2017 Air Quality Annual Status Report (ASR)

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

November 2017

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Executive Summary: Air Quality in Our Area

Air quality across the Forest of Dean District remains very good, with measured levels of nitrogen dioxide (NO_2) generally well within national limits.

We have one Air Quality Management Area (AQMA) in the District which is in Lydney and was declared in July 2010. It was identified that traffic congestion (at the T junction between the High Street and the Bream Road) was the most likely cause of the nitrogen dioxide (NO_2) levels which exceeded the national air quality objectives at the time the AQMA was declared.

Monitoring throughout 2016 has not identified any exceedances in the Forest of Dean District although the diffusion tube survey results were slightly higher than those recorded last year. (It is thought that meteorological conditions contributed to the slightly higher levels this year.)

The monitoring points in Lydney High Street, at Bream junction and just up Bream Road, which lie within our AQMA, were the only sites with nitrogen dioxide levels within 10 per cent of the annual average air quality objective (i.e. above 36ugm^{-3}).

As pollutant concentrations may vary significantly from one year to the next, due to the influence of meteorological conditions, it is not desirable to revoke our AQMA whilst we have sites still measuring levels within 10% of the national objective level, set to protect health. Our monitoring programme will continue, in conjunction with planning controls in accordance with national guidance, to try to ensure that levels continue to reduce.

Within Forest of Dean District Council's administrative area there are no sources of pollution that give rise to concern in respect of air quality. No new or significantly changed sources have been identified within the district. All proposed residential and industrial developments are considered with regard to their potential to increase traffic pollution in the AQMA and other areas.

Air Quality in the Forest of Dean

Air pollution is associated with a number of adverse health impacts. It is recognised as a contributing factor in the onset of heart disease and cancer. Additionally, air pollution particularly affects the most vulnerable in society: children and older people, and those with heart and lung conditions. There is also often a strong correlation with equalities issues, because areas with poor air quality are also often the less affluent areas.

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

In common with most local authority districts in England and Wales, the main pollutant of concern within Forest of Dean District is nitrogen dioxide from road traffic. Nationwide, levels of nitrogen dioxide have been steadily falling over the years.

We deploy a number of diffusion tube monitors across the District, measuring nitrogen dioxide as part of an ongoing survey. These are collected and sent for analysis on a monthly basis.

Air quality across the Forest of Dean District remains very good with measured levels of nitrogen dioxide (NO_2) generally well below national limits.

The nitrogen dioxide diffusion tube survey results were similar to those recorded last year, just raised by a few $\mu g/m^3$ in most cases. Our 2016 monitoring programme confirms that within the Lydney Air Quality Management Area (AQMA), the nitrogen dioxide annual mean objective is no longer exceeded,(although 5 monitoring sites within the AQMA, recorded levels within 10% of the objective) and at all other monitoring locations it continues to be comfortably met.

The 2005 – 2016 Forest of Dean District Council Air Quality reports are available online at https://uk-air.defra.gov.uk/aqma/local-authorities?la_id=106.

Actions to Improve Air Quality

Lydney Air Quality Management Area (AQMA) was declared in July 2010 and a subsequent “Further Assessment” was submitted to Defra in June 2011.
It is thought that congestion at the T junction which is in a “street canyon” (i.e. the buildings by the roadside are high compared to the width of the road, preventing exhaust emissions from dispersing easily) was the cause of the previously high NO_2 levels.

Since the “Further Assessment”, there has been an investigation into options to improve air quality in the AQMA. The key change, that may have brought about the required improvement, is the introduction of a 20 mph speed limit in Lydney High Street; it is thought that this had the effect of relieving congestion at the T junction, as drivers on the main road more readily give way to exiting traffic when moving more slowly. Meteorological conditions are also known to impact upon pollution levels as they affect dispersion of polluting emissions.

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

The Overarching Transport Strategy is supported by further policy documents relating to: Bus, Cycle, Freight, Highways, Rail and Think Travel.

Local Priorities and Challenges

The nitrogen dioxide diffusion tube monitoring programme will continue and we will review results on a monthly basis, as they are received. We will work with our Planning Department and the County Planning and Highways Departments to ensure that developers of agreed new developments consider potential air quality impacts from the outset, so as not to cause undue deterioration of air quality in the District. We will follow national guidance to ensure air quality impacts are assessed for proposed developments and that any potential adverse impacts are mitigated as necessary.

How to Get Involved

Copies of the latest Air Quality Report can be found on the Council's Website at: http://www.fdean.gov.uk/residents/environment/environmental-health/air-quality
Any queries about Air Quality should be directed to the Environmental Protection team within Forest of Dean District Council.

This team can be contacted by e mail on: ers.pollution@2020partnership.uk

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1 Local Air Quality Management

This report provides an overview of air quality in Forest of Dean District during 2016. It fulfils the requirements of Local Air Quality Management (LAQM) as set out in Part IV of the Environment Act (1995) and the relevant Policy and Technical Guidance documents.

The LAQM process places an obligation on all local authorities to regularly review and assess air quality in their areas, and to determine whether or not the air quality objectives are likely to be achieved. Where an exceedance occurs or is considered likely the local authority must declare an Air Quality Management Area (AQMA) and prepare an Air Quality Action Plan (AQAP) setting out the measures it intends to put in place in pursuit of the objectives. This Annual Status Report (ASR) is an annual requirement showing the strategies employed by Forest of Dean District Council to improve air quality and any progress that has been made.

The statutory air quality objectives applicable to LAQM in England can be found in Table E.1 in Appendix E.

2 Actions to Improve Air Quality

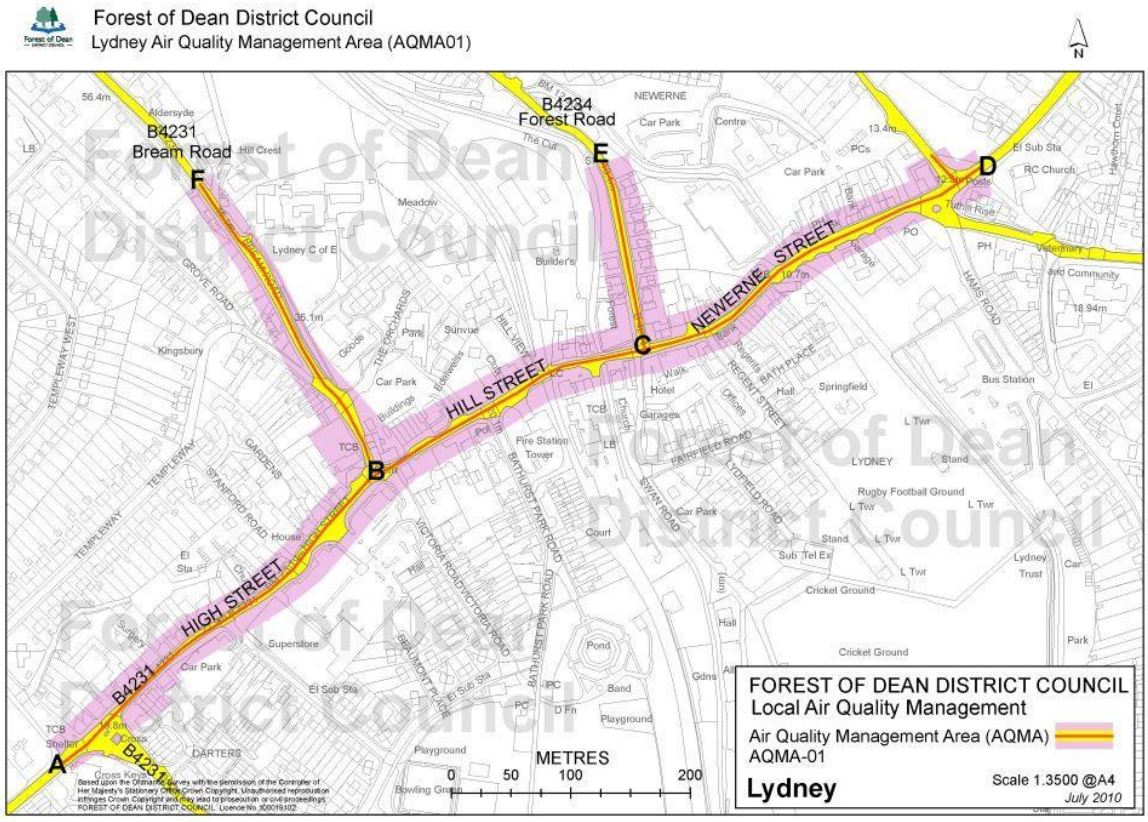
2.1 Air Quality Management Areas

Air Quality Management Areas (AQMAs) are declared when there is an exceedance or likely exceedance of an air quality objective. After declaration, the authority must prepare an Air Quality Action Plan (AQAP) within 12-18 months setting out measures it intends to put in place in pursuit of the objectives.

