



2009 Air Quality Updating and Screening Assessment for *South Oxfordshire District Council*

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

May 2009

South Oxfordshire District Council - England

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Executive Summary

The updating and screening assessment has shown that across the district there are no major changes in emissions from both the transport infrastructure and industrial sectors.

There are a number of small to medium sized developments, and these are being dealt with on a case-by-case basis.

New monitoring data is showing no exceedences of the objectives for Benzene and the short-term, hourly mean objective for nitrogen dioxide, however a number of exceedences of the $40\mu\text{g}/\text{m}^3$ annual mean objective for nitrogen dioxide have been identified. The majority of these are within existing air quality management areas, where action plans and mitigation measures are being progressed.

However, two locations outside of current air quality management areas have also shown an exceedence of the annual mean objective for nitrogen dioxide. Adwell Cottages adjacent to the M40 motorway has returned an annual mean figure of $40.2\mu\text{g}/\text{m}^3$. This area was assessed using dispersion modelling during the 2005 detailed assessment for Wallingford, and dispersion modelling carried out at the time predicted no exceedence at this location, thus far levels for 2005, 2006 and 2007 have confirmed this. In order to determine whether 2008 was an anomaly or whether there is a genuine exceedence at this location a further years monitoring data will be gathered. In order to gain an increased level of robustness in the data, triplicate diffusion tubes will be installed at this site and the situation will be reviewed in the 2010 progress report.

A borderline level and an exceedence have also been recorded along Broadway in Didcot. Diffusion tube monitoring will be increased in the area, including triplicate sites. A bid for continuous monitoring equipment and dispersion modelling for the detailed assessment will be submitted to Defra during the current round of funding.

Table of contents

| | | |
|----------|---|-----------|
| 1 | Introduction | 4 |
| 1.1 | Description of Local Authority Area | 4 |
| 1.2 | Purpose of Report | 5 |
| 1.3 | Air Quality Objectives | 5 |
| 1.4 | Summary of Previous Review and Assessments | 6 |
| 2 | New Monitoring Data | 12 |
| 2.1 | Summary of Monitoring Undertaken | 12 |
| 2.2 | Comparison of Monitoring Results with AQ Objectives | 15 |
| 3 | Road Traffic Sources | 21 |
| 3.1 | Narrow congested streets with residential properties close to the kerb | 21 |
| 3.2 | Busy streets where people may spend 1-hour or more close to traffic | 21 |
| 3.3 | Roads with high flow of buses and/or HGVs. | 21 |
| 3.4 | Junctions and busy roads | 21 |
| 3.5 | New roads constructed or proposed since the last round of review and assessment | 21 |
| 3.6 | All roads with significantly changed traffic flows. | 21 |
| 3.7 | Bus and coach stations | 22 |
| 4 | Other Transport Sources | 23 |
| 4.1 | Airports | 23 |
| 4.2 | Railways (diesel and steam trains) | 23 |
| 4.3 | Ports (shipping) | 23 |
| 5 | Industrial Sources | 24 |
| 5.1 | New or Proposed Industrial Installations | 24 |
| 5.2 | Major fuel (petrol) storage depots | 24 |
| 5.3 | Petrol stations | 24 |
| 5.4 | Poultry farms | 24 |
| 6 | Commercial and Domestic Sources | 26 |
| 6.1 | Biomass combustion – Individual Installations | 26 |
| 6.2 | Biomass combustion – Combined Impacts | 26 |
| 6.3 | Domestic Solid-Fuel Burning | 26 |
| 7 | Fugitive or Uncontrolled Sources | 27 |
| 8 | Conclusions and Proposed Actions | 28 |
| 8.1 | Conclusions from New Monitoring Data | 28 |
| 8.2 | Conclusions from Assessment of Sources | 28 |
| 8.3 | Proposed Actions | 29 |
| 9 | References | 30 |

South Oxfordshire District Council - England

Appendices

Appendix A QA / QC monitoring information

1 Introduction

1.1 Description of Local Authority Area

South Oxfordshire is a relatively large rural district located to the south east of Oxford city. The district is made up of four main market towns namely Thame, Didcot, Wallingford and Henley-on-Thames and a number of smaller towns and villages. A small section of the M40 motorway crosses the district in the north and a handful of A roads link the major towns. There are very few industrial sources within in the District although Didcot power station is situated in the neighbouring Vale of White Horse District to the west of Didcot.

Figure 1.1 The South Oxfordshire District



1.2 Purpose of Report

This report fulfils the requirements of the Local Air Quality Management process as set out in Part IV of the Environment Act (1995), the Air Quality Strategy for England, Scotland, Wales and Northern Ireland 2007 and the relevant Policy and Technical Guidance documents. The LAQM process places an obligation on all local authorities to regularly review and assess air quality in their areas, and to determine whether the air quality objectives are likely to be achieved. Where exceedences are considered likely, the local authority must then declare an Air Quality Management Area (AQMA) and prepare an Air Quality Action Plan (AQAP) setting out the measures it intends to put in place in pursuit of the objectives.

1.3 Air Quality Objectives

The air quality objectives applicable to LAQM in England are set out in the Air Quality (England) Regulations 2000 (SI 928), The Air Quality (England) (Amendment) Regulations 2002 (SI 3043), and are shown in Table 1.1. This table shows the objectives in units of microgrammes per cubic metre $\mu\text{g}/\text{m}^3$ (milligrammes per cubic metre, mg/m^3 for carbon monoxide) with the number of exceedences in each year that are permitted (where applicable).

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

| Pollutant | Air Quality Objective | | Date to be achieved by |
|--|---|---------------------|------------------------|
| | Concentration | Measured as | |
| Benzene | 16.25 $\mu\text{g}/\text{m}^3$ | Running annual mean | 31.12.2003 |
| | 5.00 $\mu\text{g}/\text{m}^3$ | Running annual mean | 31.12.2010 |
| 1,3-Butadiene | 2.25 $\mu\text{g}/\text{m}^3$ | Running annual mean | 31.12.2003 |
| Carbon monoxide | 10.0 mg/m^3 | Running 8-hour mean | 31.12.2003 |
| Lead | 0.5 $\mu\text{g}/\text{m}^3$ | Annual mean | 31.12.2004 |
| | 0.25 $\mu\text{g}/\text{m}^3$ | Annual mean | 31.12.2008 |
| Nitrogen dioxide | 200 $\mu\text{g}/\text{m}^3$ not to be exceeded more than 18 times a year | 1-hour mean | 31.12.2005 |
| | 40 $\mu\text{g}/\text{m}^3$ | Annual mean | 31.12.2005 |
| Particles (PM₁₀) (gravimetric) | 50 $\mu\text{g}/\text{m}^3$, not to be exceeded more than 35 times a year | 24-hour mean | 31.12.2004 |
| | 40 $\mu\text{g}/\text{m}^3$ | Annual mean | 31.12.2004 |
| Sulphur dioxide | 350 $\mu\text{g}/\text{m}^3$, not to be exceeded more than 24 times a year | 1-hour mean | 31.12.2004 |
| | 125 $\mu\text{g}/\text{m}^3$, not to be exceeded more than 3 times a year | 24-hour mean | 31.12.2004 |
| | 266 $\mu\text{g}/\text{m}^3$, not to be exceeded more than 35 times a year | 15-minute mean | 31.12.2005 |

1.4 Summary of Previous Review and Assessments

Table 1.4 below lists the previous completed stages of LAQM completed, the relevant dates and gives a brief description of the conclusions and recommendations from each report.

Figures 1.5, 1.6 and 1.7 below show the areas covered by the current AQMA declarations.

