

Swindon Borough Council

Updating & Screening Assessment Report

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Local Air Quality Management – Updating and Screening Assessment, 2003

1. Conclusions of Report

During the early 1990's the Department of the Environment, Transport and the Regions (DETR) (now DEFRA – Department for Environment, Food and Rural Affairs) determined the need for a framework for air quality control arising from increased concern about incidents of poor air quality.

Eight pollutants were identified as requiring monitoring or assessment, and Local Authorities were charged with assessing the impact of these pollutants within their area, and taking action, if necessary, to limit the emissions of 7 of these (the 8th being Ozone, which is trans-boundary by nature and therefore beyond local control).

The 7 pollutants, for which objective standards were established are Benzene, 1,3 Butadiene, Carbon Monoxide, Lead, Nitrogen Dioxide, Particulate Matter and Sulphur Dioxide.

An initial Review and Assessment process was established in 1999/2000 when LA's were required to undertake a detailed assessment of the situation relating to their area and determining precisely the need, or otherwise, for the establishment of Air Quality Management Areas and associated action plans.

Swindon Borough Council produced Stage 1, 2 & 3 reports but concluded, at the third stage, that there was no likelihood of any of the objectives being exceeded, and consequently no Air Quality Management Areas were declared.

Following that exercise, all LA's are now required to initiate a rolling review programme through to the year 2009, conducting updating & screening studies and, if necessary, further detailed assessments. The process is ongoing and future actions and policies will be determined by developments which may impact upon pollution levels, and in particular, continual assessment of traffic monitoring studies.

This report which has been compiled in accordance with guidance issued by DEFRA [Policy Guidance LAQM. PG(03) & Technical Guidance LAQM. TG(03)], concludes that there is no identified likelihood of exceedence of the objective standards for any of the pollutants occurring, within the respective timescales, within the Swindon Borough Council district.

It is not, therefore, necessary to conduct any Detailed Assessments at this stage.

However, in accordance with the requirements of Part IV of the Environmental Act, 1995 the Authority will produce Annual Air Quality Progress reports at the end of April 2004 & 2005, followed by a further formal Update & Screening.

Assessment (USA) in 2006. For this purpose such monitoring and/or modelling of pollutants as is necessary will continue.

SWINDON BOROUGH COUNCIL

Local Air Quality Review & Assessment 2003

2. Introduction to Air Quality Management

This report is prepared in accordance with the requirements of the Air Quality Regulations 2000 and the Air Quality (Amendments) Regulations 2002 and is compiled in accordance with the associated policy and technical guidance issues by the Department for Environment, Food and Rural Affairs (DEFRA).

Air quality is an important issue with respect to sustainability principles, and in particular those related to road transport policies. Air quality is one of the Government's key headline indicators, used to assess progress towards UK sustainable development goals.

The process of structured local air quality review and assessment was initiated by the introduction of the Air Quality Regulations 1997 and associated implementation guidance, which established the pollutants to be assessed, the objective standards to be achieved and the time-scales for achievement. All local authorities then embarked upon a programme of stages reports with the ultimate object of determining the need, or otherwise, for the designation of Air Quality Management Areas and action plans to address potential exceedences of the standards.

Swindon Borough Council produced its Stage 1 Review and Assessment report in June 2000, followed by a Stage 2 R & A report in December 2000 and the Stage 3 R & A report in January 2001 which concluded that there was no likelihood of the objective standards for any of the 7 designated pollutants (indicated below) being breached in any relevant locations within the district of the local authority. All reports, and conclusions there from, were vetted and accepted by DETR (now replaced by DEFRA).

<u>Pollutant</u>	<u>Major Source</u>	<u>Health Effects</u>
Benzene	Combustion of Petrol	Human carcinogen which can cause Leukaemia.
1,3 Butadiene	Incomplete combustion of fuels containing carbon, e.g. Coal & Petrol.	Reduces the oxygen carrying capacity of blood; causes headaches, affects concentration and reflexes.
	Road traffic accounts for about 75% of CO emissions in the UK.	High levels of exposure can retard foetal growth in pregnant women.
Lead	Now restricted to a variety of industrial activities.	It is a cumulative poison which reduces the ability of the body to produce Haemoglobin in the blood; can cause damage to the nervous system and affects the kidneys, gastrointestinal tract, joints and reproductive system. Severe poisoning can cause anaemia and impaired mental function.
Nitrogen Dioxide (NO ₂)	Road traffic, which accounted for 49% of emissions in 2000. Major roads carrying large volumes of high-speed traffic are a predominant source, as are conurbations with congested traffic.	Affects the efficiency of the lungs. Nitrogen Oxides also react with VOC's in the presence of sunlight to form low-level ozone.
	Power Stations & other industries	
Particulate Matter (PM ₁₀)	These are particles less than 10 microns in size which arise from many sources including incomplete combustion, ash and wind-blown dust.	Airway obstruction and Lung disease. Some of the particles (e.g. hydrocarbons) can penetrate deep into the lungs and may be carcinogenic.
Sulphur Dioxide (SO ₂)	Combustion of sulphur compounds which are a natural constituent of coal	Affects the efficiency of the lungs. People with asthma & chronic lung diseases are

& oil. more susceptible.
Main source is fossil
fuelled power stations.

This, round 2, Updating & Screening Assessment report should therefore be read in conjunction with the earlier reports.

2.1 Objectives included in the Air Quality Regulations 2000 and (Amendment) Regulations 2002* for the purpose of Local Air Quality Management:

Pollutant	Air Quality Objectives		Achievement Date
	Concentration	Measured As	
Benzene <i>All authorities</i>	16.25 ug/m ³	Running Annual Mean	31.12.2003
<i>Authorities in England & Wales only</i>	5 ug/m ³	Annual Mean	31.12.2010
1,3 Butadiene	2.25 ug/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 ug/m ³	Annual Mean	31.12.2004
	0.25 ug/m ³	Annual Mean	31.12.2008
Nitrogen Dioxide	200 ug/m ³ not to be exceeded more than 18 times per year	24 – hour Mean	31.12.2005
	40 ug/m ³	Annual Mean	31.12.2005
Particles (PM₁₀) (gravimetric)	50 ug/m ³ not to be exceeded more than 35 times	24-hour Mean	31.12.2004
	40 ug/m ³	Annual Mean	31.12.2004
Sulphur Dioxide	350 ug/m ³ not to be exceeded more than 24 timer per year	1-hour Mean	31.12.2004
	125 ug/m ³ not to be exceeded more than 3 times per year	24-hour Mean	31.12.2004

266 ug/m ³ not to be exceeded more than 35 times per year	15-minute Mean	31.12.2005
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* (Amendment) Regulations 2002 have not yet been laid for England & Wales
 NOTE: 1] The objectives for Benzene and Carbon Monoxide will be laid in separate Air Quality
 (Amendment) Regulations for England & Wales towards the end of 2002
 2] The objectives for Nitrogen Dioxide are provisional.

The new Particles objectives for England, Wales & Greater London, which are shown below, are not currently included in Regulations for the purpose of LAQM. Authorities therefore have no obligation to review and assess against them, but are encouraged to do so to assist with longer term planning and assessment of development proposals.

2.2 Proposed new objectives for England, Wales and Greater London:

Region	Air Quality Objective Concentration	Objective Measured As	Achievement Date
London	50 ug/m ³ not to be exceeded more than 10 times per year	24-hour Mean	31.12.2010
	23 ug/m ³	Annual Mean	31.12.2010
	20 ug/m ³	Annual Mean	31.12.2015
Rest of England & Wales	50 ug/m ³ not to be exceeded more than 7 times per year.	24-Hour Mean	31.12.2010
	20 ug/m ³	Annual Mean	31.12.2010

As indicated earlier, the process of air quality assessment is a phased one, with the intention that Local Authorities should only undertake a level of assessment which is commensurate with the risk of an air quality objective being exceeded. Phase 1, the *Updating and Screening Assessment* is based upon a checklist to identify those matters which have changed since the last exercise, to encompass new monitoring data, new objectives, new sources or significant changes to existing sources and other local changes which might affect air quality.

Phase 2, the *Detailed Assessment*, will be required where Phase 1 had identified a *risk* that an air quality objective will be exceeded at a location with relevant public exposure, with the aim of determining with *reasonable certainty* whether or not the likely exceedance is likely to actually occur.

Likely exceedances of the objectives are to be assessed in relation to '*the quality of the air at locations which are situated outside of buildings or other natural or manmade structures, above or below ground and where members of the public are regularly present*'. Reviews and Assessments are therefore to focus only upon locations where members of the public are likely to be regularly present and therefore exposed over the averaging period of the objective. Exceedances are not to be considered **relevant public exposure** would not be realistic.

It is the intention that Authorities should produce and submit to DEFRA, annual progress reports together with further *Updating and Screening Assessments* in April 2006 and 2009.

This report has been compiled in a format recommended in the DEFRA Review and Assessment Technical Guidance document [LAQM.TG(03)]

3. Current Air Pollution Monitoring in Swindon:

Continuous monitoring of Smoke and Sulphur Dioxide levels at a site in the Ferndale Road area of Swindon (Grid ref: SU 4147 1858) has been undertaken since 1963, which has confirmed the steady reduction in levels of these pollutants since the decline of the railway industry in this locality, the phasing out of coal burning steam locomotive power in the late 1960's and the progressive move away from coal as the staple fuel for home heating. This site is one of a network of some 165 across the country. Data is submitted to Netcen operating on behalf of DEFRA who collate all data to produce National Annual statistics.

In 1993 Central Government established, in conjunction with local authorities, a national network of sites to monitor ambient Nitrogen Dioxide levels using the passive diffusion tube technique, 4 sites were established in Swindon which contribute to the National Database. Additionally a further 13 sites have since been established for local information purposes. No continuous, real-time monitoring of any pollutants is, however, currently being undertaken by the Authority.

Results from these sources provide an invaluable database upon which to base further assessments, or the need for further monitoring, as necessary.

4. Consultation

The Environment Act 1995 provides the statutory basis for consultation and liaison in respect of local air quality management. Authorities are expected to work closely with other local authorities, agencies, business and the local community to improve air quality.

Schedule 11 of the Act requires local authorities to consult

- the Secretary of State
- the Environment Agency
- the Highways Authority
- all neighbouring authorities
- any National Park authority
- other public authorities as appropriate
- bodies representing local business interests and other organisation as appropriate

For the purposes of the Act, authorities must consult on their:

- air quality review and assessment
- further air quality assessment in an AQMA; and
- preparation or revision of an AQMA action plan

Local authorities are also expected to consult on the declaration, amendment or revocation of any AQMAs (Not currently relevant to Swindon Borough Council).

Guidance indicates, however, that at this Updating and Screening stage it is at the discretion of the Authority as to how wide the consultation should be although authorities should still make assessments available to the public. Due to the timescales for undertaking the USA, no external consultation has taken place prior to submission to DEFRA, however once comments have been received from DEFRA we will invite comments from interested parties, including the Primary Care Trust and the public at large. It is intended to do this in both hard copy and electronic format.

5. Updating & Screening Assessment for Benzene

Objective standards:

16.25 ug/m³ measured as a running annual mean to be achieved by end of 2003

5 ug/m³ measured as an annual mean to be achieved in England & Wales by end of 2010

The main sources of benzene emissions in the UK are petrol-engined vehicles, petrol refining and the distribution and uncontrolled emissions from petrol forecourts without vapour recovery systems.

