AMBER VALLEY
BOROUGH COUNCIL

Environment Act 1995

Updating Screening and Assessment

May 2003

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Executive Summary

This report constitutes the second round review and assessment of air quality for Amber Valley Borough Council. It focuses on any changes to industrial, domestic and road transport sources since the first round review was undertaken. It also highlights any areas where there are likely to be shortfalls in the anticipated reductions in pollutant levels predicted in round 1 and considers these in terms of any potential exceedences of the air quality standards and objectives.

Conclusions from the round 1 review are listed in this document for reference and, together with the outcome of this report, consideration is given to the need for a detailed review for individual pollutants. The pollutants evaluated are:

- Carbon monoxide
- Benzene
- 1,3 Butadiene
- Lead
- Sulphur Dioxide
- Particulate matter (PM_{10})
- Nitrogen dioxide

Each pollutant is considered in turn and a conclusion reached about the need for further investigation. For all the pollutants listed above, the round 1 review showed that the objectives were expected to be achieved in all areas and for all road links within the Borough. This report also shows that there is little likelihood of any air quality objectives being exceeded and it is not proposed therefore to proceed to a detailed review.

The Borough of Amber Valley

The borough of Amber Valley forms one of the nine Local Authority districts in Derbyshire. Located on the eastern side of Derbyshire, between Derby to the south, and Chesterfield to the north, the area gets its name from the River Amber, which flows, through it.

The area is comprised of four main towns; Alfreton, Belper, Heanor and Ripley, and is divided into twenty-five wards. Amber Valley covers just over 260 square kilometres and, apart from the towns, is largely rural in character. The present population is 116,471 (2001 Census, National Statistics). The population structure is a product of the Industrial Revolution, when the country moved from an economy based on agriculture, to a manufacturing one. The physical resources and topography of the area made this a particularly significant event in the area.

Coal, limestone and sandstone provided the key natural resources, while the four rivers supplied valuable power sources. Water power on the Derwent allowed the textile industry to grow and prosper. The demand for iron, steel and coal grew in proportion and ensured the rapid development of Alfreton, Heanor and Ripley. The result of this industrial development is that the eastern part of Amber Valley has a distinctly urban character, whilst the west is rural, with a dispersed settlement pattern. The exploitation of natural resources has not only brought direct wealth, but provides a legacy upon which a thriving tourism industry is based.

The borough has almost 500 companies located within its 20 industrial estates, with a further 400 located on singular sites or within the urban areas. The gradual shift away from the two traditional industries of coal mining and textiles now means that the area is now well represented in a wide range of industrial sectors including instrument engineering, timber and furniture manufacture, hotels and catering, and business services; textiles and clothing is still a significant industry in Amber Valley.

Although based in the East Midlands, Amber Valley provides access to all parts of the country, including ports, airports and rail stations, without the major congestion problems of larger conurbations. Travel within the borough and local area is also well provided for. Major roads, including the A38 and A6 run through the borough in a north-south direction; the A38 providing a busy link between Derby and junction 28 of the M1. The A609 and A610 also provide links to Ilkeston and Nottingham to the east. In addition, the A52 between Derby and Ashbourne cuts through the southern-most tip of the borough. The only rail stations in the area are at Belper, which is on the busy east coast mainline, and at Alfreton, with through trains to London, Manchester and the north. The River Derwent bisects the area from north to south, running parallel with the A6, Cromford Canal and the local rail line to Matlock.

The area can offer residents and visitors a wide variety of leisure facilities. A thriving tourist industry has developed with attractions such as the American Adventure World, National Tramway Museum, Midland Railway Centre, Kedleston Hall, Wingfield Manor, and numerous parks and gardens. The area along the River Derwent forms part of the National Heritage Corridor, and has recently been designated a World Heritage Site.

Contents

1 Introduction

The Environment Act 1995 brought a responsibility for local authorities to review and assess the quality of air within their district. This process started in 1999/2000 with the first Review and Assessment being undertaken for the Borough. This was conducted in 3 stages and evaluated the likelihood of any of the air quality standards listed in the regulations being exceeded. The conclusions of that review are reproduced within this report.

National and international policies are being implemented to bring about reductions in polluting emissions, particularly from road traffic and some industrial sectors. Local sources however, do have the potential to emit significant quantities of some pollutants and for this reason, review and assessment must be undertaken at the local level.

In order to ensure that the anticipated reductions in pollutant levels detailed in the previous report occur as predicted and that the anticipated targets are still likely to be met, local authorities are required to conduct reviews on a 3 – yearly cycle. These will now be in 2 parts:-

- An 'Updating and Screening Assessment' – this will be done in the form of a desk study to identify any changes that may have occurred since the last reports and evaluate whether these are likely to lead to improvement or worsening of pollutant levels and thereby determine any change to the risk of exceeding the standards and objectives. If this shows any increased risk then a 'Detailed Assessment will be required.
- A 'Detailed Assessment' – this will be a technical evaluation of current and future predicted pollutant levels by monitoring or modelling techniques.

The framework under which reviews are to be conducted is set out in the Air Quality Strategy (Jan 2000) and its associated regulations also produced in 2000. As part of the continuing development of this procedure, amended regulations were released in 2002 which revised the standards and objectives, an overview of these changes is given in Table 1. The guidance documents to assist in the structure and production of this round of reports was finally issued in February 2003.

This report presents the findings of the Updating and Screening Assessment for Amber Valley Borough Council.

2 Air Quality Standards and Objectives

The standards and objectives proposed in the original Strategy released in 1997 were derived from recommendations made by the Expert Panel on Air Quality Standards and were based on scientific and medical evidence of the effects of a particular pollutant on human health. The standards were set at a level that was assumed would present minimum or no risk to health.

The Strategy was revised in January 2000 and amended regulations released at this time. Further amendments to the regulations were released in 2002 which again revised the air quality standards and objectives. A summary of the current standards and objectives is given in the table below.

Table 1 Summary of the Revised Air Quality Standards and Objectives

POLLUTANT	STANDARD		OBJECTIVE
	concentration	measured as	Date to be achieved
Benzene	16.25 ug/m^3 5.00 ug/m^3	running annual mean annual mean	31 December 2003 31 December 2010
1,3-Butadiene	2.25 ug/m^3	running annual mean	31 December 2003
Carbon monoxide	10 mg/m^3	running 8-hour mean	31 December 2003
Lead	0.5 μg/m^3 0.25 μg/m^3	annual mean annual mean	31 December 2004 31 December 2008
Nitrogen dioxide	200 μg/m^3 with less than 18 ex/yr*	1 hour mean	31 December 2005
	40 ug/m^3	annual mean	31 December 2005
Fine particles (PM_{10}) Gravimetric	50 μg/m^3 with less than 35 ex/yr*	24-hour mean	31 December 2004
	40 ug/m^3	annual mean	31 December 2004
Sulphur dioxide	350 μg/m^3 with less than 24 ex/yr*	1 hour mean	31 December 2004
	125 μg/m^3 with less than 3 ex/yr*	24-hour mean	31 December 2004
	266 μg/m^3 with less than 35ex/yr*	15 minute mean	31 December 2005

KEY

μg/m^3 micrograms per cubic metre

ex/yr* exceedences per year

Source - 'The Air Quality Regulations 2002'

3 Consultation

As with the previous review and assessment reports, authorities are required to consult a number of bodies and organisations. Consultation will be undertaken in line with the previous exercises.

Consultees for the review and assessment process are:-

- The Secretary of State
- The Environment Agency
- Derbyshire County Council
- Neighbouring local authorities:-
  - Bolsover District Council
  - North East Derbyshire District Council
  - Derbyshire Dales District Council
  - South Derbyshire District Council
  - Derby City Council
  - Erewash Borough Council
  - Broxtowe Borough Council
  - Ashfield District Council

Copies of the review and assessment will be made available for public inspection at:-

- The Council offices
- Town Centre Bureaux
- Public libraries throughout the Borough.

A copy of the document is also to be sent to South Derbyshire Health Authority.

4 Summary of the 1999/2000 Reports

4.1 **Stage 1 -** The Stage 1 report for this Borough reviewed all potential sources of the pollutants specified in the Air Quality Strategy, including road links and industrial sources in accordance with the Pollutant Specific Guidance. It highlighted five pollutants for which the risk of exceeding the standards and objectives was not considered negligible. This was due to the existence within the Borough of potential sources of the individual pollutants that could give rise to significant emissions. The following pollutants were identified;

1. Carbon Monoxide
2. Lead
3. Nitrogen Dioxide
4. Sulphur Dioxide
5. Particulate matter

The pollutants were then investigated further by means of mathematical modelling or simple monitoring techniques to assess the likelihood of any of the air quality standards or objectives being exceeded. This was done by means of a Stage 2 report.

4.2 **Stage 2 -** The Stage 2 report addressed these pollutants individually and assessed in more detail, their likely potential to give rise to breaches of the standards by the relevant dates. It identified all sources within the Borough and in neighbouring areas that may emit the pollutants of concern in significant quantities. The conclusions for each pollutant are as follows.

- **Carbon monoxide** – traffic flow data indicated that all roads within the Borough were well below the criteria given in the Pollutant Specific Guidance for single/dual carriageway roads and there was unlikely to be breaches of the carbon monoxide standard for road traffic.

  The two industrial sources identified for Stage 1 were both discounted at Stage 2 due to the nature of the processes being undertaken and the lack of significant combustion plant on site.

  A Stage 3 report was not therefore required.

- **Lead** – PB/DETA batteries closed after production of the Stage 1 report and were not considered further for Stage 2.

  All other ferrous and non-ferrous metals processing sites identified do not use lead as an alloying agent or in any additive for the process. Limited monitoring did not show any indication of significant lead emissions from the vicinity of the largest ferrous metal foundry in the Borough.

  A Stage 3 report was not therefore required.

- **Sulphur dioxide** – the potential for emissions of sulphur dioxide was predominantly found to be from industrial sources and the burning of coal for domestic heating purposes.

  The Stage 2 review found that emissions from industrial sites were unlikely to be significant and that the main area of concern was domestic coal burning. Results from an 8-port bubbler located in one of the main coal burning areas showed that, while levels are close to the standards, they are unlikely to exceed the objectives.

  A Stage 3 report was not therefore necessary.

- **Particulate Matter (PM_{10})** – emissions of PM_{10} were considered from a wide variety of sources. Industrial emissions from Part A sites, opencast coal sites, quarries, road transport and domestic coal burning were evaluated by various methods including the Environment Agency GSS model and the Design Manual for Roads and Bridges (DMRB).

  A short-term monitoring exercise was also undertaken using gravimetric samplers for comparison with modelling done by NETCEN using data from the black smoke stain monitor co-located with the sulphur dioxide bubbler. The results of these evaluations showed that although levels were approaching the standards, it was unlikely that exceedences would occur.

