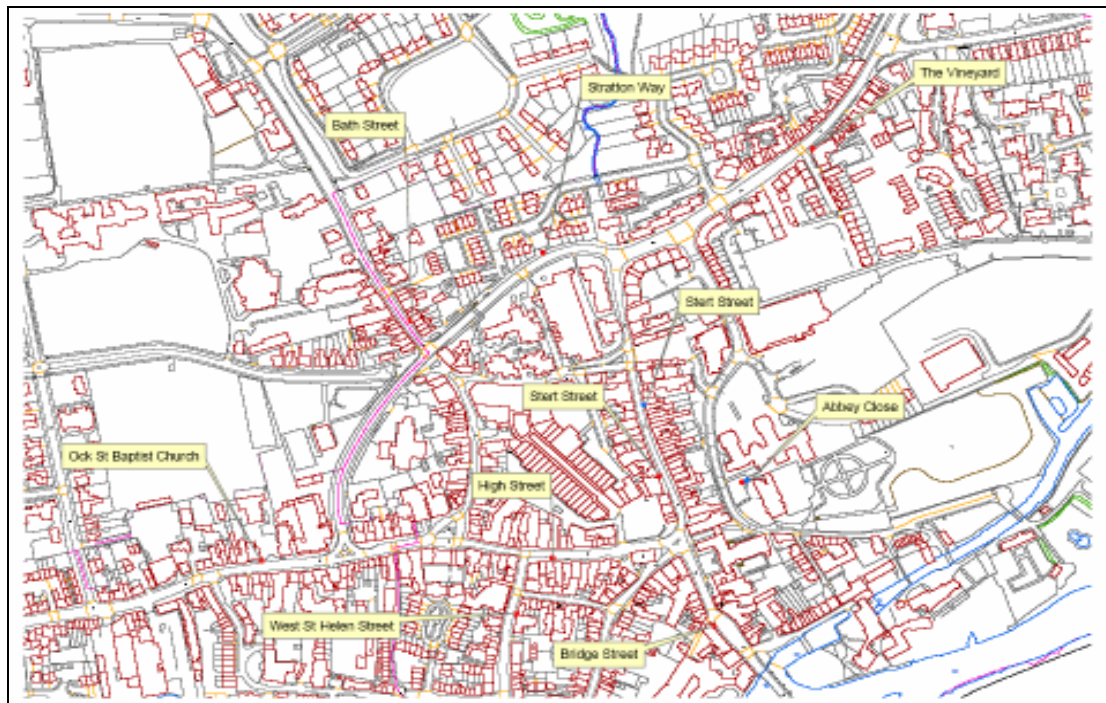




# Local Air Quality Management Air Quality Progress Report 2008



June 2008



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## 2.Introduction

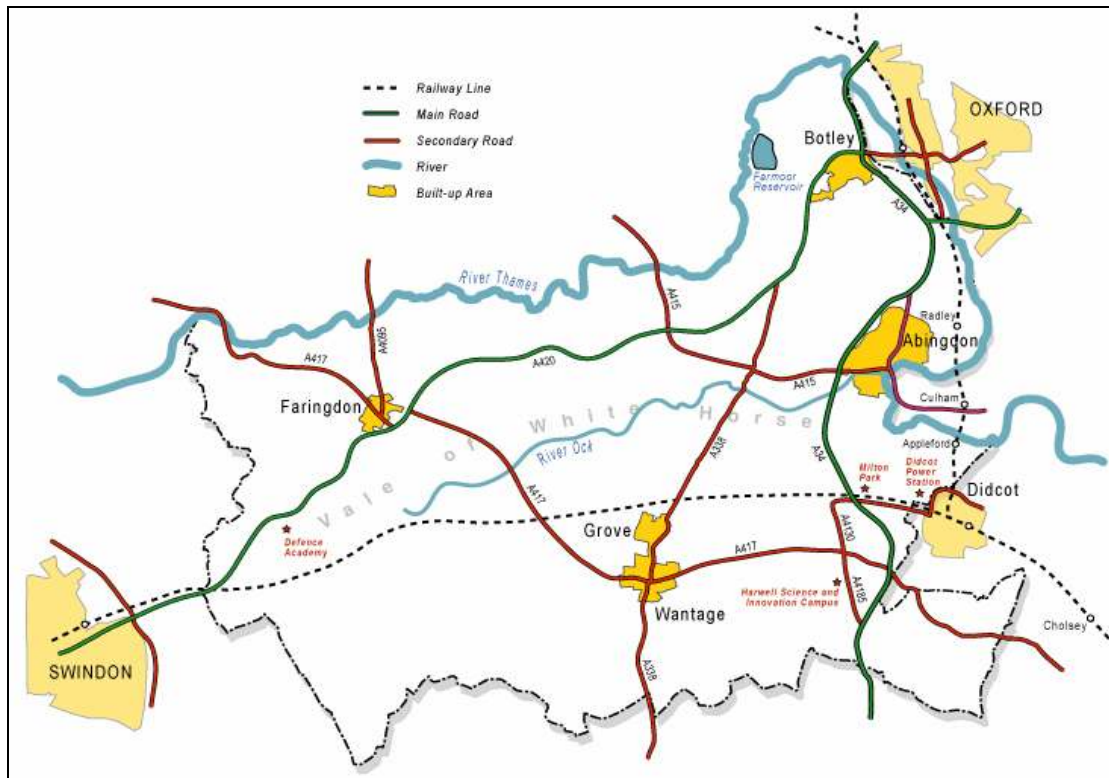
Part IV of the Environment Act 1995 requires local authorities to carry out regular Air Quality Reviews and Assessments, to ensure that the air quality in their district meets air quality objectives set for seven pollutants:-

- Benzene
- 1,3 butadiene
- Carbon monoxide
- Lead
- Nitrogen dioxide (NO<sub>2</sub>)
- Particles (PM<sub>10</sub>)
- Sulphur dioxide

These air quality objectives are to be met by specified dates which vary depending on the pollutant. This process of Local Air Quality Management (LAQM) is an ongoing process of review and assessment of local air quality. We are currently in round 3 of the LAQM Review and Assessment process and this report is an air quality Progress Report for Vale of White Horse District Council. This is required in years when local authorities are not undertaking an Updating and Screening Assessment (USA) or a Detailed Assessment of air quality. Round 4 of the LAQM process will commence with the next USA in 2009.

## 3.Vale of White Horse District

The Vale of White Horse District covers about 580 square kilometres of south-west Oxfordshire. The southern boundary lies to the north of the Berkshire Downs and the Ridgeway, and the northern boundary is defined by the river Thames. To the west the District extends towards the outskirts of Swindon and to the east towards Didcot and Oxford. The main towns in the District are the market towns of Abingdon, Wantage and Faringdon; Grove, which is north of Wantage and North Hinksey (Botley), which lies on the western fringes of Oxford. There are also numerous villages in the 68 parishes within the District.



**Map of Vale of White Horse District Council indicating primary routes.**

The main road through the District is the A34 which runs roughly north to south and is a main dual carriage way carrying traffic from the south, including goods traffic from ports of Southampton and Portsmouth, towards the M40, the Midlands and the North. It is also an important link between the M4 near Newbury and the M40. The A420 is the main east-west route in the District carrying traffic between Oxford and Swindon and provides a link between the M40 near Oxford and the M4 at Swindon. The A417 carries traffic from the A34 through Wantage and Faringdon towards Cirencester. The A338 links the A420 with the M4 and the A4 at Hungerford via Wantage. There are no motorways in the District.

Most of the District is agricultural. Harwell Science and Innovation campus lies near the southern boundary and the Didcot gas and coal fired power stations lie in the south east corner of the District. There are a number of distribution depots located on the Milton Park Industrial campus and in other areas. There are smaller industrial and science parks in and around Abingdon.

#### 4. Local air quality management history

- The Round 1 review and assessment process was incremental and staged to identify areas which required more detailed study.
- The Round 1 stage three review and assessment for the Vale of White Horse (December 2000) identified no predicted exceedence of any of the air quality objectives for each of the seven pollutants at sensitive locations, subject to the implementation of proposed changes to traffic routing around Abingdon town centre as part of Abingdon Integrated Transport Strategy (AbITS).
- Round 2 of this process required local authorities to undertake an Updating and Screening Assessment (USA) to assess any significant change in traffic patterns or industrial processes and assess the impacts on predicted and measured air quality. The Vale of White Horse USA 2003

determined that air quality objectives were being met or were predicted to be met by the required dates at sensitive locations and hence there was no need to implement an Air Quality Management Area (AQMA). The USA 2003 conclusions were based on the assumption that the Abingdon Integrated Transport Strategy (AbITS) traffic management scheme for Central Abingdon, to be implemented in 2004/2005, would be completed.

