



WEST OXFORDSHIRE
DISTRICT COUNCIL



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2017 Air Quality Annual Status Report (ASR) for WEST OXFORDSHIRE DISTRICT COUNCIL

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

November 2017

West Oxfordshire District Council

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Executive Summary: Air Quality in Our Area

The monitoring reported within this 2017 Annual Status Report for West Oxfordshire District Council took place during 2016. It does not indicate any additional areas of general concern with regard to air quality, but our two designated air quality management areas (AQMA) continue to experience nitrogen dioxide levels that exceed the national objective of $40 \mu\text{g m}^{-3}$, which was set to protect health.

There were no proposed industrial developments within the District during 2016 with air pollution implications. All residential development proposals were considered with regard to their potential to increase traffic pollution in the AQMA and other areas.

Chipping Norton AQMA

Nitrogen dioxide (NO_2) levels in the Chipping Norton AQMA remain higher than the national objective level set to protect health, which is a concern. It is anticipated that the levels will reduce to a satisfactory level in the future as the national fleet is replaced with “cleaner, greener” vehicles, but the timeframe for this anticipated improvement is not known. For the last 8 years, annual average levels have remained around $40 \mu\text{g m}^{-3}$ (+/- a few $\mu\text{g m}^{-3}$) at the site of the 3 co-located diffusion tubes in the High Street. The Horsefair diffusion tube, that always measures the highest levels (about $20 \mu\text{g m}^{-3}$ higher than the co-located tubes), is possibly unrepresentative of general air quality in the town due to its location very close to the road, but we continue to monitor there for continuity.

The Chipping Norton Air Quality Action Plan proposed the introduction of a weight limit and re-routing of HGV traffic. Oxfordshire County Council (OCC) commissioned a feasibility study, but financial constraints within OCC budgets have caused delays. The intent remains, re-stated, within the OCC LTP4 (2011 – 2030) (Vol 1, Page 77, Para 195). An implementation schedule is still awaited. (Reference A). The [WODC Low Carbon and Environmental Plan](#), 2013, (Reference B)), addresses some of the additional air quality mitigation measures within the Air Quality Action Plan, reinforcing the WODC commitment to improving air quality.

Witney AQMA

Nitrogen dioxide (NO_2) levels in the Witney AQMA remain higher than the national objective level set to protect health, which is a concern. As the vehicles using the area are updated some improvement can be anticipated, but it is not known whether the pollution will reduce to a satisfactory level through this mechanism alone and the timeframe of any anticipated improvement is not known. For the last 8 years, annual average NO_2 in Bridge Street has remained around $50 \mu\text{g m}^{-3}$ (+/- a few $\mu\text{g m}^{-3}$). The Draft Action Plan for the Witney AQMA assumed that the Cogges Link Road would proceed, as per the planning consent, but the Department for Transport refused a compulsory purchase order for the land needed. Oxfordshire County Council (OCC) now need to reconsider alternative options which might address traffic flow within and around Witney. OCC LTP4, (Vol 2, Sect ii, Pages 77 - 85) details the proposals (Reference C).

Air Quality in West Oxfordshire

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.

The main air quality issues in the West Oxfordshire District area are related to vehicular density within relatively congested urban areas, thus nitrogen dioxide is the main pollutant of concern. The 2016 monitoring survey shows nitrogen dioxide levels slightly increased compared to 2015 results, which means they are very similar to those reported in 2014. The variation between these years is thought likely to be attributable to slight meteorological differences between the years.

Current AQMAs are located within the two largest towns within the District – Witney (Bridge Street and area) and Chipping Norton (Horsefair and area):

Bridge Street, Witney (Air Quality action plan pending)
<http://www.westoxon.gov.uk/media/744184/Chipping-Norton-Air-Quality-Action-Plan.pdf>

There are no major new pollution sources in West Oxfordshire.

There is active liaison between West Oxfordshire District Council, 3 neighbouring Districts and Oxford City and this grouping has produced a useful additional resource: <https://oxfordshire.air-quality.info/>

County Council participation has been limited by financial constraints since their initial involvement in the Action Plan for Chipping Norton and this has been reflected in subsequent Local Transport Plans (LTP).

Our centralised national AQMA page is [located here](#):

https://uk-air.defra.gov.uk/aqma/local-authorities?la_id=309

Actions to Improve Air Quality

Activity within West Oxfordshire has been limited to monitoring and data collection. Cooperation between adjacent Local Authority officers gave rise to a local Air Quality

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

information resource which was the eventual outcome of a Defra grant funded project initiated by South Oxfordshire District Council. This continues to provide useful information for the residents of Oxfordshire.

The City of Oxford is working upon improving air quality in their area through the introduction of a low emission zone (LEZ) to encourage the uptake of cleaner, greener vehicles. The results of their work has the potential to reduce emissions in the outskirts and beyond if there is take up of cleaner vehicles by residents and businesses that also use them outside of Oxford. However as public service operators upgrade their fleet, they sell their older vehicles to other operators who may use them in parts of Oxfordshire outside the LEZ, so any improvements outside the city centre may be realized relatively slowly.

Conclusions and Priorities

Nitrogen dioxide levels in Bridge Street, Witney continue to exceed the national air quality objective. The annual average results of $51.5 \mu\text{g m}^{-3}$ and $55.7 \mu\text{g m}^{-3}$ are higher than last year when the levels were $42.6 \mu\text{g m}^{-3}$ and $51.9 \mu\text{g m}^{-3}$ respectively.

The two highest recording tubes in Horsefair, Chipping Norton remain high at $53.1 \mu\text{g m}^{-3}$ and $40 \mu\text{g m}^{-3}$ (compared to last year's $53.6 \mu\text{g m}^{-3}$ and $36.5 \mu\text{g m}^{-3}$) but the levels recorded by the other tubes in Chipping Norton are typical of busy roadsides around the whole of the UK.

The majority of the results were a few $\mu\text{g m}^{-3}$ higher than those of 2015, which probably reflects the influence of poor meteorological conditions during the course of the year which hamper dispersion and dilution of traffic exhaust emissions.

Challenges in addressing our two air quality management areas are anticipated due to the general desire to increase the residential availability around both Witney and Chipping Norton, which will create an additional traffic burden in the areas and it is important that the Oxfordshire County Council Transport Department are kept informed of proposed developments and that developers are aware of the need for appropriate mitigation in respect of associated pollution.

Due to the cost of building an alternative route and no agreement regarding compulsory purchase of the necessary land, there is unfortunately no short term solution envisaged to the problem of traffic congestion and associated vehicle emissions in Bridge Street Witney at this time. Mitigation, provided through the Land Planning and Development process, associated with proposed local developments may provide funding that can be put towards an alternative route. We will continue to work with the County Council Highways Department to explore road traffic development options as well as traffic management options.

How to Get Involved

As the air pollution of concern in the district is related to traffic emissions, we can all do our bit to reduce emissions, by not using a car unless entirely necessary. Walking or cycling, or taking public transport or car sharing rather than driving an otherwise empty car, reduces our individual carbon footprint.

The solution to congestion related pollution lies to a large extent in road traffic management and District authorities do not have the remit to manage this. Local interest groups can however lobby County Councils directly to influence the content of Local Transport Plans (LTP).

