

**Part IV of the Environment Act 1995
Local Air Quality Management**

The 2007 Progress Report



April 2007

Air Quality within the Kennet District – The 2007 Progress Report

Executive Summary

This Progress Report of the air quality within the Kennet district has been compiled as a consequence of the Air Quality (Amendment) Regulations 2002.

The report continues the revised phased approach to the assessment of local air quality with emphasis that local authorities should only undertake a level of assessment commensurate with the local risk of air quality objectives being exceeded.

It follows on from the first stage of the revised process, the Updating and Screening Assessments published in May 2003 and April 2006 and Progress Reports submitted in April 2004 and 2006.

This in turn continued the previous work carried out concerning the air quality within the Kennet district, which had concluded with a stage two review and assessment of the air quality completed in 2000.

This progress report has been compiled in line with the Technical Guidance document LAQM.PRG(03) and concentrates on reporting new monitoring data compiled since the previous reporting stage and information concerning local development likely to have an impact upon air quality.

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CHAPTER 1: Introduction

1.1 The need for a review of air quality

1.1.1 As a consequence of the Environment Act 1995 and subsequent regulations, local authorities are required to review and assess the air quality in their area. These laws form the cornerstone of local air quality management (LAQM), which in turn forms a key part of the UK government strategy to achieve the UK Air Quality Objectives.

1.2 The phased approach to review and assessment

1.2.1 The principal underlying the local air quality management process is one that local authorities should only undertake a level of assessment that is commensurate with the risk of an air quality objective being exceeded locally.

1.2.2 With the ongoing research into air quality and the causes of pollution, combined with increasingly more accurate monitoring equipment and modelling procedures, several air quality standards have been refined and are included into the next phase of the United Kingdom's local air quality management procedure.

1.2.3 Most recently, the review process took the form of an Updating and Screening Assessment, completed in April 2006. This concluded that further, detailed assessment was not required.

1.2.4 A further submission of an Updating and Screening Assessment of Air Quality must also be made during the first four months of 2009, with a 'Detailed Assessment' (if required) or 'Progress Report' due by the end of 2010. Another Progress Report must also be submitted by the end of April 2008. This progress report is submitted to meet the requirement for 2007.

1.3 The Kennet district

- 1.3.1 Kennet is one of five District Councils in the County of Wiltshire. It covers approximately 375 square miles and is home to about 76,000 people. The main settlements are the historic towns of Devizes and Marlborough. Pewsey, Ludgershall and Tidworth provide further centres of population, although half the area's population lives in the extensive network of scattered villages.
- 1.3.2 The district is mainly rural and agricultural in character. About two thirds of the district is included within the North Wessex Downs Area of Outstanding Natural Beauty and a further 20 per cent is designated a Special Landscape Area. The major physical features are the extensive chalk downlands of the Marlborough Downs, to the North, and Salisbury Plain to the South. The Vale of Pewsey, which runs from west to east, roughly midway through the district, separates these upland areas. The main railway service and the Kennet and Avon Canal also follow this route. The River Kennet and the Salisbury Avon have cut other significant valleys into the chalk. To the west of the District, the chalk uplands give way to the clay vale in the western part of the County.
- 1.3.3 Employment and economic activity is scattered. Historically it has centred on agriculture and Ministry of Defence Establishments. Structural changes have come from reduced opportunities in agriculture and changes in military presence following defence reviews. Unemployment is below average, but many people commute to jobs outside the district.