- The Vale of White Horse District Council air quality Progress Report 2004 identified the delay in the implementation of the AbITS scheme in central Abingdon and the likelihood that there would be an exceedance of the annual mean objective for nitrogen dioxide (NO<sub>2</sub>), at relevant locations in central Abingdon in 2005, and the need for a Detailed Assessment to be undertaken.
- The Detailed Assessment 2006 concluded that exceedance of the air quality objective (AQO) for NO<sub>2</sub> at relevant locations in central Abingdon was likely in 2005 (the relevant date for the objective to be met) and an AQMA was declared in central Abingdon in August 2006 (Appendix 3).
- The Round 3 USA was undertaken in 2006 and this concluded that all objectives would be met in the District with the exception of the objective for NO<sub>2</sub> in central Abingdon in the AQMA and also the objective for NO<sub>2</sub> in Botley. It recommended that a Detailed Assessment of air quality in Botley be undertaken.
- The Detailed Assessment was published in September 2007 and predicted exceedances of the AQO at relevant locations close to the A34. Following consultation an AQMA was formally declared in Botley in April 2008 (Appendix 4).
- After the declaration of the AQMA in Abingdon a Further Assessment report was commissioned. This report was delayed pending the completion of the AbITS works in central Abingdon and allowing time for traffic to adjust to the new system and then on the availability of accurate traffic data following the introduction of the new road system.
- The Further Assessment report was published in May 2008 and concluded that the AQO for NO<sub>2</sub> was still being exceeded despite some improvements in the worst affected parts of the AQMA and that a significant reduction in traffic emissions would be required to reduce NO<sub>2</sub> levels to below the AQO.
- In view of the continued exceedance of the AQO in Abingdon it will be necessary for the Vale of White Horse to develop an Air Quality Action Plan (AQAP) with a view to seeking to implement measures which will work towards the reduction of traffic emissions in central Abingdon. The Vale of White Horse is currently in the early stages of consideration of how an AQAP will be developed.

## 5. Background and recent developments

A Detailed Assessment Report was commissioned for central Abingdon and the final report was published in January 2006. An AQMA for central Abingdon was declared, following consultation, in August of that year. Works on the AbITS road improvements in central Abingdon began in February 2006 (after the Detailed Assessment but before the declaration of the AQMA) and were mostly complete when the new road system went live in November 2006. These works involved major changes to traffic routing through the town centre. The bulk of the re-routing and re-signalling works were completed by the end of 2006.

If an AQMA had been declared in Abingdon at an earlier date then the AbITS scheme would have represented a significant part of any AQAP. As it transpired

the declaration of the AQMA and the implementation of the AbITS scheme occurred in tandem with the Detailed Assessment of air quality preceding the works and the Further Assessment following the completion of most of the significant works affecting traffic management.

The Vale of White Horse USA 2006 concluded that the objectives in the Air Quality Regulations for England would be met for most pollutants. However, NO<sub>2</sub> concentrations measured at Westminster Way, Botley, were above the 2005 objective levels and predicted to be close to the objective value in 2010. A detailed assessment was recommended for the area around the A34 in Botley. The report also concluded that the EU annual average limit value (stage 2) for particulates (PM<sub>10</sub>) may be exceeded at some locations within the District, close to busy roads and junctions in 2010. A detailed assessment for PM10 is not required at this time. Objectives for NO<sub>2</sub> are also likely to be exceeded in Central Abingdon, where an AQMA has already been declared.

In view of the USA 2006, an extended monitoring scheme for NO<sub>2</sub> was implemented in the Botley area, to inform a Detailed Assessment of air quality in the locality. The final Detailed Assessment Report was published in September 2007 and concluded that there was a likelihood of exceedences of the objectives for NO<sub>2</sub> in the area in the vicinity of the A34 and that an AQMA should be declared. Following consultation an AQMA was declared in Botley in April 2008.

In general terms there have not been any developments other than the implementation of the AbITS scheme which are considered to have had a significant impact on air quality in the District.

There have been no new authorised processes in the District. A number of the smaller authorised processes have recently closed or reduced capacity to the extent that authorisations are no longer required. However significant developments are proposed or under consideration in the planning system, where air quality assessments have been requested:-

- Great Western Park-housing
- Grove airfield-housing
- Land north of Bellingers, Grove-office/light industrial development
- St. Mary's Convent site Wantage-housing
- Tilbury Lane N. Hinksey-housing
- Sutton Courteney Incinerator-Short-listed site, planning application anticipated
- Thames Water Reservoir Proposal East Hanney-planning application anticipated
- The Old Gaol development-housing near the Abingdon AQMA-planning application anticipated

Air quality impact assessments for some of these proposed developments have been produced or are in the process of being produced. None of the air quality assessments which have so far been reviewed indicate significant air quality impacts on the locality. Others will be reviewed when they become available.

Since the 2004 Progress Report Oxfordshire County Council (OCC) has produced a new Local Transport Strategy document 2006-2010. The Vale of White Horse air quality section of this strategy includes reference to the Abingdon AQMA but preceded the declaration of Botley AQMA. With regard to the Abingdon AQMA the document stated:-

**Problem**

*The Vale of White Horse District Council's consultants produced a Detailed Assessment Report for Abingdon in January 2006. The Report concluded that the District Council should consider establishing an Air Quality Management Area around the following locations; High Street, Stert Street, Ock Street (eastern end), The Vineyard, Bridge Street (north end) and Stratton Way (north end). This has been approved by DEFRA and the District Council will be publishing an Air Quality Management Area Order by July 2006.*

**Proposed Solution**

*The County Council will be working with the District Council on the development of an Air Quality Action Plan once the Air Quality Management Area has been declared. The Abingdon town centre scheme (AbITS) outlined below has been proposed for some time and will form a major part of the Action Plan.*

As has been stated above the AbITS traffic management related works have now been implemented. A recent independent study of the effectiveness of the traffic management system has been published by TRL on behalf of OCC (June 2008) with some recommendations for improvements to the traffic management system. OCC has only recently received this report and has yet to give full consideration to the implementation of the recommendations within the report. The Vale of White Horse District Council has had a preliminary meeting with the OCC in respect of the approach being considered for the development of an AQAP for Abingdon and looks forward to working closely with the OCC in the development and implementation of the AQAP.

## 6.0 Monitoring

When the Progress Report 2004 was published, air quality monitoring in the Vale of White Horse was undertaken utilising 16 NO<sub>2</sub> diffusion tube sites, one BTEX (benzene) tube monitoring site and one permanent automatic monitoring site, monitoring oxides of nitrogen (NO<sub>x</sub>), nitrogen dioxide (NO<sub>2</sub>), sulphur dioxide (SO<sub>2</sub>), particulates (PM<sub>10</sub>) and ozone (O<sub>3</sub>).

Since 2004 the diffusion tube network has been expanded to 30 sites and is being expanded further to provide more detailed monitoring in areas of potential concern. An additional continuous NO<sub>x</sub> analyser has been added to the monitoring network to provide data from within the Abingdon AQMA. We have recently discontinued the BTEX monitoring following many years of monitoring with results for benzene being consistently substantially below the objective level.

### 6.1 NO<sub>2</sub> diffusion tube bias correction

Co-location using three NO<sub>2</sub> diffusion tubes located alongside the continuous monitor in Abbey Close is undertaken and the results from these measurements are used to calculate a local bias adjustment factor.

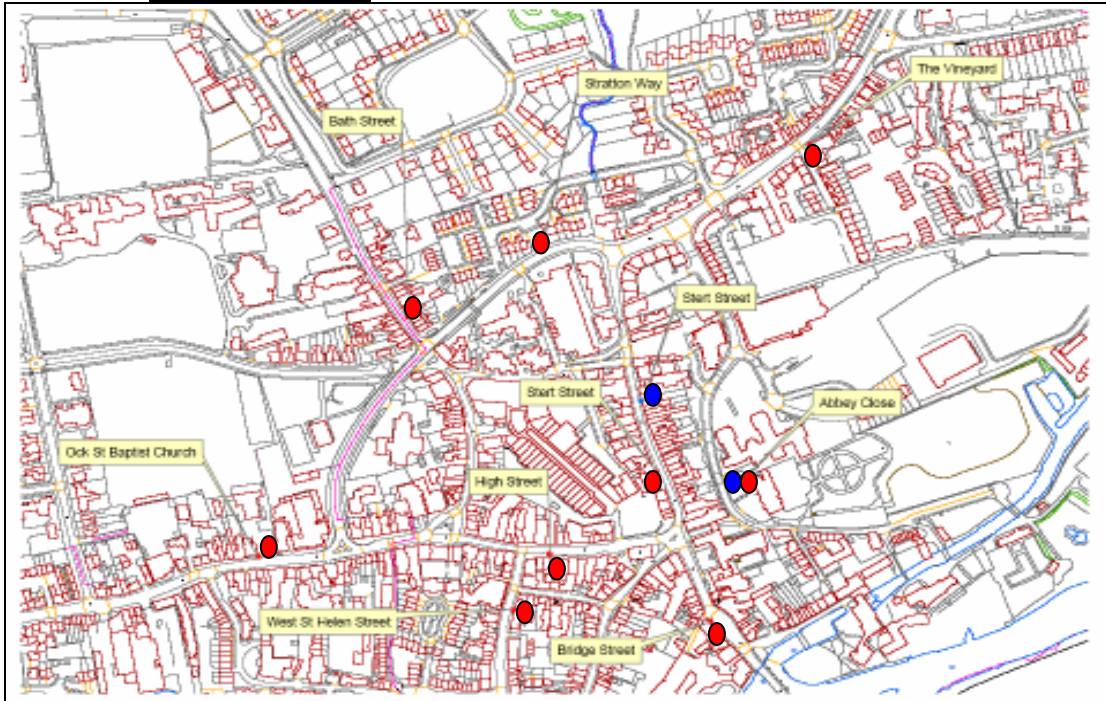
### 6.2 NO<sub>2</sub> diffusion tube monitoring

There are currently 30 NO<sub>2</sub> diffusion tubes distributed throughout the main urban areas in the District. These are at locations in Abingdon, Wantage, Botley and Faringdon. NO<sub>2</sub> monitoring began in 1995 and has been ongoing continuously since then. Three of diffusion tubes are used as part of a local collation study



which began in 2003. The other tubes are at locations throughout the District measuring background or kerbside levels of NO<sub>2</sub>. The diffusion tubes are prepared and analysed by Harwell Scientifics. They are prepared using 50%v/v TEA in acetone methodology. All tubes are exposed for a period of one month and then sent for analysis by Harwell Scientifics.