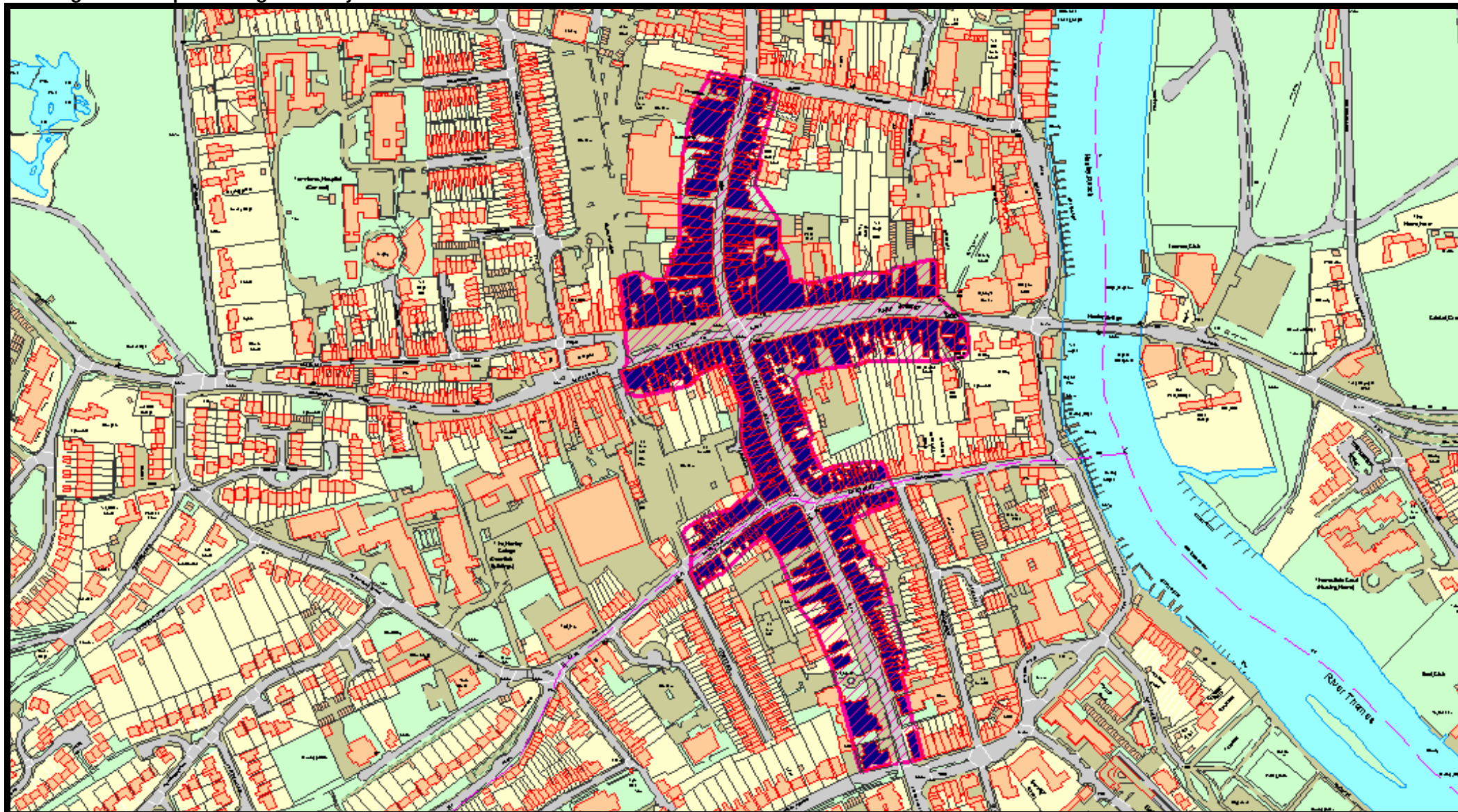
Table 1.4 Previous completed stages of LAQM

| Report | Date | Main Conclusions |
|--|--------------------|--|
| Stage 1 Assessment | 1998 | Further assessment was required for CO, SO ₂ , PM ₁₀ and NO ₂ – focussing on M40 / A40 corridor and the towns of Didcot and Henley-on-Thames. Also further assessment was required for SO ₂ emissions from Didcot A power station and NO _x / NO ₂ emissions from gas-fired Didcot B power station. |
| Stage 2 Assessment | 2000 | For CO, PM ₁₀ and NO ₂ , road traffic was identified as the major emission source. DMRB assessment showed that exceedences were likely at a number of properties in Henley-on-Thames and along the M40 / A40 corridor. ADMS dispersion modelling was undertaken for Didcot power stations (A & B) which indicated that exceedences of the air quality objectives were unlikely. |
| Stage 3 Assessment | January 2002 | Advanced dispersion modelling of pollutant emissions from road traffic showed that an exceedence of the 2005 NO ₂ objective could not be ruled out at a number of properties in Henley-on-Thames. No exceedences were identified at properties adjacent to the M40/A40. The Stage 3 report therefore recommended that an AQMA should be designated around Duke Street and suggested that further continuous NO _x /NO ₂ monitoring should take place in central Henley. |
| Stage 4 Assessment | November 2004 | Modelling results, although comparative with the earlier Stage 3 assessment, did suggest that the area of NO ₂ annual mean exceedences was wider than predicted during the Stage 3 assessment. This owed partly to the increase in monitored concentrations in 2003, based on the year 2000 baseline used in the previous assessment. SODC reviewed the assessment and responded by enlarging the AQMA to include more of Bell Street, Market Place, Hart Street and Reading Road. (See Fig 1.5 below) |
| Updating & Screening Assessment | May 2003 | The USA was based on a checklist whereby sources identified in the first phase of Review and Assessment and any new or altered emission sources, were reviewed with regard to their current significance and any requirement for further assessment. The USA concluded that based on monitored concentrations in Wallingford and close to the M40, a Detailed Assessment was required. |
| Detailed Assessment | August 2005 | The Detailed Assessment involved the use of more sophisticated modelling and monitoring techniques and was used to determine whether the likelihood existed for the AQOs to be exceeded and the consequent need to declare or revise an AQMA. Through the application of detailed dispersion modelling, supported by local monitoring data, the Detailed Assessment concluded that the Council should consider declaring an AQMA in relation to annual mean NO ₂ concentrations in Wallingford town centre. Predicted concentrations in close proximity to the M40 motorway were shown as likely to meet the AQOs in 2005. A Further Assessment would |