CHAPTER 2: Air quality monitoring results

2.1 Nitrogen dioxide monitoring

- 2.1.1 Since 1994 Kennet District Council has maintained a full program of diffusion tube based monitoring for nitrogen dioxide from locations sensitive to traffic levels across the district. The monitoring was enhanced during 2004 with the addition of a second survey to include 5 more sites to help assess the potential impact of a change to an industrial process located in a neighbouring authority, the Lafarge Cement works in Westbury, Wiltshire.
- 2.1.2 Despite the fact that the locations of the extra monitoring sites were based upon factors other than sensitivity to traffic flows, it is considered prudent to report progress with all NO₂ monitoring in the same chapter.
- 2.1.3 Maps are included in Appendix 1 to this report showing the locations of the monitoring sites currently employed, although historically a number of other locations have been employed. Map 1 sets out the sites in the Devizes area, Map 2 the Marlborough area and Map 3 highlights locations in the rest of the district.
- 2.1.4 Table 2.1 set out below sets out the monitoring data collected for the 20 sites used for the main nitrogen dioxide survey employed as within the Kennet district, plus a further three sites which were replaced, but for which excellent historical data exists. The data has been adjusted to take account of laboratory bias (see 2.1.7 – 2.1.8).
- 2.1.5 A summary of the type and location of the monitoring sites employed by Kennet District Council has been reported in the 2005 Progress Report. It is not considered necessary to repeat them here with the exception of the following sites which have replaced redundant sites during 2006.
- Aerocan (Devizes) – Suburban site located to study the impact of a proposed catalytic oxidiser upon the local air quality. The installation is not due until 2008 but the site was commissioned to establish current background levels of NO₂. Site replaced All Cannings monitoring site.
 - Seend (Bell Inn) – Suburban site relocated to examine the potential effects of a process in a neighbouring authority upon air quality in this small village. Site replaced Worton monitoring site.
- 2.1.6 The data presented in table 2.1 has been adjusted for laboratory bias in accordance with the procedures set out in the spreadsheet made available on the University of West of England Air Quality website;
<http://www.uwe.ac.uk/aqm/review/diffusiantube300307.xls>
- 2.1.7 The nitrogen dioxide tubes used for the main survey are analysed by Lambeth Scientific Services using a 50% TEA in acetone method. The correction factor obtained was 1.34

- 2.1.8 Two air quality objectives have been adopted for nitrogen dioxide in the UK, an annual mean concentration of $40\mu\text{g}/\text{m}^3$ and a 1-hour mean concentration of $200\mu\text{g}/\text{m}^3$, not to be exceeded more than 18 times per year. The objectives are to be achieved by the end of 2005.
- 2.1.9 Additionally, the first European daughter directive also sets limit values for nitrogen dioxide, which has been transposed into UK legislation. The directive objectives mirror the UK air quality objectives set out in 2.1.8, although they are to be achieved by the 1st Jan 2010.
- 2.1.10 The data presented in table 2.1 can be compared against the UK air quality objectives for nitrogen dioxide by projecting the measured roadside concentrations forward to 2010 using the correction factors and methodology set out in Box 6.6 of the guidance document LAQM.TG(03). The correction factor has been calculated at **0.851** and the projected 2010 levels are also summarised in table 2.1 and discussed in section 2.2 of this report.