  A Stage 3 report would therefore not be required.

- **Nitrogen dioxide** – the Stage 1 report identified potential sources as being road junctions with traffic flows greater than 20,000 vehicles per day and Part A industrial sites.

  The Part A sites were located in adjacent areas and were evaluated by neighbouring authorities using dispersion models where appropriate. The Pollutant Specific Guidance also advised that Part A sites would need to be within a critical distance to affect neighbouring Boroughs and since the sites were outside this, no exceedences were likely to be attributable to these sites.

  The DMRB model was then used to screen the road links to determine any possible locations of high levels. It is generally accepted that DMRB tends to overestimate pollutant levels but despite this, only two links appeared to be above the annual average standard. Both sites were adjacent to stretches of the A38 trunk road with predicted values of 45.9 and 42.5 ug/m^3 respectively.

  A diffusion tube survey was also undertaken during 1999/00 with tubes located at locations likely to represent the worst case scenarios. Tubes located along the two stretches of A38 showed levels significantly lower than the predictions and well within the standards. However, at two other locations, results were significantly higher than predicted and exceeded the standards.

  A Stage 3 report for nitrogen dioxide was required with respect to the identified road links.

4.3 Stage 3

Nitrogen Dioxide

The Stage 3 report was produced which focussed on the results of the DMRB model and the levels predicted at locations most likely to be at risk of breaching the objectives. The report highlighted potential anomalies with the modelled results in comparison with ongoing diffusion tube results for the 'worst case' locations. Investigation was then made into potential street canyon effects and the correlation of diffusion tube results with continuous analyser results for the same period before further comparison with the objectives.

The methodology for the report involved continuously monitoring the levels of NO_x alongside a fairly heavily trafficked trunk road where residential properties were located within 10 metres of the roadside. Diffusion tubes were co-located with the analyser to adjust measured levels and correct results for the other tube locations within the Borough. From this information, a correction factor was produced for the measurement period and comparison made with nearby AUN site results to evaluate the measurement period against the annual average readings. The continuous monitor recorded levels in a location identified as a potential street canyon due to elevated levels recorded on the diffusion tubes.

The survey also looked at the correlation between distances from the roadside to receptors and the measured levels. This concluded that the levels dropped away sharply from the kerbside, and the distance of property facades from the emission source had a large effect on measured levels. Overall, the round 1 review concluded that at even the 'worst case' locations there was little likelihood of exceedences and that most locations were already well below the objectives.

5 Second Round Review of Carbon Monoxide

5.1 Introduction

Carbon monoxide is a gas formed during the burning of a carbon-based material when there is insufficient oxygen present to allow complete combustion. It arises from many varied sources, including domestic heating, industrial processes, cigarette smoking, road traffic etc. The main source of outdoor exposure to carbon monoxide is general pollution of the atmosphere by vehicle exhausts and this currently accounts for around 67% of the total UK emissions. The highest levels are therefore most likely to occur adjacent to heavily trafficked routes, although concentrations fall away rapidly with distance from the road.

5.2 Health Effects

The effects of carbon monoxide are centred on the interference with the oxygen carrying capacity of the blood and also the blocking of essential biochemical reactions within cells. This in turn can affect the functions of the heart and brain. Sufferers of coronary heart and lung disease may be particularly susceptible with increased risk of chest pain, angina and heart attacks.

5.3 Standard and Objective for Carbon Monoxide

The air quality standard that has been adopted is for an ambient air concentration for carbon monoxide of 10mg/m^3 measured as a maximum daily running 8-hour average, with an objective that the standard be achieved by 31 December 2003.

5.4 The National Perspective

During the period 1999 to 2001, there were no measured exceedences of the objective at any of the UK national network sites. This included kerbside/ roadside sites and urban background/urban centres. Carbon monoxide levels adjacent to major roads have also been modelled at a national level and the results suggest that existing policies will be sufficient to reduce maximum daily running 8 – hour mean concentrations below 10mg/m^3 by about 2003.

5.5 Results of Round 1 review of carbon monoxide

The first round of review and assessments suggested that there was little likelihood of any sites or road links within the Borough exceeding the standards or objectives.

5.6 Updating and Screening Assessment for Carbon Monoxide

The Updating and Screening Assessment is based on the guidance and checklists provided in Technical Guidance LAQM. TG(03) and the results are produced in Table 2 below.

Table 2

Data to be assessed	Work undertaken	Comments
Monitoring: (A) Monitoring data	Collate all CO monitoring data	No monitoring has been undertaken for either round 1 or round 2 reviews and assessments
Road Traffic (B) Busy roads or junctions in built up areas	Identify 'very busy' roads and junctions in areas where the 2003 background is expected to be >1mg/m^3.	No road links within the Borough have daily average traffic flows (AADT) >80,000 for single carriageways or >120,000 for dual carriageways (see Appendix 1). Modelled background levels for the Borough are all < 1mg/m^3 (see Appendix 3).

5.7 Conclusion

Since the traffic flows and background concentrations of carbon monoxide are well below the criteria set in LAQM. TG(03) it is unlikely that the standards and objectives will be exceeded. It is therefore not proposed to proceed to a Detailed Assessment for carbon monoxide.

6 Second Round Review of benzene

6.1 Introduction

Benzene arises, in particular, from the combustion and distribution of petrol. Another potential source of exposure is from industry. Certain industrial processes use benzene in significant quantities and, in 1996, 15% of the total annual UK emissions of benzene arose from industrial sources, while 64% came from motor vehicle exhausts and 2% from the handling and storage of petrol. The highest levels are therefore most likely to occur adjacent to heavily trafficked routes, industrial sources or a combination of both.

6.2 Health Effects

Benzene is a recognised human carcinogen and long-term exposure carries increased risk of cancers and non-lymphocytic leukaemias. Benzene has been shown to act on the genetic material within cells leading to the possibility of malignant disease even with very small exposures.

6.3 Standard and Objective for benzene

The air quality standard that has been adopted is for an ambient air concentration for benzene of 16.25ug/m^3 measured as a running annual mean, with an objective that the standard be achieved by 31 December 2003. However, in light of the health advice from EPAQS and the Department of Health's Committee on Carcinogenicity of Chemicals in Food, Consumer Products and the Environment an additional objective has been set of 5ug/m^3 to be achieved by the end of 2010.

6.4 The National Perspective

During the period 1999 to 2001, there were no measured exceedences of the 16.25ug/m^3 running annual mean objective at any of the UK national network sites. This included kerbside/ roadside sites and urban background/urban centres. In 2001 the concentrations at urban background locations were also below the tighter 2010 objectives. It is anticipated that national policy measures currently in place will achieve the 2003 objective at all urban background and roadside/kerbside locations. It is also expected that that the 2010 objective will be achieved at all urban background and most roadside/kerbside locations.

6.5 Results of Round 1 review of benzene

The first round of review and assessments suggested that there was little likelihood of any sites or road links within the Borough exceeding the standards or objectives.

6.6 Updating and Screening Assessment for benzene

The Updating and Screening Assessment is based on the guidance and checklists provided in Technical Guidance LAQM. TG(03) and the results are produced in Table 3 below.

Table 3

Data to be assessed	Work undertaken	Comments
Monitoring: (A) Monitoring data	Collate all benzene monitoring data	Limited monitoring was undertaken prior to round 1 review, but data not 'bias corrected' so not included in this review. No round 2 monitoring undertaken.
Road Traffic (B) Busy roads or junctions in built up areas	Identify 'very busy' roads and junctions in areas where the 2003 background is expected to be >2ug/m^3.	No road links within the Borough have daily average traffic flows (AADT) >80,000 for single carriageways or >120,000 for dual carriageways (see Appendix 1). Modelled background levels for the Borough are all < 2ug/m^3 (see Appendix 3).
Industrial Sources (C) Industrial Sources	Identify any processes likely to emit significant quantities of benzene (from Annex 2 – Appendix E)	There are no processes identified in this area or adjacent areas listed as significant.
(D) Petrol Stations	Identify petrol stations with a throughput in excess of 2000m^3 per annum with a 'busy' road nearby and relevant exposure within 10m.	One petrol station is located near to a road where AADT > 30,000 but no receptors located within 10m of pumps as site is on retail park.
Other Sources (E) Major petrol storage depots	Identify any major petrol storage depots	There are no major petrol storage depots in this area.

6.7 Conclusion

As there are no relevant road links, industrial processes or major petrol handling storage depots within this area as described in LAQM. TG(03) it is unlikely that the standards and objectives will be exceeded. It is therefore not proposed to proceed to a Detailed Assessment for benzene.

7 Second Round Review of 1,3 - butadiene

7.1 Introduction

1,3-Butadiene is a chemical compound consisting of carbon and hydrogen atoms. It arises, in particular, from the combustion of petrol and other fossil fuels and is used in industry, mainly in the production of synthetic rubber for tyres. In 1995, 67% of the total annual UK emissions of 1,3-Butadiene arose from petrol vehicle exhausts while 13% came from industrial sources. The highest levels are therefore most likely to occur adjacent to heavily trafficked routes, industrial sources or a combination of both.

7.2 Health Effects

1,3-Butadiene is a recognised human carcinogen. Long-term exposure to 1,3 butadiene carries increased risk of cancers, particularly cancers of the lymphoid system and bone marrow, lymphomas and leukaemias. 1,3-Butadiene has been shown to act on the genetic material within cells leading to the possibility of malignant disease even with very small exposures.

7.3 Standard and Objective for 1,3-Butadiene

The air quality standard that has been adopted is for an ambient air concentration for 1,3-Butadiene of 2.25ug/m^3 measured as a running annual mean, with an objective that the standard be achieved by 31 December 2003.

7.4 The National Perspective

Measured concentrations of exceedences of 1,3-Butadiene at UK national network urban background/centre and roadside sites are already below the 2.25ug/m^3 objective. The continued introduction of vehicle catalysts and improvements to vehicle fuels are expected to further reduce levels and these measures are expected to achieve the objectives before the end of 2003.

7.5 Results of Round 1 review of 1,3-Butadiene

The first round of review and assessments suggested that there was little likelihood of any sites or road links within the Borough exceeding the standards or objectives.

7.6 Updating and Screening Assessment for 1,3-Butadiene

The Updating and Screening Assessment is based on the guidance and checklists provided in Technical Guidance LAQM. TG(03) and the results are produced in Table 4 below.

Table 4

Data to be assessed	Work undertaken	Comments
Monitoring: (A) Monitoring data	Collate all 1,3-Butadiene monitoring data	No monitoring has been undertaken for either round 1 or round 2 reviews and assessments
Industrial Sources (B) New Industrial Sources	Identify any processes likely to emit significant quantities of 1,3-Butadiene.	No new processes have been established in this area that use or emit 1,3-Butadiene.
(C) Industrial sources with substantially increased emissions.	Determine any sources identified in the first round that may have increased emissions.	No processes were identified in the first round that emit significant quantities of 1,3-Butadiene.

