



WEST OXFORDSHIRE  
DISTRICT COUNCIL

## **2018 AIR QUALITY ANNUAL STATUS REPORT (ASR) FOR WEST OXFORDSHIRE DISTRICT COUNCIL**

**In fulfillment of  
PART IV OF THE ENVIRONMENT ACT 1995  
LOCAL AIR QUALITY MANAGEMENT**

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## **Executive Summary: Air Quality in Our Area**

The monitoring reported within this 2018 Annual Status Report for West Oxfordshire District Council took place during 2017. It does not indicate any additional areas of general concern with regard to air quality, but our two designated air quality management areas (AQMAs) 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 2017 with air pollution implications. All residential development proposals were considered with regard to their potential to increase traffic pollution in the AQMAs and other areas.

### **Chipping Norton AQMA**

Nitrogen dioxide ( $\text{NO}_2$ ) levels in the Chipping Norton AQMA remain higher than the national objective level set to protect health at one monitoring point, 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. This year the 3 co-located tubes measured just over  $31 \mu\text{g m}^{-3}$ . The Horsefair diffusion tube, that always measures the highest levels (just over  $48 \mu\text{g m}^{-3}$  this year), 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 I, 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 ( $\text{NO}_2$ ) 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  $\text{NO}_2$  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) are now reconsidering 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<sup>1,2</sup>.

The annual health cost to society of the impacts of particulate matter alone in the UK is estimated to be around £16 billion<sup>3</sup>.

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 2017 monitoring survey shows nitrogen dioxide levels slightly decreased compared to 2016 results. The variation between the years is thought likely to be attributable to meteorological differences.

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

The Air Quality action plan for Bridge Street, Witney is pending, however, the Air Quality action plan for Chipping Norton can be obtained from the [WODC Air Quality webpage](#).

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 which can be found on the [Oxfordshire Air Quality website](#).

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 found on the [Department for Environment Food and Rural Affairs UK air information webpage](#)

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<sup>1</sup> Environmental equity, air quality, socioeconomic status and respiratory health, 2010

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

<sup>3</sup> Defra. Abatement cost guidance for valuing changes in air quality, May 2013

## **Actions to Improve Air Quality**

Activity within West Oxfordshire has been limited to monitoring and data collection. Co-operation between adjacent Local Authority officers gave rise to a local Air Quality information resource which was the 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  $43.9 \mu\text{g m}^{-3}$  and  $49.9 \mu\text{g m}^{-3}$  are lower than last year when the levels were  $51.5 \mu\text{g m}^{-3}$  and  $55.7 \mu\text{g m}^{-3}$  respectively.

The highest recording tube in Horsefair, Chipping Norton remains high at  $48.1 \mu\text{g m}^{-3}$  (compared to last year's  $53.1 \mu\text{g m}^{-3}$ ) 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  $\mu\text{g m}^{-3}$  lower than those of 2016, which probably reflects the influence of slightly improved meteorological conditions during the course of the year which aids 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 Technical Pollution Team, Environmental & Regulatory Services, within West Oxfordshire District Council. This team can be contacted by e mail on: [ers.pollution@publicagroup.uk](mailto:ers.pollution@publicagroup.uk)

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## **Local Air Quality Management**

This report provides an overview of air quality in West Oxfordshire District Council during 2017. 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.

## **Actions to Improve Air Quality**

### **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 0.1. Further information related to declared AQMAs, including maps of AQMA boundaries are available on the [Department for Environment Food and Rural Affairs UK air information webpage](#).

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

**Table 0.1 – 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 <sub>2</sub>	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 <sup>-3</sup>  2004 38 µgm <sup>-3</sup>	49.9 µgm <sup>-3</sup>	Air Quality Action Plan pending <a href="http://aqma.defra.gov.uk/action-plans/WODC%20AQAP%202010.pdf">http://aqma.defra.gov.uk/action-plans/WODC%20AQAP%202010.pdf</a> (Draft action plan published 2010)
CHIPPING NORTON Horsefair / High Street	Declared 01/03/2005	NO <sub>2</sub>	Chipping Norton	An area incorporating Horse Fair, High Street, Market Place A44 and part of West Street in Chipping Norton, Oxfordshire encompassing a number of residential and commercial properties	YES	2003 50 µgm <sup>-3</sup>  2004 49 µgm <sup>-3</sup>	48.1 µgm <sup>-3</sup>	<a href="http://www.westoxon.gov.uk/media/744184/Chipping-Norton-Air-Quality-Action-Plan.pdf">http://www.westoxon.gov.uk/media/744184/Chipping-Norton-Air-Quality-Action-Plan.pdf</a> (published 2008)

## **Progress and Impact of Measures to address Air Quality in West Oxfordshire District**

Details of measures in pursuit of improving local air quality are set out in Table 0.2. 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.

**Table 0.2 – 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 <sub>2</sub> 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: <a href="https://oxfordshire.air-quality.info/">https://oxfordshire.air-quality.info/</a>	Local AQ assoc
3	Chipping Norton AQMA Action Plan	Traffic Management	Congestion management, traffic reduction	OCC	Basic survey completed	Unknown – financial prioritisation	Reduced NO <sub>2</sub> levels recorded	Reduced traffic density	Static	Unknown	See Reference A

## **PM<sub>2.5</sub> – 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<sub>2.5</sub> (particulate matter with an aerodynamic diameter of 2.5µm or less). There is clear evidence that PM<sub>2.5</sub> 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<sub>2.5</sub> 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.

## **Air Quality Monitoring Data and Comparison with Air Quality Objectives and National Compliance**

### **Summary of Monitoring Undertaken**

This section sets out what monitoring has taken place and how it compares with objectives.

#### **Non-Automatic Monitoring Sites**

West Oxfordshire District Council has a number of long term 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 (NO<sub>2</sub>) at 21 sites during 2017. The survey focused upon locations where there is “relevant public exposure”, in accordance with Defra LAQM Technical Guidance Note TG(09) (Reference E). There were 5 new locations and some of the locations were moved slightly to provide more representative results. Some of the background tubes from previous years were removed as they were superfluous in the context of providing us with information about the general background levels of nitrogen dioxide.

