within AQMA?	Annual mean concentrations ( $\mu\text{g}/\text{m}^3$ )		
		2007	2008	2009
WHI01 Whitecroft, Park Hill	No	4.8	2.9	4.2

## 2.2.4 Benzene

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

## 2.2.5 Other pollutants monitored

The Forest of Dean District Council monitors concentrations of ozone at one site within the local authority using a monthly exposed diffusion tube. The usefulness of the data obtained is negligible as the results are in no way comparable to the ozone air quality objective. However, the annual mean result may be compared to previous year's results to study annual trends – see Table 2.5 below. Since 2003, the diffusion tube concentrations have shown little variation; therefore ozone monitoring will cease in July 2010.

**Table 2.5 Ozone diffusion tube monitoring data 2007-2009**

Monitoring Locations	Within AQMA?	Annual mean concentrations ( $\mu\text{g}/\text{m}^3$ )		
		2007	2008	2009
Grove House, St Briavels	No	36.8	38.9	31.3

## 2.2.6 Summary of Compliance with AQS Objectives

Forest of Dean District Council has examined the concentrations from all monitoring locations. Concentrations of  $\text{NO}_2$  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.



### **3 New Local Developments**

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.

## 4 Local / Regional Air Quality Strategy

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 (Local Transport Plan 2006-2011 (LTP2), Section 3.6 Delivering Better Air Quality). The county-wide strategy was adopted by the Forest of Dean District Council in 2005.

The main objectives of the county-wide strategy include:

- Working toward meeting the national air quality objectives.
- Continue working towards reducing ozone concentrations.
- Comply with the LAQM timetable regarding the submission of reports.
- Provide a framework for designating, revoking and amending AQMA's within Gloucestershire and for developing AQAP's.
- Review and seek to improve the key structures and mechanisms in place regionally to deliver air quality improvements.
- Ensure that air quality is a key objective in all future LTP's.
- Review and reduce the main constraints to improving air quality.
- Reduce air pollution inline with the underlying principles of the European Ambient Air Quality Framework Directive (96/62/EC).
- Maintain good air quality and prevent the deterioration of air quality.
- Reduce emissions of CO<sub>2</sub> emitted by road transport.
- Consider subsequent reviews of the Strategy in conjunction with annual reviews of the LTP.

Monitoring of Gloucestershire's most recent LTP2 targets shows that, whilst there is still work to be done and difficult issues to tackle, sound progress is being made towards providing a safe and sustainable transport system (2009, Gloucestershire Highways, Annual Progress Reports to the Gloucestershire Local Transport Plans 2009<sup>Ref 10</sup>).

## 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:

- 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.

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**

The Forest of Dean District Local Plan Review, which was adopted November in 2005, states under Policy P.1 that 'Provision will only be made for development where it does not have an unacceptable effect in terms of:

- (a) the environment and local community in terms of air, noise or light pollution,
- (b) the quality of surface or ground water or,
- (c) contamination of land or soil.

## 7 Local Transport Plans and Strategies

The Gloucestershire Local Transport Plan (LTP2) 2006-2011 <sup>Ref 11</sup> highlights the government's priority of achieving better air quality.

The aim of the LTP2 is to reduce air and noise pollution and the harmful physical impacts of transport on both the natural and built environment.

The objectives are to:

- Ensure air quality objectives are met.
- Improve air quality throughout the county.
- Reduce the impact of road transport on communities and the environment.

## 8 Climate Change Strategies

The Forest of Dean Community Climate Change Strategy has three main objectives:

- Embed dealing with the causes and impacts of climate change within the work of the Forest of Dean Local Strategic Partnership.
- Challenge partner organisations to demonstrate that they are addressing the impacts and causes of climate change in their mainstream work.
- Champion the work of the Local Area Agreement by raising awareness, stimulating local action and where necessary lobbying for Climate Change issues to be addressed.