7.7 Conclusion

As there are no relevant industrial processes as described in LAQM. TG(03) it is unlikely that the standards and objectives will be exceeded. It is therefore not proposed to proceed to a Detailed Assessment for 1,3-Butadiene.

8 Second Round Review of Lead

8.1 Introduction

Lead is the most widely used non-ferrous metal and has a large number of industrial applications. The largest use is in the manufacture of batteries, but it is also used as a pigment in paints and glazes, in radiation shielding, tank lining and piping. Lead was also used as an additive in petrol in the form of tetra-ethyl lead, which was used to improve the octane rating. In 1996, about 66% of the total annual UK emissions of lead arose from road transport while the metals industry contributed around 19%.

8.2 Health Effects

Exposure to high levels of lead may result in toxic biological effects, which in turn cause problems in the synthesis of haemoglobin, effects on the kidneys, gastrointestinal tract, joints and reproductive system and acute or chronic damage to the nervous system. A greater cause for concern is the possible effect on brain development in children associated with the increase in blood lead levels.

8.3 Standard and Objective for Lead

The air quality standard that has been adopted for lead is for an annual mean concentration of 0.5ug/m^3 with an objective that the standard be achieved by the end of 2004. In addition, a lower air quality objective of 0.25ug/m^3 has been set to be achieved by the end of 2008.

8.4 The National Perspective

The sale of leaded petrol was banned in Britain on 1 January 2000. Emissions are now restricted to industrial sources as described above. Measurements of lead at UK national network monitoring sites showed that concentrations at all background and roadside sites are well below objectives for both 2004 and 2008.

8.5 Results of Round 1 review of lead

The first round of review and assessments suggested that there was little likelihood of any sites or road links within the Borough exceeding the standards or objectives. Monitoring around the largest iron foundry in the Borough showed no indication that the objectives would be exceeded. This site has now closed, together with the largest non – ferrous foundry. All other metal melting processes are conducted on a very small scale and unlikely to produce significant emissions.

8.6 Updating and Screening Assessment for lead

The Updating and Screening Assessment is based on the guidance and checklists provided in Technical Guidance LAQM. TG(03) and the results are produced in Table 5 below.

Table 5

Data to be assessed	Work undertaken	Comments
Monitoring:		
(A) Monitoring data	Collate all lead monitoring data	Limited monitoring was undertaken for round 1 review, but data showed no likelihood of exceedences. No round 2 monitoring undertaken.
Industrial Sources		
(B) New Industrial Sources	Identify any processes likely to emit significant quantities of lead.	No new processes have been established in this area that use or emit lead.
(C) Industrial sources with substantially increased emissions.	Determine any sources identified in the first round that may have increased emissions.	No sites within the area have substantially increased emissions. Also, the two largest ferrous and non-ferrous metal foundries in the area have now closed. All others have furnaces with melting capacities <0.5 tonnes.

8.7 Conclusion

As there are no relevant industrial processes as described in LAQM. TG(03) it is unlikely that the standards and objectives will be exceeded. It is therefore not proposed to proceed to a Detailed Assessment for lead.

9 Second Round Review of Sulphur Dioxide

9.1 Introduction

The predominant source of sulphur dioxide in the UK is the combustion of fossil fuels, particularly coal and oil. Sulphur dioxide dissolves readily in water and is easily converted to sulphuric acid. Sulphates may also remain in the atmosphere as particles, contributing to the airborne concentration of PM_{10} (Particulate Matter less than 10 microns in diameter). In 2000, around 71% of the total annual UK emissions of SO_2 arose from fossil fuelled power stations while a significant proportion came from other industrial sources. A small contribution is also generated from the burning of fossil fuels on domestic appliances and from road transport. The highest levels are therefore most likely to occur downwind of the above sources and, in the case of power stations, at distances of up to 75 kms.

9.2 Health Effects

Sulphur dioxide is an acidic irritant which, when inhaled in high concentrations, may cause breathing difficulties in people exposed to it. Studies have shown that healthy adults inhaling concentrations of up to 8000 parts per billion continuously for a period of five days, showed only minor changes in lung function. Effects are more likely to be experienced by people suffering from asthma or chronic lung disease. These individuals often already have narrowed airways, and any further narrowing will have a disproportionately large affect on their ease of breathing. The prevalence of asthma among children is rising and chronic lung disease, due to smoking, is common among older people.

9.3 Standard and Objective for Sulphur Dioxide

The air quality standard that has been adopted for sulphur dioxide is for a 15 - minute mean concentration of 266ug/m^3 with an objective that the standard is not to be exceeded more than 35 times per year by the end of 2005. Additional objectives have been set in accordance with EU limit values. These are for a 1 – hour mean objective of 350ug/m^3, to be exceeded no more than 24 times per year, and a 24 – hour objective of 125ug/m3, to be exceeded no more than 3 times per year, to be achieved by the end of 2004.

9.4 The National Perspective

Monitoring results for the period 1999 – 2001 showed that levels of sulphur dioxide have fallen at all measurement sites. The objectives were only exceeded once; this was at the site in Belfast which has particular problems with the burning of coal on domestic fires. Local exceedences may occur in the vicinity of small combustion plant and in areas where coal is the predominant fuel for domestic heating.

9.5 Results of Round 1 review of Sulphur Dioxide

The round 1 review showed that the majority of industrial processes within the Borough either burn natural gas, electricity or gas-oil and were therefore unlikely to lead to exceedences. The issue of domestic coal burning was investigated and comparison made with 8 – port bubbler results for the town of Alfreton which showed

that the maximum daily recorded mean level was approximately 67ug/m^3, below the guidance level where exceedences would be expected.

9.6 Updating and Screening Assessment for Sulphur Dioxide

The Updating and Screening Assessment is based on the guidance and checklists provided in Technical Guidance LAQM.TG(03) and the results are produced in Table 6 below.

Table 6

Data to be assessed	Work undertaken	Comments
Monitoring:		
(A) Monitoring data	Collate all sulphur dioxide monitoring data	Monitoring ongoing using 8 – port bubbler (acidity). Data used in round 1 review, but showed no likelihood of exceedences. Round 2 - monitoring undertaken again with 8 - port. Data for 2001 and 2002 show max daily mean to be 49*1.25= **61.25ug/m^3** (2001) and 56*1.25= **70 ug/m^3** (2002).
(B) Monitoring within AQMA	No AQMA declared	
Industrial Sources		
(C) New Industrial Sources	Identify any processes likely to emit significant quantities of sulphur dioxide.	No new industrial sources likely to emit SO_2 have been identified.
(D) Industrial sources with substantially increased emissions.	Determine any sources identified in round 1 that may have increased emissions.	Sources identified in round 1 were found not to be likely to lead to exceedences. No processes have substantially increased emissions.
(E) Domestic coal burning.	Identify areas of significant coal burning.	Monitoring undertaken at Alfreton using 8-port to evaluate coal emissions as round 1. Results are as follows. Data for 2001 and 2002 show max daily mean to be 49*1.25= **61.25ug/m^3** (2001) 56*1.25= **70 ug/m^3** (2002). See Appendix 4. LAQM.TG(03) advises where max daily mean (multiplied by 1.25) < 80ug/m^3 there is no likelihood of exceedence.

(F) Small boilers >5Mw.	Collate data on small oil/coal fired boilers.	From round 1, Stevensons Dyers at Bullbridge had heavy fuel oil fired boiler plant in the range 5Mw – 20Mw. These have now been converted to gas firing with diesel back up so are not likely to lead to exceedences.
(G) Shipping	N/A	N/A
(H) Railway locomotives	Identify locations where stationary for>15 mins.	No locations identified – transit stations only.

9.7 Conclusion

As shown, there are no relevant industrial processes as described in LAQM. TG(03). Monitoring results again show that there are not likely to be exceedences due to domestic coal burning (the 8-port is located in an area of dense housing in one of the largest towns and not within a smoke control area). Results for 1998/99/00 showed an overall max daily mean value for the three years of 67ug/m^3 (uncorrected) while results for 2001/02 are 49 and 56ug/m^3 respectively. When corrected this gives values of 61.25 and 70ug/m^3 respectively. This is well below the corrected level of 80ug/m^3 given in the guidance below which exceedences are not expected.

The only boiler plant in the range 5 – 20Mw being fired by oil or coal has now been converted to gas firing. In light of the above information it is unlikely that the standards and objectives will be exceeded. It is therefore not proposed to proceed to a Detailed Assessment for sulphur dioxide.

10 Second Round Review of Particulate Matter (PM_{10})

10.1 Introduction

PM_{10} is defined as the mass fraction of particles that are below 10 μm in diameter. This size fraction has been associated with adverse health effects and once emitted, may remain in the atmosphere for many days and travel over great distances. PM_{10} arises from many sources and consists of both primary and secondary particles. Primary particles originate from sources such as wind blown soils, diesel exhausts, mining and quarrying, burning of fossil fuels and a variety of natural spores and pollens. Secondary particles may be formed from the growth in the atmosphere of molecules of sulphates and nitrates. All these sources contribute to the overall level of PM_{10} in the atmosphere.

10.2 Health Effects

In the 1950's and '60's, particulates, in combination with sulphur dioxide, were responsible for the notorious city smogs. These particulates have a well-recognised association with a range of illnesses and effects in connection with the cardiovascular system, asthma and mortality. A wide variety of natural and synthetic particles can cause adverse health effects, although, in general, particles smaller than about 10 μm are most likely to reach the lung.

10.3 Standard and Objective for PM_{10}

Two air quality objectives have been adopted which are equivalent to the EU Stage 1 Limit Values in the first Air Quality Daughter Directive. The objectives are 40ug/m^3 as an annual mean and 50ug/m^3 as a fixed 24-hour mean to be exceeded on no more than 35 days per year, to be achieved by the end of 2004.

10.4 The National Perspective

Between 1990 and 1999, emissions of particles from the transport and industrial sectors fell by almost 40%. Further reductions are expected in future years as a result of agreed additional policies or policies still under discussion. Data at the UK National Monitoring Network sites show that concentrations are generally well below the 2004 annual mean objective with the exception of a London kerbside site.

10.5 Results of Round 1 review of PM_{10}

The round 1 review identified Part A and B sites, domestic coal burning and road links >5000 vehicles per day as potential sources. The Part A and B sites were evaluated using the guidance and considered not to be likely to cause exceedence of the objectives. Areas of domestic coal burning were assessed using a combination of black smoke data and gravimetric 'M' type samplers which showed levels below the objectives. Road links were screened using DMRB which also showed there was little likelihood of exceedence.

