



**Dartford Borough Council**

**Local Air Quality Management – Updating and  
Screening Assessment**

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For the benefit of business and people



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**Client:**

**Dartford Borough Council**  
**Civic Centre**  
**Home Gardens**  
**Dartford**

**Project Manager**  
**Tel:**  
**Fax:**

**James Fox**  
**01322 343250**

**Environmental Consultant**

**Bureau Veritas**  
**Parklands**  
**825A Wilmslow Road**  
**Didsbury**  
**Manchester**  
**M20 2RE**

**Project Manager**  
**Tel:**  
**Fax:**

**Sharon Atkins**  
**0161 888 7139**  
**0161 888 7102**

**Project Team**      *Laurence Caird*  
                                  *Sharon Atkins*

**Principal Author**      *Laurence Caird*  
                                  *Sharon Atkins*

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	<b>Status</b>	<b>Description</b>	<b>Prepared by:</b> <b>Laurence Caird</b>  <b>Assistant Consultant</b> <b><i>Signed/Dated</i></b>	<b>Reviewed by:</b> <b>Sharon Atkins</b>  <b>Principal Consultant</b> <b><i>Signed/Dated</i></b>
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## EXECUTIVE SUMMARY

Part IV of the Environment Act 1995 places a statutory duty on local authorities to review and assess the air quality within their area and take account of Government Guidance when undertaking such work.

Between 1998 and 2001, Dartford Borough Council undertook its first round of review and assessment of air quality. The first round assessments (Stages 1, 2 and 3) concluded that it was necessary to declare an Air Quality Management Area (AQMA) for nitrogen dioxide (NO<sub>2</sub>) and fine particulates (PM<sub>10</sub>) along the A282 Dartford Tunnel Approach Road.

The first phase of the second round of review and assessment, the USA, was completed in May 2003 and this provided an update with respect to air quality issues within Dartford Borough Council. The USA concluded that a Detailed Assessment was required for the nitrogen dioxide (NO<sub>2</sub>) annual mean objective in Dartford Town Centre (Highfield Road/Instone Street), along the A226 London Road (through Greenhithe and Swanscombe), the A206 University Way, and five heavily trafficked junctions with nearby relevant exposure:

- Bean Interchange
- A226/B255 St Clement's Way
- A226 East Hill/Park Road
- A226 The Brent/Watling Street/St Vincents Road
- A225 Lowfield Street/Princes Road.

A Detailed Assessment of fine particulates (PM<sub>10</sub>) was also required at the busy A226/B255 St Clement's Way junction in Greenhithe.

Results of the Detailed Assessment (2004) predicted that all areas assessed would exceed the NO<sub>2</sub> annual objective of 40µg/m<sup>3</sup>. There were also predicted exceedences of the 24-hour PM<sub>10</sub> objective at the nearest receptor to the A226/B255 St Clements junction in 2004. It was recommended that Dartford Borough Council consider declaring Air Quality Management Areas (AQMA) on the basis of the potential exceedences in the assessment areas as highlighted in the Detailed Assessment Report where exposure criteria were fulfilled. Dartford Borough Council is currently undergoing consultation on these areas prior to their declaration.

The Updating and Screening Assessment (USA) provides an update with respect to air quality issues within the Borough. There have been a number of changes since the last (second) round of review and assessments which have been taken into account in this assessment; including revised modelled background concentration maps, updated future year calculation tools and updates on specific sources (rail, shipping, poultry farms). The USA has included consideration of new emissions sources, in addition to any significant changes to existing emission sources identified in the previous rounds.

The USA considers the seven priority health based air quality objectives as laid down in Regulations and assesses the likelihood that the air quality objectives will be met by their target dates. If the air quality objectives are unlikely to be met, a detailed assessment will be required. It also considers the provisional fine particulates (PM<sub>10</sub>) objectives for 2010,

although no detailed assessment of the 2010 PM<sub>10</sub> objectives is required at this stage as the objectives have not been laid down in Regulations.

Having considered each pollutant and presented evidence to support the assessment of each, it is concluded that the air quality objectives for benzene, 1, 3-butadiene, carbon monoxide, lead, and sulphur dioxide will be met. There will be no requirement to undertake a detailed assessment for these pollutants.

The results of the screening assessment have shown that a detailed assessment is required for nitrogen dioxide as a result of monitored exceedences at London Road, Northfleet diffusion tube location; DMRB predicted exceedences at the nearest receptors to the A226 Galley Hill, Northfleet, A226 Hythe Street and A226 West Hill; and DMRB predicted exceedences at the nearest receptors to the Shepherd's Lane/West Hill, A226 Westgate/Priory Road and A225 Princes Road/Shepherd's Lane junctions.

The results of the screening assessment have shown that a detailed assessment is required for PM<sub>10</sub> as a result of DMRB predicted exceedences of the 24 hour mean objective at 7 junctions: Shepherd's Lane/West Hill, St Vincent's Road/The Brent, East Hill/Park Road, A226 Westgate/Priory Road, A226 London Road/A225 Princes Road, A225 Princes Road/Shepherd's Lane, and Bean Interchange (for Bluewater).

The provisional PM<sub>10</sub> objectives for 2010 are predicted to be exceeded at a number of busy roads and junctions assessed due to the high modelled background PM<sub>10</sub> for 2010. This will require further assessment in future air quality assessments once included in Regulations.

It is recommended that the Council continue with its monitoring programme for nitrogen dioxide to confirm the findings of this report.

### Summary Table

Pollutant	Detailed assessment required?	Sources/Location
Benzene	No	
1, 3 - butadiene	No	
Carbon monoxide	No	
Lead	No	
Nitrogen dioxide	Yes	Detailed Assessment required with respect to monitored exceedences at London Road, Northfleet diffusion tube location; DMRB predicted exceedences at the A226 Galley Hill, Northfleet, A226 Hythe Street and A226 West Hill; and DMRB predicted exceedences at the Shepherd's Lane/West Hill, A226 Westgate/Priory Road and A225 Princes Road/Shepherd's Lane junctions.
PM <sub>10</sub>	Yes	Detailed Assessment required with respect to DMRB predicted exceedences at Shepherd's Lane/West Hill, St Vincent's Road/The Brent, East Hill/Park Road, A226 Westgate/Priory Road, A226 London Road/A225 Princes Road, A225 Princes



		Road/Shepherd's Lane, and Bean Interchange (for Bluewater).
Sulphur dioxide	No	

## 1 INTRODUCTION

### 1.1 Project Background

Bureau Veritas was appointed by Dartford Borough Council to carry out the third round Updating and Screening Assessment (USA) of air pollution sources that may affect local air quality within the area based on information provided by the local authority. The USA is required to be undertaken as part of the local authority's statutory duties under the Local Air Quality Management (LAQM) regime as defined within Part IV of the Environment Act 1995.

### 1.2 Legislative Background

Part IV of the Environment Act 1995 places a statutory duty on local authorities to periodically review and assess the air quality within their area. This involves consideration of present and likely future air quality against air quality standards and objectives. Guidelines for the 'Review and Assessment' of local air quality were published in the 1997 National Air Quality Strategy (NAQS)<sup>1</sup> along with associated policy guidance and technical guidance. In 2000, Government reviewed the NAQS and published a revised Air Quality Strategy (AQS) for England, Scotland, Wales and Northern Ireland<sup>2</sup>. This laid out a revised framework for air quality standards and objectives for seven pollutants, which were subsequently set in Regulations in 2000 through the Air Quality Regulations 2000<sup>3</sup>. These were subsequently amended in 2002<sup>4</sup>.

More recently (February 2003), Government published its Addendum to the NAQS that proposed new Objectives for PM<sub>10</sub> in 2010 whilst also setting down new Objectives for benzene and carbon monoxide. Provisional Objectives for PM<sub>10</sub> have been set, which mark a significant tightening of the existing 2004 Objectives. For areas outside London in England and Wales a new annual mean objective of 20 µg/m<sup>3</sup> is proposed, whilst the fixed 24-hour mean remains at the same level (50 µg/m<sup>3</sup>) but with only 7 allowable exceedence days (rather than 35). The new Objectives have yet to be set in Regulations so do not currently require consideration, but have been assessed in this Report for completeness.

