



CHELTENHAM

BOROUGH COUNCIL

2015 Air Quality Updating and Screening Assessment for Cheltenham Borough Council

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

November, 2015

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Executive Summary

Cheltenham Borough Council have undertaken this Updating and Screening Assessment in fulfilment of Part IV of the Environment Act 1995 which requires local authorities to review and assess air quality within their administrative area. This Updating and Screening Assessment updates all monitoring data since the last Assessment (Progress Report undertaken in 2014) and screens for various potential sources of pollution within the Borough's administrative area in accordance with the Local Air Quality Management Technical Guidance 2009 (LAQM.TG(09)₁).

Since a previous Updating and Screening Assessment in 2009₂, and during 2010, Cheltenham Borough Council identified several locations within the town where exceedance of the National Objective for nitrogen dioxide (annual mean) had occurred. This resulted in the declaration in 2011 of an Air Quality Management Area (AQMA) to cover the whole of the Borough area.

A real-time roadside monitoring instrument was installed in August 2011 to record nitrogen dioxide levels at a location with relevant exposure. Data from this installation is compared with data obtained from co-located diffusion tubes.

Continued monitoring during 2014 showed a decrease in nitrogen dioxide (NO₂) levels compared to 2013 levels. The annual mean nitrogen dioxide levels at eight locations were still being exceeded in 2014 which means the existing AQMA declaration remains justified.

An Air Quality Action Plan was formally adopted by the Council in April 2014.

All other air quality pollutants that can be assessed under our Local Air Quality Management obligations, such as sulphur dioxide (SO₂) and PM₁₀, have been assessed during previous monitoring periods and were found to be within national objective limits and are therefore no longer monitored.

This Updating and Screening Assessment has concluded the following:

Assessment of Monitoring Data:

- There are continued exceedances of the nitrogen dioxide annual mean objective within the AQMA.
- There are no other pollutants of concern within Cheltenham Borough Council.

Assessment of Sources:

- Following the screening criteria in LAQM.TG (09), there are no transport sources of concern; therefore, a Detailed Assessment will not be required.
- Following the screening criteria in LAQM.TG (09), there are no other transport sources of concern; therefore, a Detailed Assessment will not be required.
- Following the screening criteria in LAQM.TG (09), there are no industrial sources of concern; therefore, a Detailed Assessment will not be required.
- Following the screening criteria in LAQM.TG (09), there are no commercial/domestic sources of concern; therefore, a Detailed Assessment will not be required.
- Following the screening criteria in LAQM.TG (09), there are no fugitive sources of concern; therefore, a Detailed Assessment will not be required.

Cheltenham Borough Council will submit a Progress Report in April 2016.

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1 Introduction

1.1 Description of Local Authority Area

Cheltenham Borough Council is situated in central Gloucestershire. It is bordered by Tewkesbury Borough Council and Cotswold District Council (Figure 1.1). Cheltenham Borough Council has a population of approximately 117,000 (2012) and lies some five kilometres to the east of the M5 motorway mid-way between Bristol and Birmingham on the edge of the Cotswold Hills.

The Borough is based on the town of Cheltenham and is mainly urban with some areas of surrounding countryside. It covers an area of approximately 4,680 hectares of which 17 percent is designated as green belt and 22 percent as an area of outstanding natural beauty.

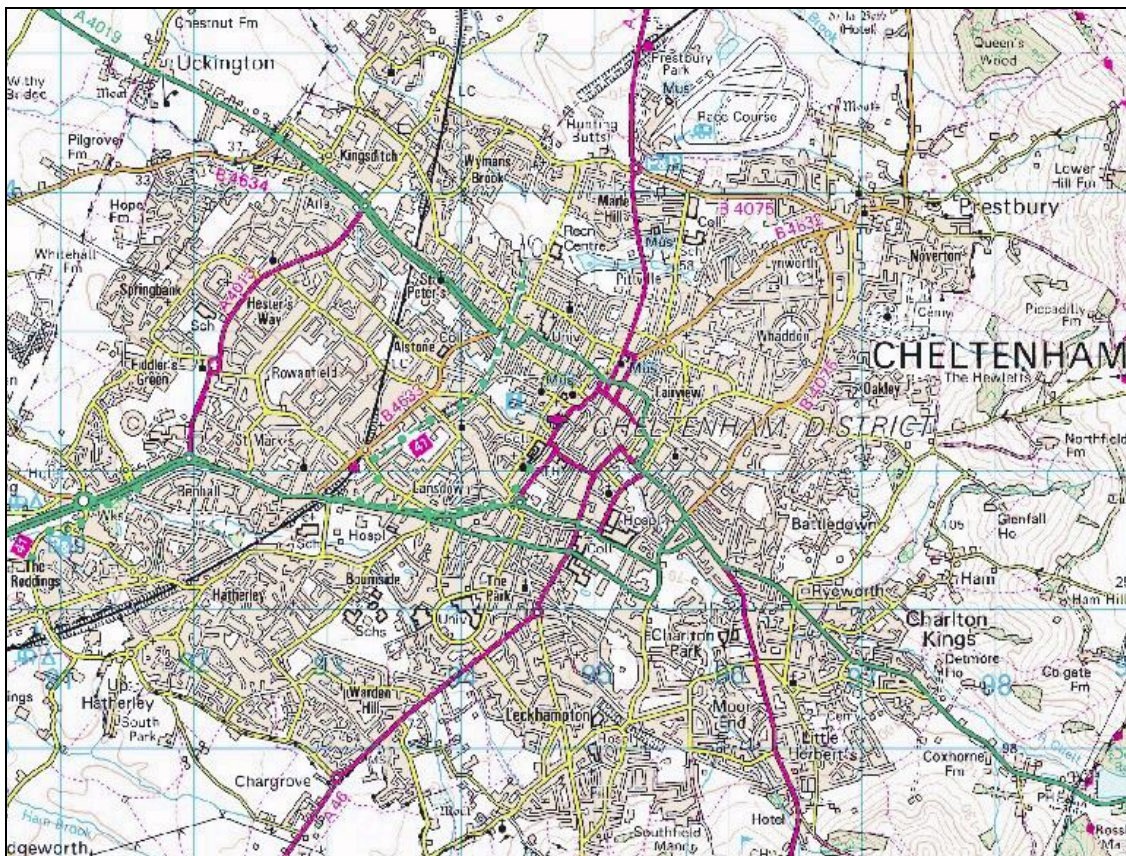


Figure 1. 1 Map of Cheltenham Borough Council Area

1.2 Purpose of Assessment

This assessment fulfils the requirements of the Local Air Quality Management process as set out in Part IV of the Environment Act (1995), the Air Quality Strategy for England, Scotland, Wales and Northern Ireland 2007 and the relevant Policy and Technical Guidance documents. The LAQM process places an obligation on all local authorities to regularly review and assess air quality in their areas, and to determine whether or not the air quality objectives are likely to be achieved. Where exceedances are considered likely, the local authority must then declare an Air Quality Management Area (AQMA) and prepare an Air Quality Action Plan (AQAP) setting out the measures it intends to put in place in pursuit of the objectives.

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

1.3 Air Quality Objectives

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

Table 1. 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 $\mu\text{g}/\text{m}^3$	Running annual mean	31.12.2003
	5.00 $\mu\text{g}/\text{m}^3$	Running 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 mg/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 ₁₀) (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

In recent years Cheltenham Borough Council has submitted the following reports:

- 2011: Progress Report
- 2011: Detailed Assessment for Cheltenham for Nitrogen Dioxide
- 2012: Updating and Screening Assessment
- 2013: Progress Report
- 2014: Progress Report ³

A Detailed Assessment was completed for Bath Road and High Street in 2007 where an exceedance of the annual mean objective for NO₂ occurred with relevant exposure. In December 2008 an Air Quality Management Area (AQMA) was declared along a section of Bath Road and High Street in Cheltenham. The area was designated in relation to a likely breach of the nitrogen dioxide (annual mean) objective as specified in the Air Quality Regulations (England) 2000.

The 2010 Progress Report identified a number of new locations in Cheltenham which had exceeded the annual mean objective for NO₂. Following submission of a detailed assessment report in 2011, the existing AQMA was revoked and a new AQMA covering the whole of Cheltenham Borough was declared in relation to a likely breach of the nitrogen dioxide (annual mean) objective at a total of seven locations, including the old AQMA area (see Figure 1.2).

During 2014 the number of locations in Cheltenham that breached the annual mean objective for NO₂ has reduced to eight (see figure 1.3), down from eleven the year before. However, the AQMA designation remained justified as a result of the continued breaches at these locations.

No other air pollutants are monitored in Cheltenham since previous rounds of review and assessment demonstrated that no breaches were likely.

