

**Updating and Screening Assessment for the
Hammersmith & Fulham Council**

March 2004

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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 Hammersmith and Fulham Council have previously undertaken the first round of review and assessment (R&A) of local air quality management.

This report concerns the Updating and Screening Assessment under the second round of review and assessment. 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 (PM₁₀). 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 review and assessment 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, 1,3-butadiene, lead and sulphur dioxide being exceeded is not significant in the Council's area.

The report also identifies the following:

For benzene - there is a risk of the 2010 objective being exceeded close to a petrol station in Fulham Palace Road.

For nitrogen dioxide (NO₂) - there is a risk of the 2005 objectives being exceeded across the borough and additionally at the Hammersmith Broadway bus station.

For particles (PM₁₀) - there is a risk of the 2004 daily mean objective being exceeded across the borough and additionally from fugitive emission sources in the north of the borough.

For particles (PM₁₀) - there is a risk of the 2010 objectives being exceeded across the borough.

The Council has already declared its area an Air Quality Management Area in respect of NO₂ and PM₁₀ and the findings of this assessment are consistent with this action. In addition and as a result of the above findings the Council will also undertake Detailed Assessments for benzene, NO₂ and PM₁₀ for the additional sources identified.

For the other pollutants not requiring detailed assessments the LAQM guidance requires the production of annual air quality progress reports by the end of April 2005, prior to undertaking the next updating and screening assessment by the end of April 2006.

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Progress with Local Air Quality Management (1998-2003)

As part of its Local Air Quality Management (LAQM) responsibilities, Hammersmith & Fulham Council completed the first round of review and assessment of air quality between 1998 and 2002 (individual reports are available on the council's air quality webpage – www.lbhf.gov.uk/Council_Services/Environment/AirQuality/index.html). These reports present a staged approach whereby the seven air pollutants in the Government's Air Quality Strategy (AQS) were first assessed and screened as to their relative importance to air quality within the Council's area.

Benzene, 1,3 butadiene, carbon monoxide, lead and sulphur dioxide (SO₂) were assessed at the earliest stage of the first round of review and assessment and were found to be unlikely to exceed the air quality objectives at this stage and therefore no further action was required.

The Stage 2 and 3 reports assessed air quality across the whole of the Council's area in accordance with DEFRA guidance. They outlined the areas that were predicted to exceed the NO₂ annual mean objective and 24 hour mean PM₁₀ objective only, with these areas relating mainly to the road network across the borough. As a consequence, an Air Quality Management Area (AQMA) was designated for both pollutants for the whole of the borough in November 2000.

The Stage 4 report subsequently examined these areas only and remodelled them with the revised vehicle emission factors in 2002. The Stage 4 modelling predictions confirmed the Stage 3 findings that the AQS objectives for NO₂ and PM₁₀ will be exceeded. However the area where the annual mean NO₂ objective is predicted to exceed was larger than that for PM₁₀. Following the Stage 4 report the Council maintained its AQMA as originally designated and began preparation of an Air Quality Action Plan (AQAP).

Introduction to Updating Screening and Assessment

The government's 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 via a local AQAP. 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 and is part of a three yearly cycle that ends in 2010. It follows the latest prescribed guidance given in Technical Guidance LAQM. TG(03), which replaces the guidance produced for the previous round of air quality assessments. TG(03) is designed to help local authorities undertake their duties under the Environment Act 1995 in reviewing and assessing air quality in their area.

The most important changes since the last round of review and assessment relate to the changes in air quality objectives. 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 NO₂ and benzene and indicative limit values for PM₁₀ for 2010. In the case of NO₂ the 2010 limit values are the same as the 2005 objectives, hence meeting the latter automatically means that the former should be 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 air quality review and assessment.