The Forest of Dean District Council declared Lydney AQMA in July 2010.

This AQMA was designated in relation to a likely breach of the nitrogen dioxide (annual mean) objective as specified in the Air Quality Standards Regulations 2007.

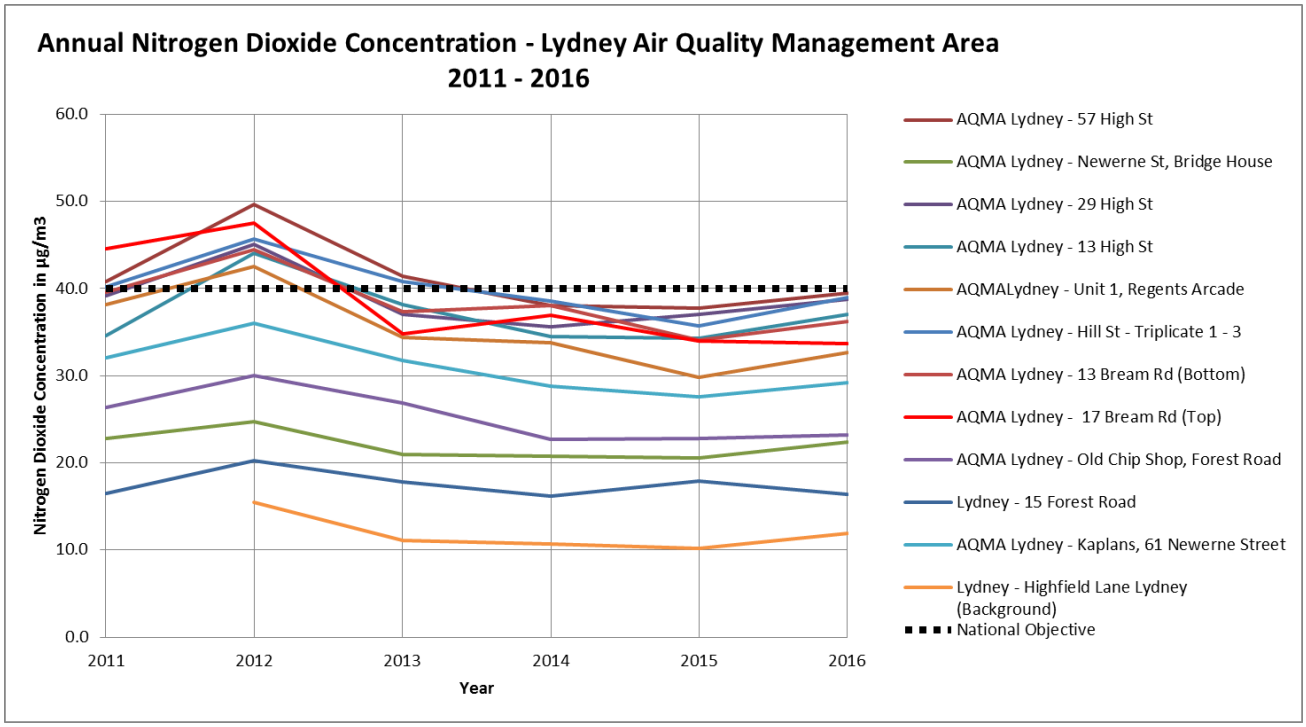
Figure 2.1- Map of Lydney AQMA Boundaries



The outlined area on the map above (Figure 2.1) shows the designated AQMA in Lydney, 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).

Fig. 2.2 Graph showing the trend over the last 6 years of nitrogen dioxide levels within our Lydney AQMA



If we compare the nitrogen dioxide concentrations measured in our Lydney AQMA during the last three or four years with those of 2011 it can be seen that at the 4 sites where the readings were the highest in 2011 (40µg/m^3 or above) there has been a decrease in levels, but that in the last 4 years the levels have not changed much. At all the other sites, where the concentration did not exceed 40µg/m^3 in 2011, the levels have not changed significantly since 2011. (2012 was a particularly high year for pollution across the whole country due to meteorological conditions that year, and the 2012 levels provide an indication of the impact that meteorology can have in our AQMA.)

Table 2.1 – Declared Air Quality Management Area

AQMA Name	Pollutants and Air Quality Objectives	City / Town	One Line Description	Action Plan
Lydney AQMA	NO_2 annual mean	Lydney	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).	The draft Lydney AQMA Action Plan January 2015 is available on the FODDC website, here.

2.2 Action Plan Options and their Evaluation

Various options were assessed and assigned scores. Those options scoring 20 or more were considered to be the most feasible and cost effective options for positive air quality impacts in the town centre.

There were 8 options which score higher than 20, as detailed below:

- Option 1 - Action Schemes
- Option 2 - Bream Road – Signalisation
- Option 7 - Switch off engines at steam train level crossing whilst idling
- Option 8 - Reduce parking near Lydney C of E School and encourage parking in car park at the bottom of Bream Road
- Option 10 - Promote regular HGV servicing and emission testing to ensure cleaner running vehicles
- Option 13 - Newerne Street Link
- Option 14 - Improve rail services and facilities
- Option 15 - Other public transport services

Option 1 aligns with Gloucestershire County Council's LTP regarding 'smarter choices', their 'Active Together' scheme and their 'Connecting Places' proposals. It provides low cost methods to encourage mode shift from the private car.

Options 2 and 13 are being promoted by Gloucestershire County Council as part of the Lydney Highway Strategy and funding is either provisionally available or is being actively sought.

Options 7, 8 and 10 are not necessarily straightforward to implement.

Options 14 and 15 involve other organisations, e.g. Network Rail, Great Western Trains, Arriva Trains, Stagecoach, Forest Routes Community Transport, etc. Funding is provisionally available for improving the railway station by providing a cycle link from the town centre to the railway, with cycle parking at each end of the scheme;

2.3 Progress and Impact of Measures to Address Air Quality in Forest of Dean District Council

Forest of Dean District Council has taken forward a number of measures during the current reporting year in pursuit of improving local air quality. Details of all measures completed, in progress or planned are set out in Table . Forest of Dean District Council expects the following measures to be completed over the course of the next reporting year:

- Continuation of nitrogen dioxide diffusion tube monitoring survey across the district
- Continuation of consultation with Forest of Dean District Planning Department as well as with Gloucestershire Highways and Planning Departments.
- Air Quality Group meetings with neighbouring authorities.

