WEST OXFORDSHIRE DISTRICT COUNCIL

WEST OXFORDSHIRE
DISTRICT COUNCIL

2011 Air Quality Progress Report for WEST OXFORDSHIRE DISTRICT COUNCIL

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

May 2011

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Executive Summary

The monitoring reported within the 2011 Progress Report for West Oxfordshire District Council does not indicate any additional areas of general concern with regard to air quality.

Within the District there are no industrial developments with air pollution implications and any development proposals have been considered with regard to their potential to increase traffic pollution in the AQMAs and other areas.

Chipping Norton AQMA

The Chipping Norton Air Quality Action Plan, as accepted by Defra, proposed the introduction of a Weight Limit for HGVs and re-routing of HGV traffic (primarily targeting the Vale of Evesham / SE England two way flow).

The proposal has the objective of reducing HGV traffic density on the A44 through Chipping Norton by routing traffic further to the West on the A40 to access the Vale of Evesham from the South. This measure would involve 'de-priming' the A44 (currently a Primary Route for HGVs) and associated modification to signage.

Oxfordshire County Council (OCC) commissioned advanced feasibility work for the implementation of the lorry management measures including consultation with neighbouring Counties and costing of proposals. This was expected to be complete by end of FY 2009 / 10. Confirmation of this and a schedule for implementation is still awaited.

Currently, additional consultation with neighbouring Counties and financial constraints within OCC budgets have further delayed plans to implement this Action Plan.

However, the WODC Climate Change Action Plan (Apr 2011), incorporating the Green Travel Plan (Feb 2011), addresses some of the additional air quality mitigation measures (Appendix D) within the Air Quality Action Plan.

Witney AQMA

The Draft Action Plan for the Witney AQMA, having been deferred for a significant period pending the outcome of the Cogges Link Road (CLR) Planning Application by OCC, was approved by WODC Cabinet in December 2010. A period of public consultation was conducted throughout February 2011.

The Draft Action Plan for the Witney AQMA was written with the assumption that the CLR would proceed as per the Planning Consent. There are further procedural stages to be concluded after which the Draft Action Plan and the results of the public consultation will be reviewed to produce an Action Plan (which should include the latest dispersion modelling) for consideration and approval by WODC Cabinet and OCC and in due course submitted to Defra.

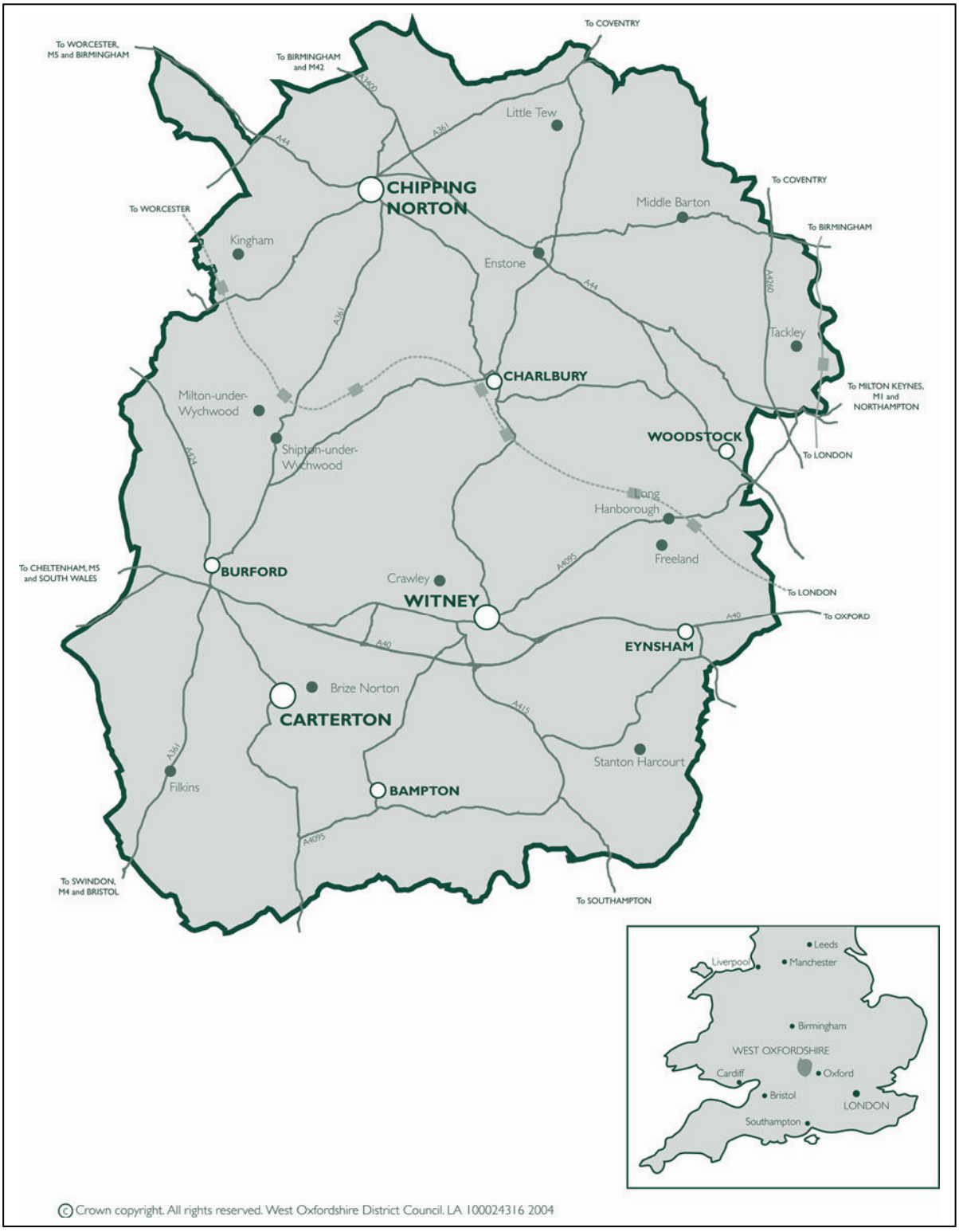

Figure 1.1 West Oxfordshire District

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1 Introduction

1.1 Description of Local Authority Area

West Oxfordshire is one of the most attractive parts of Britain, lying to the north of the River Thames, to the west of the city of Oxford and including the eastern edge of the Cotswolds, part of the District is designated an Area of Outstanding Natural Beauty.

It is a rural district covering 714 km^2 with a population of 106,000 spread across a large number of relatively small settlements, totalling 83 parishes.

Situated in a prime central location, there are excellent communications to most parts of the country via the A40/M40 and the A34 roads. There are railway stations at Charlbury, Hanborough and Kingham with regular services to London and Birmingham.

It has a rich architectural and historic heritage ranging from Cotswold stone cottages to the splendour of Blenheim Palace, a World Heritage site.

As can be expected from the above, tourism is buoyant and is a main contributor to the district's vibrant economy. The business sector is made up of a healthy mixture of high technology, small and medium enterprises and unemployment is (in normal times) less than 1%. The area faces no major social problems and crime figures are amongst the lowest in the country.

1.2 Purpose of Progress Report

Progress Reports are required in the intervening years between the three-yearly Updating and Screening Assessment reports. Their purpose is to maintain continuity in the Local Air Quality Management process.

They are not intended to be as detailed as Updating and Screening Assessment Reports, or to require as much effort. However, if the Progress Report identifies the risk of exceedence of an Air Quality Objective, the Local Authority (LA) should undertake a Detailed Assessment immediately, and not wait until the next round of Review and Assessment.

1.3 Air Quality Objectives

The air quality objectives applicable to Local Air Quality Management (LAQM) in England are set out in the Air Quality (England) Regulations 2000 (SI 928), and the Air Quality (England) (Amendment) Regulations 2002 (SI 3043). They are shown in Table 1.1. This table shows the objectives in units of micrograms per cubic metre $\mu g/m^3$ (for carbon monoxide the units used are milligrammes per cubic metre, mg/m^3). Table 1.1. includes the number of permitted exceedences in any given year (where applicable).

Table 1.1 Air Quality Objectives included in Regulations for the purpose of Local Air Quality Management in England.