## 9 Conclusions and Proposed Actions

### 9.1 Conclusions from New Monitoring Data

There are four diffusion tube location sites (Ref. LYD01, LYD03, LYD05 and LYD06) within the Forest of Dean District where the annual mean objective of  $40\mu\text{g}/\text{m}^3$  for  $\text{NO}_2$  was exceeded in 2009. These locations are all within the Lydney AQMA, which will be declared in July 2010.

$\text{NO}_2$  levels identified in Newnham-on-Severn suggest that there may be a need for further monitoring in this area. The calculated  $\text{NO}_2$  annual mean concentration of  $37.9\mu\text{g}/\text{m}^3$  is within 10% of the annual mean objective. It is considered that two further diffusion tube sites will be added to the monitoring round in 2010.

The Forest of Dean District Council will continue to monitor the results from the three  $\text{NO}_2$  diffusion tube locations in Newnham-on-Severn and if deemed necessary, will undertake a Detailed Assessment for  $\text{NO}_2$  when required.

The levels of  $\text{NO}_2$  at all other locations within the District in 2009 are generally comparable with levels from the previous two years.

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 they are at various stages in their development. These include:

- 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.

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

### 9.3 Other Conclusions

The Forest of Dean District Council monitor sites in Whitecroft and St Briavels for  $\text{SO}_2$  and  $\text{O}_3$ , respectively. The results from the diffusion tube analysis would indicate that the levels are in no way comparable to their air quality objectives and therefore, will not be monitored after July 2010.

Monitoring of Gloucestershire's most recent LTP2 targets shows that, whilst there is still work to be done and difficult issues to tackle, sound progress is being made towards providing a safe and sustainable transport system (Annual Progress Reports to the Gloucestershire Local Transport Plans 2009 <sup>Ref 10</sup>).

## 9.4 Proposed Actions

NO<sub>2</sub> levels identified in Newnham-on-Severn suggest that there may be a need for further monitoring in this area. The calculated NO<sub>2</sub> annual mean concentration of 37.9µg/m<sup>3</sup> is within 10% of the annual mean objective of 40 µg/m<sup>3</sup>. Two further diffusion tube sites will be added in the 2010 monitoring round.

The Forest of Dean District Council will continue to monitor the results from the three NO<sub>2</sub> diffusion tube locations in Newnham-on-Severn and if deemed necessary, will undertake a Detailed Assessment for NO<sub>2</sub> when required.

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.

Table 9.1 shows the diffusion tube locations that will be used in 2010.

**Table 9.1 Change of Diffusion Tube Locations from 2009-2010**

Ref	Diffusion Tube Location	2009	2010	Comments
STB01	St Briavels - Grove House	✓	X	Removed as NO <sub>2</sub> <20 µg/m <sup>3</sup> in this location
LYD08	Lydney - opposite 13 Bream Rd	✓	✓	
FIV01	Five Acres - crossroads - 3 Beech Ave	✓	✓	
LYD09	Lydney - 17 Bream Rd	✓	✓	
CIN01	Cinderford - 9 St Whites Terrace	✓	✓	
CIN02	Cinderford - opposite bus station - café, 6 Berisford Court	✓	✓	
CIN03	Cinderford - 167 High St	✓	✓	
NAI01	Nailbridge – crossroads	✓	✓	
MIT01	Mitcheldean - opposite Lamb Inn - 25 The Merrin	✓	✓	
HUN01	Huntley - A4136/A40 T junction - Gatehouse	✓	✓	
HUN02	Huntley - opposite The Red Lion - The Rustics	✓	✓	
NEW01	Newent - High St junction, opposite Clifton House	✓	✓	
NEW02	Newent - F.O.D.D.C. Branch Office	✓	✓	
BRO01	Bromsberrow Heath	✓	✓	
LYD01	Lydney - 57 High St	✓	✓	
LYD02	Lydney - Newerne St, Bridge House - Tucker	✓	✓	
LYD03	Lydney - 29 High St	✓	✓	
LYD04	Lydney - 21 High St	✓	✓	
WOS01	Westbury-on-Severn - High St - bus stop timetable	✓	✓	
NOS01	Newnham-on-Severn - High St - Severnside Press	✓	✓	
LYD05	Lydney - Unit 1, Regents Arcade	✓	✓	
LYD06	Lydney - Hill St - Art/picture gallery	✓	✓	
LYD07	Lydney Bypass	✓	X	Removed as NO <sub>2</sub> <20 µg/m <sup>3</sup> in this location
SED01	Sedbury - A48	✓	✓	
COL01	Coleford crossroads - 5 Gloucester Rd	✓	✓	
NOS02	Newnham-on-Severn – Galen House	X	✓	Added to assess locality further
NOS03	Newnham-on-Severn – Stirling House	X	✓	Added to assess locality further