Table 2.1 – Summary of 2006 nitrogen dioxide monitoring results

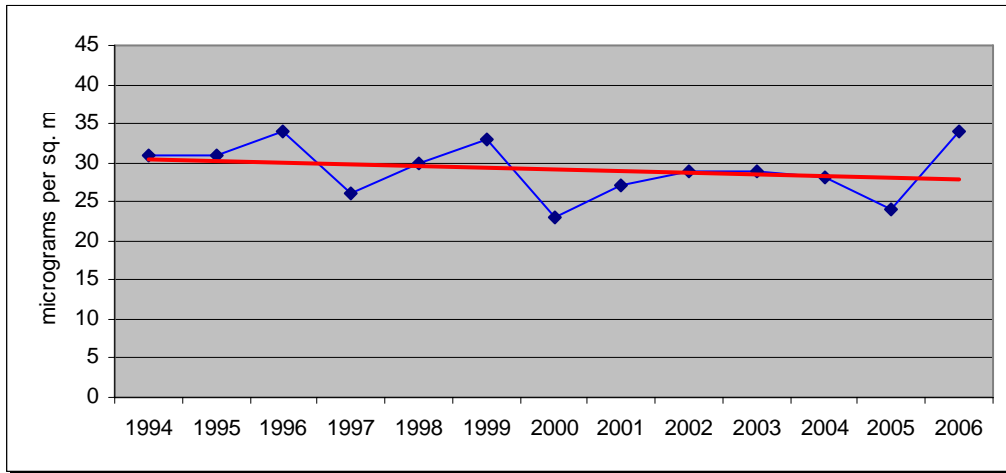
Kennet District Council				
Summary of 2006 nitrogen dioxide Survey				
Site	Site Type	2006 mean	2006 adjusted	2010 projected
Devizes Avon rd	Urban B'ground	11	14	12
Devizes Castle	Urban Centre	11	15	13
Easterton	Urban B'ground	10	13	11
Erlestoke	Urban B'ground	12	16	14
Potterne School	Roadside	14	19	16
Pewsey	Urban Centre	12	16	13
Devizes Police	Roadside	25	34	29
Devizes Windsor Dr.	Roadside	15	20	17
Devizes Brickley Ch.	Urban B'ground	12	17	14
Devizes Wansdyke Sch	Suburban	11	14	12
Devizes London Rd.	Roadside	18	24	21
Devizes Market St	Urban Centre	18	24	21
Marl. Herd St	Kerbside	28	38	32
Devizes Wadworths	Kerbside	25	34	29
Ludgershall Castle	Urban B'ground	14	19	16
Seend – Bell	Urban B'ground	13	17	15
Avebury Sch	Urban B'ground	10	13	11
Devizes Shanes Castle	Kerbside	36	48	41
Devizes Roses	Roadside	29	39	34
Marlborough High St	Roadside	24	33	28
Marlborough St Peters	Roadside	26	35	30
Marlbo. Leisure Cen.	Urban B'ground	14	19	16
Devizes Hillworth Rd	Roadside	28	38	32
Urchfont	Urban B'ground	13	17	14
All Cannings / Aerocan	Urban B'ground	10	13	11

*all results given in $\mu\text{g}/\text{m}^3$

2.2 Discussion of nitrogen dioxide monitoring

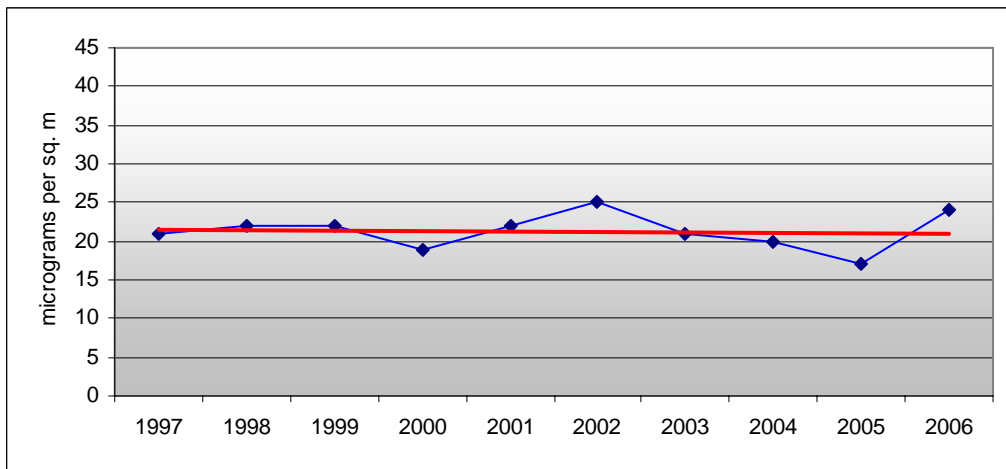
- 2.2.1 Once again the data presented in Table 2.1 largely backs up the conclusions of previous air quality reports in that the UK annual mean air quality objective for nitrogen dioxide will be met within the Kennet district.
- 2.2.2 The one site of concern first noted in the 2003 progress report, located at Shanes Castle has shown a noticeable fall in the quality of the air with the adjusted 2006 annual mean level of $48\mu\text{g}/\text{m}^3$. When projected to 2010 this predicts a slight failure of the air quality standards with a predicted annual mean of $41\mu\text{g}/\text{m}^3$.
- 2.2.3 The site itself is unusual, an isolated ex-toll house located directly in the middle of the intersection of two busy main roads. It is without doubt a worst-case scenario being sandwiched by two main roads running into Devizes from the west, the A361 and the A342, both of which experience queuing traffic at rush hour periods.
- 2.2.4 The monitoring site is located on a drain pipe on the roadside of the A342 at a height of 1.5m. The property itself is occupied on a full time basis as a domestic residence. Other residential property is located slightly further away from the main roads and a primary school, St Peters is also in the vicinity. It should be noted that the school was previously used as a monitoring location and no concerns with regard to air quality were recorded.
- 2.2.5 Nevertheless, it is proposed to increase the amount of monitoring in the vicinity of Shanes Castle, to reflect the wider risk to relevant exposure in the area. The results from the expanded monitoring will be reported in the progress report due in 2008.
- 2.2.6 Previous Air Quality Progress Reports and Updating and Screening Assessments submitted by Kennet District Council have included an investigation into the annual trend in nitrogen dioxide concentrations at several sites in the district. This work is continued in this progress report.
- 2.2.7 Monitoring data for some sites dates back to 1994 which allows for a robust study of the trends. Plotted below are selections of graphs, which show how levels of nitrogen dioxide have varied with time. Each graph includes a linear plot to show the trend in the data. Sites have been selected to represent the different types of monitoring locations employed across the Kennet district.
- 2.2.6 Graph 1 represents the annual trend at the roadside site at Devizes Police Station. The site is adjacent to New Park Street, a busy through road in the town and results date back to 1994. The trend in annual mean concentrations (the solid red line) is down over this period, although the 2006 results have noticeably bucked this trend, rising to $34\mu\text{g}/\text{m}^3$.