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.

The site identification references as provided by the analytical laboratory have changed this year. Both the old and new reference numbers have been provided in the tables, for those sites that have both.

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

#### **Individual Pollutants**

The air quality monitoring results presented in this section are, where relevant, adjusted for bias and “annualisation”. As there were at least 9 months data for each monitoring site, annualisation was not required. Details on the bias adjustment are provided in Appendix C.

#### **Nitrogen Dioxide (NO<sub>2</sub>)**

Table A2 in Appendix A compares the ratified and adjusted monitored NO<sub>2</sub> annual mean concentrations for the past 5 years with the air quality objective of 40µg/m<sup>3</sup>.

Figure A1 in Appendix A contains a graph showing the trends in annual mean NO<sub>2</sub>.

Nitrogen dioxide levels have shown a gradual downward trend over the 9 years displayed. The graph shows that the levels recorded this year were similar to last year's levels with some decreases. The decreases are possibly due to a decreased number of days in the year where our sites experienced temperature inversions and foggy conditions. Air movement would thus have been facilitated, allowing vehicle exhaust emissions to be dispersed and diluted to safe levels.

The 2017 dataset of monthly mean nitrogen dioxide concentrations is provided in Appendix B.

Levels within our AQMAs were found to exceed the annual mean NO<sub>2</sub> objective of 40 µgm<sup>-3</sup> at Horsefair, Chipping Norton (48.1 µgm<sup>-3</sup>), 25 Bridge Street, Witney (49.9 µgm<sup>-3</sup>), and Bridge Street, Witney (43.9 µgm<sup>-3</sup>).

The 3 co-located tubes in High Street, Chipping Norton gave an average reading of 31.3 µgm<sup>-3</sup>, and the annual average concentrations measured by each of the 3 tubes were within 2 µgm<sup>-3</sup> (the range was 30.6 – 32.3 µgm<sup>-3</sup>).

No other sites had levels approaching the national objective and the results show that, in the main, West Oxfordshire District Council has good air quality. Outside of the AQMAs, the highest annual average reading was found at High Street (North) Burford, 31.9 µgm<sup>-3</sup>.

Of the exposed tubes collected, only 1 gave rise to an unreliable result that was outside of 3 standard deviations from the norm. This result was rejected to maintain quality control. (The specific result is marked with an asterix\* on the results table in Appendix B).

## 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) <sup>(1)</sup>	Distance to kerb of nearest road (m) <sup>(2)</sup>	Tube collocated with a Continuous Analyser?	Height (m)
1 (S23)	20 Bridge St, Witney	R	435849	210280	NO <sub>2</sub>	<b>YES</b>	0.5	2	NO	2.5 – 3.0
4 (S1)	25 Bridge St Witney	R	435860	210285	NO <sub>2</sub>	<b>YES</b>	0	1	NO	2.5 – 3.0
(S2)	10 Bridge St Witney	R	435821	210243	NO <sub>2</sub>	<b>YES</b>	0	1.5	NO	2.5 – 3.0
(S4)	4A West End, Witney	R	435897	210324	NO <sub>2</sub>	<b>YES</b>	0	1	NO	2.5 – 3.0
2 (S3)	9 Mill Street, Witney	R	435682	210195	NO <sub>2</sub>	<b>YES</b>	0.5	1	NO	2.5 – 3.0
(S5)	Woodgreen Hill, Witney	R	435940	210351	NO <sub>2</sub>	<b>YES</b>	2	2	NO	2.5 – 3.0
(S6)	Newland ,Witney	R	435946	210326	NO <sub>2</sub>	<b>YES</b>	0.5	1	NO	2.5 – 3.0
5 (S20)	High St. (N) Burford (Bottom nr Bridge)	R	425185	212435	NO <sub>2</sub>	NO	0.5	2	NO	2.5 – 3.0
6 (S21)	93 High Street, (S) Burford (nr Barclays bank)	R	425153	212178	NO <sub>2</sub>	NO	2	0.5	NO	2.5 – 3.0
11 (S22)	Garner Close, Carterton	B	427412	208233	NO <sub>2</sub>	NO	2	1	NO	2.5 – 3.0
17 (S19)	Horsefair, (opp No.7) Chipping Norton	R	431458	227277	NO <sub>2</sub>	<b>YES</b>	0.5	0.5	NO	2.5 – 3.0
15 (S15) 16 (S16) 17 (S17)	Co-location, Chipping Norton (Triplicate Mean)	R	431430	227216	NO <sub>2</sub>	<b>YES</b>	2	0.5	NO	2.0
35 (S18)	7 Horsefair,	R	431458	227278	NO <sub>2</sub>	<b>YES</b>	0	4	NO	2.5 – 3.0

Site ID	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In AQMA?	Distance to Relevant Exposure (m) <sup>(1)</sup>	Distance to kerb of nearest road (m) <sup>(2)</sup>	Tube collocated with a Continuous Analyser?	Height (m)
	Chipping Norton									
18 (S14)	West Street, Chipping Norton	R	431342	226950	NO <sub>2</sub>	<b>YES</b>	0.5	2	NO	<b>2.5 – 3.0</b>
20 (S13)	Withers Way Chipping Norton	B	431203	226866	NO <sub>2</sub>	NO	10	1	NO	<b>2.5 – 3.0</b>
25 (S10)	Oxford Street, (E) bus stop Woodstock	R	444732	216696	NO <sub>2</sub>	NO	2	1	NO	<b>2.5 – 3.0</b>
26 (S11)	Oxford Street, (W) bottom Woodstock	R	444324	216868	NO <sub>2</sub>	NO	8	0.5	NO	<b>2.5 – 3.0</b>
28 (S12)	Rosamund Drive Woodstock	B	444199	217343	NO <sub>2</sub>	NO	10	1	NO	<b>2.5 – 3.0</b>
30 (S9)	Grove Road, Bladon	R	444904	214946	NO <sub>2</sub>	NO	11	1	NO	<b>2.5 – 3.0</b>
31 (S8)	Heath Lane, Bladon	B	445216	214389	NO <sub>2</sub>	NO	10	1	NO	<b>2.5 – 3.0</b>
39 (S7)	Park Street, Bladon	R	444812	214669	NO <sub>2</sub>	NO	10	1	NO	<b>2.5 – 3.0</b>