A number of policy measures already in place, or planned for future years, will continue to reduce emissions of Benzene. 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 from the storage and distribution of petrol are controlled by vapour recovery systems. Benzene is continuously monitored at 13 National Network sites and results confirm that measured concentrations at all urban background and roadside sites were significantly below the 2003 running annual mean objective of 16.25 ug/m³. In more recent years the concentrations measured at urban background locations were also below the tighter 2010 objectives, albeit at a reduced number of monitoring locations.

Forecasts based upon National mapping suggest that the policy measures currently in place will achieve the 2003 objective at all urban background and roadside/kerbside locations. Whilst the 2010 objectives are expected to be met at all urban background, and roadside locations, there is the possibility for some remaining exceedences which will require additional measures at local level.

There are two possible major sources of Benzene from evaporative emissions at petrol stations:

- a) when petrol vapour is displaced when filling underground storage tanks (termed stage 1),
- b) when petrol vapour is displaced from vehicle petrol tanks during refuelling (termed stage 2). All petrol stations with a throughput of greater than 1000 m³/year were required to fit stage 1 vapour recovery systems before January 1999. As yet there are no legal requirements to fit stage 2 vapour recovery systems.

There have been no AQMAs declared from the first round of review and assessments in respect of the air quality objective for Benzene. There is therefore no requirement for authorities to consider road traffic emissions in their review of the 2003 objective, and only those authorities with relevant locations in the vicinity of major industrial processes that store, handle or emit benzene will need to progress beyond the updating & screening stage for this pollutant.

5.1 Information to be collated for the R & A against the 2003 and 2010 objectives

- a) Monitoring data
- b) Very busy roads or junctions in built-up areas
- c) Industrial sources
- d) Petrol stations
- e) Major fuel storage depots (petroleum only)

5.2 Assessment

a) Monitoring Data:

Approach:

Collate all Benzene monitoring data, including local monitoring data and data from national networks.

No local monitoring of Benzene has been or is currently being carried out by S.B.C.

National network maps estimate the following annual mean background Benzene concentrations for the S.B.C. district will prevail:

(NOTE: Guidance advises that it may be assumed that the running annual mean concentration is 1.1 times the annual mean – value indicated in square brackets)

2001 – 0.5 > 0.8 ug/m³ [0.55 > 0.88 ug/m³]

2003 – 0.5 > 0.8 ug/m³ [0.55 > 0.88 ug/m³]

2010 – 0.3 > 0.5 ug/m³ [0.33 > 0.55 ug/m³]

b) Very busy roads or junctions in built up areas:

Approach:

Identify 'very busy' roads and junctions in areas where the 2010 background is expected to be above 2 ug/m³

i.e.

- a) Single carriageway roads with a.a.d.t's above 80,000 vehicles
- b) Dual carriageway roads with a.a.d.t's above 120,000 vehicles
- c) Motorways with a.a.d.t's above 140,000 vehicles

An assessment by the highways department confirms that no roads or road junctions within the S.B.C. district have vehicle flows compliant with these criteria. No further assessment of this impact potential is therefore required.

c) Industrial sources

Approach

Determine whether there are any sources which need to be considered further (by reference to Annex 2, LAQM. TG(03))

No Authorised processes with the potential to emit significant quantities of Benzene were identified at the first round of R & A and scrutiny of all

available information confirms that this continues to be the case. No detailed further assessment of industrial processes is, therefore, considered necessary for this pollutant.

d) Petrol Stations:

Approach

Identify all petrol stations with an annual throughput exceeding 2000m³ (2 million litres) with a busy road nearby.

i.e. roads with a.a.d.t.'s above 30,000 vehicles and with pumps within 10 metres of a location of relevant exposure.

There are 28 licensed sites retailing petrol within the Borough district and records confirm that 20 of these have a current annual throughput of petrol exceeding 2 million litres, these sites being:

- a) *Asda Walmart, Thamesdown Drive, Abbey Meads*
- b) *Abbotts Cross, Meads Roundabout, Great Western Way*
- c) *Asda Stores, Corton Crescent, West Swindon Centre*
- d) *Penhill Filling Station, Cricklade Road, Swindon*
- e) *Chiseldon Service Station, Marlborough Road, Chiseldon*
- f) *Dorcan Way Service Station, Dorcan Way, Swindon*
- g) *Fleming Way Service Station, Fleming Way, Swindon*
- h) *Greenbridge Service Station, Swindon Road, Swindon*
- i) *Groundwell Service Station, Ermin Street, Blunsdon*
- j) *Sainsburys, Paddington Drive, Bridgemead*
- k) *Sainsburys, Oxford Road, Stratton*
- l) *Kingshill Service Station, Kingshill Road, Swindon*
- m) *Rodbourne Service Station, Rodbourne Road, Swindon*
- n) *Roger Simpson, Swindon Road, Highworth*
- o) *Save Service Station, Great Western Way, Blagrove*
- p) *Marlborough Road Service Station, Marlborough Road, Swindon*
- q) *Shell Oasis, Great Western Way, Swindon*
- r) *South Marston Service Station, Oxford Road, Stratton*
- s) *Tesco Service Station, Ocotal Way, Swindon*
- t) *Total Filling Station, Mead Way, Swindon*

All of these stations have been assessed against the above standards and none have been found to meet the above criteria, Fleming Way Service Station having been identified as being in the closest proximity to premises representing relevant exposure (approx 11 metres). No exceedence of the objective is therefore predicted in these circumstances.

e) Major Fuel Storage Depots:

Approach

Identify, by reference to Annex 2, LAQM.TG(03), the presence of any major fuel storage depots within the locality.

There are no major fuel storage depots within the Swindon Borough district, or within the wider locality, which will impact upon ambient Benzene concentrations in the district.

5.3 Conclusion:

This updating & screening process indicates that no exceedences of the objective standards for Benzene, specified above, are predicted to occur within the Swindon Borough Council district arising from either industrial or road traffic sources.

No further, detailed assessment, for this pollutant is therefore required or proposed at present.

6. Updating & Screen Assessment for 1,3 Butadiene

Objective Standard:

2.25 ug/m³ measured as a running annual mean concentration, to be achieved by end of 2003

The main source of 1,3 Butadiene in the UK is emissions from motor vehicle exhausts, 1,3 Butadiene is also an important industrial chemical and is handled in bulk at a small number of industrial premises.

Concentrations of 1,3 Butadiene are measured at a limited number of national network sites and measured maximum running annual mean concentrations at all urban background. centre and roadside sites are already well below the 2003 objective standard.

The increasing numbers of vehicles equipped with 3-way catalysts will significantly reduce emissions of this pollutant in future years. Recently agreed further reductions in vehicle emissions and improvements to fuel quality, including those as part of the Auto-Oil programme, are expected to further reduce emissions from vehicle exhausts. These measures are expected to deliver the air quality objective by the end of 2003, and no further measures are thought to be needed.

There have been no AQMA's declared from the first round of reviews and assessments in respect of the air quality objective for 1,3 Butadiene. Studies at national level suggest that there is little likelihood of the objective for 1,3 Butadiene being exceeded by 2003.

6.1 Information to be collated for the R & A against the 2003 objectives

- a) Monitoring data
- b) New industrial sources
- c) Existing industrial sources with significantly increased emissions.

6.2 Assessment:

a) Monitoring Data:

Approach:

Collate all 1,3 Butadiene monitoring data, including local monitoring data and data from national networks:

No local monitoring of 1,3 Butadiene has been or is currently being carried out by Swindon Borough Council.

National network maps estimate the following annual mean background concentrations for the Swindon Borough Council district will prevail:

2001 – 0.1>0.3 ug/m³

2003 – 0.1>0.2 ug/m³

b) New Industrial sources:

Approach:

Identify any industrial sources of 1,3 Butadiene within the district which were not present at the first round of air quality review and assessments.

Scrutiny of all available information, including reference to the public register of Authorised processes, confirms that there are no newly established industrial processes within the Swindon district with the potential to emit significant quantities of 1,3 Butadiene.

c) Industrial sources with significantly increased emissions:

Approach:

Determine whether any of the sources identified during the first round R & A as potentially significant have substantially increased emissions, i.e. greater than 30%.

One industrial process, Tyco Electronics at Dorcan Industrial Estate, was identified at the first round R & A as having the possible potential to release 1,3 Butadiene to atmosphere. However, further scrutiny of the technical processes involved confirmed that, due to the fact that the 1,3 Butadiene is chemically bound into the polymers, there is no appreciable 1,3 Butadiene emissions arising. It is confirmed that there have been no changes in the technicalities of the process and throughputs at the plant have not significantly changed during the period.

6.3 Conclusion:

This updating & screening process indicates that no exceedences of the objective standard for 1,3 Butadiene, specified above, are predicted to occur within the Swindon Borough Council district.

No further, detailed assessment, for this pollutant is therefore required or proposed at present.

7. Updating & screening assessment for Carbon Monoxide

Objective Standard:

10 mg/m³ as a maximum daily running 8-hour mean concentration, to be achieved by the end of 2003

The main source of Carbon Monoxide in the UK is road transport, which accounted for 67% of total releases in 2000, although annual emissions of this pollutant have been falling steadily since the 1970's and are expected to continue to do so.

Carbon Monoxide is continuously monitored at 67 National Network sites across the country and results confirm that there were no measured exceedences of the objective at any site during the period 1999>2001. In general concentrations were higher at roadside and kerbside sites than at urban background or urban centre sites.

Carbon Monoxide concentrations adjacent to major roads have also been modelled at national level and the results suggest that existing policies will be sufficient to reduce maximum daily 8-hour mean concentrations below 10 mg/m³ by about 2003 although it is important that local circumstances are fully taken into consideration.

There have been no AQMA's declared from the first round of review and assessments in respect of the previous 2003 Carbon Monoxide objective (11.6 mg/m³). Studies at a national level suggest that there is little likelihood of the new objective for this pollutant being exceeded by 2003 and whilst the maximum 8-hour concentrations in December 2001 approached the objective at some urban background and urban centre sites, levels by 2003 are expected to continue to decline, and the likelihood of exceedence is considered to be low.

7.1 Information to be collated for the R & A against the 2003 and 2010 objectives

- a) Monitoring data
- b) Very busy roads

7.2 Assessment:

- a) Monitoring Data:

Approach:

Collate all Carbon Monoxide monitoring data, including local monitoring data and data from national networks.

No local monitoring of Carbon Monoxide has been, or is currently being, carried out by Swindon Borough Council.

National network maps estimate the following annual mean background Carbon Monoxide concentration for the Swindon Borough Council district:

(NOTE: In accordance with the guidance it may be assumed that the 2003 annual mean concentration is the 2001 value multiplied by 0.826 – value indicated in square brackets.

2001 – 0.2>0.4 mg/m³ [0.165>0.33 mg/3]

b) Road Traffic

Approach:

Identify 'very busy' road and junctions in areas where 2010 background is expected to be above 1mg/m³.

i.e.

- a) Single carriageway roads with a.a.d.t's above 80,000 vehicles
- b) Dual carriageway roads with a.a.d.t's above 120,000 vehicles
- c) Motorways with a.a.d.t's above 140,000 vehicles

An assessment by the highway's department confirms that no roads or road junctions within the Swindon Borough Council district have vehicle flows compliant with these criteria. No further assessment of this impact potential is therefore required.

