



# **Updating and Screening Assessment of Air Quality in the District of Richmondshire**

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Report prepared by:

Mr Kevin Carr  
Technical Officer (Environmental Protection)  
Environment Unit  
Richmondshire District Council  
Swale House  
Frenchgate  
Richmond  
North Yorkshire  
DL10 4JE

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## Executive Summary

An Updating and Screening Assessment of air quality has been carried out for the District of Richmondshire. This is a requirement of Part IV of the Environment Act 1995, which obliges local authorities to periodically review and assess the current, and likely future, air quality in their area. The role of this process is to identify areas where it is unlikely that the air quality objectives will be achieved. These locations must then be designated as Air Quality Management Areas (AQMAs). The first round of Review and Assessment was completed for the District of Richmondshire in 2000. No potential exceedences of the air quality objectives were identified and therefore no AQMAs were declared. In 2003 the second round of Review and Assessment recommended that a Detailed Assessment for sulphur dioxide emissions from domestic solid fuel burning be carried out in the town of Middleham near Leyburn. The Detailed Assessment was carried out between 2004 and 2005 and concluded that the implementation of an AQMA was not necessary. In 2005 a progress report was produced to take into account new monitoring data and any changes to sources of air pollution. This report concluded that no action was required to reduce the level of air pollution within Richmondshire.

This report begins the third round of Review and Assessment and focuses on changes that have occurred since the previous round. The conclusions of this report are that no further action is required for sources of carbon monoxide, benzene, 1,3-butadiene, lead, nitrogen dioxide, sulphur dioxide and PM<sub>10</sub>. Progress reports will be produced in 2007 and 2008 and will report monitoring data and any significant changes to sources of air pollution, until the fourth round of Review and Assessment begins in 2009.

### Summary of the Conclusions of the 2006 Updating and Screening Assessment

<b>Pollutant</b>	<b>Conclusion</b>
Carbon monoxide	No further action required
Benzene	No further action required
1,3 butadiene	No further action required
Lead	No further action required
Nitrogen dioxide	No further action required
Sulphur dioxide	No further action required
PM <sub>10</sub>	No further action required

## 1.0 Introduction

### Introduction to the Third Round of Review and Assessment

- 1.1 The Government's Air Quality Strategy for England, Scotland, Wales and Northern Ireland<sup>1</sup> and the addendum to it, published in February 2003<sup>2</sup> set out a framework for air quality improvements, which includes a series of air quality objectives. National and international measures are likely to achieve these objectives in most locations, but where areas of poor air quality remain, local air quality management will be necessary. Part IV of the Environment Act 1995 requires local authorities to periodically review and assess the current, and likely future, air quality in their area. The role of this process is to identify areas where it is unlikely that the air quality objectives will be achieved. These locations must be designated as Air Quality Management Areas (AQMAs) and subject to active management.
- 1.2 Air quality will change in response to changes in emitting activities. Air quality objectives and Review and Assessment guidance change with advances in knowledge; much of which is learnt from the Review and Assessment process itself. As a result, Review and Assessment is a long-term, rolling process, structured as a series of 'rounds'. Most local authorities in England, Scotland and Wales have now completed the second round of Review and Assessment and the third round is currently underway.
- 1.3 The revised Local Air Quality Management Technical Guidance (LAQM. TG(03))<sup>3</sup> sets out a phased approach to Review and Assessment. This prescribes an initial Updating and Screening Assessment (USA), which all authorities must undertake. It is based on a checklist to identify any matters that have changed since the second round and may now require further assessment. The Updating and Screening Assessment should cover each of the following:
- Any new monitoring data.
  - Any new objectives.
  - Any new pollutant sources, or significant changes to existing sources, either locally or in neighbouring authorities.
  - Any other local changes that might affect air quality.
- If the USA identifies any potential areas where there is a risk that the objectives may be exceeded, which were not identified in the second round, then the Local Authority should progress to a Detailed Assessment (DA).
- 1.4 This report describes the USA for Richmondshire District Council. It aims to identify any potential exceedences of the air quality objectives. Such exceedences might result from changes in pollutant emissions, or they might

be caused by pollutant sources not previously assessed or changes in the objectives themselves.

### **The Air Quality Objectives**

- 1.5 The Government's Air Quality Strategy<sup>1</sup> defines both standards and objectives for each of a range of air pollutants. The 'standards' are set as concentrations below which health effects are unlikely even in sensitive population groups, or below which risks to public health would be exceedingly small. They are based purely upon the scientific and medical evidence of the effects of a particular pollutant. The 'objectives' set out the extent to which the Government expects the standards to be achieved by a certain date. They take account of the costs, benefits, feasibility and practicality of achieving the standards. The objectives are prescribed within The Air Quality (England) Regulations 2000<sup>4</sup> and The Air Quality (England) (Amendment) Regulations 2002<sup>5</sup>. This latter publication set revised, more stringent objectives for benzene and carbon monoxide which are relevant to this third round, but which were absent in the first. The addendum to the air quality strategy<sup>2</sup> contains provisional objectives for PM<sub>10</sub> to be achieved in 2010. As these are not in the regulations, they do not strictly need to be covered in the Review and Assessment process. However, for completeness they are discussed in this report. Table 1 summarises the objectives, which are relevant to this report. Appendix 1 sets out the individual health effects of each of these "strategy pollutants".
- 1.6 These air quality objectives are only applicable where members of the public are likely to be regularly present and are likely to be exposed over the averaging time of the objective<sup>3</sup>. For annual mean and 24-hour objectives relevant exposure is limited to residential properties, schools and hospitals. The 1-hour and 15-minute objectives apply at these and at any outdoor location where a member of the public might reasonably be expected to stay for the averaging period of the objective, such as shopping streets, parks and sports grounds, as well as bus stations and railway stations that are not fully enclosed.

**Table 1: Air Quality Objectives Relevant to This Report.**

Pollutant	Time Period	Objective	To be achieved by <sup>1</sup>
Benzene	Running annual mean	16.25 µg/m <sup>3</sup>	2003
	Annual mean	5 µg/m <sup>3</sup>	2010
1,3-Butadiene	Running annual mean	2.25 µg/m <sup>3</sup>	2003
Carbon Monoxide	Maximum daily running 8-hour mean	10 mg/m <sup>3</sup>	2003
Lead	Annual mean	0.5 µg/m <sup>3</sup>	2004
	Annual mean	0.25 µg/m <sup>3</sup>	2008
Nitrogen Dioxide	1-hour mean	200 µg/m <sup>3</sup> not to be exceeded more than 18 times a year	2005
	Annual mean	40 µg/m <sup>3</sup>	2005
Sulphur Dioxide	1-hour mean	350 µg/m <sup>3</sup> not to be exceeded more than 24 times a year	2004
	24-hour mean	125 µg/m <sup>3</sup> not to be exceeded more than 3 times a year	2004
	15-minutes mean	266 µg/m <sup>3</sup> not to be exceeded more than 35 times a year	2005
Fine particles (PM <sub>10</sub> ) <sup>2</sup>	24-hour mean	50 µg/m <sup>3</sup> not to be exceeded more than 35 times a year	2004
	Annual mean	40 µg/m <sup>3</sup>	2004
	24-hour mean <sup>3</sup>	50 µg/m <sup>3</sup> not to be exceeded more than 7 times a year	2010
	Annual mean <sup>3</sup>	20 µg/m <sup>3</sup>	2010

<sup>1</sup> The achievement dates are all by the end of the specified year.

