ARUN
DISTRICT COUNCIL

Sussex Air Quality Steering Group

LOCAL AIR QUALITY MANAGEMENT
UPDATING AND SCREENING ASSESSMENT
2006

Part IV of the Environment Act 1995

Prepared by:

Arun District Council

with assistance from the

Sussex Air Quality Steering Group

April 2006

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Summary

The atmospheric emission sources in Arun District Council have been examined and those aspects that have changed since the last round of review and assessment have been identified. Recent monitoring data and screening modelling tools have been used to assess compliance with the national air quality objectives for seven pollutants. The following conclusions have been reached for each of the pollutants:

Carbon monoxide:
The Updating and Screening Assessment (USA) identified no new sources or exposures to health risk for CO in Arun District. Consequently, Arun District Council has determined that a detailed assessment is not needed for CO.

Benzene:
The USA identified no new sources or exposures to health risk for benzene in Arun District. Consequently, Arun District Council has determined that a detailed assessment is not needed for benzene.

1,3-Butadiene:
The USA identified no new sources or exposures to health risk for 1,3-butadiene in Arun District. Consequently, Arun District Council has determined that a detailed assessment is not needed for 1,3-butadiene.

Lead:
The USA identified no new sources or exposures to health risk for lead in Arun District. Consequently, Arun District Council has determined that a detailed assessment is not needed for lead.

Nitrogen dioxide:
The USA identified no new sources or exposures to health risk for NO2 in Arun District. Consequently, Arun District Council has determined that a detailed assessment is not needed for NO_2.

Sulphur dioxide:
The USA identified no new sources or exposures to health risk for SO2 in Arun District. Consequently, Arun District Council has determined that a detailed assessment is not needed for SO_2.

Particulate matter (PM_{10}):
The USA identified no new sources or exposures to health risk for PM_{10} in Arun District. Consequently, Arun District Council has determined that a detailed assessment is not needed for PM_{10}.

Introduction

Under the Environment Act 1995, local authorities are required to Review and Assess (R&A) air quality on a regular basis. A *review* of air quality means a consideration of the levels of pollutants in the air for which objectives are prescribed in Regulations[1], and estimations of likely future levels. An *assessment* of air quality is the consideration of whether estimated levels for the relevant future period are likely to exceed the levels set in the objectives.

The second review and assessment round was completed in 2003.

The main conclusion was that the national air quality objectives were not likely to be exceeded at any locations in Arun District.

This third round of R&A constitutes a benchmark against which Arun District Council can measure future progress in making improvements to the local air quality.

The guidance issued by the Department for Environment, Food and Rural Affairs (DEFRA) requires local authorities to carry out an Updating and Screening Assessments (USA) of local air quality by the end of April 2006 (LAQM.PG03). This assessment is intended to identify those aspects that have changed since the last round of review and assessment. The USA will also indicate which pollutants and specific locations within Arun District require a Detailed Assessment (DA) that will have to be carried out by the end of April 2007.

The guidance for the 2006 Updating and Screening Assessments (USA) was updated as Frequently Asked Questions (FAQ's) on the LAQM helpdesk hosted by University of the West of England (UWE)[2]. This guidance is titled LAQM.TG(03) – Update: January 2006. The 2006 guidance was prepared to compliment the existing technical guidance LAQM.TG(03).

The 2006 guidance provides up-to-date information, new tools and guidance checklists for local authorities to undertake the 2006 USA.

[1] Air Quality Regulations for England (2000; Amendment Regulations 2002)
[2] DEFRA LAQM helpdesk web-site http://www.uwe.ac.uk/aqm/review/index.html

The new 2006 guidance sets out the requirements of the 2006 USA in a series of FAQ's , the main statement of the guidance follows:

Q: What is required for the Updating and Screening Assessment?

A: The requirements for the Updating and Screening Assessment have not changed, and are described in LAQM.PG(03), LAQM.PG(S)(03) and LAQM.TG(03).

The USA should be based upon the revised checklists that have been prepared as part of this update. The intent is to identify those matters that have changed since the second round of Review and Assessment was completed. Authorities should build upon and utilise the information provided in the Progress Reports submitted in 2004 and 2005.

The USA should consider any new monitoring data, new sources or significant changes to existing sources (either locally or within neighbouring authorities), or any other local changes that may be significant.

Authorities should also carefully consider any relevant changes to public exposure e.g. new residential developments alongside busy roads etc, if these locations were not fully evaluated in previous Review and Assessment reports.

Authorities do not need to re-assess the issues that have already been adequately considered in previous rounds, but they should make it clear that due consideration has been given to each item in the checklist, and as a minimum confirm that the item is not relevant or has not changed.

The review and assessment of air quality is the first step in the Local Air Quality Management (LAQM) process. Local authorities have to designate those parts of their areas where the prescribed objectives are not likely to be met by, or at any point beyond the relevant deadline, as Air Quality Management Areas (AQMA). This applies only to those locations where members of the public might reasonably be exposed. Where local authorities have designated AQMAs, they have a duty to produce an action plan. This plan must set out what measures the authority intends to introduce in pursuit of the Air Quality Objectives. So far, there are **no** AQMAs designated in Arun District.

The main reasons for tackling poor air quality are the link between air quality and the quality of life and the need to minimise the risk of poor air quality to human health. We now have a better understanding of the short-term and the long-term health effects of air pollution largely due to the work undertaken by the Committee on the Medical Effects of Air Pollutants (COMEAP). Short-term increases in particles, sulphur dioxide and nitrogen dioxide are associated with increased deaths brought forward and increased respiratory or cardiovascular hospital admissions in the elderly and those who are already ill. These pollutants can also worsen symptoms in those with asthma. COMEAP has also recently reported that long-term exposure to particles is associated with reduced life-expectancy mainly as a result of earlier deaths from heart disease. Carbon monoxide increases symptoms in those with heart disease, and lead affects brain development in children. Benzene and 1,3-butadiene both cause cancer.

National Air Quality Objectives

The air quality objectives set out in the Air Quality Regulations provide the statutory basis for the system of Local Air Quality Management (LAQM). For each objective, local authorities have to consider present and likely future air quality, and assess whether the objectives are likely to be achieved in time.

Pollutant	**Air Quality Objective**		**Date to achieved by**
	Concentration	**Measured as**	
Benzene	16.5 µg/m^3	Running annual mean	31.12.2003
	5 µg/m^3	Annual mean	31.12.2010
1,3 Butadiene	2.25 µg/m^3	Running annual mean	31.12.2003
Carbon monoxide	10.0 mg/m^3	Maximum daily running 8-hour mean	31.12.2003
Lead	0.5 µg/m^3	Annual mean	31.12.2004
	0.25 µg/m^3	Annual mean	31.12.2008
Nitrogen dioxide	200 µg/m^3 not to be exceeded more than 18 times a year	1 hour mean	31.12.2005
	40 µg/m^3	Annual mean	31.12.2005
Particles (PM_{10}) (gravimetric)	50 µg/m^3 not to be exceeded more than 35 times a year	24 hour mean	31.12.2004
	40 µg/m^3	Annual mean	31.12.2004
Sulphur dioxide	350 µg/m^3 not to be exceeded more than 24 times a year	1 hour mean	31.12.2004
	125 µg/m^3 not to be exceeded more than 3 times a year	24 hour mean	31.12.2004
	266 µg/m^3 not to be exceeded more than 35 times a year	15 minute mean	31.12.2005

Information about Arun District Council

Arun District is a mixed urban / rural area covering 85 square miles, and has a population of over 140,000. Littlehampton and Bognor Regis are the main urban centres and the principal administrative and commercial centres within the district.

Arun District is well served by transport links to London, Gatwick Airport, the M25, the coast and Europe. A network of subsidiary routes connects the villages and small centres of population.

