



## **Review and Assessment of Air Quality**

# **Updating and Screening Assessment**

**2003**

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## Executive Summary

The role of the local authority review and assessment process is to identify the areas where it is considered that the government's air quality objectives will be exceeded. The Council has previously undertaken the first round of review and assessment (R&A).

This report concerns the Updating and Screening Assessment under the second round of review and assessment (R&A). Local authorities are now required to review and assess air quality against the objectives in the Air Quality Regulations 2000 and the amendment regulations. The air quality objectives to be assessed are for the following seven pollutants: carbon monoxide, benzene, 1,3-butadiene, lead, nitrogen dioxide, sulphur dioxide and particles (PM<sub>10</sub>). This report provides a new assessment to identify those matters that have changed since the last review and assessment, and which might lead to a risk of the objective being exceeded.

The report follows the latest prescribed guidance given in Technical guidance LAQM. TG (03), which replaced that produced for the previous round of R&A. It gives guidance on the use of background pollutant concentrations, monitoring results, industrial sources, and road traffic. It also requires both a phased approach and that local authorities only undertake a level of assessment that is commensurate with the risk of an air quality objective being exceeded.

The report identifies that the risk of the objectives for carbon monoxide, benzene, 1,3-butadiene, lead and sulphur dioxide being exceeded is not significant in the Council's area.

The updating and screening assessment for nitrogen dioxide has identified that the risk of the objectives being exceeded are significant and therefore the Council should consider undertaking a Detailed Assessment for this pollutant only for the following roads: Woburn Hill, A320 Chertsey Lane and the junctions of Eastworth Rd/ Guildford Street, High St/ Church Rd, and Woodham Lane/ New Haw Rd.

For PM<sub>10</sub> the report also identifies that parts of the Council's area will exceed the 2010 provisional objective. The Council however are not required to undertake a Detailed Assessment for the 2010 PM<sub>10</sub> objective at this stage and therefore will note this conclusion for the purposes of longer term planning in the Council's area.

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## Contents

<b>Executive Summary</b>	3
<b>1.0 Introduction</b>	9
1.1 Background	11
1.2 Progress with Local Air Quality Management (1997-2002)	11
1.3 Background pollutant concentrations	12
1.4 Monitoring Data	12
1.5 Industrial Sources	12
1.6 Road Traffic	12
1.7 Relevant Exposure	13
<b>2.0 Carbon Monoxide (CO)</b>	14
2.1 Introduction	14
2.2 National Perspective	14
2.3 Second Round assessment of CO	14
2.4 Monitoring	15
2.5 Very busy roads or junctions in built up area	15
2.6 Conclusion of Second Round assessment of CO	15
<b>3.0 Benzene</b>	16
3.1 Introduction	16
3.2 National Perspective	16
3.3 Second Round assessment of Benzene	16
3.4 Monitoring	17
3.5 Very busy roads or junctions in built up area	17
3.6 Industrial Sources	18
3.7 Petrol Stations	18
3.8 Major Fuel storage Depots	19
3.9 Conclusion of Second Round assessment of Benzene	19
<b>4.0 1,3 Butadiene</b>	20
4.1 Introduction	20
4.2 National Perspective	20
4.3 Second Round assessment of 1,3 Butadiene	20
4.4 Monitoring	21
4.5 Industrial Sources	21
4.6 Conclusion of Second Round assessment of 1,3 Butadiene	21
<b>5.0 Lead</b>	22
5.1 Introduction	22
5.2 National Perspective	22
5.3 Second Round assessment of Lead	22
5.4 Monitoring	23
5.5 Industrial Sources	23
5.6 Conclusion of Second Round assessment of Lead	23
<b>6.0 Nitrogen Dioxide (NO<sub>2</sub>)</b>	24
6.1 Introduction	24
6.2 National Perspective	24
6.3 Second Round assessment of NO <sub>2</sub>	25
6.4 Monitoring	25
6.5 Roads	27
6.6 Bus Stations	29
6.7 Industrial Sources	29
6.8 Aircraft	29
6.9 Conclusion of Second Round assessment of NO <sub>2</sub>	29

<b>7.0 Sulphur Dioxide (SO<sub>2</sub>)</b>	30
7.1 Introduction	30
7.2 National Perspective	30
7.3 Second Round assessment of SO <sub>2</sub>	30
7.4 Monitoring	31
7.5 Industrial Sources	31
7.6 Domestic Sources	31
7.7 Boilers	31
7.8 Shipping	31
7.9 Railway Locomotives	32
7.10 Conclusion of Second Round assessment of SO <sub>2</sub>	32
<b>8.0 Particles (PM<sub>10</sub>)</b>	33
8.1 Introduction	33
8.2 National Perspective	33
8.3 Second Round assessment of PM <sub>10</sub>	34
8.4 Monitoring	35
8.5 Roads	36
8.6 Industrial Sources	38
8.7 Domestic Sources	38
8.8 Quarries, Landfill Sites, etc	39
8.9 Aircraft	39
8.10 Conclusion of Second Round assessment of PM <sub>10</sub>	39
<b>9.0 Conclusions and Recommendations</b>	40
<b>10.0 References</b>	41
<b>Appendix 1: Glossary</b>	42
<b>Appendix 2: Data capture rates for NO<sub>2</sub> and PM<sub>10</sub> monitoring sites</b>	43
<b>Appendix 3: Road and Traffic Data for Runnymede BC</b>	44
<b>Appendix 4: Pollutant Source Data for Runnymede BC</b>	51

## List of Figures

<b>Figure 1</b>	Interpolated benzene (annual mean concentration $\mu\text{g}/\text{m}^3$ ) plot for Runnymede B.C (2010)	18
<b>Figure 2</b>	Interpolated 1,3-butadiene (annual mean concentration $\mu\text{g}/\text{m}^3$ ) plot for Runnymede B.C (2003)	21
<b>Figure 3</b>	Interpolated 2010 PM10 (annual mean concentration $\mu\text{g}/\text{m}^3$ ) plot for Runnymede	37

## List of Tables

<b>Table 1</b>	Air quality objectives (from Air Quality Regulations 2000 and Amendment Regulations 2002)	10
<b>Table 2</b>	Air quality objectives not in regulations (from Air Quality Strategy Addendum (2003))	11
<b>Table 3</b>	Carbon monoxide monitoring at sites near to Runnymede B.C ( $\text{mg}/\text{m}^3$ )	15
<b>Table 4</b>	$\text{NO}_2$ monitoring in Runnymede B.C area (1999 – 2000) ( $\mu\text{g}/\text{m}^3$ )	26
<b>Table 5</b>	Estimated $\text{NO}_2$ for 2005 (using TG03 methodology) ( $\mu\text{g}/\text{m}^3$ )	26
<b>Table 6</b>	$\text{NO}_2$ monitoring in neighbouring areas (1999-2001) ( $\mu\text{g}/\text{m}^3$ )	27
<b>Table 7</b>	Results of DMRB assessment of a busy junction for $\text{NO}_2$ ( $\mu\text{g}/\text{m}^3$ )	27
<b>Table 8</b>	Results of DMRB assessment of busy streets in Runnymede B.C for $\text{NO}_2$ ( $\mu\text{g}/\text{m}^3$ )	28
<b>Table 9</b>	Results of DMRB assessment of roads with increased flows in Runnymede B.C for $\text{NO}_2$ ( $\mu\text{g}/\text{m}^3$ )	28
<b>Table 10</b>	Results of DMRB re-assessment of roads in Runnymede B.C for $\text{NO}_2$ ( $\mu\text{g}/\text{m}^3$ )	28
<b>Table 11</b>	$\text{PM}_{10}$ monitoring at sites in neighbouring areas (1999 – 2002) ( $\mu\text{g}/\text{m}^3$ )	35
<b>Table 12</b>	Estimated $\text{PM}_{10}$ daily means greater than $50 \mu\text{g}/\text{m}^3$ for 2004 (using TG03)	36
<b>Table 13</b>	Estimated $\text{PM}_{10}$ concentrations in 2010 (using TG03 methodology)	36
<b>Table 14</b>	DMRB predictions assessing road junctions for PM objectives (2004)	37
<b>Table 15</b>	DMRB predictions assessing roads with increased flows for PM objectives (2004)	38
<b>Table 16</b>	DMRB 2004 $\text{PM}_{10}$ prediction for roads in Runnymede	38
<b>Table 17</b>	Data capture rates (%) for the $\text{NO}_2$ continuous monitoring sites (1999-2001)	43
<b>Table 18</b>	Data capture rates (%) for the $\text{PM}_{10}$ continuous monitoring sites (1999-2001)	43
<b>Table 19</b>	Estimated 2006 traffic count data for Runnymede Borough Council's roads	44
<b>Table 20</b>	Roads re-assessed in USA	47
<b>Table 21</b>	Junctions and Busy streets identified in Runnymede B.C	47
<b>Table 22</b>	Roads with significantly increased flows (between 1999 and 2006)	47
<b>Table 23</b>	Part B processes in the Runnymede B.C area	51
<b>Table 24</b>	Authorised petrol stations in the Runnymede B.C area	51
<b>Table 25</b>	Licensed landfills in the Runnymede B.C area	52

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## 1.0 Introduction

The government's Air Quality Strategy (AQS) establishes the framework for air quality improvements, including international and national improvements. However it is recognised that despite these improvements, areas of poor air quality will remain and that these are best dealt with using local measures implemented through the LAQM regime. The role of the local authority review and assessment process is to identify the areas where it is considered that the objectives will be exceeded. Experience has shown that such areas may range from single residential properties to whole town centres.

This report concerns the second round of LAQM review and assessment (R&A). It follows the latest prescribed guidance given in Technical guidance LAQM. TG (03), which replaced the guidance produced for the previous round of R&A. TG03 is designed to help local authorities undertake their duties under the Environment Act 1995 to review and assess air quality in their area from time to time.

Local authorities are now required to review and assess air quality against the objectives in the Air Quality Regulations 2000 and the 2002 amendment regulations. In addition the EU has set limit values for NO<sub>2</sub> and benzene and indicative limit values for PM<sub>10</sub> for 2010. In the case of NO<sub>2</sub> the 2010 limit values are the same as the 2005 objectives, hence meeting the latter automatically means that the former are met. The guidance confirms that local authorities are not statutorily required to assess air quality against these, but it advises that they may find it helpful to do so, to assist with longer term development planning.

Tables 1 and 2 below provide details of the objectives for the purposes of this round of R&A.

The guidance requires a phased approach, as with the previous guidance. This requires local authorities to undertake a level of assessment that is commensurate with the risk of an air quality objective being exceeded. It is considered that not every authority will need to proceed beyond the first step of the second round of review and assessment.

The first step is the Updating and Screening Assessment (USA), which all local authorities are required to undertake. TG03 gives guidance on the use of background pollutant concentrations, monitoring results, industrial sources, road traffic, as well as the specific AQS pollutants to be examined for both the USA and the subsequent step, i.e. the Detailed Assessment.