The guidance requires a phased approach, as with the previous work. 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. TG(03) 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, 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	
Benzene	16.25 $\mu\text{g}/\text{m}^3$ (5 ppb)	Running Annual Mean	31 Dec 2003
	5 $\mu\text{g}/\text{m}^3$	Annual Mean	31 Dec 2010
1, 3 Butadiene	2.25 $\mu\text{g}/\text{m}^3$ (1 ppb)	Running Annual Mean	31 Dec 2003
Carbon Monoxide	10 mg/m^3	Daily Maximum Running 8 hour Mean	31 Dec 2003
Lead	0.5 $\mu\text{g}/\text{m}^3$	Annual Mean	31 Dec 2003
	0.25 $\mu\text{g}/\text{m}^3$	Annual Mean	31 Dec 2008
Nitrogen Dioxide (NO₂)	200 $\mu\text{g}/\text{m}^3$ (105 ppb) not to be exceeded more than 18 times a year	1 hour Mean	31 Dec 2005
[both provisional]	40 $\mu\text{g}/\text{m}^3$ (21 ppb)	Annual Mean	31 Dec 2005
Particles (PM₁₀)	50 $\mu\text{g}/\text{m}^3$ not to be exceeded more than 35 times a year	24 hour Mean	31 Dec 2004
	40 $\mu\text{g}/\text{m}^3$	Annual Mean	31 Dec 2004
Sulphur Dioxide (SO₂)	350 $\mu\text{g}/\text{m}^3$ (132 ppb) not to be exceeded more than 24 times a year	1 hour Mean	31 Dec 2004
	125 $\mu\text{g}/\text{m}^3$ (47 ppb) not to be exceeded more than 3 times a year	24 hour Mean	31 Dec 2004
	266 $\mu\text{g}/\text{m}^3$ (100 ppb) not to be exceeded more than 35 times a year	15 minute Mean	31 Dec 2005

Table 2 Proposed new particle objectives (from Air Quality Strategy Addendum (2003))

Pollutant	Objective		Date to be achieved by
	Concentration	Measured as	
Particles (PM₁₀) <u>(NB the objective for London is given in brackets)</u>	50 µg/m ³ not to be exceeded more than 7 (10) times a year	24 hour Mean	31 Dec 2010
	20 (23) µg/m ³	Annual Mean	31 Dec 2010

London Atmospheric Emissions Inventory

The Greater London Authority (GLA) has required London Boroughs to use the latest version of the London Atmospheric Emission Inventory (LAEI). Released in November 2003, this provides data from 2001 and incorporates the latest updates and changes relating to atmospheric emissions across the Greater London area. The total area covered by the LAEI is 2,466 km², covering all 32 London boroughs and the City of London and parts of 19 districts that lie between the M25 and GLA boundary. The LAEI incorporates all major and minor sources, including roads.

The development of the revised road traffic part of the LAEI has followed closely the methodology laid out in the previous version. However a number of key areas have been enhanced, these include

- A revised road network and complete update of vehicle flow, which includes roads up to and including the M25;
- Use has been made of a new version (b 2.1) LTS model;
- Recalculation of the minor road vehicle km totals;
- Updated speed estimates on all roads;
- Revision and use of the most recent speed related emissions estimates;
- Estimates of the performance of the national vehicle stock model compared to on-road vehicle stock using 2002 VED data;
- Use of GPS positioning in estimating taxi flows on roads around Heathrow;
- Improvements made to the taxi and bus stock in London using specific data from the Public Carriage Office (PCO) and TfL Buses.

The vast majority of the road network is identical to the previous 1999 inventory. The most significant change is that the road links now include those up to and including the M25. The total number of links has increased from 18201 (1999 LAEI) to 21944.

The traffic flows have been updated using approximately 1700 manual count flows obtained from TfL, TfL automatic traffic count data, and counts supplied by the London Boroughs. Full details are given in the methodology report of the LAEI 2001.

Background concentrations provide an understanding of the prevailing pollution in the absence of specific local emission sources. Future background concentrations have been modelled on a 40m-grid square using the LAEI for NO₂, NO_x and PM₁₀ (for 2004), for details of the methodology used see www.london.gov.uk/approot/mayor/air_quality/model.jsp.

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 (NAEI) have been used to provide an understanding of future concentrations of benzene (based on 2010), 1,3-butadiene (based on 2003) and PM₁₀ (based on 2010). These are produced on a 1x1km grid square for the U.K (see 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.