A large proportion of the district is composed of countryside with a varied landscape of woodland, downland, river valleys and meadows being represented. Areas of Outstanding Natural Beauty, Sites of Special Scientific Interest, and Sites of Nature Conservation Importance overlap the area. Agriculture remains a major user of land within the District. Appendix I shows the District boundaries and major urban and rural centres.

Industrial Sources

Industrial sources are currently controlled under the Environmental Protection Act 1990, and are classified into either Part A (large industries such as power stations and chemical works) or Part B/A2 processes (such as crematoria, petrol stations, quarries, etc.) for guidance and control. Part A processes fall under the jurisdiction of the Environment Agency, whilst control of Part B/A2 processes is a duty carried out by local authorities. Those small industrial processes that fall outside of Part B/A2 Process control are also of concern. The review and assessment technical guidance (LAQM.TG03) and LAQM.TG(03) – Update: January 2006, requires details of boilers with a thermal rating of greater than 5 MW that burn coal or fuel oil (e.g. in universities, hospitals, etc).

Lists of Part A, Part B/A2 and other processes of potential concern from within Arun District are given in Appendix II. Any significant or new changes to these sources of emissions are referred to in the relevant pollutant section.

Transport/ Road traffic

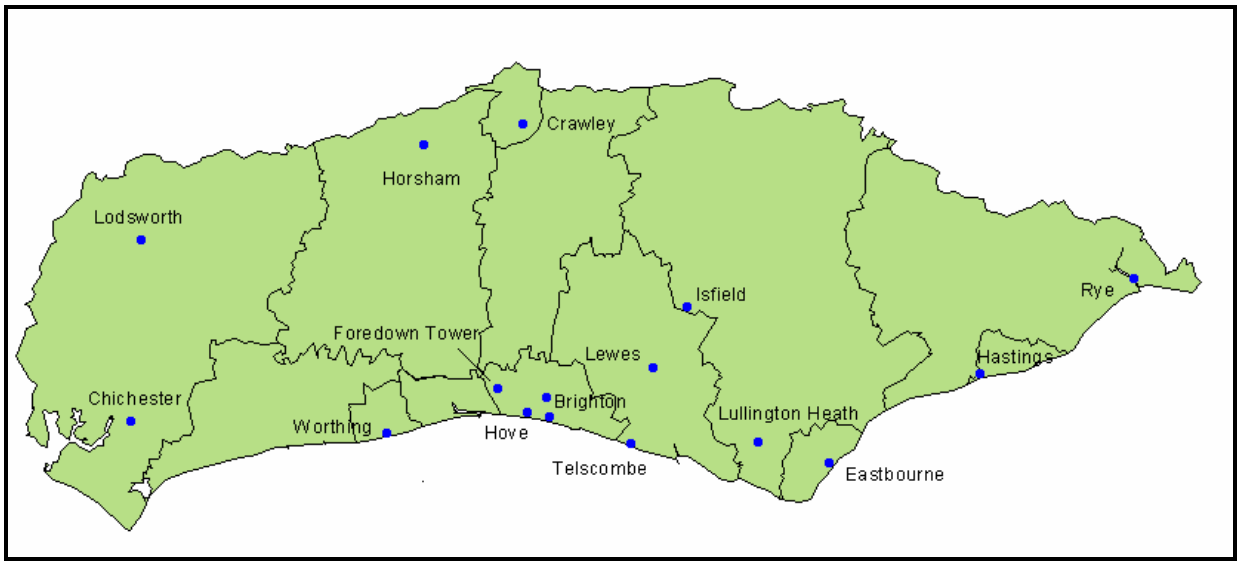
Details of road traffic movements in Arun District Council are collected by West Sussex County Council. Recent traffic data are shown in Appendix III.

Each District in the County has its own growth factor which can be used to convert 2003 traffic flows into predicted future flows, assuming that there is no local development nearby likely to increase traffic flows before this date. All councils within the County have been advised to use the "high growth" factor, which represents the worst case figure.

The technical guidance requires details of roads with more than 80,000 vehicles per day (a possible significant source of carbon monoxide and benzene) and busy streets or junctions with more than 10,000 vehicles per day or high flow of buses/HGVs (a possible significant source of NO_2 and PM_{10}). Those road sections that fall into the above categories are highlighted on the Arun District maps in Appendix I.

Monitoring of Air Quality across Sussex.

Arun District Council is a member of the Sussex Air Quality Steering Group which benefits from the co-ordinated monitoring of air pollutants across the region. The group has access to monitoring stations and is able to make comparative and comprehensive assessments for the different pollutants required under LAQM. The Sussex Air Quality Network is managed and co-ordinated by Kings College London Environmental Research Group who provide data calibration and ratification of results. The map of air quality stations is shown below:



Map 1: Sussex Air Quality Network (Jan. 2006)

The Sussex Air Quality Network is comprised of local authority air quality monitoring stations and has integrated data from national air quality stations (AURN - Lullington Heath, Brighton). The main pollutants monitored with automatic analysers are:

LA	POLLUTANTS	LOCATION	CLASSIFICATION	TYPE
Brighton CC/AURN	CO, NOX, O3 , PM10	Brighton Pavilion	Roadside	Urban
Brighton CC/AURN	CO, NOX, O3 , PAH	Hove Roadside	Roadside	Urban
Brighton CC	O3	Foredown Tower	Background	Urban
Crawley B.C.	NOx	East Gatwick	Background	Urban
Eastbourne B.C.	PM10, NOx, O3	Devonshire Park	Roadside	Urban
Lewes D.C.	PM10, NOx, O3,	Telscombe Cliffs	Roadside	Sub-urban
Lewes	PM10, NOx	Lewes Town Centre	Roadside	Urban
Rother D.C.	O3	Rye Harbour	Background	Rural
Hastings B.C.	PM10, NOx, O3	Hastings/Bexhill (A259)	Roadside	Urban
Chichester D.C.	PM10, NOx,O3	A27 Ring Road	Roadside	Urban
Chichester D.C.	O3	Lodsworth(ARMO)	Background	Rural
Horsham D.C.	PM10, NOx, WDir, WSp	Horsham centre	Background	Sub-urban
Worthing B.C.	NOx	High St, Worthing	Roadside	Urban

Wealden D.C.	O3	Isfield (ARMO)	Background	Rural
E&W Sussex C. C.	PM10, NOx,O3, CO	Mobile unit	Mobile	Mobile
National - AURN	NOx, O3	Preston Park, Brighton	Background	Urban
National - AURN	NOx, O3, SO2	Lullington Heath, Wealden	Background	Rural