South Oxfordshire District Council - England

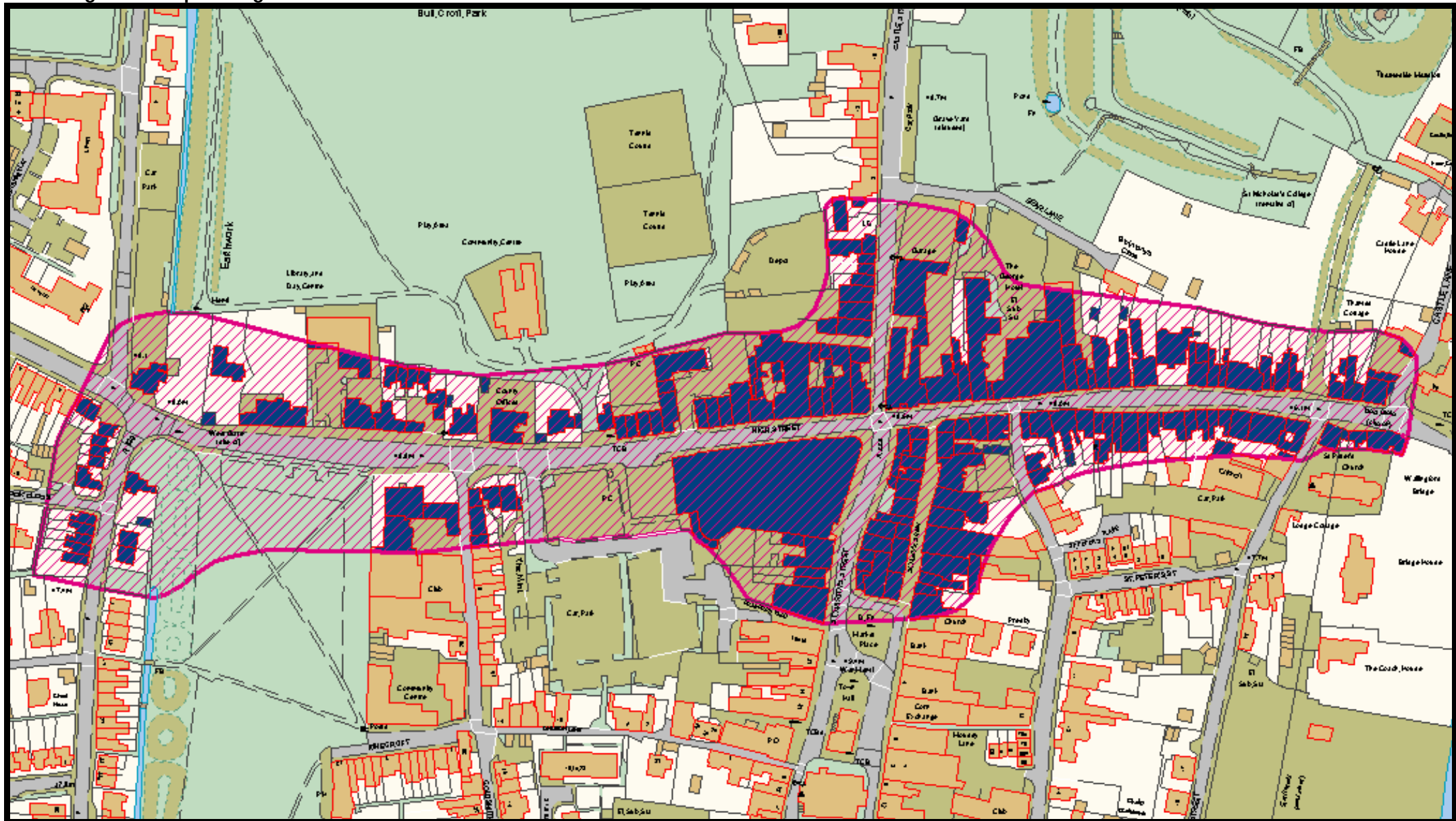
| | | |
|--|----------------------|--|
| | | therefore follow AQMA designation for Wallingford. (See figure 1.6 below) |
| Progress Report | November 2005 | Monitored concentrations of NO ₂ in Watlington were approaching the AQO. It was considered most appropriate for the Council to continue to evaluate the monitored concentrations for this location following analysis of the data for the 2005 calendar year. The Progress Report concluded that a Detailed Assessment was not required to be undertaken by the Council. |
| Further Assessment | July 2006 | The Further Assessment provided an opportunity for the Council to revisit and revise if necessary, the conclusions from the Detailed Assessment (2004) in relation to the location and extent of the AQMA declared in Wallingford. It also formed the basis for the Council to develop an Action Plan to reduce emissions of nitrogen oxides (NO _x) from road traffic sources. The Further Assessment concluded that the Council should not revoke or amend the AQMA declaration at the current time and that they should proceed with the formulation of an Air Quality Action Plan with the aim of working towards meeting the annual mean NO ₂ Air Quality Objective concentration. |
| Updating & Screening Assessment | November 2006 | The USA was based on a checklist whereby sources identified in the second round of Review and Assessment and any new or altered emission sources, were reviewed with regard to their current significance and any requirement for further assessment. The South Oxfordshire USA concluded that it was unlikely that a Detailed Assessment would be required for any potential source identified in the South Oxfordshire District. However, it noted that it was possible that with the availability of further data, the 2007 Progress Report may confirm that a Detailed Assessment is required for Watlington and/or Didcot. |
| Progress Report | May 2007 | The progress report concluded that no further exceedences were considered likely for Carbon Monoxide, Benzene, 1, 3 Butadiene, Lead, Sulphur Dioxide and PM ₁₀ . However, a detailed assessment for NO ₂ should be carried out in the central area of Watlington. It was also reported that a number of initial traffic management schemes had been identified within Wallingford and a 'gating' scheme was to be trialled, with the action plan to follow. |
| Henley Air Quality Action Plan | May 2007 | The Henley air quality action plan identified a number of measures to be introduced in Henley-on-Thames in pursuit of achieving the annual mean objective for NO ₂ . Including the introduction of an ITS scheme for the town, with a predicted 1.9µg/m ³ reduction predicted. |
| Detailed Assessment | July 2008 | Through the application of detailed dispersion modelling, supported by local monitoring data, the Detailed Assessment concluded that the Council should consider declaring an AQMA in relation to annual mean NO ₂ in the Couching Street area of Watlington. (See figure 1.7 below) |
| Action Plan – Progress Report | May 2008 | The action plan progress report updated the progress on all actions implemented under the action plan in Henley. The report concluded that the ITS scheme had almost been fully implemented. There were still exceedences of the NO ₂ annual mean; therefore, the action plan was to focus on HGV usage in the town as well as provision of parking. |

Figure 1.5 Map of enlarged Henley AQMA



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Figure 1.6 Map Wallingford AQMA



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2 New Monitoring Data

2.1 Summary of Monitoring Undertaken

2.1.1 Automatic Monitoring Sites

South Oxfordshire District Council currently operates three continuous monitoring sites. All sites are calibrated fortnightly by the LSO following Defra AURN network calibration procedures using certified calibration gasses.

All three sites are subject to six monthly audits carried out by the National Physics Laboratory (NPL) and the data is validated and ratified by the Environmental Research Group (ERG) based at Kings College London.

A dedicated supporting unit is also employed for each site, responding to equipment breakdowns and scheduled servicing.

Due to an air conditioning failure in the analyser housing, the Wallingford High Street site has been down for most of 2008. A new enclosure and air conditioning unit was commissioned in late 2008. The analyser is now re-installed collecting data.

Table 2.1 below provides the basic details of each site

Table 2.1 Details of Automatic Monitoring Sites

| Site Name | Site Type | OS Grid Ref | Pollutants Monitored | In AQMA ? | Relevant Exposure? (Y/N with distance (m) to relevant exposure) | Distance to kerb of nearest road (N/A if not applicable) | Worst-case Location ? |
|----------------------------|----------------|----------------------|----------------------|-----------|---|--|-----------------------|
| Wallingford High Street | Urban Kerbside | X 460800 Y 189500 | NO ₂ | Y | Y (1m) | 1.2m | Y |
| Henley Duke Street | Urban Roadside | X 476116 Y 182531 | NO ₂ | Y | Y (2m) | 3.5m | Y |
| Watlington Couching Street | Urban Kerbside | X 468951 Y 194457 | NO ₂ | Y | Y (1m) | 2.2m | Y |

2.1.2 Non-Automatic Monitoring

In addition to the three continuous monitoring sites, South Oxfordshire District Council also operates a passive monitoring network made up of 42 Nitrogen Dioxide diffusion tubes and 2 BTX diffusion tubes.

Table 2.2 below shows the site information for each tube

Table 2.2 Details of Non- Automatic Monitoring Sites

| Site Name | Site Type | OS Grid Ref | Pollutants Monitored | In AQMA ? | Relevant Exposure? (Y/N with distance (m) to relevant exposure) | Distance to kerb of nearest road (N/A if not applicable) | Worst-case Location ? |
|--------------------------|----------------|----------------------|----------------------|-----------|---|--|-----------------------|
| Henley - 66c Bell Street | Urban Roadside | X 476088 Y 182894 | NO ₂ | N | Y (1m) | 2m | Y |
| Henley – 37 New Street | Urban Roadside | X 476221 Y 182829 | NO ₂ | N | Y (1m) | 2m | Y |
| Henley –Northfield End | Urban Roadside | X 475870 Y 183217 | NO ₂ | N | Y (3m) | 2m | Y |

South Oxfordshire District Council - England

Table 2.2 Cont.