Pollutant	Concentration	Measured as	Date to be achieved by
Benzene	16.25 $\mu g/m^3$	Running annual mean	31.12.2003
	5.00 $\mu g/m^3$	Annual mean	31.12.2010
1,3-Butadiene	2.25 $\mu g/m^3$	Running annual mean	31.12.2003
Carbon monoxide	10.0 mg/m^3	Maximum daily running 8-hour mean	31.12.2003
Lead	0.5 $\mu g/m^3$	Annual mean	31.12.2004
	0.25 $\mu g/m^3$	Annual mean	31.12.2008
Nitrogen dioxide	200 $\mu g/m^3$ not to be exceeded more than 18 times a year	1-hour mean	31.12.2005
	40 $\mu g/m^3$	Annual mean	31.12.2005
Particles (PM_{10}) (gravimetric)	50 $\mu g/m^3$, not to be exceeded more than 35 times a year	24-hour mean	31.12.2004
	40 $\mu g/m^3$	Annual mean	31.12.2004
Sulphur dioxide	350 $\mu g/m^3$, not to be exceeded more than 24 times a year	1-hour mean	31.12.2004
	125 $\mu g/m^3$, not to be exceeded more than 3 times a year	24-hour mean	31.12.2004
	266 $\mu g/m^3$, not to be exceeded more than 35 times a year	15-minute mean	31.12.2005

1.4 Summary of Previous Review and Assessments

Two AQMA declarations have been made in the District because the annual nitrogen dioxide objective in the Air Quality (England) Regulations 2000 was unlikely to be met by December 2005 and the cause of this was believed to be traffic related.

The areas are detailed in Figures 1.2 and 1.3 below and were declared on 7th February 2005 (date of order). The development of the action plans began for both areas and a continuous monitoring site established in Chipping Norton. This site has been in operation since March 2006. The original continuous monitoring site in Witney had to be decommissioned because the site was sold. However, another site in that area was established and continuous monitoring resumed in April 2009.

Oxfordshire County Council outlined a number of traffic management options which needed looking at in more detail to investigate their feasibility and impact on air quality so that a cost benefit analysis could be applied to each option. The County employed consultants to appraise the traffic management options and the results were used by the District Council's air quality consultants to model and predict their impact on air quality.

With regard to Chipping Norton, the Air Quality Action Plan was accepted by Defra in early 2009.

In Witney, the approved traffic management option is the subject of some remaining procedural stages. A draft of the proposed Action Plan has been approved by Cabinet and a period of public consultation completed, results of which will be reviewed when the final Action Plan is compiled.

Note: Data is presented throughout in units of $\mu g/m^3$. This addresses the comment in Appraisal Report PR3-546.

Figure 1.2 Map of AQMA Boundaries – Witney

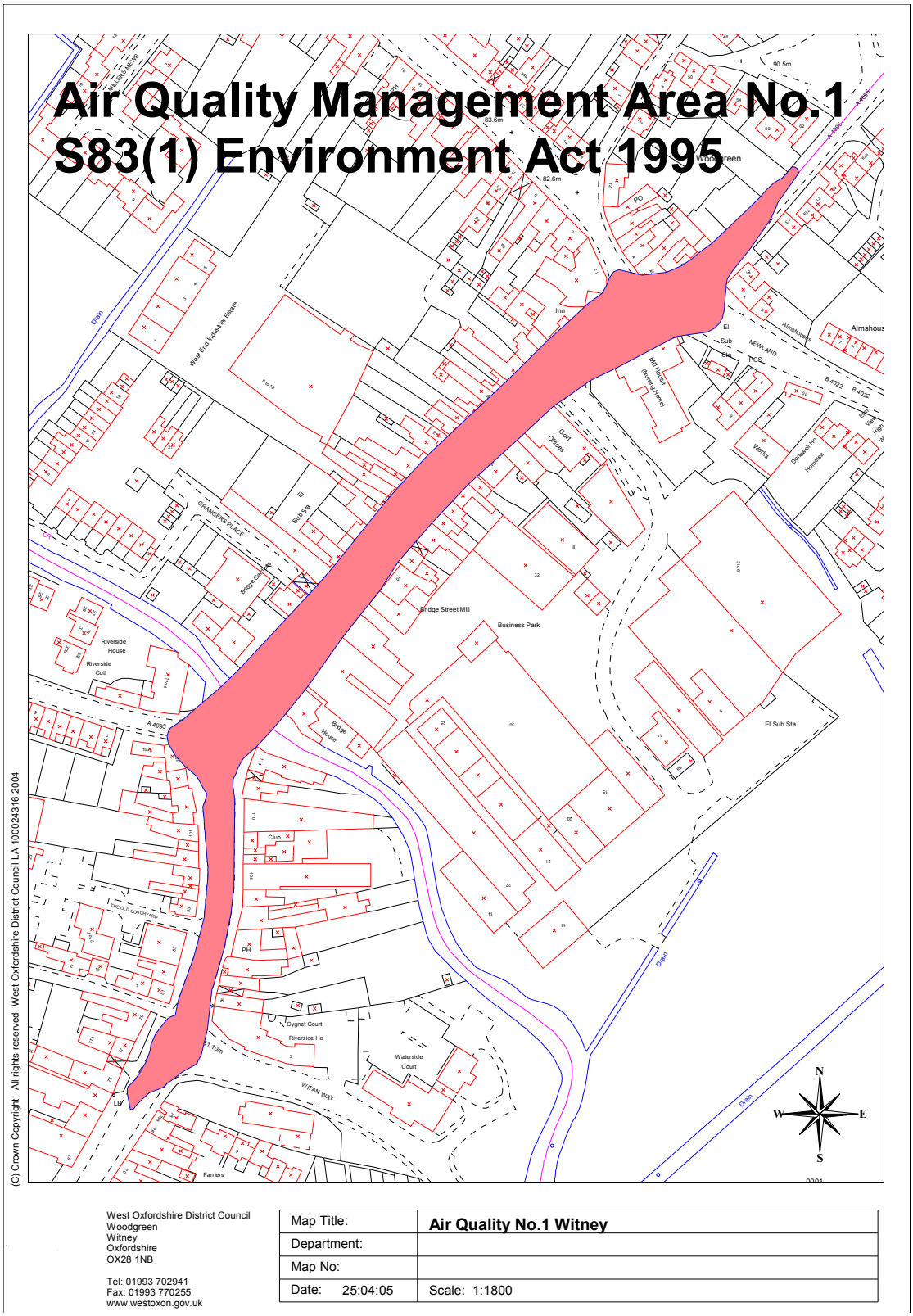
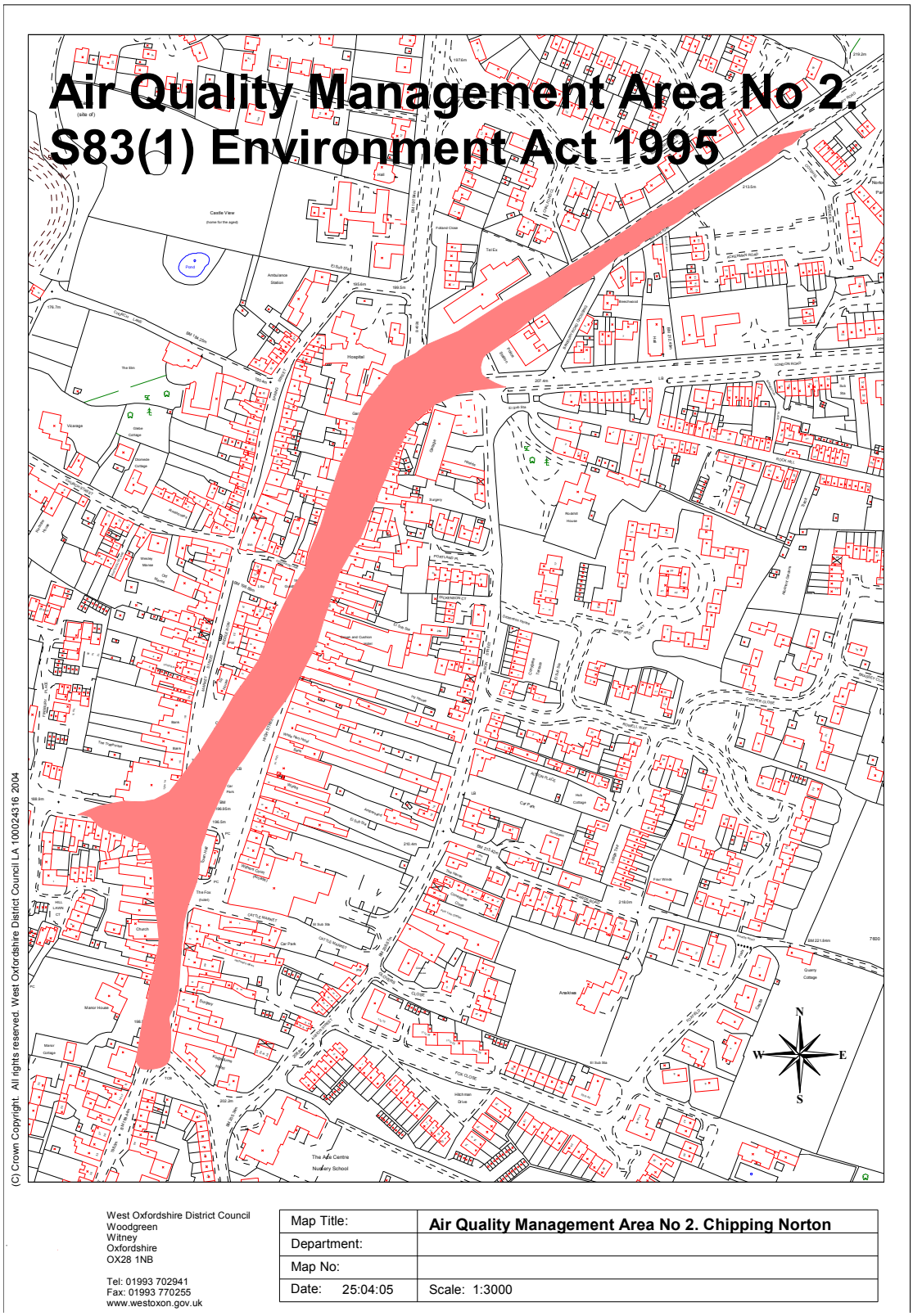