Revised Technical Guidance (LAQM.TG(03))<sup>5</sup> and Policy Guidance (LAQM.PG(03))<sup>6</sup> were issued on behalf of DEFRA in January 2003. This guidance sets the framework for the requirements of review and assessment for future years, taking account of experiences from the previous rounds of review and assessment. Additional guidance has been provided in the form of FAQs and updated LAQM tools in January 2006 to assist with the third round of review and assessment to be completed by April 2006. This includes revised modelled background concentration maps for NO<sub>x</sub>, NO<sub>2</sub> and PM<sub>10</sub>, updated future year calculation tools and updates on specific sources (rail, shipping, poultry farms).

The Objectives included in the Air Quality (England) Regulations, 2000, and Air Quality (England) (Amendment) Regulations, 2002, provide the over-arching assessment criteria to

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<sup>1</sup> DoE (1997) The United Kingdom National Air Quality Strategy The Stationery Office

<sup>2</sup> DETR (2000) The Air Quality Strategy for England, Scotland, Wales and Northern Ireland – Working together for Clean Air, The Stationery Office

<sup>3</sup> DETR (2000) The Air Quality Regulations 2000, The Stationery Office

<sup>4</sup> Defra (2002) The Air Quality Strategy for England, Scotland, Wales and Northern Ireland: Addendum, The Stationery Office

<sup>5</sup> Defra (2003) Technical Guidance LAQM.TG(03), Part IV of the Environment Act 1995, Local Air Quality Management, The Stationery Office

<sup>6</sup> Defra (2003) Policy Guidance LAQM.PG(03), Part IV of the Environment Act 1995, Local Air Quality Management, The Stationery Office

which local air quality management and the process of review and assessment relates. These are summarised below in Table 1.1 for the seven pollutants of concern to health which are assessed in this report.

**Table 1.1 Air Quality Standards and Objectives**

Pollutant	Air Quality Objective	Measured as	Date to be achieved by
	<b>Concentration</b>	<b>Measured as</b>	
<b>Benzene</b> All authorities	16.25 µg/m <sup>3</sup>	Running annual mean	31.12.2003
Authorities in England and Wales only	5.00 µg/m <sup>3</sup>	Annual mean	31.12.2010
<b>1,3 Butadiene</b>	2.25 µg/m <sup>3</sup>	Running annual mean	31.12.2003
<b>Carbon monoxide</b> Authorities in England, Wales and Northern Ireland only	10.0 mg/m <sup>3</sup>	Maximum daily 8-hour mean	31.12.2003
<b>Lead</b>	0.5 µg/m <sup>3</sup> 0.25 µg/m <sup>3</sup>	Annual mean Annual mean	31.12.2004 31.12.2008
<b>Nitrogen dioxide<sup>a</sup></b>	200 µg/m <sup>3</sup> not to be exceeded more than 18 times a year 40 µg/m <sup>3</sup>	1 hour mean annual mean	31.12.2005 31.12.2005
<b>Particles (PM<sub>10</sub>) (gravimetric)<sup>bc</sup></b> All authorities	50 µg/m <sup>3</sup> not to be exceeded more than 35 times a year 40 µg/m <sup>3</sup>  50 µg/m <sup>3</sup> not to be exceeded more than 7 times a year  20 µg/m <sup>3</sup>	24 hour mean  annual mean  24 hour mean  annual mean	31.12.2004  31.12.2004  31.12.2010  31.12.2010
<b>Sulphur dioxide</b>	350 µg/m <sup>3</sup> not to be exceeded more than 24 times a year 125 µg/m <sup>3</sup> not to be exceeded more than 3 times a year 266 µg/m <sup>3</sup> not to be exceeded more than 35 times a year	1 hour mean 24 hour mean 15 minute mean	31.12.2004 31.12.2004 31.12.2005

a. The objectives for nitrogen dioxide are provisional. These Objectives are equivalent to the EU Limit value to be met by 2010

b. Measured using the European gravimetric transfer sampler or equivalent.

c. Provisional objectives not included in Regulations to date.

Within the First Round of Review and Assessment it was recommended that local authorities fulfil their statutory duty under the Local Air Quality Management regime by undertaking a three-stage assessment, increasing in detail at each stage. The first stage of this process (Stage 1) includes undertaking a desktop review in order to identify all sources of pollution within the area. Using Technical Guidance issued by Government significance is placed on sources of pollution both within the authority's area and those immediately outside the authority's area, that are likely to impact on air quality. Having identified those sources and areas that require further attention, simple screening assessments (Stage 2) or detailed monitoring and modelling programmes (Stage 3) are undertaken. The more recent (2003-2005) Second Round of Review and Assessment provided a basis for local authorities to

again update their previous air quality assessments. In doing so, local authorities were to take into consideration changes in national air quality standards and objectives and revised Technical Guidance (LAQM.TG(03)), new emission sources, and any significant proposed planning developments due to take place before the relevant Air Quality Objective date. Where the results of the Review and Assessment process highlight that the problems are likely to exist with respect to achievement of the relevant Air Quality Standards and Objectives, the authority is required to declare an Air Quality Management Area (AQMA) under Section 83(1) of the Environment Act 1995.

Having declared an AQMA the authority is required to confirm the findings of the Detailed Assessment work through further monitoring or modelling assessments (Further Assessment). The Further Assessment should provide information on the source-apportionment of the pollutant emissions in order to identify the level of pollutant reduction required for the attainment of relevant air quality objectives. Additionally, consideration should be made to evaluating local management practices that could be used to improve air quality, and feed into the formulation of an Action Plan.

At the time of writing the Review and Assessment process has culminated in the declaration of over 175 separate AQMA areas across the UK. Results of the process have shown that road traffic emissions are the main cause of exceedences of two pollutants listed with the NAQS - fine particulates (PM<sub>10</sub>) and nitrogen dioxide (NO<sub>2</sub>). Whilst other pollutants such as carbon monoxide (CO) and benzene are associated with road traffic emissions, the latest national perspective on the occurrence of each of these pollutants suggests that these are no longer a problem at roadside locations across the UK.

### **1.3 Aims of the Updating and Screening Assessment**

The purpose of the Updating and Screening Assessment is:

- to identify new or substantially changed emission sources since the last round of review and assessment which may lead to an air quality objective being exceeded. A series of checklist for pollutants, and different screening tools for industrial and road traffic sources are used in order determine those new sources that may have significant contributions to potential exceedences of the air quality objectives.
- To assess new monitoring data in terms of relevant exposure and compare with air quality objectives
- Where a risk of exceeding an air quality objective at relevant exposure locations has been identified through the USA, a detailed assessment is required (due to be reported by April 2007). The detailed assessment should identify with reasonable certainty whether or not an exceedence is likely to occur.

### **1.4 Reporting of the Updating and Screening Assessment**

The USA has been reported as one section for each pollutant to be assessed, as per the LAQM.TG(03) Technical Guidance, with reference to updated checklists provided for the third round.

A summary of the responses to the USA checklist criteria for each pollutant has been included within each section.

## 1.5 Summary of the First and Second Rounds of Review and Assessment

The first phase of the second round of review and assessment, the USA, was completed in May 2003 and this provided an update with respect to air quality issues within Dartford Borough Council. The USA concluded that a Detailed Assessment was required for the nitrogen dioxide (NO<sub>2</sub>) annual mean Objective in Dartford Town Centre (Highfield Road/Instone Street), along the A226 London Road (through Greenhithe and Swanscombe), the A206 University Way, and five heavily trafficked junctions with nearby relevant exposure:

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A Detailed Assessment of fine particulates (PM<sub>10</sub>) was also required at the busy A226/B255 St Clement's Way junction in Greenhithe.

Results of the Detailed Assessment (2004) predicted that all areas assessed would exceed the NO<sub>2</sub> annual objective of 40µg/m<sup>3</sup>. There were also predicted exceedences of the 24-hour PM<sub>10</sub> objective at the nearest receptor to the A226/B255 St Clements junction in 2004. It was recommended that Dartford Borough Council consider declaring Air Quality Management Areas (AQMAs) on the basis of the potential exceedences in the assessment areas as highlighted in the Detailed Assessment Report where exposure criteria were fulfilled. Dartford Borough Council is currently undergoing consultation on these areas prior to their declaration.