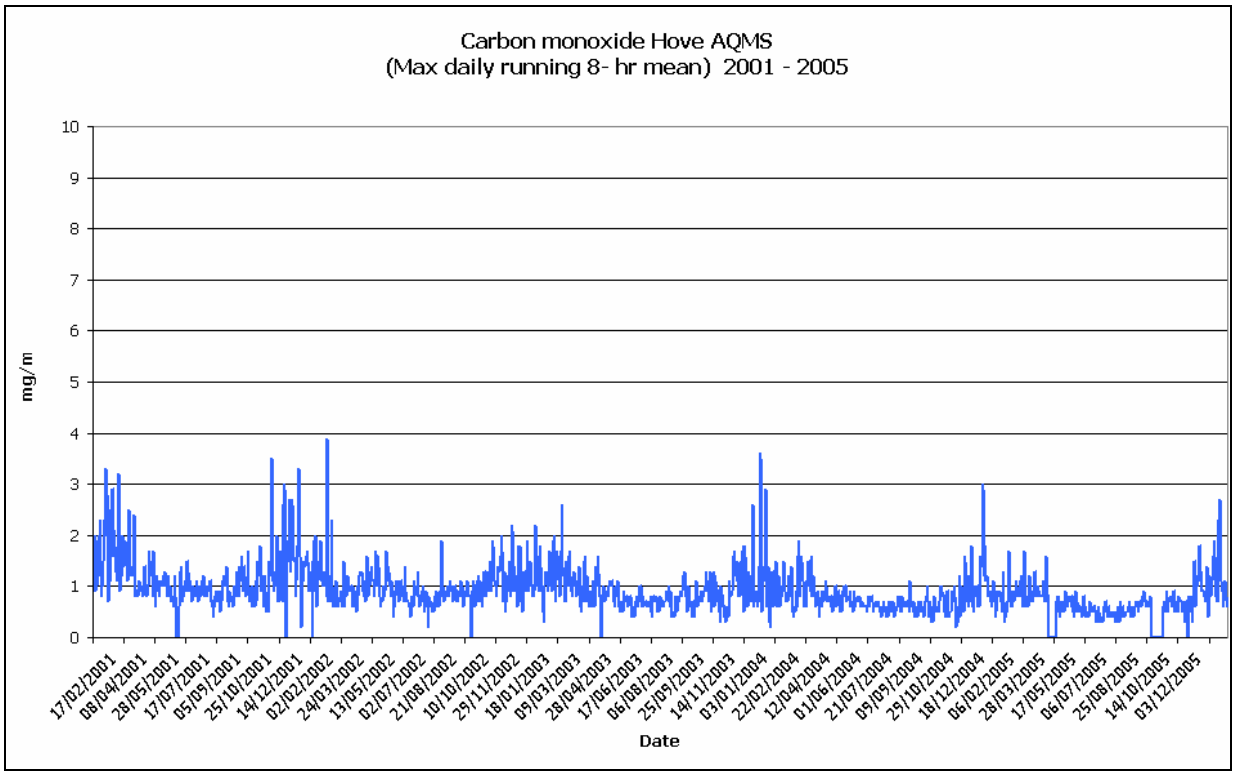
Key:
Brighton CC/AURN - affiliated /part-funded by Brighton CC and AURN
AURN - Automatic Urban and Rural Network(DEFRA owned AQ stations)
E&W Sussex County C. - Mobile lab part owned by East and West Sussex County Councils

Local authorities also monitor locally, using NO_2 diffusion tubes across their authority. These results for Arun District Council are presented in the appendix IV.

Updating and Screening Assessment for Carbon Monoxide

Carbon monoxide is an asphyxiating pollutant that reduces the ability of blood to carry oxygen to the different organs. The main source of carbon monoxide in the UK is road transport, which accounted for 67% of total releases in 2000 (the most recent year for which estimates are available). Annual emissions of carbon monoxide have been falling steadily since the 1970s, and are expected to continue to do so. This is mainly due to improvements in vehicle technology and the fitting of catalytic converters. Current projections indicate that road transport emissions will decline by a further 42% between 2000 and 2005 (LAQM.TG03).

Arun District does not carry out any monitoring for carbon monoxide. The closest automatic monitoring site to Arun District is at the junction of Marlborough Place and Church Street in Hove (Grid Ref. E531300 N104300). The monitoring data from this site suggests that the carbon monoxide objective is unlikely to be exceeded at any location in Sussex. Data from Hove AURN station has not breached the 10mg/m³ in recent years, with the maximum daily 8 hour mean = 3.9mg/m³.



The prescribed criteria set out in the new 2006 USA checklist was followed. No changes to very busy roads and junctions in Arun district were identified, and the busiest junction had an AADT 24 of less than 33,000. It was determined that there is not relevant population

exposure within 10m of the kerb and there was no significant increase in traffic volumes to require further assessment.

Updating and Screening Assessment Summary Checklist for **Carbon Monoxide**

Item	Response
A) Monitoring data	Available monitoring data (obtained with automatic infrared analysers from Sussex Monitoring stations in Brighton and Hove) suggest that the carbon monoxide objective is unlikely to be exceeded at any location in Sussex.
B) Very busy roads or junctions in built-up areas	All roads (including major junctions) within the Arun District were found to have flows of less than 80,000 vehicles per day. No further assessment was undertaken.

Updating and Screening Assessment for Benzene

Benzene is a known human carcinogen (cancer causing substance), and also contributes to the formation of ground-level ozone (summer smog). The main sources of benzene emissions in the UK are petrol vehicles, petrol refining, and the fuel distribution from petrol station without vapour recovery systems. National benzene concentrations have declined in recent years, mainly due to the increasing use of three-way catalytic converters and the introduction of vapour recovery systems in petrol stations (Stage 1 and 2 control).

Since January 2000, EU legislation has reduced the maximum benzene content of petrol to 1%, from a previous upper limit of 5%. The European Auto-Oil programme will further reduce emissions for cars and light-duty vehicles, and emissions of benzene from the storage and distribution of petrol (LAQM.TG03).

Arun District Council does not carry out any benzene monitoring. However, benzene is monitored at a number of sites in Sussex, both at the roadside and in background locations, using diffusion or pumped tubes. The nearest national network sites where automatic monitoring (using diffusion or pumped tubes) for benzene is undertaken are Hove (roadside), Portsmouth (urban background) and Southampton (urban centre). There were no recorded exceedences of the maximum running annual mean for benzene at any of the above sites in 2005.

Data from the pumped diffusion tube survey at Hove, undertaken as part of the national PAH monitoring network shows that the air quality objective would not be breached in 2005.

Site:	**Hove**	**Hove**	**Hove**	**Hove**
Year:	**2002 (part year)**	**2003**	**2004**	**2005 (75% ratified + 25% prov.)**
Units:	µg/m^3	µg/m^3	µg/m^3	µg/m^3
Annual Average (from 2 week avg.)				
Benzene: (Annual limit value = 5 µg/m^3)	1.62	1.93	1.91	1.86

Ref: UK national air quality archive: (http://www.airquality.co.uk/archive/data_and_statistics.php)

The assessment carried out by DEFRA for the 2010 objective for benzene suggests there may be a few locations close to busy roads, in areas with high background concentrations that may be at risk of exceeding the objective.

Very busy roads and junctions in areas where the 2010 background is expected to be above 2 µg/m3 were identified following traffic flow criteria as defined in technical guidance document LAQM.TG (03) and the update of this guidance in January 2006. Arun District does not have any roads where the daily average traffic flows exceed 80,000. Therefore no further assessment was undertaken.

A small aluminium foundry has opened in Arun District. This sites is not considered significant in respect of a point source. This was confirmed with the Local Authority Support Helpdesk and therefore no further assessment of this foundry has been made in respect of benzene.

There are no industrial sources with substantially increased emissions or new relevant exposure since the last round of Review and Assessment in Arun District.

There are no petrol stations with an annual throughput of 2 million litres *and* a busy road (more than 30,000 vpd) nearby in Arun District.

Arun District Council does not have any major fuel storage depots.

Updating and Screening Assessment Summary Checklist for **Benzene**

Item	Response
A) Monitoring data outside an AQMA	Data from the pumped diffusion tube survey at Hove, undertaken as part of the nation benzene monitoring network shows that the air quality objective was not breached in 2005
B) Monitoring data within an AQMA	N/A
C) Very busy roads or junctions in built up areas	No new roads or roads with a significant increase (>10% AADT) in traffic flows, or where there is new relevant exposure have been identified within Arun District.
D) New industrial sources.	One new industrial source has opened in Arun District since the last Updating and Screening Assessment in 2003. A small aluminium foundry opened in March 2006 but it is not considered that this foundry will release significant quantities of benzene into the air.
E) Industrial sources with substantially increased emissions, or new relevant exposure	There are no industrial sources within Arun District with substantially increased emissions or new relevant exposure.
F) Petrol stations	There are no petrol stations with an annual throughput of more than 2 million litres close to a busy road in Arun District.
G) Major fuel storage depots (petrol only)	There are no major fuel storage depots in Arun District.

Updating and Screening Assessment for 1,3-Butadiene

1,3-Butadiene is a suspected human carcinogen (cancer causing substance). The major source of 1,3-butadiene nationally is motor vehicle emissions, with other major sources being industrial processes (such as petrochemical and rubber processes). As with benzene, the fitting of catalytic converters to petrol vehicles reduces their emissions of 1,3-butadiene. Recently agreed reductions in vehicle emissions and improvements to fuel quality (in the framework of the Auto-Oil programme), are expected to further reduce emissions of 1,3-butadiene from vehicle exhausts (LAQM.TG03).