Figure 1.3 Map of AQMA Boundaries – Chipping Norton



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Map Title:	**Air Quality Management Area No 2. Chipping Norton**
Department:	
Map No:	
Date: 25:04:05	Scale: 1:3000

2 New Monitoring Data

2.1 Summary of Monitoring Undertaken

2.1.1 Automatic Monitoring Sites

AQMA No 1 - Witney

Continuous monitoring of nitrogen dioxide began in Newland, Witney in August 2001 and continued there until April 2005. When this site was sold, the original API, a chemiluminescent NOx continuous analyser, was relocated to Chipping Norton. A similar but newer model was established (May 2009) at a new location on Bridge Street within the Witney AQMA (the location is shown on the plan at Figure 2.1). Calibration checks of the instrumentation are made every two weeks by the LA and six monthly service and calibration work is carried out by Enviro Technology plc. Service reports to date have been routine but a CPU was replaced in early April 2010 (resulting in the loss of two weeks of data recording). A modem failure in December 2010 resulted in a further week of lost data. All the data is ratified and validated by AECOM Limited. Data was collected during the period January 2010 to December 2010.

In 2010, WODC was awarded a Defra AQ Grant to update the modelling of the AQMA – this was commenced in May 2011. Any review of the AQMA boundary, as declared, will be used to further develop the Action Plan to improve air quality in Witney.

Annual Mean NO_2 Concentrations

Period	Annual Mean NO_2 Concentration / $\mu g/m^3$	Hourly Exceedences
2010 Annual Mean	33.0	0

AQMA No 2 - Chipping Norton.

A monitoring station was established in Chipping Norton to monitor nitrogen dioxide using the chemiluminescent analyser relocated from Witney. This was done to carry out further assessment work in response to the declaration of AQMA No 2 (the location is shown on the plan at Figure 2.2). The analysis of previous results helped formulate the Chipping Norton AQMA Action Plan which was accepted by Defra

Continuing Monitoring is an integral part of the plan as submitted. Financial constraints have delayed further the necessary consultation and technical investigation required prior to installation and implementation of recommended mitigation measures. Calibration checks of the instrumentation are made every two weeks by the LA and six monthly service and calibration work is carried out by Enviro Technology plc.

Service reports have been routine and the 2010 data capture rate for this analyser is much improved. All the data is ratified and validated by AECOM Limited

The data collected in the period January 2010 to December 2010 inclusive has been ratified and validated and is summarised in the table below.

Annual Mean NO_2 Concentrations

Period	Annual Mean NO_2 Concentration / $\mu g/m^3$	Hourly Exceedences
2010 Annual Mean	45.3	6

Figure 2.1 Map of Automatic Monitoring Site

WITNEY

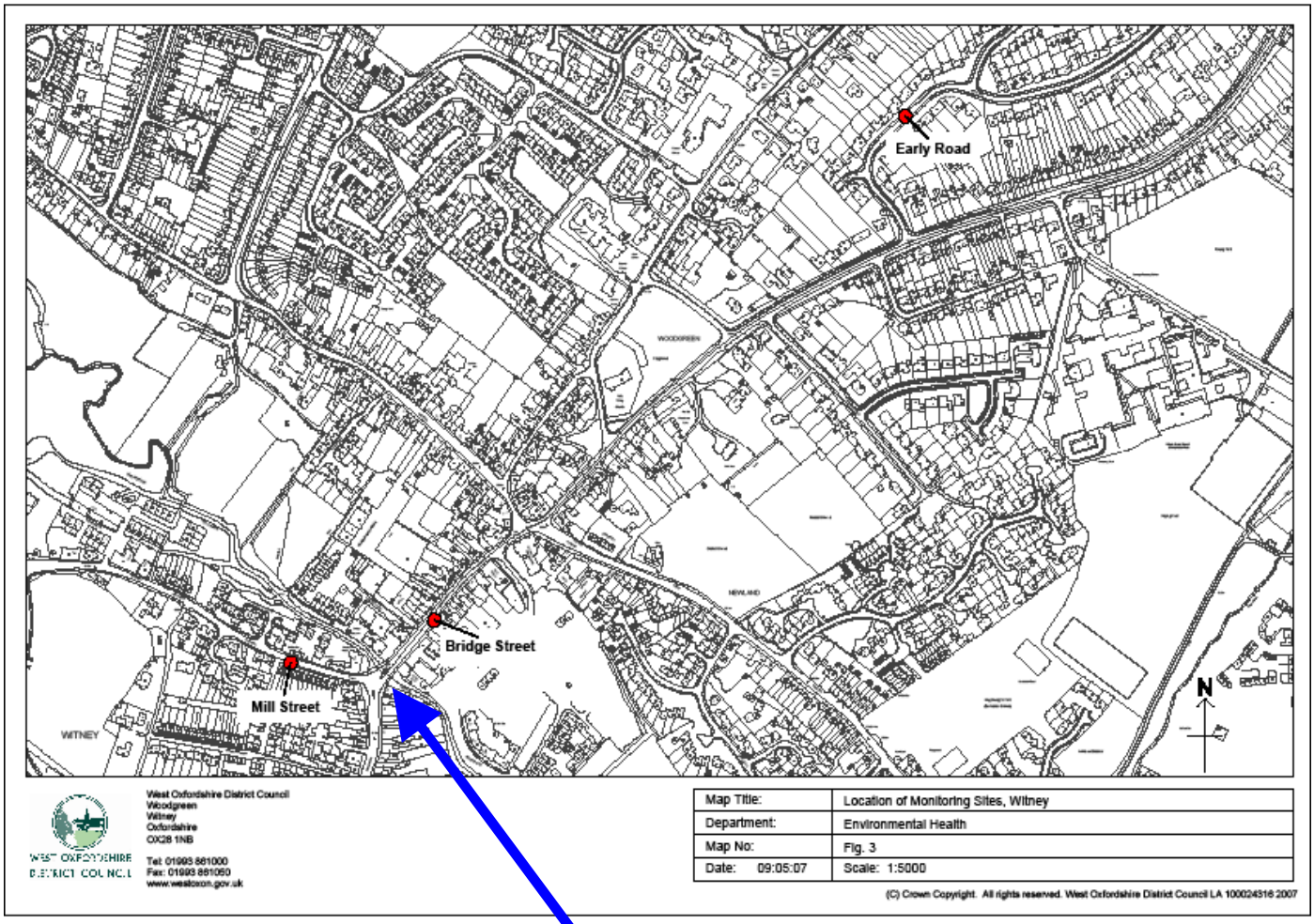
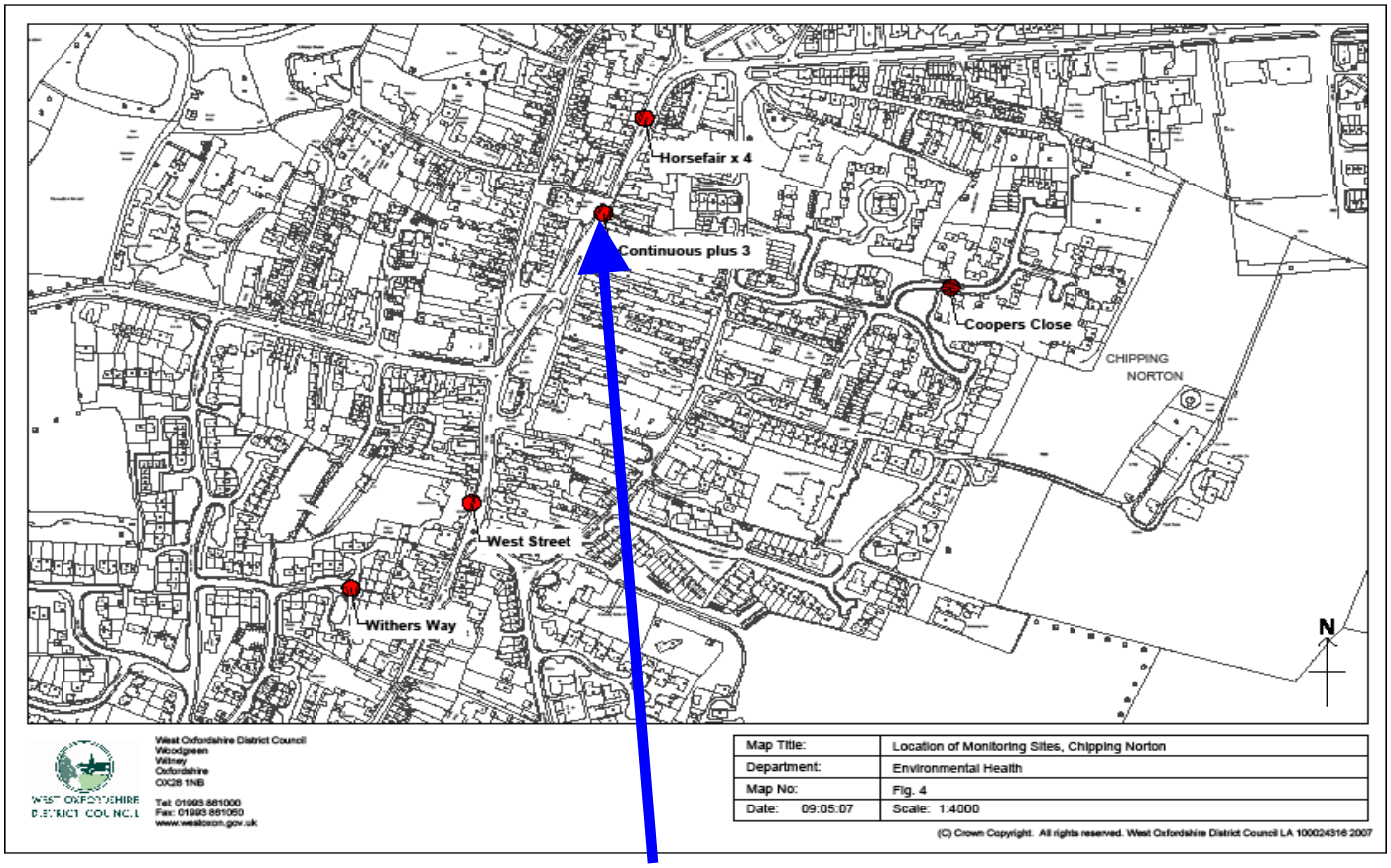