Monitoring Data

The monitoring of air quality in an authority's area provides an important source of information for understanding local air quality. 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 continuous monitoring at two sites in the borough. The Hammersmith Broadway monitoring station measures NO₂, SO₂ and PM₁₀ and the mobile station, currently installed at Brook Green, monitors NO₂ and PM₁₀. Both sites are affiliated to the London Air Quality Network (LAQN). This network provides a regional focus and the standards of QA/QC adopted meet those stipulated in TG(03) guidance. The Council also undertakes diffusion tube monitoring of NO₂ and benzene.

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 of interest to LAQM. The TG(03) guidance 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 and examined.

There are no relevant Part A processes in the borough. A list of new or recently amended Part B and other processes of potential concern in Council's area is given in Appendix 3.

Road Traffic

To estimate the air quality impact of those roads that need examining in this latest step of the review and assessment process it is necessary to use the DMRB screening 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 TG(03).

Relevant exposure

The objectives relate to public exposure to the pollutants. More specifically any areas that may exceed them 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). TG(03) advises further that the assessment should focus on those locations where members of the public are likely to regularly be present and are likely to be exposed over the period of the objective.

Carbon Monoxide

The air quality objective for carbon monoxide (CO) has been tightened and is now 10mg/m³ as a maximum daily running 8-hour concentration to be achieved by the end of 2003, which is in line with second Air Quality Daughter Directive limit value.

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 TG(03)). Despite this the guidance highlights that under certain meteorological conditions the objective was approached within 2mg/m³ at four urban background sites in 2001.

Current projections are that emissions will reduce by a further 42% between 2000 and 2005. National modelling has further indicated that at the end of 2003, major roads will not exceed the objective.

No AQMAs were declared in the first round based on the previous objective of 11.6mg/m³.

Based on TG(03), it is considered highly unlikely that any authority will be required to proceed beyond the updating and screening assessment.

Methodology Overview

Full details of the methodology employed can be found in TG(03). 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. Only monitoring data and very busy roads need be considered. (The TG(03) guidance does not require the screening of industrial sources).

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 1mg/m³. 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.

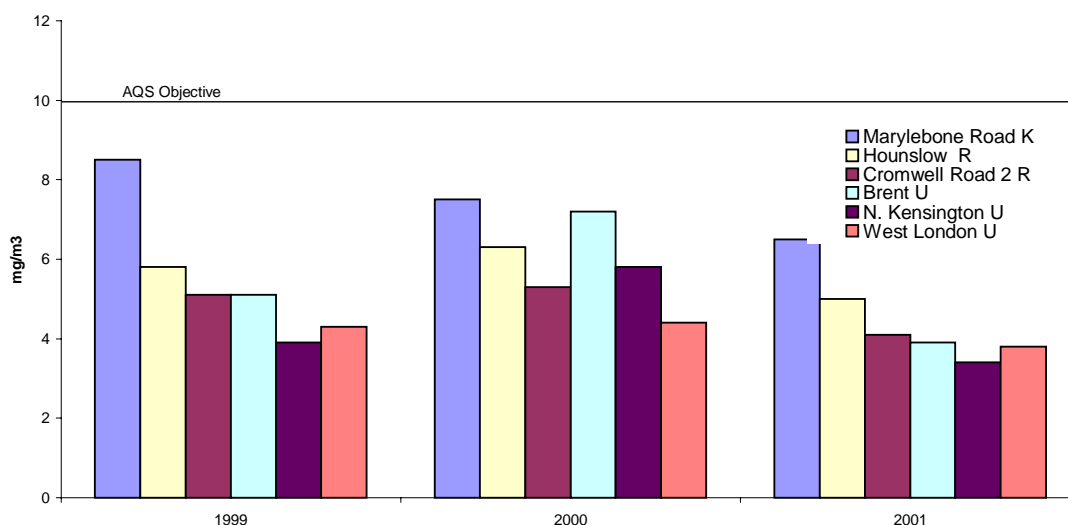
Updating and Screening Assessment of Carbon Monoxide for the Hammersmith & Fulham Council

The Council considered the following sources during the previous round of R&A: industrial processes, a combination of low level combustion sources and roads, and planned sources including major roads in the Council's area. Based on this previous screening, CO was found not likely to exceed the AQS objective where there might be exposure and hence no further action was undertaken.

