



2016 Air Quality Annual Status Report (ASR)

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

April 2017

South Somerset District Council

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Executive Summary: Air Quality in Our Area

Air Quality in South Somerset

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^{1,2}.

The annual health cost to society of the impacts of particulate matter alone in the UK is estimated to be around £16 billion³.

In South Somerset the only one of the pollutants included in the National Objectives which gives any cause for concern is Nitrogen dioxide. This pollutant is strongly linked with transport sources, particularly road transport. It is not surprising then to discover that the highest level of Nitrogen dioxide concentrations found in South Somerset are also the areas with the highest level of road traffic flows, namely the main commuter routes in Yeovil. These areas have been consistently monitored now for over a decade. During this period nitrogen dioxide levels have remained relatively unchanged, despite an increase in traffic flows. Isolated areas in Yeovil have been shown to exceed the Annual air quality objective for Nitrogen dioxide, other areas have been shown to be close to this objective.

During 2016 the concentration of nitrogen dioxide within the Yeovil Air Quality Management Area was measured to be greater than the annual mean objective value in four locations. This is consistent with measurements made in previous years.

Because of this ongoing issue an Air Quality Management Area was declared for Yeovil in 2005 and an Action Plan was developed in order to introduce measures to reduce pollutant concentrations where the objective levels have been shown to be breached. The action plan would also help prevent other areas which may be close to exceeding the objective from doing so.

¹ Environmental equity, air quality, socioeconomic status and respiratory health, 2010

² Air quality and social deprivation in the UK: an environmental inequalities analysis, 2006

³ Defra. Abatement cost guidance for valuing changes in air quality, May 2013

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The primary source of the pollutant is traffic, this Action Plan has been developed in Partnership with the Highways service at Somerset County Council and in conjunction with colleagues in the District Council's planning policy unit.

Figure 1: Map Showing the Boundary of the Yeovil Air Quality Management Area



Outside of these isolated hotspots in Yeovil, air quality in South Somerset is generally very good. This is largely due to the mainly rural character of the area. South Somerset covers a large area, extending some 64 miles from east to west with an area of 960 square kilometres. The population is mostly rural with almost 45% of the population living in settlements of fewer than 2500 people, with the two principle towns of Yeovil and Chard having more than 10,000 inhabitants each.

Actions to Improve Air Quality

The Yeovil Air Quality Management Area will remain in order to help reinforce policies that help maintain and enhance air quality in Yeovil. As the district council has limited control over emissions from transport sources, it will continue to liaise with Highways at Somerset County Council and will continue to promote procedures that are sympathetic to air quality by both promoting modal shift in essential developments and by minimising new receptors being located within vulnerable areas.

Local Priorities and Challenges

All relevant pollutants are less than objective values, except within the Yeovil Air Quality Management Area where concentrations of nitrogen dioxide were measured at three locations to still exceed the annual mean objective value of 40 µg/m³. This is due to emissions from road traffic. It is proving very challenging to reduce nitrogen dioxide concentrations at these location. Efforts continue to be made in relation to decreasing demand on road traffic as well as improving the road infrastructure around Yeovil in order to ease congestion. Should these improvements be delivered then concentrations will be positively affected.

How to Get Involved

The SSDC Website provides some advice on how to reduce emissions from personal transport <https://www.southsomerset.gov.uk/environment/travel/> and further information and advice on healthy and sustainable Transport Options is available from Moving Forward, a Somerset County Council initiative to reduce congestion and pollution <http://www.movingsomersetforward.co.uk/>

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1 Local Air Quality Management

This report provides an overview of air quality in South Somerset 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 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 South Somerset and its partners 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.

A summary of the AQMA declared by South Somerset District Council can be found in Table 2.1. A map of AQMA boundary and monitoring locations are available within this report in the Executive Summary and Appendix D respectively.