<sup>2</sup> Measured by the gravimetric method.

<sup>3</sup> Provisional objectives not included in the Regulations.



## 2.0 Methodology

- 2.1 Air pollutant concentrations in the vicinity of an emission source will be related to both the source strength and the background concentration. Interpolated background concentrations of the strategy pollutants have been produced from the national map of background concentrations available from the Air Quality Archive on the internet<sup>11</sup>. The maps of the District of Richmondshire are presented in Appendix 3.
- 2.2 The results of the air quality monitoring carried out as part of the Government's Automatic Urban and Rural Network (AURN) are published on the internet ([www.airquality.co.uk](http://www.airquality.co.uk)). There are no AURN sites in the District of Richmondshire, however results from a selection of these sites in the north-east are presented in Appendix 4. Richmondshire District Council carries out nitrogen dioxide monitoring using diffusion tubes at four sites in the District the results of which are also included in Appendix 4 and the locations are shown in Appendix 5. In 1999 Richmondshire District Council carried out some additional short-term monitoring at a number of locations, the results from this monitoring have been adjusted to an annual mean by comparison with data from 3 AURN sites in the area using the method described in the Technical Guidance<sup>3</sup> (Appendix 7).
- 2.3 Trunk road traffic flow data have been obtained from the National Atmospheric Emissions Inventory<sup>12</sup>. Traffic data for other roads have been acquired from North Yorkshire County Council. The measured traffic data have been projected forward to 2010 using National Road Traffic Forecast data.
- 2.4 The Design Manual for Roads and Bridges (DMRB) (Feb'03)<sup>13</sup> has been used to calculate levels of nitrogen dioxide and PM<sub>10</sub> at receptors nearest to the busiest roads and junctions. Spreadsheets containing the input data used in these calculations are available.
- 2.5 Lists of industrial processes held by the District Council and the Environment Agency Pollution Inventory<sup>14</sup>, have been used to identify point source emissions within the District of Richmondshire. The Environment Agency regulates large industrial processes, known as Part A1 sources, of which there are none within the District of Richmondshire. Smaller industrial sources, which are known as Part A2 and Part B processes, are regulated by Richmondshire District Council. Point sources in neighbouring Local Authority areas have also been taken into account by way of correspondence with Teesdale, Darlington, Hambleton, Harrogate, Craven, South Lakeland and Eden Councils. New or changed processes have been checked against the list of potentially significant processes that are set out in the Technical Guidance<sup>3</sup>. Large petrol stations, a list of which is also held by the District, were screened using the criteria, which are prescribed in the Technical Guidance<sup>3</sup>.

2.6 The occurrence of other potential sources of air pollutants in the area, such as airports, railway sidings, bus stations, large boilers and fugitive sources of PM<sub>10</sub> has been identified using local knowledge and screened using the criteria set out in the Technical Guidance<sup>3</sup>.

### 3.0 Updating and Screening of Carbon Monoxide

#### Updating and Screening Summary for Carbon Monoxide.

Source, location or data which need to be assessed	Action
New monitoring data	No further action required
Very busy roads or junctions in built up areas	No further action required

#### New monitoring data

- 3.1 Carbon monoxide was monitored at a location at Brompton, 6m from the A1, between July and October 1999. The results from this period have been adjusted to the equivalent annual mean and the results are shown in Appendix 4, Table 4.1. Monitoring has also been carried out as part of the AURN at an urban industrial location in Middlesbrough and urban centre locations at Leeds and Bradford. The results, which are set out in Appendix 4, show that there have been no measured exceedences of the objective, which is a maximum daily running 8-hour concentration of less than 10 mg/m<sup>3</sup> to be achieved in 2003, at any of these locations.

#### Very busy roads or junctions in built-up areas

- 3.2 Monitoring data from across the country indicate that the carbon monoxide objective is only likely to be exceeded near to 'very busy' roads and junctions, where the current year background concentration is greater than 1 mg/m<sup>3</sup>. The highest estimated background concentration is 0.240 mg/m<sup>3</sup> for the year 2001. Values for subsequent years were calculated using the method contained within the Technical Guidance<sup>3</sup> and are shown in Appendix 4, Table 4.2. This confirms that the objective will be achieved at all locations within the District.

#### Conclusion

- 3.3 No further action required for carbon monoxide.

## 4.0 Updating and Screening of Benzene

### Updating and Screening Summary for Benzene.

Source, location or data which need to be assessed	Action
New monitoring data	No further action required
Very busy roads or junctions in built-up areas	No further action required
Industrial sources	No further action required
Petrol stations	No further action required
Major petroleum storage depots	No further action required

#### New monitoring data

- 4.1 There has been no monitoring of benzene in the District of Richmondshire. Monitoring has been carried out as part of the national AURN at Leeds Potternewton (urban background) and Middlesbrough (urban industrial). The results of which are shown in Appendix 4, Table 4.3. Concentrations in 2003, 2006 and 2010 have been estimated by projecting forward measured values for 2000 using factors in the Technical Guidance<sup>3</sup>. The results show that even at the urban industrial site in Middlesbrough, where concentrations are higher than those that are likely to be found in Richmondshire, the annual mean benzene objectives of 16.25 µg/m<sup>3</sup> in 2003 and 5 µg/m<sup>3</sup> in 2010 are likely to be achieved.

#### Very busy roads or junctions in built-up areas

- 4.2 Monitoring data from across the country indicate that the benzene objective for 2010 is only likely to be exceeded near to 'very busy' roads and junctions where the 2010 background concentration is greater than 2 µg/m<sup>3</sup>. The highest estimated background concentration for 2010 is 0.211 µg/m<sup>3</sup>. This confirms that the objective will be achieved at all locations within the District.

#### Industrial sources

- 4.3 No industrial processes were found to emit significant quantities of benzene in the previous round of Review and Assessment. There have been no new processes introduced and no significant changes to existing industrial processes either in the District of Richmondshire or nearby in neighbouring authorities. Therefore there continues to be no likely exceedence of the benzene objectives.