| Site Name | Site Type | OS Grid Ref | Pollutants Monitored | In AQMA ? | Relevant Exposure? (Y/N with distance (m) to relevant exposure) | Distance to kerb of nearest road (N/A if not applicable) | Worst-case Location ? |
|--|------------------|----------------------|-----------------------|-----------|---|--|-----------------------|
| Henley – Station Road | Urban Roadside | X 476287 Y 182288 | NO ₂ | N | Y (6m) | 2m | Y |
| Henley – 178 Reading Road | Urban Roadside | X 476549 Y 181734 | NO ₂ | N | Y (1m) | 3m | Y |
| Henley – Reading Road / St Andrews Road | Urban Kerbside | X 476266 Y 182097 | NO ₂ | N | Y (9m) | 1m | Y |
| Henley – 35 Reading Road | Urban Roadside | X 476175 Y 182397 | NO ₂ | Y | Y (3m) | 2m | Y |
| Henley – 8 Reading Road | Urban Roadside | X 476131 Y 182457 | NO ₂ | Y | Y (1m) | 9m | Y |
| Henley – 2 Greys Road | Urban Kerbside | X 476113 Y 182508 | NO ₂ | Y | Y (1m) | 1m | Y |
| Henley – 45 Duke Street (Co-location) | Urban Roadside | X 476116 Y 182531 | NO ₂ | Y | Y (2m) | 4m | Y |
| Henley – 4 Duke Street | Urban Kerbside | X 476075 Y 182614 | NO ₂ | Y | Y (1m) | 2m | Y |
| Henley – Café Uno, Hart Street | Urban Roadside | X 476224 Y 182651 | NO ₂ | Y | Y (1m) | 2m | Y |
| Henley – 27 Market Place | Urban Roadside | X 475999 Y 182615 | NO ₂ | Y | Y (1m) | 3m | Y |
| Henley – 15 Lovell Close | Urban Background | X 475110 Y 181508 | NO ₂ , BTX | N | Y (14m) | 2m residential | N |
| Henley 31 Duke Street | Urban Roadside | X 476104 Y 182559 | BTX | Y | Y (1m) | 2m | Y |
| Henley – Townlands Hospital | Urban Background | X 475776 Y 182772 | NO ₂ | N | Y (10m) | N/A | N |
| Henley – 31 Bell Street | Urban Roadside | X 476050 Y 182743 | NO ₂ | Y | Y (1m) | 2m | Y |
| Wallingford – 9 Station Road | Urban Roadside | X 460313 Y 189535 | NO ₂ | N | Y (1m) | 3m | Y |
| Wallingford – 51a high Street | Urban Roadside | X 460462 Y 189487 | NO ₂ | Y | Y (1m) | 4m | Y |
| Wallingford – Welcome Chinese 79 High Street | Urban Roadside | X 460706 Y 189491 | NO ₂ | Y | Y (1m) | 2m | Y |
| Wallingford – Stafford House 12 castle Street | Urban Roadside | X 460729 Y 189611 | NO ₂ | N | Y (1m) | 2m | Y |
| Wallingford – Jumpers 24 Market Place | Urban Roadside | X 460738 Y 189411 | NO ₂ | Y | Y (1m) | 2m | Y |
| Wallingford – 59 Brookmead Drive | Urban Background | X 460283 Y 188808 | NO ₂ | N | Y (16m) | 1m residential | N |
| Wallingford – USA Chicken 6 St Martins Street | Urban Roadside | X 460692 Y 189339 | NO ₂ | N | Y (1m) | 2m | Y |

Table 2.2 Cont.

| Site Name | Site Type | OS Grid Ref | Pollutants Monitored | In AQMA ? | Relevant Exposure? (Y/N with distance (m) to relevant exposure) | Distance to kerb of nearest road (N/A if not applicable) | Worst-case Location ? |
|--|------------------|----------------------|----------------------|-----------|---|--|-----------------------|
| Wallingford – George Hotel, 83 High Street (Co-Location) | Urban Roadside | X 460800 Y 189500 | NO ₂ | Y | Y (1m) | 2m | Y |
| Wallingford – 20 high Street | Urban Roadside | X 460822 Y 189493 | NO ₂ | Y | Y (1m) | 1m | Y |
| Wallingford – The Town Arms, 102 High Street | Urban Roadside | X 461938 Y 189497 | NO ₂ | Y | Y (1m) | 2m | Y |
| Wallingford – 28 The Street, Crowmarsh | Urban Roadside | X 461397 Y 189301 | NO ₂ | N | Y (1m) | 3m | Y |
| Wallingford – 58 The Street, Crowmarsh | Urban Roadside | X 460560 Y 189233 | NO ₂ | N | Y (1m) | 2m | Y |
| Watlington – 8 Sherburn Street | Urban Roadside | X 469017 Y 194514 | NO ₂ | Y | Y (1m) | 3m | Y |
| Watlington – 41 Couching Street (Co-location) | Urban Roadside | X 468951 Y 194457 | NO ₂ | Y | Y (1m) | 2m | Y |
| Watlington – Co-op, 48 Couching Street | Urban Roadside | X 468962 Y 194458 | NO ₂ | Y | Y (1m) | 2m | Y |
| Watlington – 9 Couching Street | Urban Roadside | X 468849 Y 194340 | NO ₂ | Y | Y (3m) | 2m | Y |
| Didcot – 20 Wantage Road | Urban Roadside | X 451780 Y 189920 | NO ₂ | N | Y (9m) | 1m | Y |
| Didcot – 100 Park Road | Urban Roadside | X 451653 Y 189384 | NO ₂ | N | Y (15m) | 1m | Y |
| Didcot – 96 Broadway | Urban Roadside | X 452908 Y 189982 | NO ₂ | N | Y (1m) | 3m | Y |
| Didcot – 55 Broadway | Urban Roadside | X 453099 Y 190031 | NO ₂ | N | Y (4m) | 3m | Y |
| Didcot – Lune Close | Urban Background | X 453500 Y 190384 | NO ₂ | N | Y (2m) | 2m Residential | N |
| Thame – 1 Ludlow Drive | Urban Background | X 471283 Y 205978 | NO ₂ | N | Y (6m) | 2m Residential | N |
| Thame – 16 Park Street | Urban Roadside | X 471010 Y 205598 | NO ₂ | N | Y (4m) | 2m | Y |
| Wheatley – 37 Beech Road | Urban Background | X 459867 Y 205447 | NO ₂ | N | Y (16m) | 2m Residential | N |
| Wheatley – 50 High Street | Urban Roadside | X 459533 Y 205740 | NO ₂ | N | Y (1m) | 1m | Y |
| M40 – Crowthorne Kennels | Urban Roadside | X 463045 Y 204440 | NO ₂ | N | Y (1m) | 35m Motorway | Y |
| M40 – 9 Adwell Cottages | Urban Roadside | X 470200 Y 200197 | NO ₂ | N | Y (1m) | 15m Motorway | Y |

Diffusion Tube QA/QC

All diffusion tubes are supplied and analysed by Bristol Scientific Services, using 20% TEA in water preparation method. Preparation is carried out in line with procedures set out in the Harmonisation Practical Guidance; results from the WASP scheme and laboratory precision scheme are included in **Appendix A**.

Diffusion tube monitoring is an indicative method and the tubes tend to over or under read to a certain extent. It is therefore necessary to apply a correction (bias adjustment) factor to the results to counter the percentage over/under read.

Bias adjustment factors are calculated by locating diffusion tubes, usually in triplicate, with continuous chemiluminescent analysers, thus allowing the comparison of the tube results to the more robust reference method.

A triplicate co-location study is carried out at each of the three continuous monitoring sites Wallingford, Watlington and Henley. All three sites are located within an AQMA within a street canyon situation, and are representative of the local diffusion network.

In addition to local bias adjustment factors, there is also a national bias adjustment factor available, this is found on the national database and is derived from the average bias from all listed local authorities using the same laboratory and preparation technique. TG09 lays out guidance as to scenarios when use of the local or national factors is more appropriate.

2008 Bias Adjustment Factor

The national database contains only one co-location study using the same laboratory and technique for 2008. The study is based on a single tube co-location, and has returned an adjustment factor of 0.88, which is very different to locally derived factors. Therefore, it is deemed in this case that the locally derived bias adjustment factors are more representative.

As stated above a fault with the air conditioning at the Wallingford automatic site has resulted in data capture of only 24% for 2008, obviously making it unsuitable for deriving a bias adjustment factor.

An intermittent fault with the Henley analyser between June and August has meant that ERG have had to remove a proportion of data. This combined with one month's missing tubes has resulted in less than 9 months valid co-location. Following TG09 guidance and advice from the review and assessment helpdesk, the bias adjustment factor derived from the co-location study at Watlington has been deemed the most appropriate.

The different bias adjustment factors are listed in Table 2.3 below.

Table 2.3 – Bias Adjustment Factors

| Co-location study | No. of months based upon | Continuous analyser annual data capture | Bias | Bias adjustment factor |
|-------------------|--------------------------|---|-------|------------------------|
| National | 12 Months | 96% | 14.2% | 0.88 |
| Henley | 8 Months | 78% | -7% | 1.08 |
| Watlington | 12 Months | 97% | 6% | 0.94 |

It should be noted that although the Henley site returned a more conservative factor (1.08) using the Watlington based 0.94 factor does not alter the conclusions and outcomes of this report.