**Table 1** Air quality objectives (from Air Quality Regulations 2000 and Amendment Regulations 2002)

Pollutant	Objective		Date to be achieved by
	Concentration	Measured as	
<b>Benzene</b>	16.25 µg/m <sup>3</sup> (5 ppb)	Running Annual Mean	31 Dec 2003
	5 µg/m <sup>3</sup>	Annual Mean	31 Dec 2010
<b>1, 3 Butadiene</b>	2.25 µg/m <sup>3</sup> (1 ppb)	Running Annual Mean	31 Dec 2003
<b>Carbon Monoxide</b>	10 mg/m <sup>3</sup>	Daily Maximum Running 8 hour mean	31 Dec 2003
<b>Lead</b>	0.5 µg/m <sup>3</sup>	Annual Mean	31 Dec 2003
	0.25 µg/m <sup>3</sup>	Annual Mean	31 Dec 2008
<b>Nitrogen Dioxide (provisional)</b>	200 µg/m <sup>3</sup> (105 ppb) not to be exceeded more than 18 times a year	1 hour mean	31 Dec 2005
	40 µg/m <sup>3</sup> (21 ppb)	Annual Mean	31 Dec 2005
<b>Particles (PM<sub>10</sub>)</b>	50 µg/m <sup>3</sup> not to be exceeded more than 35 times a year	24 hour mean	31 Dec 2004
	40 µg/m <sup>3</sup>	Annual Mean	31 Dec 2004
<b>Sulphur Dioxide</b>	350 µg/m <sup>3</sup> (132 ppb) not to be exceeded more than 24 times a year	1 hour mean	31 Dec 2004
	125 µg/m <sup>3</sup> (47 ppb) not to be exceeded more than 3 times a year	24 hour mean	31 Dec 2004
	266 µg/m <sup>3</sup> (100 ppb) not to be exceeded more than 35 times a year	15 minute mean	31 Dec 2005

**Table 2** Air quality objectives not in regulations (from Air Quality Strategy Addendum (2003))

Pollutant	Objective		Date to be achieved by
	Concentration	Measured as	
<b>Benzene</b>	5 µg/m <sup>3</sup>	Annual Mean	31 Dec 2010
<b>Carbon Monoxide</b>	10 mg/m <sup>3</sup>	Daily Maximum Running 8 hour mean	31 Dec 2003
<b>Particles (PM<sub>10</sub>) (Except London given in brackets)</b>	50 µg/m <sup>3</sup> not to be exceeded more than 7 (10) times a year	24 hour mean	31 Dec 2010
	20 (23) µg/m <sup>3</sup>	Annual Mean	31 Dec 2010

### 1.1 Background

Runnymede Borough Council lies in northwest Surrey some twenty miles southwest of central London. It has three towns namely Chertsey, Egham and Addlestone. Chertsey is a historic town, which had a famous abbey dating from Saxon times. Chertsey, while retaining its historic character, is now also a thriving modern business centre. Egham lies close to the historic Runnymede Meadow site of the sealing of the Magna Carta in 1215. Several high specification modern office developments have recently been built around its pedestrianised centre. Addlestone is the Borough's youngest centre, having only grown into a town in the 19th century. It is now a busy commercial centre. The Borough also contains a number of smaller villages and suburban centres including Virginia Water, Thorpe, Englefield Green, Woodham, New Haw, Ottershaw and Lyne. Its northern and eastern edges formed by the rivers Thames and Wey, across which are the towns of Staines and Weybridge. In the northwest the Borough contains part of Windsor Great Park, to the west it reaches the edge of Chobham Common and to the south extends almost to Woking.

The population of the area is approximately 77,000 and the total area covered by the Council is 7,800 hectares. The main employment in the area is service related.

The area is well served by rail links to the South West and London Waterloo. Heathrow and Gatwick airports are also readily accessible via road. The M25 runs north south through the Borough with the M3 crossing east west. Other major roads include the A30, A318, A317, and A320.

### 1.2 Progress with Local Air Quality Management (1997-2002)

As apart of its Local Air Quality Management (LAQM) responsibilities, the Council has completed the first round review and assessment (R&A) of air quality (see the individual reports prepared between 1998 and 2002). These reports present a staged approach whereby the seven air pollutants in the Government's Air Quality Strategy related to LAQM, were first assessed and screened as to their relative importance to air quality within the Council's area.

Five AQS pollutants (Benzene, 1,3 butadiene, Carbon Monoxide, Sulphur Dioxide (SO<sub>2</sub>) and Lead) were only considered at earliest stage of the review and assessment (Stages 1 and 2). The findings for all these pollutants was that none were found likely to lead to the air quality objectives being exceeded and therefore no further action was required in respect of these pollutants.

Particles (PM<sub>10</sub>) and nitrogen dioxide (NO<sub>2</sub>) were considered at Stages 3 and 4. The Stage 3 report was undertaken for NO<sub>2</sub> and PM<sub>10</sub> and it assessed air quality across the Council's area in accordance with DEFRA guidance. The predictions in the Stage 3 report were that the statutory objectives for NO<sub>2</sub> and PM<sub>10</sub> would only be exceeded close to the M25 within the Council's area and consequently the Council designated an AQMA. In view of the Stage 4 report the M25 is not considered further in this report.

### **1.3 Background Pollutant Concentrations**

Background concentrations provide an understanding of the prevailing pollution in the absence of specific local emission sources. Mapping techniques based on the National Atmospheric Emission Inventory have been used to provide an understanding of future concentrations on a 1x1 km grid square for the U.K (see <http://www.airquality.co.uk/archive/laqm/tools.php>). It is important to note that the NAEI (incorporates all major sources, including roads) within each grid square. Interpolated background plots based on these data are given in the report for benzene (based on 2010), 1,3-butadiene (based on 2003) and PM<sub>10</sub> (based on 2010) for indicative purposes.

### **1.4 Monitoring Data**

The monitoring of air quality in a local authority's area provides an important source of information for understanding air quality in its area. This benefit can be further enhanced if the monitoring is undertaken as part of a wider e.g. regional network. It is however important to ensure that there is confidence in the data being produced and used. Hence QA/QC issues need to have been considered and the data produced also need to be properly validated and preferably ratified. The Council carries out diffusion tube monitoring for NO<sub>2</sub>. Monitoring is also undertaken in neighbouring Councils as part of the London Air Quality Network (LAQN). This network provides a regional focus and the standards of QA/QC adopted meet those stipulated in TG03 guidance.

### **1.5 Industrial Sources**

Both the Environment Agency and the Council regulate industrial sources under the Pollution Prevention and Control Act 1999 and Environmental Protection Act 1990. The Environment Agency is responsible for the largest industrial processes (IPPC/ Part A processes), whilst the Council is mainly responsible for smaller Part B and A2 processes. Those small industrial processes that fall outside of Part B/A2 Process control are also interest to LAQM. TG03 requires details of boilers with a thermal rating of greater than 5 MW that burn coal or fuel oil (e.g. in universities, hospitals, etc) to be obtained.

Updated lists of Part B processes (including petrol stations) of potential concern in Council's area are given in Appendix 4. There are no Part A processes in the Council's area.

### **1.6 Road Traffic**

Details of road traffic movements are required across the Council's area and the Surrey County Council (S.C.C) has provided these data. Recent traffic data from the S.C.C model are shown in Appendix 3.

To estimate the air quality impact in this step of review and assessment it is necessary to use the DMRB methodology produced by the Highways Agency. The version used (i.e. version 1.01) was released in February 2003 and incorporates the most recent emission factors. It is intended to provide conservative estimates, however in some instances it can under predict concentrations. In these specific instances factors can be applied, as advised in TG03.

## **1.7 Relevant Exposure**

The objectives relate to public exposure to the pollutants. More specifically any areas that may exceed the objectives should relate to “ the quality of air at locations which are situated outside of buildings or other man made structures above or below ground, and where members of the public are regularly present” (from the Air Quality regulations). TG03 advises further that the assessment should focus on those locations where members of the public are likely to be regularly present and are likely to be exposed over the period of the objective.

## 2.0 Carbon Monoxide (CO)

### 2.1 Introduction

Carbon monoxide (CO) is a colourless and odourless gas produced by the burning of fuels. Exposure to CO leads to a decreased uptake of oxygen by the lungs and can lead to a range of symptoms as the concentration increases. Early symptoms of exposure include tiredness, drowsiness, headache, pains in the chest and sometimes stomach upsets. Some people, for example those with heart disease, are at an increased risk. Exposure to very high concentrations will lead to death. However such conditions, where there are very high concentrations, are most likely to arise in confined spaces, rather than outdoors where the public are exposed and the air quality strategy (AQS) applies.

The AQS objective for CO, based on advice from the Expert Panel of Air Quality Standards (EPAQS), is as follows:

Concentration	Objective Measured as	Date to be achieved by
10 mgm <sup>-3</sup>	Daily Maximum running 8 hour mean	31 <sup>st</sup> December 2003

### 2.2 National Perspective

The main source of CO remains road transport (nationally about 67% based on 2000), although annual emissions are declining mainly as a result of uptake of abatement technologies.

Current monitoring indicates that none of the UK national network sites exceeded the objective during the period between 1999 and 2001, with kerbside/ roadside sites having higher concentrations than urban background sites (see TG03). Despite this the guidance highlights that under certain meteorological conditions the objective was approached within 2mg/m<sup>3</sup> at four urban background sites in 2001.

National modelling has further indicated that at the end of 2003, major roads will not exceed the objective.

No AQMA's were declared in the first round based on the previous objective of 11.6mg/m<sup>3</sup>.

Based on TG03, it is considered highly unlikely that any authority will be required to proceed beyond the updating and screening assessment.

### 2.3 Second Round Assessment of CO

Full details of the methodology employed can be found in TG03. The following represents a summary of the methods used. To undertake this it is necessary to draw on the first stage report of the first round of review and assessment.

A checklist approach is used, based on 1) monitoring data and 2) traffic data relating to very busy roads.

1. For monitoring data only, roadside data are required where there is public exposure. The data will be assumed to be applicable to 2003 and if the data indicate that the maximum daily running 8-hour concentration exceeds the objective then the Council will be required to proceed to the Detailed Assessment stage.
2. This relates to annual average daily traffic flows exceeding stated flows (which are dependent on the type of road) for areas where the 2003 annual mean background is

expected to be greater than  $1\text{mg}/\text{m}^3$ . If there is relevant exposure within 10m of the kerb then it will be necessary to obtain additional traffic information relating to average speeds and the HGV/LGV split. The DMRB screening model can be used to predict 2003 concentrations. (Note if junctions occur along any of the roads then the flows from the roads should be added together). If the predicted annual mean concentration is greater than  $2\text{mg}/\text{m}^3$  then it is necessary to proceed to the Detailed Assessment stage.

## 2.4 Monitoring

No monitoring for CO is carried out in the Council's area. Monitoring of CO is undertaken nearby at the kerbside side on the M25 (north of junction 13) and the roadside site on the London A3 site near Tolworth (part of the national network). The results for both sites for the period between 1999 and 2001 are given in the table below.

**Table 3** Carbon monoxide monitoring at sites near to Runnymede B.C ( $\text{mg}/\text{m}^3$ )

Site	1999	2000	2001
London A3 roadside	3.8	5.5	6.4
M25 kerbside	3.1	3.0	3.1

(italics means less than 90% data capture)

The above results confirm that recent maximum daily running 8-hour concentrations are less than  $10\text{ mg}/\text{m}^3$  objective for representative sites near to Runnymede B.C. Hence concentrations are unlikely to exceed  $10\text{ mg}/\text{m}^3$  (running 8 hour mean) in any part of the Council's area.

## 2.5 Very busy roads/ junctions in built up areas

Based on the results from the urban background sites in the LAQN, the background in the Council's area can reasonably be assumed at approximately  $0.4\text{ mg}/\text{m}^3$  (from the 2001 results). The estimated 2003 annual mean concentration can be determined from this figure and the expected reduction in future concentrations (from TG03). This is predicted as  $0.35\text{ mg}/\text{m}^3$ . It is thus less than the  $1\text{mg}/\text{m}^3$  concentration where further action is necessary.

Traffic flows in the area are given in Appendix 3 and this indicates 'very busy' roads with single carriageways exceeding 80,000 vehicles per day (vpd) and dual carriageway exceeding 120,000vpd are not found in the Council's area (as classified by TG03). There are similarly no junctions of the busiest roads where these traffic flows are approached in the Council's area. The M25 however does run through the area with flows exceeding 140,000vpd and the monitoring reported above indicates that concentrations on the west kerbside are meeting the objective. In addition no relevant exposure has been identified within 10m of the kerb and therefore no further assessment is needed.