Any queries about Air Quality should be directed to the Environmental Protection team within West Oxfordshire District Council. This team can be contacted by e mail on: ers@2020partnership.uk

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1 Local Air Quality Management

This report provides an overview of air quality in West Oxfordshire District Council 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 West Oxfordshire District Council to improve air quality and any progress that has been made.

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

2 Actions to Improve Air Quality

2.1 Air Quality Management Areas

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

A summary of AQMAs declared by West Oxfordshire District Council can be found in Table 2.1. Further information related to declared AQMAs, including maps of AQMA boundaries are available online at https://uk-air.defra.gov.uk/aqma/local-authorities?la_id=309

For reference, maps of West Oxfordshire District Council's diffusion tube monitoring locations are available in Appendix D.

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Table 2.1 – Declared Air Quality Management Areas

AQMA Name	Date of Declaration	Pollutants and Air Quality Objectives	City / Town	One Line Description	Is air quality in the AQMA influenced by roads controlled by Highways England?	Level of Exceedance (maximum monitored/modelled concentration at a location of relevant exposure)		Action Plan (inc. date of publication)
						At Declaration	Now	
WITNEY Bridge Street / High Street	Declared 01/03/2005	NO ₂	Witney	An area incorporating Bridge Street, Witney and the junctions with New Yatt Road, Newland, Mill Street and High Street encompassing a number of residential and commercial properties	YES	2003 48 µgm ⁻³ 2004 38 µgm ⁻³	55.7 µgm ⁻³	Air Quality Action Plan pending http://agma.defra.gov.uk/action-plans/WODC%20AQAP%202010.pdf (Draft action plan published 2010)
CHIPPING NORTON Horsefair / High Street	Declared 01/03/2005	NO ₂	Chipping Norton	An area incorporating Horse Fair, High Street, Market Place A44 and part of West Street in Chipping Norton,	YES	2003 50 µgm ⁻³ 2004 49 µgm ⁻³	53.8 µgm ⁻³	http://www.westoxon.gov.uk/media/744184/Chipping-Norton-Air-Quality-Action-Plan.pdf (published 2008)

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				Oxfordshire encompassing a number of residential and commercial properties				
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2.2 Progress and Impact of Measures to address Air Quality in West Oxfordshire District Council

Details of measures in pursuit of improving local air quality are set out in Table 2.2. The principal challenges and barriers to implementation that West Oxfordshire District Council anticipates facing are financial constraints within Oxfordshire County Council that are hampering progress with re-consideration of traffic management options and the development of implementation plans, as well as the anticipated increase in the amount of traffic in the AQMAs in the future, due to proposed residential developments, which could potentially cause an increase in the pollution levels.

West Oxfordshire District Council anticipates that the action plan measures, combined with the improvement of the national fleet as it is replaced by newer low emissions vehicles, will achieve compliance with the national objective for nitrogen dioxide in Chipping Norton, Horsefair, but the timeframe for this is unknown.

Whilst the improvement of the national fleet as it is replaced by newer low emissions vehicles will help to contribute towards compliance in the Witney AQMA, West Oxfordshire District Council anticipates that further additional measures not yet prescribed will be required in subsequent years to achieve compliance and enable the revocation of this AQMA.

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Table 2.2 – Progress on Measures to Improve Air Quality

Measure No.	Measure	EU Category	EU Classification	Organisations involved and Funding Source	Planning Phase	Implementation Phase	Key Performance Indicator	Reduction in Pollutant / Emission from Measure	Progress to Date	Estimated / Actual Completion Date	Comments / Barriers to implementation
1	Witney AQMA Action Plan	Freight and Delivery Management	Route Management Plans/ Strategic routing strategy for HGV's	OCC	LTP4	Awaited	Reduced NO ₂ levels recorded	Reduced traffic density	Awaited	Not known	See Reference C
2	Local AQ assoc	Policy Guidance and Development Control	Regional Groups Co-ordinating programmes to develop area wide strategies to reduce emissions and improve air quality	OAQ	N/A	N/A	Air quality data information Public awareness Increasing awareness within health monitoring policy	In service	Complete	View at: https://oxfordshire.air-quality.info/	Local AQ assoc
3	Chipping Norton AQMA Action Plan	Traffic Management	Congestion management, traffic reduction	OCC	Basic survey completed	Unknown – financial prioritisation	Reduced NO ₂ levels recorded	Reduced traffic density	Static	Unknown	See Reference A

2.3 PM_{2.5} – Local Authority Approach to Reducing Emissions and/or Concentrations

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

Other than the potential source from vehicles, no other significant source of PM_{2.5} has been identified within the District. Therefore the control at this stage is aligned with the measures designed to achieve a reduction in vehicular emissions.

Partnership working by the Oxfordshire Air Quality group has included liaison with Oxfordshire County transport and health committees to raise the profile of Air Quality.

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

3.1 Summary of Monitoring Undertaken

This section sets out what monitoring has taken place and how it compares with objectives. West Oxfordshire District Council decommissioned its two automatic (continuous) monitoring sites during 2016 as a result of ongoing technical problems making the results unreliable and the monitoring unfeasible.

3.1.1 Non-Automatic Monitoring Sites

No new areas have been identified that required monitoring; West Oxfordshire District Council has therefore retained its existing diffusion tube survey sites across the district. The sites all relate to traffic emissions. There have been no new roads or major changes that have affected traffic flows. .

West Oxfordshire District Council undertook non- automatic (passive) monitoring of nitrogen dioxide (NO₂) using 39 diffusion tubes during 2016. Each roadside monitoring site had a related background diffusion tube monitor. The survey focused upon locations where there is “relevant public exposure”, in accordance with Defra LAQM Technical Guidance Note TG(09) (Reference E).

(The “car park” tube at Air Balloon, Birdlip, was decommissioned as it was not representative of “relevant exposure”.)

Table A1 in Appendix A provides technical details of the diffusion tube monitoring sites.

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

Further details on Quality Assurance/Quality Control (QA/QC) for the diffusion tubes, including bias adjustments and “annualisation” are included in Appendix C.

3.2 Individual Pollutants

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

3.2.1 Nitrogen Dioxide (NO₂)

Table A2 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.

Figure A1 in Appendix A contains a graph showing the trends in annual mean NO₂ nitrogen dioxide levels have shown a gradual downward trend over the 8 years displayed. The graph shows that the levels recorded this year were similar to last year's levels with some increases. The increases are possibly due to an increased number of days in the year where our sites experienced temperature inversions and foggy conditions which hinder air movement, causing vehicle exhaust emissions to accumulate instead of being dispersed and diluted to safe levels.

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

Levels within our AQMAs were found to exceed the annual mean NO₂ objective of 40 µgm⁻³ at Horsefair, Chipping Norton (53.8 µgm⁻³), 25 Bridge Street, Witney (55.7 µgm⁻³), and Bridge Street, Witney (51.5 µgm⁻³).

One of the 3 co-located tubes in High Street, Chipping Norton gave a reading of 40.5 µgm⁻³, but as the other two tubes' readings at this site were lower (38.2 µgm⁻³ and 33.9 µgm⁻³) the overall average at this site (37.5 µgm⁻³) did not exceed the national objective, although it approached it.

The annual average level at High Street (North) Burford, also approached the annual mean NO₂ objective (36 µgm⁻³), but did not exceed it.