1. Monitoring

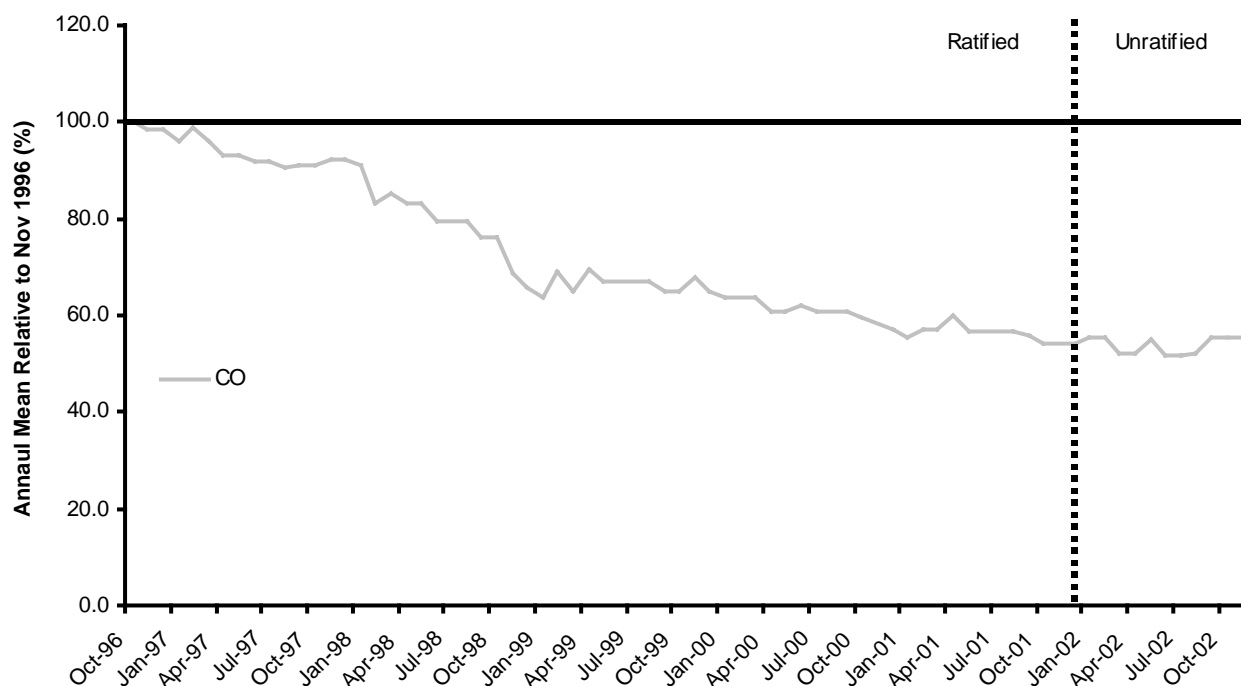
The Council does not undertake CO continuous monitoring in the borough. Continuous monitoring of CO is however undertaken at other London Air Quality Network (LAQN) sites in nearby central and west London, including the busy kerbside site at Marylebone Road in central London. The results for these sites for the period between 1999 and 2001 confirm that the objective was not exceeded. In all the above instances the data capture rates were greater than 90% and the data have been scaled and ratified.

Figure 1 Maximum daily running 8-hour mean CO at selected London sites (1999-2001)



(Note – K- kerbside site; R – roadside site; U – urban background site)

The concentrations at the above sites have not exceeded the $10\text{ mg}/\text{m}^3$ (maximum daily running 8 hour mean) objective for the period monitored.

Figure 2 Relative annual mean for CO from LAQN sites

An analysis of annual mean concentrations since 1996 for LAQN sites is given above in Figure 2. This indicates a downward trend over time, although it is important to appreciate that the AQS objective for CO is averaged over shorter time periods, which are not necessarily represented by annual mean concentrations.