Table 2.1 – Declared Air Quality Management Areas

AQMA Name	Pollutants and Air Quality Objectives	City / Town	One Line Description	Action Plan
Yeovil AQMA	<ul style="list-style-type: none"> NO₂ annual mean 	Yeovil	Urban Area of Yeovil	Table 2.2

2.2 Progress and Impact of Measures to address Air Quality in South Somerset

UPDATE 2016

South Somerset District Council and Somerset County Council has taken forward a number of measures during the 2016 in pursuit of improving local air quality. Details of all measures completed, in progress or planned are set out in Table 2.2

South Somerset District Council expects the following measures to be completed over the course of the next reporting year:

- Convert A30 Sherborne Road / Lyde Road roundabout to traffic signals

This improvement to the road infrastructure are expected to reduce congestion and provide an incremental gain the air quality.

Priorities for the coming year are to continue to work with colleagues and stakeholders to ensure that improvements to the road infrastructure are delivered, that efforts to reduce demand are continued and alternative transport options through the planning system are provided. Work will also continue with developers to ensure that development gain relating to infrastructure is provided in relation to the key site developments, especially with those developments which may have an adverse impact on the Yeovil Air Quality Management Area.

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	Roundabout Improvement schemes	Transport Planning and Infrastructure	Other	SCC Highways	Complete	2015	efficient use of road capacity	NO ₂ , Particulates	Hospital and Police Station roundabouts completed. Fiveways scheme under review.	Completed	A30/A37 Hospital roundabout A30/A3088 Police Station roundabout Signalise A37/A359 Fiveways roundabout
2	Improvements to A30 Sherborne Road	Transport Planning and Infrastructure	Other	SCC Highways	Complete	2017	efficient use of road capacity	NO ₂ , Particulates	Reprioritised with developers target dates (developer funding via planning system).	2017 On target	Convert A30 Sherborne Road / Lyde Road roundabout to traffic signals
3	Market Street/ Reckleford Junction	Transport Planning and Infrastructure	Other	SCC Highways	2016	2017	efficient use of road capacity	NO ₂ , Particulates	Section 106 agreement pending (subject to further review by Yeovil Refresh)	2018	Re-prioritisation of junction has taken place in 2016.
4	Improvements to North Yeovil	Transport Planning and Infrastructure	Other	SCC Highways	2016	2017	efficient use of road capacity	NO ₂ , Particulates	Under review with developer	2018 earliest (on delivery of 500+ dwellings)	Convert A359 Mudford Road/Lyde Road junction to a roundabout

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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
5	Improvements to North Yeovil	Transport Planning and Infrastructure	Other	SCC Highways	2016	2017	efficient use of road capacity	NO ₂ , Particulates	Under review with developer	019 earliest (on delivery of 750+ dwellings)	Convert A359 Mudford Road/Coombe Street lane junction to a roundabout
6	Interchange at the bus station & Town Centre	Transport Planning and Infrastructure	Public transport improvements-interchanges stations and services	SCC Highways and SSDC	2017	2018	Uptake of bus services	NO ₂ , Particulates	Under Review	2018? Likely to later than this I suspect – 2019/20	The interchanges at the bus station and the town centre are on hold pending the results/review being undertaken by Yeovil Vision/Teovil Refresh
7	Improve interchange at Yeovil Junction railway station	Transport Planning and Infrastructure	Public transport improvements-interchanges stations and services	Network Rail & TOC (with input from SCC and SSDC)	2016	2017	Uptake of bus and railway services	NO ₂ , Particulates	The 68 bus (commercially operated) already links the Junction & Pen Mill Stations and the Town Centre (30 min frequency). Improvements to Rail interchange are currently being considered by Network Rail along with a range of options for Rail improvement emanating from both the Wessex & Western Rail Studies and in particular in respect of resilience work needed to maintain regional connectivity arising from the increased occurrence of severe weather.		