#### Petrol stations

- 4.4 Petrol stations are only likely to lead to an exceedence of the 2010 objective for benzene if they have a large throughput of petrol (greater than 2 million

litres per annum) and are near to a busy road, with more than 30,000 vehicles per day. There must also be relevant exposure, i.e. a residential property, within 10 m of the petrol pumps. There are no petrol stations within the District of Richmondshire that fulfil these criteria, and therefore it is not likely that petrol stations will lead to an exceedence of the benzene objectives in 2006 or 2010.

#### **Major fuel storage depots (petroleum only)**

- 4.5 There are no major petrol storage depots in the District of Richmondshire.

#### **Conclusion**

- 4.6 No further action required for benzene.

## 5.0 Updating and Screening of 1,3-butadiene

### Updating and Screening Summary for 1,3-butadiene.

Source, location or data which need to be assessed	Action
New monitoring data	No further action required
New industrial sources	No further action required
Existing industrial sources with significantly increased emissions	No further action required

#### New monitoring data

- 5.1 There has been no monitoring of 1,3-butadiene carried out within the District of Richmondshire. Monitoring has been carried out as part of the national AURN at Leeds Potternewton (urban background) and Middlesborough (urban industrial). The results, which are set out in Appendix 4, Table 4.4 show that the 2003 running annual mean objective of 2.25  $\mu\text{g}/\text{m}^3$  is expected to be achieved at all of these locations. As there are no particular sources of 1,3-butadiene in Richmondshire, other than road traffic, it would be fair to assume that the objective will not be exceeded in the District.

#### New industrial sources

- 5.2 No new processes, which handle 1,3-butadiene, have been introduced in or near to the District of Richmondshire since the first and second round of Review and Assessment.

#### Existing industrial sources with significantly increased emissions

- 5.3 No industrial processes in or near to the District of Richmondshire were found to emit 1,3-butadiene in the first and second round of Review and Assessment.

#### Conclusion

- 5.4 No further action required for 1,3-butadiene.

## 6.0 Updating and Screening of Lead

### Updating and Screening Summary for Lead.

Source, location or data which need to be assessed	Action
New monitoring data outside an AQMA	No further action required
New industrial sources	No further action required
Industrial sources with substantially increased emissions	No further action required

### New monitoring data outside an AQMA

- 6.1 There has been no monitoring of lead carried out within the District of Richmondshire. Monitoring has been carried out as part of the national AURN at Styrrup and Windermere (rural), Leeds, Manchester and Newcastle (urban) and Elswick Works 1,2 and 6 in Newcastle (industrial). The results, which are set out in Appendix 4, Table 4.5, show that the annual mean objectives of  $0.5 \mu\text{g}/\text{m}^3$  in 2004 and  $0.25 \mu\text{g}/\text{m}^3$  in 2008 are expected to be achieved at all of these locations. Data is available to the end of 2004. As there are no particular sources of lead in Richmondshire, it would be fair to assume that the objective will not be exceeded in the District.

### New industrial sources

- 6.2 No new processes, which emit lead, have been introduced in or near to the District of Richmondshire since the first round of Review and Assessment.

### Industrial sources with substantially increased emissions

- 6.3 No industrial processes in or near to the District of Richmondshire were found to emit significant quantities of lead in the first or second rounds of Review and Assessment.

### Conclusion

- 6.4 No further action required for lead.

## 7.0 Updating and Screening of Nitrogen Dioxide

### Updating and Screening Summary for Nitrogen Dioxide.

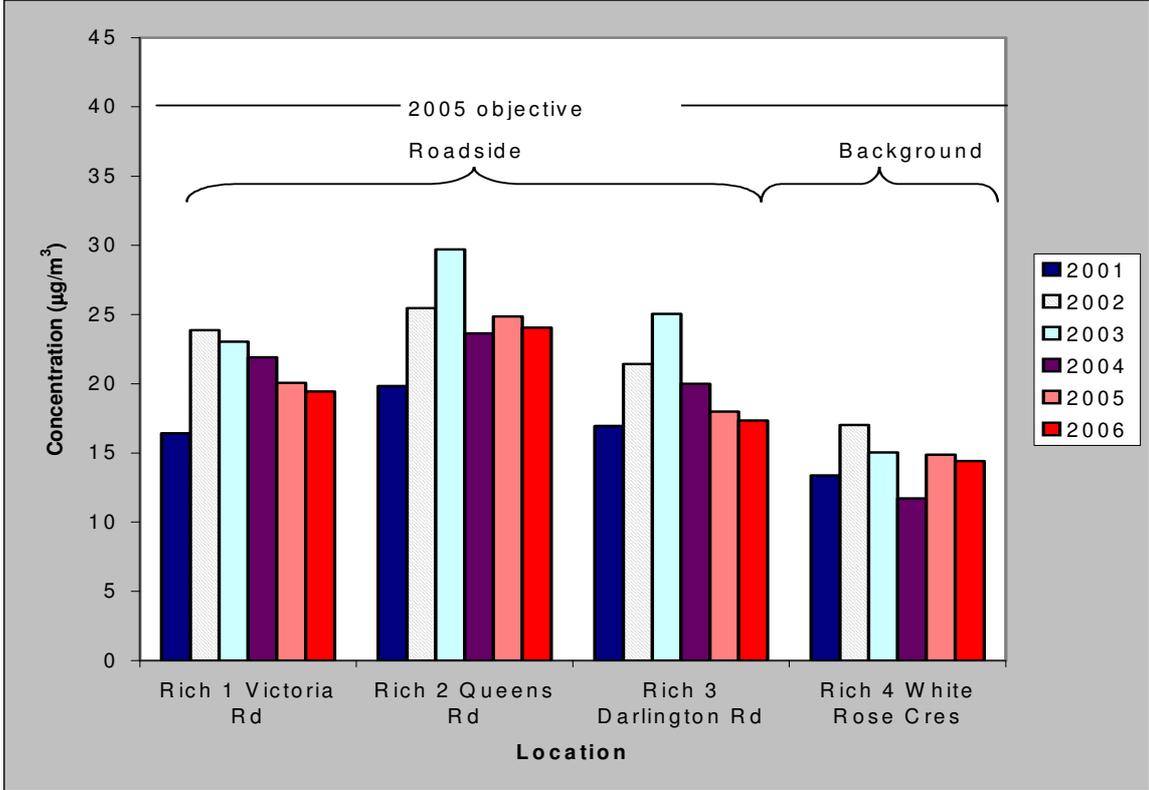
Source, location or data which need to be assessed	Action
New monitoring data outside an AQMA	No further action required
New monitoring data within an AQMA	N/A
Narrow congested streets with residential properties close to the kerb	No further action required
Junctions	No further action required
Busy streets where people may spend 1-hour or more close to traffic	No further action required
Roads with high flow of buses and/or HGVs	No further action required
New roads constructed or proposed since first round of Review and Assessment	No further action required
Roads close to the objective during the first round of Review and Assessment	No further action required
Roads with significantly changed traffic flows	No further action required
Bus Stations	No further action required
New industrial sources	No further action required
Industrial sources with substantially increased emissions	No further action required
Aircraft	No further action required