The results of monitoring in London are considered representative of the Council's area. These indicate that the objective is being met and therefore a Detailed Assessment of CO based on monitoring is not required.

2. *Very busy roads/junctions in built up areas*

Traffic flows in the area are given in Appendix 2 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 TG(03)). There are similarly no junctions of the busiest roads where these traffic flows are exceeded in the Council's area.

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 mg/m^3 (from the 2001 results). Using the factor in TG(03), the estimated 2003 annual mean concentration can be determined as 0.35 mg/m^3 , which is thus less than the 1 mg/m^3 concentration where further action is deemed necessary. This indicates that the objective is being met and therefore a Detailed Assessment of CO based on very busy roads and junctions is not required.

Conclusion

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

Summary of findings for carbon monoxide

Screening checklist for CO	Outcome
Monitoring data	No further action required
Busy roads, junctions	No further action required

Benzene

The air quality objective for benzene is $16.25\mu\text{g}/\text{m}^3$ (5ppb) as a running annual mean to be achieved by the end of 2003, this has been added to with an additional objective of $5\mu\text{g}/\text{m}^3$ (1.5ppb) as an annual mean concentration to be achieved by the end of 2010. This is in line with the second Air Quality Daughter Directive limit value.

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 TG(03)). 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 for benzene in the first round of review and assessment. 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.

Methodology Overview

Full details of the methodology employed can be found in TG(03). 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. a) For new industrial and other sources listed in TG(03) 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 review and assessment 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.
- b) For petrol stations it is necessary to identify petrol stations with a throughput of more than $2,000\text{m}^3$, and with a road with more than 30,000 vehicles per day nearby. If there is relevant exposure within 10m of the pumps it is necessary to proceed to a Detailed Assessment.
- c) 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.
- d) 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.

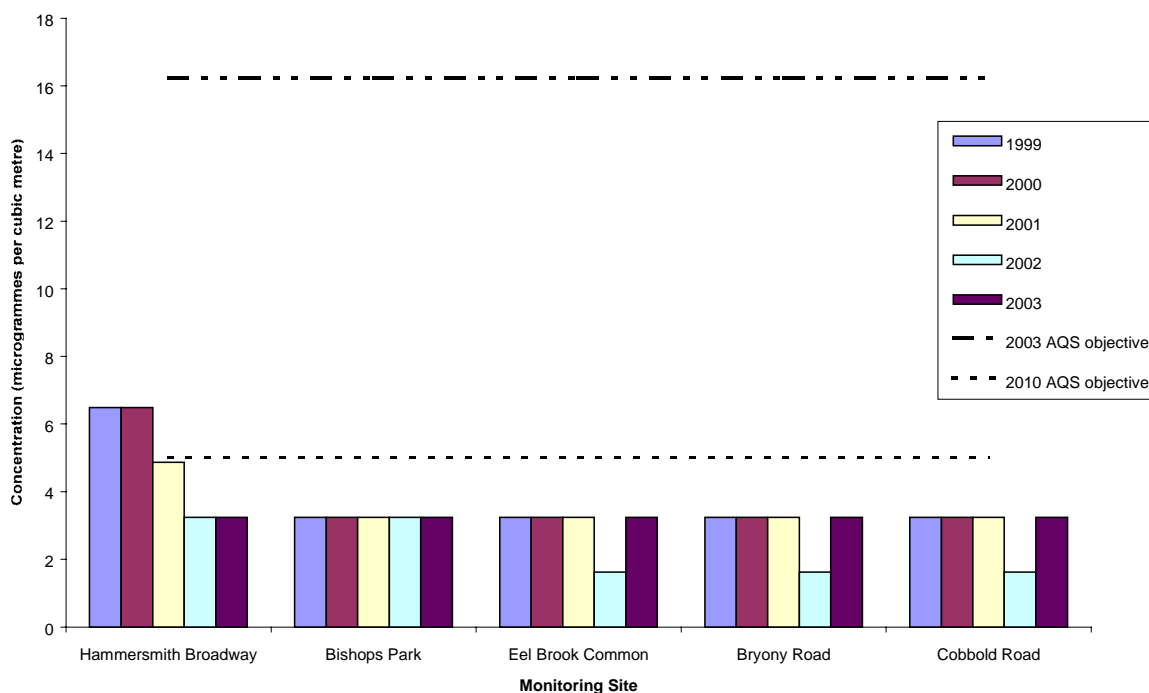
Updating and Screening Assessment of Benzene for the Hammersmith & Fulham Council