Concentrations of 1,3-butadiene are measured at a limited number of UK national network sites. No local monitoring of 1,3-butadiene is currently being carried out in any of the local authorities in Sussex.

The table below illustrates the annual mean results for 2005 from those areas of the country where 1,3 butadiene is measured. It should be noted that all of the results are significantly lower than the Air Quality Objective of 2.25µgm^{-3} (by the end of 2003).

Site Name	**Annual Mean 2005 (µgm^{-3})**
Belfast Centre	0.02
Belfast Roadside	0.05
Birmingham Roadside	0.15
Bristol Old Market	0.12
Grangemouth	0.28
Haringey Roadside	0.08
Leeds Centre	0.05
Leeds Roadside	0.11
Middlesborough	0.04

No industrial sources handling, storing or emitting 1,3-butadiene were identified during the first and second round of review and assessment as likely to give rise to exceedences of the running annual mean objective. No new sources introduced into Arun District or existing sources with substantially increased emissions have been identified. This suggests that the 1,3-butadiene objective is unlikely to be exceeded at any location in Arun District.

Updating and Screening Assessment Summary Checklist for **1,3-butadiene**

Item	**Response**
A) Monitoring data	No monitoring data is available for the Sussex Area. The table above details monitoring results from areas in the UK which do undertaken monitoring for 1,3-butadiene. These are all well below the Air Quality Objective. It is unlikely that this objective will be exceeded at any location in Arun District.

B) New industrial sources.	The new aluminium foundry in Arun District does not emit 1,3-butadiene and therefore is not considered to be a point source for this pollutant.
C) Industrial sources with substantially increased emissions, or new relevant exposure	There are no industrial sources with substantially increased emissions or new relevant exposure in Arun District.

Updating and Screening Assessment for Lead

Lead has been identified as causing acute and chronic damage to the nervous system, effects on the kidneys, joints and reproductive system. Historically, the major source of lead has been motor vehicle emissions, with other major sources being metal industries and power generation. The agreement reached between the European Parliament and the Environment Council on the Directive on the Quality of Petrol and Diesel Fuels has led to the ban on sales of leaded petrol in the United Kingdom with effect from 1 January 2000. Emissions of lead are now restricted to a variety of industrial activities, such as battery manufacture, pigments in paints and glazes, alloys, radiation shielding, tank lining and piping (LAQM.TG03).

There is currently no local monitoring of lead in any of the local authorities in Sussex.

No industrial sources were identified during the first and second rounds of review and assessment as likely to give rise to exceedences of the annual mean objective for lead. No new sources introduced into Arun District or existing sources with substantially increased emissions have been identified. This suggests that the lead objective is unlikely to be exceeded at any location in the Arun District.

Updating and Screening Assessment Summary Checklist for **Lead**

Item	**Response**
A) Monitoring data	There is currently no monitoring of lead in any of the local authorities in Sussex.
B) New industrial sources.	There is a new aluminium foundry (Part B) in Arun District, but there are no emissions of lead from this source.
C) Industrial sources with substantially increased emissions, or new relevant exposure	There are no industrial sources with substantially increased emissions or new relevant exposure in Arun District.

Updating and Screening Assessment for Nitrogen Dioxide

Nitrogen dioxide is a respiratory irritant associated with both acute (short-term) and chronic (long-term) effects on human health, particularly in people with asthma. Nitrogen dioxide (NO_2) and nitric oxide (NO) are both oxides of nitrogen, and are collectively referred to as nitrogen oxides (NO_x). All combustion processes produce NO_x emissions, largely in the form of nitric oxide, which is then converted to nitrogen dioxide, mainly as a result of reaction with ozone in the atmosphere. It is nitrogen dioxide that is associated with adverse effects upon human health.

The principal source of nitrogen oxides emissions is road transport, which accounted for about 49% of total UK emissions in 2000 (LAQM.TG03). Major roads carrying large volumes of high-speed traffic are a predominant source, as are conurbations and city centres with congested traffic. Other significant sources of nitrogen oxides emissions include the electricity supply industry and other industrial and commercial sectors. Industrial sources make only a very small contribution to annual mean nitrogen dioxide levels.

Monitoring data outside an AQMA

Nitrogen dioxide is the pollutant for which there is the most local monitoring. This is because cheap and relatively simple monitoring equipment is available to monitor nitrogen dioxide.

Arun District Council operates fourteen diffusive sampling sites (8 roadside, 5 urban background). Four of the fourteen sites are also included in the national NO_2 diffusion survey.

In accordance with current guidance, diffusion tube monitoring data must be appropriately corrected to account for any laboratory bias. Information published by Air Quality Consultants Ltd (on behalf of DEFRA) at www.uwe.ac.uk/aqm/review/diffusiontube310306.xls provides bias correction factors for collocation studies involving specific laboratories. The following overall bias adjustment factors have been provided for South Yorkshire Laboratory (which undertakes analysis for Arun District Council):

Year	Bias Adjustment Factor
2001	0.87
2002	0.90
2003	0.90
2004	0.82
2005	1.01

Arun District Council does not undertake any collocation studies and therefore the annual average monitoring data for each NO_2 tube has been corrected using the laboratory bias adjustment factors provided. The following tables show the bias corrected results for the background sites and the roadside sites in Arun District up to and including 2005.

Year	Background Sites				
	Thatchway Close Littlehampton	Westlands Littlehampton	King Street Arundel	Priory Road Arundel	Mornington Crescent Bognor Regis
2001	21	20	22	20	23
2002	17	23	22	17	20
2003	19	21	22	19	18
2004	16	18	18	16	18
2005	18	19	21	13	19

Year	Roadside Sites							
	Felpham Way Bognor Regis	Worthing Road L'ton	The Causeway (1) Arundel	Canada Grove Bognor Regis	Bognor High Street	Terminus Road L'ton	Arundel High Street	The Causeway (2) Arundel
2001	38	34	43	30	33	28	25	Not sampled
2002	36	29	40	24	30	25	23	Not sampled
2003	39	33	45	30	32	26	25	Not sampled
2004	35	29	37	26	29	23	22	38
2005	37	33	40	27	32	26	22	42

The Causeway, Arundel

After submission of Arun's Progress Report in 2004, the following comments were received from DEFRA: *"It is suggested that the diffusion tube situated at the Causeway is moved to the façade of the closest building (if practicable) or an extra site included in order that the Council satisfies itself that there is no likely exceedence of the annual mean nitrogen dioxide objective at this location".*

It was not possible to move the original diffusion tube to the façade of the closest building, but an extra tube was included at The Causeway from September 2004 onwards. The results from this extra tube are included as 'The Causeway (2)' in this report.

Using the results from both of the tubes at The Causeway, the overall annual mean for this site is **40.2 µg/m^3**. However, as the tubes are not located at the façade of the building, the results were adjusted as detailed in the FAQ on the following website: http://www.uwe.ac.uk/aqm/review/mfaqroad.html. This guidance states that "*Concentrations will be slightly lower at the building façade [as opposed to the roadside where the tubes are located]. The limited information that is available would suggest that the following adjustments can be applied to the kerbside results to estimate roadside values:*

Distance from kerb	**Multiply Kerbside Result by**
2-5 m	= 0.95
5-10 m	= 0.90

10-20 m	= 0.75

These adjustments are still conservative in nature, but are appropriate for an Updating and Screening Assessment and may be useful in a Detailed Assessment."

The closest building is 8m distant from the location of the two diffusion tubes. Using the calculation referred to in the above paragraph, the adjusted annual mean for The Causeway for 2005 at the building facade is therefore:

$$40.2 \times 0.90 = \mathbf{36.18}\ \mu g/m^3$$

It is considered that the objective for nitrogen dioxide will not be exceeded at the façade of the building, and therefore no further work needs to be undertaken for this pollutant.