Figure 1. 2 Map of current AQMA Boundary

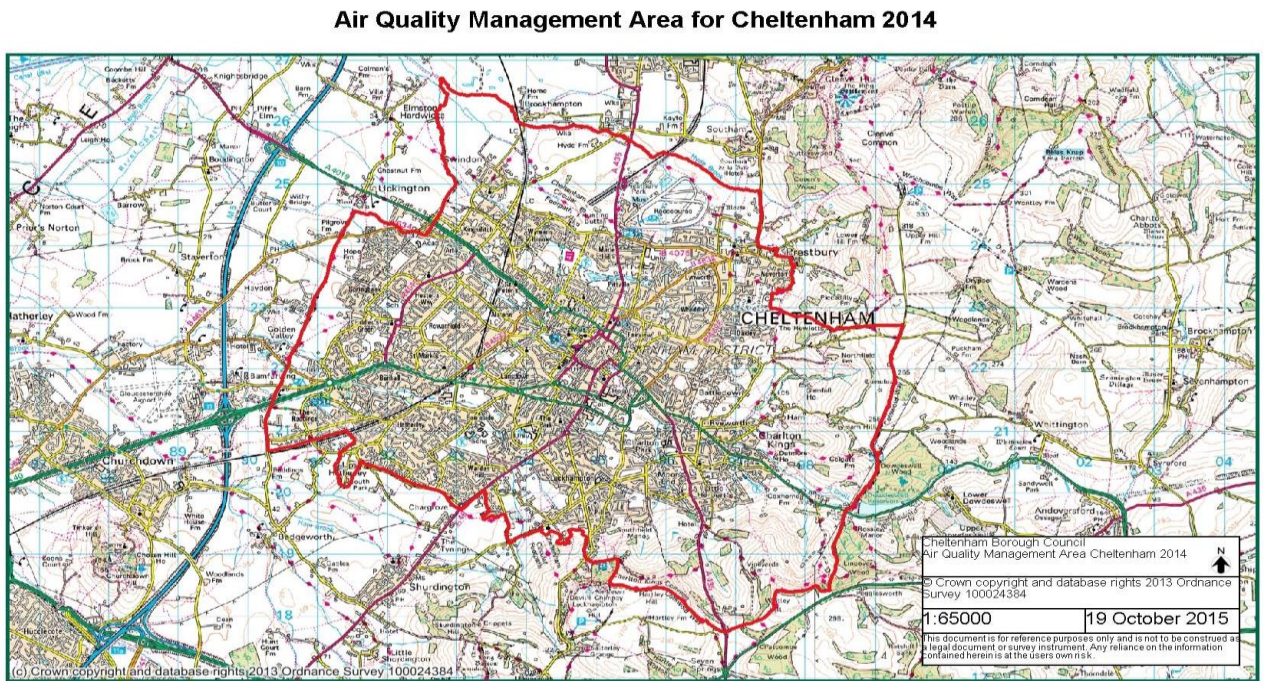
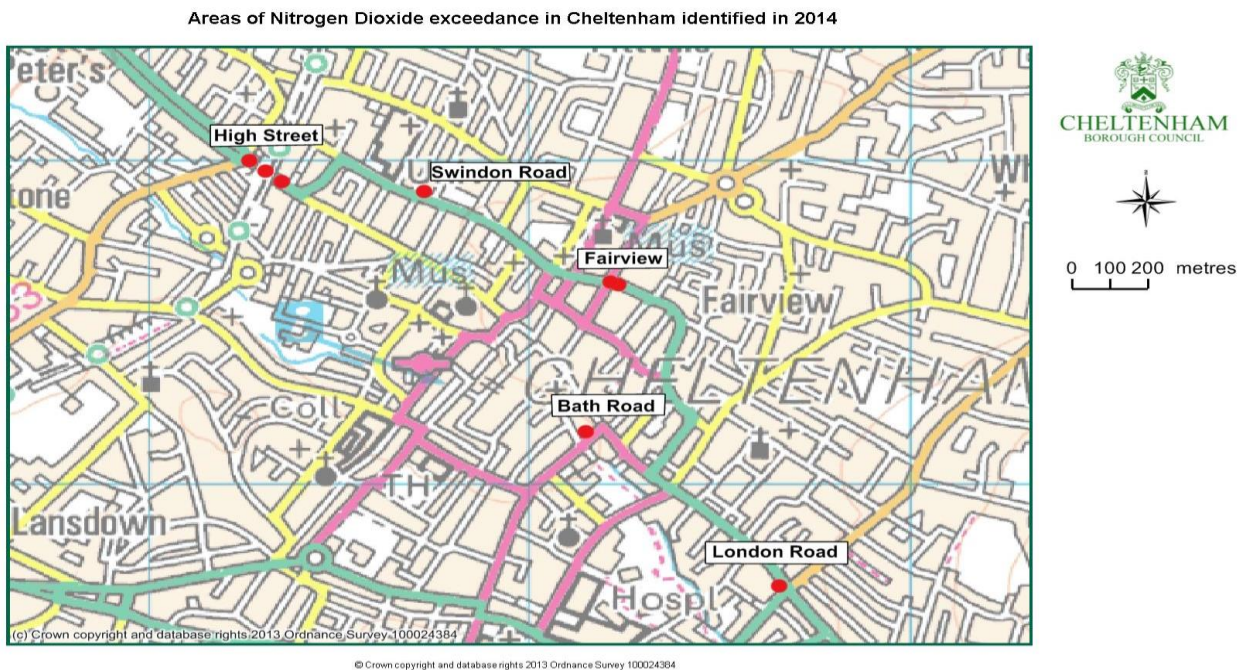


Figure 1. 3 Areas where exceedance of the NO₂ annual mean occurred in 2014



2 New Monitoring Data

2.1 Summary of Monitoring Undertaken

2.1.1 Automatic Monitoring Sites

A roadside monitoring unit is installed at the junction of Swindon Road and St Georges Street, Cheltenham where exceedance of nitrogen dioxide (annual mean) had been recorded nearby from previous diffusion tube monitoring data. The unit measures NO_x, NO₂ and NO and commenced operation in August 2011. Data is sent via telemetry to Enviro Technology limited and forwarded to AQDM for data validation and ratification purposes. Monthly routine calibration and maintenance is carried out by the equipment supplier, Enviro Technology Limited.

Figure 2. 1 Location of NO₂ Automatic Monitoring Station

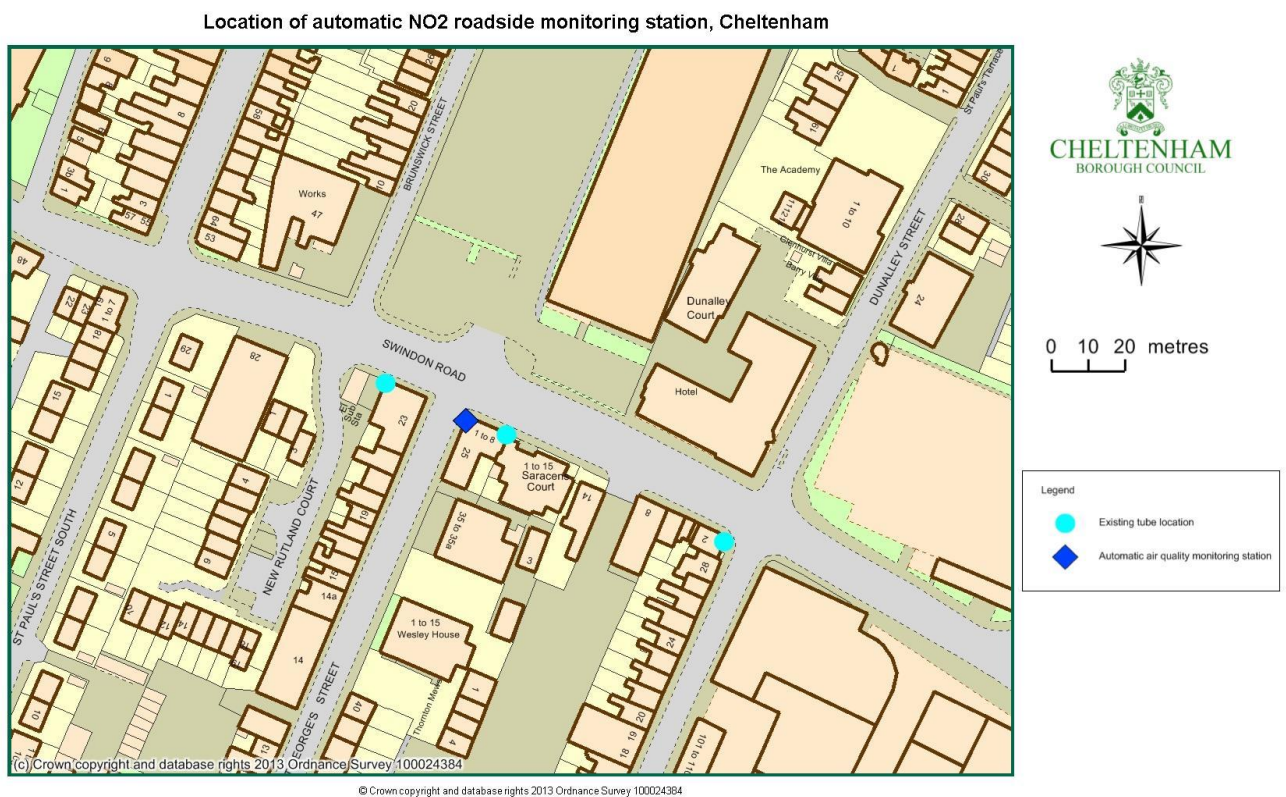




Table 2. 1 Details of Automatic Monitoring Sites

Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Inlet Height (m)	Pollutants Monitored	In AQMA?	Monitoring Technique	Relevant Exposure? (Y/N with distance (m) to relevant exposure)	Distance to kerb of nearest road (N/A if not applicable)	Does this location represent worst-case exposure?
St Georges Street	Kerbside	394760	228878	1.5m	NO ₂	Y	Chemi-luminescence	Y (1m)	2m	Y

2.1.2 Non-Automatic Monitoring Sites

Cheltenham Borough Council has been undertaking NO₂ diffusion tube monitoring at a number of locations since 2003. Many of the monitoring locations have recorded NO₂ levels consistently below the annual mean objective. Following a review at the beginning of 2010, several locations were replaced with new locations where there is relevant exposure and traffic congestion. Further monitoring tubes were installed in 2011 following exceedance of the nitrogen dioxide (annual mean) national objective levels at several new locations within the Borough with relevant exposure. At the beginning of 2012, a few further monitoring locations were installed to allow urban background measurement and a co-location study commenced at the roadside automatic monitoring station in April 2012. Further monitoring locations were added from September 2013 to assess air quality at sensitive locations prior to implementation of measures proposed within the Air Quality Action Plan. In 2014 some of the tubes which recorded regularly low levels of pollution over previous years were removed.

Figure 2.2 illustrates the approximate locations of all 56 of the final 2014 diffusion tube monitoring sites within Cheltenham Borough. Table 2.2 provides details of these locations.

Details of Bias Adjustment

The 56 diffusion tubes monitored during 2014 across the Borough of Cheltenham have a monthly exposure period. For 2014 the Bias Adjustment factor applied to the diffusion tube data was a Local Bias Adjustment Factor obtained from the co-location diffusion tube study located at the St Georges Street roadside monitoring unit. The bias adjustment value for 2014 was 0.97.