## 2.6 Conclusion of Second Round Assessment of CO

The updating and screening assessment for carbon monoxide has not identified a risk of the new objective being exceeded by 2003 anywhere in the Council's area. The Council need not therefore proceed beyond this updating and screening assessment for carbon monoxide.

### 3.0 Benzene

#### 3.1 Introduction

Benzene at normal ambient temperatures occurs as a liquid, but it readily evaporates and small amounts are detectable in the air. It is known from workplace studies that benzene is potentially carcinogenic, that is, exposure to it may lead to the development of cancer. EPAQS (1994) considered that the risks associated with the levels found in the air in the UK to be small and not be measurable with any accuracy. Nevertheless, it considered that efforts continue to be made to reduce the levels even further as a precautionary measure.

The AQS objectives for benzene, based on advice from EPAQS, are as follows:

Concentration	Objective Measured as	Date to be achieved by
16 $\mu\text{g m}^{-3}$	Running Annual Mean	31 <sup>st</sup> December 2003
5 $\mu\text{g m}^{-3}$	Annual Mean	31 <sup>st</sup> December 2010

#### 3.2 National Perspective

Petrol engine vehicles, petrol refining and the uncontrolled emissions from petrol filling stations without vapour recovery systems are the main sources of benzene.

Current monitoring indicates that all of the UK national network sites were significantly below the 2003 objective during the period between 1999 and 2001 (from TG03). Since 2001 the concentrations were also below the 2010 objective, with kerbside/ roadside sites having higher concentrations than urban background sites.

National mapping has indicated that for most areas the 2003 objective will not be exceeded. However for 2010 there is the possibility that some areas will exceed.

No AQMAs were declared in the first round of R&A. Therefore traffic emissions need not be considered. It is also considered that only those local authorities with relevant locations close to major industrial processes involving benzene will be required to proceed beyond the updating and screening assessment for the 2003 objective.

For the 2010 objective however it is necessary to consider both petrochemical processes and busy roads, as monitoring from the first round indicates that this objective has recently been exceeded.

#### 3.3 Second Round Assessment of Benzene

Full details of the methodology employed can be found in TG03. The following represents a summary of the methods used. To undertake this it is necessary to draw on the first stage report of the previous round of review and assessment.

A checklist approach is used, based on 1) monitoring data 2) data relating to very busy roads 3) industrial sources/ petrol stations/ major fuel storage depots.

1. For monitoring the data should be prioritised, based on locations near busy roads and the results at building facades. Where monitoring relating to industrial and other sources is undertaken then monitoring down wind from the site is recommended. If monitoring is undertaken by diffusion tube, suitable QA/QC procedures should be used and the tubes validated and bias corrected. The results will need to be corrected to 2003/ 2010. If the

data indicate that the objective is exceeded then the local authority will be required to proceed to the Detailed Assessment stage.

2. This relates to 2010 only, where the 2010 annual mean background exceeds  $2\mu\text{g}/\text{m}^3$  and the annual average daily traffic flows exceed the stated flows (which are dependent on the type of road). If there is relevant exposure within 10m of the kerb then it will be necessary to obtain additional traffic information relating to average speeds and the HGV/LGV split. The DMRB screening model can be used to predict 2010 concentrations. (Note if junctions occur along any of the roads then the flows from the roads should be added together). If the predicted concentration is greater than  $5\mu\text{g}/\text{m}^3$  then it is necessary to proceed to the Detailed Assessment stage.
3. For new industrial and other sources listed in TG03 it is likely that an air quality assessment will have been undertaken as part of planning or authorisation process. The results from this should be cited. Authorities are also asked to check information from the first round of R&A if there were doubts about their validity. Where it is necessary to check industrial sources then the annual emission of benzene is needed along with the height of discharge to calculate whether the relevant threshold in the guidance has been exceeded.

For petrol stations it is necessary to identify petrol stations with a throughput of more than  $2000\text{m}^3$ , and with a road with more than 30000 vehicles per day nearby. If there is relevant exposure within 10m of the pumps it is necessary to proceed to a Detailed Assessment.

For major petrol storage depots it is necessary to identify relevant exposure and annual emissions to calculate whether the relevant threshold in the guidance has been exceeded.

For combined sources the 2010 objective need only be considered. The methodology relies on an assessment based on the establishment of emission rates for the industrial/fugitive source combined with DMRB for busy roads.

### **3.4 Monitoring**

The Council does not carry out benzene monitoring by diffusion tube in its area. The monitoring undertaken across the U.K by the government's AURN indicates that all sites met the 2003 objective during the period 1999-2001. The only site exceeding the stricter 2010 objective was the very busy Marylebone Road kerbside site in central London.

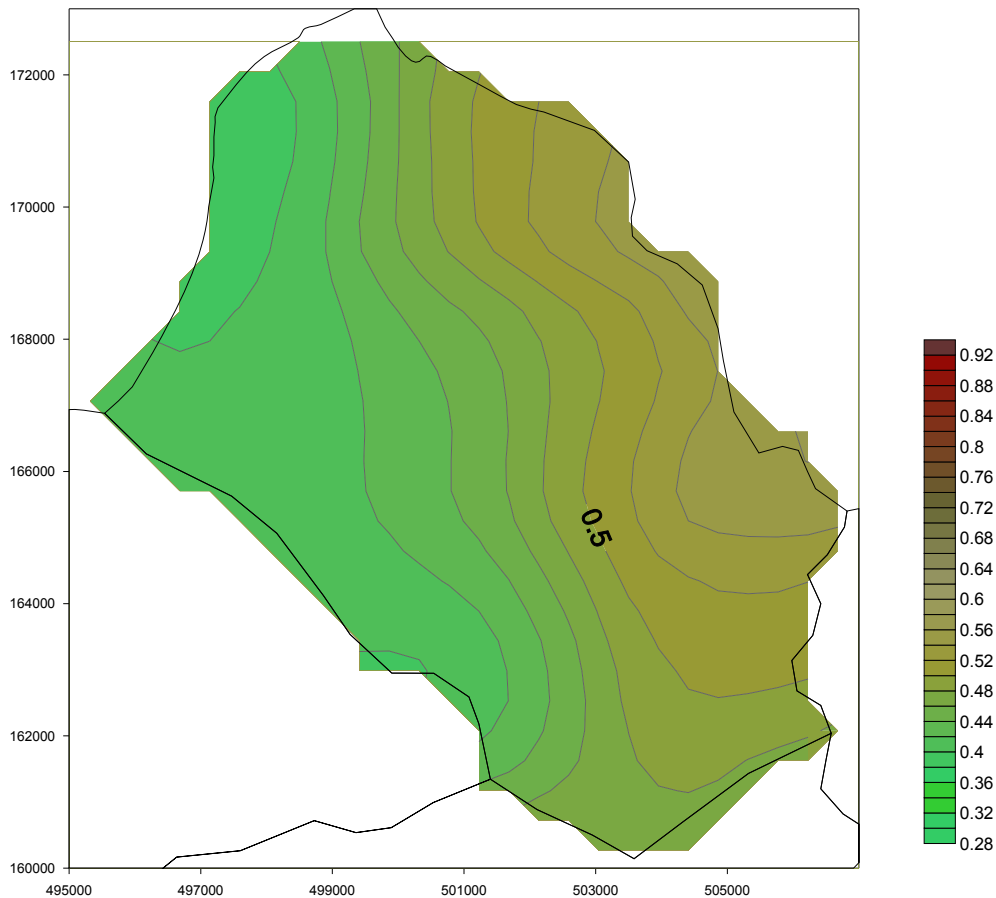
Diffusion tube monitoring undertaken in the neighbouring Woking Borough Council area also indicates that annual mean levels are well below the 2003 objective. Concentrations have varied in recent years but remain less than  $3\mu\text{g}/\text{m}^3$ .

### **3.5 Very busy roads/ junctions in built up areas**

Traffic flows in the area are given in Appendix 3 and this indicates the only 'very busy road' and junctions as outlined is the M25 motorway, which bisects the Council's area.

The 2010 background from the [ww.airquality.co.uk/archive/laqm/tools.php](http://ww.airquality.co.uk/archive/laqm/tools.php) site confirms that 2010 background is less than  $2\mu\text{g}/\text{m}^3$  (see Figure 1) required for further investigation. The estimated background predictions vary between  $0.28$  and  $0.56\mu\text{g}/\text{m}^3$  across the Council's area, with a rising pollutant gradient from west to east across the Council's area.

**Figure 1** Interpolated benzene (annual mean concentration  $\mu\text{g}/\text{m}^3$ ) plot for Runnymede B.C (2010)



As reported for carbon monoxide no relevant exposure has been identified within 10m of the kerb and hence there is no need to carry out a further assessment for benzene in connection with very busy roads.

### 3.6 Industrial sources

There are no Part A processes in the Council's area and hence no IPC/ IPPC petroleum, petrochemical, carbonisation processes within the Council's area. There are also no new or existing sources in neighbouring local authority areas with emissions that have the potential to be significant on the Council's area.

There is also no Part B process for the storage and unloading of petrol at terminals in the Council's area.

### 3.7 Petrol stations

The list of authorised petrol stations is attached in Appendix 3; details on the exact throughput in terms of quantity of petrol are not available. However based on a worst case assumption that all are greater than  $2000\text{m}^3$ , it is necessary to identify whether the petrol stations are close to a busy road with more than 30,000vpd. From Appendix 2 the only applicable road is at the petrol station on the A317 Chertsey Road and there is no relevant exposure within 10m of the petrol pumps at the site.

### **3.8 Major fuel storage depots**

There are no major fuel storage depots within the Council's area (as listed in TG03).

### **3.9 Conclusion of Second Round Assessment of Benzene**

The updating and screening assessment for benzene has not identified a risk of the objectives being exceeded by 2003 and 2010 anywhere in the Council's area. The Council need not therefore proceed beyond this updating and screening assessment for benzene.

## 4.0 1,3-Butadiene

### 4.1 Introduction

1,3 Butadiene arises from the combustion of petroleum products and its manufacture and use in the chemical industry. It is not present in petrol but is formed as a by-product of combustion.

Concentration	Objective Measured as	Date to be achieved by
2.25 $\mu\text{g m}^{-3}$	Running Annual mean	31 <sup>st</sup> December 2003

### 4.2 National Perspective

Emissions from road vehicle exhausts and a small number of industrial sites handling bulk quantities are the main sources of 1,3-butadiene.

Current monitoring indicates that all of the UK national network sites were significantly below the 2003 objective during the period between 1999 and 2001 (from TG03) apart from the Marylebone Road site in London in 1999. This site is a very busy kerbside site and concentrations at this site appear to have tailed off since. Reductions in emissions from road vehicles is continuing as a result of the uptake of abatement technology hence only locations close to industrial sites are expected to proceed beyond the updating and screening assessment for this objective.

National mapping has indicated that for all areas the 2003 objective will not be exceeded. No AQMAs were declared in the first round of R&A.

### 4.3 Second Round Assessment of 1,3-Butadiene

Full details of the methodology employed can be found in TG03. The following represents a summary of the methods used. To undertake this it is necessary to draw on the first stage report of the first round of review and assessment.

A checklist approach is used, based on 1) monitoring data 2) new industrial sources 3) existing industrial sources with significantly increased emissions.