**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.

**Table A.2 – Annual Mean NO<sub>2</sub> Diffusion Tube Monitoring Results**

Site ID	Site location	Site Type	No of valid results (total number) for 2017 <sup>(1)</sup>	Valid Data Capture 2017 (%) <sup>(2)</sup>	NO <sub>2</sub> Annual Mean Concentration (µg/m <sup>3</sup> ) <sup>(3)</sup>				
					2013	2014	2015	2016	2017
DTI (S23)	20 Bridge Street	R	11 (11)	91.7	<b>51.3</b>	<b>47.2</b>	<b>43.7</b>	<b>51.5</b>	<b>43.9</b>
2 (S3)	Mill Street	R	12 (12)	100	37.9	37.3	36.3	33.8	34.4
3 (-)	Early Rd.	B	-	-	14.4	12.6	12.1	15.3	-
4 (S1)	25 Bridge Street	R	12 (12)	100			<b>53.2</b>	<b>55.7</b>	<b>49.9</b>
5 (S20)	High St	R	11 (12)	91.7	34.1	33.0	34.1	36	31.9
6 (S21)	93 High Street	R	12 (12)	100	36.5	35.0	30.6	29.0	22.5
7 (-)	Frethern Cl	B	-	-	10.9	11.1	9.8	10.7	-
8 (-)	Orchard Rise	B	-	-	10.3	9.3	9.3	9.6	-
9 (-)	Brize Norton Rd	R	-	-	26.1	26.0	21.0	22.8	-
10 (-)	Upavon Way	R	-	-	19.9	17.5	16.9	19.2	-
11 (S22)	Garner Close	B	12 (12)	100	12.1	10.1	9.8	10.4	9.3
12 (-)	Oakfield Road	B	-	-	14.1	11.9	10.9	10.7	-
13 (-)	Dyers Hill	R	-	-	17.0	15.4	15.2	16.4	-
14 (-)	Nineacres Lane	R	-	-	15.5	14.3	14.4	16.1	-
15 (-)	Tanners Close	B	-	-	10.3	8.9	8.9	10.0	-
16 (-)	The Green	B	-	-	11.1	9.4	9.6	10.0	-
17 (S19)	Horsefair	R	11 (11)	91.7	<b>56.1</b>	<b>57.7</b>	<b>54.9</b>	<b>53.8</b>	<b>48.1</b>
33 (-)	17 Horsefair	R	-	-	31.4	30.5	29.1	28.7	-
36 (S15)	CN Co location	R	12 (12)	100				<b>40.5</b>	31.0
37 (S16)	CN Co location	R	12 (12)	100				38.2	30.6
38 (S17)	CN Co location	R	12 (12)	100				33.9	32.3

Site ID	Site Location	Site Type	No of valid results (total number) for 2016 <sup>(1)</sup>	Valid Data Capture 2016 (%) <sup>(2)</sup>	NO <sub>2</sub> Annual Mean Concentration (µg/m <sup>3</sup> ) <sup>(3)</sup>				
					2013	2014	2015	2016	2017
36,37,38	TRIPLE.MEAN			100	39.6	39.1	35.5	37.5	31.3
34 (-)	5 Horsefair	R	-	-	-	23.7	21.7	24.1	-
35 (S18)	7 Horsefair	R	11 (11)	91.7	24.8	24.0	22.5	23.8	20.5
18 (S14)	West Street	R	-	-	27.3	27.0	25.9	28.8	25.3
19 (-)	Coopers Close	B	-	-	12.6	10.4	9.9	11.5	-
20 (S13)	Withers Way	B	12 (12)	100	12.1	10.2	9.1	11.0	9.0
21 (-)	Acre End Street	R	-	-	16.6	13.3	13.5	15.2	-
22 (-)	Mill Street	R	-	-	15.9	14.3	13.1	15.7	-
23 (-)	Orchard Close	B	-	-	12.4	10.2	10.4	11.9	-
24 (-)	Shakespeare Rd	B	-	-	14.9	12.6	11.9	13.6	-
25 (S11)	Oxford Street	R	11 (11)	91.7	33.9	30.2	27.5	32.1	24.2
26 (S10)	Oxford Street(2)	R	11 (11)	91.7	33.6	29.6	26.0	23.1	26.4
27 (-)	The Ley	B	-	-	12.5	10.1	10.5	11.8	-
28 (-)	Westland Way	B	-	-	12.6	11.2	10.9	11.9	-
29 (S9)	Grove Road	R	9 (9)	75	21.3	20.7	20.3	24.0	19.9
30 (-)	Grove Road(2)	R	-	-	25.8	21.9	24.6	25.0	-
31 (S8)	Heath Lane	B	12 (12)	100	12.0	10.4	10.1	12.5	10.4
32 (-)	Park Close	B	-	-	10.9	9.8	8.9	11.5	-
39 (S7)	Park Street	R	11 (11)	91.7	31.1	31.8	31.1	32.0	28.9
(S2) new site	10 Bridge Street	R	11 (11)	91.7	-	-	-	-	40.6
(S4) new site	4A West End	R	11 (11)	91.7					33.9

(S5) new site	Woodgreen Hill	R	11 (11)	<b>91.7</b>						33.9
(S6) new site	Newland Witney	R	11 (11)	<b>91.7</b>						35.8
(S12) new site	Rosamund Drive, Woodstock	B	11 (11)							11.0

**Notes:**

Exceedances of the NO<sub>2</sub> annual mean objective of 40µg/m<sup>3</sup> are shown in **bold**.

NO<sub>2</sub> annual means exceeding 60µg/m<sup>3</sup>, indicating a potential exceedance of the NO<sub>2</sub> 1-hour mean objective are shown in **bold and underlined**.