Following the procedure as set out in Box 6.6 and Box 6.7 of technical guidance document LAQM.TG(03), the bias corrected monitoring data has been adjusted to provide an estimate for the annual mean NO_2 concentration in 2008 and 2010.

Year	Background Sites				
	Thatchway Close Littlehampton	Westlands Littlehampton	King Street Arundel	Priory Road Arundel	Mornington Crescent Bognor Regis
2008	16	18	19	12	17
2010	15	17	18	11	16

Annual mean NO_2 concentrations at background sites, estimated for 2008 and 2010 using bias corrected data ($\mu g/m^3$)

The results for background NO_2 concentrations in 2008 and 2010 are estimated to be well below the annual mean objective of 40 $\mu g/m^3$.

Year	Roadside Sites							
	Felpham Way Bognor Regis	Worthing Road L'ton	The Causeway (1) Arundel	Canada Grove Bognor Regis	Bognor High Street	Terminus Road L'ton	Arundel High Street	The Causeway (2) Arundel
2008	33	30	36	24	28	24	20	38
2010	30	27	33	22	26	22	19	35

Annual mean NO_2 concentrations at roadside sites, estimated for 2008 and 2010 using bias corrected data ($\mu g/m^3$)

The results for roadside NO_2 concentrations in 2008 and 2010 are estimated to be below the annual mean objective of 40 $\mu g/m^3$ for all sites.

Between July and October 2005, continuous monitoring of nitrogen dioxide was undertaken by West Sussex County Council using a mobile unit at The Causeway site in Arundel and giving hourly readings of nitrogen dioxide concentration. Some technical problems were experienced and as a result, less data was collected than initially expected. All data have been ratified, extrapolated to cover a full calendar year where necessary, and projected to

the end of year (2005), as indicated in the technical guidance (Box 6.5 - adjustments for short term monitoring) of the technical guidance LAQM.TQ (03). The results from this monitoring are shown in the table below:

Month in 2005	Number of days monitored	Level of nitrogen dioxide
July	6	10.9 µg/m^3
August	14	20.2 µg/m^3
September	30	19.1 µg/m^3
October	24	33.04 µg/m^3

The overall average for nitrogen dioxide from the above data is **23.16** µg/m^3. This level is well below the objective level.

Monitoring data within an AQMA

No AQMA was previously declared for nitrogen dioxide in the District.

Narrow congested streets with residential properties close to the kerb

LAQM.TG(03) Update – January 2006 states that if narrow congested streets with residential properties within 5m of the kerb were assessed previously, then there is no need to proceed further with this part. Narrow congested streets with residential properties within 5m of the kerb were assessed against traffic flow criteria as defined in technical guidance document LAQM.TG (03) in the 2003 Updating and Screening Assessment. No roads less than 10m wide with a traffic flow greater than 10,000 vehicles per day were identified at the time, and therefore no further assessment was undertaken.

There are no new narrow congested streets with residential properties within 5m of the kerb in Arun District.

Junctions

In the 2003 Updating and Screening Assessment, it was determined that all identified junctions on the A259 and A27 had traffic flows greater than 10,000vpd. All junctions were therefore assessed for relevant public exposure within 10m of the kerb. One junction (A259 Hotham Way/ A29 Shripney Road, A259 Chichester Road) was identified as having three receptors within 10m of the kerb, and further assessment of the junction was carried out using the DMRB screening model (results shown in the table below). Predictions for 2005 and 2010 using the DMRB tool suggest that there will be no exceedences of the predicted annual means at any of the receptor locations.

Receptor	NO_2 prediction for 2005	NO_2 prediction for 2010	Any predicted exceedence of the annual mean objective?
6 Gordon Road West	22.6	18.5	No
12 Gordon Avenue	22.6	18.3	No
19 Chichester Road	23.6	19.2	No

LAQM.TG(03) Update – January 2006 states that where busy junctions were assessed during previous assessments, no further assessment is necessary. Therefore no further assessment has been undertaken.

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

A specific assessment of busy streets where people may spend 1 hour or more close to traffic was undertaken in the 2003 Updating and Screening Assessment using the DMRB model. The conclusion was that at the three street locations in Arun District with outside seating areas within 5m of the kerb and a vehicle flow of 10,000 vpd, there would be no exceedence of the predicted annual mean objective for nitrogen dioxide any of the locations for 2005 or 2010.

Roads with high flow of buses and/or HGVs

In accordance with technical guidance document LAQM.TG (03) no roads were identified in Arun District as having an unusually high proportion of heavy duty vehicles (>25%), and therefore no further assessment was undertaken.

New roads constructed or proposed since the previous Updating and Screening Assessment

There have been no new roads built in Arun District since the last Update and Screening Assessment in 2003.

Roads with significantly changed traffic flows or new relevant exposure

No roads with significantly increased traffic have been identified. Roads close to the objective during the second round of review and assessment were also examined.

Bus Stations

There are no bus stations located within Arun District.

New Industrial Sources

A small aluminium foundry has opened in Arun District since the last round of Review and Assessment. Nitrogen dioxide is not emitted by this foundry and therefore has not been considered in the context of this pollutant.

Industrial sources with substantially increased emissions, or new relevant exposure

There are no industrial sources with substantially increased emissions, or new relevant exposure since the last round of Review and Assessment.

Aircraft

There is no airport located in Arun District and therefore aircraft emissions of NO_2 are not relevant.

Updating and Screening Assessment Summary Checklist for **Nitrogen Dioxide**

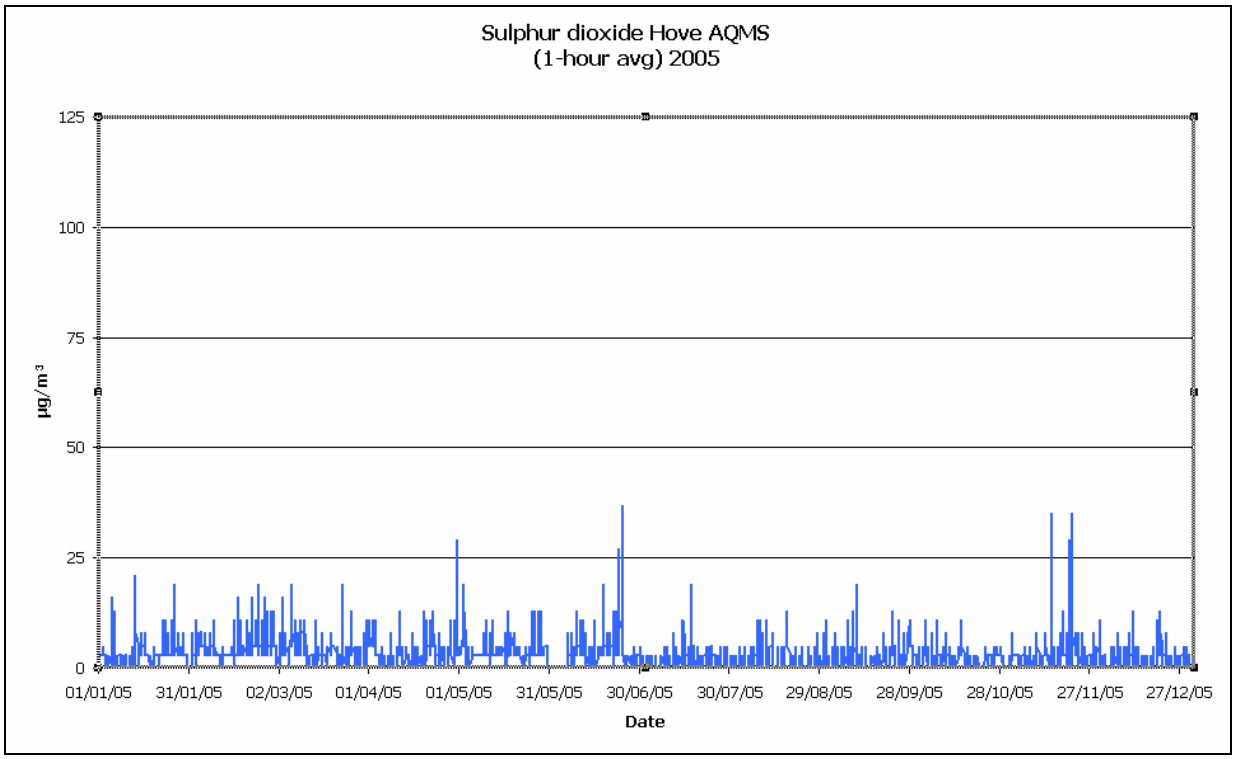
Item	Response
A) Monitoring data outside an AQMA	Monitoring data confirms that no exceedences of nitrogen dioxide are likely in Arun District and therefore no further assessment needs to be undertaken.
B) Monitoring data within an AQMA	N/A
C) Narrow congested streets with residential properties close to the kerb	There have been no new narrow congested streets with residential properties close to the kerb identified in Arun District since the last round of Review and Assessment
D) Junctions.	There have been no junctions identified during this round of Review and Assessment, or new exposures which would warrant further assessment.
E) Busy streets where people may spend 1-hour or more close to traffic	There has been no change since the last round of Review and Assessment and therefore no further assessment is considered necessary.
F) Roads with high flow of buses and/or HGVs.	There are no roads in Arun District which have a high flow of buses and/or HGVs.
G) New roads constructed or proposed since the previous round of R&A	There have been no new roads constructed since the last round of Review and Assessment.
H) Roads with significantly changed traffic flows, or new relevant exposure	There are no roads with significantly changed traffic flows or new relevant exposure in Arun District.
I) Bus Stations	There are no bus stations within Arun District.
J) New industrial sources.	A small aluminium foundry has opened in Arun District. It does not emit nitrogen dioxide and therefore will not constitute a point source for this pollutant.
K) Industrial sources with substantially increased emissions, or new relevant exposure	There are no industrial sources with substantially increased emissions or new relevant exposure in Arun District.
L) Aircraft	There are no airports in or near Arun District.