Graph 1 – Annual trend, Devizes Police Station (roadside)



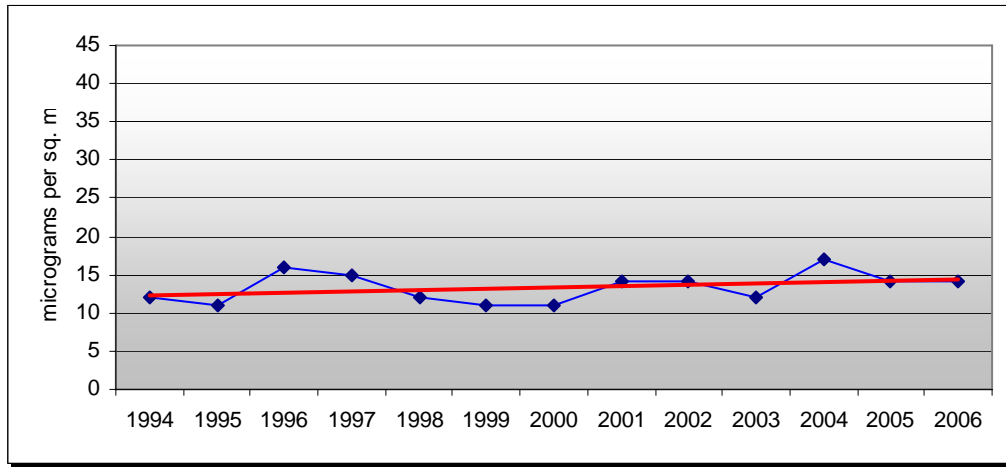
2.2.7 Graph 2 plots the annual trend in the busy Devizes Market Place. The site is an urban centre site and the general trend appears to be consistent, with annual mean concentrations relatively low. The 2006 level is the highest recorded since 2002.