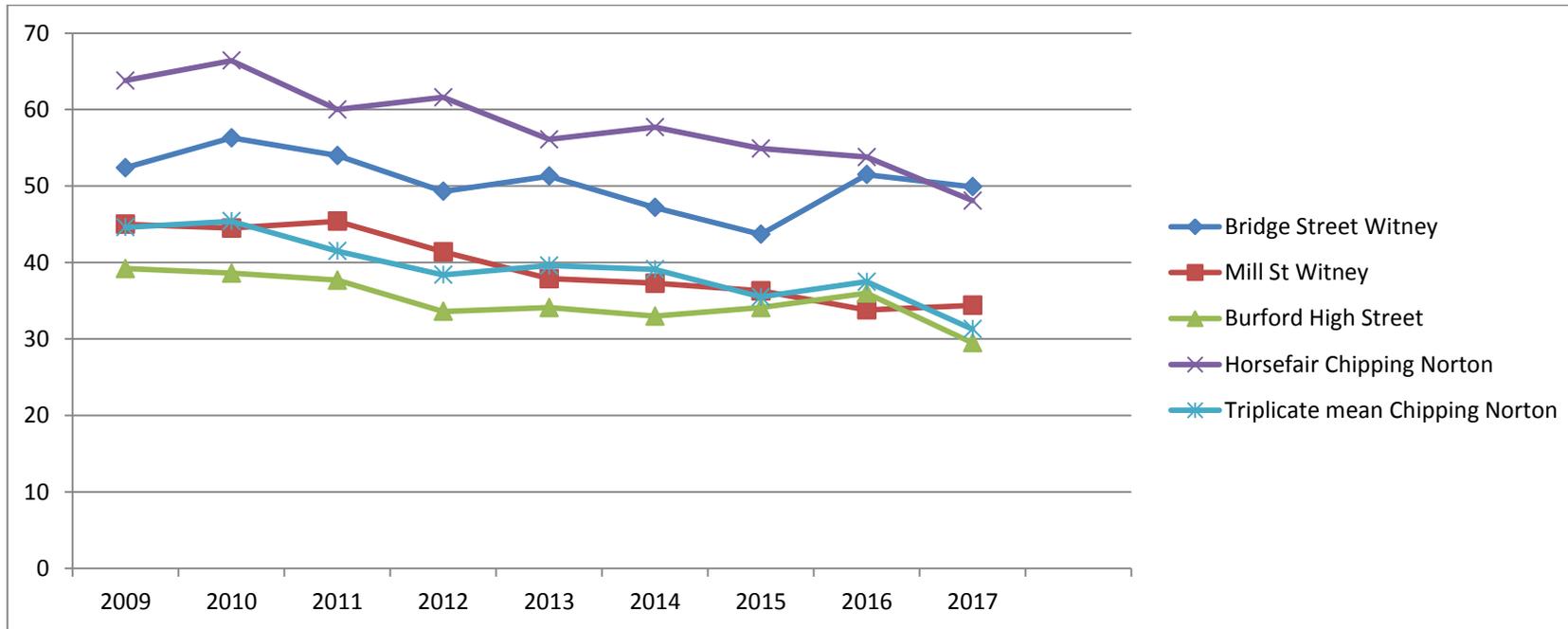
(1) Number of validated results for use in the survey (total number of results for the year).

(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.

**Figure A.2 – Trends in Annual Mean NO<sub>2</sub> Concentrations**

**Graph showing the trends over 9 years at long term diffusion tube monitoring sites**



The data points in Figure A.2 are the bias adjusted average levels of NO<sub>2</sub> at the sites which have high levels, expressed in µg/m<sup>3</sup>.

## Appendix B: Full Monthly Diffusion Tube Results for 2017

Table B.1 – NO<sub>2</sub> Monthly Diffusion Tube Results - 2017

Site ID	NO <sub>2</sub> Mean Concentrations (µg/m <sup>3</sup> )														
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean		
													Raw Data	Bias Adjusted (0.77) <sup>(1)</sup>	Distance Corrected to Nearest Exposure <sup>(2)</sup>
25 Bridge Street, Witney (S1)	72.6	62.9	73.7	75.8	57.3	56	56.8	61.4	63.5	65.2	66	65.7	64.74	49.9	
20 Bridge Street (S23)		69.8	60.8	53	58.3	58.9	47.5	42.4	53.7	54.6	64.4	64.3	57.06	43.9	
10 Bridge Street (S2)	73.7	66.6	59.4	43.3	52.5	46.1	43.9	36.5	51.5	48.1	59		52.78	40.6	
4A West End (S4)		55.6	48.1	42.1	50.7	37.1	38.1	35	41	40.9	49.5	46.5	44.05	33.9	
9 Mill Street (S3)	57.1	46.8	48.7	41.9	44.3	41.2	36.7	37.8	42.7	45.9	45.8	47.7	44.72	34.4	
Woodgreen Hill, Witney (S5)		63	59.4	43.1	48.4	47.2	39.3	37	44.5	50	50.2	46.8	44.08	33.9	
Newland, Witney (S6)		61.8	60.7	48	47.1	45.7	43.1	41	47.6	55.4	45.5	61.8	46.48	35.8	
Chipping Norton Withers Way (S13)	25.3	16.3	12.3	8.5	12.1	6.4	5.4	8.5	9.8	10	13.5	13	11.76	9.0	
Chipping Norton Nox (15) (S15)	59.2	50.4	44.9	36.3	45.7	36.8	27.9	34	35.8	35	41.3	36.4	40.31	31.0	
Chipping Norton Nox (16) (S16)	50.9	43.2	40.6	36.2	49.8	38.1	33.9	31.7	36.6	37	43.9	35.1	39.75	30.6	
Chipping Norton	59.2	51	43.9	37.9	51.6	40.3	34.2	33.8	37.4	36.6	39.1	38.4	41.95	32.3	