The Forest of Dean District Council aim to declare the Lydney AQMA in July 2010. This follows on from the findings of the Detailed Assessment (February 2009) Report. The next course of action will be to undertake and submit the 2011 Progress Report. However, if it is considered that NO<sub>2</sub> levels are likely to exceed the air quality objective, the Forest of Dean District Council will undertake a Detailed Assessment in Newnham-on-Severn.

# 10 References

**Table 10.1 Tables of references utilised in the generation of this Progress Report 2010**

<b>Ref</b>	<b>Title</b>	<b>Author</b>	<b>Year</b>
Ref. 01	Updating and Screening Assessment 2003	Forest of Dean District Council	2003
Ref. 02	Progress Report 2004	Forest of Dean District Council	2004
Ref. 03	Progress Report 2005	Forest of Dean District Council	2005
Ref. 04	Updating and Screening Assessment 2006	Forest of Dean District Council	2006
Ref. 05	Progress Report 2007	Forest of Dean District Council	2007
Ref. 06	Detailed Assessment 2009	Forest of Dean District Council	2009
Ref. 07	Updating and Screening Assessment 2009	Forest of Dean District Council	2009
Ref. 08	Local Air Quality Management - Technical Guidance (TG09)	DEFRA	2009
Ref. 09	Diffusion Tubes for Ambient NO <sub>2</sub> Monitoring: Practical Guidance for Laboratories & Users	AEA for DEFRA	2008
Ref.10	Annual Progress Reports to the Gloucestershire Local Transport Plans 2009	Gloucestershire County Council	2009
Ref.11	The Gloucestershire Local Transport Plan (LTP2) 2006-2011, The second Gloucestershire Local Transport Plan (LTP2)	Gloucestershire County Council	2006

# Appendices

## 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 v03/10).

- 2009 – 0.84 for 2 studies
- 2008 – 0.87 for 4 studies
- 2007 – 0.77 for 5 studies

**Table A1: 2009 Bias Correction Factor for NO<sub>2</sub> diffusion Tube data from Bristol Scientific Services Co-location studies (LAQM Review and Assessment Support Website)**

Analysed by	Method	Year	Site Type	Local Authority	Length of Study (Months)	Diffusion Tube Mean (Dm) $\mu\text{g}/\text{m}^3$	Automatic Monitor Mean Conc. (Cm) $\mu\text{g}/\text{m}^3$	Bias (B)	Tube Precision	Bias Adjusted Factor (A) Cm/Dm
Bristol Scientific services	20% TEA in Water	2009	Rural	Pembrokeshire	12	7.0	6.0	21.8%	p	0.82
Bristol Scientific services	20% TEA in Water	2009	K	AEA Tech Intercomparison	11	125	107	17.7%	G	0.85
Bristol Scientific services	20% TEA in Water	2009			Overall Factor (Two Studies)				Use	<b>0.84</b>

**Table A2: 2008 Bias Correction Factor for NO<sub>2</sub> diffusion Tube data from Bristol Scientific Services Co-location studies (LAQM Review and Assessment Support Website)**