The Annual Progress Report (APR) for 2005 considered monitoring data for 2004, and the conclusions of the APR were that there were potential exceedences outside the AQMA area at London Road, Northfleet which warranted a detailed assessment.

## 2 ASSESSMENT METHODOLOGY

Background concentrations as used in this assessment have been obtained from the national maps of modelled background concentrations available from the Air Quality Archive website [www.airquality.co.uk](http://www.airquality.co.uk). The maps have been updated for pollutants NO<sub>x</sub>, NO<sub>2</sub> and PM<sub>10</sub> from the previous round of review and assessment and are projected from a 2004 baseline.

Continuous monitoring results have been obtained directly from the network managers King's College ERG. Dartford Borough Council also operates additional monitoring outside the network, through nitrogen dioxide and benzene passive diffusion tubes, and these are also considered within this report.

Traffic data for roads within the area have been provided by Kent County Council, via their consultants Jacobs in the form of AADT data and future year growth factors obtained from TEMPRO/National Road Traffic Forecast. National Atmospheric Emissions Inventory road traffic data for trunk roads have been used to supplement the County data as appropriate. In the absence of speed data, speeds have been based on speed limits, modified according to local conditions to take account of congestion and stop/start vehicle movements at junctions. Speeds were reduced at junctions to 20kph at junctions in accordance with LAQM.TG (03) to reflect the higher emissions of queuing traffic.

Design Manual for Roads and Bridges (DMRB) screening method V1.02 has been used to predict the traffic flow at relevant receptor locations along significant roads and junctions in the area in order to assess the concentrations of NO<sub>2</sub>, PM<sub>10</sub>, CO and benzene in the relevant objective years. In addition, PM<sub>10</sub> concentrations have also been assessed for the year 2010, however the objectives are not yet set in Regulations for England and only a small consideration has been given to the provisional objectives in this assessment.

The Council has provided a current list of industrial processes (Part B/A2) for processes regulated by the Council under LAPPC. This includes a list of current petrol stations which have been screened using the criteria set out in the USA checklists. Additional information has been obtained for processes potentially significant to LAQM as set out in LAQM.TG(03) Annex 2. For the larger Part A1 processes, regulated by the Environment Agency, information has been obtained from the Environment Agency Pollution Inventory for new or changed processes potentially significant to LAQM as set out in LAQM.TG(03) Annex 2. Industrial sources in neighbouring Local Authority areas have also been taken into account. Industrial processes have been screened where relevant using LAQM nomogram tools.

Other potential sources of pollutant emissions in the area, such as rail, shipping, airports, domestic sources, bus stations, small boilers and fugitive sources of PM<sub>10</sub> (quarries, landfills, construction sites, etc) have been derived through discussions with the local authority and screened using the criteria as set out in the USA checklists.

### 3 UPDATING AND SCREENING OF CARBON MONOXIDE

#### 3.1 New monitoring data

There is currently no monitoring of carbon monoxide carried out within the Borough of Dartford. Carbon monoxide monitoring results for 2005 at all monitoring sites within the Kent & Medway Air Quality Monitoring Network, including busy roadside sites in Maidstone and Canterbury, confirm the Objective will be met.

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

Monitoring data from across the UK indicate that the carbon monoxide objective is only likely to be exceeded near to 'very busy' roads and junctions<sup>7</sup>, where the current year background concentration is greater than 1mg/m<sup>3</sup>. The highest modelled background concentration in 2005 in Dartford is 0.2mg/m<sup>3</sup>. Additionally, there are no new (or substantially changed) roads which meet the criteria for 'very busy' roads and junctions that warrant further assessment. The Objective is therefore expected to be achieved at all locations within the area.

#### 3.3 Conclusion

No further action is required for carbon monoxide.

#### Checklist Summary for Carbon Monoxide:

Item	Response
New monitoring data	The local authority is currently not monitoring carbon monoxide, but monitoring undertaken in Kent show the Objective to be met even at busy roadside sites
Very busy roads or junctions in built up areas	No new (or substantially changed) roads have been identified which meet this criteria. Background concentrations are below the threshold level.
<b>Conclusion</b>	<b>No further action required</b>

<sup>7</sup> 'Very busy' is defined as single carriageways with greater than 80,000 vehicles per day, dual carriageways with greater than 120,000 vehicles per day and motorways with greater than 140,000 vehicles per day

## **4 UPDATING AND SCREENING OF BENZENE**

### **4.1 Monitoring data outside an AQMA**

There is currently monitoring of benzene undertaken at two roadside sites within the Borough of Dartford: Princes Road and Lowfield Street. These sites have shown a substantial decrease in benzene concentrations in recent years brought about by the reduction of the concentrations of benzene in petrol. The results indicate that benzene concentrations are well below the 2010 annual mean benzene objective, even at these busy roadsides.

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

There are no AQMA areas that have been declared for benzene in the Borough of Dartford and therefore this section is not relevant.

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

Monitoring data from across the UK indicate that the benzene objective for 2010 is only likely to be exceeded near to 'very busy' roads and junctions<sup>8</sup>, where the 2010 background concentration is greater than  $2\mu\text{g}/\text{m}^3$ . The highest estimated background concentration in Dartford is  $0.5\mu\text{g}/\text{m}^3$ . This confirms that the objective will be met at all locations within the area.

### **4.3 New industrial sources**

There have been no new processes identified in the Borough of Dartford or in neighbouring authorities which emit significant quantities of benzene.

### **4.4 Industrial sources with substantially increased emissions, or new relevant exposure**

There are no existing industrial processes that emit significant quantities of benzene. There are therefore unlikely to be exceedences of the benzene objective as a result of industrial processes.

### **4.4 Petrol stations**

Petrol stations are only likely to lead to an exceedence of the 2010 objective for benzene if they have a large throughput of petrol (greater than 2 million litres per annum), are near to a busy road (>30,000 AADT) and have relevant exposure within 10 m of the petrol pumps. There are no petrol stations within the Borough of Dartford that fulfil these criteria, and therefore it is unlikely that petrol stations will lead to an exceedence of the benzene objective.

### **4.5 Major fuel storage depots (petrol only)**

There are no major fuel storage depots in the Borough of Dartford.

### **4.6 Conclusion**

No further action is required for benzene.

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<sup>8</sup> 'Very busy' is defined as single carriageways with greater than 80,000 vehicles per day, dual carriageways with greater than 120,000 vehicles per day and motorways with greater than 140,000 vehicles per day

### Checklist Summary for Benzene:

Item	Response
Monitoring data outside an AQMA	The Borough of Dartford is currently monitoring benzene, and roadside benzene monitoring results show levels well below the objective
Monitoring data within an AQMA	No AQMA, therefore not relevant
Very busy roads or junctions in built up areas	No roads or junctions have been identified which meet this criteria
New industrial sources.	No industrial processes have been identified which meet this criteria
Industrial sources with substantially increased emissions, or new relevant exposure	No industrial processes have been identified which meet this criteria
Petrol stations	No petrol stations have been identified which meet this criteria
Major fuel storage depots (petrol only)	No major fuel storage depots in the area
<b>Conclusion</b>	<b>No further action required</b>

## 5 UPDATING AND SCREENING OF 1,3-BUTADIENE

### 5.1 Monitoring data

There is currently no monitoring of 1,3-butadiene carried out within the Borough of Dartford. Monitoring is carried out as part of the national Automatic Urban and Rural Monitoring Network (AURN) and the results show that the running annual mean objective is expected to be achieved where there are no significant sources. As there are no significant sources of 1,3-butadiene in Dartford, it is expected that the objective will be met within the Dartford area.

### 5.2 New industrial sources

There are no new processes which handle 1,3-butadiene located in or near to the Borough of Dartford.

### 5.3 Existing industrial sources with significantly increased emissions, or new relevant exposure

There are no existing industrial processes located in or near to the Borough of Dartford which emit significant quantities of 1,3-butadiene.