Site ID	NO <sub>2</sub> Mean Concentrations (µg/m <sup>3</sup> )																	
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean					
													Raw Data	Bias Adjusted (0.77) <sup>(1)</sup>	Distance Corrected to Nearest Exposure <sup>(2)</sup>			
Nox (17) (S17)																		
TRIPPLICATE MEAN													Trip mean = 40.67		31.3			
West St, Chipping Norton	47.3	34.7	33.2	36.5	31.7	25.4	26.4	26.9	28.2	27.9	42.1	33.8	32.84		25.3			
Horsefair, Chipping Norton (opp 7) (S19)	82.2		68.3	74.1	62.7	62.5	56.2	54.8	57.4	69.6	87.5	74.4	62.48		48.1			
7 Horsefair, Chipping Norton (S18)	37.2		30.4	24.6	32.2	24.5	19	22.3	22.2	26.8	27.5	25.8	26.59		20.5			
Oxford St, Woodstock (bottom) (S11)	44.9	38.3	34.1	26.4	27.8	25.3	24.7	26.3	26.6	31.9	32.1	28.5	30.6		23.5			
Rosamund Drive, Woodstock (S12)	24.7	23.6	16.1	10.7	10.6	7	7.2	10.2	11	15.6	20.5		14.29		11.0			
Woodstock Oxford St (On Bus stop) (S10)	55.2	41.6	36.4	34.4	38.2		24.6	28	29.6	28.6	36.9	34.1	35.2		27.1			
Grove Rd, Bladon (S9)		29.5	32.4	22.5	26.9		16.9	20.6	22.9		12.8	29.9	23.82		18.3			
Heath Lane, Bladon (S8)	25.9	19.9	15	9.2	10.7	7.8	6.4	10	10.5	12.4	17.9	16.4	13.51		10.4			
Park Street, Bladon		49.8	44.1	36.8	34.3	31.9	31.8	32.5	31.5	34.3	43.6	41.9	37.50		28.9			

Site ID	NO <sub>2</sub> Mean Concentrations (µg/m <sup>3</sup> )															
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean			
													Raw Data	Bias Adjusted (0.77) <sup>(1)</sup>	Distance Corrected to Nearest Exposure <sup>(2)</sup>	
(S7)																
Burford - High Street (Bottom nr Bridge) (S20)	<b>44.3</b>	<b>44.3</b>	<b>42.5</b>	<b>45.1</b>	35.1	R* 11.6	35.9	<b>41.6</b>	37.7	38.8	<b>45.2</b>	<b>44.5</b>	41.36	31.9		
High St, Burford(Barclays) (S21)	<b>44.3</b>	35	31.6	30.8	25.9	22.7	20.5	24	26	27.1	32.5	30.9	29.28	22.5		
Carterton Garner Close (S22)	17.9	19.5	13.9	8.9	10.8	7.1	6.2	8.2	7.8	11.6	16.6	15.8	12.03	9.3		

**Notes:**

Exceedances of the NO<sub>2</sub> annual mean objective of 40µg/m<sup>3</sup> are shown in **bold**.

NO<sub>2</sub> annual means exceeding 60µg/m<sup>3</sup>, indicating a potential exceedance of the NO<sub>2</sub> 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.

R\* Rejected from 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

As at least 9 months data was collected at all sites, annualisation was not required.

## 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 0.77 based on 29 studies and this was applied to all diffusion tubes.

**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.

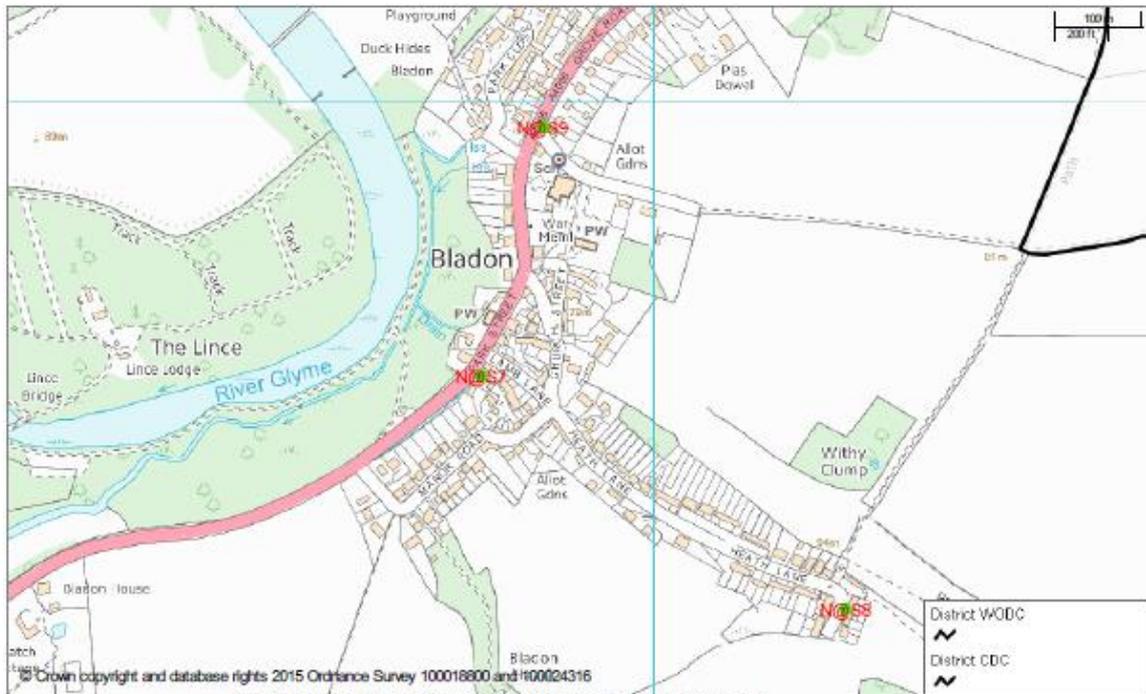
The LAQM Helpdesk is operated on behalf of Defra and the Devolved Administrations by Bureau Veritas, in conjunction with contract partners AECOM and the National Physical Laboratory. Spreadsheet maintained by the National Physical Laboratory. Original compiled by Air Quality Consultants Ltd.