Figure 2. 2 Maps of Non-Automatic Monitoring Sites

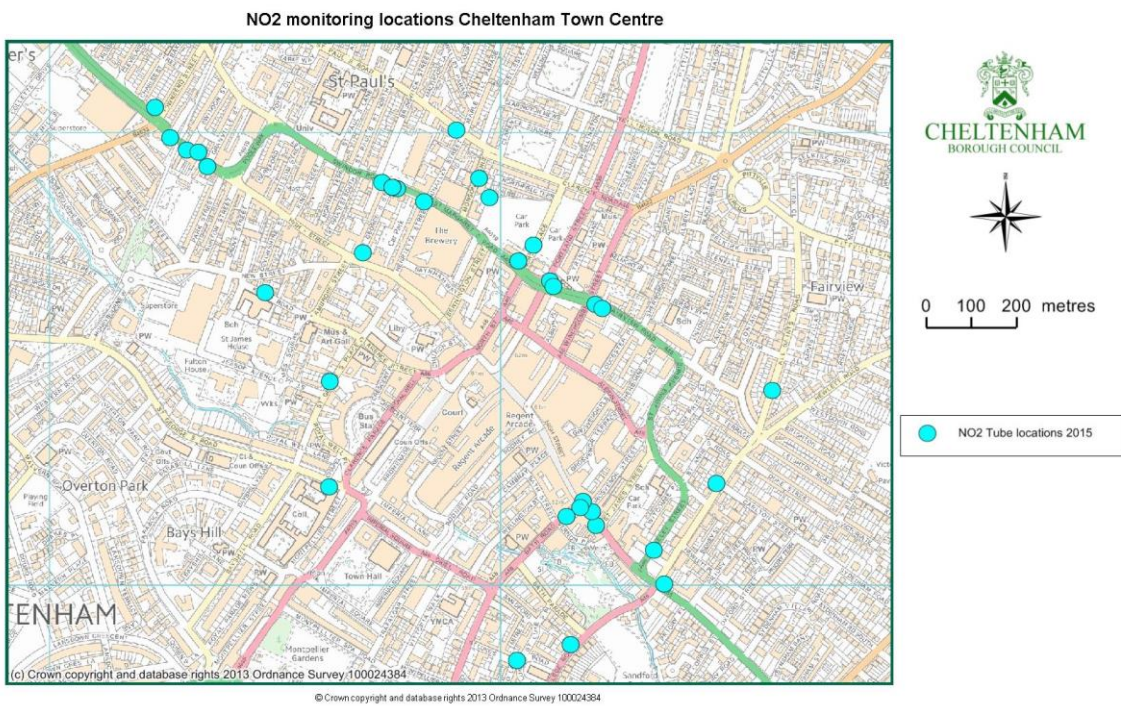
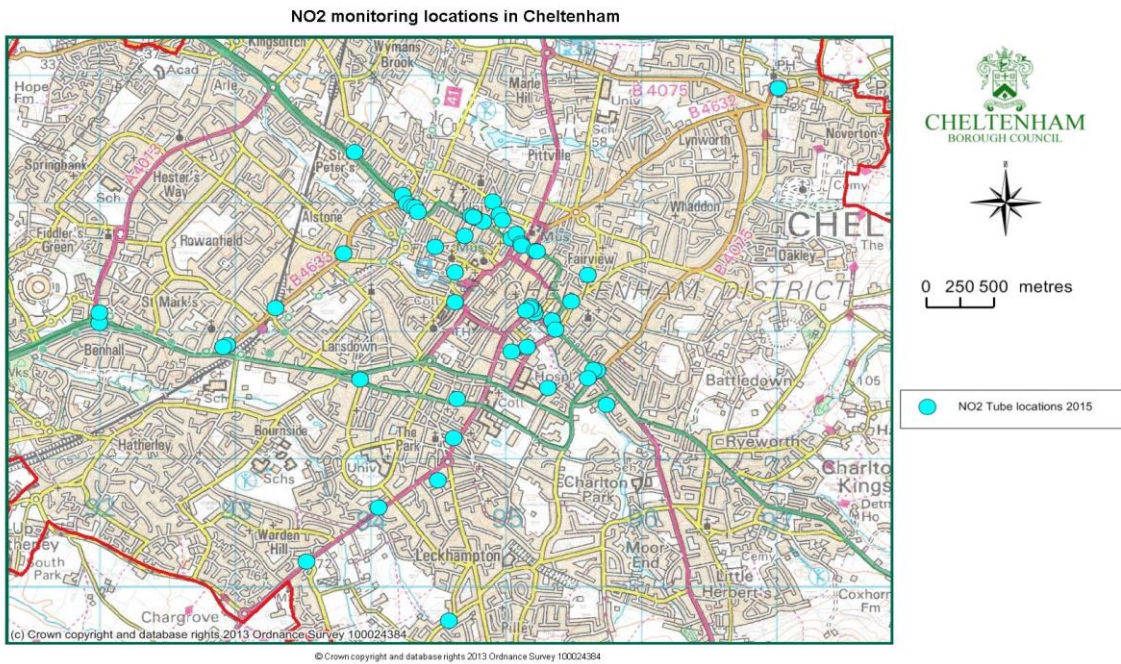


Table 2. 2 Details of Non- Automatic Monitoring Sites

Site ID	Site Name	Site Type	X OS Grid Reference	Y OS Grid Reference	Site Height (m)	Pollutants Monitored	In AQMA?	Is Monitoring Co-located with a Continuous Analyser?	Relevant Exposure?	Distance to Kerb of Nearest Road (m)	Does this Location Represent Worst-Case Exposure?
1	Westal Green	Roadside	393924	221608	2.8	NO ₂	Y	N	Y	2m	Y
2	179 Bath Road	Roadside	394614	221153	3.0	NO ₂	Y	N	Y	2m	Y
3	51 Upper Norwood	Background	394494	220823	2.7	NO ₂	Y	N	Y	2m	Y
4	97 Shurdington Road	Roadside	394058	220608	2.5	NO ₂	Y	N	Y	2m	Y
5	Opposite Kidnappers Lane	Roadside	393525	220187	2.5	NO ₂	Y	N	Y	2m	Y
6	56 Church Road	Roadside	394577	219728	2.8	NO ₂	Y	N	Y	2m	Y
7	81 London Road	Roadside	395660	221670	2.7	NO ₂	Y	N	Y	5m	Y
8	104 London Road	Roadside	395672	221680	2.8	NO ₂	Y	N	Y	2m	Y
9	1 Old Bath Road	Roadside	395642	221685	3.0	NO ₂	Y	N	Y	2m	Y
10	8 Old Bath Road	Roadside	395602	221622	2.5	NO ₂	Y	N	Y	2m	Y
11	17 Chelsea Close	Background	395740	221412	2.8	NO ₂	Y	N	Y	3m	Y
12	60 Keynsham Rd	Kerbside	395308	221544	2.8	NO ₂	Y	N	Y	0.5m	Y
13	Prestbury Post Office	Roadside	397009	223888	2.7	NO ₂	Y	N	Y	2m	Y
14	91Tewkesbury Road	Roadside	393880	223390	2.7	NO ₂	Y	N	Y	5m	Y
15	124 Gloucester Road	Roadside	393802	222595	2.8	NO ₂	Y	N	Y	10m	Y

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Site ID	Site Name	Site Type	X OS Grid Reference	Y OS Grid Reference	Site Height (m)	Pollutants Monitored	In AQMA?	Is Monitoring Co-located with a Continuous Analyser?	Relevant Exposure?	Distance to Kerb of Nearest Road (m)	Does this Location Represent Worst-Case Exposure?
16	264 Gloucester Road	Roadside	393296	222170	3.0	NO ₂	Y	N	Y	2m	Y
17	338 Gloucester Road	Roadside	392940	221880	3.0	NO ₂	Y	N	Y	2m	Y
18	340 Gloucester Road	Roadside	392912	221862	2.9	NO ₂	Y	N	Y	2m	Y
19	5 Miserden Road	Roadside	391997	222051	2.7	NO ₂	Y	N	Y	5m	Y
20	P.E. Roundabout	Roadside	391996	222133	2.7	NO ₂	Y	N	Y	15m	Y
21	7 Suffolk Road	Roadside	394640	221460	2.8	NO ₂	Y	N	Y	2m	Y
22	Ladies College	Roadside	394621	222215	2.8	NO ₂	Y	N	Y	3m	Y
23	Chelsea Court	Roadside	394622	222448	2.6	NO ₂	Y	N	Y	2m	Y
24	6 Knapp Road	Kerbside	394478	222644	2.5	NO ₂	Y	N	Y	0.5m	Y
25	50 St Georges St	Kerbside	394695	222733	2.9	NO ₂	Y	N	Y	2m	Y
26	2 Gloucester Rd	Roadside	394235	223055	3.0	NO ₂	Y	N	Y	2m	Y
27	Opp. White Hart St	Roadside	394268	222988	3.0	NO ₂	Y	N	Y	2m	Y
28	452 High Street	Roadside	394305	222960	3.0	NO ₂	Y	N	Y	2m	Y
29	443 High Street	Roadside	394330	222955	3.0	NO ₂	Y	N	Y	3m	Y
30	422 High Street	Roadside	394350	222923	3.0	NO ₂	Y	N	Y	2m	Y
31	New Rutland - Swindon Rd	Roadside	394738	222888	3.0	NO ₂	Y	N	Y	2m	Y

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Site ID	Site Name	Site Type	X OS Grid Reference	Y OS Grid Reference	Site Height (m)	Pollutants Monitored	In AQMA?	Is Monitoring Co-located with a Continuous Analyser?	Relevant Exposure?	Distance to Kerb of Nearest Road (m)	Does this Location Represent Worst-Case Exposure?
32	Saracens Court	Roadside	394771	222874	2.9	NO ₂	Y	N	Y	2m	Y
33	2 Swindon Road	Kerbside	394830	222845	3.0	NO ₂	Y	N	Y	1m	Y
34	22 St Paul's Rd	Roadside	394902	223004	2.6	NO ₂	Y	N	Y	1.3m	Y
35	10 Monson Avenue	Roadside	394952	222898	2.5	NO ₂	Y	N	Y	2.5m	Y
36	North Place West	Urbancentre	394975	222855	3.0	NO ₂	Y	N	N	100m	N
37	5 St Margaret's Terrace	Roadside	395040	222715	3.0	NO ₂	Y	N	Y	3m	Y
38	North Place East	Roadside	395073	222750	3.0	NO ₂	Y	N	N	2m	N
39	Portland St/Fairview Rd	Roadside	395110	222670	2.9	NO ₂	Y	N	Y	2m	Y
40	Millennium Plaza - Fairview	Kerbside	395117	222658	3.0	NO ₂	Y	N	Y	1m	Y
41	Winchcombe St/Fairview	Roadside	395210	222618	3.1	NO ₂	Y	N	Y	2m	Y
42	Regency Hall - Fairview	Roadside	395225	222610	3.1	NO ₂	Y	N	Y	2m	Y
43	21 All Saints Rd	Kerbside	395602	222428	2.6	NO ₂	Y	N	Y	0.2m	Y
44	40 Hewlett Road	Roadside	395479	222222	2.6	NO ₂	Y	N	Y	3.5m	Y
45	7 Berkeley Place	Roadside	395340	222075	3.5	NO ₂	Y	N	Y	2m	Y
46	2 London Road	Roadside	395362	222000	2.9	NO ₂	Y	N	Y	2m	Y
47	Pisa Pizza	Roadside	395212	222130	3.2	NO ₂	Y	N	Y	2m	Y

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Site ID	Site Name	Site Type	X OS Grid Reference	Y OS Grid Reference	Site Height (m)	Pollutants Monitored	In AQMA?	Is Monitoring Co-located with a Continuous Analyser?	Relevant Exposure?	Distance to Kerb of Nearest Road (m)	Does this Location Represent Worst-Case Exposure?
48	The Restoration	Roadside	395202	222160	3.0	NO ₂	Y	N	Y	2m	Y
49	YMCA Shop	Roadside	395182	222183	3.2	NO ₂	Y	N	Y	2m	Y
50	Cutting Room	Roadside	395176	222169	3.2	NO ₂	Y	N	Y	2m	Y
51	8a Bath Road	Roadside	395146	222149	3.1	NO ₂	Y	N	Y	2m	Y
52	15 College Road	Kerbside	395156	221865	2.5	NO ₂	Y	N	Y	0.1m	Y
53	26 St Lukes Rd	Roadside	395037	221830	2.5	NO ₂	Y	N	Y	2m	Y
54	Co-location – St Georges Street	Roadside	394760	222878	1.4	NO ₂	Y	Y	Y	2m	Y
55	Co-location – St Georges Street	Roadside	394760	222878	1.4	NO ₂	Y	Y	Y	2m	Y
56	Co-location – St Georges Street	Roadside	394760	222878	1.4	NO ₂	Y	Y	Y	2m	Y

2.2 Comparison of Monitoring Results with AQ Objectives

During 2014, Cheltenham Borough Council only carried out monitoring for the air pollutant nitrogen dioxide (NO₂). This was due to the fact that previous rounds of review and assessment had demonstrated that other air pollutants were unlikely to be breached.