7.3 Conclusion

This updating & screening process indicates that no exceedences of the objective standard for Carbon Monoxide, specified above, are predicted to occur within the Swindon Borough Council district.

No further, detailed assessment, for this pollutant is therefore required or proposed at present.

8. Updating & Screening Assessment for Lead

Objective Standards:

0.5 ug/m³ measured as an annual mean to be achieved by the end of 2004

0.25 ug/m³ measured as an annual mean to be achieved by the end of 2008

The agreement reached between the European Parliament and the Environment Council on the Directive on the Quality of Petrol and Diesel Fuels (part of the Auto-Oil programme) has led to a ban on sales of leaded petrol in the UK, effective from 1st 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.

Measured lead-in-air concentrations for all background and kerbside UK national network sites are well below the objectives for 2004 & 2008.

Detailed assessments of the potential impact of lead emissions from industrial sources have been undertaken by Government, including a 12 month monitoring survey in the vicinity of 30 key UK industrial sites. Results generally indicate no exceedences of the 2004 or 2008 objectives, although locations in close proximity to non-ferrous metal productions and foundry processes were deemed at risk and further monitoring is occurring.

There have been no AQMAs declared from the first round of review and assessments in respect of the 2004 or 2008 air quality objectives for Lead. Only those authorities with relevant locations in the vicinity of major industrial processes that emit significant quantities of lead will need to progress beyond the updating & screening stage for this pollutant.

8.1 Information to be collated for the R & A against the 2004 and 2008 objectives

- a) Monitoring data
- b) New industrial sources
- c) Industrial sources with significantly increased emissions

8.2 Assessment:

a) Monitoring Data:

Approach:

Collate all Lead monitoring data, including local monitoring data and data from national networks:

No local monitoring of Lead is currently being carried out by Swindon Borough Council Data from national networks is not relevant to the Swindon Borough Council district because there are no monitoring stations within sufficiently close proximity to have relevance to local circumstances.

b) New Industrial sources:

Approach:

Check whether an air quality assessment has already been carried out for the new industrial source and whether the assessment predicted any exceedences of the objectives at relevant locations.

Scrutiny of all available information, including reference to the public register of Authorised processes, confirms that there are no newly established industrial processes within the Swindon district with the potential to emit significant quantities of Lead.

c) Industrial sources with substantially increased emissions

Approach

Determine whether any of the sources identified during the last round R & A as potentially significant have 'substantially' increased emissions, i.e. greater than 30% increase.

Two Part B E.P.A. 1990 Authorised processes, being Sauer-Sunstrand at Cheney Manor I.E. and Honda of the UK at South Marston I.E. (both non-ferrous metal foundry processes), were initially identified as having the potential to emit significant quantities of lead. Further investigation of the processes confirmed that both plants are engaged only in the production of Aluminium die-castings from clean raw materials containing negligible quantities of Lead, with consequent negligible release potential. No detailed further assessment is, therefore, considered necessary for this pollutant.

8. Conclusion:

This updating and screening process indicates that no exceedences of the objective standard for Lead, specified above, are predicted to occur within the S.B.C. district.

No further, detailed assessment, for this pollutant is therefore required or proposed at present.

9. Updating & Screening Assessment for Nitrogen Dioxide

Objective Standards:

200 ug/m³ not to be exceeded more than 18 times per year, measured as a 24 hour mean to be achieved by the end of 2005

40 ug/m³ measured as an Annual Mean to be achieved by end of 2005

Additionally the same objectives are incorporated in the EU First Air Quality Daughter Directive, to be achieved by member states by 1/1/2010

Nitrogen Dioxide (NO₂) and Nitric Oxide (NO) are both oxides of nitrogen, and are collectively referred to as nitrogen oxides (Nox). All combustion processes produce Nox emissions, largely in the form of nitric oxide, which is often then converted to nitrogen dioxide, mainly as a result of reaction with ozone in the atmosphere. It is nitrogen dioxide which is associated with adverse effects upon human health.

The principle source of NOx emissions is road transport, which accounted for approximately 49% of total UK emissions in 2000. Major roads carrying large volumes of high speed traffic (such as motorways and other primary routes) are a predominant source, as are conurbations and city centres with congested traffic. Within most urban areas the contribution of road transport to local emissions will be much greater than for the national picture, and in London road transport is estimate to account for more than 75% of Nox emissions.

The contribution of road transport to Nox emissions has, however, declined significantly in recent years as a result of various policy measures and further reductions are expected up until 2010, and beyond. Urban traffic Nox emissions are estimated to fall by about 20% between 2000 & 2005 and by 46% between 2000 & 2010.

Other significant sources of Nox emissions include the electricity supply industry and other industrial & commercial sectors which accounted for approximately 21% and 16% respectively. Emissions from both sources have also declined dramatically due to the fitting of low Nox burners and the increased use of natural gas burning plant. Industrial sources make only a very small contribution to annual mean nitrogen dioxide levels.

Monitoring at national network sites indicates that the annual mean objective is currently widely exceeded at roadside sites throughout the UK, with exceedences also recorded at urban background locations in major conurbations. Exceedences of the one hour objective are variable year to year and are driven by meteorological conditions which give rise to winter episodes of poor dispersion and summer oxidant episodes, but in recent years exceedences have generally only been recorded at roadside or kerbside sites in close proximity to heavily-trafficked roads in major conurbations.

In practice, meeting the annual mean standard (for both 2005 & 2010) is expected to be considerably more demanding than achieving the one hour objective. National studies indicate that the annual mean objective is likely to be achieved at all urban background locations outside of London by 2005, but the objective may be more

widely exceeded at roadside locations throughout the UK in close proximity to busy road links.

Of the 100+ AQMA's declared, the vast majority are related specifically to road traffic emissions of Nitrogen Dioxide, where it is predicted that there is likely to be a breach of the annual mean objective.

Analysis of monitoring data in the vicinity of roads throughout the UK has been undertaken which indicates that outside of major conurbations exceedences of the annual mean objective are only likely to occur within about 10 metres of the kerbside of single carriageway roads, this may include roads with relatively low traffic flows (10,000>20,000 veh/day) if they are within congested town centres. Despite higher traffic flows, exceedences of the annual mean objective are only likely within about 5 metres of the kerbside or hard shoulder of dual carriageways outside of major conurbations.

Authorities are encouraged to focus attention on anticipated "hot spots" and are advised that if there are no exceedences of the objectives at the most polluted locations, it can be reasonably concluded that there should be no exceedences elsewhere.

9.1 Information to be collated for the R & A against 2005 and 2010 objectives:

- a) Monitoring data outside an AQMA
- b) Monitoring data within an AQMA
- c) Narrow congested streets with residential properties close to the kerb
- d) Junctions
- e) Busy streets where people may spend one hour or more close to traffic
- f) Roads with high flow of buses and/or HGV's
- g) New roads constructed or proposed since first round of R & A
- h) Roads close to the objective during the first round of R & A
- i) Roads with significantly changed traffic flows
- j) Bus stations
- k) New industrial sources
- l) Industrial sources with substantially increased emissions
- m) Aircraft

9.2 Assessment:

a) Monitoring data outside an AQMA:

Approach

Collate all nitrogen dioxide monitoring data including local data and data from national networks. Both continuous (chemiluminescent) and diffusion tube data should be included.

National maps indicate that the estimated 2005 annual mean background values for the Swindon area are in the band 20 – 30 ug/m³

Included at Appendix 2 are the results from S.B.C's continuous passive diffusion tube monitoring programme which, since 1999, has comprised 17 sites, 4 of which contribute data to the National Survey programme.

In 2000, 4 of these sites recorded annual mean values exceeding the 40 ug/m³ standard, site 14, an equivalent roadside site, by a margin of 121.75%

In 2001, only 2 of these sites still recorded an annual mean exceedence, with site 14 now recording a margin of 108.33%. In 2002 none of the sites recorded an annual mean exceedence, with site 14 now recording a margin of 96.45%.

Guidance establishes a formula for estimating annual average NO₂ concentrations in future years at roadside sites and the relevant sites have been processed in accordance with the formula as indicated in the Appendix.

b) Monitoring data within an AQMA:

Approach:

Carry out a data analysis

No AQMAs were declared by Swindon Borough Council at the first round of review and assessment.

c) Narrow congested streets with residential properties close to the kerb:

Approach:

Check whether these locations were assessed during the first round of R & A, identifying all general areas where there may be narrow congested streets with residential properties within 5 metres of the kerb and where average vehicle speed is less than 50kph, and where the carriageway is less than 10 metres wide. (These locations are described as 'street canyons' and are defined as relatively narrow streets with buildings on both sides, where the height of the buildings is generally greater than the width of the road).

Local knowledge has been used to consider the possibility that the following streets, which are within the older part of the town, may meet this criteria.

Devizes Road, Old Town – surveys have confirmed, however that there are no residential properties sited within 5 metres of the kerb.

Cricklade Street, Old Town – surveys have confirmed, however, that there are no residential properties sited within 5 metres of the kerb.

In accordance with the suggested assessment criteria the following streets, although not necessarily 'street canyons' have, nevertheless, been processed using the DMRB screening model (Version 1.01), as follows:

Devizes Road, Old Town:

Grid Ref: 415500/183500

Estimated 2005 background Nox value = 42.8 ug/m³

Estimated 2005 background NO₂ value = 25.7 ug/m³

Distance from road centre to house façade = 9.0m

Projected AADT flow = 20,099 vehicles/day

Annual average speed = 32 km/h

Vehicle mix: 94% LDV; 6% HDV

Initial DMRB prediction: 32.3 ug/m³ Annual Mean

In this instance guidance requires that the predicted road traffic NO₂ component (6.6 ug/m³) is doubled before being added to the background concentration (25.7 ug/m³).