**Step 1:** Select the Laboratory that Analyzes Your Tubes from the Drop-Down List  
**Step 2:** Select a Disaggregation Method from the Drop-Down List  
**Step 3:** Select a 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 LAQMHelpdesk@uk.bureauveritas.com or 0800 0327353

Analysed By	Method	Year	Site Type	Local Authority	Length of Study (months)	Diffusion Tube Mean Conc. (µg/m <sup>3</sup> )	Automatic Monitor Mean Conc. (µg/m <sup>3</sup> )	Bias (B)	Tube Precision	Bias Adjustment Factor (A) (Cm/Dm)
ESG Didcot	50% TEA in acetone	2005	R	North East Lincolnshire Council	11	39	28	38.6%	G	0.72
ESG Didcot	50% TEA in acetone	2005	R	North East Lincolnshire Council	11	55	47	85.2%	G	0.86
ESG Didcot	50% TEA in acetone	2005	R	Humberston District Council	10	22	19	17.6%	G	0.85
ESG Didcot	50% TEA in acetone	2005	UB	City of York Council	11	24	16	59.6%	G	0.66
ESG Didcot	50% TEA in acetone	2005	R	City of York Council	11	36	27	31.9%	G	0.76
ESG Didcot	50% TEA in acetone	2005	R	City of York Council	11	34	25	34.8%	G	0.74
ESG Didcot	50% TEA in acetone	2005	R	City of York Council	12	39	28	41.5%	G	0.71
ESG Didcot	50% TEA in acetone	2005	R	Rugby Borough Council	12	23	21	10.6%	G	0.90
ESG Didcot	50% TEA in acetone	2005	R	Cambridge City Council	12	45	36	25.2%	G	0.80
ESG Didcot	50% TEA in acetone	2005	R	Derby City and Strabane District Council	12	38	29	31.7%	P	0.76
ESG Didcot	50% TEA in acetone	2005	R	Walsford Borough Council	12	40	36	14.0%	S	0.89
<b>Overall Factor* (29 studies)</b>										
<b>Use 0.77</b>										

## Appendix D: Maps of Monitoring Locations

### DI Bladon



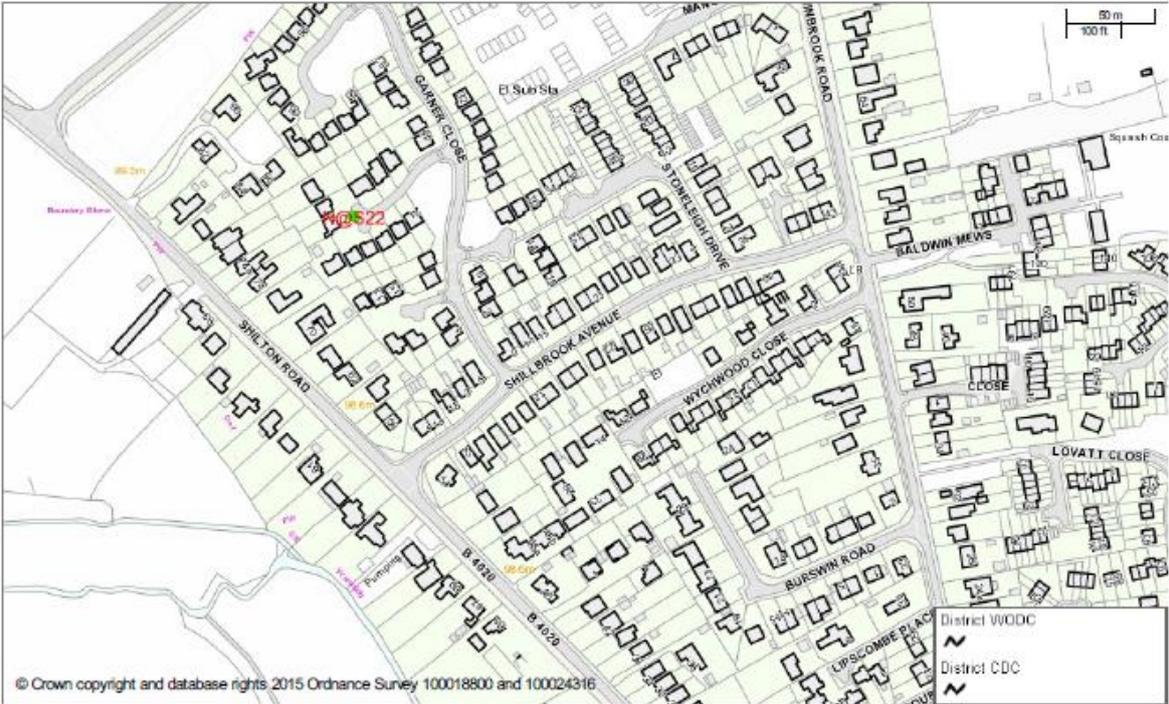
Scale: 1:5000  
Printed on: 15/3/2017 at 9:19 AM  
N@S7 - ON BUS STOP SIGN PARK STREET NR JW LAMB LANE  
N@S8 - O/S 77 HEATH LANE  
N@S9 - ON TELEGRAPH POLE GROVE ROAD OPP. WHITE HORSE PH.