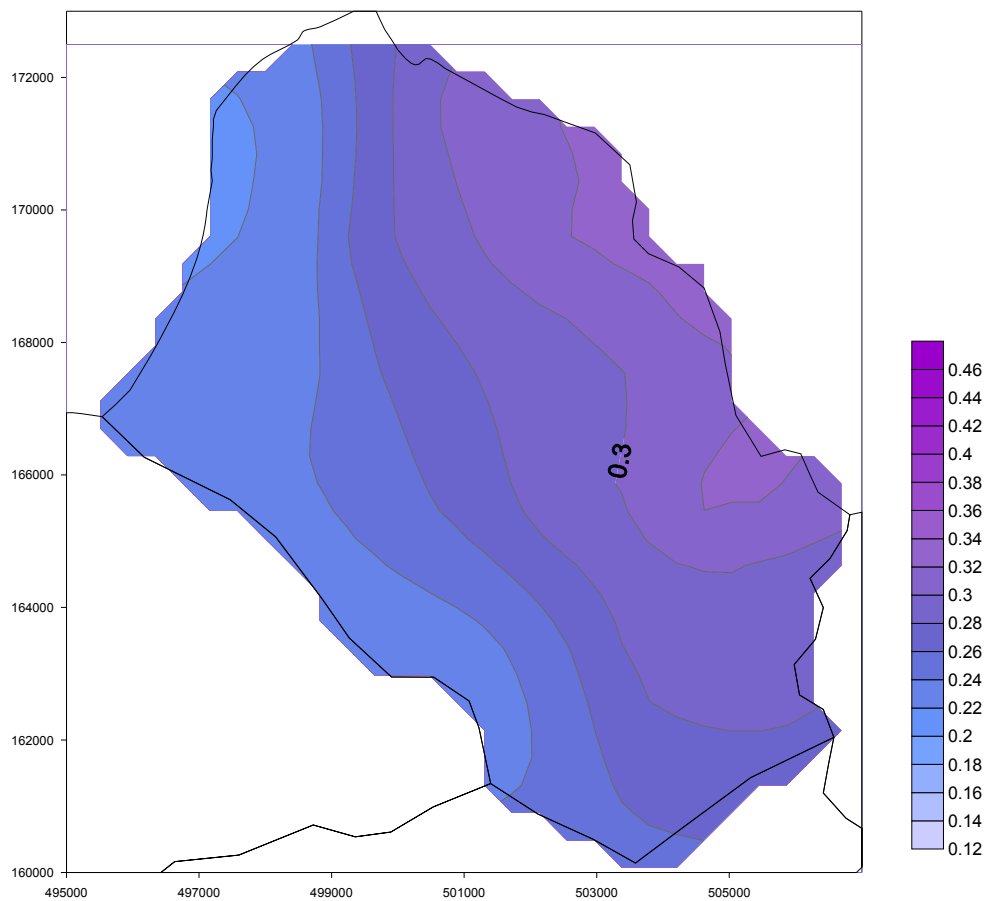
1. For monitoring the data should be prioritised and for locations near industrial sites monitoring down wind from the site is recommended. If the data indicate that the objective is exceeded then the local authority will be required to proceed to the Detailed Assessment stage (as there is no need to correct it for future years).
2. For new industrial processes listed in the guidance it is likely that an air quality assessment will have been undertaken as part of planning or authorisation process. The results from this should be cited. Authorities are also asked to check information from the first round of R&A if there were doubts about their validity. Where it is necessary to check industrial sources then annual emission of 1,3-butadiene is needed along with the height of discharge to calculate whether the relevant threshold emissions rate in the guidance has been exceeded.
3. A substantial increase in emissions is one where the increase is greater than 30%.

#### 4.4 Monitoring

The Council has not undertaken specific monitoring of 1,3-butadiene since the last round of review and assessment. No other monitoring is undertaken elsewhere nearby, although some monitoring is undertaken in London. The annual mean results at the national network sites at the roadside site at London UCL (in central London) and the suburban site at Eltham for 1999 and 2000 (when monitoring stopped) are approximately 0.5 and 0.4  $\mu\text{g}/\text{m}^3$  respectively. These results are both less than the 2003 objective.

The 2003 background from the [ww.airquality.co.uk/archive/laqm/tools.php](http://ww.airquality.co.uk/archive/laqm/tools.php) site also confirms that 2003 background is less than 1  $\mu\text{g}/\text{m}^3$  (see Figure 2). The estimated background predictions vary between 0.2 and 0.34  $\mu\text{g}/\text{m}^3$  across the Council's area.

**Figure 2** Interpolated 1,3-butadiene (annual mean concentration  $\mu\text{g}/\text{m}^3$ ) plot for Runnymede B.C (2003)



#### 4.5 Industrial sources

As for benzene, there are no new IPC/ Part B/ A2 processes or existing processes with substantially increased emissions of 1,3-butadiene within the Council's area or in neighbouring areas since the last round of review and assessment.

#### 4.6 Conclusion of second round assessment of 1,3 Butadiene

The updating and screening assessment for 1,3-butadiene not identified a risk of the objective being exceeded by 2003 anywhere in the Council's area. The Council need not therefore proceed beyond this updating and screening assessment for 1,3-butadiene.

## 5.0 Lead

### 5.1 Introduction

Lead in particulate form in air can be inhaled directly by people, and ingested indirectly following its deposition on soil and crops. Exposure to lead has been known to be harmful to people for many years, with severe adverse effects on the blood, the nervous system and the kidneys (although these effects only occur with high exposures). More subtle effects caused by lower exposure to lead can also arise, such as may occur from the presence of lead in drinking water, paint and dust, and in the ambient air. These effects include the impaired intellectual development of children. EPAQS concluded that the available evidence suggests that the risks associated with the levels found in the air in the UK are very small and cannot be measured with any accuracy (EPAQS, 1998). However, efforts should continue to reduce the levels even further as a precautionary measure.

The AQS objective for lead, based on advice from EPAQS, is as follows:

Concentration	Objective Measured as	Date to be achieved by
0.5 $\mu\text{g}/\text{m}^3$	Annual Mean	31 <sup>st</sup> December 2003
0.25 $\mu\text{g}/\text{m}^3$	Annual Mean	31 <sup>st</sup> December 2008

### 5.2 National perspective

Emissions of lead are now restricted to a small number of industrial processes, including battery manufacture, pigments in paint, alloys, radiation shielding tank lining and piping.

Current monitoring indicates that lead in air at all background and kerbside UK national network sites was significantly below the 2004 and 2008 objectives during the period between 1999 and 2001 (from TG03).

Further assessments however have been undertaken nationally at specific sites near industrial processes. For one industrial site in 2000 the result exceeded the 0.5  $\mu\text{g}/\text{m}^3$  objective, followed in 2001 by an exceedence of the 0.25  $\mu\text{g}/\text{m}^3$  objective. For the other site the result was exceeded at 2 locations in 1999, one of the 0.5  $\mu\text{g}/\text{m}^3$  objective and one of 0.25  $\mu\text{g}/\text{m}^3$  objective. Concentrations at this site however since have dropped markedly. Thus the monitoring results indicated generally no exceedences of the 2004/ 2008 objectives although locations in proximity to non-ferrous metal production and foundry processes were deemed to be at risk.

No AQMAs were declared in the first round of R&A.

### 5.3 Second Round Assessment of Lead

Full details of the methodology employed can be found in TG03. The following represents a summary of the methods used. To undertake this it is necessary to draw on the first stage report of the first round of review and assessment.

A checklist approach is used, based on 1) monitoring data 2) new industrial sources 3) existing industrial sources with significantly increased emissions.

1. For monitoring the data should be prioritised and for locations near industrial sites monitoring down wind from the site at the nearest residential property is recommended. If the data indicate that the objective is exceeded then the local authority will be required

to proceed to the Detailed Assessment stage (as there is no need to correct it for future years).

2. For new industrial processes listed in the guidance it is likely that an air quality assessment will have been undertaken as part of planning or authorisation process. The results from this should be cited. Authorities are also asked to check information from the first round of R&A if there were doubts about their validity. Where it is necessary to check industrial sources then the annual emission of lead is needed along with the height of discharge to calculate whether the relevant threshold in the guidance has been exceeded.
3. A substantial increase in emissions is one where the increase is greater than 30%.

#### **5.4 Monitoring**

The Council has not identified a need to undertake the specific monitoring of lead anywhere in its area since the last round of review and assessment.

#### **5.5 Industrial sources**

There are no new IPC/ Part B/ A2 processes or existing processes with substantially increased emissions of lead within the Council's area or within neighbouring areas since the last round of review and assessment.

#### **5.6 Conclusion of Second Round Assessment of Lead**

The updating and screening assessment for lead not identified a risk of the objectives being exceeded by 2004 and 2008 anywhere in the Council's area. The Council need not therefore proceed beyond this updating and screening assessment for lead.

## 6.0 Nitrogen Dioxide (NO<sub>2</sub>)

### 6.1 Introduction

Nitrogen dioxide (NO<sub>2</sub>) and nitric oxide (NO) are both oxides of nitrogen, and are collectively referred to as nitrogen oxides (NO<sub>x</sub>). All combustion processes produce NO<sub>x</sub> emissions, largely in the form of nitric oxide, which is then converted to nitrogen dioxide, mainly as a result of reaction with ozone in the atmosphere. It is nitrogen dioxide that is associated with adverse effects upon human health. At high concentrations NO<sub>2</sub> causes inflammation of the lung. Long-term exposure is also considered to affect lung function and exposure to NO<sub>2</sub> is particularly important for people with asthma and related diseases. NO<sub>x</sub> is also important in the formation of ozone and secondary particle formation.

The AQS objectives for NO<sub>2</sub> are as follows:

Concentration	Objective	Measured as	Date to be achieved by
200 µgm <sup>-3</sup> times a year	not to be exceeded more than 18	1 Hour Mean	31 <sup>st</sup> December 2005
0.25 µgm <sup>-3</sup> 5		Annual Mean	31 <sup>st</sup> December 2005

### 6.2 National Perspective

Nitrogen dioxide (NO<sub>2</sub>) and nitric oxide (NO) are both oxides of nitrogen, and are collectively referred to as nitrogen oxides (NO<sub>x</sub>). All combustion processes produce NO<sub>x</sub> emissions, largely in the form of nitric oxide, which is then converted to nitrogen dioxide, mainly as a result of reaction with ozone in the atmosphere. It is nitrogen dioxide that is associated with adverse effects upon human health.

The principal source of nitrogen oxides emissions is road transport, which accounted for about 49% of total UK emissions in 2000 (from TG03). Major roads carrying large volumes of high-speed traffic are a predominant source, as are conurbations and city centres with congested traffic. The contribution of road transport to nitrogen oxides emissions has declined significantly in recent years as a result of various policy measures. At a national level, urban traffic nitrogen oxides emissions are estimated to fall by about 20% between 2000 and 2005, and by 46% between 2000 and 2010 (Stedman et al, 2001).

Other significant sources of nitrogen oxides emissions include the electricity supply industry and other industrial and commercial sectors. Emissions from both sources have also declined dramatically, due to the fitting of low nitrogen oxides burners, and the increased use of natural gas. Industrial sources make only a very small contribution to annual mean nitrogen dioxide levels.

More than 100 AQMAs were declared in the first round of R&A across the country, the vast majority of which related specifically to road transport emissions, where the attainment of the annual mean objective is considered unlikely. The annual mean objective is more demanding than the one-hour mean objective and areas predicted to exceed include parts of major conurbations, town centres with congested traffic and dual carriageways and motorways.

### 6.3 Second Round Assessment of NO<sub>2</sub>

Full details of the methodology employed can be found in TG03. The following represents a summary of the methods used. To undertake this it is necessary to draw on the first stage report of the first round of review and assessment.

A checklist approach is used for the updating and screening assessment, based on 1) monitoring data 2) roads including narrow congested streets and junctions 3) bus stations 4) new industrial sources and existing ones with significantly increased emissions 5) aircraft.