10.6 Updating and Screening Assessment for PM_{10}

The Updating and Screening Assessment is based on the guidance and checklists provided in Technical Guidance LAQM.TG(03) and the results are produced in Table 7 below.

Table 7

Data to be assessed	Work undertaken	Comments
Monitoring:		
(A) Monitoring data outside an AQMA.	Collate all monitoring data.	Limited monitoring was undertaken for round 1 review, but data showed no likelihood of exceedences. No round 2 monitoring undertaken.
(B) Monitoring within AQMA.	No AQMA declared	
Road Traffic:		
(C) Junctions.	Identify busy junctions with relevant exposure.	Relevant junctions are listed with DMRB calculations in **Section 10.7.**
(D) Roads with high flows of buses and/or HGV's.	Identify all roads where AADT > 20% HGV.	No road links within area have AADT where HGV's >20%. See **Appendices 1 & 2.**
(E) New roads since round 1.	Identify new road links.	No new roads have been constructed since round 1 review.
(F) Roads close to objective in round 1.	Identify any roads where more than 30 exceedences of 50ug/m^3 predicted in round 1.	No road links were identified (using DMRB) as having significant potential to exceed objectives.
(G) Roads with significantly changed traffic flows	Identify any roads with AADT > 10,000 where large increase in flow.	Comparison of traffic flows between 2003 levels corrected to 2005 and 1996 flows corrected to 2005 for round 1 show that the predicted flows were **overestimated** and there are no road links that have been subject to 'large' increases in flow.

Industrial Sources		
(H) New Industrial Sources	Identify any new processes likely to emit significant quantities of PM_{10}.	No new processes have been identified since round 1 which are listed in Annex 2 - Appendix E.
(I) Industrial sources with substantially increased emissions.	Determine any sources identified in the first round that may have increased emissions.	No sources have been identified that have increased emissions. Several of the sources assessed in round 1 have also now closed. Notably – the only 2 potentially significant foundries and the operating opencast site.
Domestic Sources		
(J) Domestic coal burning.	Identify areas of significant coal burning.	No areas were identified as having higher incidence of coal burning in any parts of the Borough. All non-smoke control areas were of similar incidence. Further information is given in **Section 10.8.**
Other Sources		
(K) Quarries and Opencast Coal Sites.	Establish whether there is significant exposure 'near' to the dust sources.	There is currently 1 quarry and 1 opencast coal site either operating or in the process of beginning operations. Further information is given in **Section 10.9**
(L) Aircraft	Identify any relevant exposure.	There are no airports within 500m of this Borough.

10.7 Significant Junctions and DMRB Road Traffic calculations

The following road junctions were identified as having an AADT > 10,000 and had not specifically been considered in the round 1 review:

- Codnor Market Place – A610/A6007
- **Ripley – A38/A610***
- Safeway Island, Belper – A6/A609
- Belper Triangle – A6/A517
- Smalley – A608/A609
- Kilburn – A38/B6179
- **Alfreton – A38/A61***
- **Langley Mill By Pass A608/A610***
- Heanor Market Place – A608/A6007

The three junctions highlighted in bold and marked with an asterisk have no relevant receptors within 10 metres of the roadside. The remaining junctions (plus 2 listed by Derbyshire County Council in supplied information) have been assessed using the revised DMRB model and the output screen is reproduced below. This shows all junctions are likely to be well below the objectives for 2004.

All receptors

Receptor number	Name	Year	PM_{10}	
			Annual mean µg/m^3	Days >50µg/m^3
1	Codnor Market	2004	25.42	13.41
2	Ambergate	2004	26.03	14.99
3	Safeway Belper	2004	23.13	8.35
4	Belper Triangle	2004	22.31	6.84
5	Smalley	2004	24.93	12.22
6	Heanor - Ilkeston Rd	2004	26.29	15.69
7	Duffield Broadway	2004	23.86	9.83
8	Four Lane Ends	2004	22.52	7.21

10.8 Domestic Coal Burning

In accordance with the guidance in Box 7.4, two telephone sample surveys of 400 houses have been conducted as part of an energy efficiency survey. This queried whether solid fuel was used for primary or secondary heating. The surveys were done in June 2001 and August 2002. Results are reproduced below and show a continued decline in solid fuel usage. The surveys show:

	2001 %	Previous %
Dwellings with gas central heating	83	82.25
Dwellings with coal central heating	2.75	3.5
Dwellings with gas room heaters	4.75	5.0
Dwellings with coal room heaters	1.25	1.25

	2002 %	Previous %
Dwellings with gas central heating	85	83.75
Dwellings with coal central heating	2.0	2.75
Dwellings with gas room heaters	3.5	3.5
Dwellings with coal room heaters	1.75	2.0

(the balance being electric or oil firing units)

The background concentrations taken from the air quality web site show PM_{10} levels in the most densely populated town centres ranging from 20.2 to 22.6ug/m^3. From the nomogram in Figure 8.8 of the guidance, assuming the worst-case scenario, this would give a critical density of 175 houses per 500m x 500m area. Below this level, exceedences of the objectives are unlikely.

From the above survey results, an average solid fuel use of 3.75% (2002 – central heating + room heaters) when related to a critical density of 175 houses means that (from the following formula) for the critical density to be exceeded, a total number of houses in the 500m x 500m area would need to be in excess of 4,667 properties. From our GIS system, the most densely populated 500m x 500m areas in the Borough contain approximately 2000 to 2200 houses. Therefore the density of coal burning properties is not considered likely to cause exceedences of the objectives.

Total no of houses(x)*3.75% = 175. Therefore 175*100/3.75=X ie. X=4667 houses.

10.9 Quarries and Opencast Sites

Crich Quarry – this is a limestone quarry operated by Aggregate Industries UK Ltd. The quarry is a small-scale operation with a throughput of <300,000 tonnes per year. It has one processing area which incorporates a two stage crushing system and associated screens. Fugitive emissions from the site do not lead to regular instances of complaint and there have been no complaints at all within the past three years. The single extracted point source for particulate emissions (bag filter) gives normal levels of 1mg/m^3 or less. The nearest residential property is an isolated dwelling some 300 metres from the processing area with the next residential area starting at 600 metres distance. Annual average background concentrations for 2004 given in the website data show predicted levels of 19.8ug/m^3. Therefore, in accordance with the guidance in LAQM.TG(03), particulate emissions from the quarry are unlikely to lead to exceedences of the objectives.

Carrington Farm opencast site – all coaling operations and landscaping is now complete.

Forge and Monument opencast site – site stripping and bunding operations only started during 2003 and coal processing/handling has yet to start. However, the nearest relevant location to the proposed processing area is some 400 metres away. It is not possible to determine the likelihood of complaints at this time as the site is not in full operation. The background level according to the air quality website is quoted as 22.2um/m^3. It is not proposed to consider this site further at present although a 'watching brief' will be kept and the situation reviewed if complaints are received once full operations are underway.

10.10 Conclusion

As shown, there are no relevant industrial processes as described in LAQM. TG(03) apart from a potential opencast coal site, although the distance to relevant locations means that complaints are unlikely if the dust control plan is adhered to. The density of coal burning housing in areas not subject to smoke control orders is well below the level likely to lead to exceedences of the objective with the usage of coal as a fuel for both central heating and room heaters continuing to decline over the past few years. Road traffic effects have been evaluated using DMRB and found to be below the criteria listed in the guidance.

The above information shows that the conclusions reached in the round 1 review are still valid and there are unlikely to be any exceedences of the objectives adopted for 2004.

11 Second Round Review of Nitrogen Dioxide (NO_2)

11.1 Introduction

Nitrogen dioxide (NO_2) is a gas produced by the reaction of nitrogen and oxygen in combustion processes. Along with nitric oxide (NO) they are referred to as NO_x. While all combustion processes produce some NO_x, only NO_2 is associated with adverse health effects. Although there are numerous natural sources of oxides of nitrogen, by far the largest amount is produced as a consequence of the combustion of fossil fuels i.e. petrol, oil, coal and gas. Nitrogen dioxide undergoes chemical reactions in the atmosphere that convert it to nitric acid and nitrates, both of which can be removed by rain. Nitrates may also remain in the atmosphere as particles, contributing to the airborne concentration of PM_{10} (Particulate Matter less than 10 microns in diameter.

11.2 Health Effects

Nitrogen dioxide is an oxidising agent and as such has the potential to damage cell membranes and proteins. At relatively high concentrations it can cause acute inflammation of the airways. In addition, short-term exposure can affect the immune cells of the airways in a manner that might predispose people to an increased risk of respiratory infections. Levels of nitrogen dioxide required to produce an effect on people with healthy lungs are well above what may be experienced even during extreme pollution episodes. However, in people with asthma, some studies have shown changes in lung function at lower levels. It may also increase sensitisation to other allergens.

11.3 Standard and Objective for NO_2

The Government and Devolved Administrations have adopted two air quality objectives for nitrogen dioxide, an annual mean concentration of 40ug/m^3 and a 1-hour mean concentration of 200ug/m^3 not to be exceeded more than 18 times per year. The objectives are to be achieved by 2005.

11.4 The National Perspective

The contribution of road transport to nitrogen oxides emissions has declined significantly in recent years as a result of national policy measures and further reductions are expected up until 2010. Urban traffic NO_x emissions are expected to fall by about 20% between 2000 and 2005, and by 46% between 2000 and 2010.

Concentrations of NO_x measured at UK National Network sites show widespread exceedences of the annual mean objective at roadside sites throughout the UK with exceedences also reported at urban background locations in major conurbations. Exceedences of the 1-hour objective appear to vary significantly due to meteorological conditions but exceedences have generally only been recorded at roadside or kerbside locations in close proximity to heavily trafficked roads in major conurbations.

11.5 Results of Round 1 review of NO_2

No industrial sites were identified that would be likely to cause exceedence of the 2005 objectives. All Part A sites with potential to produce significant emissions were within neighbouring districts at a distance unlikely to lead to exceedences within this Borough. A Stage 3 assessment was conducted for a number of road links within the Borough using both passive and continuous monitoring methods and the report was reproduced on the UWE website of 'best practice' guidance. The road links considered were along the A38 and A6 trunk roads and the A610.

11.6 Updating and Screening Assessment for NO_2

The Updating and Screening Assessment is based on the guidance and checklists provided in Technical Guidance LAQM. TG(03) and the results are produced in Table 8 below.