Table 2.1a Details of Automatic Monitoring Sites

Site Name	Site Type	OS Grid Ref	Pollutants Monitored	In AQMA ?	Relevant Exposure?	Distance to kerb of nearest road	Worst-case Location?
Chipping Norton	Urban Roadside	431404 227206	NO_2	Y	Y (2.0m to facade)	0.5m	Y
Witney	Urban Roadside	435768 210177	NO_2	Y	Y (0.5m to facade)	2.0m	Y

Figure 2.2 Map of Automatic Monitoring Site

CHIPPING NORTON



A Q Continuous Monitor

2.1.2 Non-Automatic Monitoring Sites

Nitrogen Dioxide monitoring by Diffusion Tube.

Diffusion tubes are exposed for approximately 4 weeks before being sent for analysis to Harwell Scientifics at Didcot. The Overall Bias Adjustment factor available from the AEA spreadsheet v04.11, where a bias adjustment figure is provided for the participating laboratories for the period 2010, was 0.85. Additionally, a Bias Adjustment Factor, also 0.85, was calculated using the AEA Spreadsheet for Calculation of Diffusion Tube Precision and Accuracy and the raw NO2 concentrations measured by the Chipping Norton Co-Location study diffusion tubes.

Table 2.2 and Appendices B and C detail the results of the monitoring across the district adjusted for laboratory bias. It shows that 'Bridge Street' and 'Mill Street' in Witney and 'Horsefair', '31, High Street' and the mean of the three co-located diffusion tubes in Chipping Norton currently exceed the objective concentration and these areas lie within the Air Quality Management Areas that were declared in March 2005. All other areas were within the objective limits. Furthermore, with the exception of two roadside diffusion tube sites in Burford, two in Woodstock, and another in Bladon, all other sites (27) were more than one standard deviation (SD = 4 i.e. 36 µg/m^3 or less) below the objective limit.

Table 2.1b Details of Non-Automatic Monitoring Sites - Within AQMAs

Annual Mean NO_2 / µg/m^3 (2010) in Witney (Bias Adjusted – Local v National)

Location	Annual Mean NO_2 / µg/m^3	
	Local (0.85)	National (0.85)
Bridge Street	**56.3**	**56.3**
Mill Street	**44.5**	**44.5**

Annual Mean NO_2 / µg/m^3 (2010) in Chipping Norton (Bias Adjusted – Local v National)

Location	Annual Mean NO_2 / µg/m^3	
	Local (0.85)	National (0.85)
Horsefair	**66.4**	**66.4**
31 High Street	**45.6**	**45.6**
Co-Location Triplicate Mean	**45.4**	**45.4**
5 Horsefair	29.9	29.9
7 Horsefair	29.3	29.9
West Street	35.5	35.5

Note: Data in this table addresses the comment in Appraisal Report PR3-546. All are representative of relevant exposure – those in bold exceed 40 µg/m^3

Table 2.1c Details of Non- Automatic Monitoring Sites

Site Name	Site Type	OS Grid Ref	In AQMA ?	Relevant Exposure?	Distance to kerb of nearest road	Worst-case Location?
As detailed	Roadside or Background as specified	Listed at Appendix E	As per tables above	Appropriate to area within 3m	Generally within 3m or on building facade	Appropriate to area

For more detail see Appendices B, C and E

The diffusion tubes are supplied by Harwell Scientifics and analysed in accordance with Harwell Scientifics SOP HS/WI/1015, issue 14. This method meets the guidelines set out in Defra's 'Diffusion Tubes for Ambient NO_2 Monitoring: Practical Guidance.'

The tubes (from a specified batch) are prepared by spiking acetone : triethanolamine (50:50) on to the grids prior to the tubes being assembled.

The Overall Bias Adjustment factor available from the AEA spreadsheet v4.11, where a bias adjustment figure is provided for the participating laboratories for the period 2010 was 0.85. A Bias Adjustment Factor, also 0.85, was calculated using the AEA Spreadsheet for Calculation of Diffusion Tube Precision and Accuracy and the raw NO2 concentrations measured by the Chipping Norton Co-Location study diffusion tubes.

In the WASP inter-comparison scheme for comparing spiked Nitrogen Dioxide diffusion tubes, Harwell Scientifics is currently ranked as a **Category Good** laboratory

Ratification of the WODC data was completed by AECOM Limited in May 2011.

2.2 Comparison of Monitoring Results with Air Quality Objectives

Automatic AQ Monitoring Station – Chipping Norton

The data collected in the period January 2010 to December 2010 inclusive has been ratified and validated and is summarised in the table below.

Annual Mean NO_2 Concentrations

Period	Annual Mean NO_2 Concentration / µg/m^3	Hourly Exceedences >200 µg/m^3
2010 Annual Mean	45.3	6 (172.8 µg/m^3)

Note: Based on 93.1% data capture

Automatic AQ Monitoring Station – Witney

The data collected in the period January 2010 to December 2010 inclusive has been ratified and validated and is summarised in the table below.