2.2.1 Nitrogen Dioxide

During 2014, Cheltenham Borough Council monitored nitrogen dioxide levels using diffusion tubes at between 48 and 61 locations across the Borough (tubes were added throughout the year, and others removed). Three of the tubes were located at the roadside automatic monitoring instrument on St Georges Road, as a co-location study to obtain a local bias adjustment factor for NO₂. Additional monitoring tubes were added during the year following concerns about the potential air quality impacts of a proposed new urban development to the south of Cheltenham and the proposed Cheltenham Transport Plan. These additional locations were identified on the basis of potential residential exposure at locations where road traffic could increase.

Automatic Monitoring Data

In 2011 Cheltenham Borough Council decided that the installation of a roadside monitoring box would be useful to help validate elevated levels of nitrogen dioxide being measured in the area from diffusion tubes. The location of the roadside monitoring box was selected on the basis of relevant exposure being present and proximity to nearby diffusion tube monitoring points where elevated levels of nitrogen dioxide had been recorded. It was also located at a road junction where traffic congestion is a problem.

The annualised results from the automatic monitoring station are identified in Tables 2.3 and 2.4 below.

The data obtained during 2014 indicated an annual mean level slightly below the National Objective limit at 35ug/m³. This annual average measurement obtained during 2014 is very similar to the data obtained from the co-location study which yielded a Bias Adjustment Factor of 0.97. The nearby annual mean results at two nearby diffusion tube monitoring locations (Sites 31 and 32) recorded 43.7 ug/m³ and 39.7 ug/m³ respectively.

Table 2. 3 Results of Automatic Monitoring of Nitrogen Dioxide: Comparison with Annual Mean Objective

Site ID	Site Type	Within AQMA?	Valid Data Capture for period of monitoring % ^a	Valid Data Capture 2014 % ^b	Annual Mean Concentration $\mu\text{g}/\text{m}^3$				
					2010	2011 ^c	2012	2013	2014
St Georges Street	Roadside	Y	99.9	99.9	n/a	35	37	36	35

^a The monitoring period was 31st December 2013 to 30th December 2014

^b percentage data capture for the full calendar year

^c This mean has been annualised using data from two long-term continuous monitoring sites forming part of the national network (St Paul's in Bristol and St Ebbes in Oxford).

Table 2. 4 Results of Automatic Monitoring for Nitrogen Dioxide: Comparison with 1-hour mean Objective

Site ID	Site Type	Within AQMA?	Valid Data Capture for period of monitoring % ^a	Valid Data Capture 2014 % ^b	Number of Exceedences of Hourly Mean ($200 \mu\text{g}/\text{m}^3$)				
					2010	2011	2012	2013	2014
St Georges Street	Roadside	Y	99.9	99.9	n/a	0	0	0	0

Diffusion Tube Monitoring Data

Additional diffusion tubes were added to the monitoring network in Cheltenham during 2014 following concerns over the potential air quality impact of proposed new development to the south of Cheltenham and transport proposals for Cheltenham town centre. The locations were selected on the basis of forecast traffic modelling data, potential residential exposure and ease of access for monitoring purposes.

Results for 2014 indicate broadly similar annual mean nitrogen dioxide levels across Cheltenham compared to 2013 with no significant trends identified. Two monitoring points in close proximity to each other in Fairview Road indicated a slight overall increase in annual mean nitrogen dioxide levels, but similar to 2012 results. Three locations which previously indicated exceedance of the annual mean during 2013 indicated a reduction to just below the 40ug/m³ objective. This is encouraging. However with various new developments planned, and traffic modelling data indicating potential increases in traffic on several roads in Cheltenham in the future, there is obviously concern that nitrogen dioxide levels may remain elevated at key locations in Cheltenham.

The number of locations that are currently exceeding the annual mean objective for NO₂ with relevant exposure in 2014 is eight. This has reduced from previous years; 12 in 2013 and 11 in 2012. Those areas exceeding the annual mean objective for NO₂ are indicated in Fig 1.3 and identified as;

- adjacent to 81 London Road
- a location on the A4019 opposite the entrance to White Hart Street
- adjacent to 422 and 452 High Street
- adjacent to New Rutland House, Swindon Road
- adjacent to Winchcombe House, Fairview Road
- adjacent to Regency Hall, Fairview Road
- adjacent to 8a Bath Road

The sites at lower High Street, London Road, Swindon Road, and Bath Road (all major traffic routes around the town centre) that were reported as exceeding the annual mean objective in 2013 have continued to indicate NO₂ levels above this objective.

The monitored levels of NO₂ recorded during 2014 continue to justify the declaration of the current AQMA and implementation of an Air Quality Action Plan for Cheltenham. The results for monitoring during 2014 are identified in Tables 2.5 and 2.6 below.

Table 2.5 Results of NO₂ Diffusion Tubes 2014

Site ID	Location	Site Type	Within AQMA?	Triplicate or Co-located Tube	Full Calendar Year Data Capture 2014 (%)	2014 Annual Mean Concentration (µg/m ³)
1	Westal Green	Roadside	Y	N	100.00	29.07
2	179 Bath Road	Roadside	Y	N	91.67	32.44
3	51 Upper Norwood	Background	Y	N	100.00	16.60
4	97 Shurdington Road	Roadside	Y	N	100.00	31.27
5	Opposite Kidnappers Lane	Roadside	Y	N	100.00	26.00
6	56 Church Road	Roadside	Y	N	100.00	20.83
7	81 London Road	Roadside	Y	N	100.00	43.10
8	104 London Road	Roadside	Y	N	100.00	38.71
9	1 Old Bath Road	Roadside	Y	N	91.67	36.68
10	8 Old Bath Road	Roadside	Y	N	100.00	28.36
11	17 Chelsea Close	Background	Y	N	100.00	14.77
12	60 Keynsham Rd	Kerbside	Y	N	100.00	20.48
13	Prestbury Post Office	Roadside	Y	N	100.00	34.86
14	91 Tewkesbury Road	Roadside	Y	N	100.00	28.92
15	124 Gloucester Road	Roadside	Y	N	100.00	29.07
16	264 Gloucester Road	Roadside	Y	N	100.00	32.44

Cheltenham Borough Council

Site ID	Location	Site Type	Within AQMA?	Triplicate or Co-located Tube	Full Calendar Year Data Capture 2014 (%)	2014 Annual Mean Concentration ($\mu\text{g}/\text{m}^3$)
17	338 Gloucester Road	Roadside	Y	N	91.67	35.99
18	340 Gloucester Road	Roadside	Y	N	100.00	37.42
19	5 Miserden Road	Roadside	Y	N	91.67	26.71
20	P.E. Roundabout	Roadside	Y	N	100.00	26.73
21	7 Suffolk Road	Roadside	Y	N	91.67	26.01
22	Ladies College	Roadside	Y	N	100.00	34.98
23	Chelsea Court	Roadside	Y	N	100.00	27.19
24	6 Knapp Road	Kerbside	Y	N	91.67	20.53
25	50 St Georges St	Kerbside	Y	N	100.00	31.69
26	2 Gloucester Rd	Roadside	Y	N	83.33	42.95
27	Opp.White Hart St	Roadside	Y	N	100.00	41.05
28	452 High Street	Roadside	Y	N	100.00	44.33
29	443 High Street	Roadside	Y	N	100.00	35.99
30	422 High Street	Roadside	Y	N	100.00	47.94
31	New Rutland - Swindon Rd	Roadside	Y	N	100.00	43.37
32	Saracens Court	Roadside	Y	N	100.00	39.71
33	2 Swindon Road	Kerbside	Y	N	91.67	39.98
34	22 St Paul's Rd	Roadside	Y	N	100.00	31.89

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Site ID	Location	Site Type	Within AQMA?	Triplicate or Co-located Tube	Full Calendar Year Data Capture 2014 (%)	2014 Annual Mean Concentration ($\mu\text{g}/\text{m}^3$)
35	10 Monson Avenue	Roadside	Y	N	100.00	24.95
36	North Place West	Urbancentre	Y	N	100.00	25.60
37	5 St Margaret's Terrace	Roadside	Y	N	83.33	34.46
38	North Place East	Roadside	Y	N	100.00	33.33
39	Portland St/Fairview Rd	Roadside	Y	N	100.00	36.30
40	Millenium Plaza - Fairview	Kerbside	Y	N	100.00	31.71
41	Winchcombe St/Fairview	Roadside	Y	N	100.00	40.49
42	Regency Hall - Fairview	Roadside	Y	N	100.00	41.69
43	21 All Saints Rd	Kerbside	Y	N	100.00	31.40
44	40 Hewlett Road	Roadside	Y	N	100.00	35.31
45	7 Berkeley Place	Roadside	Y	N	100.00	30.28
46	2 London Road	Roadside	Y	N	91.67	41.30
47	Pisa Pizza	Roadside	Y	N	100.00	34.57
48	The Restoration	Roadside	Y	N	100.00	40.33
49	YMCA Shop	Roadside	Y	N	100.00	36.33
50	Cutting Room	Roadside	Y	N	91.67	39.27
51	8a Bath Road	Roadside	Y	N	100.00	42.04