## D2 Burford



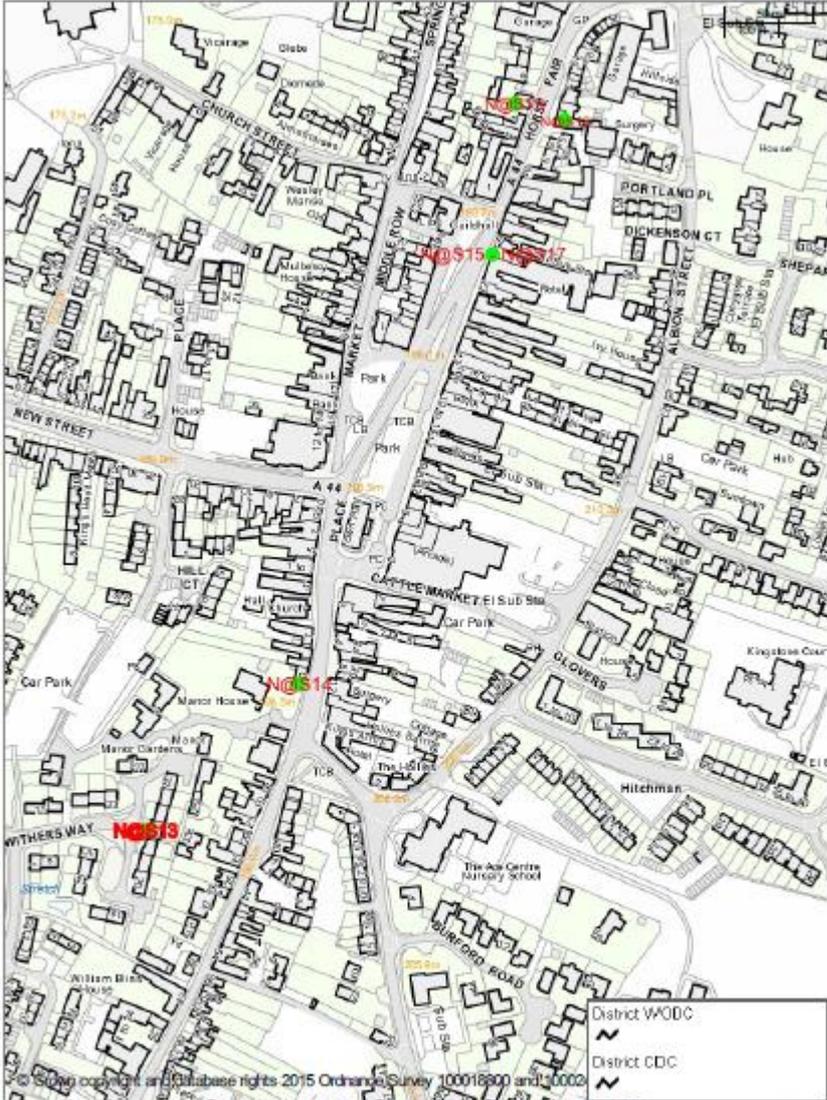
D3 Carterton



Scale: 1:2500  
Printed on: 20/3/2017 at 11:08 AM  
N@S22 - ON LAMP POST O/S NO 33 GARNER CLOSE, CARTERTON



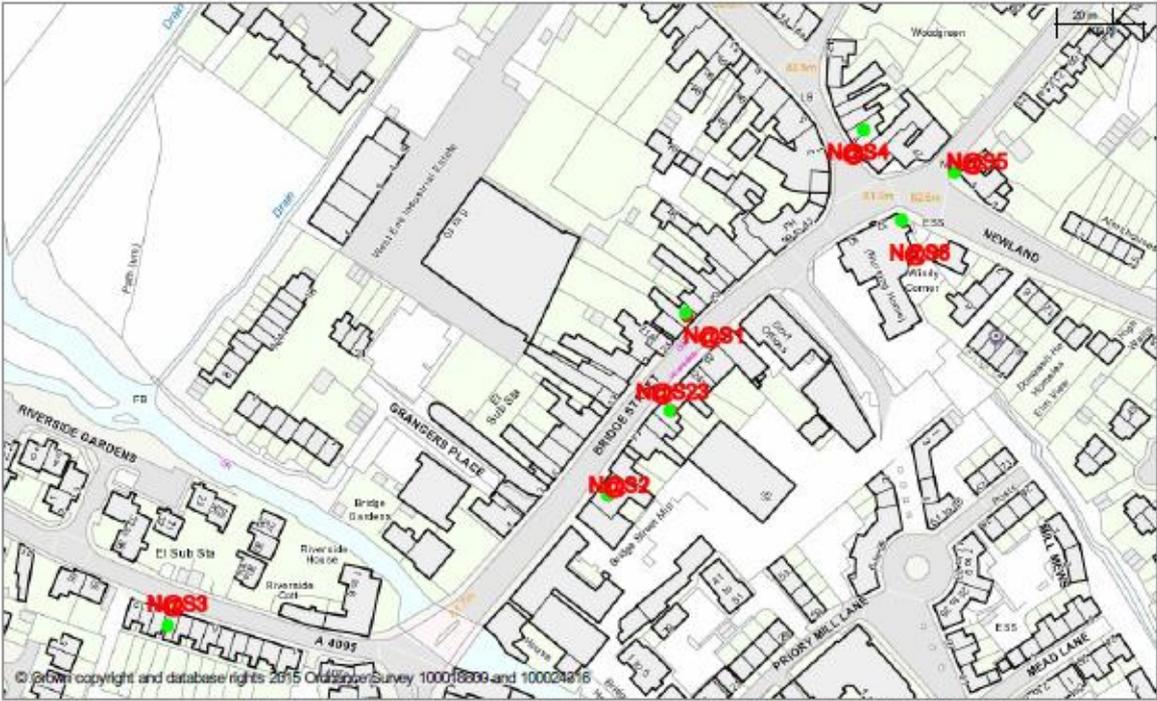
# D4 Chipping Norton



Scale: 1:2500  
 Printed on: 20/3/2017 at 9:51 AM  
 © Crown copyright and database rights 2015 Ordnance Survey 100018800 and 10002

N@S13 - LAMP POST O/S NO 26 WITHERS WAY  
 N@S14 - ON BUS STOP O/S COCA, WEST STREET  
 N@S15-N@S17 - IN CAGE OF ANALYSER  
 N@S18 - ON DRAIN PIPE OF NO 7 HORSEFAIR  
 N@S19 - ON LAMP POST (R/BOUT SIGN) OPP NO 7 HORSEFAIR