### New monitoring data outside an AQMA

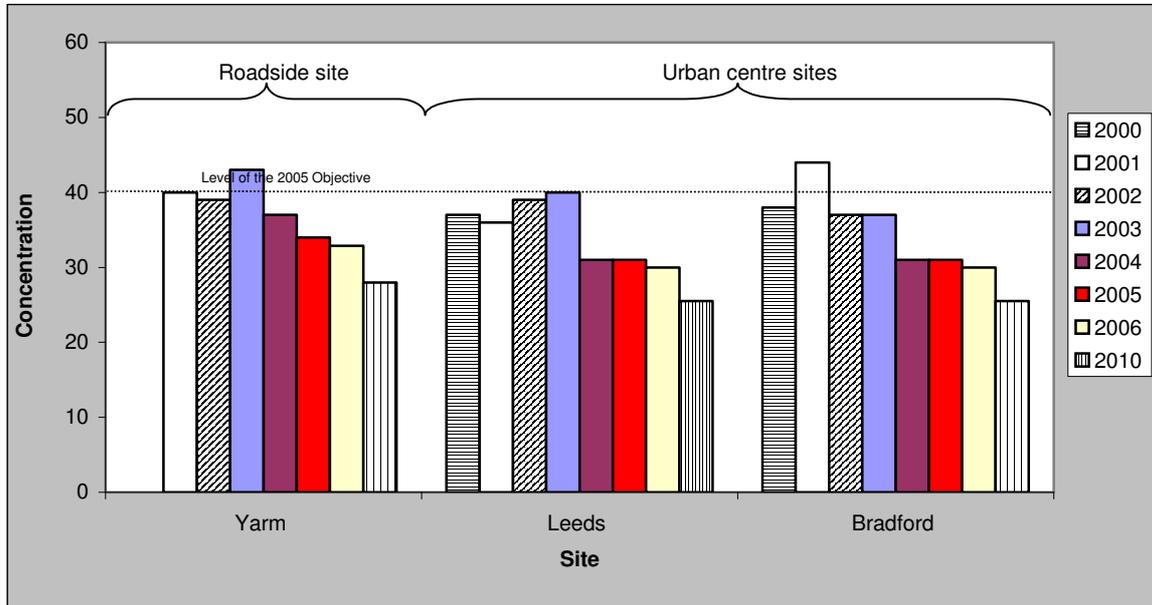
- 7.1 Nitrogen dioxide has been monitored using diffusion tubes at four locations in Richmond, as part of the National Diffusion Tube Network (which ceased to exist at the end of 2005) and beyond. The results are shown on Figure 2 and Appendix 4, Table 4.7. Jesmond Dene Laboratory analyses the diffusion tubes, which are supplied by Harwell Scientifics. This laboratory is part of the WASP laboratory intercomparison scheme. Further details of the supply, analysis and QA/QC methods are presented in Appendix 6. Studies have indicated that there are systematic differences in the performance of different laboratories and preparation methods of diffusion tubes. In order to account for any such bias in the diffusion tubes used by Richmondshire District Council, data from at least 2 sites where diffusion tubes from the same laboratory have been collocated with continuous monitors for more than 9 months have been examined. Details of this exercise are included in Appendix 7. The results show that the tubes used over-estimated nitrogen dioxide concentrations by between 2 and 3% between 2003 and 2005. The results from the national network diffusion tubes sites, presented in this report have therefore been adjusted to account for this bias. Figure 2, shows that measured concentrations of nitrogen dioxide at these diffusion tube sites within the District of Richmondshire are all below the annual mean objective of 40  $\mu\text{g}/\text{m}^3$ . The locations of these monitoring sites are shown in Appendix 5.

- 7.2 In 1999 a short-term monitoring study was carried out near to the A1. At this time, Jesmond Dene Laboratory used diffusion tubes supplied by Gradko. Collocation studies carried out in 2000 indicated that these tubes underestimated concentrations by around 7% and therefore these results have been adjusted to account for this bias (see Appendix 7). These short-term results have also been adjusted to be equivalent to annual mean by comparison with results from 3 AURN sites in the region, using the method specified in the Technical Guidance<sup>3</sup>. The results (Appendix 4, Table 4.8) show that even at the Brompton site, which was 6m from the kerb of the A1, the annual mean objective of 40  $\mu\text{g}/\text{m}^3$  in 2005 will have been achieved.
- 7.3 Concentrations have also been measured outside the District, as part of the AURN, at a roadside location in Yarm, which is in Stockton-on-Tees, and urban background locations in Leeds and Bradford (Appendix 4, Table 4.6). The results presented in Figure 3 also support the view that the annual mean objective is likely to be achieved within the District of Richmondshire.

**Figure 2 Annual Mean Nitrogen Dioxide Concentrations ( $\mu\text{g}/\text{m}^3$ ) measured by Diffusion Tube at Locations in Richmondshire and Estimated for 2006**



**Figure 3 Annual Mean Nitrogen Dioxide Concentrations ( $\mu\text{g}/\text{m}^3$ ) Measured by Continuous Monitor at Locations outside Richmondshire as part of the AURN and Estimated for 2005 and 2010**



### New monitoring data within an AQMA

- 7.4 No AQMAs have been declared for nitrogen dioxide in the District of Richmondshire and therefore this section is not applicable.

### Narrow congested streets with residential properties close to the kerb

- 7.5 Queens Road, Victoria Road and Cravengate in Richmond and High Street, Leyburn are fairly narrow and congested with residential properties close to the kerb. There are busy junctions on all of these roads. Pollutant concentrations are expected to be highest at locations near to these junctions and therefore are dealt with in the next section.

### Junctions

- 7.6 The busiest junction in Richmondshire is that of the A1 with the A66 at Scotch Corner. However, there is no relevant exposure within 10m of the road. In the rest of the district, the only fairly busy junctions, with relevant exposure are; the junctions of Victoria Road and Queens Road, and Reeth Road and Victoria Road, in Richmond, and junction of High Street and Commercial Square in Leyburn. Nitrogen dioxide concentrations in 2005 and 2010 have been calculated at the nearest receptors to these junctions using the DMRB and the results are presented in Table 2. The streets in Richmond and Leyburn are canyon type streets, where the buildings on either side are generally higher

than the distance between them. The concentration of nitrogen dioxide calculated to be generated from the road at these sites has therefore been doubled to account for poor dispersion of pollutants at these locations. At the Reeth Road/Victoria Road location, the concentration calculated using the DMRB method is 23.6  $\mu\text{g}/\text{m}^3$ , whereas the measured concentration at the same location (Rich 1), projected forward to 2005, is 20.1  $\mu\text{g}/\text{m}^3$ . These results show that at this location, the DMRB method estimates nitrogen dioxide concentrations fairly accurately. The results set out in Table 2 indicate that the annual mean objective of 40  $\mu\text{g}/\text{m}^3$  is unlikely to be exceeded at junctions in the District of Richmondshire.