1. Monitoring data are to be considered both outside an AQMA and within an AQMA. The data will be corrected to 2005 using factors in TG03 and if the data indicate that the concentration exceeds the objective then the local authority will be required to proceed to the Detailed Assessment stage.
2. These sections focus on specific examples that may not have been fully considered in the first round of review and assessment. This relates to annual average daily traffic flows exceeding stated flows (which are dependent on the type of road) for different locations. If the indications arising from these assessments are greater than 40 µg/m<sup>3</sup> in 2005 then a detailed assessment is necessary. For any new roads a specific assessment is required based on the DMRB screening model. Similarly roads close to the objective at the last review and assessment or roads with significantly changed flows should be re-assessed.
3. Bus stations should be assessed specifically based on the numbers of bus movements and the proximity of relevant exposure (in this instance it should be judged against the 1 hour criteria). If the bus station meets or exceeds these stated levels of activity then DMRB is to be used to obtain a predicted annual mean. If the predicted concentration is greater than 40 µg/m<sup>3</sup> in 2005 then it is necessary to proceed to the Detailed Assessment stage.
4. For new industrial sources (as listed in TG03) it is likely that an air quality assessment will have been undertaken as part of planning or authorisation process. The results from this should be cited. If no assessment were undertaken then TG03 provides nomograms for an assessment. The same approach is required where there has been a substantial increase in emissions (i.e. one greater than 30%).
5. Aircraft emissions are important if there is relevant exposure within 1000m of the airport boundary and the equivalent passenger numbers is predicted to exceed 5 million passengers per annum.

The main sources examined in the Council's area during the previous round of R&A were road transport sources. A list of the roads examined in this report is listed in Appendix 3 with the most recent traffic counts. The Council undertook a Stage 3 R&A and identified areas where the annual mean objective would be exceeded, this led to the Council declaring an AQMA and undertaking a Stage 4 assessment.

### 6.4 Monitoring

The results of diffusion tube monitoring for the most recent years (i.e. from 1998 to 2002) of the sites monitored in the Council's area are given in the Table 6 below. The sites represent locations relevant for public exposure.

The monitoring is undertaken by diffusion tube, with the analysis undertaken by Lambeth Scientific Services. The method of preparation is 50% TEA in acetone. A number of Councils in Surrey share the same analyst and will participate in the results of a co-location study being undertaken by the Elmbridge Borough Council. The study is using triplicate diffusion tubes in accordance with TG03 with continuous chemiluminescent analyser. As a result it is not possible to estimate any specific local bias correction to determine whether the diffusion tubes are under or over reading. A default bias adjustment factor of 1.06 has therefore been applied in this instance (as derived by Laxen et al. (IAPSC paper 2002)). This indicates that the tubes underestimate concentrations by approximately 6%.

**Table 4** NO<sub>2</sub> monitoring in Runnymede B.C area (1998 – 2001) (µg/m<sup>3</sup>)

Location	Type	1998	1999	2000	2001	2002
Civic Centre	k	na	na	na	39.3	37.8
Egham Sports Centre	i	48.6	48.6	48.6	35.5	34.2
Milton Rd, Addlestone	i	28.3	30.4	28.3	na	na
New Haw Rd, Addlestone	k	no	no	no	34.9	36.1
Station Rd, Addlestone	k	42.5	50.6	38.5	na	na
Brox Rd, Ottershaw	b	22.3	28.3	26.3	na	na
Pitson Close, Addlestone	b	26.3	28.3	26.3	26.6	23.4
Brockhurst	b	no	no	no	21.4	24.0
Ongar Place School, Addlestone	i	no	no	no	31.7	26.7

(n.a indicates not available; no indicates not in operation)

(k: indicates kerbside, b: background, i: intermediate)

The annual mean results for the Egham Sports Centre site only are consistently greater than the 40 µg/m<sup>3</sup> standard for the years 1998 to 2000, but not for 2001 and 2002. The sites consistently below the objective include the background sites at: Brox Road in Ottershaw; Pitson Close in Addlestone; and Brockhurst. The intermediate site at Ongar Place School and Milton Road and kerbside sites at New Haw Road in Addlestone were all below the objective. The kerbside site at Station Road, Addlestone exceeded the objective in 1998 and 1999 only. All sites met the objective for 2001 and 2002 with the Civic Centre kerbside site only just being below the 40 µg/m<sup>3</sup> standard in 2001.

An estimated concentration for the intermediate site (based on 2000 result only) has been derived using TG03 correction factors for roadsides; the results are given in Table 7.

**Table 5** Estimated NO<sub>2</sub> for 2005 (using TG03 methodology) (µg/m<sup>3</sup>)

Location	2005
Egham Sports Centre	39.6

This indicates that the site will not exceed the 2005 objective.

The most recent results for 1999-2001 from the continuous sites in neighbouring authorities confirm that the roadside sites failed to meet the provisional annual mean nitrogen dioxide objective. The data capture rates for these sites are given in Appendix 2. The measurements at the background sites were below this level (see Table 8 below).

**Table 6** NO<sub>2</sub> monitoring in neighbouring areas (1999-2001) (µg/m<sup>3</sup>)

Site	Type	1999	2000	2001
A3	Roadside	59	55	53
Mole Valley 2	Suburban	29	27	28
	Urban			
Teddington	Background	33	29	29
M25 site	Kerbside	46	41	40

## 6.5 Roads

The Stage 3 report for the previous round of R&A provided modelling of the main roads in Runnymede. These roads also included busy streets where members of the public may spend more than one hour across the Council's area.

Details of the traffic flows used for this updating and screening assessment are given in Appendix 2. A re-assessment has been undertaken to identify those roads which are less than 10m wide, with residential properties within 5m of the kerb, daily flows of more than 10,000vpd and with average speed of 50kph or less across the Council's area. This investigation has confirmed that there are no streets within the Council's area that meet these criteria.

A separate examination has been undertaken across the Council's area to identify busy junctions meeting the TG03 criteria i.e. roads with combined flows greater than 10000vpd and where there is relevant exposure within 10m of the kerb. The junctions identified from the data obtained are:

A317 Eastworth Road/ B375 Guildford Street – receptor location northeast corner  
 A318 High Street/ B3121 Church Road – receptor location northwest corner  
 A318 New Haw Road/ B385 Woodham Lane – receptor location west corner

(Note - the traffic flows for Guildford Street was assumed to be the same as for Heriot Road and that for New Haw Road was based on Byfleet Road).

A DMRB assessment was undertaken for the above receptor locations. The results of the assessment are given in following table:

**Table 7** Results of DMRB assessment of a busy junction for NO<sub>2</sub> (µg/m<sup>3</sup>)

Location	NO <sub>2</sub> 2005
Junction Eastworth Rd/ Guildford Street	41.9
Junction High St/ Church Rd	44.2
Junction Woodham Lane/ New Haw Rd	44.4

The above results indicate that the annual mean objective will be exceeded at these locations.

A further assessment has been made of busy streets in the Council's area i.e. where people may regularly spend more than one hour and are within 5m of the kerb. The busiest streets with more than 10,000vpd and where there is likely exposure include the High Street and

Station Road in Addlestone and Bridge Place in Chertsey. A DMRB assessment was undertaken for receptor locations along these streets and the results are given in the following table:

**Table 8** Results of DMRB assessment of busy streets in Runnymede B.C for NO<sub>2</sub> (µg/m<sup>3</sup>)

Location	NO <sub>2</sub> 2005
High Street, Addlestone	41.1
Station Rd, Addlestone	37.9
Bridge Rd, Chertsey	38.0

TG03 advises that if the annual mean objective is not exceeded then the one mean objective should also not be exceeded, therefore based on the above results it is only the High Street that is predicted to exceed.

A comparison has been undertaken between the supplied 1999 and 2006 traffic data to identify any roads where the traffic flow has increased by more than 25%. The details are given in Appendix 2. A number of roads have been identified and these have been re-assessed using DMRB. The results are given in the following table:

**Table 9** Results of DMRB assessment of roads with increased flows in Runnymede B.C for NO<sub>2</sub> (µg/m<sup>3</sup>)

Location	NO <sub>2</sub> 2005
Eastworth Rd	40.2
Chertsey Rd (A318)	42.0
Holloway Hill	37.7
Guildford Rd	37.6
Woburn Hill	42.3
Church Rd	37.0

The above results indicate that the following roads: Eastworth Road, Chertsey Road (A318) and Woburn Hill will exceed the objective.

A number of roads were close to the objective in the previous R&A and these roads have been re-assessed using DMRB and the traffic information in Appendix 2. The results of the DMRB assessment incorporating new emission factors are given in Table 12 below.

**Table 10** Results of DMRB re-assessment of roads in Runnymede B.C for NO<sub>2</sub> (µg/m<sup>3</sup>)

Location	NO <sub>2</sub> 2005
M3	39.10
A308 Windsor Road	38.06
A30 Egham Hill	38.31
B3376 Thorpe Lea Road	38.37
B385 Woodham Lane	37.87
A320 Chertsey Lane	41.12
A320 Guildford Road	39.65
B386 Longcross Road	36.96
B375 St. Anns Road	37.10

The only road in the above table that is clearly predicted to exceed is the A320 Chertsey Lane.

No roads were identified from the traffic information obtained as having less than 20000vpd and a proportion of greater than 25% HGVs.

No roads with traffic flows greater than 10,000vpd have been built in the Council's area since the first round of R&A where there is relevant exposure arising.

#### **6.6 Bus stations**

There is not a bus station in the Council's area and therefore no assessment need be made.

#### **6.7 Industrial sources**

There is no new IPC/ Part B/ A2 process or existing process with substantially increased emissions of nitrogen oxides within the Council's area or within neighbouring areas since the last round of review and assessment.

#### **6.8 Aircraft**

There is not an airport within the Council's area and therefore no assessment need be made.

#### **6.9 Conclusion of Second Round assessment of NO<sub>2</sub>**

The updating and screening assessment for nitrogen dioxide has identified a risk of the objectives being exceeded by 2005 in the Council's area, in relation to the assessment of roads.

## 7.0 Sulphur Dioxide (SO<sub>2</sub>)

### 7.1 Introduction

Sulphur dioxide (SO<sub>2</sub>) is a colourless gas, produced from burning fossil fuels like coal and oil. Power stations and oil refineries are the main sources in the UK, with small releases from other industries. SO<sub>2</sub> is also found naturally in the air at low concentrations from natural releases such as volcanoes and forest fires. SO<sub>2</sub> also has role in the formation of secondary particles.

SO<sub>2</sub> can cause breathing difficulties at high concentrations over short periods of time, particularly to those with asthma and chronic lung disease. As a result the AQS objectives are all incident based as follows:

Concentration	Objective	Measured as	Date to be achieved by
350 µgm <sup>-3</sup>	not to be exceeded more than 24 times a year	1 Hour Mean	31 <sup>st</sup> December 2004
125 µgm <sup>-3</sup>	not to be exceeded more than 3 times a year	24 Hour Mean	31 <sup>st</sup> December 2004
266 µgm <sup>-3</sup>	not to be exceeded more than 35 times a year	15 minute Mean	31 <sup>st</sup> December 2005

### 7.2 National Perspective

The main source of sulphur dioxide in the UK is power stations, which accounted for more than 71% of emissions in 2000. There are also significant emissions from other industrial combustion sources. Domestic sources now only account for 4% of emissions, but can be locally much more significant. Road transport currently accounts for less than 1% of emissions.

Measurements from the national monitoring network indicate that concentrations have fallen in recent years, with the objectives only being exceeded in Belfast (from TG03). This is associated with widespread domestic coal burning. The 15-minute objective is the most stringent for SO<sub>2</sub>. A small number of AQMA were declared during the first round of review and assessment. These relate to a number of coal-fired boilers, domestic coal burning and at a major port.