### 5.4 Conclusion

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

#### Checklist Summary for 1,3-butadiene:

Item	Response
Monitoring data	The local authority is not currently monitoring 1,3-butadiene
New industrial sources	No industrial processes have been identified which meet this criteria
Existing industrial sources with significantly increased emissions, or new relevant exposure	No industrial processes have been identified which meet this criteria
<b>Conclusion</b>	<b>No further action required</b>

## 6 UPDATING AND SCREENING OF LEAD

### 6.1 Monitoring data

There is currently no monitoring of lead carried out in the Borough of Dartford. Monitoring is carried out as part of the national metals monitoring network and the results show that the running annual mean objective is expected to be achieved where there are no significant sources. As there are no significant sources of lead in Dartford, it is expected that the objective will be met within the Borough of Dartford.

### 6.2 New industrial sources

There are no new processes, which emit lead, located in or near to the Borough of Dartford.

### 6.3 Industrial sources with substantially increased emissions, or new relevant exposure

There are no processes, which emit lead, located in or near to the Borough of Dartford.

### 6.4 Conclusion

No further action is required for lead.

#### Checklist Summary for Lead:

Item	Response
Monitoring data	The local authority is currently not monitoring lead
New industrial sources	No industrial processes have been identified which meet this criteria
Industrial sources with substantially increased emissions, or new relevant exposure	No industrial processes have been identified which meet this criteria
<b>Conclusion</b>	<b>No further action required</b>

## 7 UPDATING AND SCREENING OF NITROGEN DIOXIDE

### 7.2 Monitoring data outside an AQMA

There is currently continuous monitoring of nitrogen dioxide undertaken by Dartford Borough Council outside an AQMA at three roadside locations in the area (although these areas will be subject to declaration in the near future). The Council calibrates the site every two weeks and Enviro Technology services the station 6 monthly. Data for 2005 has been provisionally ratified by Network Managers King's College ERG. The results, as shown in Table 7.1, show that the objectives are exceeded at all three roadside sites.

**Table 7.1 Continuous nitrogen dioxide monitoring results 2005**

Location	X	Y	Data capture	2005 NO <sub>2</sub> Annual Mean	No. exceedences of hourly mean >200ug/m <sup>3</sup>
Dartford Roadside 1:St Clements	558525	174709	99	59	28
Dartford Roadside 2: Town Centre	554117	173852	98	51	0
Dartford Roadside 3: Bean Interchange	558622	172752	69	60	10

Nitrogen dioxide was measured using diffusion tubes at 22 locations in the Borough of Dartford in 2005. Five new sites have been established in December 2005 to provide additional information in the emerging AQMA areas and other potential pollutant hotspots. Gradko International Limited supplies and analyses the diffusion tubes using the 50% TEA<sup>9</sup> in acetone method. Gradko International Limited participates in the UK National Diffusion Tube Network and the Workplace Analysis Scheme for Efficiency (WASP). They currently hold UKAS accreditation for analysis of diffusion tubes.

With regard to the application of a bias adjustment factor for the diffusion tubes, the technical guidance LAQM.TG (03) and Review and Assessment Helpdesk<sup>10</sup> recommends use of a local bias adjustment factor where available and relevant to diffusion tube sites. Dartford Borough Council has triplicate co-located diffusion tubes at the Bean Interchange continuous monitoring station in Dartford which has been used to derive a local bias adjustment factor for 2005 of 0.975. Annualisation of data has been undertaken for short-term sites in accordance with LAQM.TG(03).

The bias adjusted diffusion tube results, as shown in Table 7.2, show predicted exceedences at 9 monitoring locations outside an AQMA in 2005, where there is relevant exposure:

- DA05 Ightham Cottages, Bean Interchange (Emerging AQMA)
- DA10 London Road, Stone (Emerging AQMA)
- DA16 Princes Road II (Emerging AQMA)
- DA17 Shepherd's Lane, Dartford
- DA28 Ivy Villas (Emerging AQMA)
- DA30 Charles Street
- DA34 The Brent II (Emerging AQMA)
- DA35 Highfield Road (Emerging AQMA)
- DA36 Burnham Road (Emerging AQMA)

<sup>9</sup> TEA = Triethanolamine

<sup>10</sup> [www.uwe.ac.uk/aqm/review](http://www.uwe.ac.uk/aqm/review)

Taking into account the projection to façade ([www.uwe.ac.uk/agm/review](http://www.uwe.ac.uk/agm/review) FAQ) from these sites, 7 are predicted to exceed the annual mean objective at the nearest receptor façades.

The nearest receptors to the roadside in the vicinity of the Burnham Road and Shepherd's Lane monitoring sites are 10-20m. The projection to façade indicates the annual mean objective will be met. Burnham Road is within an area that was flagged up in the Detailed Assessment as a potential area of exceedence. Based on the 2005 monitoring results, it is expected that the objective will be met at the nearest receptors.

The DA05 Ightham Cottages, Bean Interchange, DA10 London Road, Stone, DA16 Princes Road II, DA28 Ivy Villas, DA34 The Brent II, DA35 Highfield Road monitoring sites are all showing predicted exceedences at the nearest receptor façade. These are all areas previously assessed within a Detailed Assessment and are emerging AQMA areas that the Council are in the process of consulting on with respect to declaration.

The DA30 Charles Street monitoring results indicate predicted exceedences at the nearest receptor facades. However, there is low data capture for this site in 2005, due to vandalism. The previous (2004) year's monitoring results indicate that the annual mean objective would be met at the roadside.

DA31 London Road, Northfleet monitoring results for 2005 indicate the objective will be met. However, the annual progress report 2005 which considered 2004 monitoring results predicted exceedences at this location. As the location is an intermediate site and there are closer residential receptors to London Road, it has been recommended by the UWE appraisal team that a Detailed Assessment be undertaken at this location,

The majority of the monitoring sites in the Borough are kerbside and roadside sites. It is recommended that the Council consider reviewing their current sites to ensure that the sites are representative of relevant exposure and the emerging AQMA areas are robustly monitored.



**Table 7.2 Nitrogen dioxide diffusion tube annual mean results 2005 in  $\mu\text{g}/\text{m}^3$**

Code	Address	x	y	Class	No. Months Data	Annual Mean 2005	Annual Mean 2005 Projected to 2010	AQMA/ Emerging AQMA?	2005 Annual Mean with façade projection
DA01	Lowfield Street, Dartford (Site 1)	554187	173985	kerbside	12	<b>50.4</b>	<b>42.4</b>	Emerging	No exposure
DA05/32/33	Ightham Cottages near A2 with ZR1	558578	172821	Roadside	12	<b>59.1</b>	<b>49.7</b>	Emerging	<b>44.2</b>
DA07	Summerhouse Drive, Dartford	550750	171918	background	11	31.5	27.6	-	-
DA10	London Road, Stone	559189	174872	Roadside	11	<b>48.2</b>	<b>40.5</b>	Emerging	<b>45.8</b>
DA12	Bob Dunn Way, Dartford	553277	175345	Roadside	7	<b>60.7</b>	<b>51.1</b>	-	No exposure
DA14	Bow Arrow Lane, Dartford	555484	174441	Roadside	12	<b>72.9</b>	<b>61.3</b>	AQMA	-
DA16	Princes Road (2), Dartford	554108	173318	kerbside	12	<b>50.4</b>	<b>42.4</b>	Emerging	<b>45.4</b>
DA17	Shepherds Lane, Dartford	552732	173689	Roadside	12	<b>50.0</b>	<b>42.1</b>	-	37.5
DA18	Alkerden Lane Swanscombe	560298	174282	background	12	34.9	30.5	-	-
DA20	Elliot Road, Dartford	555660	174863	intermediate	12	<b>48.3</b>	<b>40.3</b>	AQMA	-
DA21	Brentfield Road, Dartford	555501	174005	intermediate	12	<b>44.4</b>	37.4	AQMA	-
DA22	Brent Way, Dartford	555600	174030	intermediate	12	<b>65.3</b>	<b>54.9</b>	AQMA	-
DA23	The Brent, Dartford	555751	173900	kerbside	12	<b>54.0</b>	<b>45.4</b>	AQMA	-
DA24	Wayville Road, Dartford	555632	173558	intermediate	12	<b>43.1</b>	36.3	AQMA	-
DA25	Queens Gardens, Dartford	555795	173210	background	12	<b>51.4</b>	<b>45.0</b>	AQMA	-
DA27	Fairway Drive, Dartford	555718	173805	intermediate	11	<b>48.1</b>	<b>40.5</b>	AQMA	-
DA28	Ivy Villas, Greenhithe	558460	174671	kerbside	12	<b>55.4</b>	<b>46.6</b>	Emerging	<b>41.6</b>
DA30	Charles Street, Greenhithe	557887	175001	Roadside	4	<b>44.8</b>	37.7	-	<b>42.6</b>
DA31	London Road, Northfleet	561215	174898	intermediate	11	38.3	32.2	-	-
DA34	The Brent II	555373	173763	intermediate	7	<b>50.3</b>	<b>42.3</b>	Emerging	<b>45.3</b>
DA35	Highfield Road	553568	173557	Roadside	5	<b>58.0</b>	<b>48.8</b>	Emerging	<b>52.2</b>
DA36	Burnham Road	553257	175263	Roadside	5	<b>44.9</b>	37.8	Emerging	33.7
DA37	Watling Street	556567	173450	kerbside	1	-	-	-	-
DA38	London Road III	558258	174588	kerbside	1	-	-	-	-
DA39	Park Road	555158	173825	kerbside	1	-	-	Emerging	-
DA40	West Hill	553500	174238	kerbside	1	-	-	-	-
DA41	Church Hill	554172	172812	kerbside	1	-	-	-	-