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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
8	Improve interchange at Yeovil Pen Mill railway station	Transport Planning and Infrastructure	Public transport improvements- interchanges stations and services	Network Rail & TOC (with input from SCC and SSDC)	2018	Control Period 6 (2019 – 2024)	Uptake of bus and railway services	NO ₂ , Particulates	Dependent on the NR option selected and appropriate funding coming forward from the DfT	Control Period 6 (2019 to 2024)	.68 bus links the 2 stations. Main interchange improvements will relate to improved rail connectivity between the 2 rail lines and options for that will come forward from NR's resilience work – see Yeovil Junction above..
9	Improve standard of bus service: Access	Promoting Travel Alternatives	Other	SCC Transport Somerset	2016	2019	Uptake of bus services	NO ₂ , Particulates	7 SLF Buses provided for Yeovil. Further improvement dependent on developer funding coming forward	Ongoing	Some potential for levering in funding towards fleet improvement coming forward from the SUEs and key sites. Date of coming forward liley to be 2/3 years

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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
10	Improve standard of bus service: Frequency	Promoting Travel Alternatives	Other	SCC Transport Somerset	2016	2019	Uptake of bus services	NO2, Particulates		Ongoing	Buses of Somerset are reducing frequency on the 2 main bus routes w.e.f. 27/02/17 to 20 mins on the 51 and to 30mins on part of the 53 (to make whole route 30 mins. The only potential to reverse this decision will come forward from developer funding
11	Improve standard of bus service: Quality	Promoting Travel Alternatives	Other	SCC Transport Somerset	2016	2017	Uptake of bus services	NO2, Particulates	New fleet vehicles, bespoke timetables	Ongoing	See comments on 9 above re vehicles and 12 below re timetables
12	Information and Marketing	Promoting Travel Alternatives	Personalised Travel Planning	SCC Highways and SSDC	Complete	2016	Uptake of bus services	NO2, Particulates	Software has been purchased to provide bespoke Timetables	Ongoing	Still awaiting stop-specific timetables. Audit reveals less than a third of Yeovil bus stops have timetable cases.

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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
13	Quality Bus Partnership	Promoting Travel Alternatives	Other	SC Highways and SSDC	Complete	2018	Uptake of bus services	NO2, Particulates	QBP agreements in place for service 77 and 54 Somerset County Council is currently unable to contribute funding to QBP initiatives	Ongoing	Situation may change will the implementation of the Buses Bill. However there is potential for QBPs through the SUEs, although again that will be dependent on the viability of the development – See 9 above
14	Provision of new cycling facilities along key corridors	Promoting Travel Alternatives	Promotion of cycling	SSC Highways and SSDC	Complete	Ongoing	Uptake of cycling	NO2, Particulates	Classified as low – medium priority. Measures under review	Ongoing	Somerset's Cycling Strategy has been updated for the period 2011-2026. It includes a commitment to develop a Cycling Network Development Plan for Yeovil.

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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
15	Provision of cycling facilities at key site developments	Promoting Travel Alternatives	Promotion of cycling	SSC Highways and SSDC	Complete	Ongoing	Uptake of cycling	NO2, Particulates	All proposed new developments should incorporate cycling facilities.	Ongoing	Somerset's Cycling Strategy has been updated for the period 2011-2026
16	Cycle routes to other settlements.	Promoting Travel Alternatives	Promotion of cycling	SSC Highways and SSDC	Complete	Complete	Uptake of cycling	NO2, Particulates	Assessment of potential cycle routes between Montacute and Odcombe to Westlands site.	Ongoing	Somerset's Cycling Strategy has been updated for the period 2011-2026
17	Trip end cycle parking	Promoting Travel Alternatives	Promotion of cycling	SSDC	Complete	Ongoing	Uptake of cycling	NO2, Particulates	Long stay cycle parking in Town Centre.	Ongoing	
18	Residential cycle parking	Promoting Travel Alternatives	Promotion of cycling	SSDC	Complete	Ongoing	Uptake of cycling	NO2, Particulates	Ensure that residential cycle parking is catered for in new developments	Ongoing	
19	Pedestrian phases at signalised junctions	Promoting Travel Alternatives	Promotion of walking	SSC Highways and SSDC	Complete	2016		NO2, Particulates	Pedestrian facilities incorporated into infrastructure upgrade	2017	