**Table 2 Summary of DMRB Calculations for NO<sub>2</sub> near Junctions**

Receptor Location	Calculated Annual Mean Concentration ( $\mu\text{g}/\text{m}^3$ )	
	2005	2010
Middleton Tyas Lane, 100m East A1 at Scotch Corner	13.0	10.1
Moor View, 7m from the A1	31.2	22.1
West View Bungalow, West of Scotch Corner	19.6	15.6
Junction of Victoria Rd and Queens Rd, Richmond	27.9*	22.8*
Junction of Reeth Rd and Victoria Road, Richmond	23.6*	19.2*
Junction of High St with Commercial Square, Leyburn	20.9*	16.8*
<b>Objective</b>	<b>40</b>	<b>40</b>

\*Canyon

### **Busy streets where people may spend 1-hour or more close to traffic**

- 7.7 There are no busy streets where people could potentially spend an hour or more close to traffic.

### **Roads with high flow of buses and/or HGVs**

- 7.8 According to traffic data obtained from North Yorkshire County Council and the National Atmospheric Emissions Inventory<sup>12</sup> the traffic flows on the A1 and A66 through Richmondshire are made up of more than 25% buses and/or HGVs. This finding is consistent with local knowledge of the District. DMRB calculations have been carried out for these roads, and the results are presented in Table 2. Concentrations of nitrogen dioxide have been calculated at a location 100m to the east of Scotch Corner, where the A1 joins the A66, on Middleton Tyas Lane, at a receptor to the west of Scotch Corner, near to the A6108 and at a receptor 7m from the A1. The results show that even at these worst case locations the annual mean objective was expected to be achieved by the 2005 deadline and beyond up to 2010. The 1999

monitoring result from a location similar to Moor View (Brompton) projected forward to 2005 is 20.8 µg/m<sup>3</sup> which is much lower than the modelled concentration, which is 31.2 µg/m<sup>3</sup>. This suggests that the DMRB may over-estimate concentrations at this type of location and therefore the calculations using the DMRB in these situations are conservative.

### **New roads constructed or proposed since first round of Review and Assessment**

- 7.9 No new roads have been constructed since the previous round of Review and Assessment. There are proposals to widen sections of the A1 and A66 through Richmondshire, however, this is unlikely to be completed before 2011. This development will be followed in the Progress Reports.

### **Roads close to the objective during the first round of Review and Assessment**

- 7.10 During previous rounds of Review and Assessment, no roads were identified as being close to the annual mean objective. The busiest roads in the District, away from junctions, have been subjected to DMRB calculations for receptors nearest to the roads in 2005 and 2010. A summary of the findings are shown in Table 3.

**Table 3 Summary of Specific Road DMRB Calculations for NO<sub>2</sub>**

Receptors Beside:	NO <sub>2</sub> Objective Exceedence Likely?	
	2005	2010
A1, Barton	No	No
A684, Hawes	No	No
A684, Leyburn	No	No
A6108, Leyburn	No	No
A6108, Richmond	No	No
A6136, Richmond	No	No
A1, Scotch Corner	No	No
A66, Scotch Corner	No	No
A6108, Skeeby	No	No

### **Roads with significantly changed traffic flows**

- 7.11 There are no roads in Richmondshire that have experienced a significant change in traffic flow since the previous round of Review and Assessment.

### **Bus Stations**

7.12 There are no bus stations in the District of Richmondshire.

### **New industrial sources**

7.13 No new industrial processes, which emit significant quantities of nitrogen dioxide have been introduced in or near to the District of Richmondshire.

### **Industrial sources with substantially increased emissions**

7.14 No industrial processes in or near to the District of Richmondshire were found to emit significant quantities of nitrogen dioxide in the previous rounds of Review and Assessment. No existing sources have substantially increased emissions.

### **Aircraft**

7.15 There are no airports in the District of Richmondshire.

### **Conclusion**

7.16 No further action is required for nitrogen dioxide.

## 8.0 Updating and Screening of Sulphur Dioxide

### Updating and Screening Summary for Sulphur Dioxide.

Source, location or data which need to be assessed	Action
New monitoring data outside an AQMA	No further action required
New monitoring data within an AQMA	N/A
New industrial sources	No further action required
Industrial sources with substantially increased emissions	No further action required
Areas of domestic coal burning	No further action required
Small boilers (>5MW(thermal)) burning coal or oil	No further action required
Shipping	No further action required
Railway Locomotives	No further action required

### New monitoring data outside an AQMA

- 8.1 Sulphur dioxide concentrations were measured in the town of Middleham, near Leyburn between 14/12/2004 and 24/03/2005 as part of a Detailed Assessment carried out on behalf of Richmondshire District Council by Air Quality Consultants Ltd. Sulphur dioxide emissions from domestic solid fuel sources were of particular concern in this area. The monitoring was carried out using a ML9850 UV fluorescence analyser housed in an air conditioned enclosure. The equipment was supplied by Casella ETi. Casella ETi contacted the site daily to ensure that it was operating correctly and supplied data to Air Quality Consultants Ltd once a week. Once a fortnight Richmondshire District Council carried out a calibration check using a suitably certified calibration gas. All data was ratified by Air Quality Consultants Ltd. The results are summarised in Table 4 and show that the sulphur dioxide objectives were met.

**Table 4 Measured SO<sub>2</sub> Concentrations 14<sup>th</sup> December 2004 to 24<sup>th</sup> March 2005**

Averaging period	Objective	Results	Data capture (%)
Period mean	N/A	10.1 µg/m <sup>3</sup>	90
15-minute	266 µg/m <sup>3</sup> not to be exceeded more than <b>35</b> times per year	1 exceedence	90
1-hour	350 µg/m <sup>3</sup> not to be exceeded more than <b>35</b> times per year	0 exceedences	90
24-hour	125 µg/m <sup>3</sup> not to be exceeded more than <b>35</b> times per year	0 exceedences	90

Monitoring is also carried out as part of the AURN at urban centre locations in Leeds and Bradford. The results from these sites are presented in Appendix 4, Table 4.8. These data indicate that the 24-hour, 1-hour and 15-minute

objectives are expected to be achieved at these urban locations in the relevant years. It can also be presumed that away from any significant local sources of sulphur dioxide in Richmondshire, the objectives will also be achieved.

### **Monitoring data within an AQMA**

- 8.2 No AQMAs have been declared for sulphur dioxide in the District of Richmondshire and therefore this section is not applicable.

### **New industrial sources**

- 8.3 There have been no new processes, which emit significant quantities of sulphur dioxide, introduced in or near the District of Richmondshire since the previous round of Review and Assessment.