Site ID	Location	Site Type	Within AQMA?	Triplicate or Co-located Tube	Full Calendar Year Data Capture 2014 (%)	2014 Annual Mean Concentration ($\mu\text{g}/\text{m}^3$)
52	15 College Road	Kerbside	Y	N	100.00	28.55
53	26 St Lukes Rd	Roadside	Y	N	100.00	20.79
54	Co-location – St Georges Street	Roadside	Y	Y	100.00	36.15
55	Co-location – St Georges Street	Roadside	Y	Y	100.00	35.06
56	Co-location – St Georges Street	Roadside	Y	Y	100.00	35.11

Table 2.6 Results of NO₂ Diffusion Tubes (2014) after Bias Adjustment

Site ID	Location	Site Type	Within AQMA?	Triplicate or Co-located Tube	Full Calendar Year Data Capture 2014 (%)	2014 Annual Mean Concentration (µg/m ³) – Bias Adjustment factor = 0.97
1	Westal Green	Roadside	Y	N	100.00	28.20
2	179 Bath Road	Roadside	Y	N	91.67	31.46
3	51 Upper Norwood	Background	Y	N	100.00	16.10
4	97 Shurdington Road	Roadside	Y	N	100.00	30.33
5	Opposite Kidnappers Lane	Roadside	Y	N	100.00	25.22
6	56 Church Road	Roadside	Y	N	100.00	20.21
7	81 London Road	Roadside	Y	N	100.00	41.81
8	104 London Road	Roadside	Y	N	100.00	37.55
9	1 Old Bath Road	Roadside	Y	N	91.67	35.58
10	8 Old Bath Road	Roadside	Y	N	100.00	27.51
11	17 Chelsea Close	Background	Y	N	100.00	14.32
12	60 Keynsham Rd	Kerbside	Y	N	100.00	19.87
13	Prestbury Post Office	Roadside	Y	N	100.00	33.82
14	91 Tewkesbury Road	Roadside	Y	N	100.00	28.05
15	124 Gloucester Road	Roadside	Y	N	100.00	29.73
16	264 Gloucester Road	Roadside	Y	N	100.00	33.95
17	338 Gloucester Road	Roadside	Y	N	91.67	34.91

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Site ID	Location	Site Type	Within AQMA?	Triplicate or Co-located Tube	Full Calendar Year Data Capture 2014 (%)	2014 Annual Mean Concentration ($\mu\text{g}/\text{m}^3$) – Bias Adjustment factor = 0.97
18	340 Gloucester Road	Roadside	Y	N	100.00	36.30
19	5 Miserden Road	Roadside	Y	N	91.67	25.91
20	P.E. Roundabout	Roadside	Y	N	100.00	25.93
21	7 Suffolk Road	Roadside	Y	N	91.67	25.23
22	Ladies College	Roadside	Y	N	100.00	33.93
23	Chelsea Court	Roadside	Y	N	100.00	26.37
24	6 Knapp Road	Kerbside	Y	N	91.67	19.91
25	50 St Georges St	Kerbside	Y	N	100.00	30.74
26	2 Gloucester Rd	Roadside	Y	N	83.33	41.66
27	Opp.White Hart St	Roadside	Y	N	100.00	39.82
28	452 High Street	Roadside	Y	N	100.00	43.00
29	443 High Street	Roadside	Y	N	100.00	34.91
30	422 High Street	Roadside	Y	N	100.00	46.51
31	New Rutland - Swindon Rd	Roadside	Y	N	100.00	42.07
32	Saracens Court	Roadside	Y	N	100.00	38.51
33	2 Swindon Road	Kerbside	Y	N	91.67	38.78
34	22 St Paul's Rd	Roadside	Y	N	100.00	30.94
35	10 Monson Avenue	Roadside	Y	N	100.00	24.20

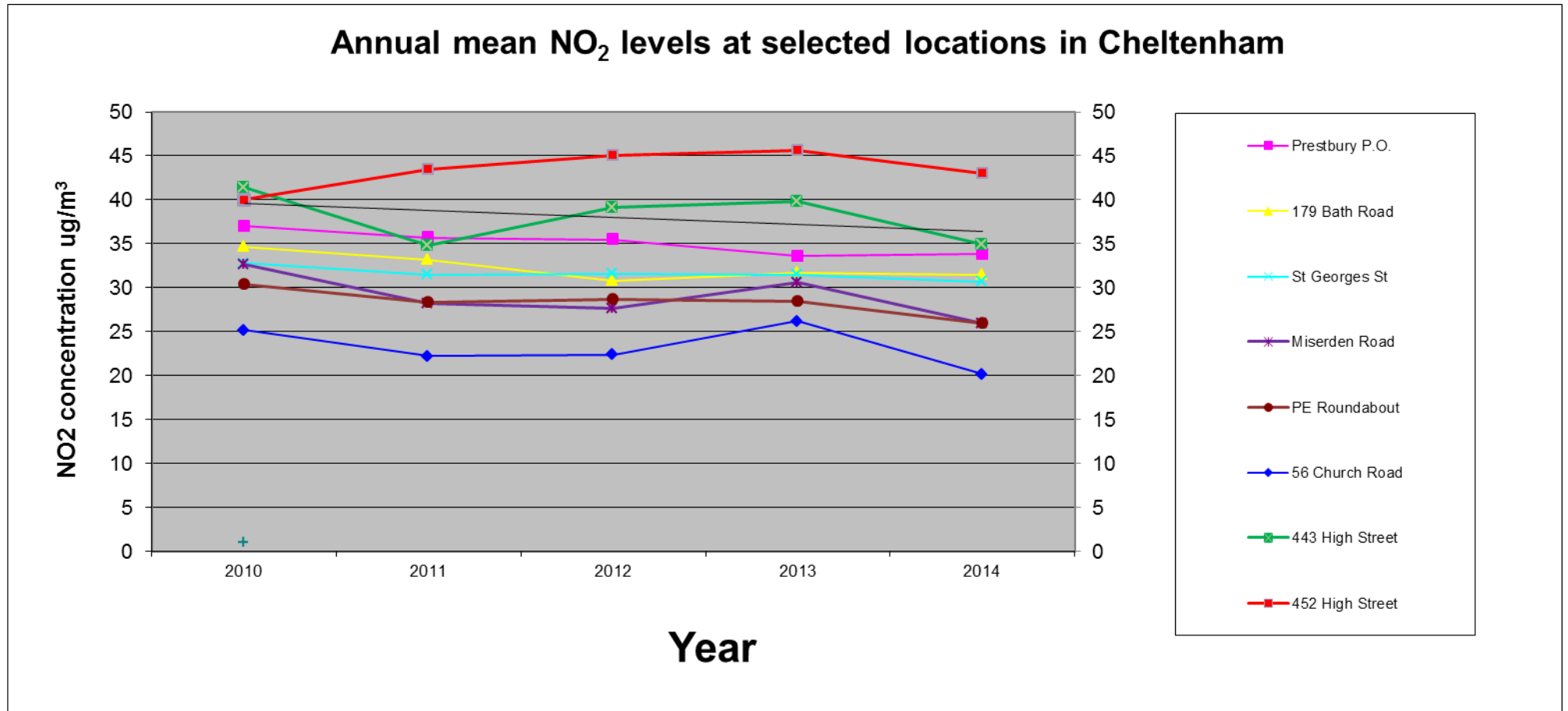
Cheltenham Borough Council

Site ID	Location	Site Type	Within AQMA?	Triplicate or Co-located Tube	Full Calendar Year Data Capture 2014 (%)	2014 Annual Mean Concentration ($\mu\text{g}/\text{m}^3$) – Bias Adjustment factor = 0.97
36	North Place West	Urbancentre	Y	N	100.00	24.83
37	5 St Margaret's Terrace	Roadside	Y	N	83.33	33.42
38	North Place East	Roadside	Y	N	100.00	32.33
39	Portland St/Fairview Rd	Roadside	Y	N	100.00	35.21
40	Millenium Plaza - Fairview	Kerbside	Y	N	100.00	30.75
41	Winchcombe St/Fairview	Roadside	Y	N	100.00	39.28
42	Regency Hall - Fairview	Roadside	Y	N	100.00	40.44
43	21 All Saints Rd	Kerbside	Y	N	100.00	30.46
44	40 Hewlett Road	Roadside	Y	N	100.00	34.25
45	7 Berkeley Place	Roadside	Y	N	100.00	29.38
46	2 London Road	Roadside	Y	N	91.67	40.06
47	Pisa Pizza	Roadside	Y	N	100.00	33.53
48	The Restoration	Roadside	Y	N	100.00	39.09
49	YMCA Shop	Roadside	Y	N	100.00	35.24
50	Cutting Room	Roadside	Y	N	91.67	38.10
51	8a Bath Road	Roadside	Y	N	100.00	40.78
52	15 College Road	Kerbside	Y	N	100.00	27.70
53	26 St Lukes Rd	Roadside	Y	N	100.00	20.16

Site ID	Location	Site Type	Within AQMA?	Triplicate or Co-located Tube	Full Calendar Year Data Capture 2014 (%)	2014 Annual Mean Concentration ($\mu\text{g}/\text{m}^3$) – Bias Adjustment factor = 0.97
54	Co-location – St Georges Street	Roadside	Y	Y	100.00	35.06
55	Co-location – St Georges Street	Roadside	Y	Y	100.00	34.00
56	Co-location – St Georges Street	Roadside	Y	Y	100.00	34.06

In bold, exceedance of the NO₂ annual mean AQS objective of 40 $\mu\text{g}/\text{m}^3$

Figure 2.3 Trends in Annual Mean Nitrogen Dioxide Concentrations measured at Diffusion Tube Monitoring Sites



2.2.2 PM₁₀

No PM₁₀ monitoring was carried out by Cheltenham Borough Council during the period covered by this report. Although historical Urban Background monitoring up to 2009 did not identify any exceedance of PM₁₀ levels, it is possible that roadside locations near to busy roads and junctions could exhibit elevated levels of PM₁₀.

Unfortunately there is no currently practical or affordable method for measuring PM₁₀ levels at roadside locations where there is potential exposure in Cheltenham.

2.2.3 Sulphur Dioxide

No Sulphur Dioxide monitoring was carried out by Cheltenham Borough Council during the period covered by this report.

2.2.4 Benzene

No Benzene monitoring was carried out by Cheltenham Borough Council during the period covered by this report.

2.2.5 Other pollutants monitored

No other pollutants were monitored by Cheltenham Borough Council during the period covered by this report.