### 6.21 Abingdon sites



Abingdon town centre monitoring locations. Red dots represent diffusion tube monitoring locations. Blue dots represent the location of continuous analysers.

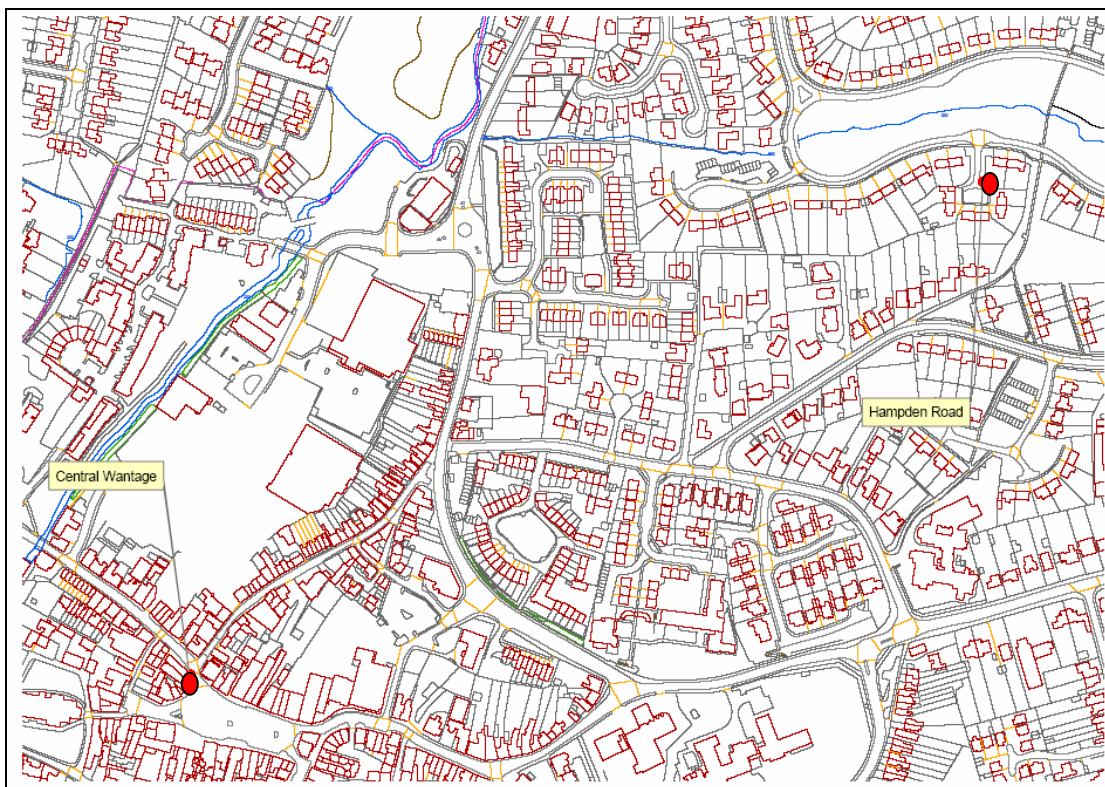


Ock Street roundabouts, monitoring locations

In 2004 there were six diffusion tube sites in the Abingdon Area. This has now extended to 16 sites including established sites where background and kerbside

monitoring have been ongoing since 1995, and sites introduced to provide more information on kerbside NO<sub>2</sub> levels in and around the AQMA. The number of diffusion tubes will soon be further increased to provide better information on Ock St which abuts the AQMA and where modelling has predicted possible exceedence of the nitrogen dioxide objective.

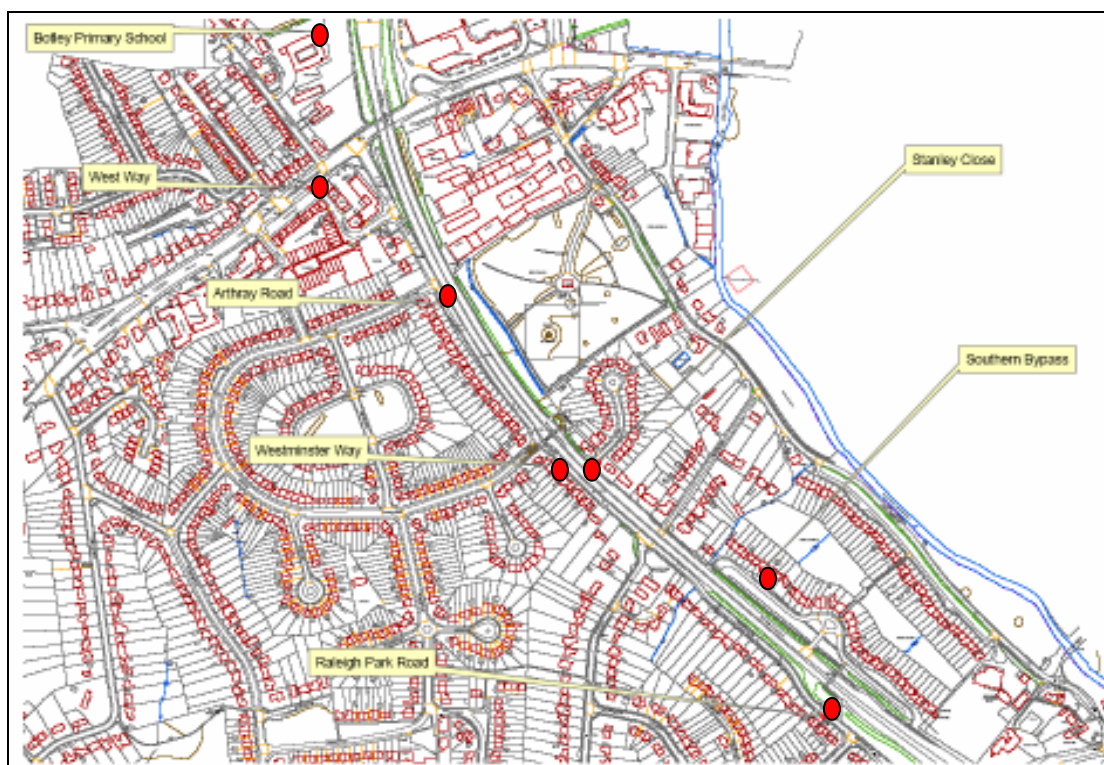
## 6.22 Wantage sites



There are currently two monitoring sites in Wantage located at Hampden Rd and Market Square. Hampden Rd is an established background site and Market Square an established kerbside location.

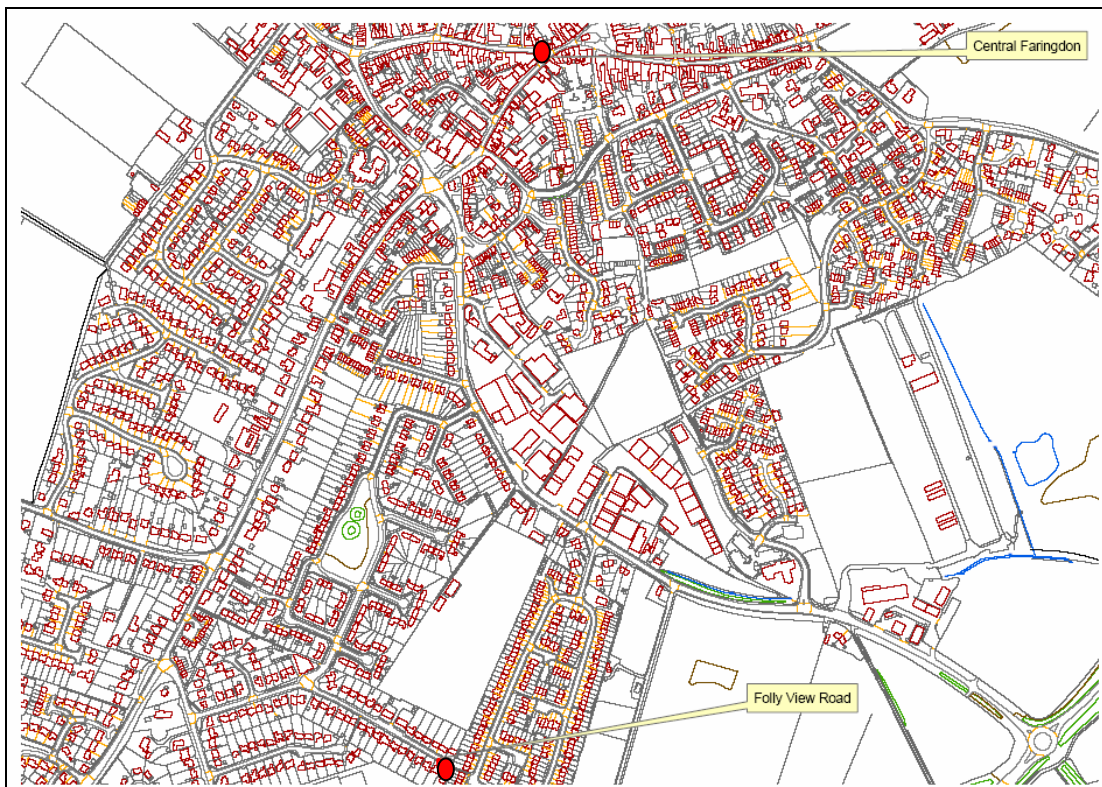
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## 6.23 Botley sites



In 2004 there were three established diffusion tube sites in the Botley Area at Westway, Hutchcombe Road and Queens Close. The Queens Close site was discontinued in 2004 as there was already sufficient background monitoring in the area. In 2004 monitoring was extended to include Westminster Way where there is residential property close to the A34. In 2006 monitoring was further extended to cover a wider area around the A34 following the recommendation in the USA 2006. An AQMA has since been declared in this area. Monitoring is continuing at eight sites in the Botley area, six of which are focussed on the A34 and the AQMA.