Table 2.2 – Progress on Measures to Improve Air Quality

Measure No.	Measure	EU Category	EU Classification	Lead Authority	Planning Phase	Implementation Phase	Key Performance Indicator	Target Pollution Reduction in the AQMA	Progress to Date	Estimated Completion Date	Comments
1		Policy Guidance and Development Control	Air Quality Planning and Policy Guidance	FOD Council	2014	2015	Approved policy in place and in use, with associated technical guidance available on FODDC website	Address potential increase in vehicular emissions due to vehicle usage associated with new residential and business developments	Policy approved and in use from 30 July 2015.	Completed	http://www.fdean.gov.uk/media/3428/air-quality-technical-planning-guidance.pdf
2		Policy Guidance and Development Control	Regional Groups Co-ordinating programmes to develop Area wide Strategies to reduce emissions and improve air quality						Gloucest-ershire Air Group meetings	Ongoing	
3		Promoting Travel Alternatives	Encourage / Facilitate home-working							Ongoing	
4		Promoting Travel Alternatives	Promotion of walking	FOD Council							
5		Public Information	Via the Internet	FOD Council							

Measure No.	Measure	EU Category	EU Classification	Lead Authority	Planning Phase	Implementation Phase	Key Performance Indicator	Target Pollution Reduction in the AQMA	Progress to Date	Estimated Completion Date	Comments
		Traffic Management	Reduction of speed limits, 20mph zones	Gloucestershire County Council			Improved traffic flow at peak hours in the Lydney	Yes		Completed	

2.4 $PM_{2.5}$ – Local Authority Approach to Reducing Emissions and or Concentrations

As detailed in Policy Guidance LAQM.PG16 (Chapter 7) local authorities are expected to work towards reducing emissions and/or concentrations of $PM_{2.5}$ (particulate matter with an aerodynamic diameter of 2.5µm or less). There is clear evidence that $PM_{2.5}$ has a significant impact on human health, including premature mortality, allergic reactions, and cardiovascular diseases.

Other than the potential source from vehicles, no significant source of $PM_{2.5}$ has been identified within the District. Forest of Dean District Council is working with Gloucestershire County Council to identify measures within the Local Transport Plan and the Health and Wellbeing Plan that will contribute towards a reduction in $PM_{2.5.}$

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

3.1 Summary of Monitoring Undertaken

This section sets out what monitoring has taken place and how the results compare with the national objectives, set to protect health.

3.1.1 Non-Automatic Monitoring Sites

Forest of Dean District Council undertook non- automatic (passive) monitoring of NO_2 using diffusion tubes at 30 sites during 2016. Table A1 in Appendix A provides technical details of the diffusion tube monitoring sites.

Maps showing the location of the monitoring sites are provided in Appendix D.

3.2 Individual Pollutants

The air quality monitoring results presented in this section are, where relevant, adjusted for annualisation and bias. Further details on the bias adjustment are provided in Appendix C. There were sufficient results from each site in 2016 so annualisation was not required ie >75% data collection at each monitoring site.

3.2.1 Nitrogen Dioxide (NO_2)

Table A 2 in Appendix A compares the bias adjusted monitored NO_2 annual mean concentrations for the past 5 years with the air quality objective of 40µg/m^3.

The full 2016 dataset of monthly mean values is provided in Appendix B.

Fig. 3.1 Graph showing the trend over the last 6 years of nitrogen dioxide levels around the district (outside of our AQMA)

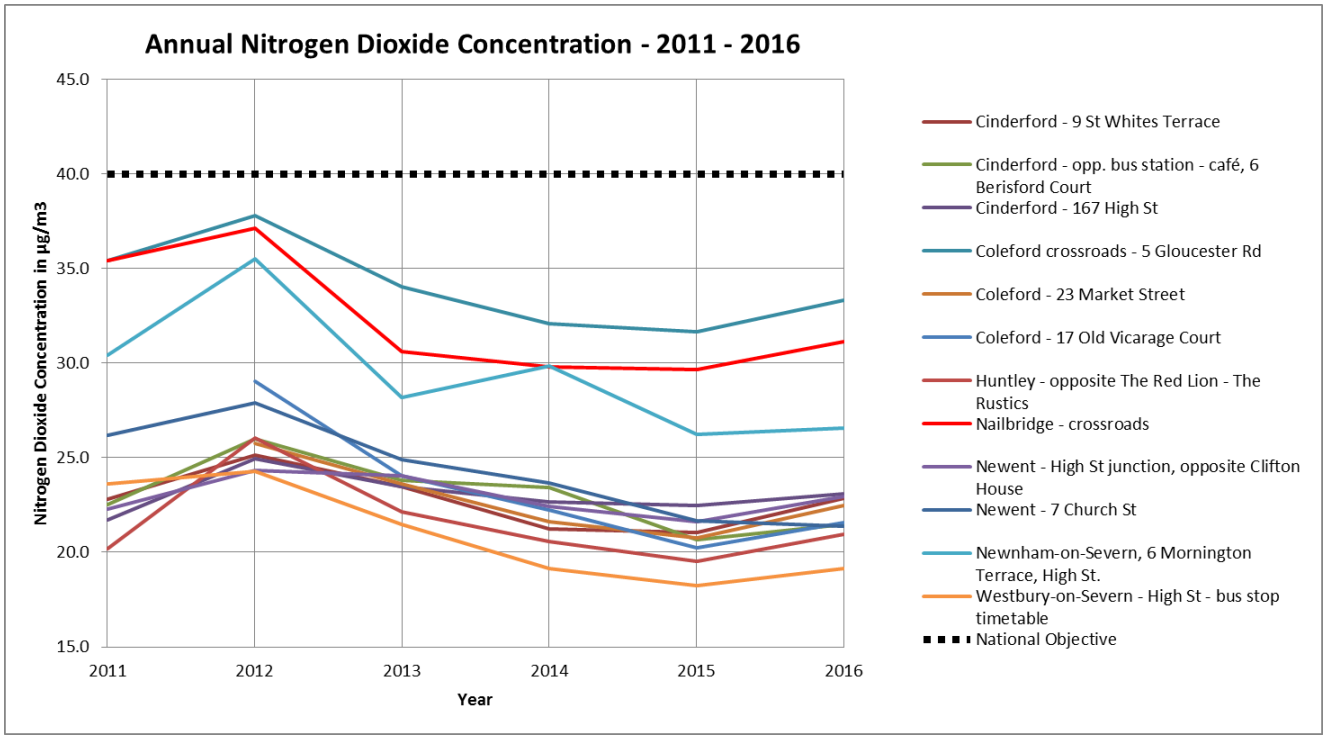


Figure 3.1 shows the trend of nitrogen dioxide levels monitored around the district (outside of our Lydney AQMA).

If we compare current monitoring results with those from 2011, it can be seen that at the sites with the highest levels (.> 25 µg/m^3) there has been a gradual decrease in nitrogen dioxide levels. Levels at most of the other sites have remained broadly similar.

Despite the slight increase in most of the results this year, (thought to be due to poor meteorological conditions), it can be clearly seen that the nitrogen dioxide levels are well below the national standard of 40µg/m^3 which is marked by a dotted line on the graph.

Appendix A: Monitoring Results

Table A.1 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
MIT02	Mitcheldean –Gloucester Road	Roadside	366584	218349	NO_2	No	Y (<1m)	2m	Yes
NAI01	Nailbridge – Crossroads	Roadside	364555	216226	NO_2	No	N (<1m)	1m	Yes
NEW01	Newent – opposite Clifton House, High St	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
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