### **Industrial sources with substantially increased emissions**

- 8.4 No industrial processes in or near to the District of Richmondshire were found to emit significant quantities of sulphur dioxide in previous rounds of Review and Assessment. None of the existing processes have substantially increased their emissions. There are 3 roadstone coating plant in the District which use oil with a sulphur content of less than 1%. It is therefore unlikely that these processes will lead to an exceedence of any of the sulphur dioxide objectives.

### **Areas of domestic coal burning**

- 8.5 Within the District of Richmondshire there are a number of villages which do not have a mains gas supply and therefore may have a higher than average density of households burning solid fuel. Of these villages, those with the highest housing densities are Reeth and Middleham which both have over 300 properties in a single 500m x 500m area. A solid fuel use survey<sup>15</sup> was carried out in the most densely populated settlements that do not have a mains gas supply. This was conducted and a report written on behalf of Richmondshire District Council, by Air Quality Consultants, Bristol, with reference to Review and Assessment Technical Guidance LAQM.TQ(03)<sup>3</sup> and submitted to Defra in August 2004. The report concluded that a Detailed Assessment was required for sulphur dioxide in the town of Middleham, near Leyburn.

The Detailed Assessment<sup>9</sup> was also conducted on behalf of Richmondshire District Council by Air Quality Consultants, Bristol. As part of this, monitoring took place during the winter of 2003/4. However, due to problems obtaining quality assured data, the exercise had to be repeated the following year. The monitoring showed that sulphur dioxide emissions from domestic solid fuel burning do have an impact on concentrations in Middleham, but no likely exceedences of the 15-minute, 1-hour and 24-hour objectives have been identified. There was no requirement, therefore to declare an Air Quality

Management Area (AQMA). As Middleham was selected as the location where exceedences are most likely, it can be concluded that exceedences in other locations are also unlikely. Full details can be found in Detailed Assessment of Sulphur Dioxide Emissions from Domestic Solid Fuel Sources – Richmondshire District Council, April 2005.<sup>9</sup>

### **Small boilers (>5MW(thermal)) burning coal or oil**

- 8.6 The existence of any schools, hospitals or other large institutional or commercial buildings, which may have boilers using coal or heavy fuel oil has been determined by contacting those institutions which exist within Richmondshire and determining the type of fuel used. The Abbey Care Village (formerly the Hospital of St John of God) in Scorton was identified as having 4 boilers, 2 of which burn coal. It has been estimated from information provided by the hospital that these boilers use 336 tonnes of coal per year. Using the emission factors from the National Atmospheric Emissions Inventory<sup>12</sup> it has been calculated that 6.7 tonnes of sulphur dioxide are emitted from this source per year. Based on the nomograms supplied in the Technical Guidance<sup>3</sup>, the maximum sulphur dioxide emission rate from a stack of the same height (17m) and diameter (0.5m), which would required a Detailed Assessment, is 131 tonnes per year. Therefore, emissions from this boiler do not have the potential to lead to an exceedence of the sulphur dioxide objectives. No other boilers using coal or heavy fuel oil have been identified in the District.

### **Shipping**

- 8.7 There is no shipping activity in the District of Richmondshire.

### **Railway Locomotives**

- 8.8 The Wensleydale Railway runs diesel trains between Leeming Bar and Redmire. The railway runs three trains a day, three times per week. There is a 9-minute turn around at each stop therefore locomotives are not stationary for 15minutes or longer. The railway is therefore unlikely to cause any exceedence of the sulphur dioxide objectives.

### **Conclusion**

- 8.9 No further action is required for sulphur dioxide.

## 9.0 Updating and Screening of Particles (PM<sub>10</sub>)

### Updating and Screening Summary for PM<sub>10</sub>.

Source, location or data which need to be assessed	Action
New monitoring data outside an AQMA	No further action required
New monitoring data within an AQMA	N/A
Junctions	No further action required
Roads with high flow of buses and/or HGVs	No further action required
New roads constructed or proposed since first round of Review and Assessment	No further action required
Roads close to the objective during the first round of Review and Assessment	No further action required
Roads with significantly changed traffic flows	No further action required
New industrial sources	No further action required
Industrial sources with substantially increased emissions	No further action required
Areas with domestic solid fuel burning	No further action required
Quarries, landfill sites, opencast coal, handling of dusty cargoes at ports etc	No further action required
Aircraft	No further action required

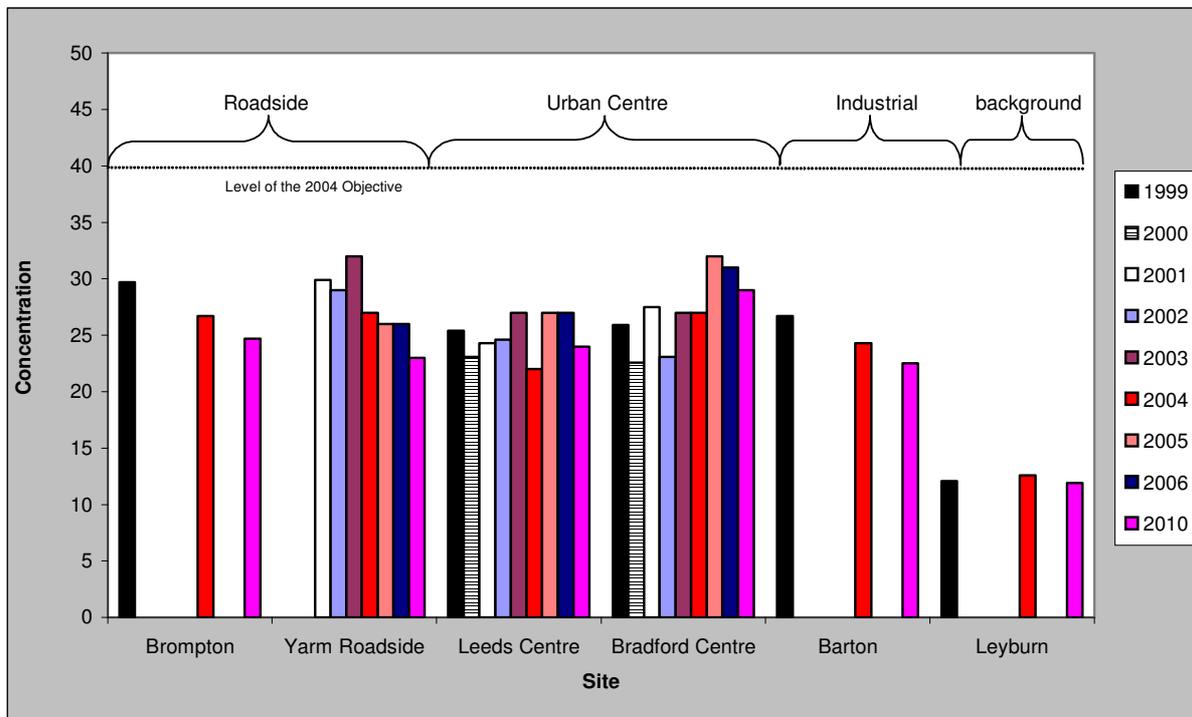
### New monitoring data outside an AQMA

- 9.1 There is no PM<sub>10</sub> monitoring carried out in Richmondshire at present. In 1999 a short survey took place at 3 locations, the results of which are presented in Figures 4 & 5 and Appendix 4, Table 4.9. A monitor was located adjacent to the A1 at Brompton, and near to quarry works at Leyburn and Barton. The Barton site was also near to a lorry park, which lies close to the A1. Monitoring is also carried out, outside Richmondshire, as part of the AURN at urban centre locations in Leeds and Bradford and a roadside location in Yarm. These results are also shown in Figures 4 & 5 and Appendix 4, Table 4.9. The results, when projected forward as described in the Technical Guidance<sup>3</sup>, support the view that even at the roadside locations in Richmondshire, annual mean and 24-hour objectives are expected to be achieved.