Annual Mean NO_2 Concentrations

Period	Annual Mean NO_2 Concentration / µg/m^3	Hourly Exceedences >200 µg/m^3
2010 Annual Mean	33.0	Nil

Note: Based on 92.1% data capture

Diffusion Tube Site Monitoring

At Appendices B and C are details of the results of the monitoring across the district adjusted for laboratory bias. It shows that 'Bridge Street' and 'Mill Street' in Witney and 'Horsefair' and '32,High Street' in Chipping Norton and the mean of the three co-located diffusion tubes in Chipping Norton currently exceed the objective concentration and these areas lie within the Air Quality Management Areas that were declared in March 2005. All other areas were within the objective limits. Furthermore, with the exception of two roadside diffusion tube sites in Burford, two in Woodstock, and another in Bladon, all other sites (27) were more than one standard deviation (SD = 4 i.e. 36 $\mu g/m^3$ or less) below the objective limit.

Annual Mean NO_2 / $\mu g/m^3$ (2010) in Witney (Bias Adjusted – Local v National)

Location	Annual Mean NO_2 / $\mu g/m^3$	
	Local (0.85)	National (0.85)
Bridge Street	**56.3**	**56.3**
Mill Street	**44.5**	**44.5**

Annual Mean NO_2 / $\mu g/m^3$ (2010) in Chipping Norton (Bias Adjusted – Local v National)

Location	Annual Mean NO_2 / $\mu g/m^3$	
	Local (0.85)	National (0.85)
Horsefair	**66.4**	**66.4**
31 High Street	**45.6**	**45.6**
Co-Location Triplicate Mean	**45.4**	**45.4**

The results, overall, do not indicate any additional areas of concern requiring a detailed assessment.

2.2.1 Nitrogen Dioxide

The Chipping Norton data includes both automatic monitoring and diffusion tube monitoring. The automatic monitoring returned a Mean Pollution Concentration of 45.3 µg/m^3 this was based on a 93.1% data capture. The measured annual mean concentration is greater than 40 µg/m^3 within parts of the Chipping Norton AQMA (Horsefair) and within or at the boundary of the Witney AQMA.

The Chipping Norton AQMA (Horsefair) site has not recorded more than 18 1-hour means above 200 µg/m^3 (actual number is 6), and the 99.8th percentile of 1-hour mean concentrations is 174.5 µg/m^3.

Data from the continuous monitoring station within the Witney AQMA achieved 92.1% capture rate. The 99.8th percentile of 1-hour mean concentrations is 105.9 µg/m^3. The Witney AQMA boundary will be reassessed and include the Mill Street diffusion tube site following an update of the dispersion modelling (this commenced in May 2011).

The monitoring site locations are representative of relevant public exposure.

Automatic Monitoring Data

Table 2.2a Results of Automatic Monitoring for Nitrogen Dioxide: Comparison with Annual Mean Objective

Site ID	Location	Within AQMA?	Data Capture for full calendar year 2010 %	Annual mean concentrations (µg/m^3)		
				2008	2009	2010
AQMA 1	Witney	Y	92.1	N/A	32.7*	33.0
AQMA 2	Chipping Norton	Y	93.1	39.8	39.6	45.3

*Mean was “annualised” as monitoring was not carried out for the full year.

Table 2.2b Results of Automatic Monitoring for Nitrogen Dioxide: Comparison with 1-hour Mean Objective

Site ID	Location	Within AQMA?	Data Capture for full calendar year 2010 %	Number of Exceedences of hourly mean (200 μg/m^3)		
				2008	2009	2010
AQMA 1	Witney	Y	92.1	N/A	0* (105.0)	0 (105.9)
AQMA 2	Chipping Norton**	Y	93.1	5 (178.6)	4 (174.5)	6 (172.8)

*Mean was “annualised” as monitoring was not carried out for the full year - the 99.8th percentile of hourly means in brackets are included for comparison only.

**Exceptionally, it is possible for a vehicle to be parked close to the automatic monitor and, in the worst case, with the exhaust closest to it and the engine running this is the likely cause of exceedences. This remains however ‘Relevant Exposure’ as this would be within 2m of the façade of a hotel or residential premises.

Diffusion Tube Monitoring Data

The full data set (monthly mean values) is at Appendix C.

Table 2.2c Results of Nitrogen Dioxide Diffusion Tubes - Witney

Annual Mean NO_2 / µg/m^3 (2010) in Witney (Bias Adjusted – Local v National)

Location	Annual Mean NO_2 / µg/m^3	
	Local (0.85)	National (0.85)
Bridge Street	**56.3**	**56.3**
Mill Street	**44.5**	**44.5**

Table 2.2d Results of Nitrogen Dioxide Diffusion Tubes - Chipping Norton

Annual Mean NO_2 / µg/m^3 (2010) in Chipping Norton (Bias Adjusted – Local v National)

Location	Annual Mean NO_2 / µg/m^3	
	Local (0.85)	National (0.85)
Horsefair	**66.4**	**66.4**
31 High Street	**45.6**	**45.6**
Co-Location Triplicate Mean	**45.4**	**45.4**

The national bias adjustment factor applied in PR 2011 to the annual means is 0.85

All of the above are located within AQMAs but note that Witney, 'Mill Street' is marginally outside the current AQMA boundary which will be re-designated after a review (2011) of the dispersion modelling (2010 Defra AQ Grant award).

All other areas were within the objective limits. Furthermore, with the exception of two roadside diffusion tube sites in Burford, two in Woodstock, and another in Bladon, all other sites (27) were more than one standard deviation (SD = 4 i.e. 36 µg/m^3 or less) below the objective limit.

See Appendix B for % data capture of other Diffusion Tubes

2.2.2 Summary of Compliance with AQS Objectives

Andrew Ward has examined the results from monitoring in the district. Concentrations outside of the AQMA are all below the objectives at relevant locations, therefore there is no need to proceed to a Detailed Assessment.

[Note: Mill Street, Witney is considered to be within the AQMA as originally declared. An update of the dispersion modelling of the area is currently being done (May 2011) and Defra will be informed when the boundary of the AQMA has been redefined.]

Note: This addresses the comments in Appraisal Report PR3-546 and PR4-038.

3 New Local Developments

The Woolgate retail outlet located in the centre of Witney has undergone development resulting in a small expansion to the built environment. This area is remote from the Witney AQMA and will have no direct impact upon it.

The Witney AQMA includes the whole of Bridge Street (A4095) with stubs extending into 5 feeder roads. The original (2005) dispersion modelling and declaration of the Witney AQMA will be reviewed in 2011. WODC was awarded a Defra AQ Grant in 2010 for this work.

At RAF Brize Norton, adjacent to the town of Carterton, there has been recent expansion of infrastructure to accommodate a new aircraft type. Operational changes envisaged during the phasing out of some aircraft types and the introduction of others will not significantly alter the environmental footprint of the military base.

A change to the collection of domestic waste within the District has introduced a waste transfer station on the western outskirts of Witney. There is no direct influence affecting air quality in the vicinity from this installation.

A green waste recycling facility has been established, just beyond the District boundary, in the vicinity of Cassington. This is not expected to adversely affect local air quality.

Within the District mineral extraction in the form of aggregate, crushed limestone and some building stone continues but no significant change to the scale or scope of these operations is noted.

Andrew Ward confirms that, other than that referred to above, there are no new or newly identified local developments which may have an impact on air quality within the Local Authority area.

Note: This addresses the comment in Appraisal Report PR3-546.

4 Local / Regional Air Quality Strategy

With two AQMAs declared, an Action Plan running for one and, pending the final stages of a Planning process, a second one ready for release after a final review of matters raised during a Public Consultation, the District has addressed the significant sources of pollution and monitors progress within these declared areas.

5 Planning Applications

The proposed Cogges Link Road in Witney will provide a significant by-pass / relief road around the Witney AQMA and should significantly reduce traffic density within the AQMA. Pre and post construction air quality data will be available from the continuous monitoring station sited within the AQMA. The design and positioning of the new road should not adversely affect air quality along its route as residential properties are located well away from the carriageway.

6 Air Quality Planning Policies

See Appendix D: Action Plan Progress – Chipping Norton

7 Local Transport Plans and Strategies

Monitoring data is now available from the automatic analyser in Witney.
A nearby diffusion tube currently lies marginally outside the AQMA as declared in 2005 – this was most likely a modelling error at the time. There is no need to proceed to a Detailed Assessment in order to rectify this.