Table A.2 – Annual Mean NO_2 Monitoring Results

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) [1]	Valid Data Capture 2016 (%) [2]	NO_2 Annual Mean Concentration ($\mu g/m^3$) [3]				
					2012	2013	2014	2015	2016
CIN01	Cinderford – St Whites Terrace	Diffusion Tube	100	100	25.1	23.5	21.2	21.0	22.9
CIN02	Cinderford – Berisford Court	Diffusion Tube	100	100	26.0	23.8	23.4	20.6	21.5
CIN03	Cinderford – Bottom High St	Diffusion Tube	100	83	25.0	23.5	22.7	22.5	23.1
COL01	Coleford –Gloucester Road	Diffusion Tube	100	83	37.8	34.0	32.1	31.6	33.3
COL02	Coleford – Market Place	Diffusion Tube	100	100	25.8	23.6	21.6	20.7	22.5
COL03	Coleford – Old Vicarage Court	Diffusion Tube	100	100	29.0	24.0	22.3	20.2	21.6
HUN02	Huntley - The Red Lion junction	Diffusion Tube	100	100	26.0	22.1	20.5	19.5	21.0
LYD01	Lydney – Top High St	Diffusion Tube	100	100	**49.7**	**41.4**	38.0	37.7	39.5
LYD02	Lydney – Newerne Street	Diffusion Tube	100	92	24.7	21.0	20.7	20.5	22.4
LYD03	Lydney – Mid High St	Diffusion Tube	100	83	**45.1**	37.1	35.6	37.0	38.8
LYD04	Lydney – Bottom High St	Diffusion Tube	100	100	**44.1**	38.2	34.5	34.3	37.0
LYD05	Lydney - Regents Arcade	Diffusion Tube	100	100	**42.5**	34.3	33.7	31.7	32.7
LYD06	Lydney – Bream Junction (1of3)	Diffusion Tube	100	100	**45.7**	**40.8**	38.6	35.7	38.2
LYD08	Lydney – Mid Bream Road	Diffusion Tube	100	100	**44.5**	37.3	38.1	34.1	36.2
LYD09	Lydney – Top Bream Road	Diffusion Tube	100	100	**47.5**	34.8	36.9	34.0	33.7
LYD10	Lydney –Chip Shop, Forest Road	Diffusion Tube	100	100	30.0	26.9	22.7	22.8	23.2

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2016 (%) (2)	NO_2 Annual Mean Concentration ($\mu g/m^3$) (3)				
					2012	2013	2014	2015	2016
LYD11	Lydney – Forest Road	Diffusion Tube	100	100	20.3	17.8	16.2	16.2	16.4
LYD12	Lydney –Newerne Street	Diffusion Tube	100	92	36.0	31.7	28.8	27.6	29.2
LYD13	Lydney – Bream Junction (2of3)	Diffusion Tube	100	100	**46.4**	**40.5**	36.8	35.5	38.1
LYD14	Lydney – Bream Junction (3of3)	Diffusion Tube	100	100	**44.3**	**40.3**	38.2	35.7	38.2
LYD15	Lydney – Highfield Lane	Diffusion Tube	100	100	15.5	11.1	10.7	10.2	11.9
MIT01	Mitcheldean –The Merrin	Diffusion Tube	100	100	31.7	28.1	27.2	25.7	26.5
MIT02	Mitcheldean – Gloucester Road	Diffusion Tube	50	100	-	-	-	-	23.8
NAI01	Nailbridge – Crossroads	Diffusion Tube	100	100	37.1	30.6	29.8	29.7	31.1
NEW01	Newent – opp Clifton House, High St	Diffusion Tube	100	100	24.3	24.0	22.4	21.6	23.0
NEW02	Newent – Church Street	Diffusion Tube	100	100	27.9	24.9	23.7	21.7	21.4
NOS02	Newnham-on-Severn - High St	Diffusion Tube	100	92	33.8	30.1	28.3	25.8	28.7
NOS04	Newnham-on-Severn - High St	Diffusion Tube	100	100	35.5	28.2	29.9	26.3	26.6
NOS05	Newnham-on-Severn - High St	Diffusion Tube	100	92	27.9	25.6	24.1	23.1	24.7
WOS01	Westbury-on-Severn - High St	Diffusion Tube	100	100	24.3	21.4	19.1	18.2	19.1

Notes: Exceedances of the NO_2 annual mean objective of $40\mu g/m^3$ are shown in **bold**.

(1) data capture for the monitoring period, in cases where monitoring was only carried out for part of the year.

(2) data capture for the full calendar year (e.g. if monitoring was carried out for 6 months, the maximum data capture for the full calendar year is 50%).

(3) Means for diffusion tubes have been corrected for bias. All means have been "annualised" as per Technical Guidance LAQMTG16 if valid data capture for the full calendar year is less than 75%. See Appendix C for details.

Appendix B: Full Monthly Diffusion Tube Results for 2016

Table B.1 – NO_2 Monthly Diffusion Tube Results – 2016

2016 Ref	AIR QUALITY DIFFUSION TUBE RESULTS -2016	Start	Jan-16 NO_2 µg/m³	Feb-16 NO_2 µg/m³	Mar-16 NO_2 µg/m³	Apr-16 NO_2 µg/m³	May-16 NO_2 µg/m³	Jun-16 NO_2 µg/m³	Jul-16 NO_2 µg/m³	Aug-16 NO_2 µg/m³	Sep-16 NO_2 µg/m³	Oct-16 NO_2 µg/m³	Nov-16 NO_2 µg/m³	Dec-16 NO_2 µg/m³	2016 Mean Unadjusted	2016 Adjusted x0.92
CIN01	Cinderford - 9 St Whites Terrace	Jul-08	26.2	29.0	23.6	23.6	22.5	22.5	18.8	17.1	22.6	29.1	29.7	33.7	24.9	22.9
CIN02	Cinderford - opp. bus station - café, 6 Berisford Court	May-09	28.5	22.4	19.1	22.9	20.9	20.5	19.5	19.2	25.6	23.1	26.0	32.3	23.3	21.5
CIN03	Cinderford - 167 High St	May-09	25.9	28.7	23.0	25.6	22.3	23.4	17.9	20.4			26.8	37.2	25.1	23.1
COL01	Coleford crossroads - 5 Gloucester Rd	May-09	39.8	39.6	30.8	40.0	39.8	34.1	30.6	32.2		40.1		35.4	36.2	33.3
COL02	Coleford - 23 Market Street	Jan-12	30.1	28.1	21.6	21.8	25.0	20.4	18.3	18.7	20.9	26.5	27.1	34.8	24.4	22.5
COL03	Coleford - 17 Old Vicarage Court	Jan-12	22.0	26.6	22.8	24.4	25.7	20.1	16.5	17.3	21.9	28.3	29.2	26.4	23.4	21.6
HUN02	Huntley - opposite The Red Lion - The Rustics	May-09	26.1	24.5	21.4	22.6	18.8	21.1	13.7	17.7	19.9	30.4	27.8	29.5	22.8	21.0
LYD01	Lydney - 57 High St	Jul-08	50.4	48.8	33.8	43.0	43.2	35.8	37.2	42.5	41.9	41.7	44.3	52.7	42.9	39.5
LYD02	Lydney - New erne St, Bridge House - Tucker	May-09	31.0	36.3		33.6	21.2	17.5	12.6	19.5	20.5	21.8	23.3	31.0	24.4	22.4
LYD03	Lydney - 29 High St	Jul-08	52.0	50.0	35.6		41.0	36.2		27.0	37.2	43.0	46.9	52.7	42.2	38.8
LYD04	Lydney - 13 High St	Mar-10	48.6	43.5	31.9	40.7	41.0	35.3	29.4	33.2	34.7	45.5	42.2	56.0	40.2	37.0
LYD05	Lydney - Unit 1, Regents Arcade	Jul-08	46.2	33.5	27.9	35.0	34.4	32.1	34.2	34.9	33.7	32.8	32.9	48.6	35.5	32.7
LYD06	Lydney - Hill St - Inspirations Gallery (Triplicate 1 of 3)	Jul-08	42.9	45.9	36.2	46.8	43.5	33.3	32.6	37.6	37.4	43.6	43.3	54.9	41.5	38.2
LYD08	Lydney - 13 Bream Rd (Bottom)	Jan-10	45.4	40.6	32.2	41.6	39.6	38.3	33.5	37.7	40.3	41.0	37.1	45.4	39.4	36.2
LYD09	Lydney - 17 Bream Rd (Top)	May-09	40.2	38.8	29.3	35.9	35.6	34.1	33.3	34.4	36.7	37.9	35.9	47.8	36.7	33.7
LYD10	Lydney - Old Chip Shop, Forest Road	Nov-10	24.0	28.4	21.2	25.2	24.3	23.6	22.3	23.2	22.5	26.4	26.8	34.5	25.2	23.2
LYD11	Lydney - 15 Forest Road	Nov-10	33.6	18.1	15.4	14.7	14.2	12.6	13.0	13.2	16.0	16.4	20.1	27.2	17.9	16.4
LYD12	Lydney - Kaplans, 61 New erne Street	Nov-10	37.0	27.1		35.7	36.7	29.7	23.7	25.8	38.7	30.4	28.1	35.8	31.7	29.2
LYD13	Lydney - Hill St - Inspirations Gallery (Triplicate 2 of 3)	Jan-11	45.6	45.3	33.3	47.2	45.6	38.9	32.5	38.0	38.7	40.8	41.8	49.1	41.4	38.1
LYD14	Lydney - Hill St - Inspirations Gallery (Triplicate 3 of 3)	Jan-11	43.3	46.7	35.8	47.4	44.4	39.3	32.5	36.6	39.1	41.0	43.3	49.2	41.6	38.2
LYD15	Lydney - Highfield Lane (Background)	Jan-12	16.4	12.2	9.3	7.4	24.9	8.2	7.7	7.0	10.0	14.6	13.1	23.9	12.9	11.9
MIT01	Mitcheldean - opposite Lamb Inn - 25 The Merrin	May-09	30.3	34.8	25.5	28.2	31.3	21.1	24.7	25.5	28.6	30.5	29.7	35.7	28.8	26.5
MIT02 [NEW]	Mitcheldean - Old Cottage, Gloucester Road	May-16						21.6	16.9	21.4	25.9	32.4	29.9	33.3	25.9	23.8
NAI01	Nailbridge - crossroads	May-09	34.5	38.5	33.6	34.9	32.5	36.1	19.2	33.0	32.5	37.8	35.5	37.7	33.8	31.1
NEW01	New ent - High St junction, opposite Clifton House	May-09	26.4	28.5	23.3	24.5	22.7	22.4	17.4	18.9	25.6	28.0	31.5	30.4	25.0	23.0
NEW02	New ent - 7 Church St	May-09	20.8	27.9	22.3	24.9	21.6	23.8	19.7	19.3	24.1		22.8	28.4	23.2	21.4
NOS02	New nham-on-Severn - High St - Galen House	Jan-10	30.1	31.4	25.9	32.7	33.1	28.9	25.5	23.5	32.5	33.9	36.3	40.9	31.2	28.7
~~NOS03~~	~~New nham-on-Severn, High Street, Stirling House~~	~~Jan-10~~	~~30.2~~	~~27.4~~	~~21.3~~	~~24.3~~	~~27.6~~								26.2	24.1
NOS04	New nham-on-Severn, 6 Mornington Terrace, High St.	Nov-10	27.2	33.9	24.7	25.5	29.9	25.0	28.6	18.9	32.3	30.5	31.0	39.1	28.9	26.6
NOS05	New nham-on-Severn, Upper Merton Hse, High Street	Nov-10	28.4	30.7		25.8	26.5	22.5	19.1	24.5	25.0	28.6	31.6	32.8	26.9	24.7
WOS01	Westbury-on-Severn - High St	Jul-08	23.7	25.6	17.8	17.0	17.7	17.8	15.1	15.7	18.9	22.8	26.7	30.8	20.8	19.1