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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
20	All proposed new employment and residential developments should incorporate pedestrian facilities.	Promoting Travel Alternatives	Promotion of walking	SSDC	Complete	Ongoing		NO2, Particulates	Pedestrian facilities incorporated into infrastructure of key sites	Ongoing	
21	Include Air Quality considerations in planning decisions.	Policy Guidance and Development	Air Quality Planning and Policy Guidance	SSDC	Complete	Ongoing		NO2, Particulates	Policy EQ7 adopted to ensure AQ is considered	Complete	EQ7 includes - "New development should not exacerbate air quality problems in existing and potential AQMAs"
22	Support drive down pollution campaign.	Public Information	Via other mechanisms	SSDC	Complete	Ongoing		NO2, Particulates	Continued promotion of air quality issues	Ongoing	
23	Improve coordination of works by public utilities.	Traffic Management	Other	SCC Highways	Complete	Ongoing		NO2, Particulates	The computerised map based Highway Scheme Proposal Register (HSPR Environmental) is used to coordinate works on the highway. GIS is being used to coordinate works	Ongoing	

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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
24	Yeovil car parking strategy	Traffic Management	Other	SCC Highways and SSDC	Ongoing	Ongoing		NO2, Particulates	Reduction of single yellow line parking zones, repaint as double (Ashford)		Progress on Countywide car parking strategy stalled
25	Encourage Somerset Car Sharing Scheme	Public Information	Via other mechanisms	SCC Highways	Complete	Ongoing	Uptake of Car Share Scheme	NO2, Particulates	Car share website ongoing	Ongoing	
26	SSDC Travel Plan	Promoting Travel Alternatives	Workplace Travel Planning	SSDC	Ongoing	Ongoing		NO2, Particulates	Currently on hold	Unknown	

2.3 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.

South Somerset District Council is not currently taking any specific measures to address PM_{2.5}, however most measures currently being implemented with the existing Yeovil Air Quality Management Area Action Plan will have a direct positive impact on PM_{2.5} concentrations.

There are currently no plans to directly measure PM_{2.5} concentrations within South Somerset District Council. However, via the review of the Somerset Air Quality Strategy, which includes partnership working with Public Health England, Somerset Local Authorities will be examining the scope of any future monitoring requiring and how best to deliver any such requirement. The expectation is that any such monitoring will be designed in order to inform the Public Health Outcomes Framework. This work is ongoing.

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

3.1 Summary of Monitoring Undertaken

3.1.1 Automatic Monitoring Sites

South Somerset District Council undertook no automatic (continuous) monitoring at any sites in 2016.

Previous continuous monitoring which was undertaken in Yeovil ceased operation following failure of equipment and the subsequent demolition of the Station for alternative use by Yeovil District Hospital.

3.1.2 Non-Automatic Monitoring Sites

South Somerset District Council undertook non- automatic (passive) monitoring of NO₂ at 20 sites during 2016. Appendix A shows the details of the sites.

Maps showing the location of the monitoring sites are provided in Appendix D. Further details on Quality Assurance/Quality Control (QA/QC) and bias adjustment for the diffusion tubes are included in Appendix C.

These results showed exceedances at 5 locations, two of which, Y11 and Y703 are at locations where relevant receptors may be affected. Two of the other sites, Y7 and Y613, are at roadside locations and are not representative of exposure to relevant receptors. Y26 also showed an exceedance but with poor data capture. This site is also a roadside location and not representative of exposure.

Results in other locations along Sherborne Road, Everton Road and Fiveways Roundabout, Y403, Y502, Y407 show pollution levels close to the Air Quality standard and continue to cause concern regarding the possibility of future exceedances.

All these results are consistent with previous monitoring.

In the light of these results and ongoing residential development in Yeovil, the tube location will be reviewed during 2016 with a view to using current resources to monitor relevant exposure more effectively going forward.

3.2 Individual Pollutants

The air quality monitoring results presented in this section are, where relevant, adjusted for “annualisation” and bias. Further details on adjustments are provided in Appendix C.

3.2.1 Nitrogen Dioxide (NO₂)

Table A.2 in Appendix A compares the ratified and adjusted monitored NO₂ annual mean concentrations for the past 5 years with the air quality objective of 40µg/m³.

For diffusion tubes, the full 2016 dataset of monthly mean values is provided in Appendix B.

Appendix A: Monitoring Results

There are no Urban background or Roadside automatic monitoring sites in South Somerset.