No other sites had levels approaching the national objective and the results show that, in the main, West Oxfordshire District Council enjoys very good air quality.

Staffing disruption during the transition from District Council to 2020 Partnership caused problems with the survey, and data capture was not as good as usual in 2016. Of the exposed tubes collected, 9 had split caps, 1 was found on the ground and 1 gave rise to an unreliable result that was outside of 3 standard deviations from the norm. Results from each of these were rejected to maintain quality control. (The specific results are clearly marked with asterix* on the results table in Appendix B)

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Appendix A: Monitoring Results

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)
1	Bridge St, Witney	R	435816	210239	NO ₂	YES	0.5	2	NO	2.5 – 3.0.
2	Mill Street, Witney	R	435671	210198	NO ₂	YES	0.5	1	NO	2.5 – 3.0.
3	Early Rd., Witney	B	436339	210806	NO ₂			2	NO	2.5 – 3.0.
4	25 Bridge St Witney	R	435853	210302	NO ₂	YES	0	1	NO	2.5 – 3.0.
5	High St, (N) Burford	R	425187	212431	NO ₂		0.5	2	NO	
6	93 High Street, (S) Burford	R	425156	212197	NO ₂		2	0.5	NO	2.5 – 3.0.
7	Frethern Cl, Burford	B	425406	211678	NO ₂			1	NO	2.5 – 3.0.
8	Orchard Rise, Burford	B	425447	211949	NO ₂			1	NO	
9	Brize Norton Rd, Carterton	R	428329	206946	NO ₂		15	1	NO	2.5 – 3.0.
10	Upavon Way, Carterton	R	428467	207442	NO ₂		N/A	2	NO	2.5 – 3.0.
11	Garner Close, Carterton	B	427415	208234	NO ₂			1	NO	2.5 – 3.0.
12	Oakfield Road, Carterton	B	427687	206254	NO ₂			1	NO	2.5 – 3.0.
13	Dyers Hill, Charlbury	R	435585	219620	NO ₂		1	1	NO	2.5 – 3.0.
14	Nineacres Lane, Charlbury	R	435654	219763	NO ₂		10	1	NO	2.5 – 3.0.

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15	Tanners Close, Charlbury	B	435945	219324	NO ₂			1	NO	2.5 – 3.0.
16	The Green, Charlbury	B	436138	219973	NO ₂			1	NO	2.5 – 3.0.
17	Horsefair, Chipping Norton	R	431425	227275	NO ₂	YES	0.5	0.5	NO	2.5 – 3.0.
33	17, Horsefair Chipping Norton	R	431450	227315	NO ₂	YES	2	0.5	NO	2.5 – 3.0.
36 37 38	Co-location, Chipping Norton (Triplicate Mean)	R	431404	227206	NO ₂	YES	2	0.5	NO	(2.0)
34	5 Horsefair, Chipping Norton	R	431439	227268	NO ₂	YES	0	5	NO	2.5 – 3.0.
35	7 Horsefair, Chipping Norton	R	431443	227282	NO ₂	YES	0	4	NO	2.5 – 3.0.
18	West Street, Chipping Norton	R	431300	226959	NO ₂	YES	0.5	2	NO	2.5 – 3.0.
19	Coopers Close, Chipping Norton	B	431694	227156	NO ₂			1	NO	2.5 – 3.0.
20	Withers Way Chipping Norton	B	431207	226877	NO ₂			1	NO	2.5 – 3.0.
21	Acre End Street, Eynsham	R	442950	209301	NO ₂		2	1	NO	2.5 – 3.0.
22	Mill Street, Eynsham	R	443309	209573	NO ₂		2	1	NO	2.5 – 3.0.
23	Orchard Close, Eynsham	B	443632	209356	NO ₂			0.5	NO	2.5 – 3.0.
24	Shakespeare Rd, Eynsham	B	442856	209781	NO ₂			1	NO	2.5 – 3.0.
25	Oxford Street, (E) Woodstock	R	444592	216763	NO ₂		2	1	NO	2.5 – 3.0.
26	Oxford Street, (W) Woodstock	R	444536	216846	NO ₂		8	0.5	NO	2.5 – 3.0.
27	The Ley, Woodstock	B	445131	216615	NO ₂			1	NO	2.5 – 3.0.
28	Westland Way, Woodstock	B	444212	217270	NO ₂			1	NO	2.5 – 3.0.
29	Grove Road, (S) Bladon	R	444871	214983	NO ₂		8	1	NO	2.5 – 3.0.

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30	Grove Road, (N) Bladon	R	445190	215353	NO ₂		11	1	NO	2.5 – 3.0.
31	Heath Lane, Bladon	B	445227	214402	NO ₂			1	NO	2.5 – 3.0.
32	Park Close, Bladon	B	444851	215094	NO ₂			1	NO	2.5 – 3.0.
39	Park Street, Bladon	R	444791	214681	NO ₂		0.5	1	NO	2.5 – 3.0.

Notes:

- (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.

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Table A.2 – Annual Mean NO₂ Diffusion Tube Monitoring Results

Site ID	Site location	Site Type	No of valid results (total number) for 2016 ⁽¹⁾	Valid Data Capture 2016 (%) ⁽²⁾	NO ₂ Annual Mean Concentration (µg/m ³) ⁽³⁾				
					2012	2013	2014	2015	2016
DT1	Bridge Street	R	8 (9)	66.7	49.3	51.3	47.2	43.7	51.5
2	Mill Street	R	9	75	41.5	37.9	37.3	36.3	33.8
3	Early Rd.	B	3	25	14.0	14.4	12.6	12.1	15.3
4	25 Bridge Street	R	8 (9)	66.7				53.2	55.7
5	High St	R	7 (9)	58.3	33.6	34.1	33.0	34.1	36
6	93 High Street	R	9	75	30.9	36.5	35.0	30.6	29.0
7	Frethern Cl	B	9	75	12.6	10.9	11.1	9.8	10.7
8	Orchard Rise	B	9	75	10.3	10.3	9.3	9.3	9.6
9	Brize Norton Rd	R	9	75	21.8a	26.1	26.0	21.0	22.8
10	Upavon Way	R	9	75	20.0	19.9	17.5	16.9	19.2
11	Garner Close	B	7 (9)	58.3	11.5	12.1	10.1	9.8	10.4
12	Oakfield Road	B	9	75	13.2	14.1	11.9	10.9	10.7
13	Dyers Hill	R	11	91.7	17.9	17.0	15.4	15.2	16.4
14	Nineacres Lane	R	11	91.7	15.7	15.5	14.3	14.4	16.1
15	Tanners Close	B	10	83.3	10.2	10.3	8.9	8.9	10.0
16	The Green	B	11	91.7	10.6	11.1	9.4	9.6	10.0
17	Horsefair	R	11	91.7	61.6	56.1	57.7	54.9	53.8
33	17 Horsefair	R	11	91.7	31.9	31.4	30.5	29.1	28.7
36	CN Co location	R	5	41.7					40.5
37	CN Co location	R	5	41.7					38.2
38	CN Co location	R	5	41.7					33.9