Graph 2 – Annual trend, Devizes Market Place (urban centre)



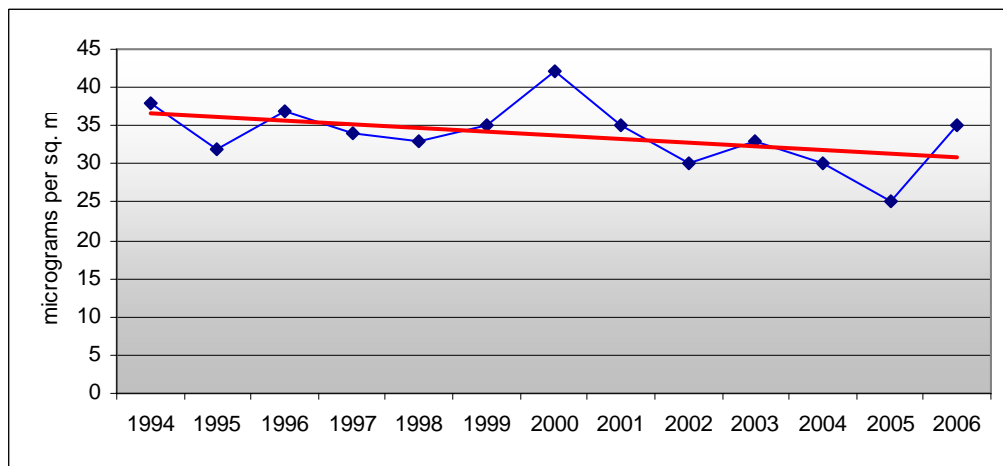
2.2.8 Graph 3 shows the situation at an urban background site in Devizes, the tube being located at Wansdyke Primary School. Annual mean levels at the site have remained low since monitoring was first started in 1994 although a slight upward trend has been noted.

Graph 3 – Annual trend, Wansdyke Primary School (urban background)



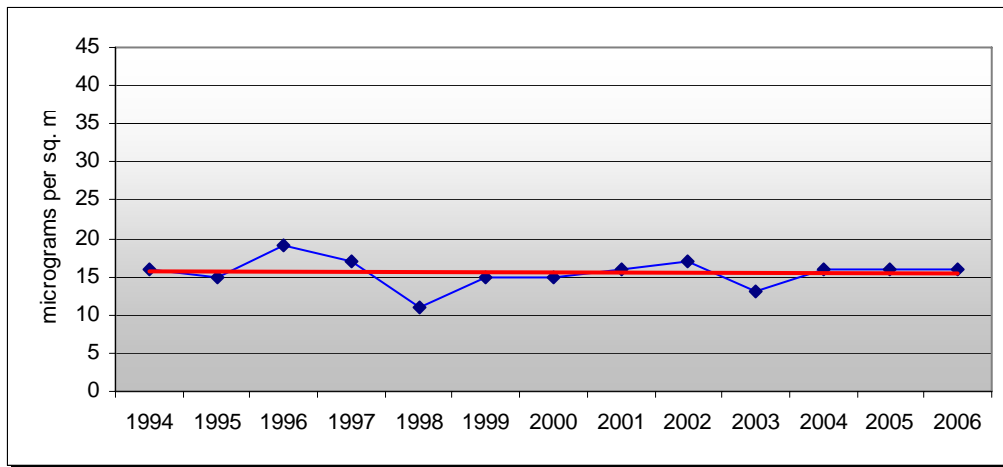
2.2.9 The town of Marlborough is served by a total of 4 nitrogen dioxide monitoring sites, although only the roadside site at St Peters Church has been operating consistently since monitoring began in 1994. The site is adjacent to both carriageways of the busy A4 through road and the trend in annual mean concentrations is demonstrated in Graph 4. The graph shows a downward trend in annual mean concentrations although the 2006 level was a significant rise on the 2005 level recorded.

Graph 4 – Annual trend, St Peters Church, Marlborough (roadside site)



2.2.10 Elsewhere in the Kennet district, a number of the monitoring sites located at village locations have been employed. Several sites have been in use since 1994 and the trend at the Pewsey Church site is set out in Graph 5. The site is centrally located, away from the main road bisecting the village. The graph again shows a very slight downward trend in nitrogen dioxide concentrations (solid line), with levels of nitrogen dioxide remaining low.