Table 8

Data to be assessed	Work undertaken	Comments
Monitoring:		
(A) Monitoring data	Collate all monitoring data	Stage 3 report prepared for round 1 review included monitoring using chemiluminescent continuous analyser and bias adjusted diffusion tubes, but data showed no likelihood of exceedences on any road links. No round 2 monitoring undertaken.
(B) Monitoring within AQMA.	No AQMA declared.	N/A
(C) Narrow congested streets with properties located close to kerb.	Check whether these locations were considered in round 1 review.	Addressed in round 1 review (Stage 3 report) with continuous monitor and diffusion tubes. No likelihood of exceedences predicted.
(D) Junctions.	Check whether junctions were addressed in round 1.	The major junctions (Nottingham Road Ripley and Codnor Market Place) which have relevant exposure within 10m of the kerb were also addressed in round 1 (Stage 3 report). No exceedences likely.
(E) Busy streets where people may spend 1-hour or more close to traffic.	Check whether relevant locations were assessed in round 1.	The only road link >10,000 vehicles per day with potential exposure for 1-hour is the A6 trunk road in Belper town centre. This was specifically targeted in round 1 (Stage 3 report).

(F) Roads with high flows of buses and/or HGV's.	Check whether road links with %HGV >25% were addressed in round 1 review.	No road links identified in traffic survey issued by Derbyshire County Council for this Borough that have HGV% > 25% (see Appendices 1/2).
(G) New or proposed roads since round 1 review.	Check for new roads.	No new or proposed roads since round 1.
(H) Roads close to objective in round 1.	Identify any roads where annual mean concentration above 36ug/m^3 but below 40um/m^3 at round 1.	All predicted levels validated by monitoring at round 1 (Stage 3 report) for relevant locations were < 36ug/m^3.
(I) Roads with significantly changed traffic flows.	Identify any roads with AADT > 10,000 that have experienced 'large' increases in traffic.	Comparison of traffic flows between 2003 levels corrected to 2005 and 1996 flows corrected to 2005 for round 1 show that the predicted flows were **overestimated** and there are no road links that have been subject to 'large' increases in flow.
(J) Bus stations.	Identify any non-enclosed bus stations with relevant exposure within 10m where >1000 bus movements/day	Bus station in Belper is enclosed with no residential properties within 10m and <1000 movements/day. Bus station in Alfreton – no relevant exposure within 10m and <1000 movements/day.
Industrial Sources		
(K) New Industrial Sources	Identify any new processes likely to emit significant quantities of NO_X.	No new processes identified.
(L) Industrial sources with substantially increased emissions.	Determine any sources identified in round 1 that may have increased emissions.	No industrial sources were identified in round 1 review that were likely to cause exceedences.
(M) Aircraft.	Identify airports with emissions at <200m.	No airports in this Borough.

11.7 Conclusion

The above information shows that the conclusions reached in the round 1 review are still valid and there are unlikely to be any exceedences of the objectives adopted for 2005. As shown, there are no relevant industrial processes to be considered as described in LAQM. TG(03).

The Stage 3 review in round 1 used continuous monitoring as well as bias corrected diffusion tubes to determine actual pollutant levels at all the locations likely to produce the highest levels of nitrogen dioxide in the Borough. The highest level was recorded at the roundabout at Nottingham Road Ripley where the diffusion tube by necessity was located some 3-4 metres from the building façade but, when bias corrected and not projected forward to 2005, was recording an annual mean of 40ug/m^3. When re-calculated to 2005 this value fell to 35ug/m^3. Clearly, with the levels of NO_2 expected to continue to fall leading up to 2005, it is again unlikely that there will be exceedences of the objectives in this area. It is not proposed therefore to undertake a detailed review for nitrogen dioxide.

APPENDIX 1

Updated Traffic Flows (2003)

Amber Valley B C 2003

Road No	Location	24hr AADT 2003	%HDV
A6	Milford south west of Chevin Rd	11469	7%
A6	Duffield near Burley Meadows Farm	20021	6%
A38	Between Little Eaton and Coxbench	44753	13%
A38	Between Watchorn and Nix's Hill	44963	15%
A38	Between Watchorn and Hartshay	45241	14%
A38	Between Hartshay and Coxbench	41639	13%
A52	Brailsford north west of Windy Arbour	11020	10%
A61	Shirland between Park La and Hallfieldgate La	13377	6%
A61	Alfreton between Watchorn and Eachwell La	24386	5%
A61	Alfreton between B600 and B6025	14524	8%
A61	Alfreton between Eachwell La and Gooker La	17044	7%
A61	Stretton between Mickley La and Morton Rd	13059	7%
A609	West Hallam High La East North West of Strawsbridge	12625	4%
A609	Belper New Rd between Campbell St and Strutt St	13969	4%
A609	Belper Nottingham Rd near Rothwell La (one way)	12814	6%
A609	Horsley Woodhouse Main St between The Crescent and Golden Valley	10754	4%
A610	Ripley Bypass opposite Padley Hall	14218	6%
A610	Codnor Glasshouse Hill	17737	7%
A610	Woodlinkin Bypass outside disused open cast site	15223	8%
A615	Wingfield Rd near Leonard Cheshire home	10112	7%
A615	Oakerthorpe between Linbery Cl and Bunker Hill	10621	5%
A6007	Shipley between The Field and Pit La	11062	4%
A6007	Loscoe between Kirkman Rd and Sheldon Rd	11438	5%
B6179	Kilburn Toll Bar Signals	11599	6%
A6	Jtn Broadway Duffield		
	A6 North leg	17524	5%
	A6 South leg	20322	6%
	B5023 Broadway leg	5541	7%
A6	Jtn King St Duffield		
	A6 North leg	11599	6%
	A6 South leg	13656	6%
	King St leg	2236	2%
A610	Codnor Market Place jtn A6007/Woodlinkin Bypass		
	A610 Market Place leg	23834	7%
	A610 Nottingham Road leg	14643	7%
	A6007 Heanor Rd leg	11668	6%
A615	B5035/B6013 Four Lane Ends Oakerthorpe		
	A615 Matlock leg	10783	4%
	A615 Alfreton leg	9156	6%
	B6013 leg	4603	3%

Growth factors - 2000 to 2003 1.045, 2003 to 2005 1.030

APPENDIX 2

Traffic Flows (2000)

	Road Link.	Count Location	1996 AADT	2005 Ave	Veh/day	Backgr	D to Kerb	D to Centre	Av Spd	%cv
1	A38	East of Watchorn	42054	49620	2068	20	40	50	110	15
2	A38	Sth of A61 Alfreton	41953	49500	2063	20	40	50	110	15
3	A38	Sth of A610	37768	44570	1857	20	40	50	110	14
4	A61	Alfreton South	23769	28050	1169	20	20	25	48	5
5	A610	Codnor Gate	20324	23980	999	20	10	15	48	8
6	A61	Hall Street - Alfreton	20294	23950	998	20	10	15	48	8
7	A6	Burley Hill	18982	22400	933	20	20	25	75	8
8	A52	Markeaton	17658	20840	868	20	15	20	80	4
9	B600	Alfreton	15883	18740	781	20	10	15	60	12
10	A610	Buckland Hollow	15638	18450	769	20	15	20	60	12
11	A608	Langley Mill - Sedgwick St.	15218	17960	748	20	10	15	45	5
12	A6	Makeney - Milford	15000	17700	738	20	10	15	45	6
13	A61	Alfreton	14596	17220	718	20	10	15	45	13
14	A6	Belper - Bridge Street	14078	16610	692	20	5	10	45	6
15	B6441	Ripley	14008	16530	689	20	10	15	45	7
16	B6441	Ripley	13786	16270	678	20	10	15	45	6
17	A6007	Shipley - N of American Adv.	13567	16010	667	20	15	20	60	4
18	A610	Sawmills	12772	15070	628	20	10	15	60	14
19	A609	Belper	12684	14970	624	20	10	15	45	5
20	A610	Ripley By Pass	12399	14630	610	20	50	55	80	14
21	A610	Langley Mill By Pass	11941	14090	587	20	40	45	80	9
22	B6179	Ripley	11912	14060	586	20	5	10	60	4
23	B6179	Swanwick	11806	13930	580	20	15	20	60	5
24	B6179	Sth of Kilburn Crossroads	11632	13730	572	20	15	20	60	8
25	A6007	Shipley - American Adv.	11617	13710	571	20	15	20	60	4
26	B600	Somercotes	11580	13660	569	20	15	20	45	6
27	A6	Whatstandwell Bridge	11330	13370	557	20	15	20	75	15
28	A6	Whatstandwell	11138	13140	548	20	20	25	75	14
29	A6007	Codnor	11105	13100	546	20	10	15	45	5
30	A6	Belper Triangle	10808	12750	531	20	15	20	45	8
31	B6441	Nottingham Road Ripley	10772	12710	530	20	10	15	45	7
32	A608	Main Road - Smalley	10714	12640	527	20	10	15	45	5
33	B600	Alfreton	10368	12230	510	20	10	15	45	4
34	B6016	Swanwick	9812	11580	483	20	5	10	60	3
35	B6179	Swanwick	8934	10540	439	20	5	10	60	5
36	A608	Smalley	8627	10180	424	20	5	10	60	5
37	B5023	Idridgehay	8500	10030	418	20	15	20	75	6
38	A609	Belper - Openwoodgate	6077	7170	299	20	10	15	48	5
39	A609	Horsley Woodhouse	5284	6240	260	20	15	20	48	6
40	B6013	Belper	4861	5740	239	20	5	10	48	3
41	A517	Shottlegate	4430	5230	218	20	20	25	75	7