Notes Exceedences are highlighted in bold.

### 7.3 Monitoring data within an AQMA

There is currently one AQMA area in the Borough of Dartford in relation to exceedences of the NO<sub>2</sub> and PM<sub>10</sub> annual mean objectives, along the A282 Dartford Tunnel Approach Road. The diffusion tube monitoring undertaken in this area as shown in Table 7.2, show widespread exceedences of the annual mean objective.

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

There are no new areas identified which meet this criteria and there is no new relevant exposure at the locations previously assessed in the USA 2003. As these types of location were specifically included during previous rounds, there is no need to proceed further with this section.

### 7.5 Junctions

Eight junctions have been identified as potentially significant due to congestion issues and relevant exposure. These have been assessed using the DMRB screening tool and the results are shown in Table 7.3. The DMRB results predict that that the annual mean objective is likely to be exceeded at these locations. Three junctions are outside areas previously assessed, which are emerging AQMA areas. These include Shepherd's Lane/West Hill, A226 Westgate/Priory Road and A225 Princes Road/Shepherd's Lane junctions which will require further consideration in the Detailed Assessment.

**Table 7.3 DMRB results for nitrogen dioxide at significant junctions**

Receptor Location/Junction	Predicted (2005) Annual Mean Concentration (µg/m <sup>3</sup> )	Predicted (2010) Annual Mean Concentration (µg/m <sup>3</sup> )	Detailed Assessment required?
Shepherd's Lane/West Hill	46.5 (58.8)	38.7 (48.2)	Yes
St Vincent's Road/The Brent	43.7 (53.3)	36.8 (44.3)	No (EA)
East Hill/Park Road	47.9 (61.6)	40.1 (50.9)	No (EA)
A226 Westgate/Priory Road	42.1 (50.2)	35.3 (41.4)	Yes
A226 London Road/A225 Princes Road	47.3 (60.4)	39.5 (49.9)	No (EA)
A225 Princes Road/Shepherd's Lane	43.8 (53.4)	36.8 (44.3)	Yes
A226 London Road/A255 Bean Road	48.2 (62.2)	40.4 (51.6)	No (EA)
A2 Bean Interchange (for Bluewater)	46.8 (59.4)	38.9 (48.6)	No (EA)
<b>Objective/EU Limit Value</b>	<b>40</b>	<b>40</b>	

Street canyon DMRB model runs shown in brackets. EA= Emerging AQMA; Assessed in Detailed Assessment 2004.

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

There are no busy streets where members of the public are likely to spend an hour or more close to traffic in the Borough of Dartford that have not been assessed previously. The town centre of Dartford is largely pedestrianised.

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

There are no roads in Dartford identified that have a flow of buses and/or HGVs greater than 20%.

### 7.8 New roads constructed or proposed since the previous round of Review and Assessment

There are no new roads that has been constructed or proposed since the previous round and therefore this section is not relevant.

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

There are no roads in Dartford identified that have had a substantial change in traffic flow of greater than 25% and no new relevant exposure at previously assessed roads which warrant further assessment.

The DMRB assessment results for all roads assessed in the area are shown in Appendix II. There are exceedences of the annual mean objective predicted along the A226 Galley Hill, Northfleet, A226 Hythe Street and A226 West Hill. The comparison of DMRB results with NO<sub>2</sub> monitoring undertaken shows concentrations in Dartford to be more akin to the street canyon model runs where the nearest receptors are within 10m. Where the nearest receptors are >10m, DMRB is generally over-predicting.

## **7.10 Bus Stations**

There is an open bus station in Dartford which has no relevant exposure and has been assessed in the previous round USA 2003. There are no significant changes to bus movements or new receptor locations.

## **7.11 New industrial sources**

There have been no new processes, which emit significant quantities of nitrogen dioxide in or near to the Borough of Dartford since the previous round of review and assessment and therefore there is no need for any further assessment.

## **7.12 Industrial sources with substantially increased emissions, or new relevant exposure**

There are no industrial processes in or near to the Borough of Dartford which have been identified as significant contributors to nitrogen dioxide in the previous round of review and assessment. No existing sources have substantially increased emissions or new relevant exposure.

## **7.13 Aircraft**

There are no major airports in or near to the Borough of Dartford.

## **7.14 Conclusion**

A detailed assessment is required for nitrogen dioxide as a result of measured exceedences of the annual mean objective at the nearest receptors to the London Road, Northfleet diffusion tube location. The DMRB assessment results for roads assessed predict exceedences of the annual mean objective along the A226 Galley Hill, Northfleet, A226 Hythe Street and A226 West Hill, which will require detailed assessment. Three junctions have also been assessed as at risk of exceeding the annual mean objective: Shepherd's Lane/West Hill, A226 Westgate/Priory Road and A225 Princes Road/Shepherd's Lane, and will require detailed assessment.

## Checklist Summary for Nitrogen Dioxide:

Item	Response
Monitoring data outside an AQMA	Monitoring data indicates a risk of exceedences of the annual mean objective at the nearest receptors to London Road, Northfleet.
Monitoring data within an AQMA	Monitoring data within the AQMA areas continue to show predicted exceedences of the objectives.
Narrow congested streets with residential properties close to the kerb	This was examined in the previous round USA 2003. No changes or further assessment required.
Junctions	Eight potentially significant junctions assessed using DMRB. Results show annual mean objective expected to be exceeded at all locations assessed. Of these, three are outside areas previously assessed which are emerging AQMA areas and will require Detailed Assessment - Shepherd's Lane/West Hill, A226 Westgate/Priory Road and A225 Princes Road/Shepherd's Lane
Busy streets where people may spend 1-hour or more close to traffic	This was examined in the previous round USA 2003. No changes or further assessment required.
Roads with high flow of buses and/or HGVs	This was examined in the previous round USA 2003. No changes or further assessment required.
New roads constructed or proposed since the previous round of R&A	No new roads, therefore this section not relevant.
Roads with significantly changed traffic flows, or new relevant exposure	No roads identified with significantly changed traffic flows, or new relevant exposure.
Bus Stations	This was examined in the previous round USA 2003. No changes or further assessment required.
New industrial sources	No industrial processes have been identified which meet this criteria
Industrial sources with substantially increased emissions, or new relevant exposure	No industrial processes have been identified which meet this criteria
Aircraft	No airports have been identified which meet this criteria
<b>Conclusion</b>	<b>Detailed Assessment required with respect to monitored exceedences at London Road, Northfleet diffusion tube location; DMRB predicted exceedences at the A226 Galley Hill, Northfleet, A226 Hythe Street and A226 West Hill; and DMRB predicted exceedences at the Shepherd's Lane/West Hill, A226 Westgate/Priory Road and A225 Princes Road/Shepherd's Lane junctions.</b>

## **8 UPDATING AND SCREENING OF SULPHUR DIOXIDE**

### **8.1 Monitoring data outside an AQMA**

There is currently no continuous monitoring of sulphur dioxide undertaken within the Borough of Dartford. Data from sites with the Kent and Medway Air Quality Monitoring Network show no exceedences of the objectives in 2005.