Table A.1 – Details of Non-Automatic Monitoring Sites

Site ID	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In AQMA ?	Distance to Relevant Exposure (m) ⁽¹⁾	Distance to kerb of nearest road (m) ⁽²⁾	Tube collocated with a Continuous Analyser?	Height (m)
Y7	Fiveways	Roadside	355316	116464	NO ₂	Y	N (8m)	1 m	N	2.7
Y11	Ilchester Road (on façade of No 13)	RR	355118	116900	NO ₂	Y	Y	3 m	N	2.7
Y12	Ilchester Road, No 98	RR	355080	117007	NO ₂	Y	Y	4 m	N	2.7
Y13	Maternity Unit (external seating area)	Urban back	355608	116257	NO ₂	Y	N (8m)	12 m	N	2.7
Y17	Sparrow Road	Roadside	355375	116556	NO ₂	Y	N (3m)	2 m	N	2.7
Y26	Lyde Road	Roadside	356753	116404	NO ₂	Y	N (5m)	2 m	N	2.7

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Site ID	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In AQMA ?	Distance to Relevant Exposure (m) ⁽¹⁾	Distance to kerb of nearest road (m) ⁽²⁾	Tube collocated with a Continuous Analyser?	Height (m)
Y102	Wyndam Street	RR	356161	116098	NO ₂	Y	Y	2 m	N	2.7
Y204	Bus Station	Roadside	356018	116037	NO ₂	Y	N	1 m	N	2.7
Y401	73 Sherborne Road	RR	356312	116228	NO ₂	Y	Y	4 m	N	2.7
Y402	Hillside Residential Home	RR	356520	116360	NO ₂	Y	Y	7 m	N	2.7
Y403	167 Sheborne Road	RR	356643	116382	NO ₂	Y	Y	6 m	N	2.7
Y407	Fiveways Flat	RR	355330	116454	NO ₂	Y	Y	4 m	N	2.7
Y501	42 The Crescent	RR	355212	115705	NO ₂	Y	Y	8 m	N	2.7
Y502	Everton Road	RR	355449	116292	NO ₂	Y	Y	8 m	N	2.7

Site ID	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In AQMA ?	Distance to Relevant Exposure (m) ⁽¹⁾	Distance to kerb of nearest road (m) ⁽²⁾	Tube collocated with a Continuous Analyser?	Height (m)
Y503	4 Yarn Barton	RR	355194	115515	NO ₂	Y	Y	4 m	N	2.7
Y504	New Town	Urban Back	356285	116463	NO ₂	Y	Y	1 m	N	2.7
Y505	Summerland	Urban Back	354204	116767	NO ₂	Y	Y	8 m	N	2.7
Y613	Hospital Sign	Roadside								
Y701	Brimsgrove Court	RR	353039	116802	NO ₂	Y	Y	8 m	N	2.7
Y702	Muchelney Way	RR	355262	115367	NO ₂	Y	Y	5 m	N	2.7
Y703	Hendford Hill	Roadside	354357	117679	NO ₂	Y	5 m	1 m	N	2.7

(1) 0m if the monitoring site is at a location of exposure (e.g. installed on/adjacent to the façade of a residential property).

(2) N/A if not applicable.

Table A.2 – Annual Mean NO₂ Monitoring Results

Site ID	Site Name	Monitoring Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2016 (%) ⁽²⁾	NO ₂ Annual Mean Concentration (µg/m ³) ⁽³⁾				
					2012	2013	2014	2015	2016
Y7	Fiveways	Diffusion Tube	NA	92%	53.3	55.1	50.9	51.3	48.6
Y11	Ilchester Rd	Diffusion Tube	NA	100%	58.8	58.0	54.2	54.0	53.7
Y12	Ilchester Rd No. 98	Diffusion Tube	NA	100%	27.6	32.4	28.9	28.5	32.2
Y13	Maternity Unit	Diffusion Tube	NA	NA	30.8	36.8	NA	NA	NA
Y17	Sparrow Road	Diffusion Tube	NA	100%	28.4	32.1	30.0	29.5	31.4
Y26	Lyde Rd*	Diffusion Tube	NA	50%	44.6	43.6	39.9	42.8	45.2
Y102	Wyndam St	Diffusion Tube	NA	92%	22.9	29.5	25.7	25.6	26.9
Y204	Bus Station	Diffusion Tube	NA	100%	26.6	31.2	26.7	30.3	30.0
Y401	73 Sherborne Road*	Diffusion Tube	NA	100%	32.7	34.9	28.7	29.6	30.9
Y402	Hillside Residential	Diffusion Tube	NA	100%	31.5	28.7	27.3	26.7	26.5
Y403	Sherborne	Diffusion Tube	NA	100%	36.7	41.0	36.3	37.3	37.6