APPENDIX 3

Pollutant Background Levels

Background Pollutant Levels

X	Y	PM10 2001 ugm-3 grav. annual mean	PM10 2004 ugm-3 grav. annual mean	SO2 2001 ugm-3 annual mean	Benzene 2001 ugm-3 annual mean	Benzene 2003 ugm-3 annual mean	Benzene 2010 ugm-3 annual mean	CO 2001
426500	338500	19.2	18.4	4.21	0.322	0.286	0.228	0.271
427500	338500	19.3	18.5	4.32	0.338	0.3	0.239	0.278
427500	339500	19.5	18.6	4.33	0.356	0.316	0.251	0.285
427500	340500	19.5	18.6	4.34	0.351	0.312	0.248	0.283
427500	343500	21.6	20.4	4.72	0.651	0.572	0.449	0.399
427500	344500	21.7	20.5	5.04	0.661	0.582	0.457	0.402
427500	348500	19.8	18.8	4.79	0.371	0.331	0.265	0.287
427500	350500	20	19	4.76	0.398	0.354	0.283	0.297
428500	338500	19.4	18.6	4.33	0.355	0.315	0.25	0.285
428500	339500	19.5	18.7	4.34	0.37	0.328	0.26	0.291
428500	340500	19.5	18.7	4.34	0.363	0.322	0.256	0.288
428500	342500	19.7	18.8	4.64	0.363	0.323	0.257	0.287
428500	343500	21.7	20.4	4.72	0.659	0.58	0.454	0.403
428500	344500	21.8	20.6	4.87	0.669	0.589	0.462	0.406
428500	345500	21.9	20.7	5.01	0.669	0.588	0.462	0.406
428500	347500	21.7	20.5	4.88	0.666	0.586	0.461	0.404
428500	348500	19.8	18.9	4.79	0.377	0.335	0.268	0.29
428500	349500	19.9	18.9	4.75	0.402	0.357	0.285	0.299
428500	350500	20	19	4.85	0.401	0.356	0.285	0.298
428500	351500	20.5	19.4	4.82	0.452	0.401	0.321	0.316
429500	337500	19.4	18.6	4.34	0.363	0.322	0.255	0.287
429500	338500	19.5	18.7	4.33	0.359	0.319	0.252	0.286
429500	339500	19.6	18.7	4.33	0.369	0.327	0.259	0.29
429500	340500	19.5	18.7	4.34	0.361	0.32	0.254	0.287
429500	341500	19.5	18.7	4.36	0.355	0.315	0.25	0.283
429500	342500	19.5	18.6	4.63	0.351	0.312	0.248	0.282
429500	343500	19.7	18.8	4.69	0.378	0.335	0.267	0.292
429500	344500	19.8	18.9	4.74	0.387	0.344	0.274	0.295
429500	345500	19.9	19.1	4.82	0.387	0.344	0.274	0.294
429500	346500	20	19	4.88	0.39	0.346	0.276	0.295
429500	347500	19.9	19	4.77	0.391	0.347	0.277	0.295
429500	348500	19.8	18.9	4.77	0.378	0.336	0.269	0.289
429500	349500	19.9	18.9	4.74	0.402	0.358	0.286	0.298
429500	350500	20	19	4.74	0.401	0.356	0.286	0.297
429500	351500	20.5	19.4	4.77	0.451	0.401	0.321	0.315
430500	337500	19.8	19	4.49	0.422	0.374	0.292	0.31
430500	338500	19.7	18.9	4.36	0.393	0.349	0.275	0.299
430500	339500	19.7	18.9	4.34	0.392	0.348	0.275	0.299
430500	340500	19.7	18.9	4.36	0.381	0.339	0.268	0.294
430500	341500	19.7	18.9	4.37	0.374	0.333	0.264	0.29
430500	342500	19.6	18.8	4.63	0.369	0.328	0.261	0.288
430500	343500	19.9	19	4.66	0.395	0.35	0.279	0.298
430500	344500	20	19.1	4.73	0.402	0.357	0.284	0.3
430500	345500	20.1	19.2	4.75	0.401	0.356	0.284	0.299

430500	346500	20.1	19.2	4.79	0.403	0.358	0.285	0.3
430500	347500	20.1	19.1	4.73	0.403	0.358	0.286	0.299
430500	348500	19.9	19	4.72	0.388	0.345	0.276	0.293
430500	349500	20	19	4.76	0.41	0.364	0.291	0.301
430500	350500	20.1	19	4.73	0.407	0.362	0.29	0.299
430500	351500	20.5	19.4	4.76	0.456	0.405	0.324	0.317
430500	352500	20.8	19.6	4.8	0.493	0.438	0.35	0.33
430500	353500	20.8	19.7	4.99	0.478	0.425	0.34	0.324
431500	337500	20.2	19.4	4.5	0.496	0.439	0.342	0.333
431500	338500	20.1	19.2	4.38	0.452	0.401	0.314	0.318
431500	339500	19.9	19.1	4.37	0.431	0.382	0.3	0.312
431500	340500	19.9	19	4.48	0.414	0.367	0.291	0.304
431500	341500	19.8	18.9	4.39	0.399	0.355	0.281	0.298
431500	342500	19.6	18.8	4.63	0.388	0.345	0.274	0.295
431500	343500	19.8	18.9	4.66	0.412	0.366	0.291	0.304
431500	344500	19.9	19	4.71	0.416	0.369	0.294	0.305
431500	345500	19.9	19	4.74	0.414	0.368	0.293	0.304
431500	346500	19.9	19	4.77	0.412	0.366	0.292	0.302
431500	347500	19.9	19	4.71	0.41	0.365	0.291	0.301
431500	348500	19.8	18.8	4.72	0.391	0.348	0.279	0.293
431500	349500	19.8	18.9	4.74	0.404	0.359	0.288	0.298
431500	350500	19.9	18.9	4.73	0.398	0.354	0.284	0.295
431500	351500	19.9	18.9	4.75	0.4	0.357	0.287	0.296
431500	352500	20.1	19	4.8	0.406	0.361	0.29	0.298
431500	353500	20.1	19.1	4.85	0.392	0.35	0.282	0.293
431500	354500	20.5	19.4	4.9	0.442	0.393	0.315	0.313
432500	337500	20.9	20	5.25	0.604	0.533	0.414	0.37
432500	338500	20.7	19.8	5.15	0.545	0.482	0.375	0.351
432500	339500	20.4	19.5	5.25	0.5	0.443	0.347	0.336
432500	340500	20.3	19.4	5.2	0.472	0.418	0.33	0.325
432500	341500	20.3	19.3	5.17	0.45	0.399	0.315	0.318
432500	342500	20.1	19.1	4.78	0.431	0.382	0.302	0.312
432500	343500	20.3	19.3	4.79	0.453	0.402	0.318	0.321
432500	344500	20.3	19.4	4.8	0.457	0.406	0.322	0.321
432500	345500	20.5	19.5	4.97	0.473	0.42	0.334	0.324
432500	346500	20.4	19.5	4.87	0.473	0.42	0.335	0.323
432500	347500	20.4	19.4	4.77	0.469	0.417	0.333	0.32
432500	348500	20.3	19.3	4.79	0.448	0.4	0.32	0.312
432500	349500	20.3	19.3	4.78	0.455	0.406	0.325	0.314
432500	350500	20.2	19.1	4.75	0.426	0.379	0.304	0.306
432500	351500	20.2	19.1	4.78	0.42	0.374	0.301	0.304
432500	352500	20.2	19.2	4.62	0.423	0.377	0.303	0.305
432500	353500	21	19.8	4.67	0.408	0.364	0.293	0.3
432500	354500	21.2	19.9	4.7	0.432	0.384	0.309	0.309
432500	356500	21.4	20.1	4.82	0.428	0.381	0.307	0.308
432500	357500	21.4	20.1	4.93	0.433	0.386	0.31	0.31
432500	358500	20.9	19.7	4.96	0.449	0.4	0.322	0.312
433500	340500	21	20	5.24	0.522	0.462	0.362	0.344
433500	341500	20.7	19.7	5.25	0.495	0.439	0.345	0.335
433500	342500	20.4	19.4	4.86	0.468	0.415	0.327	0.325
433500	343500	20.6	19.6	4.95	0.484	0.429	0.339	0.332

433500	344500	20.7	19.7	4.91	0.488	0.433	0.344	0.331
433500	345500	20.9	19.9	4.93	0.514	0.457	0.364	0.337
433500	346500	20.9	19.8	5.03	0.517	0.46	0.366	0.337
433500	347500	20.9	19.8	4.94	0.515	0.458	0.367	0.334
433500	348500	20.7	19.7	4.88	0.495	0.442	0.355	0.326
433500	349500	20.7	19.7	4.84	0.497	0.443	0.355	0.327
433500	350500	20.5	19.4	4.81	0.459	0.409	0.329	0.317
433500	351500	20.5	19.4	4.83	0.449	0.401	0.323	0.314
433500	352500	20.5	19.4	4.62	0.449	0.4	0.322	0.314
433500	353500	21.2	20	4.66	0.429	0.383	0.309	0.307
433500	354500	21.3	20.1	4.71	0.449	0.4	0.322	0.315
433500	355500	21.4	20.2	4.76	0.441	0.393	0.317	0.312
433500	356500	21.5	20.2	4.74	0.438	0.391	0.315	0.311
433500	357500	21.4	20.2	4.85	0.439	0.391	0.315	0.312
433500	358500	20.8	19.7	4.89	0.44	0.392	0.316	0.311
434500	341500	21	20	5.28	0.523	0.463	0.362	0.348
434500	342500	20.6	19.6	5.18	0.492	0.436	0.343	0.335
434500	343500	20.7	19.7	9.18	0.489	0.434	0.344	0.332
434500	344500	20.7	19.7	5.68	0.487	0.433	0.345	0.329
434500	345500	20.9	19.9	5.24	0.517	0.46	0.368	0.334
434500	346500	20.9	19.9	5.59	0.522	0.465	0.372	0.335
434500	347500	20.9	19.8	7.09	0.519	0.463	0.372	0.333
434500	348500	20.8	19.8	5.8	0.536	0.479	0.39	0.329
434500	349500	20.8	19.8	5.04	0.536	0.479	0.39	0.329
434500	350500	20.6	19.5	4.97	0.491	0.439	0.359	0.317
434500	351500	20.5	19.5	4.98	0.478	0.428	0.35	0.313
434500	352500	20.5	19.5	4.68	0.474	0.424	0.346	0.312
434500	353500	21.2	20	4.76	0.439	0.393	0.318	0.308
434500	354500	21.4	20.2	4.84	0.456	0.407	0.329	0.315
434500	355500	21.4	20.2	4.77	0.447	0.399	0.323	0.312
434500	356500	21.5	20.2	4.73	0.448	0.4	0.324	0.312
434500	357500	21.5	20.2	4.83	0.447	0.399	0.323	0.312
434500	358500	20.9	19.7	4.87	0.45	0.401	0.323	0.314
435500	341500	21.2	20.2	5.36	0.547	0.484	0.378	0.359
435500	343500	21.1	20	5.41	0.521	0.462	0.364	0.348
435500	344500	21.1	20	5.38	0.524	0.465	0.368	0.347
435500	345500	21.3	20.3	9.01	0.554	0.492	0.391	0.353
435500	346500	21.3	20.3	5.78	0.558	0.496	0.395	0.353
435500	347500	21.2	20.2	6.58	0.553	0.493	0.394	0.349
435500	348500	21.2	20.1	5.76	0.567	0.507	0.411	0.343
435500	349500	21.1	20.1	5.3	0.561	0.501	0.407	0.341
435500	350500	20.8	19.8	5.2	0.514	0.459	0.374	0.326
435500	351500	20.7	19.7	5.07	0.496	0.444	0.363	0.319
435500	352500	20.7	19.6	4.93	0.489	0.438	0.358	0.318
435500	353500	21.3	20.1	4.92	0.454	0.406	0.329	0.313
435500	354500	21.5	20.2	4.8	0.467	0.417	0.337	0.318
435500	355500	21.5	20.3	4.78	0.458	0.409	0.331	0.315
435500	356500	21.6	20.3	4.73	0.459	0.41	0.332	0.315
435500	357500	21.5	20.3	4.83	0.456	0.407	0.33	0.314
436500	343500	21.1	20.1	4.96	0.539	0.479	0.379	0.352
436500	344500	21.2	20.1	5.28	0.543	0.482	0.383	0.351