## 6.24 Faringdon sites



There are currently two sites in Faringdon; Folly View Rd an established background site and The Old Town Hall an established kerbside location. Two others sites were removed from Faringdon in 2004 one was a back ground site and one at an intermediate location.

## 6.3 BTEX monitoring

Until recently there was one BTEX tube located alongside the NO<sub>2</sub> tube in Stert Street. This consistently recorded levels below the 2003 annual objective levels and demonstrated a steady reduction in levels. Since 2000 this site has recorded levels which are below the proposed objective levels for 2010 and has continued to show a decline in the subsequent years. In view of the above it was felt that it was not cost effective to continue BTEX monitoring.

## 6.4 Continuous air quality monitoring

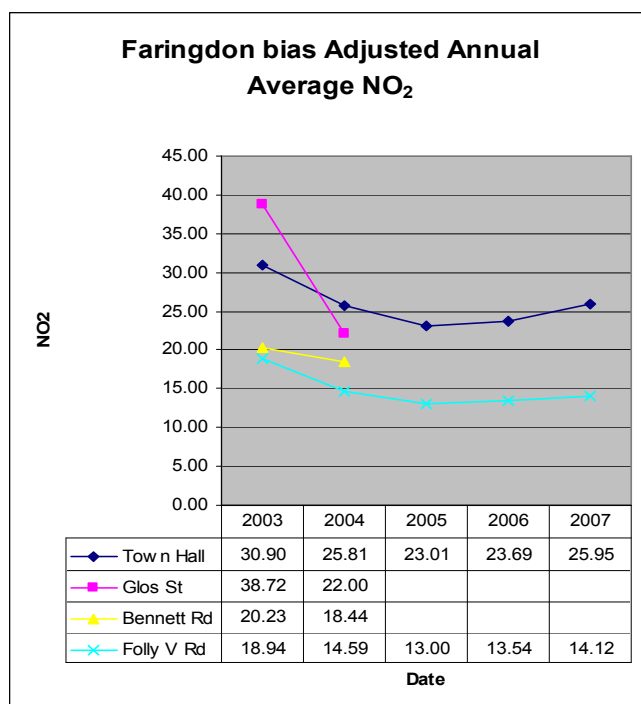
For some time we have operated a continuous air quality monitoring station in an intermediate location close to the council offices in Abbey Close. This station monitors oxides of nitrogen, sulphur dioxide, particulates and ozone. Three diffusion tubes are located alongside this continuous monitor in order to provide a comparison between real-time continuously monitored levels and diffusion tube levels measured over one month. The continuous air quality monitoring system is audited every six months by NETCEN to ensure that it is operating effectively. NETCEN also scale and ratify the data from the site. Staff from Vale of White

Horse District Council calibrate the system, with gases of known concentration, every two weeks. The system is maintained and regularly serviced by Signal Ambitech who installed the system. Fortnightly calibration records are forwarded electronically to NETCEN to assist them in data ratification.

Following the declaration of the AQMA in central Abingdon a continuous NOx monitor was installed in Stert St which is one of the main streets within the AQMA. This unit is similarly calibrated fortnightly by staff from the Vale, audited by NETCEN and maintained and serviced by Signal Ambitech.

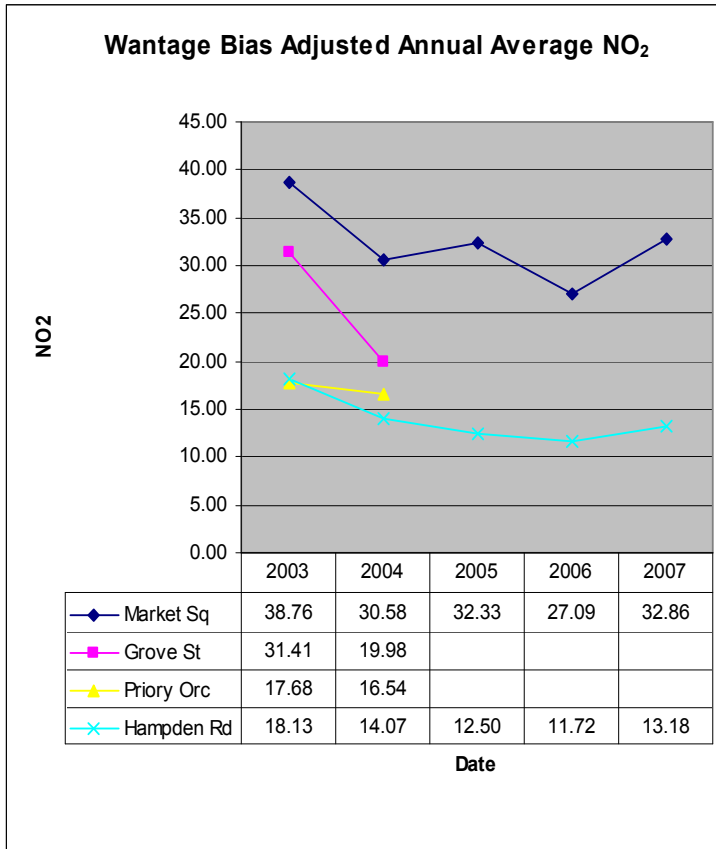
## 6.5 Monitoring Results for NO<sub>2</sub>

Results from diffusion tube monitoring and from continuous monitoring are included as graphs of the bias adjusted annual average NO<sub>2</sub> levels and associated tables, for the last five years. Continuous monitoring reports from the two continuous monitoring sites in Abingdon are attached (Appendix 1 and 2). Diffusion tubes are used for monitoring NO<sub>2</sub> in the air. The annual average AQO for NO<sub>2</sub> is 40 µg/m<sup>3</sup>. The monitoring results recorded are for the sites where the diffusion tubes are located. These sites are not necessarily "relevant locations" for the purpose of air quality assessment. "Relevant location" is a term used in the air quality guidance which in general terms means the façade of a residential property. It is only when the annual average level of NO<sub>2</sub> is greater than the AQO level at a "relevant location" that consideration needs to be given to implementing an AQMA. Diffusion tubes are an economical method of measuring NO<sub>2</sub> but they do tend to over estimate the levels of NO<sub>2</sub> in the air. In order to account for this three diffusion tubes are located alongside the more accurate continuous monitor in Abbey Close. The average diffusion tube values over a year are compared with the average level from the continuous monitor to give a bias adjustment factor. This factor is then applied to all results to provide more meaningful and representative bias adjusted NO<sub>2</sub> levels.



### **6.51 Faringdon**

Of the two sites in Faringdon The Old town Hall is kerbside and the Folly View Road is a background site. The kerbside site represents what is probably the worst case in Faringdon with two way traffic in a street canyon. This site has recorded nitrogen dioxide levels of at or below 30µg/m<sup>3</sup> for the past five years. The background site has been consistently about 10 µg/m<sup>3</sup> lower over the same period. On the basis of these results the air quality in Faringdon meets the NO<sub>2</sub> air quality objectives and is judged to be satisfactory.



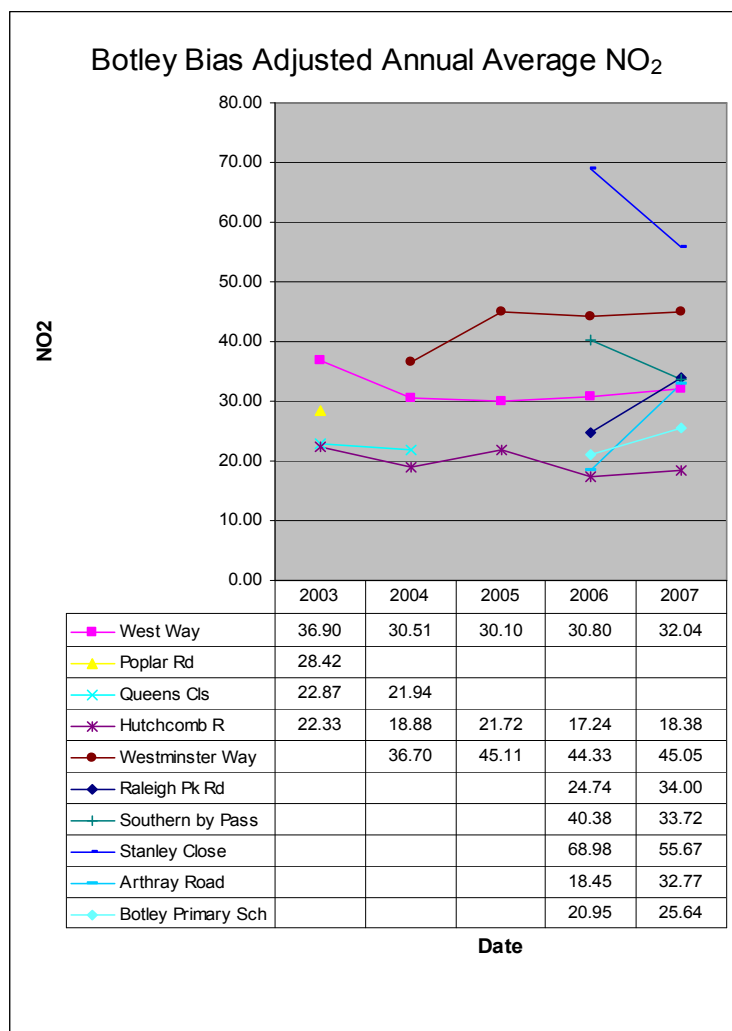
### **6.52 Wantage**

There are also two sites in Wantage representing a kerbside location at the Market Place and a background location in Hampden Road. Market Place represents what is probably the worst case for air quality in Wantage. In 2003 this site was close to the NO<sub>2</sub> objective level at 38.8 µg/m<sup>3</sup> however since 2004 levels of less than 33 µg/m<sup>3</sup> have been recorded. Background levels are comparable to those recorded in Faringdon. On the basis of these results the air quality in Wantage meets the NO<sub>2</sub> air quality objective and is judged

to be satisfactory.