See Appendix C for details on bias adjustment

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

Diffusion Tube Bias Adjustment Factors

The diffusion tubes (20% TEA in water) were supplied and analysed by Gradko. The tubes at all locations throughout the area have a monthly exposure period. A bias adjustment factor of 0.92, based upon 32 studies, was obtained via the national bias spreadsheet, and this was applied to all diffusion tubes.
This spreadsheet is available at:
http://laqm.defra.gov.uk/bias-adjustment-factors/national-bias.html

The bias adjustment factor for 2016 data analysed by Gradko (20% TEA in water method), based upon 32 studies is 0.92, as highlighted in the table below.

Diffusion Tube Bias Adjustment Factors 09/17 Issue of the Spreadsheet							
			Previous	New (09/17) Update			
Laboratory	Method	Year	Number of Studies	No. Studies Added	Total No. of Studies	Factor	Change in Factor
Aberdeen Scientific Services	20% TEA in water	2016	7	0	7	0.85	0.85
Edinburgh Scientific Services	50% TEA in acetone	2016	6	0	6	0.77	0.77
ESG Didcot	20% TEA in water	2016	3	0	3	0.83	0.83
ESG Didcot	50% TEA in acetone	2016	38	0	38	0.77	0.77
ESG Glasgow	20% TEA in water	2016	1	0	1	0.79	0.79
ESG Glasgow	50% TEA in acetone	2016	1	0	1	0.78	0.78
Glasgow Scientific Services	20% TEA in water	2016	9	0	9	0.97	0.97
Gradko	**20% TEA in water**	**2016**	**27**	**5**	**32**	**0.92**	**0.92**
Gradko	50% TEA in acetone	2016	18	1	19	1.01	1.01
Lambeth Scientific Services	50% TEA in acetone	2016	5	1	6	1.06	1.06
Milton Keynes Council	20% TEA in water	2016	1	2	3	0.66	0.66
Northampton BC	20% TEA in water	2016	3	0	3	0.85	0.85
Somerset County Council	20% TEA in water	2016	3	0	3	0.88	0.88
South Yorkshire Air Quality Samplers	50% TEA in acetone	2016	2	0	2	0.83	0.83
Staffordshire Scientific Services	20% TEA in water	2016	12	1	13	0.91	0.91
Tayside Scientific Services	20% TEA in water	2016	5	0	5	0.82	0.82
West Yorkshire Analytical Services	50% TEA in acetone	2016	7	0	7	0.75	0.75
Number of Studies Included			**148**	**10**	**158**		

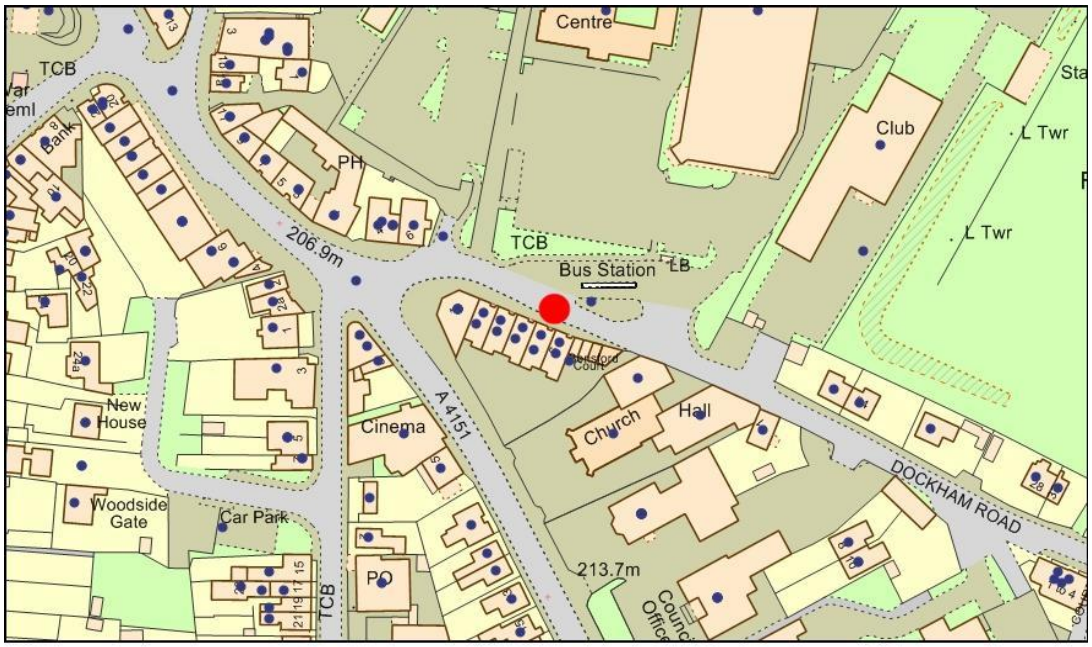
There was sufficient data collected (.>75%) from all sites in the survey, so “annualisation” calculations were not required.