436500	345500	21.4	20.4	5.54	0.577	0.514	0.41	0.358
436500	346500	21.4	20.4	5.5	0.581	0.518	0.414	0.359
436500	347500	21.4	20.3	6.02	0.579	0.516	0.414	0.356
436500	348500	21.3	20.2	5.33	0.588	0.525	0.426	0.351
436500	349500	21.2	20.2	5.27	0.578	0.516	0.419	0.347
436500	350500	20.9	19.8	5.28	0.528	0.472	0.384	0.332
436500	351500	20.7	19.7	5	0.506	0.453	0.371	0.323
436500	352500	20.6	19.6	4.89	0.493	0.441	0.361	0.318
436500	353500	21.2	20	4.73	0.452	0.404	0.328	0.311
436500	354500	21.2	20	4.73	0.452	0.404	0.328	0.312
436500	355500	21.2	20	4.81	0.442	0.396	0.322	0.308
436500	356500	21.3	20.1	4.76	0.446	0.399	0.325	0.309
437500	343500	21.1	20.1	5.57	0.546	0.485	0.384	0.354
437500	344500	21.1	20	5.7	0.547	0.486	0.387	0.352
437500	345500	21.3	20.3	5.91	0.567	0.505	0.403	0.357
437500	346500	21.4	20.3	5.92	0.574	0.512	0.41	0.359
437500	347500	21.4	20.4	5.53	0.58	0.517	0.416	0.358
437500	348500	21.4	20.4	5.46	0.602	0.538	0.437	0.358
437500	349500	21.4	20.4	5.46	0.597	0.534	0.433	0.357
437500	350500	21.3	20.2	5.54	0.569	0.509	0.414	0.348
437500	351500	21.2	20.1	5.31	0.553	0.495	0.404	0.343
437500	352500	21	20	5.02	0.534	0.478	0.39	0.337
437500	353500	20.9	19.8	5.02	0.485	0.433	0.351	0.327
437500	354500	20.9	19.8	4.95	0.48	0.43	0.349	0.325
437500	355500	20.8	19.7	5.12	0.469	0.42	0.342	0.319
437500	356500	20.9	19.8	5.07	0.47	0.421	0.344	0.319
438500	343500	21.2	20.1	5.52	0.56	0.498	0.394	0.358
438500	344500	21.1	20.1	5.73	0.56	0.498	0.395	0.357
438500	345500	21.3	20.3	6.49	0.57	0.508	0.405	0.359
438500	346500	21.3	20.3	6.01	0.578	0.515	0.412	0.36
438500	347500	21.5	20.5	5.75	0.587	0.523	0.42	0.361
438500	348500	22.5	21.5	5.42	0.618	0.552	0.446	0.364
438500	349500	22.6	21.5	5.48	0.622	0.556	0.45	0.366
438500	350500	22.5	21.4	5.81	0.606	0.541	0.439	0.361
438500	351500	22.5	21.4	5.47	0.595	0.531	0.432	0.357
438500	352500	22.4	21.3	5.02	0.589	0.526	0.428	0.358
438500	353500	21.4	20.3	5.05	0.536	0.479	0.387	0.347
438500	354500	21.4	20.3	5.15	0.529	0.473	0.383	0.343
438500	355500	21.4	20.3	5.18	0.52	0.465	0.378	0.339
438500	356500	21.4	20.3	5.38	0.517	0.463	0.376	0.338
439500	343500	21.3	20.2	5.51	0.577	0.513	0.406	0.364
439500	344500	21.3	20.3	5.66	0.581	0.516	0.41	0.365
439500	345500	21.4	20.4	5.74	0.572	0.509	0.407	0.359
439500	346500	21.4	20.4	5.85	0.58	0.518	0.415	0.361
439500	347500	21.8	20.8	5.49	0.609	0.544	0.438	0.366
439500	348500	22.9	21.7	5.65	0.625	0.559	0.45	0.371
439500	349500	22.9	21.8	6.1	0.634	0.566	0.456	0.374
439500	350500	22.9	21.7	7.39	0.619	0.553	0.446	0.37
439500	351500	22.9	21.7	5.68	0.612	0.547	0.442	0.368
439500	352500	22.7	21.6	5.23	0.599	0.535	0.431	0.368
439500	353500	22	20.8	5.35	0.584	0.523	0.423	0.362

439500	354500	22.1	20.9	5.26	0.58	0.519	0.421	0.36
439500	355500	22.1	20.9	5.35	0.572	0.513	0.418	0.355
439500	356500	22	20.9	5.33	0.561	0.503	0.41	0.351
440500	343500	21.7	20.7	5.57	0.597	0.532	0.423	0.364
440500	344500	21.8	20.7	5.64	0.606	0.54	0.431	0.365
440500	345500	21.9	20.8	5.72	0.605	0.541	0.435	0.36
440500	346500	22	20.9	5.76	0.617	0.552	0.446	0.363
440500	347500	22.5	21.3	5.34	0.652	0.584	0.473	0.372
440500	348500	23.4	22.2	5.65	0.666	0.596	0.481	0.378
440500	349500	23.5	22.3	6.08	0.665	0.595	0.481	0.381
440500	350500	23.5	22.4	7.04	0.656	0.587	0.475	0.378
440500	351500	23.7	22.6	6.12	0.66	0.591	0.479	0.38
440500	352500	23.8	22.6	5.4	0.66	0.59	0.477	0.384
440500	353500	23.1	21.9	5.61	0.651	0.583	0.474	0.381
440500	354500	23.3	22.1	6.01	0.649	0.581	0.473	0.38
440500	355500	23.2	21.9	6.05	0.633	0.568	0.464	0.373
440500	356500	23	21.7	5.58	0.61	0.548	0.447	0.366
441500	342500	21.3	20.3	6.26	0.587	0.521	0.412	0.363
441500	343500	21.7	20.7	5.58	0.61	0.543	0.432	0.368
441500	344500	21.9	20.8	5.58	0.636	0.566	0.452	0.374
441500	345500	22	20.9	5.72	0.633	0.566	0.455	0.368
441500	346500	22.1	21	5.72	0.647	0.579	0.467	0.372
441500	347500	22.5	21.4	5.68	0.681	0.609	0.493	0.379
441500	348500	23.4	22.3	5.56	0.692	0.619	0.501	0.384
441500	349500	23.4	22.2	6.81	0.672	0.601	0.486	0.38
441500	350500	23.5	22.4	5.97	0.669	0.6	0.486	0.379
441500	351500	23.7	22.6	5.82	0.674	0.604	0.491	0.381
441500	352500	23.9	22.7	5.47	0.681	0.61	0.495	0.387
441500	353500	23.4	22.2	5.87	0.681	0.61	0.497	0.389
441500	354500	23.5	22.3	6.3	0.672	0.603	0.492	0.385
441500	355500	23.2	22	9.95	0.651	0.584	0.478	0.378
441500	356500	23	21.8	6.91	0.628	0.564	0.461	0.371
442500	342500	21.3	20.3	5.07	0.596	0.53	0.42	0.366
442500	343500	21.7	20.7	5.04	0.622	0.554	0.443	0.372
442500	344500	22	20.9	5.08	0.658	0.587	0.47	0.381
442500	345500	22.2	21.2	5.49	0.67	0.599	0.483	0.38
442500	346500	22.4	21.3	5.73	0.683	0.611	0.494	0.384
442500	347500	22.7	21.6	6.21	0.709	0.635	0.515	0.389
442500	348500	23.5	22.4	5.62	0.708	0.634	0.514	0.389
442500	349500	23.4	22.2	5.72	0.68	0.609	0.495	0.382
442500	350500	23.3	22.2	5.7	0.663	0.595	0.485	0.375
442500	351500	23.5	22.3	5.72	0.665	0.597	0.487	0.375
442500	352500	23.7	22.6	6.49	0.679	0.609	0.495	0.384
442500	353500	23.3	22.1	7.96	0.69	0.619	0.505	0.39
442500	354500	23.9	22.7	8.11	0.693	0.622	0.508	0.392
442500	355500	23.6	22.3	6.79	0.678	0.609	0.497	0.391
443500	342500	21.5	20.5	5.03	0.621	0.552	0.44	0.373
443500	343500	21.8	20.8	5.02	0.642	0.573	0.459	0.377
443500	344500	22.1	21	5.12	0.682	0.609	0.489	0.387
443500	345500	22.4	21.4	5.87	0.697	0.624	0.503	0.389
443500	346500	22.5	21.4	8.1	0.703	0.629	0.509	0.391

443500	347500	22.7	21.6	6.01	0.726	0.651	0.528	0.395
443500	348500	22.8	21.6	5.54	0.716	0.642	0.52	0.393
443500	349500	22.6	21.5	5.47	0.681	0.61	0.496	0.384
443500	350500	22.5	21.4	5.65	0.659	0.591	0.482	0.375
443500	351500	22.7	21.5	5.78	0.663	0.595	0.487	0.375
443500	352500	23	21.8	6.35	0.667	0.599	0.489	0.379
443500	353500	23.5	22.3	6.11	0.691	0.621	0.508	0.391
443500	354500	24.2	22.9	6.54	0.711	0.639	0.522	0.402
444500	343500	22.1	21.1	5.24	0.663	0.591	0.474	0.382
444500	344500	22.5	21.4	5.47	0.702	0.628	0.505	0.391
444500	345500	22.8	21.7	5.52	0.721	0.646	0.521	0.396
444500	346500	22.8	21.7	6.8	0.716	0.641	0.517	0.394
444500	347500	22.8	21.7	7.64	0.721	0.646	0.522	0.395
444500	348500	22.8	21.7	6.08	0.705	0.631	0.51	0.391
444500	349500	22.5	21.4	5.57	0.654	0.586	0.475	0.378
444500	350500	22.4	21.3	5.55	0.632	0.567	0.461	0.369
444500	353500	23.5	22.3	5.88	0.675	0.606	0.494	0.391
445500	344500	22.6	21.5	5.42	0.716	0.64	0.514	0.398
445500	345500	22.9	21.8	5.49	0.728	0.651	0.524	0.4
445500	346500	22.8	21.7	5.94	0.719	0.643	0.518	0.398