2.2 Comparison of Monitoring Results with AQ Objectives

The following section provides updated monitoring results across the district. Previous rounds of review and assessment have screened out the necessity to monitor levels of PM10, Sulphur dioxide, Lead, Carbon

monoxide and 1,3 Butadiene. Therefore the following section concentrates on Nitrogen dioxide and Benzene monitoring results

2.2.1 Nitrogen Dioxide

The monitoring data below shows a number of exceedences for Nitrogen dioxide within our three AQMA's and at two other locations within the District. These are discussed in further detail in the relevant sections below.

Automatic Monitoring Data

Tables 2.3a and 2.3b below show the previous three years data (if available) for continuous monitoring sites. Table 2.3a shows any exceedences of the annual mean objective and table 2.3b shows any exceedences of the hourly mean objective.

Table 2.3a Results of Automatic Monitoring for Nitrogen Dioxide: Comparison with Annual Mean Objective

| Site ID | Location | Within AQMA? | Proportion of year with valid data 2008 % | Annual mean concentrations (40 µg/m ³) | | |
|---------|------------------|--------------|---|--|------|-----------------|
| | | | | 2006 | 2007 | 2008 |
| OX1 | Henley-on-Thames | Y | 78 | 37 | 44 | 47 |
| OX2 | Wallingford | Y | 24 | 49 | 57 | 44 [†] |
| OX3 | Watlington | Y | 97 | - | - | 47 |

^{*} Based on 62% data capture.

[†] Due to a technical fault with the Wallingford analyser's air conditioning unit in 2008, the data capture rate is very low (24%).

Table 2.3b Results of Automatic Monitoring for Nitrogen Dioxide: Comparison with 1-hour Mean Objective

| Site ID | Location | Within AQMA? | Data Capture 2008 % | Number of Exceedences of hourly mean (200 µg/m ³) | | |
|---------|------------------|--------------|---------------------|---|-----------------|------|
| | | | | 2006 | 2007 | 2008 |
| OX1 | Henley-on-Thames | Y | 78 | 0 | 0 | 3 |
| OX2 | Wallingford | Y | 24 | 16 | 71 [*] | 0 |
| OX3 | Watlington | Y | 97 | - | 2 | 6 |

**Mainly occurred in one period in April – Thought to be a fault with the analyser, however diagnostics are unable for this period to verify this conclusively.*

All three continuous monitoring site within the three declared AQMAs have all shown exceedences of the annual mean concentration for NO₂.

The 2008 data shows that none of the continuous monitoring sites are recording an exceedence of the hourly mean objective. All three continuous monitoring sites represent relevant receptor locations and are within existing air quality management areas, where action plans and mitigation measures are currently being progressed.

It should be noted that some of the data is still provisional awaiting the next round of site audits from NPL, therefore the final annual mean figure may change once fully ratified.

Diffusion Tube Monitoring Data

Table 2.4a Results of Nitrogen Dioxide Diffusion Tubes

| Site ID | Location | Within AQMA? | Data Capture 2008 % | Annual mean concentrations |
|--------------------|---|--------------|---------------------|---|
| | | | | 2008 ($\mu\text{g}/\text{m}^3$) Adjusted for bias (0.94) |
| Henley | 66C Bell Street | N | 100 | 42.6 |
| Henley | 37 New Street | N | 91.7 | 28.5 |
| Henley | Northfield End | N | 100 | 35.0 |
| Henley | Station Road | N | 100 | 35.9 |
| Henley | 178 Reading Road | N | 100 | 38.8 |
| Henley | Reading Rd / St Andrews Rd | N | 91.7 | 42.5 |
| Henley | 35 Reading Road | Y | 100 | 37.9 |
| Henley | 8 Reading Road | Y | 100 | 22.5 |
| Henley | 2 Greys Road | Y | 100 | 44.2 |
| Henley | 45 Duke Street (Co-location) | Y | 91.7 | 38.6 - Triplicate |
| Henley | 4 Duke Street | Y | 100 | 58.0 |
| Henley | Café Uno, Hart Street | Y | 91.7 | 42.4 |
| Henley | 27 Market Place | Y | 100 | 34.4 |
| Henley | 15 Lovell Close | N | 100 | 18.5 |
| Henley | Townlands Hospital, York Road | N | 100 | 19.3 |
| Henley | 31 Bell Street | Y | 100 | 40.1 |
| Wallingford | 9 Station Road | N | 100 | 30.7 |
| Wallingford | 51a High Street | Y | 100 | 33.5 |
| Wallingford | Welcome Chinese, 79 High St | Y | 91.7 | 47.9 |
| Wallingford | Stafford House, 12 Castle St | N | 100 | 32.7 |
| Wallingford | Jumpers, 24 Market Place | N | 91.7 | 31.1 |
| Wallingford | 59 Brookmead Drive | N | 100 | 19.3 |
| Wallingford | USA Chicken, 6 St Martins St | N | 100 | 25.0 |
| Wallingford | George Hotel (Co-location) | Y | 100 | 41.8 - Triplicate |
| Wallingford | 20 High Street | Y | 100 | 48.3 |
| Wallingford | The Town Arms, 102 High St | Y | 100 | 40.2 |
| Wallingford | 28 The Street, Crowmarsh | N | 100 | 24.2 |
| Wallingford | 58 The Street, Crowmarsh | N | 75.0 | 24.3 |
| Watlington | 8 Sherburn Street | Y | 91.7 | 47.3 |
| Watlington | 41 Couching Street (Co-location) | Y | 100 | 47.3 - Triplicate |
| Watlington | Co-op, 48 Couching Street | Y | 100 | 47.1 |
| Watlington | 9 Couching Street | Y | 100 | 32.2 |
| Didcot | 20 Wantage Road | N | 83.3 | 35.1 |
| Didcot | 100 Park Road | N | 100 | 25.2 |
| Didcot | 96 Broadway | N | 91.7 | 39.2 |
| Didcot | 55 Broadway | N | 91.7 | 40.6 |
| Didcot | Lune Close | N | 100 | 25.0 |
| Thame | 1 Ludlow Drive | N | 100 | 19.1 |
| Thame | 16 Park Street | N | 100 | 28.8 |
| Wheatley | 37 Beech Road | N | 91.7 | 21.2 |
| Wheatley | 50 High Street | N | 100 | 30.4 |
| M40 | 9 Adwell Cottages | N | 100 | 40.2 |