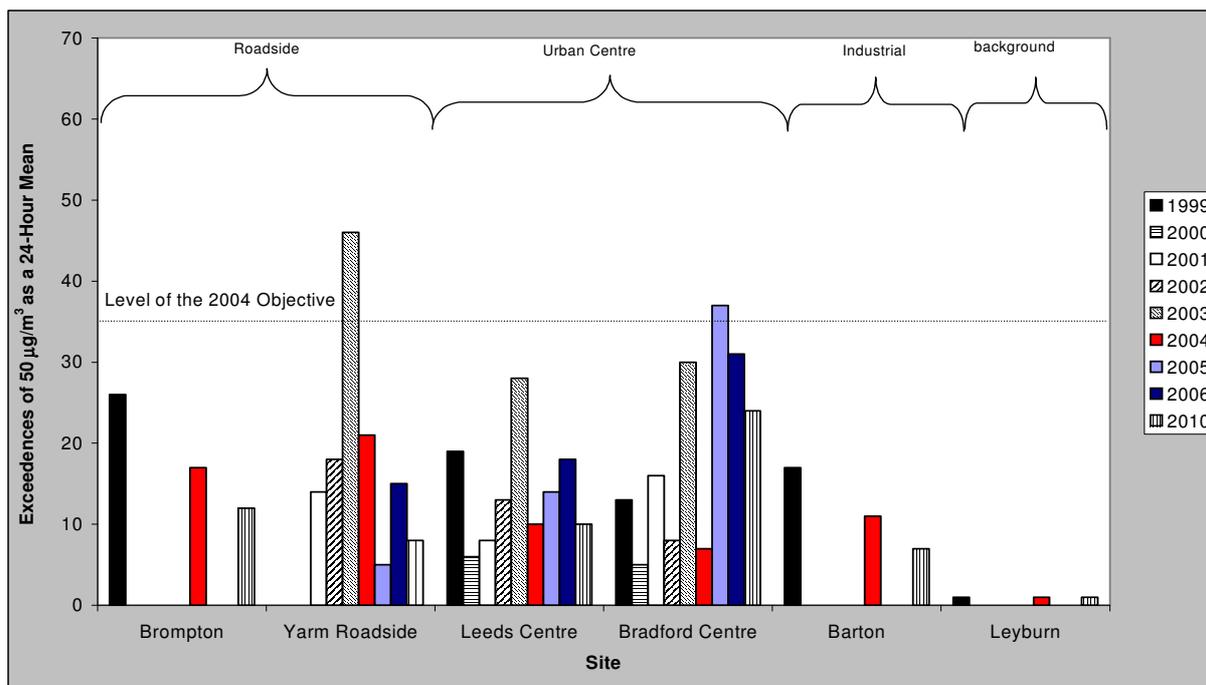
### New monitoring data within an AQMA

- 9.2 No AQMAs have been declared for PM<sub>10</sub> in the District of Richmondshire and therefore this section is not applicable.

**Figure 4 Annual Mean PM<sub>10</sub> Concentrations (µg/m<sup>3</sup>) Measured at Locations in and Around Richmondshire, together with Estimated Values for 2006 and 2010**



**Figure 5 Exceedences of the 24-hour PM<sub>10</sub> Objective of 50 µg/m<sup>3</sup> Measured at Locations in and Around Richmondshire, together with Estimated Values for 2004 and 2010**



## **Junctions**

- 9.3 The busiest junction in Richmondshire is the junction of the A1 with the A66 at Scotch Corner. However, there is no relevant exposure within 10m of the road. In the rest of the district, the only fairly busy junctions, with relevant exposure are; the junctions of Victoria Road and Queens Road, and Reeth Road and Victoria Road, in Richmond, and junction of High Street and Commercial Square in Leyburn. PM<sub>10</sub> concentrations in 2004 and 2010 were calculated at the nearest receptors to these junctions using the DMRB and the results are presented in Table 4. Results from the DMRB suggest that the 2004 objectives of 40 µg/m<sup>3</sup> as an annual mean and fewer than 36 days with a 24-hour average concentration greater than 50 µg/m<sup>3</sup> will be achieved. No junctions have been identified in the District of Richmondshire where the 2010 PM<sub>10</sub> objectives are likely to be exceeded.

## **Roads with high flow of buses and/or HGVs**

- 9.4 According to traffic data obtained from North Yorkshire County Council and the National Atmospheric Emissions Inventory<sup>12</sup> the traffic flows on the A1 and A66 through Richmondshire are made up of more than 20% buses and/or HGVs. This finding is consistent with local knowledge of the District. DMRB calculations have been carried out for these roads, and the results are presented in Table 4. Concentrations of PM<sub>10</sub> have been calculated at a location 100m to the east of Scotch Corner, where the A1 joins the A66, on Middleton Tyas Lane, at a receptor to the west of Scotch Corner, near to the A6108 and at a receptor 7m from the A1. The results show that even at these worst case locations the annual mean and 24-hour objectives should be achieved by 2004 with no exceedences expected up to 2010.
- 9.5 Calculated annual mean concentrations in 2010 also achieve the provisional objective of 20 µg/m<sup>3</sup>. The 2010 objectives are, however, currently provisional and do not need to be considered for the purposes of this assessment.