The final DMRB prediction is 38.9 ug/m³ Annual Mean – No exceedence

Cricklade Street, Old Town, Swindon:

Grid Ref: 415500 / 183500

Estimated 2005 background Nox value = 42.8 ug/m³

Estimated 2005 background NO₂ value = 25.7 ug/m³

Distance from road centre to house façade = 10.0m

Projected AADT flow = 21,026 vehicles/day

Annual average speed = 48 km/h

Vehicle mix: 94% LDV; 6% HDV

Initial DMRB prediction 31.7 ug/m³ Annual Mean

In this instance guidance required that the predicted road traffic NO₂ component (6.0 ug/m³) is doubled before being added to the background concentration (25.7 ug/m³)

The final DMRB prediction is 37.7 ug/m³ Annual Mean – No exceedence

Additionally, the following urban roads within the older areas of the town, which are locations where pollutant concentrations are expected to be highest (potential worst-case locations), have been subject to the DMRB assessment process as follows:

Newport Street, Old Town, Swindon

Grid Ref: 415500 / 183500

Estimated 2005 background Nox value = 42.8 ug/m³

Estimated 2005 background NO₂ value = 25.7 ug/m³

Distance road centre to house façade = 8.5 m

Projected AADT flow = 22, 972 vehicles/day

Annual average speed = 24 km/h

Vehicle mix: 95% LDV; 5% HDV

DMRB prediction: 32.7 ug/m³ Annual Mean – No exceedence

Westcott Place, Swindon

Grid Ref: 414500 / 184500

Estimated 2005 background NO_x value = 41.6 ug/m³

Estimated 2005 background NO₂ value = 25.5 ug/m³

Distance from road centre to house façade = 5.3 m

Projected AADT flow = 16,604 vehicles/day

Annual average speed = 41.6 km/h

Vehicle mix : 97% LDV; 3% HDV

DMRB prediction: 30.3 ug/m³ Annual Mean – No Exceedence

County Road, Swindon

Grid Ref: 415500 / 185500

Estimated 2005 background NOx value = 40.5 ug/m³
Estimated 2005 background NO₂ value = 24.7 ug/m³
Distance from road centre to house façade = 9.2 m
Projected AADT flow = 26,014 vehicles/day
Annual average speed = 41.6 km/h
Vehicle mix : 96% LDV; 4% HDV

DMRB prediction: 30.5 ug/m³ Annual Mean – No Exceedence

Kingshill Road, Swindon

Grid Ref: 414500 / 183500
Estimated 2005 background NOx value = 42.6 ug/m³
Estimated 2005 background NO₂ value = 25.6 ug/m³
Distance from road centre to house façade = 4.7m
Projected AADT flow = 22,875 vehicles/day
Annual average speed = 44.8 km/h
Vehicle mix: 98% LDV

DMRB prediction: 30.5 ug/m³ Annual Mean – No Exceedence

Faringdon Road, Swindon

Grid Ref: 414500 / 184500
Estimated 2005 background NOx value = 42.4 ug/m³
Estimated 2005 background NO₂ value = 25.5 ug/m³
Distance from road centre to house façade = 9.5 m
Projected AADT flow = 22,757 vehicles/day
Annual average speed = 33.6 km/h
Vehicle mix: 93% LDV; 7% HDV

DMRB prediction 32.7 ug/m³ Annual Mean – No Exceedence

Gypsy Lane, Swindon

Grid Ref: 416500/185500
Estimated 2005 background NOx value = 41.3 ug/m³
Estimated 2005 background NO₂ value = 25.0 ug/m³
Distance from road centre to house façade = 12 m
Projected AADT flow = 25,383 vehicles/day
Annual average speed = 48 km/h
Vehicle mix: 89% LDV; 11% HDV

DMRB prediction 33.2 ug/m³ Annual Mean – No Exceedence

Cricklade Road, Swindon

Grid Ref: 415500 / 187500
Estimated 2005 background NOx value = 36.9 ug/m³
Estimated 2005 background NO₂ value = 23.2 ug/m³
Distance from road centre to house façade = 13.5m
Projected AADT flow = 24,603 vehicles/day
Annual average speed = 36.8 km/h
Vehicle mix: 94% LDV; 6% HDV

DMRB prediction ug/m3 Annual Mean – No Exceedence

Wootton Bassett Road, Swindon

Grid Ref: 413500 / 184500

Estimated 2005 background NOx value = 42.9 ug/m3

Estimated 2005 background NO2 value = 25.7 ug/m3

Distance from road centre to house façade = 10.8 m

Projected AADT flow = 28,082 vehicles/day

Annual average speed = 44.8 km/h

Vehicle mix: 94% LDV; 6% HDV

DMRB prediction 33.6 ug/m3 Annual Mean – No Exceedence

Bruce Street, Swindon

Grid Ref: 413500 / 185500

Estimated 2005 background NOx value = 38.3 ug/m3

Estimated 2005 background NO2 value = 23.7 ug/m3

Distance from road centre to house façade = 22.3m

Projected AADT flow = 39,695 vehicles/day

Annual average speed = 38.4 km/h

Vehicle mix: 95% LDV; 5% HDV

DMRB prediction 30.2 ug/m3 Annual Mean – No Exceedence

Swindon Road, Stratton

Grid Ref: 416500 / 184500

Estimated 2005 background NOx value = 40.6 ug/m3

Estimated 2005 background NO2 value = 24.7 ug/m3

Distance from road centre to house façade = 5.9 m

Projected AADT flow = 34,432 vehicles/day

Annual average speed = 44.8 km/h

Vehicle mix: 95% LDV; 5% HDV

DMRB prediction 33.3 ug/m3 Annual Mean – No Exceedence

Queens Drive (Drakes > Magic R'about), Swindon

Grid Ref: 416500 / 184500

Estimated 2005 background NOx value = 41.6 ug/m3

Estimated 2005 background NO2 value = 25.2 ug/m3

Distance from road centre to house façade = 22m

Projected AADT flow = 53,691 vehicles/day

Annual average speed = 48.0 km/h

Vehicle mix: 94.4% LDV; 5.6% HDV

DMRB prediction 32.4 ug/m3 Annual Mean – No Exceedence

No exceedences of the Annual Mean objective are therefore predicted at any of the above locations.

- d) Junctions
Approach:

Identifying 'busy' junctions with traffic flows exceeding 10,000 vehicles/day and where there is relevant exposure within 10 metres of the kerb.

Reliable traffic flow data for all busy junctions within the Borough is not currently available. However, authorities are advised 'to start with an examination of worst-case locations and then work outward if exceedences are found, rather than take an unfocussed look at a large geographical area. If there is no exceedence at the most polluted location, there should be no exceedence elsewhere'. Hence, the following busy junctions, for which traffic data is available, have been processed in accordance with the DMRB (Version 1.01) model:

Newport Street/Devizes Road/Croft Road, Swindon

Grid Ref: 415500 / 183500

Estimated 2005 background NO_x value = 42.8 ug/m³

Estimated 2005 background NO₂ value = 25.7 ug/m³

Distance from road centre to house façade = 5 m

Projected AADT flow = 40907 vehicles/day (figure computed as per technical guidance – 16604 + 22875 + 28082 x 2/3)

Annual average speed = 10 km/h

Vehicle mix: 94% LDV; 6% HDV

DMRB prediction 38.7 ug/m³ Annual Mean – No Exceedence

Westcott Place/Kingshill Road/Wootton Bassett Road, Swindon

Grid Ref: 414500 / 184500

Estimated 2005 background NO_x value = 42.4 ug/m³

Estimated 2005 background NO₂ value = 25.5 ug/m³

Distance from road centre to house façade = 5 m

Projected AADT flow = 45041 vehicles/day (figure computed as per technical guidance – 16604 + 22875 + 28082 x 2/3)

Annual average speed = 10 km/h

Vehicle mix: 94% LDV; 6% HDV

DMRB prediction 38.9 ug/m³ Annual Mean – No Exceedence

It is concluded, therefore, based upon this rationale, that there is unlikely to be any exceedence at any other busy junction within the district.

e) Busy streets where people may spend 1-hour or more close to the kerb:

Approach:

Check whether such locations were assessed during the first round of R & A, identifying all streets, carrying more than 10,000 vehicles/day, where members of the public may be exposed within 5 metres of the kerb for 1-hour or more.

In accordance with the suggested assessment criteria the following streets have been processed using the DMRB screening model (Version 1.01), as follows: (Note: Guidance advises that if the annual mean value does not exceed 40 ug/m³, then there should be no more than 18 hours above 20 ug/m³.)

Regent Circus, Swindon

Grid Ref: 413500 / 184500

Estimated 2005 background NOx value = 42.9 ug/m³

Estimated 2005 background NO₂ value = 25.7 ug/m³

Distance from road centre to house façade = 5m

Projected AADT flow = 13023 vehicles/day (projected from 2001 survey)
(based upon survey of Commercial Road)

Annual average speed = 16 km/h

Vehicle mix: 90% LDV; 10% HDV

DMRB prediction 34.9 ug/m³ Annual Mean – No Exceedence

It is therefore considered that there should be no more than 18 occasions per year when the 1-hour mean objective is exceeded.

Similar considerations as applied to section d) have been applied with regard to 'worst-case' locations, due to unavailability of complete and up-to-date traffic data. Local knowledge suggests that this assumption is valid.

f. Roads with high flow of buses and/or HGV's:

Approach:

Check whether such locations were assessed during the first round of R & A, identifying all roads with an unusually high proportion of heavy duty vehicles, i.e. greater than 25%, and where there is relevant exposure within 10 metres of the kerb and where the flow of HDV's is greater than 2,500 vehicles/day.

No such locations were identified at the first round R & A, but an assessment by the highways department confirms that there are no roads within the Borough with such an unusually high flow of HDV's. One possible exception was considered to be Manchester Road (between Corporation Street junction and Wellington Street), which is recognised to have a high flow of buses, being a feeder road to the bus station. However, recently obtained traffic flow data, based upon a 12 hour count reveals a total flow of 10,397 vehicles with a bus component of 10.26% (11,989 / 10.26% extrapolated to AADT). The assessment criteria does not, therefore, require any further consideration in this situation. However, the road section has been processed using the DMRB (Version 1.01) model, as follows.

Grid Ref: 415500 / 185500

Estimated 2005 background NOx value = 40.5 ug/m³

Estimated 2005 background NO₂ value = 24.7 ug/m³

Distance from road centre to house façade = 5m

Projected AADT flow = 11989 vehicles/day

Annual average speed = 32 km/h

Vehicle mix: 89.75 LDV; 10.25% HDV

DMRB prediction 32.0 ug/m³ Annual Mean – No Exceedence

g. New roads constructed or proposed since the first round of R & A

Approach:

Check whether an air quality assessment has already been carried out for the new road and whether it predicated any exceedences of the objectives at

relevant locations.

The only significant new road constructed within the Borough during the past three years has been the Northern Orbital Road which provides a by-pass link from the A419 Trunk Road at Turnpike roundabout to the West Swindon developments as well as being the main service road for the continuing residential, commercial and light industrial North Swindon developments.

A comprehensive Environmental Impact assessment was undertaken, by consultants contracted by the developers, and submitted in support of the requisite planning application and the anticipated traffic pollution effects upon local air quality arising from predicted traffic flow variations, was modelled.

No exceedences of the objectives standards then pertaining for Nitrogen Dioxide was predicted. This remains the case.

h) Roads close to the objective during the first round of R & A

Approach:

Identify any roads where annual mean concentrations in 2005 were predicted to be above 36 ug/m³, but below 40 ug/m³ at relevant locations during the first round of R & A taking into consideration the revised vehicle emission factors.

Although not strictly appropriate to this section, the only road which was found to exceed, or be at risk of exceeding, the Annual mean objective was the M4 Motorway where the maximum annual mean values were predicted to be 47 ug/m³ at Junction 15 and 46 ug/m³ at Junction 16. However, the predicted area of exceedence consisted only of a narrow strip within the carriageway and at no point extended beyond the highway boundary. There are no potential relevant locations within considerable distance of Junction 16 and there is therefore no potential for the declaration of an AQMA in this regard. Continuous monitoring of Nitrogen Dioxide levels (using passive diffusion tubes) in Meadow Way, Badbury, (Site 13) which lies in the shadow of Junction 15, confirms annual average values of 34.20 / 31.14 / 31.07 ug/m³ for the years 2000 / 2001 / 2002.

An allowance for the potential inaccuracies of this method of monitoring (up to +/- 30%) would suggest that a possible marginal exceedence for the past two years (40.48 & 40.39 for the years 2001 & 2002 respectively), could have occurred, but the trend suggests that confidence can be had in the results.

Applying the approved correction factor (0.892/0.969) to the 2002 Annual Mean value for this site produces an estimated value for 2005 of 28.60 ug/m³.

No Exceedence of the Annual Mean objective at this site therefore predicted to occur.

i) Roads with significantly changed traffic flows:

Approach:

Identify roads with more than 10,000 vehicles/day that have experienced 'large' increases in traffic, i.e. more than 25% traffic flow increase.