### 6.53 Botley

There are currently eight diffusion tube sites in the Botley area comprising two long established sites measuring background levels at Hutchcombe Road and kerbside levels at the Westway. There are also six sites measuring levels where there is exposure close to the A34.



There is exposure close to the A34.

The results for the established sites show that Westway is more or less steady at about 30 µg/m<sup>3</sup>. The background site at Hutchcombe Road shows similar trends to the background sites in Wantage and Faringdon but is 4-5 µg/m<sup>3</sup> higher which represents the more urban location of this background site. On the basis of these results the air quality in central Botley meets the NO<sub>2</sub> air quality objective and is judged to be satisfactory.

The sites near the A34 are at Westminster Way, Raleigh Park Rd, Southern By Pass, Stanley Close, Arthray Road and Botley Primary School. With the exception of Westminster Way there is only two months data for these other sites for

2006. The annual averages recorded for 2006 are based on these limited results and so should be treated as indicative only. This is probably why there are big differences in the annual average nitrogen dioxides for some sites between 2006 and 2007 which is based on a full years monitoring. Exceedences of the objective have been recorded at Westminster Way since 2005 and exceedences have been recorded at Stanley Close since monitoring began at this site in 2006. Modelling has indicated the likelihood of exceedence of the AQO at Southern Bypass. This monitoring and modelling was used in the preparation of a Detailed Assessment report which resulted in an AQMA being declared near the A34 in Botley in April 2008. The parts of Westminster Way near Raleigh Park Rd and Arthray Rd meet the AQO as does Botley Primary School. These areas are close to the A34 but have not been included in the AQMA.

### **6.54 Abingdon**

The Abingdon diffusion tube network has expanded greatly over the years in particular to provide information on the AQMA and changes resulting from the introduction of AbITS. The results from the Abingdon monitoring have recently been published in the Further Assessment report of May 2008 which followed the declaration of the AQMA in August 2006.

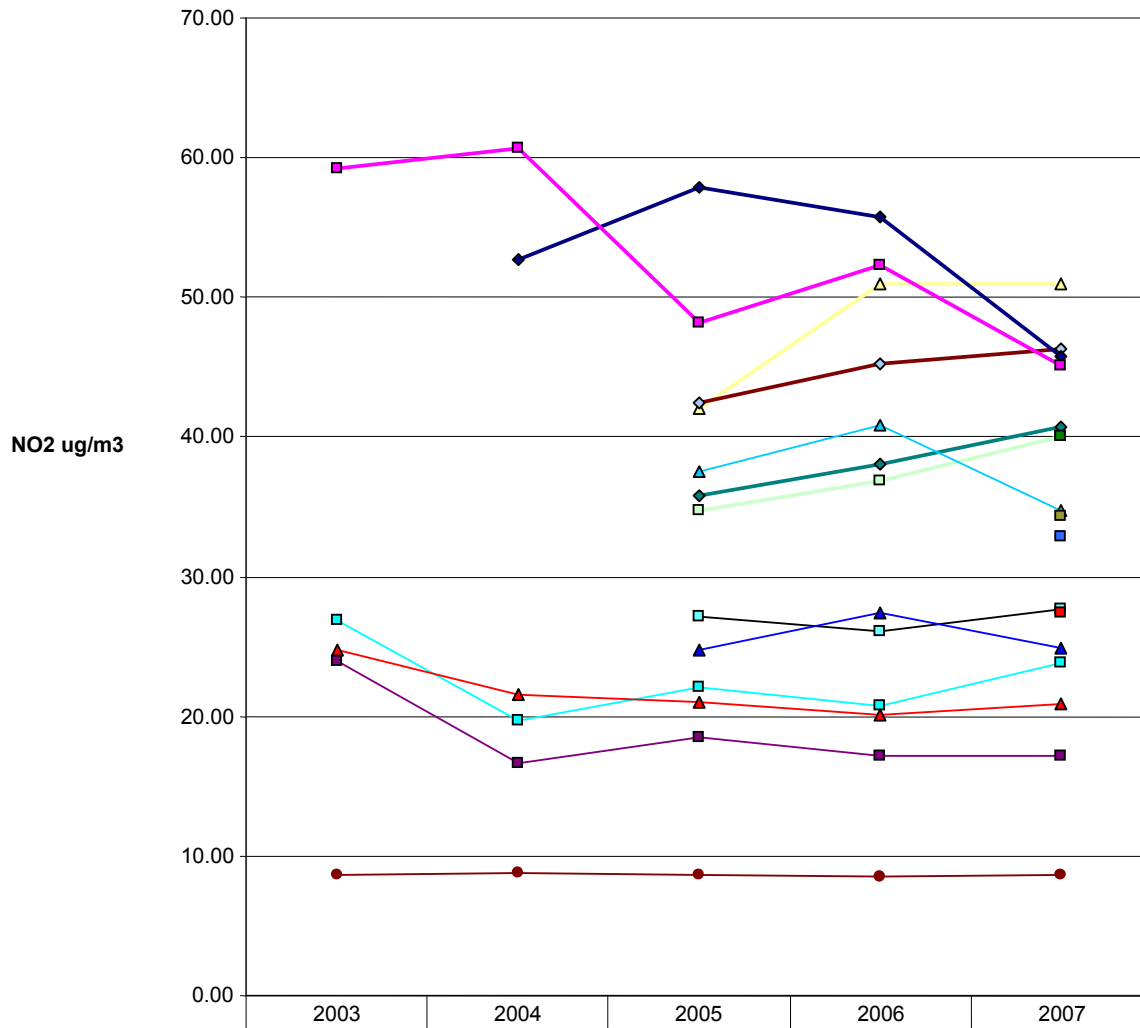
Modelling based on diffusion tube and continuous monitoring indicates that the air quality objective for NO<sub>2</sub> is still being exceeded or likely to be exceeded at relevant locations where people live and that the AQMA should remain in place. Continuous monitoring in Stert St shows an annual mean from January to December 2007 of 42 µg/m<sup>3</sup> (52µg/m<sup>3</sup> in 2006) and a maximum hourly mean concentration recorded was 157 µg/m<sup>3</sup> in 2007. These measurements are based on only 60% data capture over the year and so should only be taken as indicative. These levels indicate that the annual mean objective for NO<sub>2</sub> is still being exceeded and that the hourly objective for NO<sub>2</sub> (200 µg/m<sup>3</sup>) is being met. The diffusion tube in Stert St is at a different location to the continuous monitor. The annual average NO<sub>2</sub> for 2007 at this location was 45µg/m<sup>3</sup>. The annual mean NO<sub>2</sub> objective is not being met despite the improvements in air quality apparent since the introduction of the AbITS scheme. In 2007 the annual mean NO<sub>2</sub> at the Abbey Close continuous monitor, which represents the urban background level, was 21 µg/m<sup>3</sup> (20 µg/m<sup>3</sup> in 2006 and 21 µg/m<sup>3</sup> in 2005) the maximum hourly mean recorded was 113 µg/m<sup>3</sup>. The objective for both the annual mean and hourly mean, are met at this location.

In view of some of the predicted impacts of the AbITS scheme, further monitoring sites were set up in Bath St and St Helen Church in East St Helen St. The first years monitoring (2007) show that at these locations the annual average air quality objective for NO<sub>2</sub> being met at these locations.

In 2004 following a recommendation in the USA 2003, diffusion tube monitoring was started near school locations on either side of the A34 near Abingdon. These sites are at Manor School and Copenhagen Drive which is near Larkmead School. The Manor School site is located on the school premises near to the A34 and has shown levels consistently well below the air quality objective level. The Copenhagen Drive site is located away from the Larkmead School site and is impacted by both the A34 and also the north Abingdon link road which includes Copenhagen Drive. Levels at this monitoring site have shown a small but steady increase over the three years since monitoring began, this may be due to possible increased use of this road, as an impact of the AbITS scheme. In 2007 the annual



### Abingdon Bias Adjusted Annual Average NO<sub>2</sub> Diffusion Tubes Jan-Dec



	2003	2004	2005	2006	2007
Stratton Way			42.11	50.98	51.02
The Vineyard			42.50	45.31	46.25
High Street		52.64	57.94	55.81	45.82
Stert St	59.20	60.62	48.20	52.35	45.14
Copenhagen Drive			35.79	38.06	40.73
Ock St			34.79	36.81	40.03
Ock St Drama Club					40.00
Bridge St			37.52	40.92	34.67
Bath St					34.35
Ock St wine shop					32.83
West St Helens			27.21		27.66
St Helen Church					27.36
Manor School			24.80	27.43	24.93
Langley Rd	26.84	19.75	22.13	20.70	23.77
Abbey Cls	24.73	21.56	21.07	20.13	20.91
Turner Rd	24.01	16.59	18.53	17.16	17.17
Bias Factor X10	8.70	8.80	8.70	8.50	8.60

average recorded at the site was above the air quality objective. There is no 'relevant exposure' in the immediate vicinity of the diffusion tube site, but given the levels recorded it is proposed to relocate or introduce a further diffusion tube which reflects more accurately exposure at the nearby Larkmead School.