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Site ID	Site Location	Site Type	No of valid results (total number) for 2016 ⁽¹⁾	Valid Data Capture 2016 (%) ⁽²⁾	NO ₂ Annual Mean Concentration (µg/m ³) ⁽³⁾				
					2012	2013	2014	2015	2016
36,37,38	TRIPLE.MEAN			41.7	38.4	39.6	39.1	35.5	37.5
34	5 Horsefair	R	10 (11)	83.3	24.2	23.3	23.7	21.7	24.1
35	7 Horsefair	R	11	91.7	24.7	24.8	24.0	22.5	23.8
18	West Street	R	11	91.7	29.6	27.3	27.0	25.9	28.8
19	Coopers Close	B	11	91.7	11.5	12.6	10.4	9.9	11.5
20	Withers Way	B	10 (11)	83.3	11.5	12.1	10.2	9.1	11.0
21	Acre End Street	R	7 (9)	58.3	16.2	16.6	13.3	13.5	15.2
22	Mill Street	R	11	91.7	15.3	15.9	14.3	13.1	15.7
23	Orchard Close	B	11	91.7	12.3	12.4	10.2	10.4	11.9
24	Shakespeare Rd	B	11	91.7	14.0	14.9	12.6	11.9	13.6
25	Oxford Street	R	11	91.7	32.5	33.9	30.2	27.5	32.1
26	Oxford Street(2)	R	10	83.3	33.9	33.6	29.6	26.0	23.1
27	The Ley	B	11	91.7	11.5	12.5	10.1	10.5	11.8
28	Westland Way	B	11	91.7	12.2	12.6	11.2	10.9	11.9
29	Grove Road	R	11	91.7	20.8	21.3	20.7	20.3	24.0
30	Grove Road(2)	R	10	83.3	26.1	25.8	21.9	24.6	25.0
31	Heath Lane	B	10 (11)	83.3	12.6	12.0	10.4	10.1	12.5
32	Park Close	B	11	91.7	10.8	10.9	9.8	8.9	11.5
39	Park Street	R	11	91.7	33.5	31.1	31.8	31.1	32.0

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**.

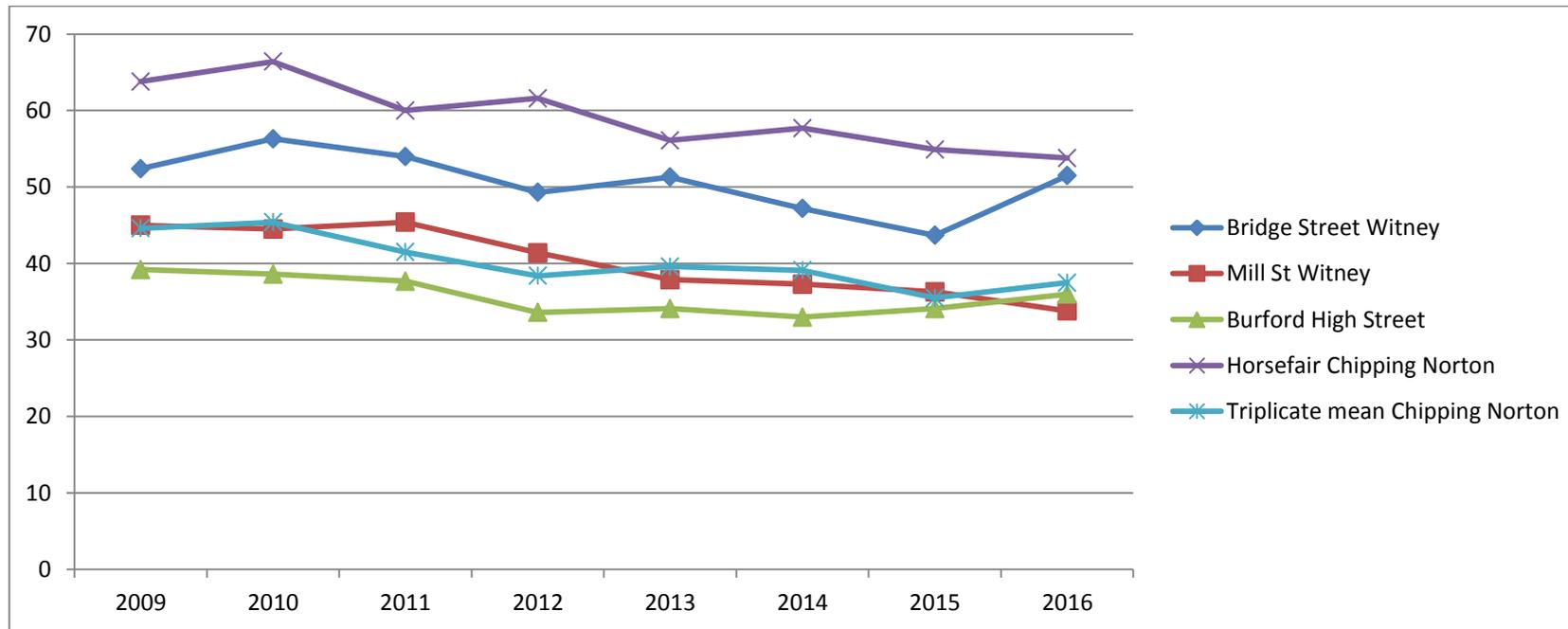
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- (1) Number of validated results for use in the survey (total number of results for the year).
- (2) Data capture for the full calendar year (e.g. if monitoring was carried out for 6 months, the maximum data capture for the full calendar year is 50%).
- (3) Means for diffusion tubes have been corrected for bias. All means have been “annualised” as per Boxes 7.9 and 7.10 in LAQM.TG16 if valid data capture for the full calendar year is less than 75%. See Appendix C for details.

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Figure A.2 – Trends in Annual Mean NO₂ Concentrations

Graph showing the trends over 8 years at long term diffusion tube monitoring sites



The data points in Figure 2.4 are the annualised and bias adjusted average levels of NO₂ at the sites which have high levels, expressed in µg/m³.

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)														
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean		
													Raw Data	Bias Adjusted (0.79) and Annualised ⁽¹⁾	Distance Corrected to Nearest Exposure ⁽²⁾
1 Bridge Street	63.8	61.8	64		(243.3) R*	55.5	40.4	43.7	55.2	65.4	Not exposed	Not exposed	77.0	51.5	
2 Mill Street	53.6	44.1	40.3		55.7	35.9	40.7	32.2	48	34.4	Not exposed	Not exposed	42.8	33.8	
3 Early Rd.	24.7	23	16.3								Not exposed	Not exposed	21.3	15.3	
4 25 Bridge Street	73.1	62.1	71.1*		88.1	62.5	63.6	59.6	61	58.7	Not exposed	Not exposed	66.1	55.7	
5 High St (N)	44.8	44.5	40.6		68.6*	39.2	41.8*	39	43.7	41.5	Not exposed	Not exposed	41.9	36	
6 93 High Street (S)	32	37.4	42.5		57.8	36.7	24	33	37.8	29.5	Not exposed	Not exposed	36.7	29.0	
7 Frethern Cl	16.7	16.9	13.5		26.5	7	8.4	9.5	11.8	11.7	Not exposed	Not exposed	13.6	10.7	
8 Orchard Rise	13.1	11.3	13.2		26.8	6.6	7.3	8.5	10.6	11.8	Not exposed	Not exposed	12.1	9.6	
9 Brize Norton Rd	33.2	32	29.7		45.5	25	19.8	21.7	25.6	26.7	Not exposed	Not exposed	28.8	22.8	
10 Upavon Way	32.8	28.2	25.2		36.5	15.4	16.8	18.1	24.1	21.8	Not exposed	Not exposed	24.3	19.2	