2.2.6 Summary of Compliance with AQS Objectives

Cheltenham Borough Council has examined the results from monitoring in the Borough.

Concentrations within the AQMA still exceed the annual mean objective for nitrogen dioxide at several locations as identified within the report and the AQMA should remain.

3 Road Traffic Sources

3.1 Narrow Congested Streets with Residential Properties Close to the Kerb

Cheltenham Borough Council has continued to monitor locations where exceedances in annual mean nitrogen dioxide levels were observed during 2013. Further monitoring locations were installed in 2014 at these locations to obtain a better spatial coverage of the particular road junctions or sections of road where traffic congestion is an ongoing problem.

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

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

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

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

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

3.4 Junctions

Cheltenham Borough Council confirms that there are no further new/newly identified busy junctions/busy roads in 2014.

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

Cheltenham Borough Council confirms that there are no new/proposed roads.

3.6 Roads with Significantly Changed Traffic Flows

Cheltenham Borough Council confirms that there are no new/newly identified roads with significantly changed traffic flows.

3.7 Bus and Coach Stations

Cheltenham Borough Council confirms that there are no relevant bus stations in the Local Authority area.

4 Other Transport Sources

4.1 Airports

Cheltenham Borough Council confirms that there are no airports in the Local Authority area.

4.2 Railways (Diesel and Steam Trains)

4.2.1 Stationary Trains

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

4.2.2 Moving Trains

Cheltenham Borough Council confirms that there are no locations with a large number of movements of diesel locomotives, and potential long-term relevant exposure within 30m.

4.3 Ports (Shipping)

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

5 Industrial Sources

5.1 Industrial Installations

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

Consideration has been given to any new or proposed industrial installations for which an Air Quality Assessment has been carried out.

Cheltenham Borough Council confirms that there were no new or proposed industrial installations for which an Air Quality Assessment has been carried out within its area or nearby in a neighbouring authority.

5.1.2 Existing Installations where emissions have Increased Substantially or New Relevant Exposure has been introduced

Consideration has been given to any existing industrial installations where emissions have increased substantially or new exposure introduced.

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

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

Consideration has been given to any new or significantly altered industrial installations for which no Air Quality Assessment has been produced.

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

5.2 Major Fuel (Petrol) Storage Depots

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

5.3 Petrol Stations

Petrol stations combined with nearby busy roads may potentially emit sufficient benzene to risk exceeding the 2010 objective. Consideration has been given to all petrol stations with an annual throughput of more than 2000m³ of petrol, with busy roads close by and relevant exposure within 10m of the pumps. This element of the Updating and Screening Assessment considers benzene only.

Cheltenham Borough Council confirms that there are no petrol stations meeting the specified criteria.

Details of all permitted petrol stations within the Borough are provided in Appendix C.

5.4 Poultry Farms

Consideration has been given to any farms housing in excess of 400,000 birds (mechanically ventilated), 200,000 birds (naturally ventilated) or 100,000 turkeys (any ventilation) where relevant exposure exists with 100m. This element of the Updating and Screening Assessment considers PM₁₀ only.

Cheltenham Borough Council confirms that there are no poultry farms meeting the specified criteria.

6 Commercial and Domestic Sources

6.1 Biomass Combustion – Individual Installations

Consideration has been given to large individual installations (50kW to 20MW in size) burning biomass. This element of the Updating and Screening Assessment considers PM10 and NO₂. Further information on the detailed criteria followed can be found in Section D1a, Box 5.8 of LAQM.TG (09). Calculations were made relating to information provided to the Local Authority (stack height, diameter and emission rates) and using the appropriate nomogram within the above guidance.

Cheltenham Borough Council confirms that there is one 630 kW biomass combustion plant in its area. From calculation the background adjusted emission rate is below the threshold emission rate and therefore a Detailed Assessment is not required.

6.2 Biomass Combustion – Combined Impacts

Cheltenham Borough Council confirms that there is only one biomass combustion plant in the Local Authority area and therefore there are no combined impacts.

6.3 Domestic Solid-Fuel Burning

Cheltenham Borough Council has a Smoke Control Area which covers approximately 70% of the Borough. Within this area only exempt fuels or exempt appliances can be used in domestic fuel burning situations. Although anecdotal evidence points to an increase in the use of woodburners and multi-fuel stoves in Cheltenham, it is not thought that this is having a significant impact on air quality at present.

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

7 Fugitive or Uncontrolled Sources

Fugitive or uncontrolled sources may give rise to emissions of PM₁₀. This section considers numerous sources such as quarries, landfill sites, stockyards, construction work and waste management site. Consideration has been given to elements such as:

- the passage of vehicles over unpaved roads;
- handling of dust materials;
- process dust e.g. concrete cutting; and
- windblown dust from stockpiles and dusty surfaces.

This element of the Updating and Screening Assessment considers PM₁₀ only.

Further information on the detailed criteria followed can be found in Section E1, Box 5.10 of LAQM.TG(09).

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

8 Conclusions and Proposed Actions

8.1 Conclusions from New Monitoring Data

The diffusion tube monitoring data for 2014 continues to demonstrate that the annual mean objective for NO₂ is being exceeded at eight locations in Cheltenham where there is relevant exposure. These locations are indicated in Fig. 1.3. and described in Section 2.2.

Two locations that exceeded the annual mean objective in 2013: one in Hewlett road and one in St Paul's Street were withdrawn for 2014 as they weren't in relevant exposure areas.

Four other locations that previously exceeded the annual mean objective in 2013; two in the High Street, one in Hewlett Road, and one at London Road fell below the national objective limit in 2014. However they are still being monitored in case the situation changes.

A further three locations in the lower High Street also showed a reduction in Nitrogen Dioxide.

Unfortunately one location at Fairview Road showed a slight increase over 2014, subsequently exceeding the air quality objective limit for Nitrogen Dioxide. This location is a major traffic route and therefore readings will always fluctuate around this magnitude, subject to any air quality action planning.

A new monitoring location in 2014, at London Road, subsequently exceeded the annual air quality objective.

During 2014 the number of locations in Cheltenham that breached the annual mean objective for NO₂ has reduced to eight (see figure 1.3), however the AQMA designation remained justified as a result of the continued breaches at these locations.

8.2 Conclusions from Assessment of Sources

Cheltenham Borough Council is satisfied that the main source of nitrogen dioxide in the Borough is from vehicle emissions. Following the screening criteria in LAQM.TG(09), there are no other significant air pollution sources of concern.

8.3 Proposed Actions

Cheltenham Borough Council has not identified any other pollutant of concern in the local authority area and will not be proceeding to any detailed assessments.

The existing AQMA for nitrogen dioxide exceedance remains justified according to diffusion tube monitoring data from 2014 despite an overall reduction across the Borough in measured NO₂ levels. Real-time monitoring data from the Swindon Road Air Quality Monitoring Station indicated levels of NO₂ below the national objective from annualised results. Co-location diffusion tubes are installed at the location of the monitoring station to assist with obtaining a local bias adjustment factor for diffusion tube data.

8.4 Air Quality Action Plan (2014)

A Draft Action Plan public consultation exercise was carried out in July of 2013, considering possible initiatives. Following on from various public meetings to discuss the issues the initiatives finally pursued included various highway amendments (road closures, changes in traffic flow, vehicle and speed restrictions, etc.), public transport initiatives (low emission buses, park and ride, etc.) and modal changes (cycling, car sharing, travel planning, greener vehicles, travel grants, etc.). See Table 8.1 for details.

The Air Quality Action Plan was produced in April 2014.

Proposed Highways Improvements to be implemented under the Council's Transport Plan proved controversial due to fears about deteriorating air quality in areas that may receive more traffic under this proposed measure. Extra monitoring of air quality

commenced in Sept 2013 in those areas most at risk of receiving extra traffic. Data to date suggest that there may be a slight impact on air quality but no breach of pollution limits at residential facades (with possible exception of St Paul's Road).

It was recommended that a period of air quality monitoring was carried out to gauge the impact of the Boots Corner closure once the Traffic Regulation Order (TRO) had been obtained.

Table 2.7 Cheltenham Air Quality Action Plan - 2014

No.	Measure	Focus	Lead Authority	Planning Phase	Implementation Phase	Indicator	Target Annual Emission Reduction in the AQMA	Progress to Date	Progress in Last 12 Months	Estimated Completion Date	Comments Relating to Emission Reductions
1	Highways Improvements	A range of highway amendments to improve traffic flow and improve cycle and pedestrian provision within Cheltenham.	Glos County Council	2013-14	2014-16	Reduction in through traffic and improved access to car parks. Reduced congestion at key junctions	1-2%	The authority has applied for a Traffic Regulation Order to implement the junction changes	Scheme approved by Council	2016	Vehicle CO2 emissions have been modelled to fall within the inner ring road and core areas of Cheltenham compared to Do nothing approach
2	Air Quality Information	To provide up to date information on local air quality, air quality forecasts and sustainable travel options	Chelt Borough Council	2014-15	2014-15	Hit counter on webpage.	<0.1%	None	-	2015	Emission reductions directly attributable to this action cannot be measured
3	Promotion of Park & Ride	The promotion of existing and proposed new Park & Ride schemes to include improved signage	Glos County Council	2014-15	2014-16	Reduced car travel into & out of Cheltenham	0.1-1%	Ongoing transport planning work for development of new P&R site	Securing new site. New signage erected	2016?	Gauge use of P&R site and relate to traffic count data.