Analysed by	Method	Year	Site Type	Local Authority	Length of Study (Months)	Diffusion Tube Mean (Dm) $\mu\text{g}/\text{m}^3$	Automatic Monitor Mean Conc. (Cm) $\mu\text{g}/\text{m}^3$	Bias (B)	Tube Precision	Bias Adjusted Factor (A) Cm/Dm
Bristol Scientific services	20% TEA in Water	2008	UB	LB Waltham Forest	12	41	36	14.2%	S	0.88
Bristol Scientific services	20% TEA in Water	2008	Rural		11	40	38	6.0%	S	0.94
Bristol Scientific services	20% TEA in Water	2008	K	AEA Tech Intercomparison	12	122	116	5.4%	G	0.95
Bristol Scientific services	20% TEA in Water	2008	Rural		11	43	31	38.7%	G	0.72
Bristol Scientific services	20% TEA in Water	2008			Overall Factor (Four Studies)				Use	<b>0.87</b>

**Table A3: 2007 Bias Correction Factor for NO<sub>2</sub> diffusion Tube data from Bristol Scientific Services Co-location studies (LAQM Review and Assessment Support Website)**

Analysed by	Method	Year	Site Type	Local Authority	Length of Study (Months)	Diffusion Tube Mean (Dm) $\mu\text{g}/\text{m}^3$	Automatic Monitor Mean Conc. (Cm) $\mu\text{g}/\text{m}^3$	Bias (B)	Tube Precision	Bias Adjusted Factor (A) Cm/Dm
Bristol Scientific services	20% TEA in Water	2007	Rural	Pembrokeshire	11	7	5	36.9%	G	0.82
Bristol Scientific services	20% TEA in Water	2007	Rural		12	46	33	38.2%	G	0.94
Bristol Scientific services	20% TEA in Water	2007	K		9	29	24	21.0%	G	0.95
Bristol Scientific services	20% TEA in Water	2007	Rural		9	36	26	46.6%	G	0.95
Bristol Scientific services	20% TEA in Water	2007	K	AEA Tech Intercomparison	12	115	103	12.0%	G	0.85
Bristol Scientific services	20% TEA in Water	2007			Overall Factor (Four Studies)				Use	<b>0.87</b>

#### QA/QC of diffusion tube monitoring

All diffusion tube monitoring data has been ratified following the methods described in LAQM.TG(09). A quality assurance/quality control (QA/QC) programme including field duplicates and blanks, and instrument calibration with standard gases has been followed (AEAT, 2000). The NO<sub>2</sub> diffusion tube analysis for 2009 was carried out and analysed by Bristol Scientific Services. The NO<sub>2</sub> tube preparation method used is 20% triethanolamine (TEA) in water.

The QA/QC methodology and criteria for Bristol Scientific Services analysis of the NO<sub>2</sub> diffusion tube data is shown in Table A4.

**Table A4 QA/QC Bristol Scientific Services Diffusion Tube Analysis**

–	Bristol City Council Scientific Services participates in the Workplace Analysis Scheme for Proficiency (WASP) for nitrogen dioxide. The latest WASP report for nitrogen dioxide for the laboratory indicated a performance classification of “Good” and ranked the laboratory first from thirty- one other laboratories.
–	In the case of nitrogen dioxide analysis the laboratory also analyses a solution supplied by AEA Technology Environment as part of the QA\QC scheme that they run. Results are returned to AEA Technology on a monthly basis. The laboratory also participates in occasional field comparison exercises again run by AEA Technology Environment.
–	Reference materials and equipment are obtained from suppliers who are approved to BS EN 9001. All reference materials are of at least analytical grade or equivalent. Standards are prepared using equipment that is all within the normal quality system.
–	Each nitrogen dioxide tube is prepared by pipetting 30 $\mu\text{l}$ of a solution of 20% triethanolamine in water onto the metal grids in the end cap, then assembling the tube components. A fresh batch of tubes is prepared each month ready to dispatch in time for the required exposure date.
–	Laboratory blanks are retained so that at least one is run alongside each batch of samples.
–	Travel blanks are supplied three-monthly as required by the U.K. Survey procedure.