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11 Garner Close	17.9	15.8	16.4		47.3*	2.2*	7.5	9.6	10.8	14.4	Not exposed	Not exposed	13.2	10.4	
12 Oakfield Road	16.7	18.1	14.7		15.6	11.9	7.6	10.2	12	15.6	Not exposed	Not exposed	13.6	10.7	
13 Dyers Hill	20.1	21.8	16.9		22.3	15.9	16.5	17.1	19.3	19.4	26.7	31.8	20.7	16.4	
14 Nineacres Lane	21.8	22.9	19.8		20.8	14.2	13	13.7	18.1	18.2	27.6	33.9	20.4	16.1	
15 Tanners Close	14.2	15.6	8.8		12.6	7	7.9	10.3		11.5	16	22.7	12.7	10.0	
16 The Green	14.4	15.6	13.8		12.8	7.1	10.5	10.3	10.7	12	14.7	16.7	12.6	10.0	
17 Horsefair	69.4	67.2	64.4		56.5	60.1	65.9	64.4	70.4	50.6	90.2	89.4	68.0	53.8	
33 17 Horsefair	39*g	39.8	39.3		42.1	29.4	24	30	35.2	35.7	40.7	47	36.3	28.7	
36 CN Co location	43	51.5	56.6		56.1	44.1							50.3	40.5	
37 CN Co location	40.7	40.4	57.8		52.2	45.6							47.3	38.2	
38 CN Co location	32.7	42.2	50.7		48.6	35.9							42.0	33.9	
TRIPLICATE.MEAN														37.5	
34 5 Horsefair	29.2	27.3	35.6		31.3	23.6	5.7*	22.6	27.3	30.1	35.7	42.2	30.5	24.1	
35 7 Horsefair	28.2	26.8	37.1		33.9	23.4	19.1	24.2	26.6	31	35.7	45.2	30.1	23.8	
18 West Street	30.9	37.7	35.6		40.8	33.2	29.3	29.6	37.8	33.7	41.5	51.1	36.5	28.8	
19 Coopers Close	17.7	17.2	15		14.3	8	9.5	10	13.4	11.9	20.8	21.7	14.5	11.5	
20 Withers Way	16.5	15.5	18*		13.6	8.7	6.7	8	12.5	13.7	16.8	27.6	14.0	11.0	
21 Acre End Street	22.2g		21.8		19.8	11.8	10.5*		16.2	18.6	24.1	31.7	20.6	15.2	
22 Mill Street	20.8	23	21.8		15.7	13.5	9.6	12.1	17.5	19.6	29.2	36.4	19.9	15.7	
23 Orchard Close	17.5	19.4	12.2		13.1	8.4	7.2	10	13.7	15.4	19.9	28.6	15.0	11.9	
24 Shakespeare Rd	19.5	19.4	18.2		16	11.4	7.8	11.5	13.9	18.2	21.1	32.6	17.2	13.6	
25 Oxford Street	27.9	39.8	42.9		39.2	34	34.2	40.7	43.4	34.9	51.9	57.6	40.6	32.1	
26 Oxford Street(2)	35.9	36.5	14.9			37	19.7	28.1	33.7	38.4	39.3	9.4	29.3	23.1	
27 The Ley	18.5	18	14		12.6	7.8	7.7	10.2	14.2	11.1	20.9	29.3	14.9	11.8	
28 Westland Way	19.4	18.2	17.5		13.8	7.6	6.6	9.9	12.7	13.4	20.4	25.8	15.0	11.9	

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29 Grove Road	28.2	31.3	27.2		25.7	21.7	27.1	28.4	28.8	25.2	41.8	49	30.4	24.0	11
30 Grove Road(2)	40.3	41.5	36.2		34		18.9	17.9	24.1	30.4	32.1	40.9	31.6	25.0	10
31 Heath Lane	16.4	18.4	16.5		12.6	8.5	6.3*	10.2	12.4	12.7	21.5	28.6	15.8	12.5	10 (11)
32 Park Close	17	16.8	15.6		15	7.8	6.8	10.5	13.4	13	17.8	26.6	14.6	11.5	11
39 Park Street	43.9	48.6	39.1		38.6	34.6	33.3	33.7	38.4	39.1	46.1	50.8	40.6	32.0	11

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) See Appendix C for details on bias adjustment and annualisation.

(2) Distance corrected to nearest relevant public exposure.

* Rejected from result set as black cap was reported as split, giving rise to quality concerns

*g Rejected from data set as tube was found on the ground, giving rise to quality concerns

R* Rejected from Bridge Street data set as a faulty outlier, being outside of 3 standard deviations from the mean

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

Annualisation

For a few of the diffusion tube monitoring sites, less than 9 months data was collected. In one case (Witney Bridge Street) the rejection of a result for quality control reasons meant that there was less than 9 months of useable data.

In these cases the results can be used for comparison with the annual average national objective of $40 \mu\text{g m}^{-3}$ provided they are “annualised”. As we had good background data from diffusion tube monitoring carried out at locations relatively close to the sites where we had insufficient data, the results from these sites was used for annualisation purposes. Annualisation was carried out in accordance with guidance provided in Defra LAQM TG 16. (Reference F)

Site requiring annualisation	Months of data available	B/g site data used for annualisation	Calculated annualisation factor (AF)
Witney Early Road (b/g)	Jan, Feb, Mar	Eynsham: Orchard Close Shakespeare Road Burford Frethern Close Orchard Rise	For Eynsham b/g sites 0.91 For Burford b/g sites 0.92 Average AF 0.915
Witney Bridge Street (R)	Jan, Feb, Mar, Jun, Jul, Aug, Sep, Oct	Eynsham: Orchard Close Shakespeare Road Burford Frethern Close Orchard Rise	For Eynsham b/g sites 1.15 For Burford b/g sites 1.16 Average AF 1.16

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Witney 25 Bridge Street (R)	Jan, Feb, May, Jun, Jul, Aug, Sep, Oct	Eynsham: Orchard Close Shakespeare Road Burford Frethern Close Orchard Rise	For Eynsham b/g sites 1.16 For Burford b/g sites 1.0 Average AF 1.08
Burford High Street (R)	Jan, Feb, Mar, Jun, Aug, Sep, Oct	Burford Frethern Close Orchard Rise	For Burford b/g sites 1.1 Average AF 1.1
Carterton Garner Close (b/g)	Jan, Feb, Mar, Jul, Aug, Sep, Oct	Carterton Oakfield Road	For Carterton b/g site Average AF 1.0
Eynsham Acre End	Mar, May, Jun, Sep, Oct, Nov, Dec	Eynsham: Orchard Close Shakespeare Road	For Eynsham b/g sites 0.93 Average AF 0.93
Chipping Norton 3 co-located tubes (R)	Jan, Feb, Mar, Jul, Aug, Sep, Oct	Chipping Norton Coopers Close Withers Way	For Chipping Norton b/g sites 1.02 Average AF 1.02

The calculated annualisation factor was applied to the relevant site average result prior to applying the bias adjustment factor.