### 7.3 Second Round Assessment of Sulphur Dioxide (SO<sub>2</sub>)

Full details of the methodology employed can be found in TG03. The following represents a summary of the methods used. To undertake this it is necessary to draw on the first stage report of the first round of review and assessment.

A checklist approach is used, based on 1) monitoring data 2) new industrial sources and existing ones with significantly increased emissions 3) areas of domestic coal burning 4) boilers burning coal or oil 5) railway locomotives.

1. Monitoring data are to be considered both outside an AQMA and within an AQMA. The data will be assumed to relate to the relevant objective year and if the data indicate that the concentration exceeds the objective then the local authority will be required to proceed to the Detailed Assessment stage.

2. For new industrial sources listed in TG03 it is likely that an air quality assessment will have been undertaken as part of planning or authorisation process. The results from this should be cited. If no assessment were undertaken then TG03 provides nomograms for an assessment. The same approach is required where there has been a substantial increase in emissions (i.e. one greater than 30%).
3. For domestic sources there is the need to identify small areas (500 x 500m) where significant coal burning still takes place. If the density of coal burning premises exceeds 100 per 500 x 500m then a detailed assessment is required.
4. For boiler plant it is necessary to identify all plant >5MW(thermal) that burn coal or fuel oil and establish whether there is relevant exposure within 500m. If such boilers are found then TG03 provides nomograms for an assessment.
5. Both diesel and coal fired locomotives emit SO<sub>2</sub> and this is most relevant where the locomotives are stationary for periods of 15 minutes or more. It is also necessary to establish whether or not there is relevant exposure within 15m of the source. If there are more than 2 occasions when locomotives are stationary with engines running then it is necessary to go to a detailed assessment.

The main sources examined during the previous round were large boilers and no Part A or B process, nor boilers greater than 5MW (thermal) were identified as a significant emission source of SO<sub>2</sub> in the area. The assessment of SO<sub>2</sub> therefore ended at the Stage 1 R&A.

#### **7.4 Monitoring**

Continuous monitoring of SO<sub>2</sub> is not undertaken by the Council, but is undertaken in neighbouring areas including the M25 site, Hounslow 4 (part of the LAQN) and Teddington (an urban site part of the national network). The data capture for the sites was more than 90%. The 2001 results for these sites confirm that the SO<sub>2</sub> objectives were met.

#### **7.5 Industrial sources**

There are no new relevant IPC/ Part B/ A2 processes within the Council's area or nearby in neighbouring authorities since the last round of R&A.

#### **7.6 Domestic sources**

Local knowledge and professional judgement indicates that significant domestic coal burning is not undertaken across the Council's area.

#### **7.7 Boilers**

No specific new boilers have been identified since the last round of R&A.

#### **7.8 Shipping**

There are no local sources of shipping emissions.

## **7.9 Railway locomotives**

An assessment has been made of railway activity at sites where locomotives are known to operate in the Council's area. From this it has been established that there is no relevant exposure within 15m of the sites where locomotives are stationary with engines running for two periods of more than 15 minutes per day.

## **7.10 Conclusion of Second Round Assessment of SO<sub>2</sub>**

The updating and screening assessment for sulphur dioxide not identified a risk of the objectives being exceeded by 2004 and 2005 anywhere in the Council's area. The Council need not therefore proceed beyond this updating and screening assessment for sulphur dioxide.

## 8.0 Particles (PM<sub>10</sub>)

### 8.1 Introduction

The PM<sub>10</sub> (particles measuring 10µm or less aerodynamic diameter) standard was agreed to represent those particles likely to be inhaled by humans, accepting that the chemical and physical composition varies widely. In view of this there is a wide range of emission sources that contribute to PM<sub>10</sub> concentrations in the UK. Research studies have confirmed that these sources can be divided into 3 main categories (APEG): (i) Primary particle emissions derived directly from combustion sources, including road traffic, power generation, industrial processes etc. (ii) Secondary particles formed by chemical reactions in the atmosphere, comprising principally of sulphates and nitrates. (iii) Coarse particles comprising emissions from a wide range of sources, including re-suspended dusts from road traffic, construction works, mineral extraction processes, wind-blown dusts and soils, sea salt and biological particles.

Particles are associated with a range of health effects, including effects on respiratory and cardiovascular systems, asthma and mortality. As a result, EPAQS recommended a daily standard based on the evidence reviewed with an annual mean standard to assist with policy formation.

The AQS objectives for PM<sub>10</sub> are as follows:

Concentration	Objective	Measured as	Date to be achieved by
50 µgm <sup>-3</sup>	not to be exceeded more than 35 times a year	24 Hour Mean	31 <sup>st</sup> December 2004
40 µgm <sup>-3</sup>		Annual Mean	31 <sup>st</sup> December 2004

Proposed new particle objectives were introduced by the 2003 Air Quality Strategy Addendum (DEFRA, 2003b) based on the Stage 2 limit values set in the first EU Air Quality Daughter Directive. These objectives were included as provisional pending further EU reviews. TG03 guidance confirmed that local authorities are not statutorily required to assess air quality against these, but advised that they may find it helpful to do so, to assist with longer term development planning.

Concentration	Objective	Measured as	Date to be achieved by
50 µgm <sup>-3</sup>	not to be exceeded more than 7 times a year	24 Hour Mean	31 <sup>st</sup> December 2010
20 µgm <sup>-3</sup>		Annual Mean	31 <sup>st</sup> December 2010

### 8.2 National Perspective

There is a wide range of emission sources that contribute to PM<sub>10</sub> concentrations in the UK. Research studies have confirmed that these sources can be divided into 3 main categories (APEG, 1999): (i) Primary particle emissions are derived directly from combustion sources, including road traffic, power generation, industrial processes etc. (ii) Secondary particles are formed by chemical reactions in the atmosphere, and comprise principally of sulphates and nitrates. (iii) Coarse particles comprise of emissions from a wide range of sources, including resuspended dusts from road traffic, construction works, mineral extraction processes, wind-blown dusts and soils, sea salt and biological particles.

The expected reduction in national particle emissions in future years is different for each source type. For example, emissions from road transport will be governed by new legislation on vehicle emission standards; emissions of secondary particles will be largely governed by controls on power generation, industrial and transport SO<sub>2</sub> and NO<sub>x</sub> emissions, both in the UK and in Europe; emissions of coarse particles are largely uncontrolled, and in general are not expected to decline in future years.

Measurements from the national monitoring network indicate that concentrations are generally below the current annual mean objective (TG03). The 24-hour mean objective however has been exceeded at a small number of sites, principally close to busy roads or close to industrial activities. The 2010 annual mean and 24 hour mean objectives are widely exceeded across the network.

An analysis of PM<sub>10</sub> projections for the AQS indicated that exceedences of the 2004 objectives might be found in areas adjacent to busy roads, particularly in urban areas, areas with significant emissions from domestic solid fuel burning, and areas in the vicinity of industrial plant or which have significant uncontrolled or fugitive emissions.

An analysis for 2010 indicates that, dependant on meteorological conditions; exceedences of annual mean concentrations at background locations are only likely to occur in the southeast of England. In addition exceedences of the annual mean objectives are still expected at some busy roadsides throughout the UK.

Approximately half of the AQMAs declared during the first round of review and assessment were for the 24-hour mean PM<sub>10</sub> objective. The majority of these are in combination with nitrogen dioxide and are associated with road transport sources. Other AQMAs have declared in relation to industrial activities and fugitive sources around a quarry and from port handling activities.

### **8.3 Second Round Assessment of PM<sub>10</sub>**

Full details of the methodology employed can be found in TG03. The following represents a summary of the methods used. To undertake this it is necessary to draw on the first stage report of the first round of review and assessment.

A checklist approach is used, based on 1) monitoring data 2) roads including junctions and new roads 3) new industrial sources and existing ones with significantly increased emissions 4) areas of domestic coal burning 5) quarries, landfill sites, opencast coal, handling of dusty cargoes at ports, etc and 6) aircraft.

1. Monitoring data are to be considered both outside an AQMA and within an AQMA. The data will be corrected to 2004 using factors in TG03 and if the data indicate that the concentration exceeds the 24-hour objective then the local authority will be required to proceed to the Detailed Assessment stage.
2. These sections focus on specific examples that may not have been fully considered in the first round of review and assessment. This relates to busy roads with annual average daily traffic flows exceeding 10,000vpd. Any relevant exposure within 10m of the kerb needs to be determined. Then using DMRB screening model to predict the number of 24-hour exceedences more than 50 µg/m<sup>3</sup> in 2004. If the number is greater than 35 then a detailed assessment is necessary. Similar assessments are required for roads with high numbers of HGVs and/or buses, i.e. where the proportion of this type of vehicle exceeds 20% and the HGV/ bus flow exceeds 2000vpd. For any new roads a specific assessment is required based on the DMRB screening model. Similarly roads

close to the objective at the last review and assessment or roads with significantly changed flows should be re-assessed.

3. For new industrial sources listed in the guidance it is likely that an air quality assessment will have been undertaken as part of planning or authorisation process. The results from this should be cited. If no assessment were undertaken then TG03 provides nomograms for an assessment. The same approach is required where there has been a substantial increase in emissions (i.e. one greater than 30%).
4. For domestic sources there is the need to identify small areas (500 x 500m) where significant solid fuel burning still takes place. If the density of such premises exceeds 50 per 500 x 500m then the nomogram in TG03 is used to determine whether or not a detailed assessment is required.
5. For quarries, landfill sites and ports where dusty cargoes are handled then it is necessary to identify whether is relevant exposure near to any unpaved haul road, processing plant and materials handling facility. The proximity relates to distance, which is dependant on the annual mean background. For sites identified there is a need to use professional judgement based on complaints received and concerns with the facility.
6. Aircraft emissions are important if there is relevant exposure within 500m of the airport boundary and the equivalent passenger numbers is predicted to exceed 10 million passengers per annum.

The main sources examined during the previous round of R&A were road transport sources and these are listed in Appendix 3.

#### 8.4 Monitoring

The Council does not undertake continuous monitoring in its area. The following table presents the results for the period 1999 – 2001 for representative sites in nearby local authority areas. The sites use TEOM instruments for monitoring PM<sub>10</sub>; the results are therefore presented as a gravimetric equivalent, i.e. TEOM times 1.3. The data capture rates are given in Appendix 2. The results confirm for that the 2004 annual mean objective is being met. It also confirms that there were days where the 24-hour mean standard is being exceeded, however the number of such days does not exceed 35 and therefore the objective is not being exceeded.

**Table 11** PM<sub>10</sub> monitoring at sites in neighbouring areas (1999 – 2002) (µg/m<sup>3</sup>)

Site	Type	1999	1999	2000	2000	2001	2001
		Days> 50 µg/m <sup>3</sup>	Annual mean	Days> 50 µg/m <sup>3</sup>	Annual mean	Days> 50 µg/m <sup>3</sup>	Annual mean
A3	Roadside	22	29	16	26	15	27
Mole Valley 2	Suburban	1	22	3	21	5	22
Heathrow	Urban	na	na	14	28	21	29
	Background						
Hounslow 2	Suburban	na	na	4	22	11	23
M25	Kerbside	25	25	17	27.6	26	27.3

(na indicates not available)

An estimated concentration for the monitoring sites has been derived using TG03 methodology; the results are given in the following table.

**Table 12** Estimated PM<sub>10</sub> daily means greater than 50 µg/m<sup>3</sup> for 2004 (using TG03)

<b>2004</b>	<b>No. of days &gt; 50ug/m3</b>
Heathrow	20
A3	15
Mole Valley 2	5
Hounslow 2	7
M25	17

The above results do not indicate an exceedence of the 2004 objective. The results in Table 14 are based on a relationship for the years 1997-2001 and thus it does not represent worst-case meteorology.