**D5 Witney**

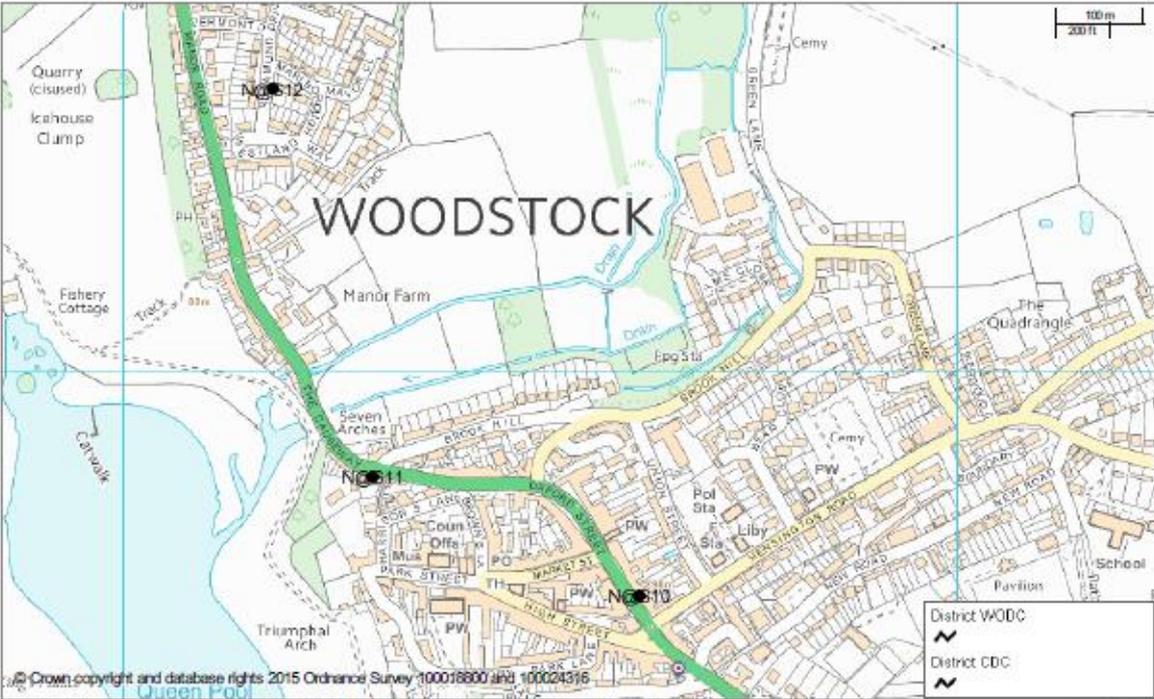


Scale: 1:1500  
 Printed on: 25/2/2017 at 12:01 PM

N@S1 - O/S 25 BRIDGE STREET, WITNEY	N@S6 - O/S MILL HOUSE J/W NEWLAND
N@S2 - O/S 10 BRIDGE STREET, WITNEY	N@S23 - O/S 18 BRIDGE STREET, WITNEY
N@S3 - O/S 9 MILL STREET, WITNEY	
N@S4 - O/S 4A WEST END, WITNEY	
N@S5 - R/ABOUT WOODGREEN JUNCTION	



**D6 Woodstock**



© Crown copyright and database rights. 2015 Ordnance Survey 100018600 and 100024316  
 Scale: 1:5000  
 Printed on: 20/3/2017 at 9:18 AM  
 N@S10 - ON BUS STOP SIGN O/S NO 22 OXFORD STREET, WOODSTOCK  
 N@S11 - ON LAMP POST 62, O/S NO 85 OXFORD STREET, WOODSTOCK  
 N@S12 - ON LAMP POST OPP NO 5 ROSAMUND DRIVE, WOODSTOCK



## Appendix E: Summary of Air Quality Objectives in England

**Table E.1 – Air Quality Objectives in England**

Pollutant	Air Quality Objective <sup>4</sup>	
	Concentration	Measured as
Nitrogen Dioxide (NO <sub>2</sub> )	200 µg/m <sup>3</sup> not to be exceeded more than 18 times a year	1-hour mean
	40 µg/m <sup>3</sup>	Annual mean
Particulate Matter (PM <sub>10</sub> )	50 µg/m <sup>3</sup> , not to be exceeded more than 35 times a year	24-hour mean
	40 µg/m <sup>3</sup>	Annual mean
Sulphur Dioxide (SO <sub>2</sub> )	350 µg/m <sup>3</sup> , not to be exceeded more than 24 times a year	1-hour mean
	125 µg/m <sup>3</sup> , not to be exceeded more than 3 times a year	24-hour mean
	266 µg/m <sup>3</sup> , not to be exceeded more than 35 times a year	15-minute mean

<sup>4</sup> The units are in microgrammes of pollutant per cubic metre of air (µg/m<sup>3</sup>).

## 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 <sub>2</sub>	Nitrogen Dioxide
NO <sub>x</sub>	Nitrogen Oxides
PM <sub>10</sub>	Airborne particulate matter with an aerodynamic diameter of 10 $\mu\text{m}$ (micrometres or microns) or less
PM <sub>2.5</sub>	Airborne particulate matter with an aerodynamic diameter of 2.5 $\mu\text{m}$ or less
QA/QC	Quality Assurance and Quality Control

## References

### **A Chipping Norton AQMA:**

Connecting Oxfordshire: Local Transport Plan 2015-2031

Volume I: Policy & Overall Strategy (Page 77, Para 195)

LTP Volume I: policy and overall strategy

### **B WODC Low Carbon and Environmental Plan**

[www.westoxon.gov.uk/residents/environment/climate-change-home-energy/reducing-our-carbon-emissions/](http://www.westoxon.gov.uk/residents/environment/climate-change-home-energy/reducing-our-carbon-emissions/)

### **C Witney Area Transport Strategy:**

[Connecting Oxfordshire: Local Transport Plan 2015 - 2031 Volume 2 part ii:](#)

[LTP4 – Witney \(Pages 77- 85\)](#) (click to view)

### **D Defra LAQM Policy Guidance PG16 (chapter7)**

[Defra LAQM Policy Guidance PG 16](#) (click to view)

### **E Defra LAQM Technical Guidance TG09**

[Defra LAQM Technical Guidance TG\(09\)](#) (click to view)

### **F Defra LAQM Technical Guidance TGI6**

[Defra LAQM Technical Guidance TGI6](#) (click to view)