Diffusion Tube Bias Adjustment Factors

The diffusion tubes (50% TEA in acetone) were supplied and analysed by ESG Didcot laboratories. The tubes at all locations have a monthly exposure period.

National bias adjustment factors have been used from Defra database, available at: <http://laqm.defra.gov.uk/bias-adjustment-factors/national-bias.html>

(see below) The factor used is 0.79 based on 29 studies and this was applied to all diffusion tubes.

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Copy of Database_Diffusion_Tube_Bias_Factors.xls - Microsoft Excel

National Diffusion Tube Bias Adjustment Factor Spreadsheet Spreadsheet Version Number: 09/16

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. [View the spreadsheet history](#)

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

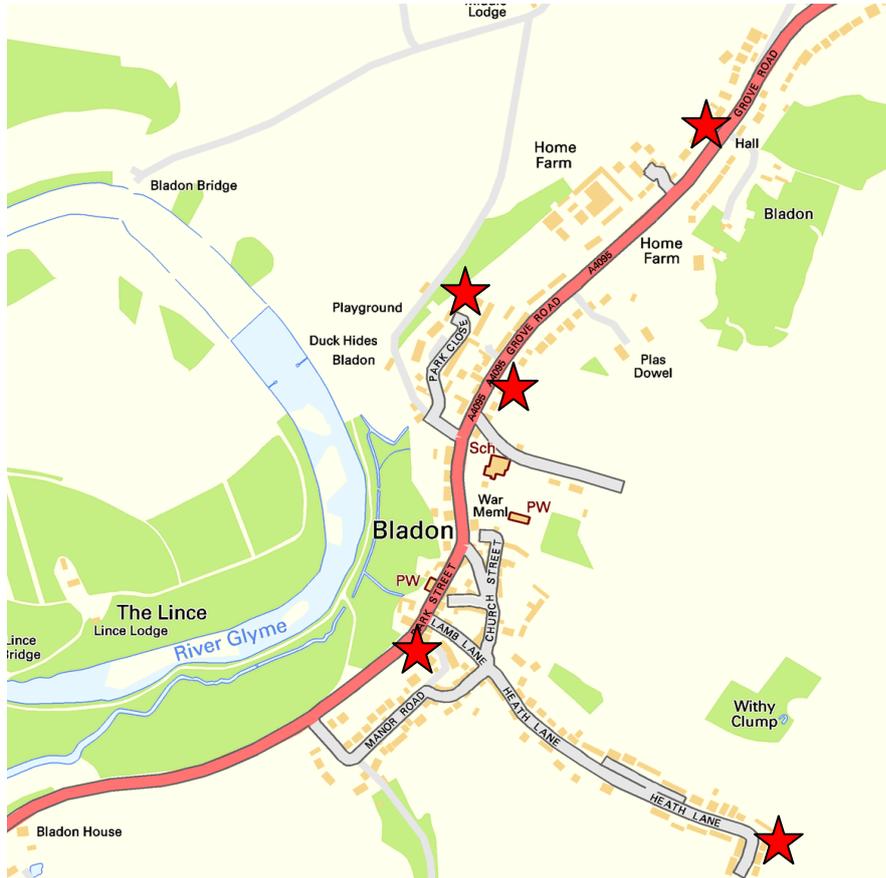
Step 1: Select the Laboratory that Analyses Your Tubes from the Drop-Down List
Step 2: Designation Method from the Drop-Down List
Step 3: Year from the Drop-Down List
Step 4: Where there is only one study for a chosen combination, you should use the adjustment factor shown with caution. Where there is more than one study, use the overall factor shown in blue at the foot of the final column.
 If you have your own co-location study then see footnote. If uncertain what to do then contact the Local Air Quality Management Helpdesk at LAQM-Helpdesk@uk.bureauveritas.com or 0800 0327953

Analysed By	Method	Year	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 ⁿ	Bias Adjustment Factor (A) (Cm/Dm)	
2012	ESS Diddot	50% TEA in acetone	2015	R	North East Lincolnshire Council	11	39	28	38.6%	G	0.72
2015	ESS Diddot	50% TEA in acetone	2015	R	North East Lincolnshire Council	11	55	47	16.2%	G	0.86
2015	ESS Diddot	50% TEA in acetone	2015	R	Hambleton District Council	10	22	19	17.6%	G	0.85
2023	ESS Diddot	50% TEA in acetone	2015	UB	City of York Council	11	24	16	59.6%	G	0.66
2024	ESS Diddot	50% TEA in acetone	2015	R	City of York Council	11	36	27	31.9%	G	0.76
2025	ESS Diddot	50% TEA in acetone	2015	R	City of York Council	11	34	25	34.6%	G	0.74
2026	ESS Diddot	50% TEA in acetone	2015	R	City of York Council	12	35	28	41.9%	G	0.71
2040	ESS Diddot	50% TEA in acetone	2015	R	Rugby Borough Council	12	23	21	10.6%	G	0.90
2047	ESS Diddot	50% TEA in acetone	2015	R	Cambridge City Council	12	45	36	25.2%	G	0.80
2056	ESS Diddot	50% TEA in acetone	2015	R	Derry City and Strabane District Council	12	38	29	31.7%	P	0.78
2057	ESS Diddot	50% TEA in acetone	2015	R	Walsford Borough Council	12	40	35	14.0%	S	0.88
2306	ESS Diddot	50% TEA in acetone	2015		Overall Factor* (29 studies)						Use 0.79