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

No AQMA areas have been declared for sulphur dioxide in Dartford and therefore this section is not relevant.

### **8.3 New industrial sources**

There have been no new processes, which emit significant quantities of sulphur dioxide, introduced in or near to the Borough of Dartford since the previous round of review and assessment.

### **8.4 Industrial sources with substantially increased emissions, or new relevant exposure**

There have been no substantial changes to industrial processes or new relevant exposure since the previous rounds.

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

There are no areas of the Borough of Dartford where there is a high density of domestic coal burning.

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

The existence of any schools, hospitals or other large institutional or commercial buildings, which may have boilers using coal or heavy fuel oil has been determined using local knowledge. No such boilers have been identified within or near to the Borough of Dartford.

### **8.7 Shipping**

Ship movements were assessed in the previous round and found to be insignificant and well below the criteria in LAQM.TG(03). There are no significant changes to ship movements since the last round to warrant any further assessment and more recent guidance for the USA 2006 round suggest that only very large ports (5000 – 1500 movements) with relevant exposure within 250m require consideration.

### **8.8 Railway Locomotives**

Railway locomotives were not identified as a significant source of sulphur dioxide in the Borough of Dartford in the previous rounds of review and assessment. There are no significant changes to rail network since the last round to warrant any further assessment.

### **8.9 Conclusion**

A Detailed Assessment is not required for sulphur dioxide.

### Checklist Summary for Sulphur Dioxide:

Item	Response
Monitoring data outside an AQMA	The local authority is currently not monitoring SO <sub>2</sub>
Monitoring data within an AQMA	No AQMA, therefore not relevant
New industrial sources	No new industrial processes have been identified which meet this criteria
Industrial sources with substantially increased emissions, or new relevant exposure	No industrial processes have been identified which meet this criteria
Areas of domestic coal burning	No significant areas identified
Small boilers (>5MW(thermal)) burning coal or oil	No boilers which meet this criteria
Shipping	No shipping movements which meet this criteria
Railway Locomotives	No rail movements identified which meet this criteria
<b>Conclusion</b>	<b>No further action required</b>

## 9 UPDATING AND SCREENING OF PARTICLES (PM<sub>10</sub>)

### 9.1 Monitoring data outside an AQMA

Dartford Borough Council currently undertakes monitoring of PM<sub>10</sub> outside an AQMA using a BAM analyser at three roadside locations within the Borough. The Council calibrates the site every two weeks and Enviro Technology services the station 6 monthly. Data for 2005 has been provisionally ratified by Network Managers King's College ERG. Results from this site are shown in Table 9.1. The results show that there are measured exceedences of the 2004 PM<sub>10</sub> objectives in 2005 at the St Clements and Town Centre roadside sites; and additionally exceedences of the annual mean objective at the St Clements site. These sites have been assessed within the Detailed Assessment 2004 and the St Clement's junction has been identified as an area requiring declaration as an AQMA for both NO<sub>2</sub> and PM<sub>10</sub>.

**Table 9.1 PM<sub>10</sub> Monitoring Results in 2005**

Location	X	Y	Data capture	2005 PM <sub>10</sub> Annual Mean	No. exceedences of 24 hour mean
Dartford Roadside 1: St Clements	558525	174709	95	41	84
Dartford Roadside 2: Town Centre	554117	173852	95	37	57
Dartford Roadside 3: Bean Interchange	558622	172752	31	30	6

### 9.2 Monitoring data within an AQMA

Dartford Borough Council does not currently monitor within their AQMA and therefore this section is not relevant.

### 9.3 Junctions

Eight junctions have been identified by the local authority as potentially significant due to congestion issues and relevant exposure. PM<sub>10</sub> concentrations in 2005 and 2010 were assessed at the nearest relevant receptors to these junctions using DMRB and the results are shown in Table 9.2. Results from the DMRB assessment of junctions indicate that the 2004 24 hour mean objective is being exceeded at all locations. It is considered that DMRB is precautionary and the objective is unlikely to be exceeded at all these locations. However, the NO<sub>2</sub> annual mean is also predicted to be exceeded at all these junctions and therefore it is considered that a detailed assessment for PM<sub>10</sub> is warranted where not previously assessed. The A226 London Road/A255 Bean Road has previously been assessed in a detailed assessment with respect to PM<sub>10</sub> and is an emerging AQMA for both NO<sub>2</sub> and PM<sub>10</sub>.

With respect to the 2010 provisional annual mean objective of 20 µg/m<sup>3</sup>, this is predicted to be exceeded at all locations as is expected to be the case at a large number of locations across the UK. Until these provisional objectives are set in Regulations, they do not need to be considered further within this assessment.

**Table 9.2 DMRB Calculations for PM<sub>10</sub> at Significant Junctions**

	2005	2005	2010	2010
Receptor location/ Junction	Predicted Annual Mean Concentration (µg/m <sup>3</sup> )	Predicted Number of Exceedences of 50 µg/m <sup>3</sup> as	Predicted Annual Mean Concentration (µg/m <sup>3</sup> )	Predicted Number of Exceedences of 50 µg/m <sup>3</sup> as

		a 24-Hour Mean		a 24-Hour Mean
Shepherd's Lane/West Hill	35.7	53	29.6	26
St Vincent's Road/The Brent	33.9	44	28.8	23
East Hill/Park Road	36.7	59	30.3	29
A226 Westgate/Priory Road	32.2	36	27.5	19
A226 London Road/A225 Princes Road	36.2	56	30.0	27
A225 Princes Road/Shepherd's Lane	33.8	43	28.7	23
A226 London Road/A255 Bean Road	36.5	58	30.2	28
A2 Bean Interchange (for Bluewater)	34.8	48	29.1	24
<b>Objective</b>	<b>40</b>	<b>35</b>	<b>20</b>	<b>7</b>

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

There are no roads identified in the Borough of Dartford with a flow of buses and/or HGVs greater than 20%.

#### 9.5 New roads constructed or proposed since the previous round of Review and Assessment

There are no new roads that has been constructed or proposed since the previous round and therefore this section is not relevant.

#### 9.6 Roads with significantly changed traffic flows, or new relevant exposure

There are no roads in Dartford identified that have had a substantial change in traffic flow of greater than 25% and no new relevant exposure at previously assessed roads which warrant further assessment.

The DMRB assessment results for all roads assessed in the area are shown in Appendix II. There are no exceedences of the 2004 PM<sub>10</sub> objectives predicted outside an AQMA.

#### 9.7 New industrial sources

There are no new processes, which emit significant quantities of PM<sub>10</sub>, identified in or near the Borough of Dartford since the previous round of review and assessment.

#### 9.8 Industrial sources with substantially increased emissions, or new relevant exposure

There were no processes identified in the previous round, which emit significant quantities of PM<sub>10</sub> in or near the Borough of Dartford. No industrial sources have substantially increased their emissions of PM<sub>10</sub> and there is no new relevant exposure which warrants further assessment.

#### 9.9 Areas with domestic solid fuel burning

There are no areas of the Borough of Dartford where there is a high density of domestic coal burning.

#### 9.10 Quarries, landfill sites, opencast coal, handling of dusty cargoes at ports

No processes have been identified that are expected to emit significant fugitive dust emissions that would lead to exceedences of the PM<sub>10</sub> objectives.

With respect to operational quarry activities, Pinden quarry has been the source of historical complaints on nuisance dust, but there have been no recent issues with respect to this site.

Landfill Bakers Hole is still operational and has been the subject to occasional nuisance dust complaints, but these are not considered significant in terms of potential PM<sub>10</sub> exceedences.