A change is required to the boundary of this existing AQMA. A review of the dispersion modelling (last done in 2005) has just begun (May 2011) - a result of having been awarded a Defra AQ Grant in 2010. Reasons for the delay in publishing an Action Plan for this area are detailed in the Executive Summary.

The review will give a better 'before' scenario of the AQMA - prior to the implementation of the proposed Action Plan and the activation of any relief road, as finally decided. Comparisons will be able to be made with post construction data.

The next formal actions will be to declare the revised Witney AQMA (subject to completion of modelling) and submit the Witney AQMA Action Plan.

In 2012 there will be a USA (for 2011).

8 References

West Oxfordshire Air Quality Data Ratification AECOM Ltd May 2011

Appendices

Appendix A: QA/QC Data and Bias Adjustment Calculations, 2010

Appendix B: Diffusion Tube Results Summary, 2010

Appendix C: Raw Diffusion Tube Monitoring Data, 2010

Appendix D: Action Plan Progress – Chipping Norton

Appendix E: Grid References of Diffusion Tube Locations

Appendix A: QA:QC Data and Bias Adjustment Calculations, 2010

QA/QC of automatic monitoring

Calibration checks of the instrumentation are made every two weeks by the LA and six monthly service and calibration work is carried out by Enviro Technology plc. All the data is ratified and validated by AECOM Limited.

QA/QC of diffusion tube monitoring

See detailed data below for information regarding diffusion tube precision.

Diffusion Tube Bias Adjustment Factors and Factor from Local Co-location Studies

Diffusion tubes are exposed for approximately 4 weeks before being sent for analysis to the supplier, Harwell Scientifics at Didcot. The Overall Bias Adjustment factor available from the AEA spreadsheet v4/11, where the bias adjustment figure provided for the participating laboratories for the period 20010 is 0.85. A Bias Adjustment Factor, also 0.85, was calculated using the AEA Spreadsheet for Calculation of Diffusion Tube Precision and Accuracy and the raw NO2 concentrations measured by the CN Co Location study diffusion tubes.

Discussion of Choice of Factor to Use

Both local and national Bias Adjustment Factors were available and these were identical. The national factor had been used hitherto because of the previously 'below ideal' data capture rate of the automatic analyser within the Chipping Norton AQMA - which has now improved to 93.1%

This is now above the UK NAQS recommended capture rate of 90% and continues to exceed the EU Directive for NO2 which specifies a 75% data capture threshold for assessing compliance with limit and guidance values. The previously reduced capture rate was due to equipment outages. Reliability has improved during 2010 and the data captured was assessed to be reliable and representative.

Note: This addresses the comment in Appraisal Report PR3-546 though for this PR the bias factors are identical.

Checking Precision and Accuracy of Triplicate Tubes

AEA Energy & Environment
From the AEA group

Diffusion Tubes Measurements										Automatic Method		Data Quality Check	
Period	Start Date dd/mm/yyyy	End Date dd/mm/yyyy	Tube 1 μgm^{-3}	Tube 2 μgm^{-3}	Tube 3 μgm^{-3}	Triplicate Mean	Standard Deviation	Coefficient of Variation (CV)	95% CI of mean	Period Mean	Data Capture (% DC)	Tubes Precision Check	Automatic Monitor Data
1	05/01/2010	03/02/2010	61.8	57.2	59.8	60	2.3	4	5.7	48.9	93.4	Good	Good
2	03/02/2010	02/03/2010	71.2	61.2	65.9	66	5.0	8	12.4	56.6	93.1	Good	Good
3	02/03/2010	30/03/2010	50.9	53.8	55.5	53	2.3	4	5.8	45.9	92.1	Good	Good
4	30/03/2010	28/04/2010	51.8	57.7	56.4	55	3.1	6	7.7	70.7	93.0	Good	Good
5	28/04/2010	01/06/2010	52.7	42.2	53.2	49	6.2	13	15.4	44.9	94.7	Good	Good
6	01/06/2010	30/06/2010	50.1	52.1	47.4	50	2.4	5	5.9	41.8	92.7	Good	Good
7	30/06/2010	03/08/2010	37.6	36.4	32.9	36	2.4	7	6.1	26.2	92.6	Good	Good
8	03/08/2010	01/09/2010	29.3	36.8	34.3	33	3.8	11	9.5	27.5	92.4	Good	Good
9	01/09/2010	28/09/2010	51.5	53.1	50.7	52	1.2	2	3.0	39.3	90.1	Good	Good
10	28/09/2010	02/11/2010	53.5	54.7	55.3	55	0.9	2	2.3	40.9	95.1	Good	Good
11	02/11/2010	01/12/2010	70.6	68.0	57.0	65	7.2	11	17.9	48.3	92.8	Good	Good
12	01/12/2010	05/01/2011	67.7	69.0	65.6	67	1.7	3	4.3	56.7	94.1	Good	Good
13													
											Overall survey -->	Good precision	Good Overall DC

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

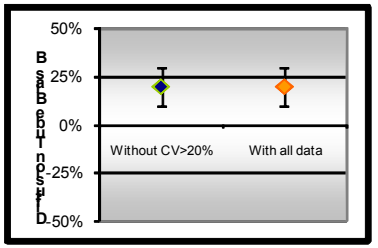
(Check average CV & DC from Accuracy calculations)

Site Name/ ID:	Chipping Norton 2010

Precision: 12 out of 12 periods have a CV smaller than 20%

Accuracy (with 95% confidence interval) without periods with CV larger than 20%	
Bias calculated using 12 periods of data	
Bias factor A	0.85 (0.79 - 0.93)
Bias B	17% (7% - 27%)
Diffusion Tubes Mean:	53 μgm^{-3}
Mean CV (Precision):	6
Automatic Mean:	46 μgm^{-3}
Data Capture for periods used:	93%
Adjusted Tubes Mean:	45 (42 - 50) μgm^{-3}

Accuracy (with 95% confidence interval) WITH ALL DATA	
Bias calculated using 12 periods of data	
Bias factor A	0.85 (0.79 - 0.93)
Bias B	17% (7% - 27%)
Diffusion Tubes Mean:	53 μgm^{-3}
Mean CV (Precision):	6
Automatic Mean:	46 μgm^{-3}
Data Capture for periods used:	93%
Adjusted Tubes Mean:	45 (42 - 50) μgm^{-3}



Jaume Targa, for AEA
Version 04 - February 2011

National Bias Adjustment Factor Calculation for Diffusion Tube Correction (Spreadsheet Version 04/11)

Analysed By[1]	Method	Year[5]	Site Type	Local Authority	Length of Study (months)	Diffusion Tube Mean Conc. (Dm) (mg/m^3)	Automatic Monitor Mean Conc. (Cm) (mg/m^3)	Bias (B)	Tube Precision[6]	Bias Adjustment Factor (A) (Cm/Dm)
Harwell Scientific Services	50% TEA in Acetone	2010	R	Hambleton DC	11	26	18	46.6%	G	**0.68**
Harwell Scientific Services	50% TEA in Acetone	2010	R	Falkirk Council	11	37	31	18.6%	P	**0.84**
Harwell Scientific Services	50% TEA in Acetone	2010	UB	Falkirk Council	10	27	22	21.1%	P	**0.83**
Harwell Scientific Services	50% TEA in Acetone	2010	R	Swale BC	12	46	39	18.1%	G	**0.85**
Harwell Scientific Services	50% TEA in Acetone	2010	UC	Dover DC	12	44	42	5.2%	G	**0.95**
Harwell Scientific Services	50% TEA in Acetone	2010	B	Gravesham BC	10	36	27	31.8%	G	**0.76**
Harwell Scientific Services	50% TEA in Acetone	2010	I	Swale BC	10	25	30	-17.6%	G	**1.21**
Harwell Scientific Services	50% TEA in Acetone	2010	R	Tunbridge Wells BC	12	67	77	-13.5%	G	**1.16**
Harwell Scientific Services	50% TEA in Acetone	2010	B	Canterbury CC	12	21	18	15.4%	G	**0.87**
Harwell Scientific Services	50% TEA in Acetone	2010	R	Canterbury CC	12	48	34	41.7%	G	**0.71**
Harwell Scientific Services	50% TEA in Acetone	2010	R	Gravesham BC	11	42	36	16.5%	G	**0.86**
Harwell Scientific Services	50% TEA in Acetone	2010	UB	City of York Council	12	26	25	6.6%	G	**0.94**
Harwell Scientific Services	50% TEA in Acetone	2010	B	Gravesham BC	10	36	27	31.8%	G	**0.76**
Harwell Scientific Services	50% TEA in Acetone	2010	B	Stockton on Tees	12	30	27	10.5%	G	**0.91**
Harwell Scientific Services	50% TEA in Acetone	2010	R	Stockton on Tees	12	25	21	17.1%	G	**0.85**
Harwell Scientific Services	50% TEA in Acetone	2010	K	Marylebone Road Intercomparison	11	120	94	27.3%	G	**0.79**
Harwell Scientific Services	50% TEA in Acetone	2010	R	Vale of White Horse DC	12	39	32	23.6%	G	**0.81**
Harwell Scientific Services	50% TEA in Acetone	2010	R	Thanet DC	11	32	26	25.8%	G	**0.79**
Harwell Scientific Services	50% TEA in Acetone	2010		**Overall Factor[3] (18 studies)**				**Use**		**0.85**