Collocation Data Revisions
 Ready 30 of 2311 records found

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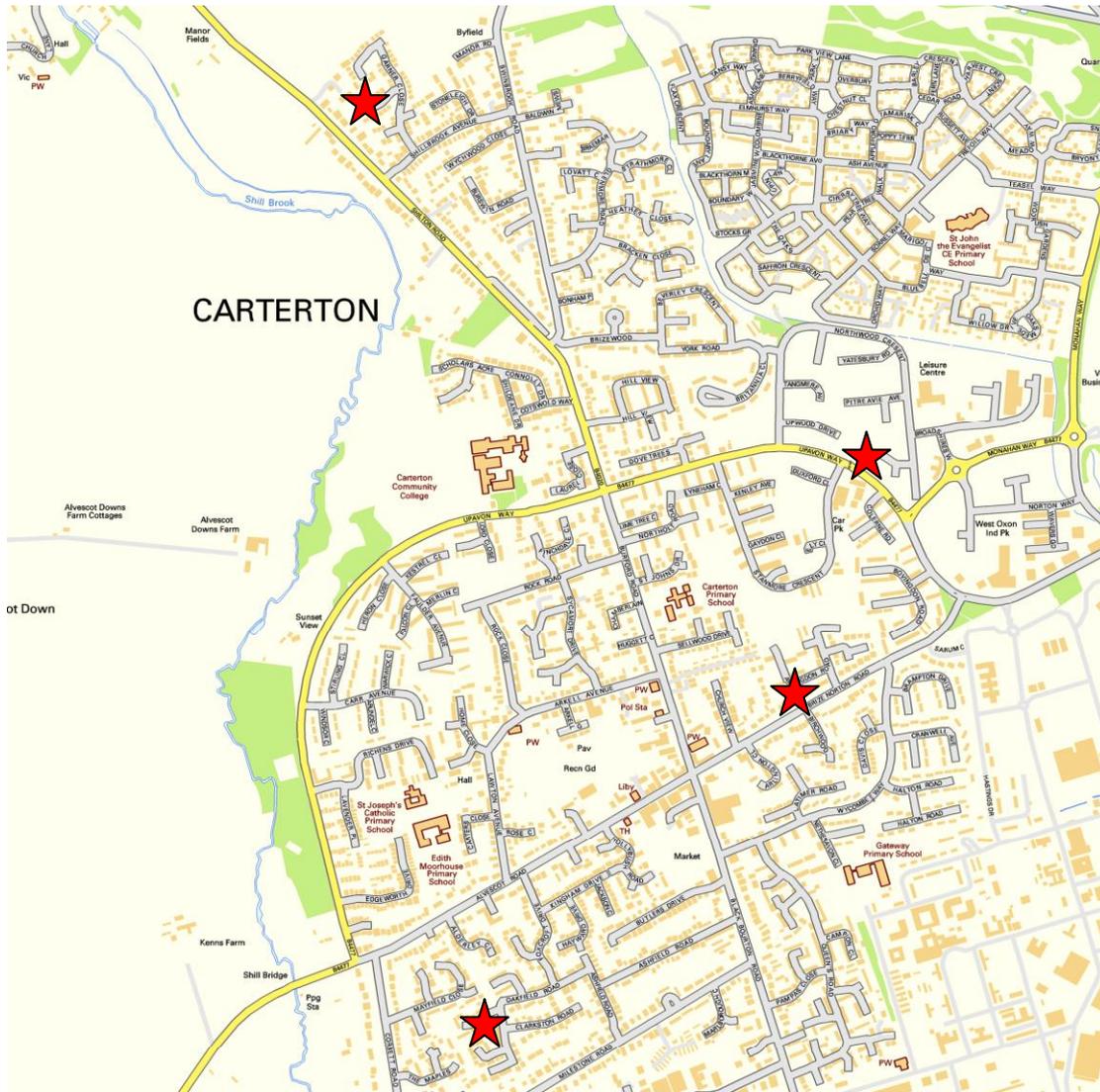
Appendix D: Maps of Monitoring Locations