### 9.11 Aircraft

There are no major airports in or near to the Borough of Dartford.

### 9.12 Conclusion

A Detailed Assessment is required for PM<sub>10</sub> 24 hour mean objective at 7 junctions: Shepherd's Lane/West Hill, St Vincent's Road/The Brent, East Hill/Park Road, A226 Westgate/Priory Road, A226 London Road/A225 Princes Road, A225 Princes Road/Shepherd's Lane, and Bean Interchange (for Bluewater).

#### Checklist Summary for PM<sub>10</sub>:

Item	Response
Monitoring data outside an AQMA	There are measured exceedences of the 2004 PM <sub>10</sub> objectives in 2005 at the St Clements and Town Centre roadside sites. These are within areas previously assessed at detailed assessment in 2004. The St Clements junction is an emerging AQMA for PM <sub>10</sub> .
Monitoring data within an AQMA	No monitoring within the AQMA currently undertaken.
Junctions	Eight junctions assessed – 24 hour mean objective predicted to be exceeded at all junctions. One junction previously assessed, but seven require detailed assessment.
Roads with high flow of buses and/or HGVs	This was examined in the previous round USA 2003. No changes or further assessment required.
New roads constructed or proposed since the previous round of Review and Assessment	No new roads, therefore not relevant.
Roads with significantly changed traffic flows, or new relevant exposure	No roads meet this criteria
New industrial sources	No new industrial processes have been identified which meet this criteria
Industrial sources with substantially increased emissions, or new relevant exposure	No industrial processes have been identified which meet this criteria
Areas with domestic solid fuel burning	No significant areas identified
Quarries, landfill sites, opencast coal, handling of dusty cargoes at ports	No significant processes identified
Aircraft	No airports have been

	identified which meet this criteria
<b>Conclusion</b>	<b>Detailed assessment required for 7 junctions: Shepherd's Lane/West Hill, St Vincent's Road/The Brent, East Hill/Park Road, A226 Westgate/Priory Road, A226 London Road/A225 Princes Road, A225 Princes Road/Shepherd's Lane, and Bean Interchange (for Bluewater).</b>

## APPENDIX I TRAFFIC DATA

Site Number	X	Y	Road Number/Name	Date of Count	%HGVs	2005 AADT	2010 AADT
D034385	560082	173985	Bodle Avenue	12/05/2003	12.4	438	498
D034473	560002	174977	A226 / London Road	16/06/2003	11.9	16377	18626
D420082	560106	173997	Bodle Avenue	10/05/2004	10.5	526	599
D420106	560009	174970	A226 / London Road	10/05/2004	12.6	14592	16599
D520471	560106	173997	Bodle Avenue	09/05/2005	12.9	462	525
D520521	561880	173770	A226 / Thames Way	10/06/2005	19.0	6719	7638
D520570	560009	174970	A226 / London Road	14/07/2005	10.5	12806	14557
X511660	560711	174877	A226 / Galley Hill	05/10/2005	12.3	14259	16208
D034329	553611	175000	A2026 / Burnham Road	26/03/2003	5.8	12654	14331
D034364	556207	175372	A282	08/04/2003	18.8	131335	148747
D034428	555089	174733	Littlebrook Manor Way	03/06/2003	6.7	3694	4183
D034483	555527	173367	A225 / Princes Road	25/06/2003	6.0	32217	36488
D034573	556023	173385	A296 / Princes Road	06/10/2003	4.6	16063	18192
X037553	553857	174120	A226 / West Hill	09/09/2003	5.8	15659	17734
X037556	553841	173754	Highfield Road	09/09/2003	1.7	9303	10536
X037559	554079	173435	A225 / Lowfield Street	10/09/2003	4.5	12895	14605
X037562	554520	173991	A226 / East Hill	10/09/2003	6.1	20336	23033
X037565	554136	174275	A206 / Hythe Street	11/09/2003	8.3	12573	14240
D420038	554081	173726	A225 / Lowfield Street	29/03/2004	4.6	11672	13222
D420064	555459	174403	A282	28/04/2004	18.3	132744	150375
D420120	555000	173847	A226 / East Hill	24/05/2004	7.0	20192	22874
D420157	554200	173900	A226 / Market Street	10/06/2004	5.4	12726	14416
X410070	553593	173960	Miskin Road	02/02/2004	1.3	3360	3806
X410559	554079	173435	A225 / Lowfield Street	10/09/2004	4.1	13597	15404
X410562	554520	173991	A226 / East Hill	09/09/2004	7.2	20880	23653
X410565	554136	174275	A206 / Hythe Street	07/09/2004	7.6	13255	15015
D511838	555900	174900	A282/A206	17/10/2005	20.6	11561	13087
D511761	555900	174900	A282 South Bnd Off Slip	17/10/2005	19.5	10540	11931
D520407	555735	172887	A282	18/03/2005	15.5	128178	145096
D520499	555100	174700	Littlebrook Manor Way	24/05/2005	6.8	3000	3396
D520531	555000	173342	A225 / Princes Road	17/06/2005	4.6	23899	27054
D520566	556200	175400	A282	06/07/2005	18.8	134306	152033
D520582	554136	174275	A226 / Westgate Road	14/09/2005	6.0	16591	18781
X511495	553857	174120	A226 / West Hill	07/09/2005	5.8	15256	17270
X511498	553841	173754	Highfield Road	07/09/2005	1.0	8223	9308
X511500	554079	173435	A225 / Lowfield Street	07/09/2005	4.2	11269	12756
X511503	554520	173991	A226 / East Hill	08/09/2005	6.5	19705	22306
X511506	554136	174275	A226 / Hythe Street	08/09/2005	7.8	12606	14270
X511666	554245	174472	Mill Pond Road	29/09/2005	5.6	14029	15881
X511667	554263	173314	A225 / Princes Road	28/09/2005	4.2	22094	25010
X511755	555903	174896	A282 South Bnd On Slip	17/10/2005	17.1	8742	9896
X511756	555794	175008	A282 North Bnd Off Slip	17/10/2005	24.5	7841	8876
X511760	555900	174900	A282/A206	17/10/2005	20.6	11567	13093
X511797	555737	175278	A206 / University Way	17/10/2005	20.2	22469	25434
X511798	556294	174829	Junction 1a Cotton Lane	17/10/2005	6.6	6223	7044
X511799	556076	175113	A206	17/10/2005	14.0	23613	26730
X511847	554100	174300	A226 / Retail Car Park	21/10/2005	0.3	6162	6975