Following the introduction of the AQMA it was apparent that we had not undertaken monitoring at the Ock St roundabouts where Drayton Road and Spring Road join Ock St and where there is often peak hour congestion. In view of this monitoring sites were introduced on either side of the roundabouts in 2006. These sites are called "Ock St wine shop" and "Ock St Drama Club". Only one years monitoring data has been recorded from these sites. Results show the Ock St Drama club site to be at the air quality objective level at  $40 \mu\text{g}/\text{m}^3$  and the Ock St wine shop site to be below the objective level at  $33 \mu\text{g}/\text{m}^3$ . Ock St is a long street and the nearest other diffusion tube site is a considerable distance away near the junction of Stratton Way and Ock St. This site is also at the objective level of  $40 \mu\text{g}/\text{m}^3$ . Both locations are kerbside and reflect points where some congestion is often present. In order to provide better information on the air quality in Ock St it is proposed to introduce further monitoring sites along Ock St in order to establish whether the AQMA should be expanded to include the whole of Ock St.

Of the existing Abingdon town centre sites, there have been changes in levels recorded following the introduction of the AbITS scheme. Comparison between the pre AbITS 2005 levels and the post AbITS 2007 levels demonstrates the changes in annual average  $\text{NO}_2$  levels. These changes are highlighted in Section 8.0 of this report.

## 6.6 Other monitoring

The Abbey Close continuous monitor records levels of Ozone ( $\text{O}_3$ ), sulphur dioxide ( $\text{SO}_2$ ) and particulates ( $\text{PM}_{10}$ ) in addition to  $\text{NO}_2$  and  $\text{NO}_x$ .

$\text{O}_3$  levels are not the subject of a mandatory air quality objective but there is a non-mandatory national objective of  $100 \mu\text{g}/\text{m}^3$  as an 8 hour mean not to be exceeded more than 10 times in a year. The Abbey Close continuous monitor recorded 53 such exceedences over 10 days in 2007. Levels of ozone do not meet the national air quality objective in Abingdon.  $\text{O}_3$  is a trans-boundary pollutant which for the most part is not formed directly by man made emissions but formed by complex chemical reactions in the atmosphere. There is no requirement to introduce an AQMA for exceedence of the AQO for ozone.

$\text{SO}_2$  levels showed no exceedence of the AQO of the 15 minute, hourly, daily or annual mean values during 2007.

PM<sub>10</sub> is measured using a TEOM monitor. This type of monitor is not a reference monitor and under-reads the droplet fraction of particles. In view of this a correction factor of 1.3 needs to be applied to make it equivalent with a reference monitor. These results show a daily PM<sub>10</sub> average of 24µg/m<sup>3</sup>. This meets the annual mean AQO of 40 µg/m<sup>3</sup>. The 24 hour mean of 50 µg/m<sup>3</sup> is exceeded 8 times in 2007. This is less than the 35 exceedences of the 24 hour mean per year which the AQO allows. This indicates that the PM<sub>10</sub> AQO is being met at this location.

Benzene was monitored using a BTEX diffusion tube in Stert St Abingdon in the AQMA. The annual average benzene level in 2007 was 0.61 µg/m<sup>3</sup> this is well below the annual mean AQO for 2005 of 16.25 µg/m<sup>3</sup> and also well below the AQO for 2010 of 5.00 µg/m<sup>3</sup>. Similarly low levels have been recorded in previous years and in view of the low levels recorded this monitoring ceased in March 2008.

USA 2006 concluded that objectives for other pollutants included in the Air Quality Regulations; lead, 1,3 butadiene and carbon monoxide are being met in this district.

## 7.0 Further Assessment of air quality in Abingdon 2008

The Further Assessment Report of air quality in central Abingdon was required as part of the LAQM process following the declaration of the AQMA, and to help inform the AQAP process. This report published in May 2008, followed the introduction of the AbITS traffic management changes and concluded:-

- *NO<sub>2</sub> concentrations within and around the Abingdon AQMA have been assessed through diffusion tube monitoring and detailed dispersion modelling. The results indicate that the annual mean NO<sub>2</sub> objective was exceeded in 2007 within the AQMA, and also at locations outside of the AQMA along Ock Street.*
- *It is therefore recommended that the Abingdon AQMA should be extended to include all relevant exposure along Ock Street and that monitoring should continue.*
- *Source apportionment of the local traffic emissions has been undertaken to inform the action plan. This shows that Light and Heavy Duty Vehicles each contribute approximately 50% of the emissions from the total locally-generated road component.*

- *A reduction in the volume of traffic within and around the AQMA is predicted to result in a decrease in the concentrations of NO<sub>2</sub>, however a reduction in total vehicle emissions of between 25-50% would be required to achieve the annual mean air quality objective at all modelled receptor locations in 2007.*

The Council accepted the report with the proviso to withhold the extension of the AQMA to include Ock St until further more detailed monitoring has been undertaken to confirm the need to extend the AQMA in this area. The Council has written to DEFRA expressing this view and is currently awaiting a response.

It is worth pointing out that the Further Assessment 2008 followed the introduction of the AbITS road scheme and that the Detailed Assessment 2006 was undertaken prior to this scheme being implemented. The two reports therefore provide a basis for assessment of the impact of the AbITS scheme on local air pollution.

## 8.0 AbITS and traffic in Abingdon

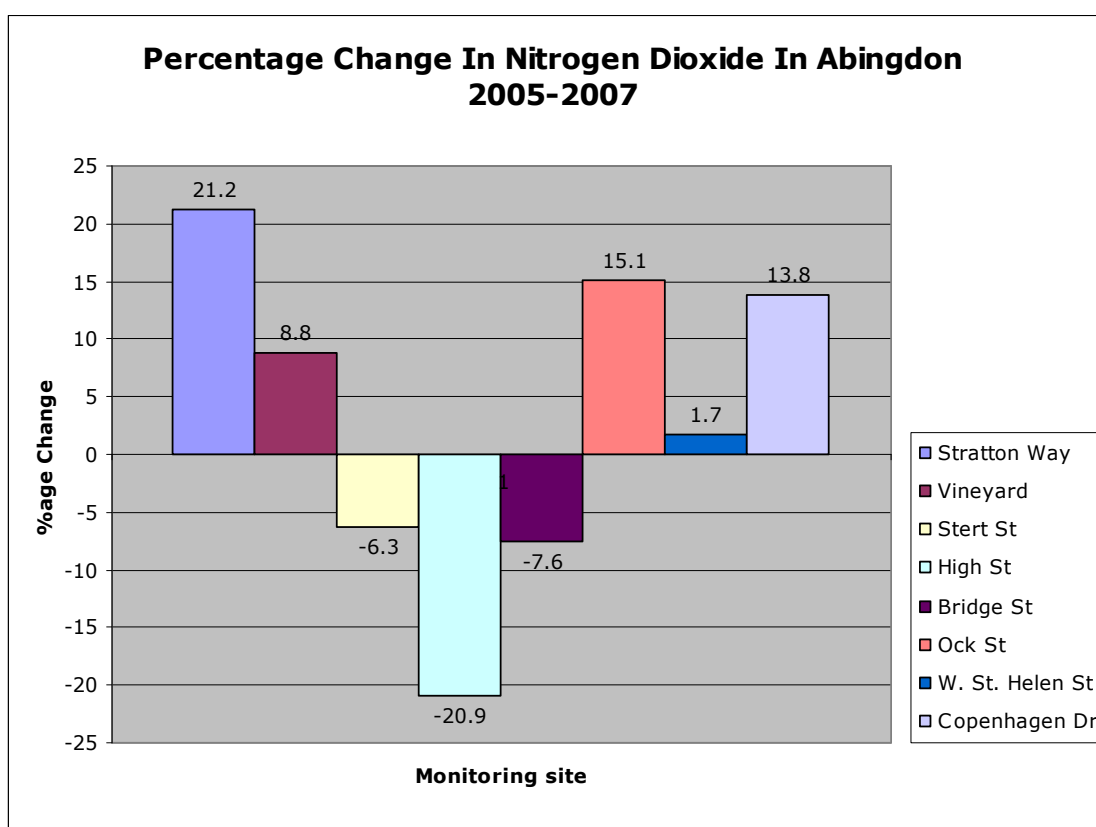
The AQMA in Abingdon is centred on the triangular road system in the town centre, which links traffic from Oxford(north east) along Vineyard with the A34(west) along Ock St via the A415 Stert St, High St and Stratton Way and with the A415 which continues along Bridge St and across the River Thames to link with the A4074 Oxford to Reading road. Prior to the introduction of AbITS this triangle of roads comprising Stert St, High St and Stratton Way were all part of a one way system. This meant that much cross town traffic had to travel through the narrow street canyons of Stert St and High St and resulted in problems with congestion and consequential pollution resulting in the declaration of an AQMA.

In terms of traffic management the principle aims of the AbITS scheme were:-

- To reduce congestion and improve traffic flow in the town centre, by improved signalling and holding back traffic from inner ring of the town centre by means of traffic light controlled "gateways".
- Converting Stratton Way to two way single carriage way, to provide a route from the Oxford direction along the A415 going west avoiding the centre of the town, with its problems with street canyons and congestion.
- Relocating the bus layover from the High St in the centre of town to a properly designed facility in Stratton Way to reduce congestion in the town centre.