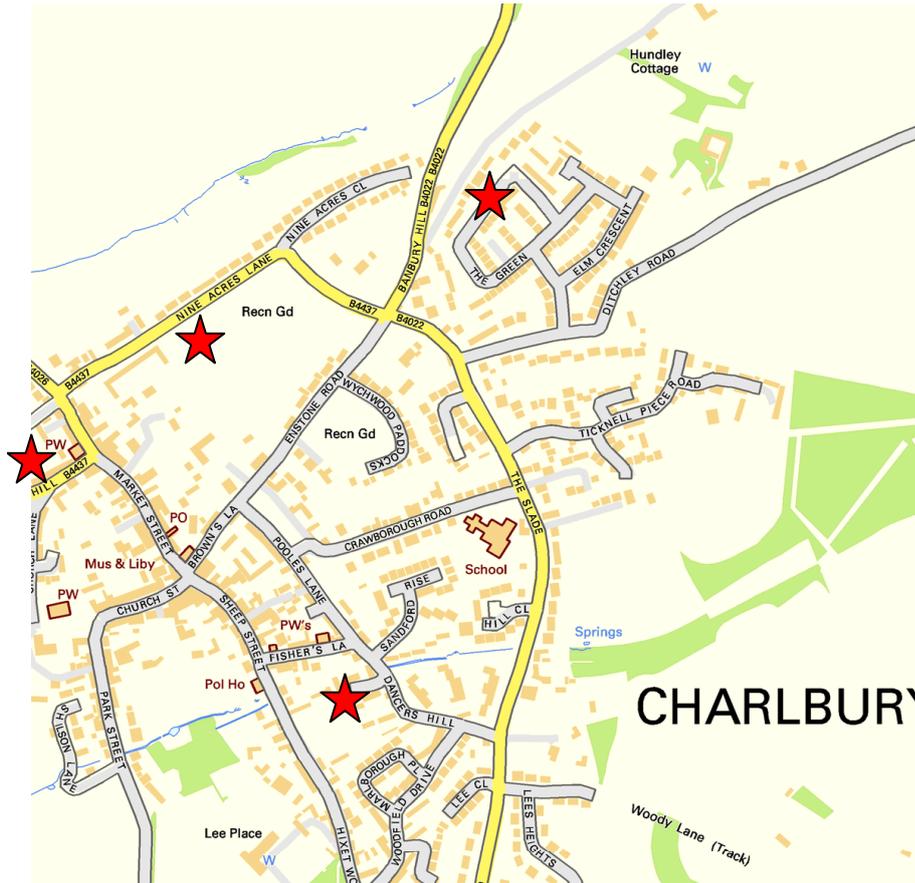
BLADON



BURFORD



CARTERTON



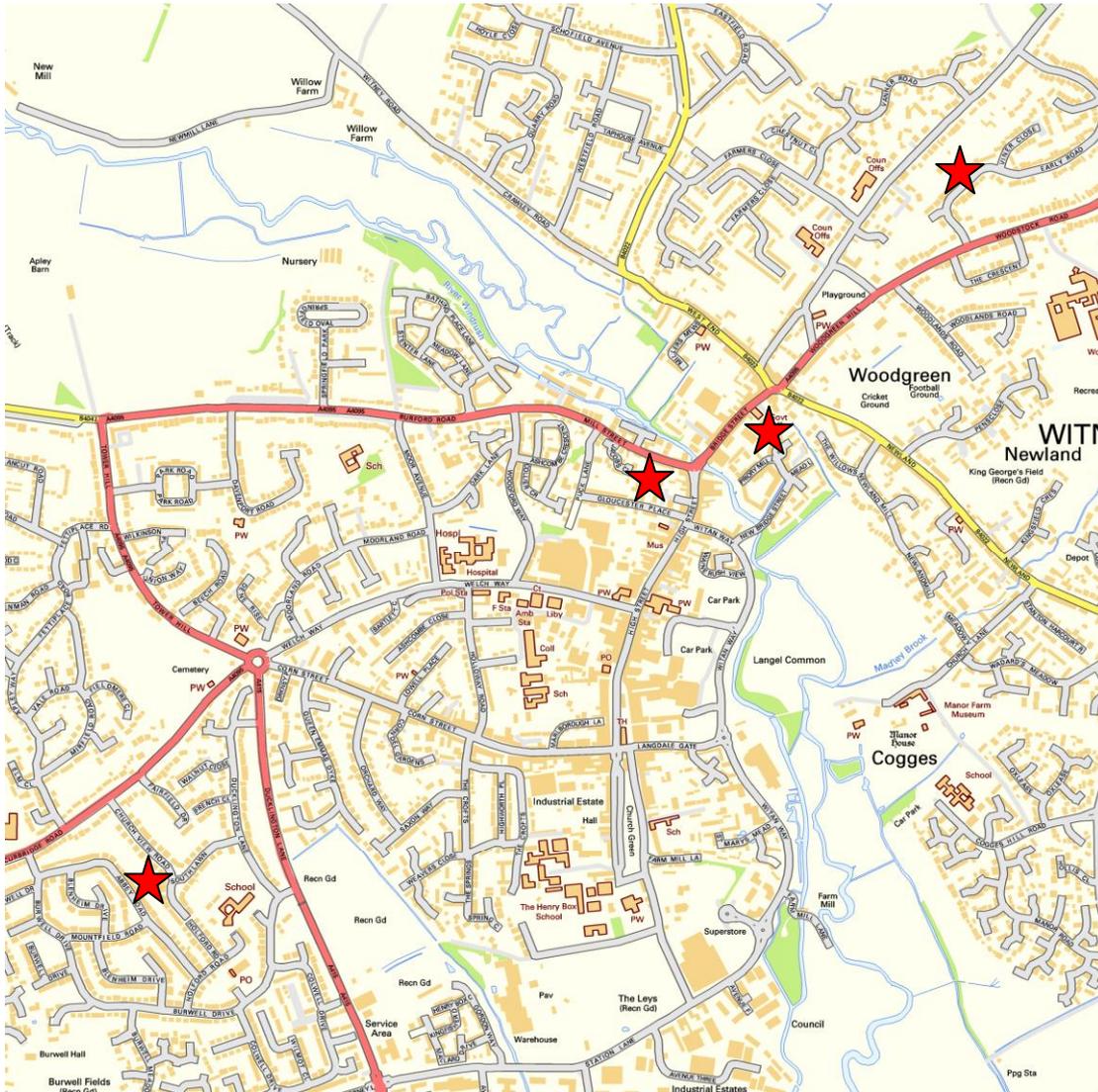
CHARLBURY



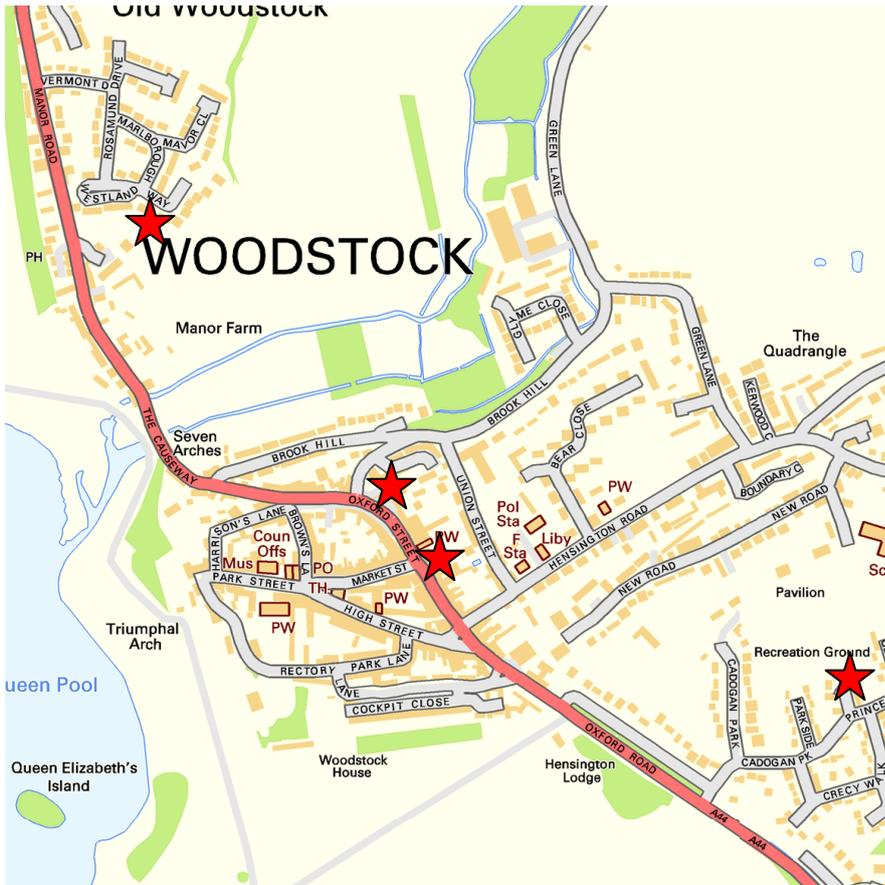
CHIPPING NORTON



Diffusion tubes co-located



WITNEY



WOODSTOCK

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
AF	Annualisation factor – a calculated adjustment factor used when there is less than 9 months data collected at a nitrogen dioxide diffusion tube monitoring site. Its application enables comparison of the site average result with the annual average national objective of 40 $\mu\text{g m}^{-3}$
AQAP	Air Quality Action Plan - A detailed description of measures, outcomes, achievement dates and implementation methods, showing how the local authority intends to achieve air quality limit values'
AQMA	Air Quality Management Area – An area where air pollutant concentrations exceed / are likely to exceed the relevant air quality objectives. AQMAs are declared for specific pollutants and objectives
ASR	Air quality Annual Status Report
Defra	Department for Environment, Food and Rural Affairs
EU	European Union
LAQM	Local Air Quality Management
NO ₂	Nitrogen Dioxide
NO _x	Nitrogen Oxides
PM ₁₀	Airborne particulate matter with an aerodynamic diameter of 10 μm (micrometres or microns) or less
PM _{2.5}	Airborne particulate matter with an aerodynamic diameter of 2.5 μm or less
QA/QC	Quality Assurance and Quality Control

References

A Chipping Norton AQMA:

Connecting Oxfordshire: Local Transport Plan 2015-2031
Volume 1: Policy & Overall Strategy (Page 77, Para 195)
LTP Volume 1: policy and overall strategy

B WODC Low Carbon and Environmental Plan

[West Oxfordshire District Council Low Carbon and Environmental Plan December 2013](https://www.westoxon.gov.uk/media/731615/WODC-Low-Carbon-and-Environmental-Plan.pdf) <https://www.westoxon.gov.uk/media/731615/WODC-Low-Carbon-and-Environmental-Plan.pdf>

C Witney Area Transport Strategy:

<https://www.oxfordshire.gov.uk/cms/content/witney-area-transport-strategy>

Connecting Oxfordshire: Local Transport Plan 2015 - 2031 Volume 2 part ii:
LTP4 – Witney (Pages 77- 85)

<https://www.oxfordshire.gov.uk/cms/sites/default/files/folders/documents/roadsandtransport/transportpoliciesandplans/localtransportplan/ConnectingOxfordshirevol2partiiOtherAreasRouteFreightStrategy.pdf>

D Defra LAQM Policy Guidance PG16 (chapter7)

[Defra LAQM Policy Guidance PG 16](https://laqm.defra.gov.uk/documents/LAQM-PG16-April-16-v1.pdf)

<https://laqm.defra.gov.uk/documents/LAQM-PG16-April-16-v1.pdf>

E Defra LAQM Technical Guidance TG09

[Defra LAQM Technical Guidance TG\(09\).](https://laqm.defra.gov.uk/technical-guidance/)

<https://laqm.defra.gov.uk/technical-guidance/>

F Defra LAQM Technical Guidance TG16

[Defra LAQM Technical Guidance TG16](https://laqm.defra.gov.uk/documents/LAQM-TG16-April-16-v1.pdf)

<https://laqm.defra.gov.uk/documents/LAQM-TG16-April-16-v1.pdf>