**Table A5 Laboratories that have demonstrated satisfactory performance in the WASP scheme for analysis of NO<sub>2</sub> diffusion tubes, October 2008 – October 2009.**

	Performance on basis of RPI, OLD CRITERIA, best 4 out of the 5 rounds 103-107	Performance on basis of RPI, NEW CRITERIA, best 4 out of the 5 rounds 103-107
Aberdeen Public Analysts	Good	Good
<b>Bristol City Council</b>	<b>Good</b>	<b>Good</b>
Bureau Veritas	Good	Good
Cardiff Scientific Services	Good	Good
Edinburgh City Council	Good	Good
Exova (formerly Clyde Analytical)	Good	Acceptable
Glasgow Scientific Service	Good	Good
Gradko	Good	Good
Harwell Scientifics	Good	Good
Kent Scientific Services	Good	Good
Kirklees MBC	Good	Acceptable
Lambeth Scientific Services	Good	Acceptable
Lancashire County Analysts	Good	Acceptable
Milton Keynes Council	Good	Acceptable
Northampton Borough Council	Good	Acceptable
South Yorkshire Laboratories	Good	Good
Staffordshire County Council	Good	Good
Tayside (formerly Dundee CC)	Good	Good
Walsall MBC	Good	Acceptable
West Yorks Analytical Services	Good	Acceptable

## 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 B1: 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.

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 B2: 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

## 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 C1: 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 Foundry



## 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 D1: 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/49/92	T S Thomas Haulage Ltd., Church Road, Lydney	Waste Oil Burner

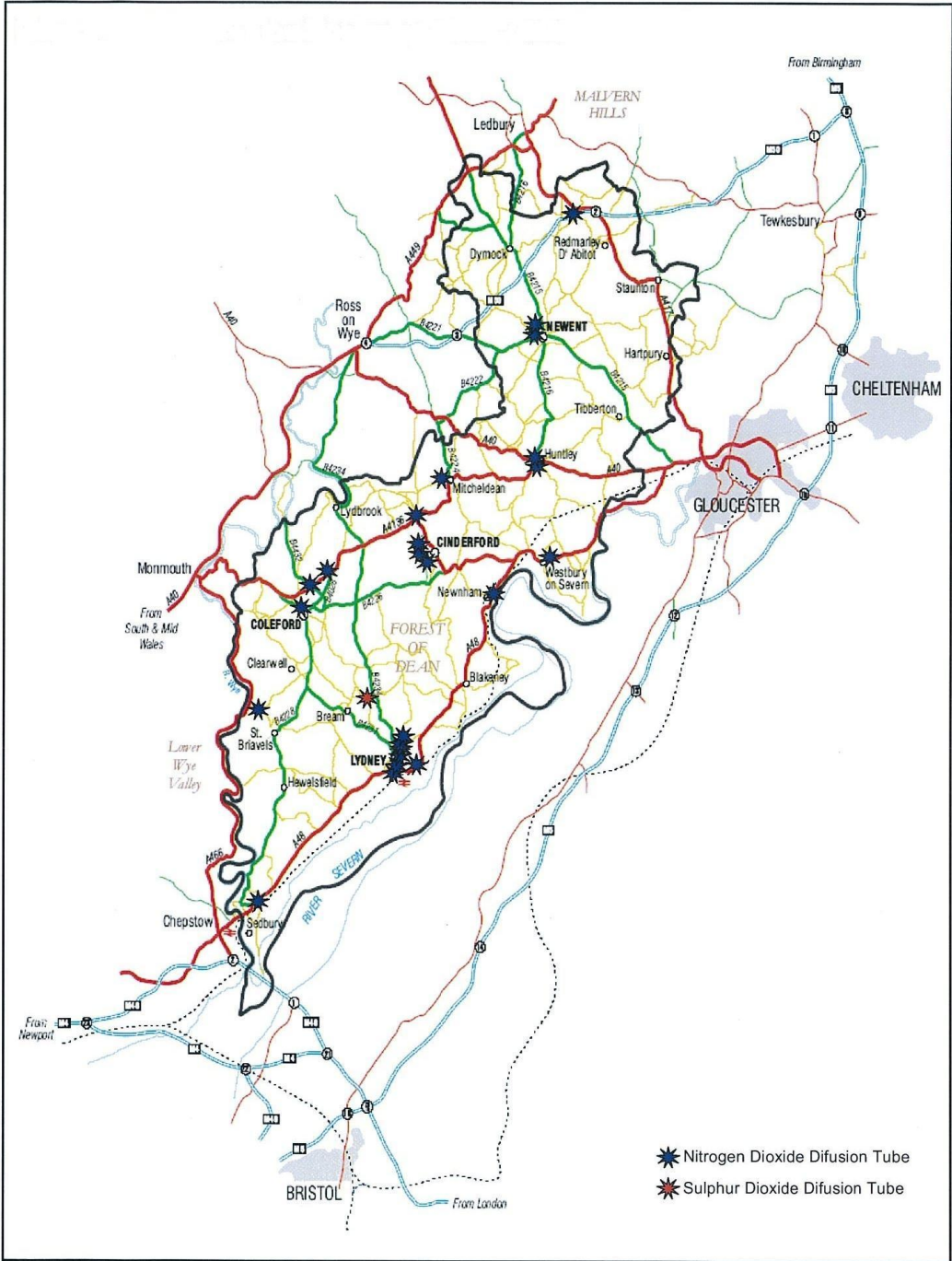
PPC/50/98	Rackham Housefloors Ltd., Forest Vale I.E. Cinderford	Bulk Use of Cement
PPC/51/00	Buckland Agricultural, Court Farm Workshops Huntley Road, Tibberton	Waste Oil Burner
PPC/53/01	Newspace Containers Ltd., New Dun Works, Coleford	Coating of Metal and Plastic
PPC/54/02	Bardon Concrete, Clearwell 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
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
PPC/63/07	Mitcheldean MOT Centre, Mitcheldean, Glos	Waste Oil Burner
PPC/61/04	Construction Agricultural, Valley Road Industrial Estate, Cinderford, Glos	Respraying of motor vehicles