Table 2.4b Results of Nitrogen Dioxide Diffusion Tubes

| Site ID | Location | Within AQMA? | Annual mean concentrations ($\mu\text{g}/\text{m}^3$) Adjusted for bias* | | |
|-------------|----------------------------------|--------------|--|-------------|-------------|
| | | | 2006 | 2007 | 2008 |
| Henley | 66C Bell Street | N | - | 37.5 | 42.6 |
| Henley | 37 New Street | N | - | 27.6 | 28.5 |
| Henley | Northfield End | N | - | - | 35.0 |
| Henley | Station Road | N | - | 33.4 | 35.9 |
| Henley | 178 Reading Road | N | - | 35.6 | 38.8 |
| Henley | Reading Rd / St Andrews Rd | N | - | 40.7 | 42.5 |
| Henley | 35 Reading Road | Y | - | 32.5 | 37.9 |
| Henley | 8 Reading Road | Y | 20.4 | 19.9 | 22.5 |
| Henley | 2 Greys Road | Y | 38.2 | 44.3 | 44.2 |
| Henley | 45 Duke Street (Co-location) | Y | 38.6 | 34.6 | 38.6 |
| Henley | 4 Duke Street | Y | 50.6 | 53.7 | 58.0 |
| Henley | Café Uno, Hart Street | Y | - | 37.0 | 42.4 |
| Henley | 27 Market Place | Y | 28.4 | 32.6 | 34.4 |
| Henley | 15 Lovell Close | N | 14.2 | 16.5 | 18.5 |
| Henley | Townlands Hospital, York Road | N | 15.6 | 16.9 | 19.3 |
| Henley | 31 Bell Street | Y | 29.0 | 34.7 | 40.1 |
| Wallingford | 9 Station Road | N | - | 29.4 | 30.7 |
| Wallingford | 51a High Street | Y | - | 31.5 | 33.5 |
| Wallingford | Welcome Chinese, 79 High St | Y | 37.7 | 43.9 | 47.9 |
| Wallingford | Stafford House, 12 Castle St | N | - | 27.2 | 32.7 |
| Wallingford | Jumpers, 24 Market Place | N | - | 25.1 | 31.1 |
| Wallingford | 59 Brookmead Drive | N | 15.3 | 15.3 | 19.3 |
| Wallingford | USA Chicken, 6 St Martins St | N | - | 27.4 | 25.0 |
| Wallingford | George Hotel (Co-location) | Y | 33.1 | 38.1 | 41.8 |
| Wallingford | 20 High Street | Y | 40.3 | 42.0 | 48.3 |
| Wallingford | The Town Arms, 102 High St | Y | 31.1 | 36.6 | 40.2 |
| Wallingford | 28 The Street, Crowmarsh | N | - | 23.1 | 24.2 |
| Wallingford | 58 The Street, Crowmarsh | N | - | - | 24.3 |
| Watlington | 8 Sherburn Street | Y | 39.1 | 39.8 | 47.3 |
| Watlington | 41 Couching Street (Co-location) | Y | - | 39.8 | 47.3 |
| Watlington | Co-op, 48 Couching Street | Y | 38.7 | 37.4 | 47.1 |
| Watlington | 9 Couching Street | Y | 28.0 | 29.6 | 32.2 |
| Didcot | 20 Wantage Road | N | - | 28.0 | 35.1 |
| Didcot | 100 Park Road | N | - | 27.2 | 25.2 |
| Didcot | 96 Broadway | N | 31.6 | 36.0 | 39.2 |
| Didcot | 55 Broadway | N | - | 38.0 | 40.6 |
| Didcot | Lune Close | N | - | 19.4 | 25.0 |
| Thame | 1 Ludlow Drive | N | 14.8 | 16.7 | 19.1 |
| Thame | 16 Park Street | N | 23.4 | 27.0 | 28.8 |
| Wheatley | 37 Beech Road | N | 16.3 | 18.6 | 21.2 |
| Wheatley | 50 High Street | N | 27.3 | 28.0 | 30.4 |
| M40 | 9 Adwell Cottages | N | 38.0 | 37.1 | 40.2 |

* Bias adjustment factors: 2008 – 0.94
 2007 – 0.80
 2006 – 0.85

The 2008 data has shown an increase at all monitoring locations including background sites, this can be at least partially attributed to unusually high concentrations recorded in February and May. A number of regional pollution episodes are thought to be responsible for the high readings in February, however the reasons for elevated levels in May is less clear.

South Oxfordshire District Council - England

The updated 2008 data has shown an exceedence of the $40\mu\text{g}/\text{m}^3$ nitrogen dioxide annual mean objective at 15 locations, with a further three sites returning borderline results.

Of the 15 exceedences, 11 are within existing AQMA declarations. The four sites showing an exceedence not currently within an AQMA are 66c Bell Street and Reading Road / St Andrews Road in Henley, 55 Broadway in Didcot and Adwell Cottages adjacent to the M40 motorway.

Of the borderline levels there are two currently outside of an AQMA designation: 178 Reading Road, Henley and 96 Broadway, Didcot.

Henley

The two Henley sites showing an exceedence are located just outside of the AQMA boundary, indicating the boundary may need to be adjusted. Neither location showed an exceedence in 2007 therefore further monitoring is required to determine whether the 2008 is in line with the longer-term trend or whether it is simply an unusual monitoring year. With regards the borderline reading recorded at 178 Reading Road, this location is situated approximately 9 metres away from the façade of the nearest residential property. Using the distance calculation method outlined in TG(09) it is estimated that the level is likely to be in the region of $28.7\mu\text{g}/\text{m}^3$.

Wallingford

Wallingford's continuous analyser data shows a very poor capture rate due to problems with the analyser housing air conditioning unit. This housing has been replaced, but we are still having problems with the analyser. Actions to address this shall be outlined below. Four of the diffusion tube locations show exceedences of the annual mean within the AQMA.

Watlington

Watlington analyser has performed very well throughout 2008 (97% capture rate, with continuous analyser data and results from the diffusion tubes showing exceedences in the annual mean. This has resulted in an AQMA being declared 31 March 2009.

Adwell Cottages

An exceedences of $40.2\mu\text{g}/\text{m}^3$ has been recorded at Adwell Cottages (next to the M40), this location was assessed using dispersion modelling during the 2005 detailed assessment for Wallingford, and dispersion modelling carried out at the time predicted no exceedence at this location.

Didcot

Levels at one location in Didcot have exceeded the annual mean $40.6\mu\text{g}/\text{m}^3$ (55 Broadway) with another location approaching borderline exceedence at $39.2\mu\text{g}/\text{m}^3$ (96 Broadway). Other locations monitored in Didcot fall below the annual mean concentration.

2.2.2 Benzene

South Oxfordshire District Council also monitors levels of Benzene at two locations in Henley, using BTX diffusion tubes. These tubes are exposed for the first fortnight in every diffusion tubes monitoring month. They are supplied and analysed by Bristol Scientific Services.

One tube is located at the background site in Lovell Close and the other is located at 31 Duke Street, this location was chosen as it was assumed to be the worst-case location for the town.

Tables 2.5a and 2.5b below shows the results from the BTX diffusion tubes for the last 3 years. The annual mean for 2008 in Duke street is 0.6 which is well below the objective of 5.00 $\mu\text{g}/\text{m}^3$. Therefore a detailed assessment for Benzene is not required.

It could be worth considering ceasing this monitoring, but it is being continuing for political reasons.

Table 2.5b 2008 Results of BTX Diffusion Tubes

| Site ID | Location | Within AQMA? | Annual mean concentration ($\mu\text{g}/\text{m}^3$) | | |
|---------|--------------|--------------|--|---------|--------|
| | | | Benzene | Toluene | Xylene |
| Henley | Duke Street | N | 0.6 | 4.1 | 0.9 |
| Henley | Lovell Close | N | 0.6 | 0.8 | 0.6 |

Table 2.5a Historic results of BTX Diffusion Tubes

| Site ID | Location | Within AQMA? | Benzene Annual mean concentrations ($\mu\text{g}/\text{m}^3$) | | |
|---------|--------------|--------------|---|------|------|
| | | | 2006 | 2007 | 2008 |
| Henley | Duke Street | N | 0.8 | 0.9 | 0.6 |
| Henley | Lovell Close | N | 0.6 | 0.6 | 0.6 |

3 Road Traffic Sources

3.1 Narrow Congested Streets with Residential Properties Close to the Kerb

South Oxfordshire District Council confirms that there are no new/newly identified congested streets with a flow above 5,000 vehicles per day and residential properties close to the kerb, that have not been adequately considered in previous rounds of Review and Assessment.

3.2 Busy Streets Where People May Spend 1-hour or More Close to Traffic

South Oxfordshire District Council confirms that there are no new/newly identified busy streets where people may spend 1 hour or more close to traffic.

3.3 Roads with a High Flow of Buses and/or HGVs.

South Oxfordshire District Council confirms that there are no new/newly identified roads with high flows of buses/HDVs.

3.4 Junctions

South Oxfordshire District Council confirms that there are no new/newly identified busy junctions/busy roads.

3.5 New Roads Constructed or Proposed Since the Last Round of Review and Assessment

South Oxfordshire District Council confirms that there are no new/proposed roads.

3.6 Roads with Significantly Changed Traffic Flows

South Oxfordshire District Council confirms that there are no new/newly identified roads with significantly changed traffic flows.

3.7 Bus and Coach Stations

South Oxfordshire District Council confirms that there are no relevant bus stations in the Local Authority area.

4 Other Transport Sources

4.1 Airports

South Oxfordshire District Council confirms that there are no airports in the Local Authority area.

4.2 Railways (Diesel and Steam Trains)

4.2.1 Stationary Trains

South Oxfordshire District Council confirms that there are no locations where diesel or steam trains are regularly stationary for periods of 15 minutes or more, with potential for relevant exposure within 15m.

4.2.2 Moving Trains

South Oxfordshire District Council confirms that there are no locations with a large number of movements of diesel locomotives, and potential long-term relevant exposure within 30m.