Works to the AbITS scheme commenced in the February 2006 prior to the declaration of the Abingdon AQMA and the bulk of the alterations to the traffic scheme were completed by November 2006. The construction phase of the works resulted in significant traffic congestion during this period and this appears to be reflected in the annual average NO<sub>2</sub> levels for Abingdon in 2006.

Comparison between the 2005 and 2007 annual averages shows apparent reductions in levels in the areas which were of principle concern in the declaration of the AQMA, namely the street canyons of Stert St and High St. Stratton Way which has a more open aspect and was made two way has shown an increase in the annual average which probably reflects the increased volume of traffic using this link following the introduction of the AbITS scheme. The effects of the "gateways" introduced can be assessed from the diffusion tubes located at Ock St, Vineyard and Bridge St. The Ock St site is near the traffic lights by the Stratton Way junction and an increase in the annual average levels has been recorded here. There is a similar increase recorded at the Vineyard site whilst Bridge St has shown a reduction. The "gateway" at Bridge St was initially placed on south side of the river, away from the centre of Abingdon and also away from the diffusion tube site. This was an experiment and the distance involved meant that the SCOOT traffic management system was not coping well. This has now been rectified by relocating the gateway closer to the junction of Bridge St and High St.



There is inherent variation in annual average NO<sub>2</sub> levels, principally due to the variations in weather patterns in different years and trends can only be properly determined over a number of years. This must be borne in mind when making comparisons between different years.

Comparison between the 2005 and 2007 annual average figures does however concur with what might be expected as a result of the changes in the traffic management in central Abingdon. The graph shows percentage change recorded in the annual average levels of NO<sub>2</sub> between 2005 and 2007.

Monitoring is continuing in central Abingdon and will be used to inform future air quality reports and assessments.

## 9.0 Air Quality Action Plan

In view of the fact that air quality objectives continue to be exceeded in central Abingdon there is a need now to develop an Air Quality Action Plan targetted at reducing air pollution from road traffic and the impacts of air pollution within the AQMA and surrounding area.

The Council has had preliminary discussions with OCC in respect of drafting an AQAP. The mechanism for the general approach to consultation and co-ordination of this exercise is currently being developed following consultation with neighbouring local authorities which have or are in the process of drafting an AQAP. A Project Board is in the process of being established to drive the process forward and a target date for the final AQAP to be in place is March 2009.

## 10. Further Assessment Botley

A Further Assessment of air quality in Botley will be required following the declaration of the AQMA in this area. This is needed as part of the process , to confirm the appropriateness of the boundaries and to gain further information for the development of an AQAP in this area. The target date for this report is April 2009.

## 11.0 Summary and further actions

Air quality in the Vale of White Horse district is generally good for the seven pollutants included in the the Air Quality Regulations 2000 and (Amendment) Regulations 2002, for the purpose of Local Air Quality Management. There are two exeptions, in central Abingdon and Botley where NO<sub>2</sub> levels exceed the annual mean AQO. Both of these areas have been declared as AQMAs. A Further Assessment of air quality has been undertaken in Abingdon and work to develop

an AQAP for Abingdon is in its preparatory stages. The Further Assessment has also identified a potential need to extend the Abingdon AQMA and further monitoring will be introduced to provide more information on whether it will be necessary to extend the area and if so how far it will need to be extended. Monitoring in Copenhagen Drive has indicated kerbside exceedance of the AQO for NO<sub>2</sub> and further monitoring at a relevant location in the vicinity is planned in order to assess whether any further action is required in this area.

Monitoring at other locations will continue in order to inform the LAQM process and will be reviewed from time to time to ensure that monitoring information is useful and that the most suitable locations are being assessed.

It is noted that target dates for the Abingdon AQAP, USA 2009 and Further Assessment for Botley are all April 2009. Consideration will need to be given adjusting these targets over a wider timescale to make them achievable with current resources.

It is anticipated that the further monitoring in Ock St and near Copenhagen Drive will be specifically reported on in the USA 2009.

**Tim Williams**

**Senior Environmental Health Officer**

**Vale of White Horse District Council**

## 11.0 Glossary of abbreviations

**AbITS**- Abingdon Integrated Transport Strategy

**AQAP**- Air Quality Action Plan

**AQMA**- air Quality Management Area

**AQO**- Air Quality Objective

**BTEX**- Benzene, Toluene, Ethyl-benzene, and Xylene

**CO**- carbon monoxide

**EU**- European Union

**LAQM**- Local air Quality Management

**NETCEN**- National Environmental Technology Centre (UK)

**NO<sub>2</sub>**- nitrogen dioxide

**NO<sub>x</sub>**- oxides of nitrogen

**OCC**- Oxfordshire County Council

**O<sub>3</sub>**- Ozone

**PM<sub>10</sub>**- particles (10<sub>μ</sub> or less)

**SCOOT**- (Split Cycle Offset Optimisation Technique), a tool for managing and controlling traffic signals in urban areas.

**SO<sub>2</sub>**-sulphur dioxide

**TEA**- triethanolamine

**TRL**- Transport Research Laboratory

**USA**- Updating & Screening Assessment

**μg/m<sup>3</sup>**-microgram per cubic metre



## 12.0 References

### **Local Air Quality Management (DEFRA)**

Technical Guidance LAQM TG(03)

<http://www.defra.gov.uk/environment/airquality/local/guidance/pdf/laqm-tg03.pdf>

Policy Guidance LAQM PG(03)

<http://www.defra.gov.uk/environment/airquality/local/guidance/pdf/laqm-pg03.pdf>

Policy Guidance: Addendum LAQM PGA(05)

<http://www.airquality.co.uk/archive/laqm/documents/laqm-pga05-addend.pdf>

Progress Report Guidance LAQM PRG(03)

<http://www.defra.gov.uk/environment/airquality/local/guidance/pdf/laqm-pg03.pdf>

### **Vale of White Horse District Council**

Stage 3 Air Quality Review & Assessment 2000

Updating & Screening Assessment 2003

Air Quality Progress Report 2004

[http://www.whitehorsedc.gov.uk/Images/Final%20Air%20Quality%20Progress%20Report%202004\\_tcm4-3241.pdf](http://www.whitehorsedc.gov.uk/Images/Final%20Air%20Quality%20Progress%20Report%202004_tcm4-3241.pdf)

Detailed Assessment Abingdon 2006

[http://www.whitehorsedc.gov.uk/Images/Detailed%20Assessment%20Report%20%20\(f%20Central%20Abingdon\)%202005\\_tcm4-9524\\_tcm4-943.pdf](http://www.whitehorsedc.gov.uk/Images/Detailed%20Assessment%20Report%20%20(f%20Central%20Abingdon)%202005_tcm4-9524_tcm4-943.pdf)

Updating & Screening Assessment 2006

[http://www.whitehorsedc.gov.uk/Images/US%20and%20A%202006%20Final%20Edition\\_tcm4-3149.pdf](http://www.whitehorsedc.gov.uk/Images/US%20and%20A%202006%20Final%20Edition_tcm4-3149.pdf)

Detailed Assessment Botley 2007

[http://www.whitehorsedc.gov.uk/Images/Botley%20DA%20Final%20Sep%202007\\_tcm4-12316\\_tcm4-944.pdf](http://www.whitehorsedc.gov.uk/Images/Botley%20DA%20Final%20Sep%202007_tcm4-12316_tcm4-944.pdf)

Further Assessment Abingdon 2008

[http://www.whitehorsedc.gov.uk/Images/Abingdon%20FA%20FINAL%2012%20May%200812\\_tcm4-3117.pdf](http://www.whitehorsedc.gov.uk/Images/Abingdon%20FA%20FINAL%2012%20May%200812_tcm4-3117.pdf)

### **Oxfordshire County Council**

Local Transport Plan 2006-2011

[http://portal.oxfordshire.gov.uk/content/publicnet/council\\_services/roads\\_transport/plans\\_policies/local\\_transport\\_plan/ltp2/Ch10.pdf](http://portal.oxfordshire.gov.uk/content/publicnet/council_services/roads_transport/plans_policies/local_transport_plan/ltp2/Ch10.pdf)

Abingdon integrated Transport Strategy

[http://www.oxfordshire.gov.uk/wps/portal/publicsite/kcxml/04\\_Sj9SPykssy0xPLMnMz0vM0Y\\_QjzKL94k3Mg8F5ZnFO8WHOepHogtZloR8PfJzU\\_WD9L31A\\_QLckMjyh0dFQEnurQ-/delta/base64xml/L3dJdyEvd0ZNQUFzQUMvNEIVRS82X01fMU9C?WCM\\_GLOBAL\\_CONTEXT=http://apps.oxfordshire.gov.uk/wps/wcm/connect/Internet/Council+services/Roads+and+transport/Major+projects/Integrated+Transport+Strategies/Abingdon/RT+-+PP+-+Abingdon+ITS](http://www.oxfordshire.gov.uk/wps/portal/publicsite/kcxml/04_Sj9SPykssy0xPLMnMz0vM0Y_QjzKL94k3Mg8F5ZnFO8WHOepHogtZloR8PfJzU_WD9L31A_QLckMjyh0dFQEnurQ-/delta/base64xml/L3dJdyEvd0ZNQUFzQUMvNEIVRS82X01fMU9C?WCM_GLOBAL_CONTEXT=http://apps.oxfordshire.gov.uk/wps/wcm/connect/Internet/Council+services/Roads+and+transport/Major+projects/Integrated+Transport+Strategies/Abingdon/RT+-+PP+-+Abingdon+ITS)