Appendix D: Maps of Monitoring Locations

CIN01 - St Whites Terrace, Cinderford

Site	Annual mean concentrations (µg/m^3) Bias Adjusted			
	2013	2014	2015	2016
CIN01	23.5	21.2	21.0	22.9

CIN02 - Berisford Court, Cinderford



Site	Annual mean concentrations (μg/m^3) Bias Adjusted			
	2013	2014	2015	2016
CIN02	23.8	23.4	20.6	21.5

CIN03 - Bottom High Street, Cinderford

Site	Annual mean concentrations (μg/m^3) Bias Adjusted			
	2013	2014	2015	2016
CIN03	23.5	22.7	22.5	23.1

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

Site	Annual mean concentrations (µg/m^3) Bias Adjusted			
	2013	2014	2015	2016
COL01	34	32.1	31.6	33.1
COL02	23.6	21.6	20.7	22.5

COL03 – Old Vicarage Court, Coleford

Site	Annual mean concentrations (µg/m^3) Bias Adjusted			
	2013	2014	2015	2016
COL03	24.0	22.3	20.2	21.6

HUN02 - A40 Red Lion Junction, Huntley

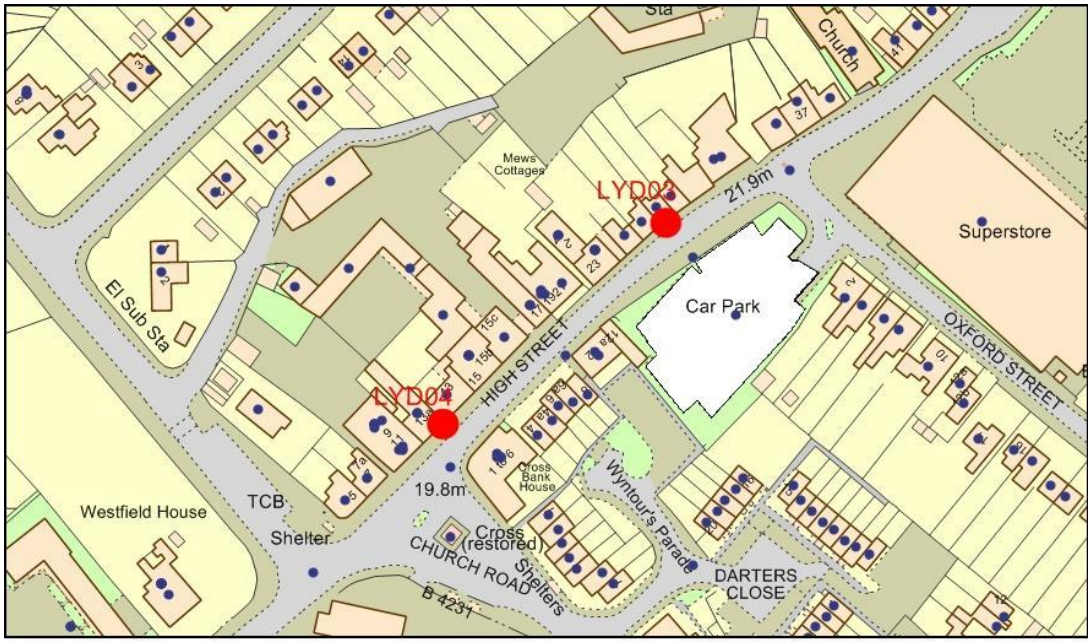
Site	Annual mean concentrations ($\mu g/m^3$) Bias Adjusted			
	2013	2014	2015	2016
HUN02	22.1	20.5	19.5	21.0

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

Site	Annual mean concentrations (µg/m^3) Bias Adjusted			
	2013	2014	2015	2016
LYD01	41.4	38	37.7	39.5
LYD06	40.8	38.6	35.7	38.2

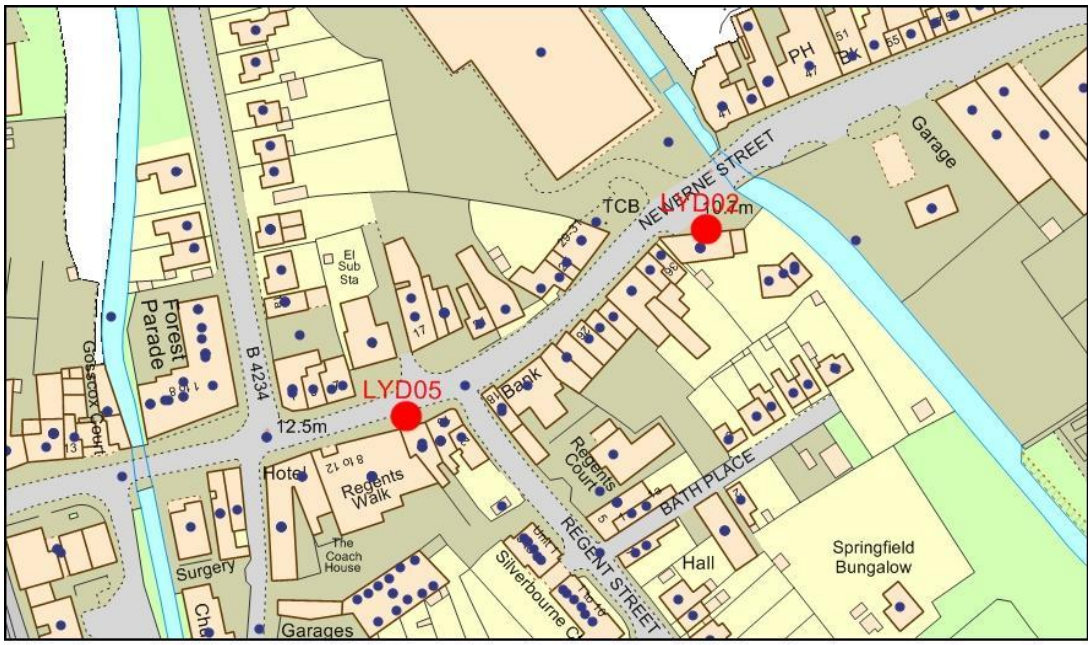
Site	Annual mean concentrations (µg/m^3) Bias Adjusted			
	2013	2014	2015	2016
LYD13	40.5	36.8	35.5	38.1
LYD14	40.3	38.2	35.7	38.2

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



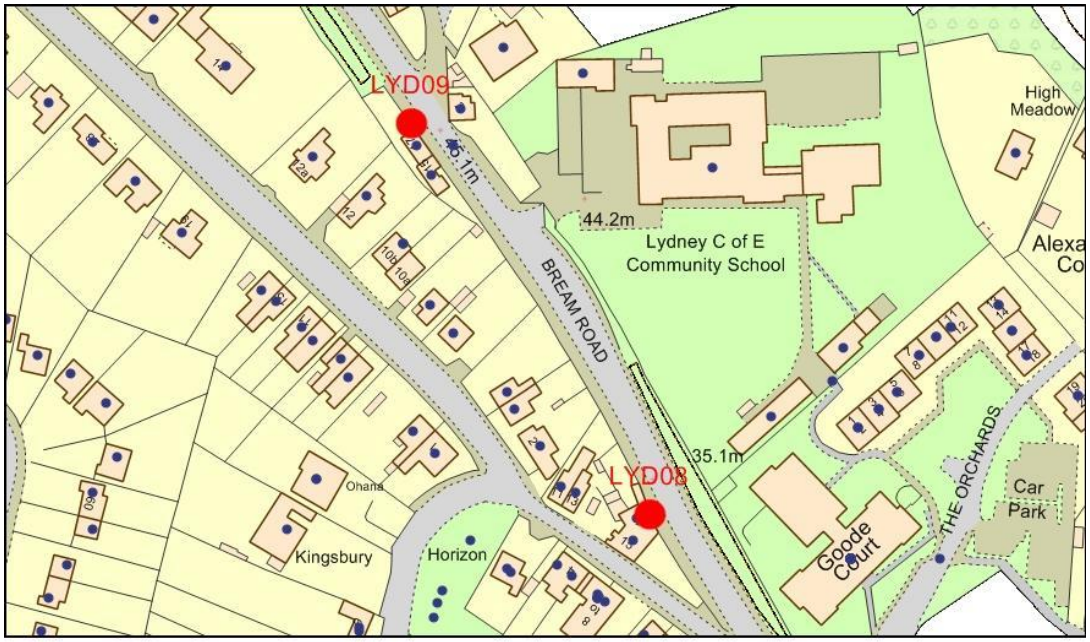
Site	Annual mean concentrations (µg/m^3) Bias Adjusted			
	2013	2014	2015	2016
LYD03	37.1	35.6	37.0	38.8
LYD04	38.2	34.5	34.3	37.0