Graph 5 – Annual trend, Pewsey Church (urban centre site)



2.3 Nitrogen dioxide monitoring – conclusions

- 2.3.1 The primary conclusion to make from the air quality monitoring information set out in this report is that the air quality objectives for nitrogen dioxide will largely be met in the Kennet district. However, the predicted exceedence noted at Shanes Castle, Devizes is of concern and monitoring in the vicinity of this site will be increased accordingly.
- 2.3.2 Nevertheless, the general trend for annual mean levels of nitrogen dioxide levels across the Kennet district is a stable one. Graphs have been presented for 5 of the monitoring sites employed, including a couple to show a robust monitoring history at the worst case situation for general public exposure within the main towns of the Kennet district.
- 2.3.3 Overall though, monitored levels of nitrogen dioxide in 2006 are generally higher than in previous years and although air quality standards are still on target to be achieved future air quality reporting will need to establish that this is not the start of a worrying upward trend.

CHAPTER 3: Other pollution monitoring

3.1 Introduction

- 3.1.1 As already discussed in this and previous air quality reports, Kennet DC has a programme of monitoring aimed at assessing the impact of a proposed change to an industrial process located in neighbouring West Wiltshire District Council.
- 3.1.2 Monitoring of nitrogen dioxide, sulphur dioxide and trace organic pollutants (benzene, toluene and xylene) continued throughout 2006.
- 3.1.3 However, the industrial process concerned, Lafarge Cement in Westbury located 6 km from the south-western border of the Kennet district has withdrawn its proposals to trial the substitution of up to 40% of their fuel load with recycled waste solvents.
- 3.1.4 Thus, the bulk of the additional air quality monitoring undertaken by the Kennet District Council ceased at the end of March 2007, with only nitrogen dioxide monitoring continued.
- 3.1.5 Nevertheless, the results for 2006 are set out and discussed in this Progress Report; those for nitrogen dioxide in chapter 2 of the report and the rest in this chapter. The monitoring exercise serves as a useful benchmarking process against which the impact of any future process variation can be measured. A full list of the sites employed in this additional survey was set out in the 2005 Progress Report.

3.2 Sulphur dioxide monitoring

- 3.2.1 Table 3.1 below summarises the monitoring carried out for levels of sulphur dioxide. Quarterly averages have been used to simplify the data for the purposes of this progress report. It should be noted that the survey employs diffusion tubes and the technical guidance (the revised USA checklist) states that diffusion tube data should not be included. As such, no ratification of this data is considered necessary; it is reported solely as an indicator air quality.
- 3.2.2 The recorded levels of sulphur dioxide are very low and well below the most relevant Air Quality Objective for a 24-hour mean of $125 \mu\text{g}/\text{m}^3$, not to be exceeded more than 3 times a year.
- 3.2.3 Sulphur dioxide levels are measured by diffusion tubes and analysed by Lambeth Scientific Services using an Ion Chromatography method.

Table 3.1 – Summary of sulphur dioxide monitoring 2006

Site	2006 Q1	2006 Q2	2006 Q3	2006 Q4
Devizes – Avon Road	10	7.5	10.33	5
Devizes – Castle	7	11.66	10.33	7.5
Easterton	12	14	12	7.5
Erlestoke	10.33	13	13.33	9
Potterne	9	8.7	7	6.5

*all results given in $\mu\text{g}/\text{m}^3$

3.3 VOC Monitoring

- 3.3.1 At each monitoring location a BTEX diffusion tube is used and data collected for 5 chemical species; benzene, toluene, ethyl-benzene, mp-xylene and o-xylene.
- 3.3.2 Annex 1 of the technical guidance sets out how local monitoring data for benzene obtained by using diffusion tubes is to be ratified. Box A1.4 and paragraph A1.80 sets out the information required to ensure that results are properly calculated and reported, this information is summarised in table 3.2 below:

Table 3.2 – Benzene monitoring information

Name of laboratory	Lambeth Scientific Services
Participation in round robin exercises	Workplace Analysis Scheme for Proficiency
Formal accreditation	No
Type of tubes	BTEX diffusion – limit of detection +/- 0.10-0.15 ng
Type of absorbent	Chromosorb 106
Uptake rate	Benzene 1.72, toluene 1.94, ethylbenzene 1.9, xylenes 2.10
Monitoring location	Various (see results summary). Tubes mounted at least 2.5m from ground and 10cm away from walls etc
Exposure duration	One month