Updating and Screening Assessment for Sulphur Dioxide

Sulphur dioxide is an acute respiratory irritant, hence the short averaging time for its objective. The main source of sulphur dioxide in the UK is power stations, which accounted for more than 71% of emissions in 2000. There are also significant emissions from other industrial combustion sources. Domestic sources now only account for 4% of emissions, but can be locally much more significant. Road transport currently accounts for less than 1% of emissions (LAQM.TG03).

Monitoring data outside an AQMA

Automatic sulphur dioxide monitoring is undertaken at two permanent stations in Sussex located in Hove (roadside) and Lullington Heath (rural). The 2005 data does not indicate any exceedence of the national objectives.



Monitoring data within an AQMA

No AQMA was previously declared for sulphur dioxide within Arun District.

New industrial sources

No new industrial sources of sulphur dioxide have been identified within Arun District since the last round of Review and Assessment. The new aluminium foundry located within the district does not emit sulphur dioxide and therefore is not of concern for this pollutant.

Industrial sources with substantially increase emissions

One Part B/A2 industrial process, Tarmac Southern Ltd (Roadstone Coating Process) was identified during the first round of review and assessment as having potentially significant emissions of sulphur dioxide to air. Advanced modelling of the process was undertaken and suggested that emissions from the process would not breach any of the 2004 objectives for sulphur dioxide. There have since been no substantially increased emissions from this source (30% or more) and therefore no further assessment has been undertaken. No exceedences are likely from this source.

Areas of domestic coal burning

There are no significant areas of domestic coal burning (areas of about 500 x 500 m with more than 100 houses burning solid fuel as their primary source of heating) in Arun District.

Small boilers >5 MW (thermal)

Large boiler plant (>5 $MW_{thermal}$) can give rise to high short-term concentrations, with the risk that the 15-minute objective may be exceeded. No such boilers have been identified within Arun District.

Shipping

There are no significant shipping or railway locomotive emissions in Arun District. It is thus conclude that sulphur dioxide objective is unlikely to be exceeded at any location in the District/Borough.

Updating and Screening Assessment Summary Checklist for **Sulphur Dioxide**

Item	Response
A) Monitoring data outside an AQMA	Data shows no likely exceedences of the sulphur dioxide objective in Arun District.
B) Monitoring data within an AQMA	No AQMA was previously declared in the District.
C) New industrial sources.	A small aluminium foundry is now operating in Arun District. There are no emissions of sulphur dioxide, and therefore this source has not been considered further.
D) Industrial sources with substantially increased emissions, or new relevant exposure	There are no industrial sources with substantially increase emissions or new relevant exposure since the last round of Review and Assessment.

E) Areas of domestic coal burning	No new or significant changes in domestic coal usage has been identified within or adjacent to the district since the last round of R&A. Therefore it is not considered that domestic coal burning will be a significant source of sulphur dioxide.
F) Small Boilers > 5 MW (thermal).	There are still no boiler plant in Arun District which may give rise to high short-term concentrations of sulphur dioxide.
G) Shipping	Littlehampton Port does not experience the movement of large ships such as cross-Channel ferries, Ro-Ro, container ships or cruise liners, and is therefore not expected to present a risk of exceeding the 15-minute objective for sulphur dioxide in 2005.
H) Railway Locomotives	There are no railway locomotive emissions in Arun District.

Updating and Screening Assessment for Particulate Matter (PM_{10})

Particulate matter is of major health concern, as it has been linked with both increased morbidity and premature mortality. There is a wide range of emission sources that contribute to PM_{10} concentrations in the UK. Research studies have confirmed that these sources can be divided into 3 main categories (APEG, 1999): (I) *Primary particle* emissions are derived directly from combustion sources, including road traffic, power generation, industrial processes etc. (II) *Secondary particles* are formed by chemical reactions in the atmosphere, and comprise principally of sulphates and nitrates. (III) *Coarse particles* comprise of emissions from a wide range of sources, including re-suspended dusts from road traffic, construction works, mineral extraction processes, wind-blown dusts and soils, sea salt and biological particles.

Monitoring data outside an AQMA

An automatic (TEOM) monitor is permanently located on the A27 Ring Road at Chichester (Grid Ref. E485887, N103802), giving hourly readings of PM_{10} concentration. The obtained data have been used to estimate gravimetric concentrations (TEOM x 1.3), which were then ratified. The annual average for the year 2005 was 27.0 $\mu g/m^3$, which is below the national objective. The number of exceedences of the 24-hour PM10 objective for the same year was 5, thus below the allowed number of exceedences.

Monitoring data within an AQMA

No AQMA was previously declared for PM_{10} for Arun District.

Junctions

An assessment using the DMRB screening model was undertaken in the 2003 Updating and Screening Assessment for Arun District. This confirmed that there would not be more than 35 24-hour exceedences of 50 $\mu g/m^3$ at any of the receptor locations and that the predicted annual mean PM_{10} (of 40 $\mu g/m^3$) would not be exceeded in 2004. Using the Year Adjustment Calculator available from www.airquality.co.uk/archive/laqm/tools/Year_Adjustment-Calculator22a.xls, it was determined that the likely annual mean in 2005 would be 23.50 $\mu g/m^3$. Therefore no further work has been undertaken during this round of Review and Assessment.

Roads with high flow of buses and/or HGVs

No roads in Arun District have been identified with a high flow of buses and/or HGVs.

New roads constructed or proposed since the last round of Review and Assessment

There have been no new roads constructed or proposed since the last round of Review and Assessment.

Roads with significantly changed traffic flows or new relevant exposure

No roads with significantly changed traffic flows (>25%) or new relevant exposure have been identified in Arun District.