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No.	Measure	Focus	Lead Authority	Planning Phase	Implementation Phase	Indicator	Target Annual Emission Reduction in the AQMA	Progress to Date	Progress in Last 12 Months	Estimated Completion Date	Comments Relating to Emission Reductions
4	Promotion of Personal Travel Plans (PTP)	Target individuals directly by actively promoting and developing alternative travel options to allow a change in their transport behaviour	Glos County Council	2012	2013-2015	Repeat surveys to gauge behaviour change	0.5%	First phase of PTP completed	First phase of PTP completed	2015	Difficult to quantify any reductions directly attributable to PTP
5	Bike-It-Officer	To encourage parents and children to cycle and walk to school where possible	Glos County Council	2012	2013-2015	none	<0.5%	Numerous schools visited		2015	Difficult to quantify any reductions directly attributable to Bike it officer
6	Promotion of Greener Vehicles	To encourage electric vehicle use through the installation of charge points in car parks & on-street plus differential car parking charges	Glos County Council	2012	2013-2015	Charge point use data	<0.5%	None	None	2015	Dependant on uptake of electric vehicles locally

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No.	Measure	Focus	Lead Authority	Planning Phase	Implementation Phase	Indicator	Target Annual Emission Reduction in the AQMA	Progress to Date	Progress in Last 12 Months	Estimated Completion Date	Comments Relating to Emission Reductions
7	HGV restrictions	To encourage deliveries during the quieter footfall periods of the day to reduce congestion	Glos County Council & Chelt Borough Council	2014	2015	Traffic count data	0.1%	None	None	2016	
8	Increase Car Sharing	Upgrade and re-launch car-sharing website plus improved signage and promotion	Glos County Council	2013	2015	Traffic count data	0.1%	None	None	2016	
9	School Travel Grants	LSTF grants to schools for sustainable travel initiatives	Glos County Council	2013	2014-15	Uptake of grants	<0.1%	None	None	2016	
10	Business Travel Grants	LSTF grants to businesses for sustainable travel initiatives	Glos County Council	2013	2014-15	Uptake of grants	<0.1%	None	None	2016	
11	Wayfinding Initiative	To improve signage and routing for bus users and pedestrians	Glos County Council	2013	2014-15	none	<0.1%	New direction signage installed	New direction signage installed	2016	Greater bus use and walking difficult to quantify emission reductions

Cheltenham Borough Council

No.	Measure	Focus	Lead Authority	Planning Phase	Implementation Phase	Indicator	Target Annual Emission Reduction in the AQMA	Progress to Date	Progress in Last 12 Months	Estimated Completion Date	Comments Relating to Emission Reductions
12	Promote Workplace Travel Plans	Cheltenham Borough Council will develop a workplace 'smarter' travel plan where resources allow and encourage businesses	Chelt Borough Council	2014	2015	Whether or not a plan is implemented	<0.1%l	None	None	2015?	Aim to encourage more sustainable travel choices by staff through formal adoption of a Travel Plan
13	Air Quality Planning Policy	An Air Quality Policy will be adopted as part of the emerging Cheltenham Local Plan	Chelt Borough Council	2013	2015	Whether or not a formal AQ planning Policy is adopted	Unknown but potentially significant - >1%	Draft AQ Policy submitted for consultation	Draft AQ Policy submitted for consultation	2015	
14	Traffic Light Appraisal	To investigate the potential for traffic light switch off trials with a view to removal	Glos County Council	2014	2015-16	Number of traffic lights removed & traffic count/speed data	Potentially significant at current areas of poor air quality	6 sets of lights currently being looked at	6 sets of lights currently being looked at	2015	
15	Bus & taxi quality partnership	To encourage fuel efficient & safe driving with no idling	Glos County Council and Chelt Borough Council	2013	2014-15	Anecdotal	unknown	None	None	2016	Will also look at bus routing to assist emission reductions

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No.	Measure	Focus	Lead Authority	Planning Phase	Implementation Phase	Indicator	Target Annual Emission Reduction in the AQMA	Progress to Date	Progress in Last 12 Months	Estimated Completion Date	Comments Relating to Emission Reductions
16	Twenty is Plenty	Reduce urban speed limit to 20mph in some areas to reduce congestion and improve traffic flow on busier roads	Chelt Borough Council and Glos County Council	2014-15	2015-16?	Traffic count/speed data	<0.5%	None	None	2016	Limited data on emission reductions from reducing traffic speed
17	A lower emission bus fleet	To encourage improvement of bus fleets to meet latest Euro emission standards	Chelt Borough Council	2013	2014-16	Bus fleet data	0.5%	Initial funding bid to Govt failed but positive response	Initial funding bid to Govt failed but positive response	Ongoing	May depend on Govt funding to assist bus fleet upgrade
18	Green Planting	To increase green planting through planning to help off-set air pollution impacts	Chelt Borough Council	2014	2014-2016	Number of urban planning applications with green planting schemes adopted	<0.1%	None	None	Ongoing	Evidence supports green planting to help reduce airborne pollution
19	Vehicle Management Signage	Electric signage to inform drivers of congestion and nearest parking	Chelt Borough Council & Glos County Council	2014	2014-2016	Traffic count data	<0.1%	None	None	2016?	

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No.	Measure	Focus	Lead Authority	Planning Phase	Implementation Phase	Indicator	Target Annual Emission Reduction in the AQMA	Progress to Date	Progress in Last 12 Months	Estimated Completion Date	Comments Relating to Emission Reductions
20	Cycle Safety Improvements	Improvement of road layouts and associated infrastructure to improve the safety of cyclists in Cheltenham	Chelt Borough Council & Glos County Council	2014	2014-2016	Number of cyclists and accident & injury statistics	<0.1%	None	None	2016?	

In 2014 various work was carried out in line with the Action Plan. In detail these are: -

1. Highways Improvements

No change in 2014. Gloucestershire County Council approved Cheltenham Transport Plan on 22.07.2015 on a phased basis. First stage not anticipated until February 2016.

2. Air Quality Information

No change in 2014. This action linked to Gloucestershire County Council.

3. Promotion of Park & Ride

2014 - Funding for Elmbridge Scheme to commence 2016/2017.

4. Promotion of Personal Travel Plans (PTP)

PTP was undertaken in Cheltenham during spring and summer 2013. 28,447 households in Cheltenham were targeted, and of these, 14,049 were engaged in a face-to-face conversation. The post-project surveys showed that 35% of the residents engaged with stated that they either had changed or intended to change their travel behaviour following the PTP. Of these, 17% of residents said that they had already made a change to sustainable travel methods from single occupancy car use. The benefits of these changes were estimated to have reduced the number of car journeys per year by 365,000.

5. Bike-It-Officer

4 schools in Cheltenham took part in the programme throughout the duration of the LSTF period alongside a further 6 across Gloucestershire. There has been an increase in the level of pupils who usually travel to school actively, from 53.2% before engagement to a high of 60.0% after one year. Active travel levels remained high (59%) in the second year of engagement (an overall increase of 5.8%). The level of pupils who usually travel to school by car decreased and remain below baseline after two years; from 34.8% at baseline to 33.6% after one year and 29.1% after two years (an overall decrease of 5.7%).

6. Promotion of Greener Vehicles

2014 – Electric charging points installed at Cheltenham Railway Station and Town Centre East car park.

7. HGV restrictions

No change in 2014. Cheltenham Transport Plan to be implemented by Gloucestershire County Council.

8. Increase Car Sharing

New upgraded website has been launched and membership numbers are steadily increasing. There are currently approximately 2320 members, with memberships increasing each year even accounting for the removal of inactive members. The car share website has been funded until September 2018, when this will need to be reviewed to determine whether the current provider offers value for money. Flyers have been distributed to businesses around Gloucestershire to raise awareness.

9. School Travel Grants

To support the activities which were coordinated by the Bike It Officer Plus, all schools benefited from Dr Bike sessions, and 11 schools (5 in Cheltenham) also benefitted from new cycle/scooter parking as a reward for working with the scheme and making a commitment to creating a sustainable travel culture. In total 156 additional cycle parking spaces and 280 scooter parking spaces have been installed.

10. Business Travel Grants

The aim of the Business Travel Grant (BTG) workstream was to provide financial support in the delivery of sustainable travel incentives to employers to a value of £5,000 per site. 40 businesses received grants throughout the LSTF project duration, to a total award value of circa £153K. The majority of these grants enabled the provision of new or improved workplace cycle parking. The remainder funded pool cycles, lockers for the storage of cycling equipment, showers and changing facilities and electric vehicle charging points. Additionally all successful grant applicants have agreed either financial or non-financial match commitments to implement initiatives to support the BTG, for example, cycle training, the provision of cycling clothing and Personalised Travel Planning for employees.

11. Wayfinding Initiative

2014 – First phase completed.

12. Promote Workplace Travel Plans

No change in 2014

13. Air Quality Planning Policy

Drafted in 2014 and out for consultation in 2015

14. Traffic Light Appraisal

Awaiting Cheltenham Transport Plan in Spring 2016

15. Bus & taxi quality partnership

Work carried out by Stagecoach bus company in 2014. Switched fleet to low emission buses.

16. Twenty is Plenty

St Paul's district earmarked but no work commenced in 2014.

17. A lower emission bus fleet

See 15 above.

18. Green Planting

No change in 2014.

19. Vehicle Management Signage

No change in 2014. Cheltenham Transport Plan to be implemented 2016.

20. Cycle Safety Improvements

No work in 2014. Re-signing linked to Cheltenham Transport Plan.

8.5 Local Sustainable Transport Fund

Since declaration of the AQMA in November 2011, Gloucestershire County Council has been successful in obtaining significant funding from Government to implement transport related measures to encourage sustainable transport and modal shift within the county. Modal shift is the movement away from using one particular form of transport to another. In the case of Gloucestershire and Cheltenham in particular, the overriding aim is to encourage more sustainable travel choice through movement away from single occupancy private vehicle use to public transport, cycling and walking. This is to be achieved through the implementation of a number of schemes that are identified under the local sustainable transport fund (LSTF) project plan.

Further details of the LSTF project plan can be obtained at

www.gloucestershire.gov.uk/lstf

Many of the schemes planned for Cheltenham under the LSTF project are in the process of being implemented. Where a reduction in vehicle use occurs there is likely to be a corresponding positive impact on air quality. Some modelling has been carried out to assess the effect on traffic flow with implementation of the LSTF transport proposals for Cheltenham. This suggests that some of the locations that currently have poor air quality should show some reduction in traffic flow following implementation, which should equate to an improvement in air quality. Therefore this Action Plan has incorporated several of the LSTF schemes within the list of proposed Air Quality actions. For a more thorough run down of all the LSTF schemes, please visit www.thinktravel.info

9 References

1. Local Air Quality Management – Technical Guidance LAQM.TG(09) – DEFRA (2009)
2. Updated Screening Assessment (2009) - Cheltenham Borough Council
3. Progress Report (2014) - Cheltenham Borough Council

Appendices

Appendix A: QA:QC Data

Diffusion Tube Bias Adjustment Factors

During the period covered by this report, the diffusion tubes (20% TEA in Acetone) were supplied and analysed by Gradko International Limited. The tubes at all locations throughout the area have a monthly exposure period. For 2010 and 2011 a local bias adjustment was not available. Instead a National Bias Adjustment factor was calculated in March each year using the Bias Adjustment Factor Spreadsheet available at <http://laqm.defra.gov.uk/bias-adjustment-factors/national-bias.html>. The bias adjustment factors utilised were:

- 2010 bias adjustment factor: 0.85
- 2011 bias adjustment factor: 0.83
- 2012 bias adjustment factor: 0.99
- 2013 bias adjustment factor: 1.04
- 2014 bias adjustment factor: 0.97

From 2012 local Bias Adjustment Factors were used from a triplicate co-location study that commenced at the Council's roadside Air Quality Monitoring Station in April 2012. Triplicate co-location measurements continue to be used.