**Table 4 Summary of DMRB Calculations for PM<sub>10</sub> near Junctions.**

	<b>2004</b>	<b>2004</b>	<b>2010</b>	<b>2010</b>
<b>Receptor Location</b>	<b>Predicted Annual Mean Concentration (µg/m<sup>3</sup>)</b>	<b>Predicted Number of Exceedences of 50 µg/m<sup>3</sup> as a 24-Hour Mean</b>	<b>Predicted Annual Mean Concentration (µg/m<sup>3</sup>)</b>	<b>Predicted Number of Exceedences of 50 µg/m<sup>3</sup> as a 24-Hour Mean</b>
Middleton Tyas Lane, 100m East A1 at Scotch Corner	16.5	1	14.9	0
Moor View, 15m from the A1	26.4	16	19.9	3
West View Bungalow, West of Scotch Corner	19.7	3	16.6	1
Junction of Victoria Rd and Queens Rd, Richmond	20.3	4	17.3	1
Junction of Reeth Rd and Victoria Road, Richmond	18.7	2	16.2	0
Junction of High St with Commercial Square, Leyburn	20.1	4	17.8	1
<b>Objective</b>	<b>40</b>	<b>35</b>	<b>20</b>	<b>7</b>

**New roads constructed or proposed since first round of Review and Assessment**

- 9.6 No new roads have been constructed since the previous round of Review and Assessment. There are proposals to widen sections of the A1 and A66 through Richmondshire, however, this is unlikely to be carried out before 2011. This development will be followed in the Progress Reports.

**Roads close to the objective during the first round of Review and Assessment**

- 9.7 During the first round of Review and Assessment, no roads were identified as being close to the annual mean objective. The busiest roads in the District, away from junctions, have been subjected to DMRB calculations for receptors nearest to the roads in 2004 and 2010. A summary of these findings is shown in Table 5.

**Table 5 Summary of Specific Road DMRB Calculations for PM<sub>10</sub>**

Receptors Beside:	PM <sub>10</sub> Objective Exceedence Likely?	
	2004	2010
A1, Barton	No	No
A684, Hawes	No	No
A684, Leyburn	No	No
A6108, Leyburn	No	No
A6108, Richmond	No	No
A6136, Richmond	No	No
A1, Scotch Corner	No	No
A66, Scotch Corner	No	No
A6108, Skeeby	No	No

### **Roads with significantly changed traffic flows**

- 9.8 There are no roads in Richmondshire that have experienced a significant change in traffic flow since the previous round of Review and Assessment.

### **New industrial sources**

- 9.9 A new concrete block process has begun production at Brompton on Swale. Emissions to air are minimised through the use a pressurised system and filters on the silos and the nearest residential premises are 120m from the process. It is therefore unlikely that it will lead to any exceedences of the objectives. There have been no other new processes, which emit significant quantities of PM<sub>10</sub>, introduced in or near to the District of Richmondshire since the first round of Review and Assessment.

### **Industrial sources with substantially increased emissions**

- 9.10 No industrial processes in or near to the District of Richmondshire were found to emit significant quantities of PM<sub>10</sub> in previous rounds of Review and Assessment. None of the existing processes have substantially increased their emissions.

### **Areas with domestic solid fuel burning**

- 9.11 Within the District of Richmondshire there are a number of villages which do not have a mains gas supply and therefore may have a higher than average density of households burning solid fuel. Of these villages, those with the highest housing densities are Reeth and Middleham which both have over 300 properties in a single 500m x 500m area. However, the background PM<sub>10</sub> concentrations in these areas are low (less than 15 µg/m<sup>3</sup> in 2004) and therefore according to the nomograms provided in the Technical Guidance<sup>3</sup>,

even if all of these households used coal, it would be unlikely that there would be an exceedence of the objectives.

**Quarries, landfill sites, opencast coal, handling of dusty cargoes at ports etc**

- 9.12 There are a number quarries, landfill sites or other dusty operations in the District of Richmondshire that have the potential to have a significant effect on PM<sub>10</sub> concentrations at residential properties. However, these were assessed in the first round of Review and Assessment and monitoring was carried out at two worst-case locations. The results of this monitoring indicated that exceedences of the objectives due to these sources were unlikely at relevant locations. The Local Authority continues to monitor the situation at dusty operations as part of the routine inspections carried out in accordance with LAPC and LAPPC.

**Aircraft**

- 9.13 There are no airports in the District of Richmondshire.

**Conclusion**

- 9.14 No further action is required for PM<sub>10</sub>.

## Glossary

Standards	A nationally defined set of concentrations for eight pollutants below which health effects do not occur or are minimal.
Objectives	A nationally defined set of health-based concentrations for nine pollutants, seven of which are incorporated in Regulations, setting out the extent to which the standards should be achieved by a defined date, taking into account costs, benefits, feasibility and practicality. There are also vegetation-based objectives for sulphur dioxide and nitrogen oxides.
Exceedence	A period of time where the concentration of a pollutant is greater than the appropriate air quality objective.
AQMA	Air Quality Management Area
USA	Updating and Screening Assessment
DA	Detailed Assessment
Defra	Department for Environment Food and Rural Affairs
TG(03)	Technical guidance document provided by Defra to assist local authorities in completion of the next round of the Air Quality Review & Assessment process <sup>3</sup>
DMRB	Design Manual for Roads and Bridges (Highways Agency 2003)
PM <sub>10</sub>	Small airborne particles, more specifically particulate matter less than 10 micrometers in aerodynamic diameter.
NO <sub>2</sub>	Nitrogen dioxide.
SO <sub>2</sub>	Sulphur dioxide.
m	Metres.
µm	Micrometres (one millionth of a metre)
µg/m <sup>3</sup>	Microgrammes per cubic metre.

## References

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- <sup>1</sup> DETR (January 2000), The Air Quality Strategy for England, Scotland, Wales and Northern Ireland.
  - <sup>2</sup> Defra, (February 2003), The Air Quality Strategy for England, Scotland, Wales and Northern Ireland: Addendum.
  - <sup>3</sup> Defra, (January 2006), Local Air Quality Management, Technical Guidance LAQM.TG(03).
  - <sup>4</sup> The Air Quality (England) Regulations 2000, Statutory Instrument 928
  - <sup>5</sup> The Air Quality (England) (Amendment) Regulations 2002, Statutory Instrument 3043
  - <sup>6</sup> Richmondshire District Council (1999) Stage 1 Air Quality Review and Assessment.
  - <sup>7</sup> Laxen, D (December 1999) Air Quality Monitoring in Richmondshire
  - <sup>8</sup> Richmondshire District Council (2003) Updating and Screening Assessment of Air Quality in the District of Richmondshire
  - <sup>9</sup> Richmondshire District Council (2005) Detailed Assessment of Sulphur Dioxide Emissions from Domestic Solid Fuel Sources
  - <sup>10</sup> Richmondshire District Council (2005) Air Quality in the District of Richmondshire Progress Report
  - <sup>11</sup> [www.airquality.co.uk](http://www.airquality.co.uk)
  - <sup>12</sup> [www.naei.co.uk](http://www.naei.co.uk)
  - <sup>13</sup> Highways Agency (February 2003), Design Manual for Roads and Bridges, Volume 11, Section 3, Part 1 Air Quality.
  - <sup>14</sup> [www.environment-agency.gov.uk/yourenv/](http://www.environment-agency.gov.uk/yourenv/)
  - <sup>15</sup> Richmondshire District Council (2003) Solid Fuel Use in the District of Richmondshire