Site ID	Site Name	Monitoring Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2016 (%) ⁽²⁾	NO ₂ Annual Mean Concentration (µg/m ³) ⁽³⁾				
					2012	2013	2014	2015	2016
	Road								
Y407	Fiveways Flats	Diffusion Tube	NA	100%	37.3	39.4	37.3	35.1	37.0
Y501	42 The Crescent	Diffusion Tube	NA	100%	20.0	24.5	21.4	20.1	22.3
Y502	Everton Road	Diffusion Tube	NA	100%	39.2	39.4	36.3	36.1	35.5
Y503	4 Yarn Barton	Diffusion Tube	NA	100%	17.0	19.9	18.4	17.2	18.5
Y504	New Town*	Diffusion Tube	NA	100%	15.3	16.9	15.9	15.2	18.1
Y505	Summerlands	Diffusion Tube	NA	100%	9.5	11.8	10.1	12.5	10.7
Y613	Hospital Sign	Diffusion Tube	NA	67%	NA	NA	45.0	43.5	40.7
Y701	1 Brimsgrove Court	Diffusion Tube	NA	100%	NA	NA	NA	NA	14.9
Y702	59 Muchelney Way	Diffusion Tube	NA	100%	NA	NA	NA	NA	33.6
Y703	71 Hendford Hill	Diffusion Tube	NA	100%	NA	NA	NA	NA	42.1

Notes: Exceedances of the NO₂ annual mean objective of 40µg/m³ are shown in **bold**.

NO₂ annual means exceeding 60µg/m³, indicating a potential exceedance of the NO₂ 1-hour mean objective are shown in **bold and underlined**.

- (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 LAQM.TG16 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 – NO₂ Monthly Diffusion Tube Results - 2016

Site ID	NO ₂ Mean Concentrations (µg/m ³)													Annual Mean	
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Raw Data	Bias Adjusted ⁽¹⁾	
	Y7	58.27	50.66	51.56	49.96	56.67	58.18	58.68	52.68	54.36	64.63	50.23			57.5
Y11	63.85	58.96	59.04	65.34	61.95	60.50	57.50	50.92	56.76	64.79	59.67	73.5	61.1	53.7	
Y12	32.30	33.85	37.46	38.48	38.71	35.14	26.11	30.93	33.83	46.96	42.72	43.1	36.6	32.2	
Y17	38.48	35.96	34.32	34.66	35.88	31.63	29.17	26.92	36.38	40.02	39.51	45.1	36.6	31.4	
Y26	49.70			58.58					42.04	51.69	55.38	50.7	51.4	45.2	
Y102	18.40	31.89	37.00	34.04	30.87	28.33	19.78		24.96	40.46	37.59	32.7	30.6	26.9	
Y204	37.64	36.50	34.66	37.71	33.09	30.36	28.87	32.80	29.59	39.25	35.02	33.2	34.1	30.0	
Y401	31.41	37.01	39.45	38.32	36.10	33.28	28.11	28.66	30.77	39.14	41.34	38.2	35.2	30.9	
Y402	33.96	30.35	30.25	30.65	29.56	27.27	25.32	22.00	25.91	35.12	34.96	36.5	30.2	26.5	
Y403	44.72	47.22	55.27	49.97	40.09	42.01	35.46	33.32	36.10	35.67	48.65	43.4	42.7	37.5	
Y407	53.34	44.22	42.15	47.94	27.56	34.43	38.98	39.17	38.22	47.51	44.50	47.3	42.1	37.1	
Y501	25.11	23.02	26.66	27.99	27.11	20.35	15.18	17.61	23.12	33.58	32.30	32.2	26.4	22.3	