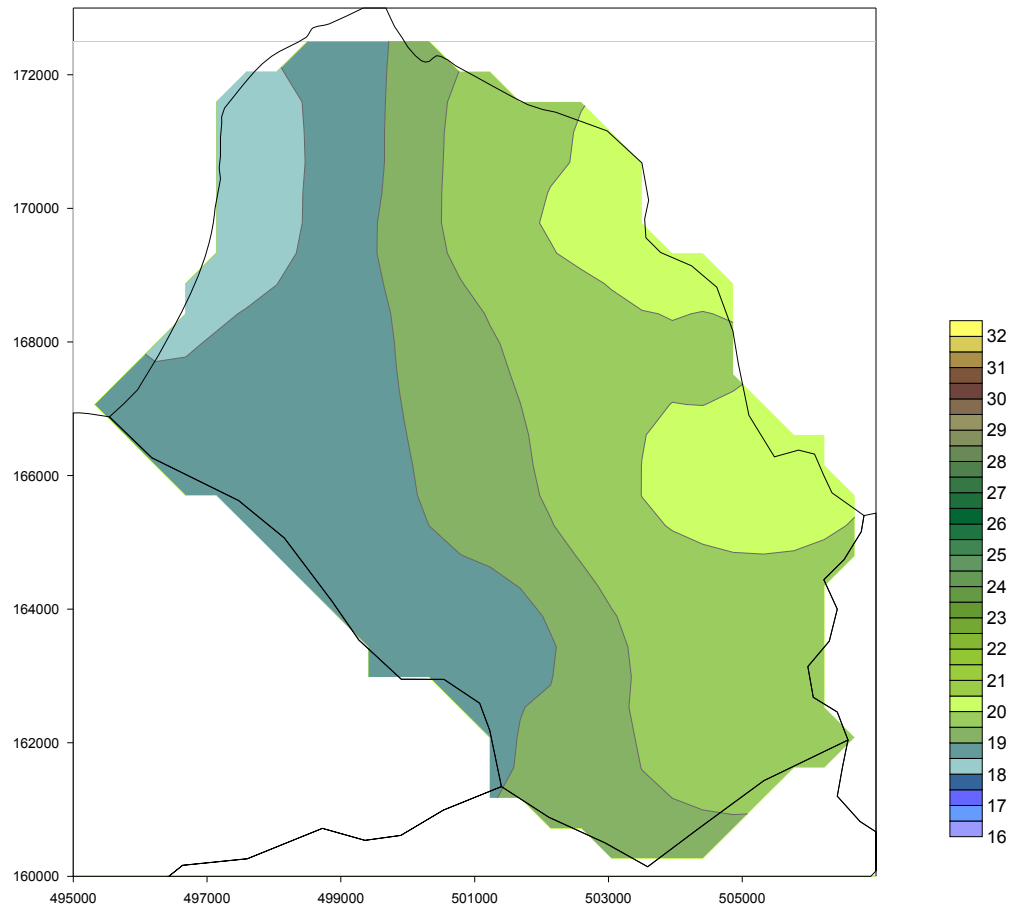
The details of the estimated PM<sub>10</sub> concentrations in 2010 using a similar methodology are given in the following table:

**Table 13** Estimated PM<sub>10</sub> concentrations in 2010 (using TG03 methodology)

<b>2010</b>	<b>Annual mean µg/m<sup>3</sup></b>
Heathrow	25.4
A3	23.8
Mole Valley 2	19.7
Hounslow 2	20.5
M25	24.5

The estimates for all these sites indicate that the 2010 annual mean objective will be either approached or exceeded in the Council's area.

Figure 3 is a plot of the Council's area, based on an interpolation of the national projections (from the [www.airquality.co.uk/archive/laqm/tools.php](http://www.airquality.co.uk/archive/laqm/tools.php) site) for the predicted annual mean concentrations in 2010. The estimated background predictions vary between 18 and 20.5 µg/m<sup>3</sup> across the Council's area, with the highest concentrations in the west of the Council's area. Care however is needed with this interpretation as the map of background concentrations has been calculated for the whole of the UK at a 1 km x 1 km square resolution. It therefore does not represent locations (and emissions) other than on a general scale.

**Figure 3** Interpolated 2010 PM<sub>10</sub> (annual mean concentration  $\mu\text{g}/\text{m}^3$ ) plot for Runnymede

## 8.5 Roads

Details of the traffic flows for roads in the Council's area are given in Appendix 3. An assessment incorporating the effects at those junctions identified where there is exposure within 10m of the kerb has been undertaken using DMRB. The results indicate that the 2004 objectives will be met (see Table 16 below):

**Table 14** DMRB predictions assessing road junctions for PM objectives (2004)

Location	Annual mean ( $\mu\text{g}/\text{m}^3$ )	Days > 50 $\mu\text{g}/\text{m}^3$
Junction Eastworth Rd/ Guildford Street	26.2	15.5
Junction High St/ Church Rd	28.2	21.3
Junction Woodham Lane/ New Haw Rd	29.6	26.0

Appendix 3 provides the details of the traffic information for the Council's area. A comparison has been undertaken between 1999 and 2006 traffic data to identify any roads where the traffic flow has increased by more than 25%. A number of roads have been identified and these have been re-assessed using DMRB. The results are given in the following table:

**Table 15** DMRB predictions assessing roads with increased flows for PM objectives (2004)

Location	Annual mean ( $\mu\text{g}/\text{m}^3$ )	Days > 50 $\mu\text{g}/\text{m}^3$
Eastworth Rd	25.3	13.1
Chertsey Rd (A318)	26.7	16.8
Holloway Hill	25.4	13.4
Guildford Rd	23.8	9.8
Woburn Hill	26.8	17.0
Church Rd	23.7	9.4

The results indicate that the 2004 objectives will not be exceeded.

A number of roads were close to the objective in the previous R&A and these roads have been re-assessed using DMRB and the traffic information in Appendix 3. The results of the DMRB assessment incorporating new emission factors are given in the table below.

**Table 16** DMRB 2004 PM<sub>10</sub> prediction for roads in Runnymede

Location	Annual mean ( $\mu\text{g}/\text{m}^3$ )	Days > 50 $\mu\text{g}/\text{m}^3$
M3	24.6	11.4
A308 Windsor Road	24.1	10.3
A30 Egham hill	24.6	11.4
B3376 Thorpe Lea Road	25.5	13.7
B385 Woodham Lane	25.0	12.4
A320 Chertsey Lane	25.1	12.6
A320 Guildford Road	25.3	13.2
B386 Longcross Road	23.1	8.3
B375 St. Anns Road	23.7	9.6

The results confirm that these roads are not predicted to exceed the 2004 objectives.

The only roads identified from the traffic information obtained as having a proportion of greater than 20% HGVs are some of the slips roads to and from the M25. In these instances there is no relevant exposure within 10m and therefore no further assessment need be made.

No roads with traffic flows greater than 10,000vpd have been built in the Council's area since the first round of R&A where there is relevant exposure arising.

## 8.6 Industrial sources

No new relevant processes have started in the Council's area or within neighbouring areas since the last round of review and assessment. An examination of the Part B processes on the Council's Public Register has identified that there are no existing processes with substantially increased emissions of PM<sub>10</sub> within the Council's area since the last round of review and assessment.

## 8.7 Domestic sources

From local knowledge and professional judgement, significant domestic burning of solid fuels is not undertaken across the Council's area.

### **8.8 Quarries/ landfill sites/ etc**

Potential sources within the Council's area include the licensed landfill sites in the Council's area. The landfill sites licensed by the Environment Agency are listed in Appendix 4, however all these sites are closed and no longer being actively filled. There is therefore no need for further assessment. There are also no quarries in the area.

### **8.9 Aircraft**

As stated earlier in the section for nitrogen dioxide there is not an airport in the Council's area and no assessment is needed.

### **8.10 Conclusion of Second Round Assessment of PM<sub>10</sub>**

The updating and screening assessment for PM<sub>10</sub> has not identified any additional risk of the objectives being exceeded by 2004. The same assessment has also identified that there is a risk that the 2010 objectives will be exceeded across parts of the Council's area.

## 9.0 Conclusion and Recommendations

This report follows the technical guidance (TG03) produced for the updating and screening assessment of the second round of review and assessment and it therefore fulfils this part of the continuing LAQM process.

The results from following this methodology are that the Council has not identified a risk of the air quality objectives for carbon monoxide, benzene, 1,3-butadiene, lead and sulphur dioxide being exceeded by the relevant years anywhere in the Council's area. Thus the Council need not therefore proceed beyond the updating and screening assessment for these pollutants.

The Council has identified a risk that the air quality objectives for nitrogen dioxide will be exceeded at locations with relevant public exposure.

The Council has identified a risk that the provisional air quality objectives for PM<sub>10</sub> (for 2010 only) will be exceeded. The Council however are not required to undertake a Detailed Assessment for the 2010 PM<sub>10</sub> objective at this stage and therefore will note this conclusion for the purposes of longer term planning in the Council's area.

The Council is therefore recommended to undertake the following actions:

1. Undertake consultation on the findings arising from this report with the statutory and other consultees as required.
2. Undertake a Detailed Assessment against the annual mean nitrogen dioxide objective at the following areas: Woburn Hill, A320 Chertsey Lane and the junctions of Eastworth Rd/ Guildford Street, High St/ Church Rd, and Woodham Lane/ New Haw Rd to determine with reasonable certainty whether or not there is a likelihood of the objectives not being achieved.
3. For the pollutants not requiring detailed assessments the LAQM guidance requires the production of annual air quality progress reports by the end of April 2004 and 2005, prior to undertaking the next updating and screening assessment by the end of April 2006.

## 10.0 References

Airborne Particles Expert Group (APEG), 1999. *Source apportionment of particulate matter in the United Kingdom*. HMSO.

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DEFRA, 2003. *Local Air Quality Management, Technical guidance LAQM.TG03*. DEFRA, London.

Runnymede Borough Council, 1998. *Air Quality Review and Assessment Stages 1 and 2*, Runnymede Borough Council.

Runnymede Borough Council, 2000. *Third Stage Review and Assessment for Runnymede Borough Council*.

London Air Quality Network Annual Reports 1997 – 2000.