An assessment by the highways department confirms that there are no roads within the Borough which have experienced such 'large' increases in traffic flows during the past three years.

j) Bus Stations:

Approach:

(This only applies to bus stations that are not enclosed)

Collect information on the daily movements of buses at the bus station and determine whether there is relevant exposure (judged against the 1-hour criteria) within 10 metres of the bus station and where the flow of buses is greater than 1000 / day.

Enquiries have determined that weekday bus movements, into and out of, Swindon Bus Station total approximately 920 / week-day, being some 15% less on Saturdays.

The assessment criteria determines, therefore, that there is no requirement to proceed to a Detailed Assessment in respect of this situation.

k) New Industrial sources:

Approach:

Check whether an air quality assessment has already been carried out for the new industrial source.

Scrutiny of all available information, including reference to the public register of Authorised processes, confirms that there are no newly established processes within the S.B.C. district with the potential to emit significant quantities of oxides of nitrogen.

l) Industrial sources with substantially increased emissions:

Approach:

Determine whether any of the sources identified during the first round of R & A as potentially significant have substantially increased emissions. I.e. greater than 30% increase.

No authorised processes with the potential to emit significant quantities of oxides of nitrogen were identified at the first round of R & A and scrutiny of all available information confirms that this continues to be the case. No detailed further assessment of industrial processes is, therefore, considered necessary in this circumstance.

m) Aircraft

Approach:

Establish whether there is relevant exposure within 1000 metres of the airport boundary.

There are no Airports within the Swindon Borough district.

9.3 Conclusion:

This updating & screening process indicates that no exceedences of the objective standards for Nitrogen Dioxide, specified above, are predicted to occur within the S.B.C. district.

No further, detailed assessment, for this pollutant is therefore required or proposed at present.

10. Updating & screening assessment for Particulate Matter (PM₁₀)

Objective standards:

50 ug/m³ measured as a 24-hour mean not to be exceeded more than 35 times per year, to be achieved by end of 2004

40 ug/m³ measured as an Annual Mean, to be achieved by end of 2004

Additionally the EU First Air Quality Daughter Directive establishes indicative standards of 20 ug/m³ Annual Mean & 50 ug/m³ not to be exceeded more than 7 times/year to be achieved by member states by the end of 2010

There is a wide range of emission sources which contribute to PM₁₀ concentrations in the UK. These can be usefully divided into three main categories. *Primary Particle* emissions are derived directly from combustion sources, including road traffic, power generation, industrial processes etc. *Secondary particles* are formed by chemical reactions in the atmosphere, and comprise principally sulphates and nitrates. *Coarse particles* comprise of emissions from a wide range of sources, including resuspended dusts from road traffic, construction works, mineral extraction processes, wind-blown dusts and soils, sea salt and biological particles.

The expected reduction in particle emission in future years is different for each source type. Emissions from road transport will be governed by new legislation on vehicle emission standards; emissions from secondary sources will be largely governed by controls on power generation, industrial and transport SO₂ and NO_x emissions, both in the UK and Europe; emissions of coarse particles are largely uncontrolled and in general are not expected to decline in future years.

The principal focus of Local Air Quality Management should be towards the control of emissions at local level.

A significant proportion of current annual mean. PM₁₀ is derived from regional (including long distance transport from Europe) background sources. The exact regional background contribution at any site is variable and will be dependant upon the precise geographic location. Typical regional annual mean background contributions are currently within the range 14-21 ug/m³ and are outside the control of Local Authorities.

More than 50% of the AQMAs declared in the UK have included exceedences of the 2004 24-hour mean PM₁₀ objective, although the majority of these have been in combination with nitrogen dioxide, and are associated with traffic sources. In most of these cases the spatial extent of the 24-hour mean PM₁₀ exceedence is smaller than those for the nitrogen dioxide annual mean objective.

The highest PM₁₀ concentrations associated with road traffic emissions will be close to roads with relevant locations for public exposure at building facades.

10.1 Information to be collated for the R & A against the 2004 objective:

- a) Monitoring data outside an AQMA
- b) Monitoring data within an AQMA
- c) Busy roads and junctions in Swindon
- d) Junctions
- e) Roads with high flow of buses and/or HGV's
- f) New roads constructed or proposed since first round of R & A
- g) Roads close to the objective during the first round of R & A
- h) Roads with significantly changed traffic flows
- i) New industrial sources
- j) Industrial sources with significantly increased emissions
- k) Areas with domestic solid fuel heating
- l) Quarries, landfill sites, opencast coal, handling of dusty cargoes at ports
- m) Aircraft

10.2 Assessment

- a) Monitoring data outside an AQMA:

Approach

Collate all local PM₁₀ monitoring data from the national networks.

Local monitoring of Particulate matter has been undertaken at one site in Swindon, at Bridge End Road.

An Osiris monitor, using the light scattering technique has been sited on a lamp-post within 1 metre of the kerbside since August 2001.

The site was selected as a potential 'hot-spot' being bordered by a scrap metal re-cycling plant and a stone crushing/aggregate transfer plant which had been the subject of complaint about dust emissions on occasions. 'Relevant exposure' as defined by the Technical Guidance, is not appropriate to the site. Results obtained are therefore only indicative and cannot be classed as comprehensive for comparison with the objective standard. Additionally, technical and power disruption difficulties have restricted the scope of the exercise.

Results obtained are tabulated at Appendix 3

National maps indicate that the estimated 2004 Annual Mean background PM₁₀ values for the Swindon area are in the band 18 – 20 ug/m³.

- b) Monitoring data within an AQMA:

Approach:

Carry out analysis of data used to determine requirement to declare AQMA.

No AQMAs were declared by Swindon Borough Council at the first round review and assessment.

c) Busy roads and junctions in Scotland:

Requirement not applicable to Swindon Borough

d) Junctions

Approach:

Identify 'busy' junctions with traffic flows exceeding 10,000 vehicles/day, where there is relevant exposure within 10 metres of the kerb.

Reliable traffic flow data for all busy junctions within the Borough is not currently available, but authorities are advised 'to start with an examination of worst-case locations and then work outward if exceedences are found, rather than take an unfocussed look at a large geographical area. If there is no exceedence at the most polluted location, there should be no exceedence elsewhere.' The following junctions, on two busy arterial urban roads, for which traffic data is available, are considered to be representative of most polluted locations and have been processed in accordance with the DMRB (Version 1.01) model. It is considered unlikely that exceedences of the objective will occur at any other similar location.

Newport Street/Devizes Road/Croft Road, Swindon:

Grid Ref: 415500/183500

Estimated 2004 background PM₁₀ value = 19.1 ug/m³

Distance from road centre to house façade = 5m

Projected AADT flow = 40321 vehicles/day

(22580 + 19925 + 17977 x2/3)

Annual average speed = 10 km/h

Vehicle mix: 94% LDV; 6% HDV

DMRB prediction 28.7 ug/m³ Annual Mean + 23 days above 50 ug/m³ – No Exceedence

Westcott Place/Kingshill Road/Wootton Bassett Road, Swindon:

Grid Ref: 414500/184500

Estimated 2004 background PM₁₀ value = 19.4 ug/m³

Distance from road centre to house façade = 5m

Projected AADT flow = 44267 vehicles/day

(16318 + 22485 + 27598 x2/3)

Annual average speed = 10 km/h

Vehicle mix: 94% LDV; 6% HDV

DMRB prediction 29.3 ug/m³ Annual Mean + 25 days above 50 ug/m³ – No Exceedence

e) Roads with high flow of buses and/or HGVs:

Approach:

Identify all roads with an unusually high proportion of heavy duty vehicles, i.e. greater than 20% of AADT flow, with an absolute flow of HDV's exceeding 2000 vehicles/day and with relevant exposure existing within 10 metres of the kerb.

An assessment by the highways department confirms that there are no roads within the Borough with such an unusually high flow of HDV's. One possible exception was considered to be Manchester Road (between Corporation Street junction and Wellington Street), which is recognised to have a high flow of buses, being a feeder road to the bus station. However, recently obtained traffic flow data, based upon a 12-hour count reveals a total flow of 10,397 vehicles with a Bus component of 10.26% (11,989 / 10.26 extrapolated AADT). The assessment criteria does not, therefore, require any further consideration in this situation. However, the road section has been processed using the DMRB screening model (Version 1.01) as follows:

Manchester Road, Swindon:

Grid Ref: 415500/185500

Estimated 2004 background PM₁₀ value = 19.5 ug/m³

Distance from road centre to house façade = 5m

Projected AADT flow = 11989 vehicles/day

Annual average speed (estimated) = 32 km/h

Vehicle mix: 89.75% LDV; 10.25% HDV

DMRB prediction 23.1 ug/m³ Annual Mean + 23 days above 50 ug/m³ – No Exceedence

f) New roads constructed or proposed since first round of R & A

Approach:

Check whether an air quality assessment has already been carried out on the new road.

The only significant new road constructed within the Borough during the past three years has been the Northern Orbital road which provides a by-pass link from the A419 Trunk Road at Turnpike roundabout to the West Swindon developments as well as being the main service road for the continuing residential, commercial and light industrial Northern developments.

A comprehensive Environmental impact assessment was undertaken by consultants and submitted in support of the planning application and the anticipated traffic pollution effects upon local air quality arising from predicted traffic flow variations was modelled.

No exceedences of the objective standards then pertaining for Particulate Matter was predicted. This remains the case.

g) Roads close the objective during the first round R & A

Approach:

Identify any roads where more than 30 24 hours exceedences of 50 ug/m³ were predicted at relevant locations in 2004 during the first round R & A

Swindon Road, Stratton:

Grid Ref: 417500/186500

Estimated 2004 background PM₁₀ value = 19.2 ug/m³

Distance from road centre to house façade = 5.9m

Projected AADT flow = 33845 vehicles/day

Annual average speed = 44.8 km/h
Vehicle mix: 95% LDV; 5% HDV

DMRB prediction 23 ug/m3 Annual Mean + 8 days above 50 ug/m3 – No Exceedence

Kingshill Road, Swindon:

Grid Ref: 414500/183500
Estimated 2004 background PM₁₀ value = 19.2 ug/m³
Distance from road centre to house façade = 4.7m
Projected AADT flow = 22485 vehicles/day
Annual average speed = 44.8 km/h
Vehicle mix: 98% LDV; 2% HDV

DMRB prediction 21.9 ug/m3 Annual Mean + 6 days above 50 ug/m3 – No Exceedence

Cricklade Road, Swindon:

Grid Ref: 415500/187500
Estimated 2004 background PM₁₀ value = 19.1 ug/m³
Distance from road centre to house façade = 13.5m
Projected AADT flow = 24,603 vehicles/day
Annual average speed = 36.8 km/h
Vehicle mix: 94% LDV; 6% HDV

DMRB prediction 22.4 ug/m3 Annual Mean + 7 days above 50 ug/m3 – No Exceedence

Wootton Bassett Road, Swindon:

Grid Ref: 413500/184500
Estimated 2004 background PM₁₀ value = 19.5 ug/m³
Distance from road centre to house façade = 10.8m
Projected AADT flow = 28082 vehicles/day
Annual average speed = 44.8 km/h
Vehicle mix: 94% LDV; 6% HDV

DMRB prediction 22.9 ug/m3 Annual Mean + 8 days above 50 ug/m3 – No Exceedence

Bruce Street, Swindon:

Grid Ref: 413500/185500
Estimated 2004 background PM₁₀ value = 19.3 ug/m³
Distance from road centre to house façade = 22.3m
Projected AADT flow = 39.695 vehicles/day
Annual average speed = 38.4 km/h
Vehicle mix: 95% LDV; 5% HDV

DMRB prediction 22.9 ug/m3 Annual Mean + 8 days above 50 ug/m3 – No Exceedence

Queens Drive (Drakes . Magic R'about), Swindon:

Grid Ref: 416500/184500

Estimated 2004 background PM₁₀ value = 19.2 ug/m³

Distance from road centre to house façade = 22m

Projected AADT flow = 53,691 vehicles/day

Annual average speed = 48 km/h

Vehicle mix: 94.4% LDV; 5.6% HDV

DMRB prediction 23.0 ug/m³ Annual Mean + 8 days above 50 ug/m³ – No Exceedence

Marlborough Road, Swindon:

Grid Ref: 416500/182500

Estimated 2004 background PM₁₀ value = 18.7ug/m³

Distance from road centre to house façade = 16.5m

Projected AADT flow = 22,526 vehicles/day

Annual average speed = 48 km/h

Vehicle mix: 98% LDV; 2% HDV

DMRB prediction 20.9 ug/m³ Annual Mean + 5 days above 50 ug/m³ – No Exceedence

h) Roads with significantly changed traffic flows:

Approach:

Identify any roads with more than 10,000 vehicles/day that have experienced 'large' increased in traffic, i.e. greater than 25% in AADT traffic flow.