Site ID	NO ₂ Mean Concentrations (µg/m ³)													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean	
													Raw Data	Bias Adjusted ⁽¹⁾
Y502	47.22	40.89	40.57	40.42	40.55	35.83	36.52	36.41	36.15	45.64	42.23	41.3	40.3	35.5
Y503	20.24	23.91	21.98	20.22	19.19	17.06	12.15	13.65	18.08	28.24	28.25	29.2	21.0	18.5
Y504	21.37	22.91	19.47	16.27	14.75	15.27	13.71	13.23	15.48	43.38	24.39	26.6	20.6	18.1
Y505	13.95	13.42	13.58	10.86	9.11	7.79	6.30	6.32	9.35	21.58	13.65	20.4	12.2	10.7
Y613	46.26	45.67			50.34	48.96	39.34	39.33			50.62	49.8	46.3	40.7
Y701	46.58	45.85	54.59	49.40	48.70	46.96	42.54	39.76	39.26	56.81	48.96	22.3	17.0	14.9
Y702	17.28	16.68	18.82	13.65	14.12	14.11	21.03	11.83	15.20	18.06	20.39	37.2	38.2	33.6
Y703	38.94	36.01	41.66	38.31	40.88	36.49	33.26	35.40	34.97	43.99	40.93	54.6	47.8	42.1

(1) See Appendix C for details on bias adjustment

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

QA/QC of diffusion tube monitoring

The nitrogen dioxide diffusion tubes are prepared with 20% v/v Triethanolamine in Acetone. They are deployed according to the procedures given in Box A1.7 “Instructions for Exposing Nitrogen dioxide Diffusion Tubes” of the Technical Guidance. A travel blank is included in each batch.

The diffusion tube gauges are analysed by a Somerset Scientific Services. This laboratory participates in the AIR NO₂ PT intercomparison scheme. The purpose of scheme is to test each participating laboratory’s analytical performance on a quarterly basis and continues the format used in the preceding WASP PT scheme.

Every quarter, roughly January, April, July and October each year, each laboratory receives four diffusion tubes doped with an amount of nitrite, known to LGC Standards, but not the participants.

At least two of the tubes are usually duplicates, which enables precision, as well as accuracy, to be assessed. The masses of nitrite on the spiked tubes are different each quarter, and reflect the typical analytical range encountered in actual NO₂ ambient monitoring in the UK.

The participants analyse the test samples and report the results via their on-line data management system. LGC Standards assign a performance score to each laboratory’s result, based on how far their results deviate from the assigned values for each test samples.

At the completion of the round, laboratories receive a report detailing how they have performed and how their results relate to those of their peers.

In 2016 Somerset Scientific Services participated in rounds 12, 13, 15 and 16 of the scheme. They received the following results.

Table AC.1 Diffusion Tube Intercomparison Results.

Round 12

Analyte	Analyst	Method	Result	Ux	Units	z score (** z' score)
11A - NO2 as nitrite	Lab Result	Colorimetry	0.99		µg	0.28
11B - NO2 as nitrite	Lab Result	Colorimetry	1.00		µg	0.27
11C - NO2 as nitrite	Lab Result	Colorimetry	1.65		µg	0.59
11D - NO2 as nitrite	Lab Result	Colorimetry	1.67		µg	0.85

Round 13

Analyte	Analyst	Method	Result	Ux	Units	z score (** z' score)
11A - NO2 as nitrite	Lab Result	Colorimetry	1.77		µg	0.39
11B - NO2 as nitrite	Lab Result	Colorimetry	1.23		µg	0.68
11C - NO2 as nitrite	Lab Result	Colorimetry	1.26		µg	0.79
11D - NO2 as nitrite	Lab Result	Colorimetry	1.82		µg	0.67 **

Round 15

Analyte	Analyst	Method	Result	Ux	Units	z score (** z' score)
11A - NO2 as nitrite	Lab Result	Colorimetry	1.77		µg	0.39
11B - NO2 as nitrite	Lab Result	Colorimetry	1.23		µg	0.68
11C - NO2 as nitrite	Lab Result	Colorimetry	1.26		µg	0.79
11D - NO2 as nitrite	Lab Result	Colorimetry	1.82		µg	0.67 **