Roads close to the objective during the second round of Review and Assessment

During the first round of Review and Assessment no road sections were predicted (using the DMRB screening model) as potentially exceeding the annual mean objective for PM_{10} (40 μg/m^3) in 2004.

During the second round of Review and Assessment no roads were identified where more than 30 24-hour exceedences of 50 μg/m^3 were predicted. Also, following advice from the Review and Assessment Helpdesk, it was assumed that as all first round annual mean predictions for PM_{10} in 2004 were below 28 μg/m^3, it is unlikely that there will be any exceedences of the 24-hour mean objective in 2004 for any road within Arun District.

No roads in have been identified in Arun District where between 25 and 35 days exceedence of the 24 objective were predicted, and therefore no further assessment has been undertaken.

Industrial Sources

A small aluminium foundry is now operating in Arun District. No data is available from the foundry on particulate matter release levels. Monitoring is due to take place in July 2006 in accordance with the permit conditions (an emission limit of 20mg/m^3 for particulate matter).

The checklist in Annex 2 of LAQM.TG (03) does not list PM_{10} as a pollutant which needs further consideration for aluminium foundries.

It is highly unlikely that any exceedences will occur as a result of this aluminium factory and therefore further assessment has not been undertaken.

Industrial sources with substantially increased emissions or new relevant exposure

There are no industrial sources with substantially increased emissions or new relevant exposure within Arun District.

Areas of domestic solid fuel burning

There are no significant areas of domestic coal burning (areas of about 500 x 500 m with more than 50 houses burning solid fuel as their primary source of heating) in Arun District.

Quarries/landfill sites/opencast coal/handling of dusty cargoes at ports etc.

A number of fugitive dust sources including quarries, landfill sites, opencast coal, handling of dusty cargoes at ports may be significant for PM_{10}. Where dust is emitted, a proportion, (typically around 20%), will be present as PM_{10} (LAQM.TG03). None of the above sources have been identified within the District.

Aircraft

There is no airport located in Arun District and therefore aircraft emissions of PM_{10} are not relevant.

Updating and Screening Assessment Summary Checklist for **PM_{10}**

Item	Response
A) Monitoring data outside an AQMA	Data shows that the nearest monitoring site (Chichester) had an average annual mean of 27.0 µg/m^3, which is below the national objective. The number of exceedences of the 24-hour PM_{10} objective for the same year was 5, thus below the allowed number of exceedences.
B) Monitoring data within an AQMA	N/A
C) Junctions.	No further assessment is needed.
D) Roads with high flow of buses and/or HGVs.	There are no roads with high flows of buses and/or HGVs.
E) New roads constructed or proposed since last round of R&A	No new roads have been constructed or proposed since the last round of Review and Assessment.
F) Roads with significantly changed traffic flows, or new relevant exposure.	No roads with significantly changed traffic flows or new relevant exposure in Arun District were identified.
G) Roads close to the objective during the second round of Review and Assessment	There have been no significant changes since the last round of Review and Assessment.
H) New industrial sources.	A small aluminium foundry is now operating within Arun District. It is not expected to be a significant source of PM_{10}.
I) Industrial sources with substantially increased emissions, or new relevant exposure	No significant changes in local industry have occurred within or adjacent to the district since the last round of R&A. Therefore no further assessment was considered necessary.

J) Areas of domestic solid fuel burning	No new or significant changes in small boilers usage has been identified within or adjacent to the district since the last round of R&A. Therefore no further assessment was considered necessary.
K) Quarries / landfill sites / opencast coal / handling of dusty cargoes at ports etc.	None of these sources have been identified within Arun District.
L) Aircraft	There is no airport located in Arun District.

Conclusions

The atmospheric emission sources in Arun District Council have been examined and those aspects that have changed since the last round of review and assessment have been identified. Recent monitoring data and screening modelling tools have been used to assess compliance with the national air quality objectives for seven pollutants. The following conclusions have been reached for each of the pollutants:

Carbon monoxide: No further assessment needed.

Benzene: No further assessment needed.

1,3-Butadiene: No further assessment needed.

Lead: No further assessment needed.

Nitrogen dioxide: No further assessment needed.

Sulphur dioxide: No further assessment needed.

Particulate matter (PM_{10}): No further assessment needed.

Glossary

AADT	Annual Average Daily Traffic (vehicles per day)
AEOLIUSQ	Screening model for street canyons (Met Office)
APEG	Airborne Particles Expert Group
AQMA	Air Quality Management Area
AURN	Automatic Urban and Rural Network
CO	Carbon monoxide
COMEAP	Committee on the Medical Effects of Air Pollutants
DA	Detailed Assessment
DEFRA	Department for Environment Food and Rural Affairs
DMRB	Design Manual for Roads and Bridges Screening Model
ESCC	East Sussex County Council
HDV	Heavy Duty Vehicles
LTP2	Local Transport Plan (Round 2, 2006 – 2011))
LAQM	Local Air Quality Management
mg/m^3	Milligrams of the pollutant per cubic meter of air
$\mu g/m^3$	Micrograms of the pollutant per cubic meter of air
ppb	Parts per billion
ppm	Parts per million
NAEI	National Atmospheric Emissions Inventory
NAQS	National Air Quality Strategy
NO	Nitrogen monoxide
NO_2	Nitrogen dioxide
NO_x	Oxides of nitrogen
PM_{10}	Particles with diameter less than 10µm
QA/QC	Quality Assurance / Quality Control
R&A	Review and Assessment
SAQSG	Sussex Air Quality Steering Group
SO_2	Sulphur dioxide
TEOM	Tapered Element Oscillating Microbalance
USA	Updating and Screening Assessment
WSCC	West Sussex County Council

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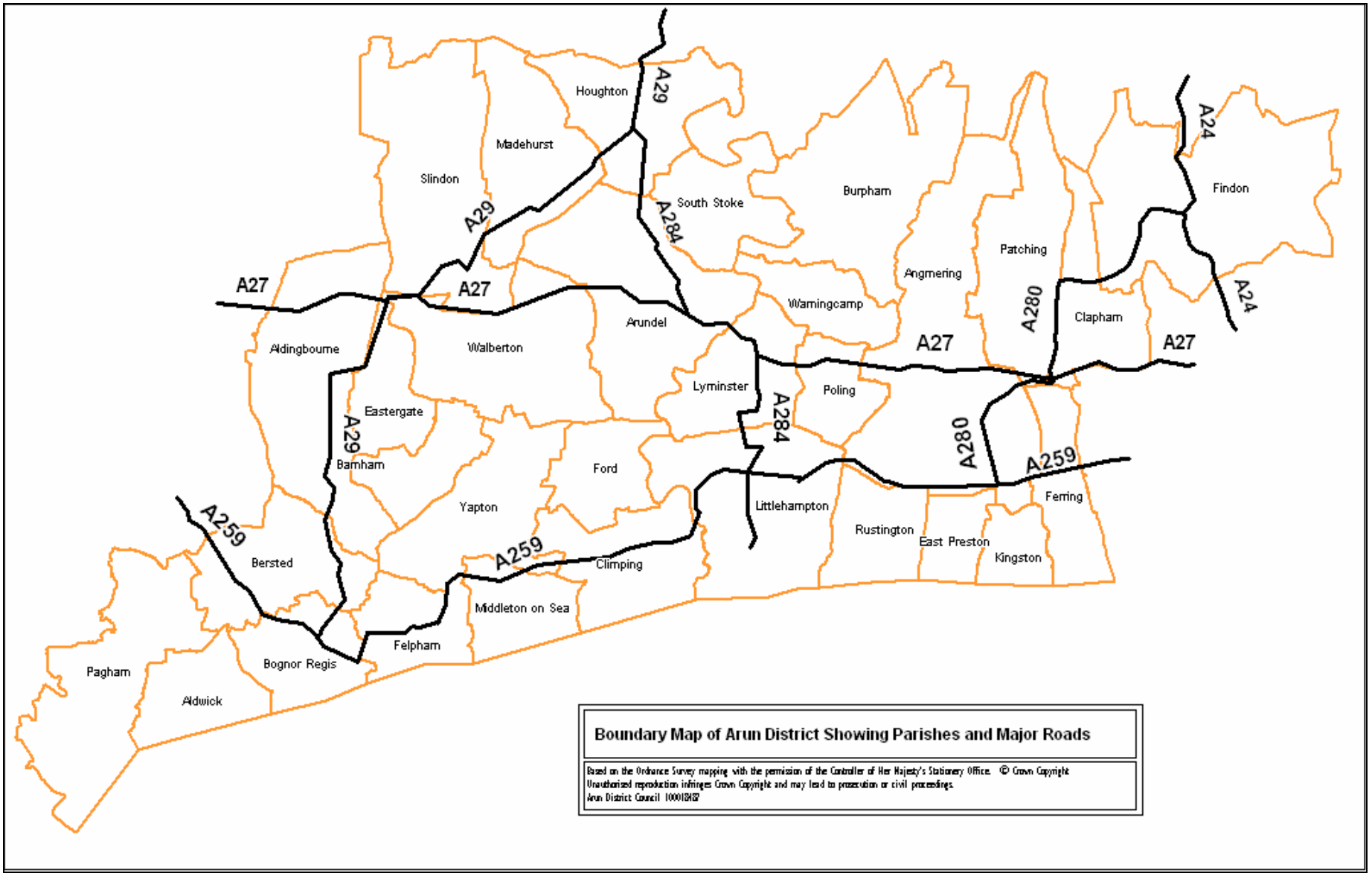
The Environment Act (1995)