An assessment by the highways department has confirmed that there are no roads within the Borough which have experienced such 'large' increased in traffic flows during the past three years.

i) New Industrial sources

Approach:

Check whether an air quality assessment has already been carried out for any new industrial source.

Scrutiny of all available information, including reference to the public register of Authorised Processes confirms that there are no newly established processes within the S.B.C. district with the potential to emit significant quantities of Particulate Matter.

k) Areas of domestic solid fuel burning:

Approach:

Identify areas where significant solid fuel burning still takes place, i.e. any area of about 500 x 500m with more than 50 houses burning solid fuel as their primary source of heating.

Local knowledge has been applied to confirm that no areas which meet this criteria exist within the district. The town of Swindon, which has seen its major development and expansion occur within the past forty years, has never experienced any acute smoke pollution arising from burning of solid fuel for

domestic heating, and it has, consequently, not been considered necessary to declare any smoke control areas, under the provisions of the Clean Air Acts, within the Borough.

l) Quarries, landfill sites, opencast coal, handling of dusty cargoes at ports:

Approach:

Establish whether there is relevant exposure 'near' to the sources of any dust emission, i.e. within 1000m if the estimated 2004 annual mean background is greater than or equal to 27 ug/m³; within 400m if the 2004 background is greater than or equal to 26 ug/m³; and within 200m if the background is <26 ug/m³.

No such locations which may give rise to relevant exposure to Particulate Matter exist within the S.B.C. district.

m) Aircraft

Approach:

Establish whether there is relevant exposure within 500m of an airport boundary.

Not applicable to Swindon Borough as there are no airports within the district.

10.3 Conclusion

This updating & screening process indicates that no exceedences of the objective standards for Particulate Matter, specified above, are predicted to occur within the S.B.C. district.

No further, detailed assessment for this pollutant is therefore required or proposed at present.

11. Updating & Screening assessment for Sulphur Dioxide

Objective standards:

350 ug/m³ measured as a 1-hour mean not to be exceeded more than 24 times per year, to be achieved by end of 2004

125 ug/m³ measured as a 24-hour mean not to be exceeded more than 3 times per year, to be achieved by end of 2004

266 ug/m³ measured as a 15-minute mean not to be exceeded more than 35 times per year, to be achieved by end of 2005

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 processes, but domestic sources now only account for 4% of emissions, although these can be locally significant in themselves. Road transport currently accounts for less than 1% of emissions.

Measured concentrations at UK national network sites have fallen at all sites in recent years and the objectives were only exceeded at one site in Belfast, Northern Ireland during the period 1999 > 2001. This is associated with domestic coal burning which is still widespread in the area.

Local exceedences of the objectives (principally the 15-minute mean) may occur in the vicinity of small combustion plant (less than 20MW), burning coal or oil, in areas where solid fuels are also the predominant form of domestic heating, and also in the vicinity of major ports.

There have been a small number of AQMAs declared from the first round of review and assessments which relate to emissions from coal-fired boilers at a cellophane Process and a food processing plant, a coal-fired boiler at a hospital, domestic coal burning and shipping at a major port.

11.1 Information to be collated for the R & A against the 2004 and 2005 objectives:

- a) Monitoring data outside an AQMA
- b) Monitoring data within an AQMA
- c) New industrial sources
- d) Industrial sources with significantly increased emissions
- e) Areas of domestic coal burning
- f) Small boilers (>5MW (thermal)
- g) Shipping
- h) Railway locomotives

11.2 Assessment:

- a) Monitoring data outside an AQMA:

Approach:

Collate all sulphur dioxide monitoring data including local monitoring data, i.e. data from 8-port bubbler samplers and data from national networks:

Details of S.B.C's continuous monitoring at a site in Ferndale Road are listed at Appendix 1.

National maps indicate that the maximum estimated annual mean background values for the Swindon area are in the band 12 – 16 ug/m³, with the majority of the district being within the 2 – 4 ug/m³ band.

b) Monitoring data within an AQMA:

Approach:

Carry out a data analysis.

No AQMAs were declared at the first round of review and assessments within the Swindon Borough district.

c) New Industrial sources:

Approach:

Check whether an air quality assessment has been carried out for any new industrial source or refer to checklist at Annex 2 of LAQM.TG(03):

No new authorised processes have been established in Swindon since the first round of R & A which have the potential to emit significant quantities of SO₂

d) Industrial sources with substantially increased emissions:

Approach:

Determine whether any of the sources identified during the first round of R & A's are potentially significant have substantially, i.e. greater than 30%, increase.

Two Part 2 E.P.A.1990 Authorised processes, being Sauer-Sunstrand at Cheney Manor I.E. and Honda of the UK at South Marston I.E. (both non-ferrous metal foundry processes), were initially identified as being potentially associated with the release to atmosphere of significant quantities of SO₂ at the first round of R & A.

Further assessment determined that the potential for such release arose only from the combustion of heavy fuel-oil in such foundry operations. In practice the furnaces at these two premises are fire by natural gas. No detailed further assessment is, therefore considered necessary for this pollutant.

e) Areas of domestic coal burning:

Approach:

Identify areas where significant coal burning still takes place, i.e. areas of 500 x 500m where there may be more than 100 houses burning solid fuel as their primary source of heating.

The 1992/2000 review & assessment exercise determined that, in 1996, the maximum low-level emissions within a 1km x 1km grid square were in the band 10.000 > 49.999 tonnes confirming no impact upon ambient SO₂ concentrations sufficient to cause an exceedence of the prescribed objective standard. Local experience and knowledge suggests there has been no change in circumstances likely to have any regressive effects upon this situation.

- f) Small boilers > 5MW (thermal):

Approach:

Identify all boiler plant of this capacity that burn coal or oil.

Local knowledge of the locality and significantly large buildings therein confirms that there are no boiler plants of such capacity burning coal or fuel oil. The newly completed Great Western Hospital building at Common Head, Swindon has dual fuelled (mains gas + fuel oil standby facility) boiler plant with a thermal capacity of 6,600KW.

- g) Shipping:

Emissions from shipping are not relevant to the Swindon Borough district.

- h) Railway locomotives:

Approach:

Identify locations where diesel locomotives are regularly stationary for periods of 15 minutes or more, i.e. at signals, goods loops, depots or stations.

Despite Swindon's emergence and growth as a railway town, the railway now plays no particular role, there being no longer any rail workshops or ancillary activity.

The town stands on the Great Western main London > Bristol line, but now has little freight activity and no locomotive stabling points. Passenger carrying train units on this line call only briefly at the station, rarely being stationary for more than approximately 5 minutes. Passenger services also operate on the Swindon > Gloucester line, with train units standing in a bay platform for periods sometimes exceeding 15 minutes. However, it is the practice of drivers to turn off the engines when stationary for extended periods.

11.3 Conclusion:

This updating & screening process indicates that no exceedences of the objective standards for Sulphur Dioxide, specified above, are predicted to occur within the S.B.C. district.

No further, detailed assessment, for this pollutant is there required or proposed at present.

Appendix 1

Sulphur Dioxide Monitoring Data

Ferndale Road Monitoring site, Swindon [Grid ref: SU 147 858]
(Urban Background classification – Site code 3220002)

This continuous monitoring station, measuring Smoke & Sulphur Dioxide levels has been established on the site at the ex-Ferndale Road Secondary school (now occupied by Oxford Brookes university) since 1963 and has confirmed the progressive reduction in levels of these pollutants since the decline of the railway workshops in this locality, the phasing out of coal burning steam locomotive power in the late 1960's and the progressive move away from coal as a staple fuel for home heating.

	Annual Mean Value Ug/m3	Equivalent annual mean p.p.b.
1990/91	20	8
1991/92	18	7
1992/93	14	5
1993/94	12	5
1994/95	13	5
1995/96	13	5
1996/97	11	4
1997/98	10	4
1998/99	10	4
2000	9	3
2001	9	3

Guidance advises that measured daily mean concentrations should be multiplied by a factor of 1.25 to take account of a general tendency for bubbler samplers to under-read at high concentrations.

In the year 2002 the highest recorded daily concentration at this site was 13 ug/m3, which was recorded on a total of 32 days during the year. Applying the correction factor produces a figure of 16.25 ug/m3. During 2001 the highest figure was 24 ug/m3 [recorded on 3 days] (30 ug/m3 corrected).

Guidance advises that the 15-minute objective is unlikely to be exceeded if the maximum daily mean concentration is less than 80 ug/m³ and the 1-hour mean objective is unlikely to be exceeded if the maximum daily mean concentration is less than 200 ug/m³.

Maintenance and operation of the monitoring equipment is conducted in accordance with procedures detailed in the UK Smoke & Sulphur Dioxide Network Instruction Manual to ensure that QC protocols are adhered to.

Appendix 2

NITROGEN DIOXIDE DIFFUSION TUBE MONITORING DATA

Monitoring of Nitrogen Dioxide levels, using passive diffusion tubes, has been carried out at a number of sites across the Borough since 1993. The tubes, which are prepared by pipetting 30ul of a solution of 20% triethanolamine in water onto the metal grids in the end cap, are exposed for a period of one month in accordance with the national survey protocol.

Bristol City Council Scientific Services unit has been contracted to supply and analyse the tubes since the start of the exercise. The laboratory does not hold UKAS accreditation for NO₂ tube analysis, but does participate in the Workplace Analysis Scheme for Proficiency (WASP) for NO₂ tubes. At the last round of performance assessment (round 46 – March 2003) the laboratory recorded a 'good' classification.

The laboratory also participates in a Quality Control programme operated by NETCEN for which they recorded 'good' classification for 11 of the monthly assessments in the year 2002.

They also participate in a field inter-comparison scheme that started in November 2002, controlled by NETCEN and organised by the Health & Safety Laboratory, in which 3 tubes are co-located with a continuous analyser which provides a reference value. Three sets of results have been returned to date and these show an average positive bias for the tubes of 11%, 16% and 34%.