**Table D2: List of Petrol Stations**

<b>Permit</b>	<b>Company Name/Address</b>	<b>Description</b>
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

# Appendix E: Diffusion Tube Locations

Figure E1: Map of monitoring locations in Forest of Dean



## Appendix F: Estimated Annual Mean Concentrations

### Adjustment to estimate annual mean

The adjustment is based on the fact that patterns in pollutant concentrations usually affect a wide region. Thus if a six month period is above average at one place it will almost certainly be above average at other locations in the region.

The adjustment procedure is as follows:

1. Identify two to four nearby, long-term, continuous monitoring sites, ideally those forming part of the national network. These should be background sites to avoid any very local effects that may occur at roadside sites, and should, wherever possible lie within a radius of about 50 miles.
2. Obtain the annual means, **Am**, for the calendar year for these sites.
3. Work out the period means, **Pm**, for the period of interest.
4. Calculate the ratio, **R**, of the annual mean to the period mean (**Am/Pm**) for each of the sites.
5. Calculate the average of these ratios, **Ra**. This is then the adjustment factor.
6. Multiply the measured period mean concentration **M** by this adjustment factor **Ra** to give the estimate of the annual mean for 2009.

**Table F1 Calculation of Annual means, Period means and the Ratio between them**

Long term Site	Annual Mean 2009 (AM)	Period Mean 2009 (PM)	Ratio (R) (Am/Pm)
Bristol St Pauls	30	39	0.77
Charlton Mackrell	9	12.125	0.74
Leominster	11	16.25	0.68
Newport	25	33	0.76
<b>Average (Ra)</b>			<b>0.74</b>

Adjusted estimate of annual mean = M x Ra (e.g. 19.6 x 0.74 (Lydney – Mid Bream Road))

**Table F2 Calculation of the estimated annual mean concentrations for 2009**

Reference	Monitoring Locations	Within AQMA	2009 NO <sub>2</sub> Concentrations M (µg/m <sup>3</sup> )	2009 NO <sub>2</sub> Adjusted estimate of annual mean (µg/m <sup>3</sup> )
LYD02	Lydney – Bridge House, Newerne St	Yes	21.9	16.1
LYD08	Lydney – Mid Bream Road	Yes	19.6	14.4
LYD09	Lydney – Top Bream Road	Yes	44.4	32.7