4.3 Ports (Shipping)

South Oxfordshire District Council confirms that there are no ports or shipping that meet the specified criteria within the Local Authority area.

5 Industrial Sources

5.1 Industrial Installations

5.1.1 New or Proposed Installations for which an Air Quality Assessment has been Carried Out

South Oxfordshire District Council has assessed new/proposed industrial installations, and concluded that it will not be necessary to proceed to a Detailed Assessment.

5.1.2 Existing Installations where Emissions have increased Substantially or New Relevant Exposure has been Introduced

South Oxfordshire District Council confirms that there are no industrial installations with substantially increased emissions or new relevant exposure in their vicinity within its area or nearby in a neighbouring authority.

5.1.3 New or Significantly Changed Installations with No Previous Air Quality Assessment

South Oxfordshire District Council has assessed new/proposed industrial installations, and concluded that it will not be necessary to proceed to a Detailed Assessment.

5.2 Major Fuel (Petrol) Storage Depots

There are no major fuel (petrol) storage depots within the Local Authority area.

5.3 Petrol Stations

South Oxfordshire District Council confirms that there are no petrol stations meeting the specified criteria.

5.4 Poultry Farms

South Oxfordshire District Council confirms that there are no poultry farms meeting the specified criteria.

6 Commercial and Domestic Sources

6.1 Biomass Combustion – Individual Installations

South Oxfordshire District Council confirms that there are no biomass combustion plant in the Local Authority area.

6.2 Biomass Combustion – Combined Impacts

South Oxfordshire District Council confirms that there are no biomass combustion plant in the Local Authority area.

6.3 Domestic Solid-Fuel Burning

South Oxfordshire District Council confirms that there are no areas of significant domestic fuel use in the Local Authority area.

7 Fugitive or Uncontrolled Sources

South Oxfordshire District Council confirms that there are no potential sources of fugitive particulate matter emissions in the Local Authority area.

8 Conclusions and Proposed Actions

8.1 Conclusions from New Monitoring Data

The 2008 monitoring data has shown a number of exceedences, from both continuous and passive monitoring locations. The following section is broken down into geographical location to discuss the new monitoring data.

The continuous monitoring sites in Henley, Wallingford and Watlington have shown an exceedence of the annual mean objective for nitrogen dioxide. All sites are located within existing AQMA's and confirm the declaration decision.

Adwell Cottages

With regards the exceedence recorded at Adwell Cottages, this location was assessed using dispersion modelling during the 2005 detailed assessment for Wallingford, and dispersion modelling carried out at the time predicted no exceedence at this location, thus far levels for 2005, 2006 and 2007 have confirmed this.

Didcot

NO₂ levels within Didcot have been approaching borderline exceedence since 2007, with an exceedences at 55 Broadway and also a high level at 96 Broadway recorded for 2008.

Henley-on-Thames

An area of Henley-on-Thames is covered by an AQMA declaration, this is due to exceedences of the annual mean objective for Nitrogen Dioxide. The continuous analyser situated in Duke Street within the AQMA has returned an annual mean level of 47µg/m³ for 2008 with the hourly mean exceeding 200µg/m³ on three occasions. This confirms the declaration for the annual mean, however shows that the current levels are well below the short-term objective.

Six diffusion tube sites recorded exceedences of the 40µg/m³ annual mean, with a further three being very close to this level.

Wallingford

Wallingford monitoring data has shown an exceedence of the annual mean objective for nitrogen dioxide. All the exceedences sites are located within existing AQMA's and confirm the declaration decision. The poor level of data capture is a major concern. Our analyser is still not functioning correctly.

Watlington

Watlington monitoring data has shown an exceedence of the annual mean objective for nitrogen dioxide. All the exceedences sites are located within existing AQMA's and confirm the declaration decision.

8.2 Conclusions from Assessment of Sources

There are no new sources that shall significantly affect local air quality across the South Oxfordshire District.

8.3 Proposed Actions

Adwell Cottages

In order to determine whether 2008 was an anomaly or whether there is a genuine exceedence at this location a further years monitoring data will be gathered. In order to gain an increased level of robustness in the data, triplicate diffusion tubes shall be installed at this site and the situation will be reviewed in the 2010 progress report.

Didcot

Following discussions with the Helpdesk, and the completion of this updating and screening assessment exercise, the need to progress to a detailed assessment in the area of Didcot has been highlighted. This is to investigate further exceedences of the annual mean objective of $40\mu\text{g}/\text{m}^3$ of Nitrogen dioxide. Initially the diffusion tube monitoring will be increased, with further sites identified to give a better resolution and triplicate tubes employed to give more robust data. A bid will be submitted to Defra in the current air quality grant programme, this will involve funding the installation of continuous monitoring equipment. We are also proposing to apply for a internal funding growth bid to fund a detailed assessment in 2010.

Henley-on-Thames

Monitoring in Henley-on-Thames has indicated that the AQMA boundary may have to be amended slightly to extend further along Reading Road to the South and along Bell Street to the north. South Oxfordshire District Council will continue to monitor in these locations and re-appraise the situation when undertaking the 2010 Progress Report.

Wallingford

South Oxfordshire District Council will continue to monitor in these locations, develop and implement Action Plans and re-appraise the situation when undertaking the 2010 Progress Report. We are proposing to bid for a Defra grant to replace this analyser due to the ongoing problems experienced with the device and our lack of confidence in its overall reliability.

Watlington

South Oxfordshire District Council will continue to monitor in these locations, develop and implement Action Plans and re-appraise the situation when undertaking the 2010 Progress Report.

The next course of action for South Oxfordshire District Council is to proceed to Detailed Assessment as outlined above, continue work on existing and planned action plans for the three AQMAs and submit a progress report in 2010.

9 References

South Oxfordshire District Council Stage 1 Assessment - 1998
South Oxfordshire District Council Stage 2 Assessment - 2000
South Oxfordshire District Council Stage 3 Assessment - January 2002
South Oxfordshire District Council Stage 4 Assessment - November 2004
South Oxfordshire District Council Updating & Screening Assessment - May 2003
South Oxfordshire District Council Detailed Assessment - August 2005
South Oxfordshire District Council Progress Report - November 2005
South Oxfordshire District Council Further Assessment - July 2006
South Oxfordshire District Council Updating & Screening Assessment - November 2006
South Oxfordshire District Council Progress Report - May 2007
South Oxfordshire District Council Henley Air Quality Action Plan - May 2007
South Oxfordshire District Council Detailed Assessment - July 2008
South Oxfordshire District Council Action Plan Progress Report - May 2008
LAQM TG(09)
LAQM PG (09)

Appendices

Appendix A: QA/QC Data

See main report for details.

Appendix A: QA:QC Data

Diffusion Tube Bias Adjustment Factors

See main report for details.

Factor from Local Co-location Studies (if available)

See main report for details.

Discussion of Choice of Factor to Use

See main report for details.

QA/QC of automatic monitoring

See main report for details.

QA/QC of diffusion tube monitoring

See main report for details.

WASP Results Lab 152 Round 97 onwards:

| Round | 97 | 98 | 99 | 100 | 101 | 102 | 103 | 104 |
|---|-------|-------|-------|-------|--------|--------|--------|--------|
| Tube 1 (µg NO ₂) | 0.890 | 1.865 | 2.085 | 1.358 | 0.949 | 1.489 | 1.178 | 1.179 |
| Tube 2 (µg NO ₂) | 1.573 | 1.228 | 2.093 | 1.474 | 2.576 | 1.431 | 0.916 | 1.108 |
| Tube 3 (µg NO ₂) | 1.582 | 1.857 | 0.885 | 1.354 | 1.813 | 2.307 | 0.934 | 1.840 |
| Tube 4 (µg NO ₂) | 0.914 | 1.217 | 0.879 | 1.467 | 0.914 | 1.960 | 1.071 | 1.960 |
| Spike tube 1 (µg NO ₂) | 0.890 | 1.830 | 2.150 | 1.360 | 0.920 | 1.370 | 1.220 | 1.220 |
| Spike tube 2 (µg NO ₂) | 1.580 | 1.190 | 2.150 | 1.470 | 1.860 | 1.370 | 0.940 | 1.220 |
| Spike tube 3 (µg NO ₂) | 1.580 | 1.830 | 0.840 | 1.360 | 1.860 | 2.280 | 0.940 | 2.020 |
| Spike tube 4 (µg NO ₂) | 0.890 | 1.190 | 0.840 | 1.470 | 0.920 | 2.280 | 1.220 | 2.020 |
| Standardised result tube 1 | 1.000 | 1.019 | 0.970 | 0.999 | 1.032 | 1.087 | 0.966 | 0.966 |
| Standardised result tube 2 | 0.996 | 1.032 | 0.973 | 1.003 | 1.385 | 1.045 | 0.974 | 0.908 |
| Standardised result tube 3 | 1.001 | 1.015 | 1.054 | 0.996 | 0.975 | 1.012 | 0.994 | 0.911 |
| Standardised result tube 4 | 1.027 | 1.023 | 1.046 | 0.998 | 0.993 | 0.860 | 0.878 | 0.970 |
| Performance index | 1.87 | 5.29 | 16.61 | 0.08 | 374.65 | 73.42 | 41.98 | 45.95 |
| Rolling performance index (NOT best of 4 out of 5) | | | | 5.96 | 99.16 | 116.19 | 122.53 | 134.00 |
| Rolling performance index (best 4 out of 5) | | | | 5.96 | 5.96 | 23.85 | 33.02 | 40.36 |
| Performance classification | | | | Good | Good | Good | Good | Good |

(criteria from April 2009)

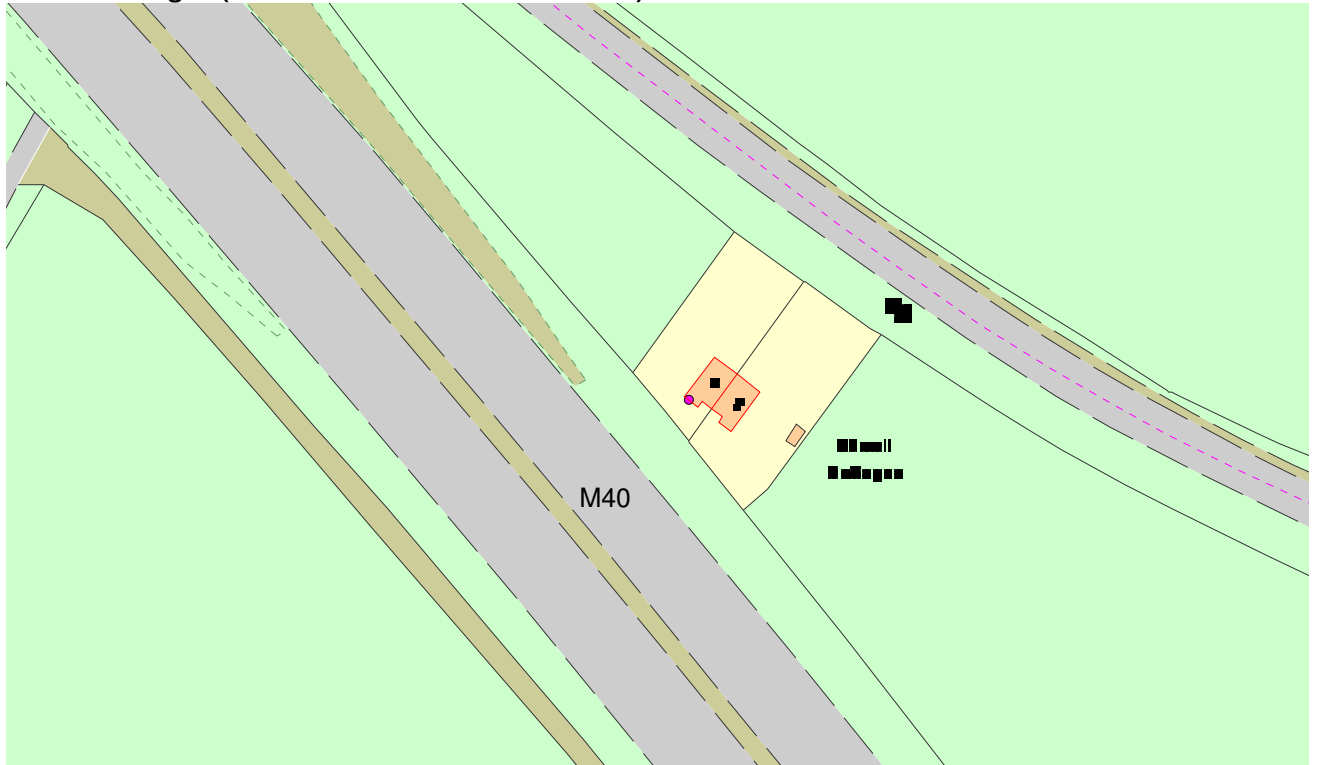
Good =<56.25

Acceptable =<225

Unacceptable >225

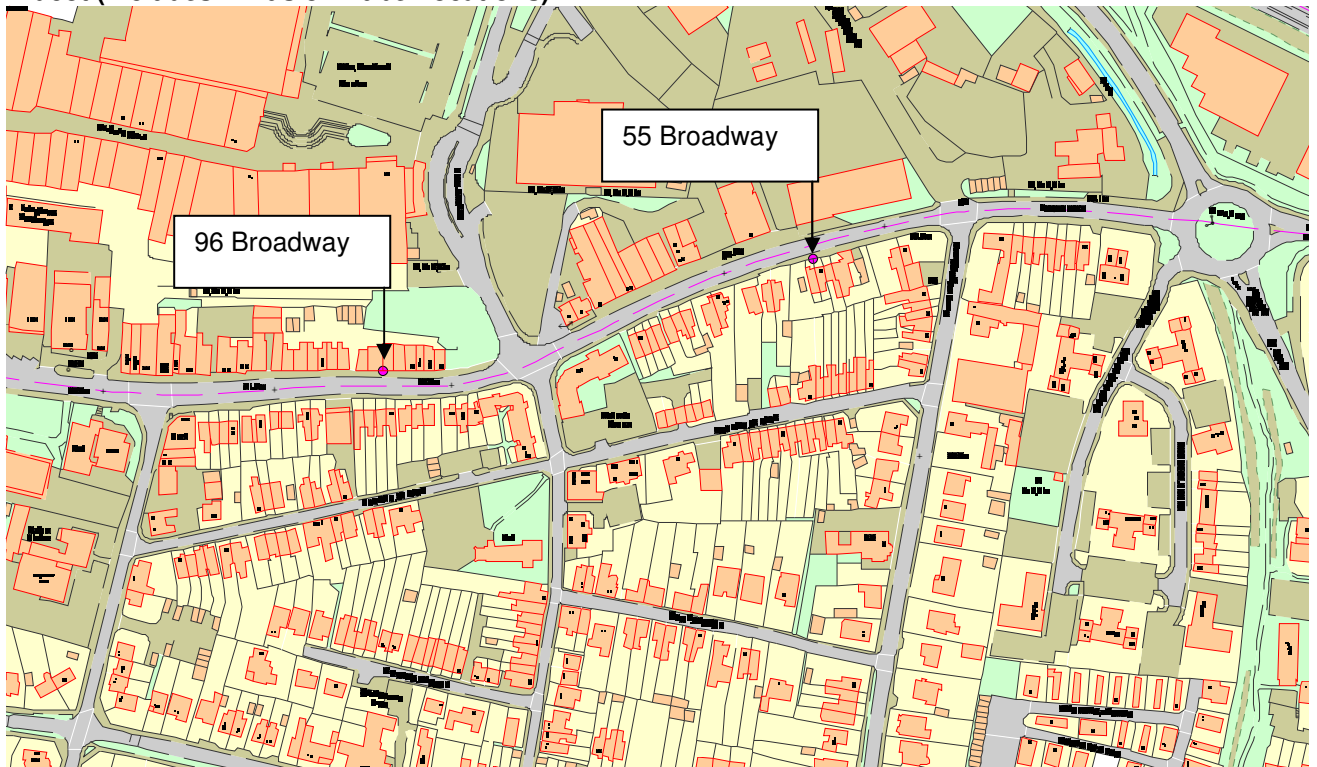
Maps of Locations

Adwell Cottages (include Diffusion Tube Location)



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Didcot (includes Diffusion Tube Locations)



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