The following roadside (or equivalent) sites, at which continuous monitoring by passive diffusion tube sampling has taken place, have been assessed in accordance with guidance contained in LAQM. TG (03), which takes account of the estimated reduction in road traffic emissions in future years, to predict annual average values in 2005, as follows:

Site 1: GWR Museum, Faringdon Road, Swindon – Roadside site 2.7m from kerbside (This site contributes to the National database)

1999 Ann. Mean = 39.1ug/m³ x 0.83 correction factor = 32.5 ug/m³

2000 Ann. Mean = 33.1ug/m³ x 0.86 correction factor = 28.6 ug/m³

2001 Ann. Mean = 30.7 ug/m³ x 0.89 correction factor = 27.4 ug/m³

2002 Ann. Mean = 28.2ug/m³ x 0.92 correction factor = 26.0 ug/m³

It is predicted that this site will **not fail** the objective standard in 2005

Site 5: Kingshill Road, Swindon – Kerbside site 1.0m from kerbside (at bottom of hill)

1999 Ann. Mean = $46.10\text{ug/m}^3 \times 0.83$ correction factor = 38.3 ug/m^3

2000 Ann. Mean = $42.10\text{ug/m}^3 \times 0.86$ correction factor = 36.2 ug/m^3

2001 Ann. Mean = $35.64\text{ ug/m}^3 \times 0.89$ correction factor = 31.8 ug/m^3

2002 Ann. Mean = $38.94\text{ug/m}^3 \times 0.92$ correction factor = 35.8 ug/m^3

It is predicted that this site will **not fail** the objective standard in 2005

Site 6: Chalet School, Queens Drive, Swindon – Roadside site 4.3m from kerbside (between Magic & Drakes roundabouts)

1999 Ann. Mean = $40.2\text{ug/m}^3 \times 0.83$ correction factor = 33.4 ug/m^3

2000 Ann. Mean = $36.9\text{ug/m}^3 \times 0.86$ correction factor = 31.7 ug/m^3

2001 Ann. Mean = $32.3\text{ ug/m}^3 \times 0.89$ correction factor = 28.8 ug/m^3

2002 Ann. Mean = $27.8\text{ug/m}^3 \times 0.92$ correction factor = 25.6 ug/m^3

It is predicted that this site will **not fail** the objective standard in 2005

Site 10: Ermin Street, Blunsdon – Kerbside site situated on central reservation of dual-carriageway.

1999 Ann. Mean = $36.20\text{ug/m}^3 \times 0.83$ correction factor = 30.1 ug/m^3

2000 Ann. Mean = $33.60\text{ug/m}^3 \times 0.86$ correction factor = 28.9 ug/m^3

2001 Ann. Mean = $32.46\text{ ug/m}^3 \times 0.89$ correction factor = 28.9 ug/m^3

2002 Ann. Mean = $27.63\text{ug/m}^3 \times 0.92$ correction factor = 25.4 ug/m^3

It is predicted that this site will **not fail** the objective standard in 2005

Site 14: Kingshill Road, Swindon – Kerbside site 1.0m from kerbside (at top of hill)

1999 Ann. Mean = 59.00ug/m³ x 0.83 correction factor = 49.0 ug/m³

2000 Ann. Mean = 48.70ug/m³ x 0.86 correction factor = 42.0 ug/m³

2001 Ann. Mean = 43.33 ug/m³ x 0.89 correction factor = 38.6 ug/m³

2002 Ann. Mean = 38.58ug/m³ x 0.92 correction factor = 35.5 ug/m³

It is predicted that this site will **not fail** the objective standard in 2005

Site 15: Westcott Place, Swindon – Roadside site 1.4m from kerbside

1999 Ann. Mean = 49.00ug/m³ x 0.83 correction factor = 41.0 ug/m³

2000 Ann. Mean = 44.50ug/m³ x 0.86 correction factor = 38.3 ug/m³

2001 Ann. Mean = 36.43ug/m³ x 0.89 correction factor = 32.4 ug/m³

2002 Ann. Mean = 36.07ug/m³ x 0.92 correction factor = 33.2 ug/m³

It is predicted that this site will **not fail** the objective standard in 2005

Site 16: Cricklade Road, Swindon – Roadside site 5.5m from kerbside
(This site contributes to the National Database)

1999 Ann. Mean = 41.00ug/m³ x 0.83 correction factor = 34.0 ug/m³

2000 Ann. Mean = 39.7ug/m³ x 0.86 correction factor = 34.1 ug/m³

2001 Ann. Mean = 31.5ug/m³ x 0.89 correction factor = 28.0 ug/m³

2002 Ann. Mean = 29.5ug/m³ x 0.92 correction factor = 27.1 ug/m³

It is predicted that this site will **not fail** the objective standard in 2005

Site 17: Bruce Street Bridges, Swindon – Roadside site 5.5m from kerbside

1999 Ann. Mean = 35.9ug/m³ x 0.83 correction factor = 29.8 ug/m³

2000 Ann. Mean = 34.2ug/m³ x 0.86 correction factor = 29.4 ug/m³

2001 Ann. Mean = 34.4ug/m³ x 0.89 correction factor = 30.6 ug/m³

2002 Ann. Mean = 29.9ug/m³ x 0.92 correction factor = 27.5 ug/m³

It is predicted that this site will **not fail** the objective standard in 2005

2000 Nitrogen Dioxide Diffusion Tube Results: ug/m3

Site 1:	GWR Museum, Faringdon Road, Swindon	<i>(Roadside site - 2.7m from Emlyn Square)</i>
Site 2:	Pipers Way, Swindon	<i>(Intermediate site - 30m from Pipers roundabout)</i>
Site 3:	Roussel Laboratory, Kingfisher Drive, Swindon	<i>(Urban background site – 170m from Cricklade Road)</i>
Site 4:	Crowdys Hill School, Jefferies Avenue, Swindon	<i>(Urban background site – 170m from Cricklade Road)</i>
Site 5:	F/O 186 Kingshill Road, Swindon	<i>(1m from Kingshill Road, at bottom of hill)</i>
Site 6:	Chalet School, Queens Drive, Swindon	<i>(14.3m from Queens Drive)</i>
Site 7:	Link Centre, Tewkesbury Way, Swindon	<i>(61m from Tewksbury Way)</i>
Site 8:	Thornhill, South Marston	<i>(on Thornhill roundabout)</i>
Site 9:	Village Hall, South Marston	<i>(10m from Old Vicarage Lane)</i>
Site 10:	Ermin Street, Blunsdon	<i>(on dual-carriageway central reservation)</i>
Site 11:	South Street, Swindon	<i>(Established Nov. 1999) (1m from kerbside in South Street)</i>
Site 12:	Swindon Bus Station	<i>(Established Nov. 1999)(within Bus Station)</i>
Site 13:	Meadow Way, Badbury Wick	<i>(Established Dec 1999) (74m from M4 Motorway kerbside)</i>
Site 14:	Kingshill Road/Clifton Street, Swindon	<i>(Established Dec. 1999)(1m from kerbside of Kingshill Road, towards top of hill)</i>
Site 15:	Westcott Place, Swindon	<i>(Established Dec. 1999)(5.5m from kerbside of Cricklade Road).</i>
Site 16:	F/O 483 Cricklade Road, Swindon	<i>(Established Dec. 1999 (5.5m from Kerbside of Cricklade Road)</i>
Site 17:	Bruce Street Bridges, Swindon	<i>Established Dec. 1999) (5.5m from kerbside of Bruce Street roundabouts)</i>
Site 18:	Validation sample	<i>(*located at site 5)</i>

Site no.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept	Oct.	Nov.	Dec.
1	*44.1	36.6	41.3	36.1	19.5	34.8	27.9	25.9	35	23.8	38.5	33.2
2	29.5	24.9	22.6	23.1	22.8	20.2	12.4	20.3	19.9	20.5	22	25.6
3	31.5	26.3	26.4	18.3	18.9	15.5	16.2	18.4	22.4	18.9	20.1	30
4	34.2	n/r	22.9	19.7	15.6	18	10.4	21.6	20.4	38.9	31.9	26.5
5	54.7	39.6	43.3	43.5	43.8	43.7	31.7	42.1	40.2	31.9	40.5	49.8
6	49.7	46.8	43.2	30.5	32.6	33.4	24.2	34.3	32.7	26.4	49.8	39.4
7	34.6	29.9	32.9	23.9	n/r	18.9	16.3	18.6	17	20.8	24.9	25.9
8	44.2	41.7	29.1	30.3	19.8	29.1	14.6	26.2	36.2	35.4	49.8	36.7
9	36	27.7	23.4	14.5	13.1	15.3	8.9	15.3	15.7	19.1	26.6	27.3
10	42.3	29.8	41.1	37.4	28	35.4	29.7	32.5	28.6	30.8	30.9	36.4
11	39.6	32.7	33.9	27.6	22.1	16.6	15.2	20.1	24.1	25.2	30.5	34.7
12	43.6	45.9	49	41.9	37.5	50.4	35.2	35.8	36.4	44	58	47.7
13	46.5	42.6	43.2	25.1	27.4	34.6	21	31.1	26.5	30.5	39.5	42.7
14	49.9	59.1	55.1	42.7	51.4	63.1	38.5	54.1	39.8	39.9	49.6	41.5
15	47.8	46.7	53	53.6	48.8	33.7	30.8	37	44.8	n/r	n/r	48.3
16	51	44.9	48.9	35.1	38.8	33.7	29.2	39.6	34.8	40.8	42.6	37.1
17	42.7	28.9	39.7	42.3	50.1	29.9	22.5	33	27.8	20.3	31.5	42
18	*32.1	*46.5								*36.1	*40.8	*50.9

Sites 1,2,3 & 4 contribute to the National Survey and are classified accordingly

2000 Annual Mean Values:

Site 1:	(2.5m from kerbside at Emlyn Square	33.1 ug/m ³	(12 samples)
Site 2:	(30m from Pipers Roundabout)	22.0 ug/m ³	(12 samples)
Site 3:	(123m from Dorcan Way)	21.9 ug/m ³	(12 samples)
Site 4:	(170m from Cricklade Road)	23.7 ug/m ³	(11 samples)
Site 5:	(1m from kerbside at bottom of Kingshill Road	42.1 ug/m³ (105.25%)	(12 samples)
Site 6:	(14.3m from Queens Drive)	36.9 ug/m ³	(12 samples)
Site 7:	(61m from Tewksbury Way)	24.0 ug/m ³	(11 samples)
Site 8:	(On Thornhill Roundabout)	32.8 ug/m ³	(12 samples)
Site 9:	(10m from Old Vicarage Lane)	20.2 ug/m ³	(12 samples)
Site 10:	(on dual-carriageway central reservation)	33.6 ug/m ³	(12 samples)
Site 11:	(1m from kerbside at South Street)	26.9 ug/m ³	(12 samples)
Site 12:	(within Bus Station)	43.8 ug/m³ (109.5%)	(12 samples)
Site 13:	(74m from M4 Motorway)	34.2 ug/m ³	(12 samples)
Site 14:	(1m from kerbside at top of Kingshill Road)	48.7 ug/m³ (121.75%)	(12 samples)
Site 15:	(1.4m from kerbside at Westcott Place)	44.5 ug/m³ (111.25%)	(10 samples)
Site 16:	(5.5m from Cricklade Road)	39.7 ug/m ³	(12 samples)
Site 17:	(5.5m from Bruce Street Roundabout)	34.2 ug/m ³	(12 samples)
Site 18:	Validation sample for Site 5	41.3 ug/m³ (103.25%)	(05 samples)

2001 Nitrogen Dioxide diffusion tube results – ug/m3**Site Nos 1 & 3 > 18 details as 2000**

NOTE: Beginning January 2001, the classifications of sites contributing to the National survey were altered by NETCEN with the effect that Site nos 1 & 16 are now 'Roadside' sites, (being sites 1-5 metres from a busy road, but may be up to 15 metres) with sites 3 & 4 'Urban Background' sites, (being sites > 50 metres from a busy road and typically in a residential area).