## APPENDIX II DMRB ASSESSMENTS FOR ROADS

Receptor/Road	X	Y	Annual Mean PM <sub>10</sub>	PM <sub>10</sub> Number Daily means > 50	Annual Mean PM <sub>10</sub>	PM <sub>10</sub> Number Daily means > 50	Annual Mean Benzene	CO	Annual Mean NO <sub>2</sub>	Annual Mean NO <sub>2</sub> (with SC)	Annual Mean NO <sub>2</sub>	Annual Mean NO <sub>2</sub> (with SC)	Detailed Assessment Required?	Monitoring results 2005
			2005	2005	2010	2010	2010	2005	2005	2005	2010	2010		
University Way	555575	175385	30.2	28	26.2	16	0.5	0.3	41.8	49.6	35.0	40.9	No (EA)	
University Way	555348	175482	30.0	28	26.1	15	0.5	0.3	41.4	48.7	34.7	40.2	No (EA)	
A226 / London Road	559450	174899	30.9	31	26.9	17	0.6	0.3	41.5	49.0	35.3	41.3	No (EA)	45.8
A226 / London Road	559225	174876	31.2	32	27.0	18	0.6	0.3	42.0	49.9	35.6	42.1	No (EA)	45.8
A226 / Galley Hill	561173	174895	31.8	35	27.3	18	0.6	0.3	43.2	52.3	36.3	43.5	Yes, NO <sub>2</sub>	
A2026 / Burnham Road	553603	174914	29.7	27	26.2	15	0.6	0.3	39.2	44.3	33.3	37.5	No (EA)	33.7
A282	555430	174423	36.6	58	30.1	28	0.8	0.4	52.5	70.9	43.5	57.7	No, AQMA	
A225 / Princes Road	555335	173383	29.3	25	25.8	14	0.6	0.3	38.3	42.4	32.3	35.5	No, not street canyon	
A296 / Princes Road	556118	173358	29.1	24	25.7	14	0.6	0.3	37.9	41.8	32.1	35.0	No, not street canyon	
A226 / West Hill	553931	174090	30.7	30	26.6	17	0.6	0.4	40.8	47.4	34.3	39.3	Yes, NO <sub>2</sub>	
A225 / Lowfield Street	554085	173708	29.4	25	26.0	15	0.6	0.3	38.5	42.9	32.8	36.3	No (EA)	
A226 / East Hill	555077	173822	30.9	31	26.8	17	0.6	0.4	41.3	48.4	34.6	40.1	No (EA)	
A226 / Hythe Street	554120	174249	30.5	29	26.6	17	0.6	0.3	40.6	47.2	34.5	39.8	Yes, NO <sub>2</sub>	
A226 / Market Street	554170	173925	30.0	28	26.4	16	0.6	0.3	39.6	45.2	33.7	38.2	No (EA)	
A2018 / Shepherds Lane	552551	173561	29.8	27	26.1	15	0.6	0.3	39.2	44.3	33.0	36.9	No	37.5
DA39 Park Road	555158	173825	31.0	31	26.8	17	0.6	0.4	41.3	48.5	34.7	40.2	N/A	(52.1)
DA01 Lowfield Street	554187	173985	30.1	28	26.4	16	0.6	0.3	39.7	45.3	33.7	38.3	N/A	50.4
DA17 Shepherd's Lane	552732	173689	30.7	30	26.7	17	0.6	0.4	40.8	47.5	34.3	39.4	N/A	50.0
DA14 Bow Arrow Lane	555484	174441	36.4	57	30.0	27	0.8	0.4	52.3	70.5	43.3	57.4	N/A	72.9

Notes SC=Street canyon. EA = Emerging AQMA/Assessed in Detailed Assessment (2004). All results as  $\mu\text{g}/\text{m}^3$ , except CO ( $\text{mg}/\text{m}^3$ ) and number of exceedences. Shaded rows are roadside monitoring sites, for comparison purposes; Park Road only has short-term monitoring results.



### APPENDIX III LIST OF INDUSTRIAL PROCESSES

Ref.	Process Name	x	y	Process Type	PG Note	Identified as significant in LAQM.TG(03) Annex 2	New Source?	Substantial Change? >30%	Complaints?	Detailed Assessment Required?
B/09/00/rev1	J Clubb Ltd	555135	172665	Blending, Packing and Loading of Bulk Cement	PG3/1	No	No	No	No	No
B10/02/rev4	Lafarge Redland Readymix Ltd	558269	175163	Blending, Packing and Loading of Bulk Cement	PG3/1	No	No	No	No	No
B/13/03/rev3	Barney Sands Ltd	561249	174935	Respraying of Road Vehicles	PG6/34	No	No	No	No	No
B/15/02/rev3	A. Pile & Sons	555142	174331	Respraying of Road Vehicles	PG6/34	No	No	No	No	No
B/16/03/rev6	Corus - Dartford Service Centre	555451	169289	Painting of Metal and Plastic	PG6/35	No	No	No	No	No
B/20/03/rev3	Pinden Ltd	559540	169589	Mobile Crusher	PG3/16	No	No	No	No	No
B/21/01/rev4	JD Automotive	553572	175361	Respraying of Road Vehicles	PG6/34	No	No	No	No	No
B/22/03/rev1	Cray Metal Finishers	554251	174901	Powder Coating	PG6/31	No	No	No	No	No
B23/99/rev1	South East Recycling Ltd	560574	175064	Mobile Crusher	PG3/16	No	No	No	No	No
B/24/01/rev1	North Kent Commercials	561188	174963	Respraying of Road Vehicles	PG6/34	No	No	No	No	No
B/25/03/rev3	Howard Hunt Ltd	556198	175157	Printing	PG6/16	No	No	No	No	No
B/27/99	Greenhithe Service Station	559019	174813	Unloading of Petrol into Storage	PG1/14	No	No	No	No	No
B/28/01/rev1	Dartford Service Station	555604	173333	Unloading of Petrol into Storage	PG1/14	No	No	No	No	No
B/30/01/rev1	Hawley Service Station	554662	172354	Unloading of Petrol into Storage	PG1/14	No	No	No	No	No
B/31/00/rev1	Vanguard Service Station	559018	174812	Unloading of Petrol into Storage	PG1/14	No	No	No	No	No
B/33/99	Winston Service Station	552761	173565	Unloading of Petrol into Storage	PG1/14	No	No	No	No	No
P/34/05/orig	Burnham Road Service Station	553508	175159	Unloading of Petrol into Storage	PG1/14	No	No	No	No	No
B/35/01/rev1	Elms Service Station	555397	173380	Unloading of Petrol into Storage	PG1/14	No	No	No	No	No
B/36/01/rev1	St Vincent Service Station	555144	174334	Unloading of Petrol into Storage	PG1/14	No	No	No	No	No
B/37/01/rev2	Priory Motor Group	560135	169134	Unloading of Petrol into Storage	PG1/14	No	No	No	No	No



### APPENDIX III (Continued) LIST OF INDUSTRIAL PROCESSES

Ref.	Process Name	x	y	Process Type	PG Note	Identified as significant in LAQM.TG(03) Annex 2	New Source?	Substantial Change? >30%	Complaints?	Detailed Assessment Required?
P/38/05/orig	Dartford Express	552964	174300	Unloading of Petrol into Storage	PG1/14	No	No	No	No	No
P40/05/orig	Joydens Wood Service Station	550696	171787	Unloading of Petrol into Storage	PG1/14	No	No	No	No	No
B/50/03/rev2	F M Conway Ltd	551121	173732	Mobile Crusher	PG3/16	No	No	No	No	No
P/51/05/rev1	Easy Load Ltd	551110	173683	Mobile Crusher and Screener	PG3/16	No	No	No	No	No
B/54/02	ASDA	558209	175048	Unloading of Petrol into Storage	PG1/14	No	No	No	No	No
P/55/04/orig	F M Conway Ltd	551121	173732	Cement Batching	PG3/1	No	No	No	No	No
AG9264	Wellcome Foundation Ltd	554850	174740	Waste Incineration	-	Yes	No	No	No	No
AK6853	Wellcome Foundation Ltd	554850	174740	Organic Chemicals	-	No	No	No	No	No
AJ2372	Glaxosmithkline R&D Ltd	554850	174740	Organic Chemicals	-	No	No	No	No	No
-	National Power plc	555750	176473	Combustion Process	-	Yes	No	No	No	No
-	Arjo Wiggins Ltd	553661	175162	70,000 tonnes fine paper	-	Yes	No	No	No	No

## GLOSSARY

Abbreviation	Definition
AQMA	Air Quality Management Area
DEFRA	Department for Environment, food and Rural Affairs
DETR	Department for Transport and Regions
DMRB V1.02	Design Manual for Roads and Bridges (Highways Agency November 2003) - screening tool for traffic sources
DOE	Department of the Environment
HGV	Heavy goods vehicles
LAQM	Local Air Quality Management
LAQM.TG(03)	Technical guidance document provided by DEFRA to assist local authorities in completion of the LAQM Review & Assessment process
NAQS	National Air Quality Strategy
NO <sub>2</sub>	Nitrogen dioxide
NO <sub>x</sub>	Oxides of nitrogen
PM <sub>10</sub>	Fine particle matter less than 10µm diameter
ppb	Parts per billion
SO <sub>2</sub>	Sulphur dioxide
µg/m <sup>3</sup>	Micrograms per cubic metre
USA	Updating and Screening Assessment

## REFERENCES

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Defra, (February 2003), Local Air Quality Management, Technical Guidance LAQM.TG(03).  
The Air Quality (England) Regulations 2000, Statutory Instrument 928

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Highways Agency (November 2003), Design Manual for Roads and Bridges, Volume 11,  
Section 3, Part 1 Air Quality v1.02.