APPENDIX 4

Sulphur Dioxide Data

8 – Port Results

SO_2 Data for 2001/2002

Sulphur Dioxide	
SITE CODE	40004
STATION	ALFRETON 4
REGION	EAST MIDLANDS
01/01/01	19
02/01/01	25
03/01/01	37
04/01/01	25
05/01/01	19
06/01/01	25
07/01/01	37
08/01/01	25
09/01/01	25
10/01/01	37
11/01/01	25
12/01/01	31
13/01/01	37
14/01/01	25
15/01/01	31
16/01/01	31
17/01/01	25
18/01/01	43
19/01/01	31
20/01/01	37
21/01/01	25
22/01/01	31
23/01/01	25
24/01/01	31
25/01/01	31
26/01/01	25
27/01/01	37
28/01/01	25
29/01/01	19
30/01/01	19
31/01/01	31
01/02/01	43
02/02/01	25
03/02/01	19
04/02/01	31
05/02/01	25
06/02/01	37
07/02/01	25
08/02/01	37
09/02/01	25
10/02/01	37
11/02/01	25
12/02/01	31
13/02/01	37
14/02/01	31

Sulphur Dioxide	
SITE CODE	40004
STATION	ALFRETON 4
REGION	EAST MIDLANDS
01/01/02	37
02/01/02	56
03/01/02	37
04/01/02	37
05/01/02	43
06/01/02	25
07/01/02	31
08/01/02	37
09/01/02	31
10/01/02	25
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12/01/02	18
13/01/02	25
14/01/02	18
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16/01/02	25
17/01/02	18
18/01/02	31
19/01/02	25
20/01/02	25
21/01/02	31
22/01/02	37
23/01/02	31
24/01/02	25
25/01/02	25
26/01/02	31
27/01/02	18
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29/01/02	25
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31/01/02	25
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07/02/02	18
08/02/02	18
09/02/02	18
10/02/02	24
11/02/02	31
12/02/02	24
13/02/02	18
14/02/02	31

15/02/01	37	15/02/02	18
16/02/01	31	16/02/02	18
17/02/01	43	17/02/02	25
18/02/01	37	18/02/02	12
19/02/01	43	19/02/02	18
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21/02/01	37	21/02/02	25
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23/02/01	25	23/02/02	31
24/02/01	31	24/02/02	37
25/02/01	31	25/02/02	25
26/02/01	25	26/02/02	37
27/02/01	43	27/02/02	31
28/02/01	37	28/02/02	18
01/03/01	31	01/03/02	25
02/03/01	37	02/03/02	25
03/03/01	31	03/03/02	18
04/03/01	37	04/03/02	25
05/03/01	31	05/03/02	18
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07/03/01	25	07/03/02	25
08/03/01	25	08/03/02	31
09/03/01	18	09/03/02	25
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11/03/01	31	11/03/02	18
12/03/01	25	12/03/02	31
13/03/01	37	13/03/02	18
14/03/01	18	14/03/02	25
15/03/01	31	15/03/02	18
16/03/01	25	16/03/02	24
17/03/01	19	17/03/02	24
18/03/01	25	18/03/02	31
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23/03/01	25	23/03/02	25
24/03/01	37	24/03/02	18
25/03/01	31	25/03/02	25
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27/03/01	25	27/03/02	25
28/03/01	31	28/03/02	18
29/03/01	19	29/03/02	31
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31/03/01	25	31/03/02	19
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02/04/01	31	02/04/02	31
03/04/01	25	03/04/02	25
04/04/01	31	04/04/02	19
05/04/01	25	05/04/02	24
06/04/01	31	06/04/02	30

07/04/01	25	07/04/02	24
08/04/01	31	08/04/02	30
09/04/01	31	09/04/02	36
10/04/01	31	10/04/02	24
11/04/01	37	11/04/02	30
12/04/01	31	12/04/02	18
13/04/01	19	13/04/02	36
14/04/01	25	14/04/02	24
15/04/01	31	15/04/02	36
16/04/01	25	16/04/02	30
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24/04/01	37	24/04/02	30
25/04/01	25	25/04/02	30
26/04/01		26/04/02	37
27/04/01	18	27/04/02	18
28/04/01	18	28/04/02	25
29/04/01	37	29/04/02	18
30/04/01	24	30/04/02	25
01/05/01	37	01/05/02	18
02/05/01	37	02/05/02	31
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12/05/01	24	12/05/02	24
13/05/01	36	13/05/02	12
14/05/01	30	14/05/02	18
15/05/01	24	15/05/02	24
16/05/01	12	16/05/02	42
17/05/01	30	17/05/02	36
18/05/01	24	18/05/02	24
19/05/01	18	19/05/02	18
20/05/01	30	20/05/02	36
21/05/01	18	21/05/02	30
22/05/01	18	22/05/02	24
23/05/01	24	23/05/02	36
24/05/01	36	24/05/02	24
25/05/01	24	25/05/02	24
26/05/01	24	26/05/02	18
27/05/01	18	27/05/02	36

28/05/01	24	28/05/02	24
29/05/01	30	29/05/02	18
30/05/01	36	30/05/02	24
31/05/01	24	31/05/02	18
01/06/01	18	01/06/02	30
02/06/01	30	02/06/02	36
03/06/01	24	03/06/02	30
04/06/01	24	04/06/02	24
05/06/01	18	05/06/02	30
06/06/01	30	06/06/02	36
07/06/01	36	07/06/02	30
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19/06/01	36	19/06/02	36
20/06/01	24	20/06/02	42
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23/06/01		23/06/02	36
24/06/01		24/06/02	30
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27/06/01		27/06/02	36
28/06/01		28/06/02	42
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01/07/01	24	01/07/02	30
02/07/01	24	02/07/02	36
03/07/01	18	03/07/02	30
04/07/01	18	04/07/02	36
05/07/01	30	05/07/02	42
06/07/01	30	06/07/02	24
07/07/01	30	07/07/02	30
08/07/01	36	08/07/02	36
09/07/01	18	09/07/02	36
10/07/01	18	10/07/02	24
11/07/01	24	11/07/02	24
12/07/01	24	12/07/02	36
13/07/01	30	13/07/02	36
14/07/01	24	14/07/02	36
15/07/01	30	15/07/02	30
16/07/01	24	16/07/02	36
17/07/01	24	17/07/02	42

18/07/01	18	18/07/02	42
19/07/01	18	19/07/02	48
20/07/01	18	20/07/02	24
21/07/01	30	21/07/02	42
22/07/01	24	22/07/02	24
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15/08/01	30	15/08/02	42
16/08/01	36	16/08/02	36
17/08/01	24	17/08/02	30
18/08/01	12	18/08/02	24
19/08/01	18	19/08/02	30
20/08/01	30	20/08/02	42
21/08/01	30	21/08/02	30
22/08/01	36	22/08/02	36
23/08/01	36	23/08/02	30
24/08/01	36	24/08/02	36
25/08/01	30	25/08/02	30
26/08/01	30	26/08/02	24
27/08/01	36	27/08/02	42
28/08/01	36	28/08/02	36
29/08/01	36	29/08/02	36
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03/09/01	30	03/09/02	42
04/09/01	30	04/09/02	54
05/09/01	30	05/09/02	42
06/09/01	36	06/09/02	48

07/09/01	24	07/09/02	36
08/09/01	24	08/09/02	30
09/09/01	30	09/09/02	24
10/09/01	36	10/09/02	42
11/09/01	18	11/09/02	36
12/09/01	24	12/09/02	42
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17/09/01	18	17/09/02	42
18/09/01	12	18/09/02	42
19/09/01	18	19/09/02	42
20/09/01	24	20/09/02	48
21/09/01	18	21/09/02	42
22/09/01	30	22/09/02	42
23/09/01	24	23/09/02	42
24/09/01	24	24/09/02	24
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29/09/01	24	29/09/02	42
30/09/01	30	30/09/02	48
01/10/01	30	01/10/02	36
02/10/01	24	02/10/02	30
03/10/01	36	03/10/02	42
04/10/01	30	04/10/02	43
05/10/01	24	05/10/02	36
06/10/01	24	06/10/02	30
07/10/01	18	07/10/02	49
08/10/01	24	08/10/02	43
09/10/01	18	09/10/02	36
10/10/01	24	10/10/02	36
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13/10/01	24	13/10/02	49
14/10/01	24	14/10/02	31
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16/10/01	36	16/10/02	31
17/10/01	30	17/10/02	37
18/10/01	18	18/10/02	49
19/10/01	18	19/10/02	43
20/10/01	30	20/10/02	43
21/10/01	18	21/10/02	37
22/10/01	18	22/10/02	49
23/10/01	18	23/10/02	43
24/10/01	36	24/10/02	31
25/10/01	24	25/10/02	31
26/10/01	24	26/10/02	37
27/10/01	30	27/10/02	24

28/10/01	24	28/10/02	37
29/10/01	36	29/10/02	49
30/10/01	24	30/10/02	37
31/10/01	24	31/10/02	43
01/11/01	24	01/11/02	37
02/11/01	24	02/11/02	31
03/11/01	30	03/11/02	31
04/11/01	30	04/11/02	37
05/11/01	24	05/11/02	31
06/11/01	30	06/11/02	43
07/11/01	30	07/11/02	31
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12/11/01	18	12/11/02	37
13/11/01	24	13/11/02	37
14/11/01	30	14/11/02	0
15/11/01	18	15/11/02	0
16/11/01	24	16/11/02	0
17/11/01	24	17/11/02	0
18/11/01	37	18/11/02	0
19/11/01	18	19/11/02	0
20/11/01	24	20/11/02	0
21/11/01	24	21/11/02	0
22/11/01	18	22/11/02	0
23/11/01	18	23/11/02	0
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26/11/01	24	26/11/02	0
27/11/01	37	27/11/02	0
28/11/01	30	28/11/02	0
29/11/01	18	29/11/02	31
30/11/01	18	30/11/02	25
01/12/01	24	01/12/02	25
02/12/01	31	02/12/02	37
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07/12/01	37	07/12/02	37
08/12/01	37	08/12/02	43
09/12/01	37	09/12/02	37
10/12/01	31	10/12/02	25
11/12/01	37	11/12/02	31
12/12/01	43	12/12/02	37
13/12/01	37	13/12/02	25
14/12/01	31	14/12/02	37
15/12/01	31	15/12/02	31
16/12/01	31	16/12/02	25
17/12/01	37	17/12/02	43

18/12/01		25	18/12/02		37
19/12/01		25	19/12/02		37
20/12/01		37	20/12/02		31
21/12/01		31	21/12/02		49
22/12/01		31	22/12/02		49
23/12/01		37	23/12/02		56
24/12/01		25	24/12/02		55
25/12/01		31	25/12/02		49
26/12/01		31	26/12/02		55
27/12/01		43	27/12/02		55
28/12/01		31	28/12/02		43
29/12/01		43	29/12/02		55
30/12/01		43	30/12/02		49
31/12/01		49	31/12/02		
	Max mean =	**49**		**Max mean =**	**56**