Site No. 2 now relocated at Leamington Grove, Swindon [Grid Ref: SU 166 827] from 01/01/01 and deleted from National Survey.

Site No. 16 classified as a 'Roadside' Site contributing to National Survey from 01/01/01 – Due to repeated loss of tubes, this site re-located to F/O 461 Cricklade Road with effect from 02/10/2001: due to further repeated loss of tubes, this site relocated again to opposite side of Cricklade Road, F/O No. 422 (lamp-post 124, 2.6m from kerbside) with effect from 04/03/2003.

Site no.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept	Oct.	Nov.	Dec.
1	n/r	42.3	28.5	33.9	34.7	25.2	23.9	23.2	29.3	30.8	35.5	n/r
2	35.5	31.7	30.6	20.2	15.6	8.8	9.7	13.5	17.7	14.5	30.3	21.5
3	30.3	36.3	24.3	19.2	23.3	12.3	16.8	15.7	13.6	17.2	32.6	28.7
4	n/r	29.4	26.2	20.7	19.5	10	14.1	16.9	15.6	24.6	36.4	26.5
5	25.9	50.4	37.3	35.6	18.9	28.9	n/r	33.6	29.9	39	56.6	35.9
6	39.1	47	31.9	41.1	28.8	24.5	27.8	29.8	21.4	21.4	45.5	28.9
7	28.3	36.3	26.3	18.6	23.1	12.7	n/r	17.8	n/r	23.4	34.6	26.3
8	36.8	33.9	32.9	21.9	20.5	16.2	25.4	15.2	21.4	27.7	47.6	25.8
9	21	26.7	22.4	18.5	14.3	11.8	14.6	12.5	18.3	15.5	34.4	25.5
10	28.2	42.8	33	28.6	44.7	20.3	26.4	24	32.8	28.8	41.1	38.8
11	44.9	N/r	33.3	26.3	25.7	11.3	15.3	17.7	19	25.2	35.4	19.2
12	50.5	56.3	52.2	57.9	50.3	23.6	35.5	35.5	33.7	37.1	57.7	n/r
13	38.5	46	39.7	36.1	25.4	14.7	22.6	21.6	13.8	31.3	52.8	n/r
14	44.9	61.65	55.7	43.6	49.1	28.3	40.6	37.9	29.1	37.4	44.8	46.9
15	n/r	52.6	n/r	39.2	28	23.4	n/r	32.8	37	42	n/r	n/r
16	34	48.9	n/r	n/r	n/r	22.1	n/r	n/r	n/r	23.1	n/r	29.5
17	56.9	46.2	43.2	28.8	40.5	19.7	17.2	22.1	24.2	30.5	42.3	40.8
18	*37.3	* 49.9	* 47.2	*32	*31.4	*15	n/r	*33.5	*35.2	*36.8	*34.7	*29.8

2001 Annual Mean Values

Site 1:	30.73 ug/m ³	(10 samples)
Site 2:	20.80 ug/m ³	(12 samples)
Site 3:	22.53 ug/m ³	(12 samples)
Site 4:	21.63 ug/m ³	(11 samples)
Site 5:	35.64 ug/m ³	(11 samples)
Site 6:	32.27 ug/m ³	(12 samples)
Site 7:	24.74 ug/m ³	(10 samples)
Site 8:	27.19 ug/m ³	(12 samples)
Site 9:	19.63 ug/m ³	(12 samples)
Site 10:	32.46 ug/m ³	(12 samples)
Site 11:	24.85 ug/m ³	(11 samples)
Site 12:	44.57 ug/m³ (111.43%)	(11 samples)
Site 13:	31.14 ug/m ³	(11 samples)
Site 14:	43.33 ug/m³ (108.33%)	(12 samples)
Site 15:	36.43 ug/m ³	(07 samples)
Site 16:	31.52 ug/m ³	(05 samples)
Site 17:	34.37 ug/m ³	(12 samples)
Site 18:	34.80 ug/m ³	(11 samples)

2002 Nitrogen Dioxide Diffusion Tube Results – ug/,3

All sites as 2001

Site no.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept	Oct.	Nov.	Dec.
1	34.8	24.4	34.7	38.7	n/r	21.1	29.4	29	28.7	29.3	19.5	20.9
2	20.3	19.8	19.1	n/r	11.5	11.5	10.2	7.9	22.2	20.3	25	29.6
3	26.9	n/r	n/r	16.4	19.5	7.9	18.2	16.9	20.7	24.8	25.9	39.7
4	31	22.7	17.5	18.2	12.2	15.6	14.5	13.4	23.1	24.5	26.9	10.6
5	n/r	38.9	60.1	40.2	44.7	n/r	18.8	28.9	35	37.5	44	41.3
6	31.4	30.3	42.4	29.5	28.9	22.2	12.9	13.5	24	37.4	34.4	26.7
7	26.5	29.9	36.5	18.9	n/r	n/r	17.6	14.7	17.7	14.8	18.5	29.4
8	32.4	21.7	27.8	23.2	n/r	13.2	26.9	16	17.6	32.2	26.9	20.8
9	44.8	21.7	36.1	13.2	13.1	18.5	17.4	8.9	12.7	22.2	12.2	27.3
10	26.9	23.6	31.3	20.6	20.6	19.7	27.1	26.5	45.7	37.7	28.6	23.3
11	31.6	27.1	33.5	20.5	19	n/r	13.4	n/r	23.4	11.2	8.2	31.3
12	41.7	14.4	44.8	47.9	46	30.5	40.8	30.2	45.7	46.7	47.3	30.6
13	31.8	26.8	37.7	31.5	40.4	45.1	35.4	19	31.6	34.4	21.7	17.4
14	47.4	31	44.3	34.5	39.7	n/r	n/r	35.3	48.2	47.4	20.8	37.2
15	33.1	n/r	30.3	n/r	n/r	15.2	40.9	28.7	48	45.6	53.1	29.8
16	44	18.7	36.2	23.8	22.5	15.9	n/r	22.7	n/r	n/r	n/r	n/r
17	28.5	21.2	33.1	30	28.5	15.5	22.2	17.8	43.6	38.1	37.8	42.0
18	n/r	*33.6	* 46.4	n/r	*32.1	n/r	*29.4	*29.4	*32	*26.8	41.8	38.3

2002 Annual Mean Values:

Site 1:	28.23 ug/m3	(11 samples)
Site 2:	17.95 ug/m3	(11 samples)
Site 3:	21.69 ug/m3	(10 samples)
Site 4:	19.18 ug/m3	(12 samples)
Site 5:	38.94 ug/m3	(10 samples)
Site 6:	27.80 ug/m3	(12 samples)
Site 7:	22.36 ug/m3	(10 samples)
Site 8:	23.52 ug/m3	(11 samples)
Site 9:	20.68 ug/m3	(12 samples)
Site 10:	27.63 ug/m3	(12 samples)
Site 11:	21.92 ug/m3	(10 samples)
Site 12:	38.88 ug/m3	(12 samples)
Site 13:	31.07 ug/m3	(12 samples)
Site 14:	38.58 ug/m3	(10 samples)
Site 15:	36.07 ug/m3	(09 samples)
Site 16:	26.43 ug/m3	(07 samples)
Site 17:	29.86 ug/m3	(12 samples)
Site 18:	34.42 ug/m3	(09 samples)

2003 Nitrogen Dioxide Diffusion Tube Results – ug/m³

All sites as 2002 excepting Site 16, which was relocated, due to repeated tube loss, to opposite side of road, F/O 422 Cricklade Road with effect from 04/03/03

Site no.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept	Oct.	Nov.	Dec.
1	37.0	44.7	35.3	32.9	26.4	38.8						
2	27.7	29.4	25.3	20.5	10.5	13.9						
3	30.9	34.8	30.5	25.2	5.8	18.0						
4	26.5	24.7	28.8	22.7	14.4	18.3						
5	45.6	34.9	44.8	40.6	21.0	39.8						
6	41.7	42.4	31.3	34.6	25.9	41.2						
7	30.5	33.0	32.2	26.1	16.1	16.8						
8	36.6	44.2	16.4	31.8	21.5	18.0						
9	27.5	34.3	23.6	18.4	9.9	16.1						
10	38.7	47.7	33.0	44.0	30.7	25.4						
11	31.8	39.9	34.0	28.0	15.0	15.7						
12	52.5	50.4	61.6	45.9	49.8	52.9						
13	42.0	48.0	42.8	39.2	24.9	36.9						
14	53.4	63.9	50.6	48.9	35.7	57.1						
15	47.3	n/r	n/r	39.0	29.9	31.1						
16	n/r	n/r	42.8	40.2	23.8	30.7						
17	35.5	56.8	60.8	48.1	19.9	27.8						
18	45.5	50.8	58.6	36.5	28.5	37.5						

APPENDIX 3

PARTICULATE MATTER MONITORING DATA

BRIDGE END ROAD MONITORING SITE, SWINDON [GRID REF: SU 167 861]

This continuous monitoring station was established in mid-August 2001 with the objective of gauging the daily variations and the average values of particulate matter pollution in the locality, which contains both a scrap metal recycling plant and a stone crushing/aggregate handling plant.

(Data continuity has been impaired by intermittent and prolonged power disruption)

2001	Max. daily reading	No. of days exceeding 50 mg/m³
August (from 15/08)	83	9
September	54	1
October	63	3
November	83	8
December	55	2
2002		
January (to 31/01)	58	3
April (from 16/04)	64	4
May (to 31/05)	76	6
December (from 13/12)	90	1
2003		
January (from ¼ to 10/04)	71	3
February (to 02/02)	79	1
April (to 10/04)	69	2

The Osiris monitor has not been calibrated for direct comparison of results with the Air Quality objective as the primary purpose of selection of this site was targeted investigation of the locality.

Appendix 4

Glossary of Terms

CO	Carbon Monoxide
SO ₂	Sulphur Dioxide
NO ₂	Nitrogen Dioxide
NO _x	Collective term to describe Nitric Oxide and Nitrogen Dioxide
PM ₁₀	Particulate matter less than 10 microns in diameter
Ug/m ³	Micrograms per cubic metre (i.e. one-millionth of a gram of pollutant per cubic meter).
Part B	Industrial Process authorised by the Local Authority under Part B of the Environmental Protection Act 1990.
AADT	Annual average daily traffic flow (vehicles/day)
AQMA	Air Quality Management Area
DEFRA	Department for Environment, Food & Rural affairs
DMRB	Design Manual for Road & Bridges Screening Model (v1.01)
HDV	Heavy Duty Vehicles (includes rigid and articulated heavy goods vehicles & buses & coaches)
NETCEN	National Environmental Technology Centre