- 3.3.3 The annual mean concentrations for the monitoring for benzene and associated species in 2006 are summarised in table 3.3 below:

Table 3.3 – Summary of BTEX monitoring 2006

Site	benzene	Toluene	Ethyl benzene	mp-xylene	o-xylene
Avon Road, Devizes	0.71	1.14	0.16	0.17	0.27
Devizes Castle	0.72	0.85	0.12	0.21	0.23
Easterton	0.64	0.81	0.12	0.22	0.17
Erlestoke	0.65	0.85	0.14	0.22	0.17
Potterne	0.68	0.95	0.13	0.27	0.17

*all data is given in ppb.

- 3.3.4 Methodology for the ratification of the above data is set out in paragraphs A1.81 and A1.82 of the technical guidance. Given that the purpose of the monitoring for BTEX species within the Kennet district is as a screening device it is not considered necessary to engage in ratification above the simple checks for analytical accuracy outlined above.
- 3.3.5 With regard to the monitoring locations, it is considered that all locations are relevant for public exposure for annual when reference is made to paragraphs 1.19 to 1.21 of LAQM.TG(03).

3.3.6 It is clear from the results set out in table 3.2 that the annual mean concentrations of benzene monitored are low and well below the air quality objective limits for the species, a fixed annual mean of $5 \mu\text{g}/\text{m}^3$ (1.54 ppb) to be achieved by the end of 2010 (for England and Wales).

3.4 Additional monitoring – conclusions

3.4.1 Essentially, the monitoring discussed in this chapter of the progress report serves only to highlight the excellent background air quality in the South-West of the Kennet district.

3.4.2 The survey has now finished by the results may still have value as a benchmarking tool should any further changes to the operating conditions at the Westbury Cement works be proposed.

CHAPTER 4: New local developments

4.1 Industrial sources

- 4.1.1 No significant local industrial sources of pollutants were identified during the first round of the review and assessment process within the Kennet district. This situation was confirmed in the Update and Screening Assessment for the Kennet district completed in 2006 and remains unchanged to date.
- 4.1.2 No new Part A installations have been established within the Kennet district since the previous air quality reporting stage.
- 4.1.3 As discussed in this report, the proposed changes to the production processes at the nearby Westbury Cement works have failed to materialise with all plans being withdrawn. This situation will continue to be monitored for future air quality reports.

4.2 Planned developments

- 4.2.1 Liaison with development control officers at Kennet District Council has not realised any significant plans for development likely to significantly impact upon air quality.
- 4.2.2 A Devizes based factory owned by Aerocan UK Limited will be installing a large catalytic incinerator during early 2008. The potential impact of this upon air quality is not expected to be significant, nevertheless Kennet District Council have started to monitor background nitrogen dioxide levels in the vicinity of the plant to allow the impact of the plant to be assessed.
- 4.2.3 Of more relevance is a draft plan by County Council transport planners to redirect traffic in Devizes town centre. Although the plan is still years from fruition, indeed has still to pass the first stage of planning, future air quality assessments and progress reports will consider the implications of any changes to the traffic flow through the town, should they eventually occur.
- 4.2.4 No new landfill sites or quarries have been granted permission in the Kennet district since the last air quality reporting stage.

CHAPTER 5: Conclusions to the 2007 progress report

5.1 Conclusions to the report

- 5.1.1 This progress report has concluded that there have been no significant changes within the Kennet district likely to impact upon air quality.
- 5.1.2 The report has summarised the extensive nitrogen dioxide monitoring carried out and has identified one site at risk of exceeding the air quality objectives. The monitoring of the air quality in this area is to be expanded to examine the significance of the risk and its impact upon receptors, including a school.
- 5.1.3 Monitoring to assess the impact of a proposed change to an industrial process located in a neighbouring authority has ceased following the withdrawal of the proposals. Nevertheless, the results of the monitoring programme are reported and serve to highlight excellent background air quality in the south west of the Kennet district.

Appendix 1 – Location of Pollution Monitoring Sites.