Appendix B: Diffusion Tube Results Summary, 2010

Area	Site Name	Site Type[A]	Annual Mean NO_2 Concentration ($\mu g/m^3$)			Data Capture
			Unadjusted	Bias Adjusted (Local)[B]	Bias Adjusted (National)[C]	(%)
Witney	Bridge Street	R	66.2	**56.3**	**56.3**	100.0
	Mill Street	R	52.4	**44.5**	**44.5**	100.0
	Early Rd.	B	19.9	16.9	16.9	100.0
	Abbey Rd.	B	23.6	20.0	20.0	83.3
Burford	High St	R	45.4	38.6	38.6	100.0
	93 High Street	R	45.5	38.6	38.6	83.3
	Frethern Cl	B	18.2	15.5	15.5	100.0
	Orchard Rise	B	14.7	12.5	12.5	100.0
Carterton	Brize Norton Rd	R	27.9	23.7	23.7	91.7
	Upavon Way	R	28.9	24.6	24.6	91.7
	Garner Close	B	16.8	14.3	14.3	100.0
	Oakfield Road	B	18.5	15.7	15.7	100.0
Charlbury	Dyers Hill	R	23.3	19.8	19.8	75.0
	Nineacres Lane	R	20.7	17.6	17.6	100.0
	Tanners Close	B	15.4	13.1	13.1	100.0
	The Green	B	14.9	12.6	12.6	100.0
Chipping Norton	Horsefair	R	78.1	**66.4**	**66.4**	91.7
	31 High Street	R	53.7	**45.6**	**45.6**	100.0
	Co-location Average	R	53.5	**45.4**	**45.4**	100.0
	5 Horsefair	R	35.2	29.9	29.9	100.0
	7 Horsefair	R	34.5	29.3	29.3	91.7
	West Street	R	41.7	35.5	35.5	100.0
	Coopers Close	B	17.4	14.8	14.8	100.0
	Withers Way	B	17.4	14.8	14.8	100.0
Eynsham	Acre End Street	R	21.9	18.6	18.6	100.0
	Mill Street	R	22.5	19.1	19.1	100.0
	Orchard Close	B	17.2	14.7	14.7	100.0
	Shakespeare Rd	B	21.6	18.4	18.4	100.0
Woodstock	Oxford Street	R	45.9	39.0	39.0	83.3
	Oxford Street(2)	R	45.4	38.6	38.6	100.0
	The Ley	B	16.0	13.6	13.6	100.0
	Westland Way	B	19.4	16.5	16.5	91.7
Bladon	Grove Road	R	27.6	23.5	23.5	100.0
	Grove Road(2)	R	36.8	31.3	31.3	100.0
	Heath Lane	B	16.5	14.0	14.0	100.0
	Park Close	B	15.0	12.8	12.8	91.7
	Park Street	R	43.4	36.9	36.9	100.0

Notes: [A] Site Types: R = Roadside; B = Background. [B] Local bias adjustment factor = 0.85. [C] National bias adjustment factor = 0.85. Further details on bias adjustment can be found in Appendix B

Appendix C: Raw Monthly Diffusion Tube Monitoring Data, 2010

Area	Location	Site Type	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Data Capture (%)	Uncorr. Annual Average
Witney	Bridge Street	R	65.8	80.6	64.8	84.1	60.8	56.8	47.5	46.6	64.5	68.0	73.2	81.7	100.0	66.2
	Mill Street	R	60.8	64.1	59.5	41.9	43.9	42.3	42.2	38.1	56.4	60.5	55.7	63.1	100.0	52.4
	Early Rd.	B	33.5	30.8	20.3	13.0	12.0	9.4	8.8	10.8	17.4	18.7	27.4	36.5	100.0	19.9
	Abbey Rd.	B	35.7	33.0	18.7	14.7	ND	11.2	ND	10.6	18.4	20.5	29.5	43.2	83.3	23.6
Burford	High St	R	47.9	41.9	44.1	40.9	41.9	42.5	49.0	43.8	43.1	47.5	53.4	49.2	100.0	45.4
	93 High Street	R	48.0	ND	49.5	46.3	39.3	40.7	31.8	ND	41.9	50.7	49.4	56.9	83.3	45.5
	Frethern Cl	B	31.1	24.3	16.6	13.7	10.5	9.5	8.7	9.5	13.7	18.1	28.2	35.0	100.0	18.2
	Orchard Rise	B	24.9	20.0	12.8	8.4	9.2	7.7	7.3	8.3	13.3	12.4	23.8	28.2	100.0	14.7
Carterton	Brize Norton Rd	R	39.7	35.9	28.3	23.6	20.1	19.2	ND	13.8	21.6	24.2	39.4	41.3	91.7	27.9
	Upavon Way	R	2.6	32.2	27.9	22.7	21.6	ND	20.5	20.1	32.8	35.6	49.4	52.6	91.7	28.9
	Garner Close	B	28.9	23.4	15.1	11.4	9.7	8.0	6.4	7.0	13.2	15.9	28.3	34.2	100.0	16.8
	Oakfield Road	B	30.1	28.2	16.3	14.1	12.1	8.3	6.6	5.2	14.9	17.3	29.9	39.1	100.0	18.5
Charlbury	Dyers Hill	R	28.9	30.5	19.3	18.9	20.1	18.6	15.5	ND	ND	22.3	ND	36.0	75.0	23.3
	Nineacres Lane	R	30.6	29.0	17.2	16.6	11.1	13.3	11.3	11.7	19.9	19.9	30.2	37.0	100.0	20.7
	Tanners Close	B	26.8	23.7	14.1	10.4	9.7	6.9	5.7	7.1	12.4	13.7	22.5	31.8	100.0	15.4
	The Green	B	27.7	23.0	11.1	9.3	6.0	6.0	8.8	7.0	13.0	14.1	23.8	28.7	100.0	14.9
Chipping Norton	Horsefair	R	77.2	85.2	75.0	79.5	84.8	53.4	77.4	78.2	77.5	77.8	ND	92.7	91.7	78.1
	31 High Street	R	61.4	66.2	58.1	52.5	52.1	38.6	43.5	40.7	49.6	54.2	63.0	64.2	100.0	53.7
	CN Co-location	R	61.8	71.2	50.9	51.8	52.7	50.1	37.6	29.3	51.5	53.5	70.6	67.7	100.0	54.1
	CN Co-location	R	57.2	61.2	53.8	57.7	42.2	52.1	36.4	36.8	53.1	54.7	68.0	69.0	100.0	53.5
	CN Co-location	R	59.8	65.9	55.5	56.4	53.2	47.4	32.9	34.3	50.7	55.3	57.0	65.6	100.0	52.8
	Co-location Average	R	59.6	66.1	53.4	55.3	49.4	49.9	35.6	33.5	51.8	54.5	65.2	67.4	100.0	53.5
	5 Horsefair	R	39.9	44.1	35.9	34.3	30.3	28.9	24.8	23.4	29.5	37.7	45.3	47.8	100.0	35.2
	7 Horsefair	R	37.2	ND	35.6	35.4	34.3	31.0	24.6	21.8	31.6	34.8	45.7	47.7	91.7	34.5
	West Street	R	51.7	51.9	41.4	37.8	35.7	28.2	32.6	30.9	39.9	41.8	54.0	54.7	100.0	41.7
	Coopers Close	B	27.9	22.9	14.5	13.3	10.8	8.8	8.9	9.8	15.5	16.4	26.2	33.9	100.0	17.4
	Withers Way	B	28.4	28.1	16.8	12.5	10.9	9.6	6.7	7.7	13.0	15.4	26.6	33.6	100.0	17.4