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



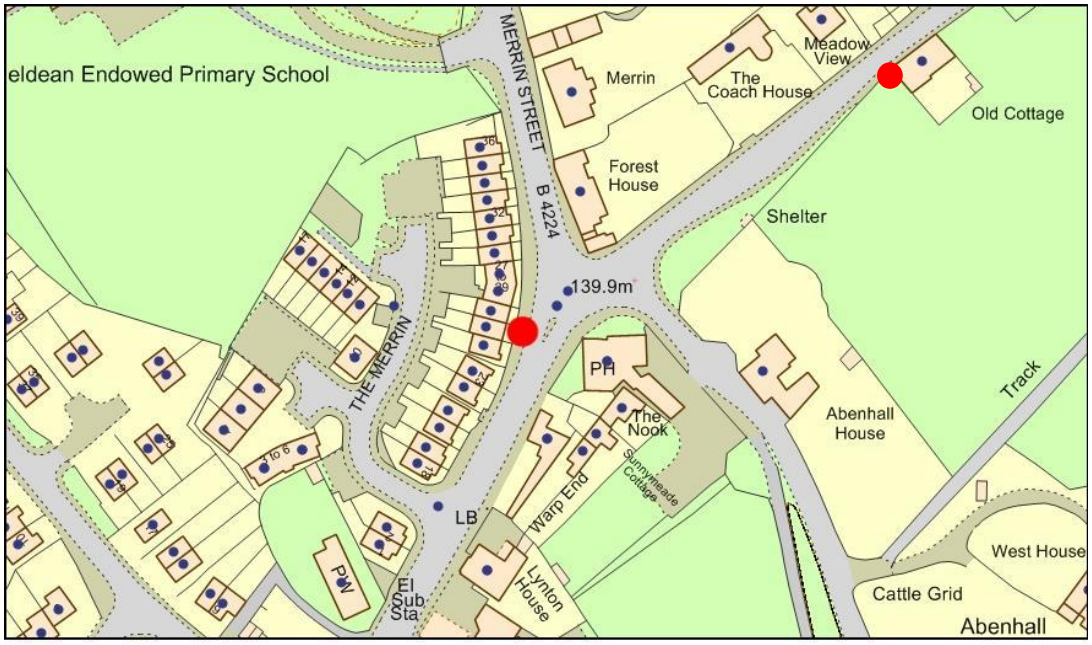
Site	Annual mean concentrations (µg/m^3) Bias Adjusted			
	2013	2014	2015	2016
LYD02	21	20.7	20.5	22.4
LYD05	34.3	33.7	31.5	32.7

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



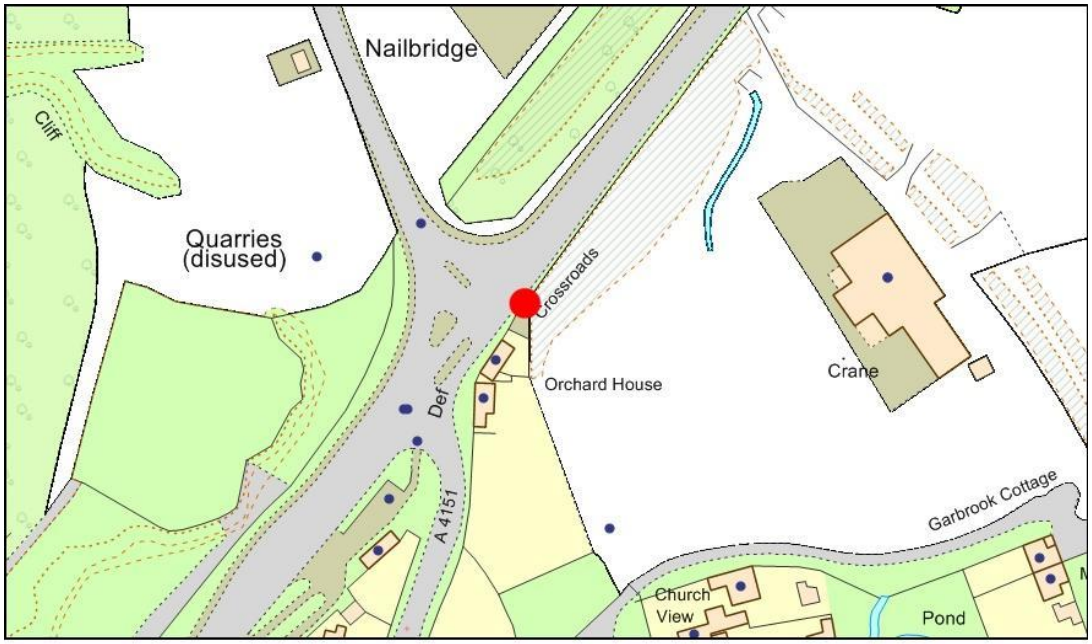
Site	Annual mean concentrations (µg/m^3) Bias Adjusted			
	2013	2014	2015	2016
LYD08	37.3	38.1	34.1	36.2
LYD09	34.8	36.9	34.0	33.7

MIT01 The Merrin, Mitcheldean



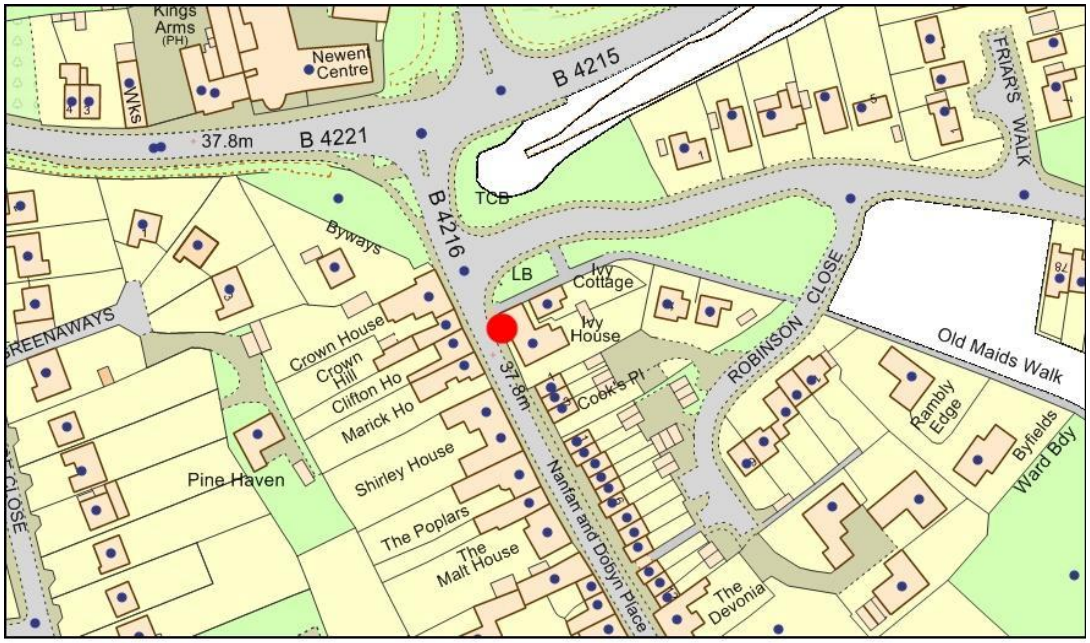
Site	Annual mean concentrations (µg/m^3) Bias Adjusted			
	2013	2014	2015	2016
MIT01	28.1	27.2	25.7	26.5
MIT02	-	-	-	23.8