## Appendix 1: Glossary

AADT	Annual Average Daily Traffic (vehicles per day)
APEG	Airborne Particles Expert Group
AQMA	Air Quality Management Area
AURN	Automatic Urban and Rural Network
CO	Carbon monoxide
COMEAP	Committee on the Medical Effects of Air Pollutants
DA	Detailed Assessment
DEFRA	Department for Environment Food and Rural Affairs
DMRB	Design Manual for Roads and Bridges Screening Model
HGV	Heavy Goods Vehicles
LAQM	Local Air Quality Management
mg/m <sup>3</sup>	Milligrams of the pollutant per cubic metre of air
µg/m <sup>3</sup>	Micrograms of the pollutant per cubic metre of air
ppb	Parts per billion
ppm	Parts per million
NAEI	National Atmospheric Emissions Inventory
AQS	Air Quality Strategy
NO	Nitric oxide
NO <sub>2</sub>	Nitrogen dioxide
PM <sub>10</sub>	Particles with diameter less than 10µm
QA/QC	Quality Assurance / Quality Control
R&A	Review and Assessment
SO <sub>2</sub>	Sulphur dioxide
TEOM	Tapered Element Oscillating Microbalance

## Appendix 2: Data Capture Rates for NO<sub>2</sub> and PM<sub>10</sub> monitoring sites

**Table 17** Data capture rates (%) for the NO<sub>2</sub> continuous monitoring sites (1999-2001)

<b>Data capture</b>	<b>2001</b>	<b>2000</b>	<b>1999</b>
A3	97	96	99
Mole Valley 2	98	97	95
Teddington	94	98	99
M25 site	98	99	82

**Table 18** Data capture rates (%) for the PM<sub>10</sub> continuous monitoring sites (1999-2001)

<b>Data capture</b>	<b>2001</b>	<b>2000</b>	<b>1999</b>
A3	97	98	98
Mole Valley 2	98	90	99
Heathrow	93	97	na
Hounslow 2	96	97	na
M25 site	91	94	95

(na means not available)

### Appendix 3: Road and Traffic Data for Runnymede BC

**Table 19** Estimated 2006 traffic count data for Runnymede Borough Council's roads

Road	Description	AADT flow	%HGVS	SPEED (kph)
M25	M25 Jnt 12-13	104158	11.17	94
M25	J12-13	104158	11.17	100
M25	Jnt 11-12	99832	9.92	80.3
M25	M25 Jnt 13-12	93785	12.3	112.8
M25	J13-12	93785	12.3	120
M25	Jnt 12-11	93702	11.21	112.4
M25	Jnt 10-11	91738	10.36	83.4
M25	J9-10	91738	10.36	81
M25	J10-11	91738	10.36	79.2
M25	J12-13	86559	8.87	75
M25	Jnt 11-10	86048	10.98	119.1
M25	J10-9	86048	10.98	108
M25	J11-10	86048	10.98	132
M25	J11-12	78822	11.08	67.5
M3	J2-1	76803	5.28	104
M3	J2-1	76803	5.28	100.6
M25	J11-10	69866	12.47	135
M3	J3-2	65112	11.93	60
M3	J2-3	65112	11.93	55
M3	J2-3	63993	12.53	100
M3	J3-2	63993	12.53	102.5
M25	J12-11	63852	11.38	120
A317	St Peter's Way	45970	3.8	84.7
M3	J1-2	39964	6.26	108
A317	St Peter's Way	38184	8.17	86.7
M25	J12 slip on to M3 W	38115	16.16	60
B375	Bridge Road	36939	3.76	18.5
M3	J2-1	36839	4.22	108
A320	Guildford Road	35880	6.09	62.7
A320	Guildford Road	35880	6.09	60
A320	Guildford Road	35880	6.09	62.3
A317	Chertsey Road	35171	7.07	40.7
M3	J2 slip off to M25 N	33365	19.61	90
A318	Chertsey Road	32355	8.19	48.6
M3	J2-1	31747	3.85	54.5
A317	Woburn Hill	30353	6.19	54
A317	Woburn Hill	30353	6.19	56.7
B386	Holloway Hill	30264	5.23	37.8
M25	J12 slip on to M3 E	29933	14.27	80
M3	J2 Slip on to M25 S	29850	10.83	60
A317	Weybridge Road	29812	4.38	55
A317	Weybridge Road	29812	4.38	54
M25	J11 Slip Off to M3 W	29804	14.33	75
A30	London Road	29777	4.34	54.6
B3121	Spinney Hill	28371	2.64	33.3
A30	Bypass	28249	7.1	60
A308	The Causeway	27981	8.3	52.5
A30	Egham Bypass	27007	4.82	73.9

A30	London Road	26923	4.21	48.1
A320	Guildford Road	26462	3.95	48.1
M3	J1-2	25879	7.2	75
A318	Chertsey Road	25193	10.29	52.5
A30	London Road	24070	4.75	60
M25	J11 Slip Off to A317	23836	7.49	75
B3407	The Avenue	23750	4.85	54
B3407	High Street	23257	5.37	56.4
B387	Fordwater Road	22894	7.02	31.3
A320	Guildford Road	22374	9.33	60
A308	Windsor Road	22369	4.11	52.9
A320	Guildford Road	21505	4.85	89
M25	J11 Slip On W	21010	5.55	75
A308	The Causeway	20077	4.84	60
A30	Egham Hill	20006	4.94	54
A30	London Road	20006	4.94	52.6
A318	Chertsey Road	19960	7.57	32.8
A318	Chertsey Road	19960	7.57	30.8
A318	High Street	19960	7.57	60
B3376	Thorpe Lea Road	19403	4.41	24
A320	Staines Road	19221	5.56	80
A30	London Road	18655	3.78	63.6
B385	Woodham Lane	18293	7.71	40.6
A320	Staines Road	17877	5.65	53
A320	Chertsey Lane	17877	5.65	51.4
A320	Staines Road	17877	5.65	91.5
M3	J2 slip off to M25 N	17599	22.45	90
B388	Tite Hill	17370	2.22	45.2
A320	Guildford Road	17103	9.87	53.3
B385	Woodham Lane	17097	4.8	40.7
M3	J2 slip off to M25 N	16934	23.32	60
M3	J2 Slip Off to M25 S	16432	15.79	75
M25	J11 Slip On E	16182	4.54	75
B3121	Station Road	16079	2.99	26.5
A318	Byfleet Road	15932	14.22	51
A320	Guildford Road	15415	7.84	53.4
A308	The Glanty	15351	8	90
A320	Chilsey Green Road	14986	7.9	55
B3121	Station Road	14678	7.07	30.7
A320	Guildford Road	14570	11.59	55
B3407	High Street	14474	0.75	49.4
A320	Chertsey Lane	14290	4.28	54
B386	Longcross Road	14221	5.17	57.3
B386	Longcross Road	14221	5.17	55.7
M3	J2 Slip on to M25 S	14085	4.55	75
M3	J2 Slip on to M25 S	13419	4.77	60
M25	J12 slip on to M3 W	13274	16.72	80
B3376	New Wickham Lane	13125	4.61	47
C10	Stroude Road	13125	4.61	59.5
C10	Stroude Road	13125	4.61	59.2
C10	Stroude Road	13125	4.61	63
M25	J11 Slip Off to A317	12915	5.98	75
B388	Vicarage Road	12654	5.8	35
A317	Eastworth Road	12277	7.15	51.2

B3376	Thorpe Lea Road	11920	3.83	50
B388	Vicarage Road	11436	5.92	51
B388	Vicarage Road	11436	5.92	48
B375	Bridge Road	11376	4.19	52
B375	St. Anns Road	10893	2.14	49.8
B389	Green Road	10693	9.28	63
B3121	Church Road	10543	4	45.9
B3121	Church Road	10543	4	45.5
B388	Thorpe Lea Road	10231	5.16	48
A328	St Jude's Road	10121	4.85	64.5
A328	Priest Road	10121	4.85	66

(Supplied by the Surrey County Council)

**Table 20** Roads re-assessed in USA

Road	Description	Distance (m) to	
		receptor	Easting Northing
M3	J2-3	33	500563 167197
A317	Woburn Hill	6.5	505469 165534
B386	Holloway Hill	11.1	502226 165345
A308	Windsor Road	8.3	499641 173139
A30	Egham Hill	7.4	500253 171038
A318	High Street	3.9	504986 164635
B3376	Thorpe Lea Road	5.6	502128 170531
B385	Woodham Lane	7	505445 163034
A320	Chertsey Lane	9	503521 170852
A320	Guildford Road	8.6	502175 163689
B386	Longcross Road	5.6	500921 165651
B375	Bridge Road	4.1	504593 166815
B375	St. Anns Road	7.5	504149 166994

**Table 21** Junctions and Busy streets identified in Runnymede B.C

Road	Description	Distance (m) to	
		receptor	Easting Northing

<u>Junctions</u>				
A317	Eastworth Road	10	503948	166469
B375	Heriot Road			
A318	High Street	10	505012	164587
B3121	Church Road			
B385	Woodham Lane	5.9	505454	163102
A318	New Haw Road			
<u>Busy street</u>				
A318	High Street	3.9	505012	164587
B3121	Station Road	5	505461	164723
B375	Bridge Road	4.1	504593	166815

**Table 22** Roads with significantly increased flows (between 1999 and 2006)

Road	Description	AADT 1999	AADT 2006	Difference in flows%
A317	Eastworth Road	9279	12277	32.31
A318	Chertsey Road	21630	32354	49.58
B386	Holloway Hill	23957	30264	26.33
A320	Guildford Road	17805	22373	25.66
A317	Woburn Hill	19993	30352	51.81
A317	Woburn Hill	19993	30352	51.81
B3121	Church Road	8007	10542	31.66

## Appendix 4: Pollutant Source Data for Runnymede BC

**Table 23** Part B processes in the Runnymede B.C area

PROCESS	NAME	ADDRESS
MOBILE	Capital	Capital House, Woodham Park Road, Woodham,
CRUSHER	Demolition Ltd	Weybridge, Surrey, KT15 3EG
COATING	Eclipse Auto Repairs	Unit 2A, Bridge Wharf, Chertsey, Surrey, KT16 8LJ
COATING	Ferrari UK	Maranello Concessionaires Ltd, Thorpe Industrial Estate, Egham, Surrey, TW20 8RJ
COATING	LA Coachworks	Byron Road, Addlestone, Surrey, KT15 2SY.
BULK CEMENT	Lafarge Redland Aggregates	Longside, Thorpe Lea Road, Egham, Surrey, TW20 8RH
INCINERATOR	M.A.F.F	Central Veterinary Laboratory, Woodham Lane, New Haw, Addlestone, Surrey
COATING	Medcalf & Co (Coachbuilders)	Fordwater Trading Estate, Fordwater Road, Chertsey, Surrey
COATING	Neweld Coachworks	Crystal Haven Ltd, Hanworth Lane, Chertsey, Surrey
COATING	Panel Wise	Hamm Moor Lane, Weybridge Industrial Estate, Weybridge, Surrey, KT15 2SD.
BULK CEMENT	Ready Mix Concrete	(Thames Valley) Ltd, Staines Lane, Chertsey, Surrey
BULK CEMENT	Remix Dry Mortar Ltd	Addlestone Quarry, Byfleet Road, Addlestone, Surrey, KT15 3LA
COATING	Denmark Coachworks	AS Denmark Coachworks, Unit B9, Crabtree Road, Cavons Yard, Thorpe Industrial Estate, EGHAM, Surrey, TW20 8RN

**Table 24** Authorised petrol stations in the Runnymede B.C area

Location	Easting	Northing	Traffic > 30000 vpd
Wheatsheaf Service Station London Road GU25 4QE	498068	168756	No
Ayebridges Service Station 171 Thorpe Lea Road TW20 8HP	502142	170489	No
Shell Ottershaw Guildford Road KT15 2DS	502237	163777	No
Trident Garage Guildford Road KT16 0NZ	502168	163802	No
Totalfina Chertsey Road KT15 1ED	505013	165257	Yes
Shell Egham 186/7 High Street TW20 9ED	500715	171265	No
Chertsey Service Station 102 Bridge Road KT16 8LA	505234	166631	No
Runnymede Service Station, 41 The Avenue TW20 9AD	501691	171681	No
BP Express Shopping, 1 Egham Hill TW20 0ET	500576	171236	No
Fillup Motor Co Ltd New Haw Road KT15 2DS	505436	163186	No
Sainsbury's Petrol Station The Causeway TW18 3AG	502863	171504	No
J Sainsbury Petrol Station 1 Sainsbury's Centre KT16 9AG	504181	166774	No
Tesco Petrol Filling Station 117 Station Road KT15 2AS	505287	164741	No

**Table 25** Licensed landfills in the Runnymede B.C area

<b>Address</b>	<b>Postcode</b>	<b>Licence No</b>	<b>Type</b>	<b>Issued</b>
Norlands Lane Landfill, Norlands Lane, Thorpe	TW20 8SS	83063	Co-disposal landfill sites	01/07/1977
Penton Hook Marina, Chertsey Lane	TW18 3NG	83064	Landfills taking other wastes (construction, demolition, dredgings)	07/06/1990
Trumps Farm Landfill, Kitsmead Lane	KT16	83065	Household, Commercial and industrial waste landfills	07/10/1994