The Environmental Protection Act (1990)

Appendix I: Map of Arun District


Houghton
A29
Madehurst
Slindon
A29
A27
A27
South Stoke
A284
Burpham
Findon
A24
Patching
Angmering
A24
Warningcamp
A280
Clapham
Arundel
A27
A27
Aldingbourne
Walberton
Lyminster
Poling
A284
Eastergate
A29
Barnham
A280
A259
Ford
Ferring
Yapton
Littlehampton
Rustington
East Preston
Kingston
A259
A259
Bersted
Climping
Middleton on Sea
Felpham
Bognor Regis
Pagham
Aldwick
Boundary Map of Arun District Showing Parishes and Major Roads
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Arun District Council 100018487

Appendix II: Emissions Sources

Industrial sources

Part A Processes

Lidsey Landfill site.

Part B/A2 Processes

1. Tarmac Southern Ltd - Roadstone Coating Plant - Quayside, Littlehampton, West Sussex, BN17 5DD.
2. Tarmac Topblock Ltd - Production of Aerated Concrete Blocks - Ford Aircrete Works, Ford Airfield Industrial Estate, Yapton, Nr Arundel, West Sussex, BN18 0HY.
3. Tarmac Topblock Ltd - Production of Formed Concrete Blocks - Ford Aggregate Works, Ford Airfield Industrial Estate, Yapton, Nr Arundel, West Sussex, BN18 0HY.
4. The Worthing Crematorium - Cremation of Human Remains - Horsham Road, Findon, West Sussex.
5. Eurotek Office Furniture Ltd - Waste wood combustion - Southern Cross Trading Estate, Bognor Regis, West Sussex, PO22 9SB.
6. Poling Motor Company - Respraying of Road Vehicles - Fordingbridge Industrial Estate, Barnham Road, Barnham, West Sussex, PO22 0HD.
7. LEC Refrigeration Plc - Production of Urethane Rigid Foam - Shripney Road, Bognor Regis, West Sussex, PO22 9NG.
8. Marine Pack Ltd - Breeding of Maggots - T/A National Bait Company, Lidsey Farm, Lidsey, West Sussex.
9. Dudman Equipment Ltd - Mobile Concrete Crusher - Mobile Plant operated at various locations including:- Valdoe Quarry, New Road, Goodwood, West Sussex, PO21 0PJ.
10. Finecast Foundry Limited - Aluminum Foundry Process - Unit 1, Lineside Way, Lineside Industrial Estate, Littlehampton, West Sussex BN17 7EH.

Large Boiler Plant

None located within Arun District.

Transport sources

No transport sources have been located within Arun District.

Appendix III: Road Traffic Movements

Road Number	Road Section	AADT 24
A27	Worthing – Patching	32756
A27	Patching – B2225 Junction	30563
A27	B2225 Junction - Crossbush	33139
A27	Lyminster Road/Station Road/The Causeway	40253
A27	Arundel Bypass	26449
A27	Chichester Road/Arundel Road – B2132 Junction	29861
A27	B2132 Junction – Fontwell	42742
A27	Fontwell – Chichester Border	44966
A259	A2032 Junction – Ferring Lane	37121
A259	Ferring Lane – B2140 Junction	40294
A259	Roundstone Bypass	25144
A259	B2140 Junction – B2187 Junction	42352
A259	B2187 Junction – Watersmead	26699
A259	Watersmead – Toddington Lane	26582
A259	Toddington Lane – A284 Junction (Wick)	29743
A259	A284 Junction (Wick) – B2187 Junction	21664
A259	B2187 Junction – Church Lane Junction	29275
A259	Church Lane Junction – B2233 Junction	25762
A259	Grevatts Lane	17094
A259	Felpham Way – Summerley Lane Junction	24638
A259	Felpham Way	31383
A259	Upper Bognor Road	25469
A259	Hotham Way	23713
A259	A29 Junction – Orchard Way	24432
A259	Orchard Way – North Bersted	18583
A259	North Bersted – Chichester Border	23813

Appendix IV: Air Quality Modelling

Air quality monitoring takes place at a number of locations in Arun District using NO_2 passive diffusion tubes.

Nitrogen dioxide is the pollutant for which the most monitoring has been carried out in Arun District Council. There are currently 14 diffusion tube locations, most of them operating for a number of years.

Analysis of nitrogen dioxide diffusion tube data since 2000 in Arun District, as can be seen in the table in the nitrogen dioxide section, shows that in the intermediate and background area, the annual air quality strategy objective of 21 ppb (40 $\mu g/m^3$) has not been exceeded.

All monitoring data have been ratified following the methods described in LAQM.TG(03). A quality assurance / quality control (QA/QC) programme including field duplicates and blanks, and instrument calibration with standard gases has been followed (AEAT, 2000).

Results from the nitrogen dioxide diffusion tubes are included on the following page.

2005	January	Feb	March	April	May	June	July	August	Sept	October	Nov	Dec
Terminus Road L'ton	30	30	33	30	20	16	23	25	23	26	31	xxx
Worthing Road L'ton	38	39	44	30	27	28	31	29	xxx	32	31	xxx
Thatchway Close L'ton	22	23	27	18	12	11	14	14	13	19	23	xxx
Westlands L'ton	xxx	25	27	20	16	14	14	14	9	23	30	xxx
Arundel High Street	xxx	24	31	27	17	17	22	21	21	26	18	xxx
The Causeway Arundel	42	42	48	39	25	39	51	29	39	44	40	xxx
King Street Arundel	26	25	28	16	16	15	16	xxx	17	22	29	xxx
Priory Road Arundel	xxx	17	xxx	xxx	xxx	xxx	14	10	12	20	6	xxx
Bognor Regis High Street	32	38	42	37	29	24	28	22	27	29	36	xxx
Felpham Way Bognor Regis	43	44	51	34	36	37	38	21	30	34	31	xxx
Church Lane Bognor Regis	28	31	30	20	18	14	14	13	17	21	7	xxx
Mornington Crescent Bognor Regis	24	29	37	10	13	13	15	14	5	19	27	xxx
Canada Grove Bognor Regis	31	34	26	29	26	24	23	23	26	23	27	xxx
The Causeway 2 Arundel	43	38	54	41	32	xxx	52	41	30	42	43	xxx

xxx = no readings taken for this month