Review of the Abingdon Traffic Management Scheme-TRL

[http://portal.oxfordshire.gov.uk/content/publicnet/council\\_services/roads\\_transport/major\\_projects/integrated\\_transport\\_strategies/abingdon\\_its/Abingdon-Report-june.pdf](http://portal.oxfordshire.gov.uk/content/publicnet/council_services/roads_transport/major_projects/integrated_transport_strategies/abingdon_its/Abingdon-Report-june.pdf)

## **Legislation**

Environment Act 1995

[http://www.opsi.gov.uk/acts/acts1995/Ukpga\\_19950025\\_en\\_1](http://www.opsi.gov.uk/acts/acts1995/Ukpga_19950025_en_1)

Air Quality Regulations 2000

<http://www.opsi.gov.uk/si/si2000/20000928.htm>

Air Quality Amendment Regulations 2002

<http://www.opsi.gov.uk/si/si2002/20023043.htm>

## APPENDIX 1

Produced by AEA Energy & Environment on behalf of Vale of White Horse DC

### **ABINGDON STERT ST 2 01 January to 31 December 2007**

These data have been fully ratified by AEA Energy & Environment

POLLUTANT	NO	NO <sub>x</sub>	NO <sub>2</sub>
Number Very High	-	-	0
Number High	-	-	0
Number Moderate	-	-	0
Number Low	-	-	5250
Maximum 15-minute mean	1060 µg m <sup>-3</sup>	1709 µg m <sup>-3</sup>	199 µg m <sup>-3</sup>
Maximum hourly mean	591 µg m <sup>-3</sup>	1060 µg m <sup>-3</sup>	157 µg m <sup>-3</sup>
Maximum running 8-hour mean	383 µg m <sup>-3</sup>	700 µg m <sup>-3</sup>	119 µg m <sup>-3</sup>
Maximum running 24-hour mean	279 µg m <sup>-3</sup>	525 µg m <sup>-3</sup>	100 µg m <sup>-3</sup>
Maximum daily mean	225 µg m <sup>-3</sup>	440 µg m <sup>-3</sup>	96 µg m <sup>-3</sup>
Average	35 µg m <sup>-3</sup>	96 µg m <sup>-3</sup>	42 µg m <sup>-3</sup>
Data capture	59.9 %	59.9 %	59.9 %

All mass units are at 20°C and 1013mb  
NO<sub>x</sub> mass units are NO<sub>x</sub> as NO<sub>2</sub> µg m<sup>-3</sup>

Pollutant	Air Quality (England) Regulations 2000 and (Amendment) Regulations 2002	Exceedences	Days
Nitrogen Dioxide	Annual mean > 40 µg m <sup>-3</sup>	1 *	-
Nitrogen Dioxide	Hourly mean > 200 µg m <sup>-3</sup>	0	0

\* exceedence based on 60 % data capture for a dataset existing predominantly through the winter months.

## APPENDIX 2

**Produced by AEA Energy & Environment on behalf of  
Vale of White Horse District Council**

### **ABINGDON**

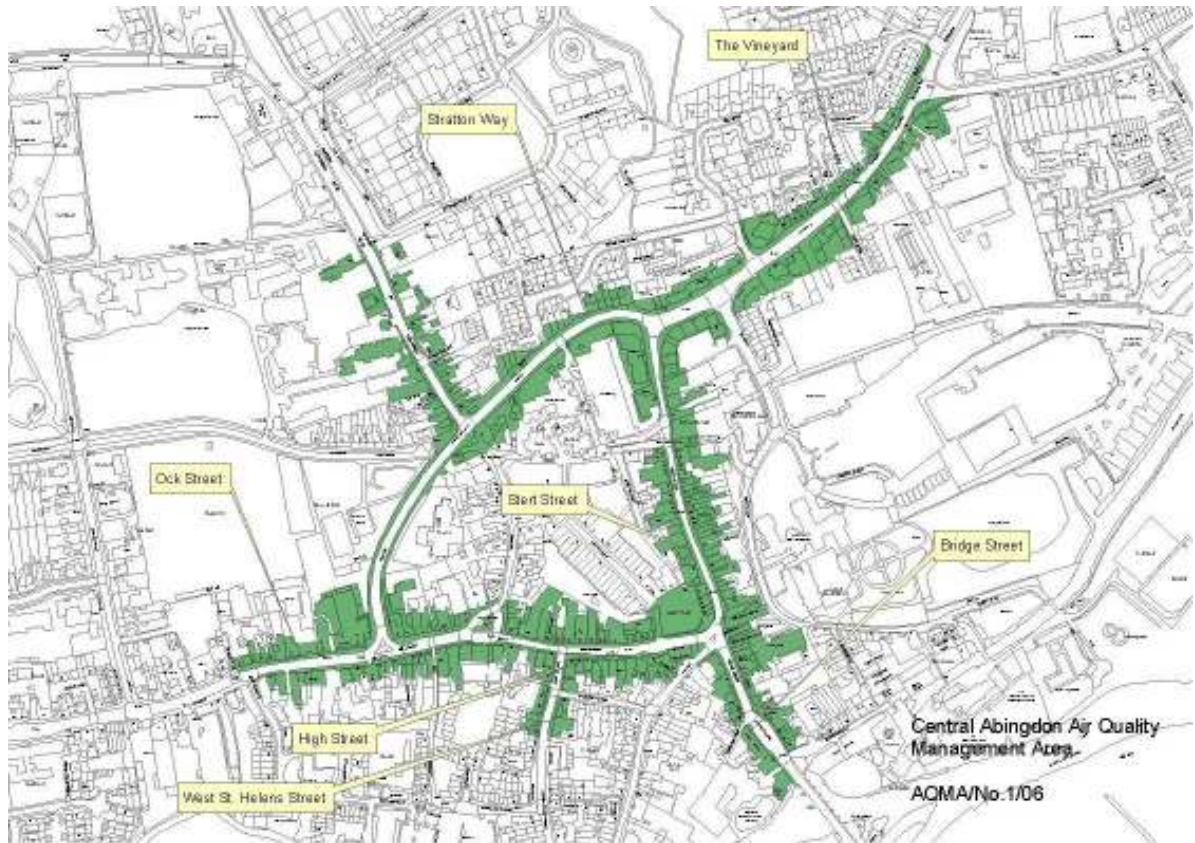
**01 January to 31 December 2007**

These data have been fully ratified by AEA Energy & Environment

POLLUTANT	PM <sub>10</sub> <sup>+</sup>	NO <sub>2</sub>	NO <sub>x</sub>	O <sub>3</sub>	SO <sub>2</sub>
Number Very High	0	0	-	0	0
Number High	0	0	-	0	0
Number Moderate	69	0	-	109	0
Number Low	6810	6948	-	6838	29791
Maximum 15-minute mean	460 µg m <sup>-3</sup>	134 µg m <sup>-3</sup>	741 µg m <sup>-3</sup>	138 µg m <sup>-3</sup>	59 µg m <sup>-3</sup>
Maximum hourly mean	211 µg m <sup>-3</sup>	113 µg m <sup>-3</sup>	556 µg m <sup>-3</sup>	136 µg m <sup>-3</sup>	35 µg m <sup>-3</sup>
Maximum running 8-hour mean	144 µg m <sup>-3</sup>	82 µg m <sup>-3</sup>	473 µg m <sup>-3</sup>	125 µg m <sup>-3</sup>	20 µg m <sup>-3</sup>
Maximum running 24-hour mean	96 µg m <sup>-3</sup>	64 µg m <sup>-3</sup>	355 µg m <sup>-3</sup>	95 µg m <sup>-3</sup>	13 µg m <sup>-3</sup>
Maximum daily mean	92 µg m <sup>-3</sup>	61 µg m <sup>-3</sup>	229 µg m <sup>-3</sup>	95 µg m <sup>-3</sup>	13 µg m <sup>-3</sup>
Average	24 µg m <sup>-3</sup>	21 µg m <sup>-3</sup>	38 µg m <sup>-3</sup>	41 µg m <sup>-3</sup>	3 µg m <sup>-3</sup>
Data capture	80.2 %	79.3 %	79.3 %	78.4 %	86.4 %

+ PM<sub>10</sub> as measured by a TEOM using a gravimetric factor of 1.3 for Indicative Gravimetric Equivalent units  
All mass units are at 20°C and 1013mb  
NO<sub>x</sub> mass units are NO<sub>x</sub> as NO<sub>2</sub> µg m<sup>-3</sup>

Pollutant	Air Quality (England) Regulations 2000 and (Amendment) Regulations 2002	Exceedences	Days
PM <sub>10</sub> Particulate Matter (Gravimetric)	Daily mean > 50 µg m <sup>-3</sup>	8	8
PM <sub>10</sub> Particulate Matter (Gravimetric)	Annual mean > 40 µg m <sup>-3</sup>	0	-
Nitrogen Dioxide	Annual mean > 40 µg m <sup>-3</sup>	0	-
Nitrogen Dioxide	Hourly mean > 200 µg m <sup>-3</sup>	0	0
Ozone	Running 8-hour mean > 100 µg m <sup>-3</sup>	53	10
Sulphur Dioxide	15-minute mean > 266 µg m <sup>-3</sup>	0	0
Sulphur Dioxide	Hourly mean > 350 µg m <sup>-3</sup>	0	0
Sulphur Dioxide	Daily mean > 125 µg m <sup>-3</sup>	0	0
Sulphur Dioxide	Annual mean > 20 µg m <sup>-3</sup>	0	-



**Appendix 3.** Abingdon AQMA



**Appendix 4.** Botley AQMA