Area	Location	Site Type	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Data Capture (%)	Uncorr. Annual Average
Eynsham	Acre EndStreet	R	32.5	32.0	22.8	16.9	17.2	14.7	2.0	10.9	21.2	21.1	31.5	40.0	100.0	21.9
	Mill Street	R	33.7	32.0	23.0	19.4	16.3	12.1	10.3	11.7	19.9	20.7	29.5	41.2	100.0	22.5
	Orchard Close	B	30.4	24.2	14.3	13.2	11.0	7.8	7.3	8.7	16.4	16.4	24.6	32.6	100.0	17.2
	Shakespeare Rd	B	35.1	29.8	19.5	17.5	15.2	12.0	8.6	11.1	18.4	19.0	31.5	41.9	100.0	21.6
Woodstock	Oxford Street	R	**ND**	61.7	36.4	43.9	41.9	38.9	**ND**	28.9	44.4	46.1	53.5	63.3	83.3	45.9
	Oxford Street(2)	R	52.2	53.6	41.4	38.6	40.0	38.2	38.9	37.9	47.7	45.9	53.6	56.4	100.0	45.4
	The Ley	B	26.6	24.1	14.8	11.9	9.2	6.8	7.1	7.7	15.0	16.2	23.7	28.4	100.0	16.0
	Westland Way	B	31.4	**ND**	42.4	7.5	10.9	8.7	6.6	8.6	14.7	16.9	27.3	38.0	91.7	19.4
Bladon	Grove Road	R	41.4	40.0	26.0	23.9	22.6	22.9	16.5	16.7	28.0	31.1	38.0	24.5	100.0	27.6
	Grove Road(2)	R	48.4	47.2	39.1	31.2	25.9	24.7	24.2	25.5	36.1	38.9	59.8	41.1	100.0	36.8
	Heath Lane	B	28.0	22.3	14.2	12.5	10.3	8.5	7.5	8.4	14.8	13.6	27.4	30.7	100.0	16.5
	Park Close	B	23.3	20.0	13.7	9.8	**ND**	7.1	6.5	6.6	13.9	11.9	24.0	28.6	91.7	15.0
	Park Street	R	52.0	57.0	45.6	38.9	37.4	32.0	30.1	30.1	43.1	46.1	58.7	50.1	100.0	43.4

Note: ND = No data due to vandalism / theft. Site type codes: R = roadside; B = background.

Appendix D: Action Plan Progress – Chipping Norton

[2010 / 2011 revisions in black]

No.	Measure	Focus	Lead authority	Planning phase	Implementation phase	Indicator	Target annual emission reduction in the AQMA	Progress to date	Progress in last 12 months
1	HGV Routing	Reduce unit emissions in the AQMA in conjunction with County LTP	OCC	2009 - 2010	2011 – 2012 Subject to current financial constraints	Annual returns	To within national limits	Awaiting finalisation of Consultant's Report	Development and implementation subject to current financial constraints
2	Funding bid for regional prioritisation		OCC						Only required if Measure 1 does not deliver Results
3	Continuously monitor emissions within AQMA	Identify and confirm reducing emissions trend	WODC	2005 - 2008	2009 - Current	Annual returns	To within national limits	Awaiting implementation of Measure 1	See PR 2008, USA 2009, PR 2010 and 2011
4	Steering group		WODC		2011 -12 onwards as required upon full implementation of Measure 1	Annual returns			
5	Development of Climate Change Policy		Government						

No.	Measure	Focus	Lead authority	Planning phase	Implementation phase	Indicator	Target annual emission reduction in the AQMA	Progress to date	Progress in last 12 months
5a	Lobby Government	Lobbying and support of Government to create policy to increase the use of cleaner vehicles and fuels	OCC has Highway Authority Network Management Duty (for the free flow of traffic etc						
5b	Engage with local public transport operators	Reduce unit emissions in the AQMA	OCC	Engage with local public transport operators (buses and taxis) to a) promote the procurement of vehicles with cleaner engine technologies and b) to promote the use of cleaner fuels.	Continuing introduction of newer, less polluting buses	Annual returns	Reduce unit emissions in the AQMA using Bus Quality Partnership Agreements (BQPA]	Manage bus emissions	

No.	Measure	Focus	Lead authority	Planning phase	Implementation phase	Indicator	Target annual emission reduction in the AQMA	Progress to date	Progress in last 12 months
5c	Engage with freight transport operators	Engage with freight transport operators to a) promote the procurement of vehicles with cleaner engine technologies and b) to promote the use of cleaner fuels.	OCC		Expected changes to emission standards	Techno-logical develop-ment	Reduce unit emissions in the AQMA in conjunction with County LTP	HGV Routing	
5d	'Leave your car at home' initiative	WODC and OCC to Promote use of public transport - awareness levels raised in all periodic Council publicity media	WODC	WODC Climate Change Action Plan - Apr 2011 – Green Travel Action 5.1	Continuous Produce maps and information on local public transport and publicise			June 2011 WODC Sustainable Transport Group	In progress
5e	Promote use of cycles	Promotion of the use of the cycle. Awareness levels raised in all periodic Council publicity media Promote cycling and walking in Chipping Norton	WODC	WODC Climate Change Action Plan - Apr 2011 – Green Travel Action 3.3	Continuous Update, print and promote Maps Council campaign carried out in the town			June 2011 Mar 2012	In progress Planned - Sustainable Transport Group

No.	Measure	Focus	Lead authority	Planning phase	Implementation phase	Indicator	Target annual emission reduction in the AQMA	Progress to date	Progress in last 12 months
5f	School Travel Plans / Green Travel Plan	Development of School Travel Plans and promotion of WODC Green Travel Plan	OCC	WODC Climate Change Action Plan - Apr 2011 – Green Travel Actions	Continuous				WODC Green Travel Plan revised Feb 2011
6	County Bus Strategy		OCC						
7	Local Transport Plans	County wide improvements to route infrastructure and traffic management	OCC						
8	Switch off idling engines	Acquisition of powers to require drivers to switch off their engines if they are left idling.			Education al approach favoured over enforcement		Visual evidence of drivers being more aware		Advice / Action as required by Community Wardens
9	Manage parking to reduce traffic congestion and improve air quality	Manage parking to reduce traffic congestion and improve air quality	WODC		New Community Wardens to enforce both on and off road parking to minimise restrictions to traffic flow.			Current	Increased / high visibility patrolling within the District by Community Wardens

Appendix E: Grid References of Diffusion Tube Locations

Site Name	Grid Reference
Bridge Street, Witney	435816 210239
Mill Street, Witney	435671 210198
Early Rd., Witney	436339 210806
Abbey Rd., Witney	434596 209210
High St, Burford (N)	425187 212431
93 High Street, Burford (S)	425156 212197
Frethern Cl, Burford	425406 211678
Orchard Rise, Burford	425447 211949
Brize Norton Rd, Carterton	428254 206902
Upavon Way, Carterton	428467 207442
Garner Close, Carterton	427415 208234
Oakfield Road, Carterton	427687 206254
Dyers Hill, Charlbury	435585 219620
Nineacres Lane, Charlbury	435654 219763
Tanners Close, Charlbury	435945 219324
The Green, Charlbury	436138 219973
Horsefair, Chipping Norton	431425 227275
31 High Street, Chipping Norton	431428 227260
Co-location, Chipping Norton (Triplicate Mean)	431404 227206

5 Horsefair, Chipping Norton	431439	227268
7 Horsefair, Chipping Norton	431443	227282
West Street, Chipping Norton	431300	226959
Coopers Close, Chipping Norton	431694	227156
Withers Way, Chipping Norton	431207	226877
Acre End Street, Eynsham	442950	209301
Mill Street, Eynsham	443309	209573
Orchard Close, Eynsham	443632	209356
Shakespeare Rd, Eynsham	442856	209781
Oxford Street, Woodstock (E)	444592	216763
Oxford Street(2), Woodstock (W)	444526	216851
The Ley, Woodstock	445131	216615
Westland Way, Woodstock	444212	217270
Grove Road, Bladon	444871	214983
Grove Road(2), Bladon	445158	215312
Heath Lane, Bladon	445227	214402
Park Close, Bladon	444851	215094
Park Street, Bladon	444791	214681

List as provided to AECOM for 2010 Diff Tube Data Ratification

Note: This data replaces a location map as submitted in previous PRs and addresses the comment in Appraisal Report PR4-038.
An indicative map at Figure 1.1 'West Oxfordshire District' gives the general distribution of residential areas which are monitored

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