NAI01 Crossroads, Nailbridge



Site	Annual mean concentrations (µg/m^3) Bias Adjusted			
	2013	2014	2015	2016
NAI01	30.6	29.8	29.7	31.1

NEW01 High Street, Newent

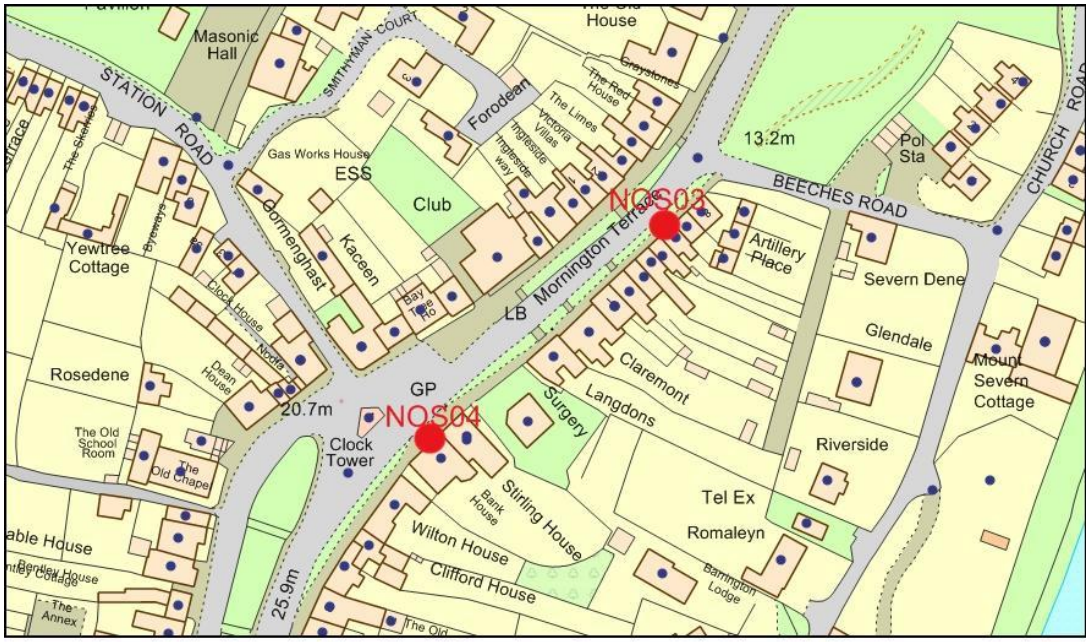


Site	Annual mean concentrations (µg/m^3) Bias Adjusted			
	2013	2014	2015	2016
NEW01	24.0	22.4	21.6	23.0

NEW02 Church Street, Newent

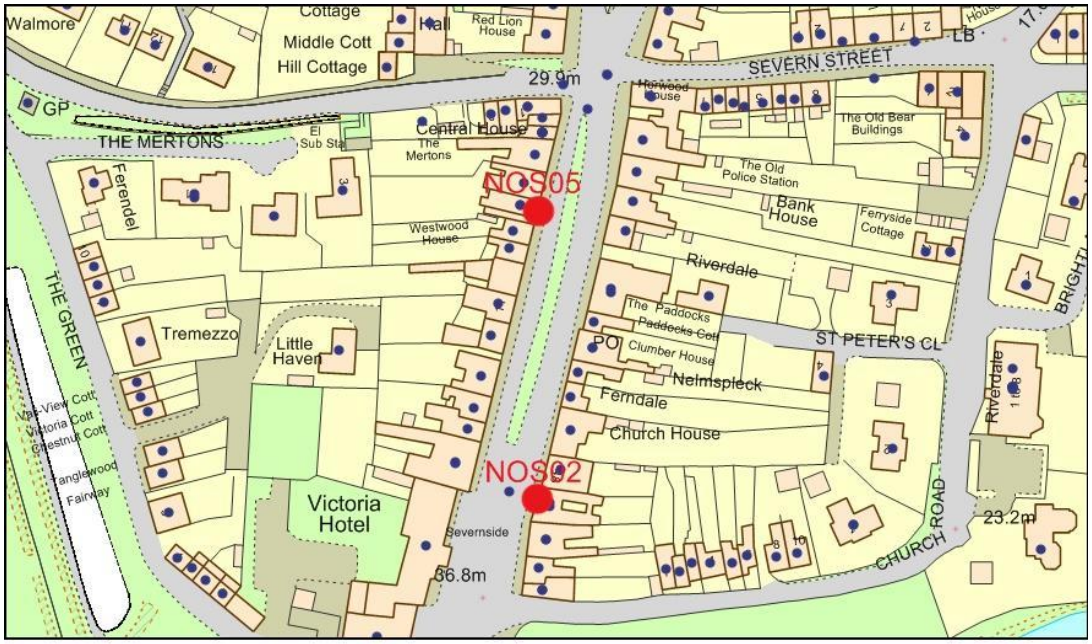
Site	Annual mean concentrations (µg/m^3) Bias Adjusted			
	2013	2014	2015	2016
NEW02	24.9	23.7	21.7	21.4

NOS04 opposite Clock Tower, Newnham, NOS03 Mornington Terrace



Site	Annual mean concentrations (µg/m^3) Bias Adjusted			
	2013	2014	2015	2016
NOS03	27.1	26.7	23.1	-
NOS04	28.2	29.9	26.3	26.6

NOS02 High Street, Newnham, NOS05 High Street, Newnham



Site	Annual mean concentrations (µg/m^3) Bias Adjusted			
	2013	2014	2015	2016
NOS02	30.1	28.3	25.8	28.7
NOS05	25.6	24.1	23.1	24.7

WOS01 Bus Stop A48, Westbury-on-Severn

Site	Annual mean concentrations (µg/m^3) Bias Adjusted			
	2013	2014	2015	2016
WOS01	21.4	19.1	18.2	19.1

Appendix E: Summary of Air Quality Objectives in England

Table E.1 – Air Quality Objectives in England

Defra have a page describing all the objectives that apply across the UK, and when they should be met, here: https://uk-air.defra.gov.uk/assets/documents/Air_Quality_Objectives_Update.pdf

The following table provides a brief description of the objectives in England:

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

[1] The units are in microgrammes of pollutant per cubic metre of air (µg/m^3).

Glossary of Terms

Abbreviation	Description
AQAP	Air Quality Action Plan - A detailed description of measures, outcomes, achievement dates and implementation methods, showing how the local authority intends to achieve air quality limit values'
AQMA	Air Quality Management Area – An area where air pollutant concentrations exceed / are likely to exceed the relevant air quality objectives. AQMAs are declared for specific pollutants and objectives
ASR	Air quality Annual Status Report
Defra	Department for Environment, Food and Rural Affairs
EU	European Union
LAQM	Local Air Quality Management
NO_2	Nitrogen Dioxide
NO_x	Nitrogen Oxides
PM_{10}	Airborne particulate matter with an aerodynamic diameter of 10µm (micrometres or microns) or less
$PM_{2.5}$	Airborne particulate matter with an aerodynamic diameter of 2.5µm or less
QA/QC	Quality Assurance and Quality Control
…	…