Round 16

Analyte	Analyst	Method	Result	Ux	Units	z score (** z' score)
11A - NO2 as nitrite	Lab Result	Colorimetry	2.11		µg	0.53
11B - NO2 as nitrite	Lab Result	Colorimetry	2.34		µg	0.35
11C - NO2 as nitrite	Lab Result	Colorimetry	2.22		µg	-0.12
11D - NO2 as nitrite	Lab Result	Colorimetry	2.12		µg	0.43 **

Therefore Somerset Scientific Services have performed satisfactory during the entire period.

Diffusion Tube Bias Adjustment Factors

The national bias adjustment spreadsheet version number: 03/17 V2 has been used to calculate the bias adjustment factor for 2016. The national bias adjustment factor was calculated as 0.88. A copy of the national bias adjustment spreadsheets are included below.

National Diffusion Tube Bias Adjustment Factor Spreadsheet				Spreadsheet Version Number: 03/17 V2						
Follow the steps below in the correct order to show the results of relevant co-location studies Data only apply to tubes exposed monthly and are not suitable for correcting individual short-term monitoring periods Whenever presenting adjusted data, you should state the adjustment factor used and the version of the spreadsheet This spreadsheet will be updated every few months; the factors may therefore be subject to change. This should not discourage their immediate use.								This spreadsheet will be updated at the end of June 2017 LAQM Helpdesk Website		
The LAQM Helpdesk is operated on behalf of Defra and the Devolved Administrations by Bureau Veritas, in conjunction with contract partners AECOM and the National Physical Laboratory.				Spreadsheet maintained by the National Physical Laboratory. Original compiled by Air Quality Consultants Ltd.						
Step 1:	Step 2:	Step 3:	Step 4:							
Select the Laboratory that Analyses Your Tubes from the Drop-Down List	Select a Preparation Method from the Drop-Down List	Select a Year from the Drop-Down List	Where there is only one study for a chosen combination, you should use the adjustment factor shown with caution. Where there is more than one study, use the overall factor shown in blue at the foot of the final column.							
If a laboratory is not chosen, we have no data for this laboratory.	If a preparation method is not chosen, we have no data for this method at this laboratory.	If a year is not chosen, we have no data.	If you have your own co-location study then see footnote ¹ . If uncertain what to do then contact the Local Air Quality Management Helpdesk at LAQMHelpdesk@uk.bureauveritas.com or 0800 0327953							
Analysed By ¹	Method	Year ¹	Site Type	Local Authority	Length of Study (months)	Diffusion Tube Mean Conc. (Dm) ($\mu\text{g}/\text{m}^3$)	Automatic Monitor Mean Conc. (Cm) ($\mu\text{g}/\text{m}^3$)	Bias (B)	Tube Precision ⁴	Bias Adjustment Factor (A) (Cm/Dm)
Somerset County Council	20% TEA in water	2016	R	South Gloucestershire Council	12	28	24	14.8%	G	0.87
Somerset County Council	20% TEA in water	2016	R	Bath & North East Somerset	11	49	48	1.1%	G	0.99
Somerset County Council	20% TEA in water	2016	KS	Marjlebone Road Intercomparison	12	100	79	26.2%	G	0.79
Somerset County Council	20% TEA in water	2016		Overall Factor¹ (3 studies)					Use	0.88

Appendix D: Map(s) of Monitoring Locations



Appendix E: Summary of Air Quality Objectives in England

Table E.1 – Air Quality Objectives in England

Pollutant	Air Quality Objective ⁴	
	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

⁴ The units are in microgrammes of pollutant per cubic metre of air (µg/m³).

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
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

References

Environmental equity, air quality, socioeconomic status and respiratory health, 2010

Air quality and social deprivation in the UK: an environmental inequalities analysis, 2006

Defra. Abatement cost guidance for valuing changes in air quality, May 2013

Somerset Health Protection Strategic Action Plan, March 2015