Factor from Local Co-location Studies

The Bias Adjustment Factor used for 2014 was from a local co-location study located at the roadside Automatic NO₂ analyser instrument at the junction of St George's Street and Swindon Road. The Bias Adjustment Calculation resulted in a Bias Adjustment Factor of 0.97 for 2014. This was calculated using the AEA_DifTPAB_v04.xls spreadsheet. A copy of the spreadsheet is included in Appendix B.

Discussion of Choice of Factor to Use

The Local Bias Adjustment Factor was used since the triplicate study demonstrated good precision and we obtained high quality chemi-luminescence analyser results.

QA/QC of automatic monitoring

Cheltenham Borough Council's nitrogen dioxide Air Quality Monitoring Station (AQMS) on St Georges Street/Swindon Road junction is operated and managed by Enviro Technology Services plc. The unit was installed in August 2011 and Enviro Technology Services undertake routine monthly calibration visits and data download services. Data received is ratified by Geoff Broughton from Air Quality Data Management (AQDM). Ratified data is provided to us every quarter in a .pdf format (see Appendix D).


The M200E NO_x analyser is MCERTS approved and measures nitric oxide and oxides of nitrogen in total. The analyser uses a technique called chemiluminescence to detect the gases. The analytical technique used can be broadly explained by stating that a beam of light is directed onto the molecules of gases as they enter the analyser. As a result, the gas molecules themselves either emit or absorb light, and it is the intensity of the emitted or absorbed light that is measured by the analysers, and the concentrations of the pollutants are then calculated. The concentrations of the gases are then expressed in parts per billion (parts of gas per billion parts of air).

QA/QC of diffusion tube monitoring

Nitrogen dioxide diffusion tubes used by Cheltenham Borough Council in 2014 were 20% TEA in water supplied and analysed by Gradko International Limited. It can be confirmed that the laboratory follows the procedures set out in the Harmonisation Practical Guidance Procedures under the DEFRA practical guidance. It also participates in the Ambient, Indoor, Workplace Air and Stack Emissions Proficiency Testing (AIR PT) scheme. This is an independent analytical proficiency-testing (PT) scheme, operated by the Health and Safety Laboratory (HSL) and accredited by LGC Limited. The results from the AIR PT scheme for this laboratory during 2014 indicate that 99% of the results submitted were deemed to be satisfactory.

Appendix B: Copy of Diffusion Tube Co-location study calculation of Precision and Bias Adjustment

Checking Precision and Accuracy of Triplicate Tubes



From the AEA group

Diffusion Tubes Measurements									
Period	Start Date dd/mm/yyyy	End Date dd/mm/yyyy	Tube 1 μgm^{-3}	Tube 2 μgm^{-3}	Tube 3 μgm^{-3}	Triplicate Mean	Standard Deviation	Coefficient of Variation (CV)	95% CI of mean
1	31/12/2013	31/01/2014	38.2	38.4	37.2	38	0.6	2	1.6
2	31/01/2014	27/02/2014	30.2	29.7	29.3	30	0.5	2	1.1
3	27/02/2014	02/04/2014	44.6	40.4	40.9	42	2.3	5	5.7
4	02/04/2014	02/05/2014	37.7	34.0	33.9	35	2.2	6	5.4
5	02/05/2014	02/06/2014	32.6	31.5	28.9	31	1.9	6	4.7
6	02/06/2014	01/07/2014	34.6	32.9	33.0	34	1.0	3	2.4
7	01/07/2014	31/07/2014	28.9	28.6	31.1	30	1.4	5	3.4
8	31/07/2014	01/09/2014	30.4	30.6	27.6	30	1.7	6	4.2
9	01/09/2014	30/09/2014	38.4	37.8	40.1	39	1.2	3	3.0
10	30/09/2014	31/10/2014	32.0	30.5	34.7	32	2.1	7	5.3
11	31/10/2014	01/12/2014	43.4	44.0	41.2	43	1.5	3	3.7
12	01/12/2014	30/12/2014	42.7	42.3	43.5	43	0.6	1	1.5
13									

Automatic Method		Data Quality Check	
Period Mean	Data Capture (% DC)	Tubes Precision Check	Automatic Monitor Data
37.1	99.2	Good	Good
29.4	96	Good	Good
42.6	99.5	Good	Good
36.4	99.9	Good	Good
32	99.6	Good	Good
29	99.6	Good	Good
27	99.6	Good	Good
27	99.8	Good	Good
35	96	Good	Good
33	99.6	Good	Good
42	99.7	Good	Good
43.7	99.6	Good	Good

It is necessary to have results for at least two tubes in order to calculate the precision of the measurements

Site Name/ ID:	Cheltenham Borough Council
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Precision	12 out of 12 periods have a CV smaller than 20%
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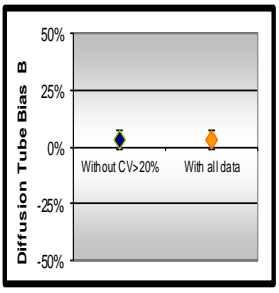
Accuracy (with 95% confidence interval)	without periods with CV larger than 20%
Bias calculated using 12 periods of data	
Bias factor A	0.97 (0.94 - 1.01)
Bias B	3% (-1% - 7%)
Diffusion Tubes Mean:	35 μgm^{-3}
Mean CV (Precision):	4
Automatic Mean:	35 μgm^{-3}
Data Capture for periods used:	99%
Adjusted Tubes Mean:	34 (33 - 36) μgm^{-3}

Accuracy (with 95% confidence interval)	WITH ALL DATA
Bias calculated using 12 periods of data	
Bias factor A	0.97 (0.94 - 1.01)
Bias B	3% (-1% - 7%)
Diffusion Tubes Mean:	35 μgm^{-3}
Mean CV (Precision):	4
Automatic Mean:	35 μgm^{-3}
Data Capture for periods used:	99%
Adjusted Tubes Mean:	34 (33 - 36) μgm^{-3}

Overall survey -->

	Good precision	Good Overall DC
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(Check average CV & DC from Accuracy calculations)



Jaume Targa, for AEA
Version 04 - February 2011

If you have any enquiries about this spreadsheet please contact the LAQM Helpdesk at:

LAQMHelpdesk@uk.bureauveritas.com

Appendix C: List of Service Stations

Table 1: List of Service Stations

IPC ID	Location	Post Code	Process Guidance
EPR 1/14(13)2.01	Wm. Morrisons Filling Station, Greatfield Park, Up Hatherley, Cheltenham	GL51 5BW	Petroleum PG1/14
EPR 1/14(13)2.02	Shell Cheltenham, 352-35 Gloucester Road, Cheltenham	GL51 7AY	Petroleum PG1/14
EPR 1/14(13)2.03	Shell Arle, Princess Elizabeth Way, Cheltenham	GL51 7PA	Petroleum PG1/14
EPR 1/14(13)2.04	Tesco Petrol Filling Station, Colletts Drive, Cheltenham	GL51 8JQ	Petroleum PG1/14
EPR 1/14(13)2.05	Sainsbury's Petrol Filling Station, Tewkesbury Road, Cheltenham	GL51 9AA	Petroleum PG1/14
EPR 1/14(13)2.06	Shell c/o Waitrose Petrol Filling Station, Honeybourne Way, Cheltenham	GL50 3QW	Petroleum PG1/14
EPR 1/14(13)2.07	ASDA, Hatherley Lane, Cheltenham	GL51 0EU	Petroleum PG1/14
EPR 1/14(13)2.08	Sainsbury's Petrol Filling Station (Oakley), Priors Road, Cheltenham	GL52 5AQ	Petroleum PG1/14
EPR 1/14 (06)1.01	394 Gloucester Road, Cheltenham	GL51 7AT	Petroleum PG1/14
EPR 1/14 (06)1.02	Sixways Service Station, London Road, Cheltenham	GL52 6HZ	Petroleum PG1/14
EPR 1/14 (06)1.03	Cheltenham Service Station, Bouncers Lane, Prestbury, Cheltenham	GL52 4JF	Petroleum PG1/14
EPR 1/14 (06)1.04	East End Service Station, London Road, Cheltenham	GL52 6YY	Petroleum PG1/14
EPR 1/14 (06)1.05	Tewkesbury Road, Cheltenham	GL51 9SG	Petroleum PG1/14
EPR 1/14 (06)1.06	Star Cheltenham Service Station, Westal Green, Cheltenham	GL50 2JA	Petroleum PG1/14
EPR 1/14 (06)1.07	BP Prestbury Road Service Station, 80-86 Prestbury Road, Cheltenham, GL52 2DJ	GL52 2DJ	Petroleum PG1/14

Appendix D: Ratified data from NO₂ analyser on St Georges Road – Swindon Road junction

Produced by AQDM on behalf of Cheltenham B.C.

CHELtenham SWINDON ROAD 1 January to 31 December 2014

These data have been fully ratified by AQDM to LAQM TG(09) standards

Site Description

Junction of Swindon Road and St George St

Air Quality Statistics

Pollutant	NO	NO ₂	NO _x
Number Very High #	-	0	-
Number High #	-	0	-
Number Moderate #	-	0	-
Number Low #	-	8961	-
Maximum 15-minute mean	405 µg m ⁻³	164 µg m ⁻³	743 µg m ⁻³
Maximum hourly mean	354 µg m ⁻³	124 µg m ⁻³	663 µg m ⁻³
Maximum running 8-hour mean	207 µg m ⁻³	97 µg m ⁻³	414 µg m ⁻³
Maximum running 24-hour mean	120 µg m ⁻³	71 µg m ⁻³	277 µg m ⁻³
Maximum daily mean	127 µg m ⁻³	73 µg m ⁻³	267 µg m ⁻³
Average	23 µg m ⁻³	34 µg m ⁻³	68 µg m ⁻³
Data capture	99.9 %	99.9 %	99.9 %

Daily Air Quality Index (DAQI) as defined by COMEAP 1st January 2012 and revised in April 2013
 Mass units for the gases are at 20°C and 1013mb
 NO_x mass units are NO_x as NO₂ µg m⁻³

Air Quality Exceedences

Pollutant	Air Quality (England) Regulations 2000 & (Amendment) Regulations 2002	Max Conc	Number	Days	Allowed	Exceeded
Nitrogen Dioxide	Annual mean > 40 µg m ⁻³	35 µg m ⁻³	-	-	-	No
Nitrogen Dioxide	Hourly mean > 200 µg m ⁻³	124 µg m ⁻³	0	0	18 hours	No