The Council carried out benzene monitoring in its area using diffusion tubes. Based on these it was considered in the previous review and assessment that annual mean concentrations would not exceed the old objective (for 2003) in the Council's area. Benzene sources were also screened during the previous round of review and assessment and found to pose a negligible risk in localities where there might be exposure, hence progression beyond the Stage 2 report was not undertaken at the time.

1. Monitoring

The results for the years 1999 to 2002 are given below for the Hammersmith Broadway roadside site and urban background sites at Bishops Park, Eelbrook Common, Bryony Road and Cobbold Road.

All the results for the years monitored are less than $7\mu\text{g}/\text{m}^3$ and thus indicate that the 2003 annual mean objective of $16.25\mu\text{g}/\text{m}^3$ will be met. The roadside results at the busy Hammersmith Broadway monitor the highest concentrations and since 2001, all results from all sites indicate that the 2010 annual mean objective of $5\mu\text{g}/\text{m}^3$ will also be achieved.

Figure 3 Benzene monitoring in the Council's area (1999 – 2003)

Continuous monitoring of benzene is also undertaken in other areas of London. These sites include the busy kerbside site at London Marylebone Road. The results for this site for the period 1999 to 2001 were 12.8, 10.8 and 6.29 $\mu\text{g}/\text{m}^3$. These results indicate that the 2003 objective will be met. However they exceed the 2010 objective. To predict future concentrations and allow for the expected reductions in emissions it is necessary to correct the data using factors from TG(03). The factors used are based on the continuing reductions in emissions arising from petrol and its use. Based on the 2001 data, the predicted concentration for the Marylebone Road site is 4.06 $\mu\text{g}/\text{m}^3$, which is below the 2010 objective.

The above monitoring results above are considered representative of the Council's area. They indicate that the concentrations will not exceed the benzene objectives for 2003 and 2010 and therefore a Detailed Assessment based on monitoring is not required.

2. *Very busy roads/ junctions in built up areas*

Traffic flows in the area are given in Appendix 2; from this no roads in the Council's area need be identified as a 'very busy road' using the TG(03) definition.

The www.airquality.co.uk/archive/laqm/tools.php site gives the 2010 background for the Council's area and from this the estimated background predictions vary between 0.76 and 0.94 $\mu\text{g}/\text{m}^3$. This is less than the 2 $\mu\text{g}/\text{m}^3$ referred to in the TG(03) guidance for further assessment. Based on these findings there is no need to carry out a Detailed Assessment in connection with very busy roads.

3a. *Part A processes*

There were no industrial processes that were found in or near to the Council's area to emit significant quantities of benzene during the previous R&A. Since then no significant new industrial sources of benzene or existing ones with increased emissions have been identified either in the Council's area or in neighbouring local authority areas.

3b. Petrol stations

The list of authorised petrol stations is attached in Appendix 3. A petrol station is only considered important for 2010 objective, if the throughput is greater than 2000m³ and if it is close to a busy road with more than 30,000vpd. Full details on the throughput are not available, although all petrol stations are known to have a throughput of greater than 1000m³.

There are two petrol stations in the Council's area, close to busy roads (as defined by TG(03)), which have relevant exposure within 10m of the petrol pumps. These petrol stations are sited on Shepherd's Bush Green and Fulham Palace Road. The petrol station on Shepherd's Bush Green had a Stage 2 recovery system installed last year and hence based on TG(03) it does not need to be assessed in more detail. The petrol station on Fulham Palace Road is still operating a Stage 1B system and in view of the close proximity to residential premises, does require further assessment.

3c. Major fuel storage depots

There are no major fuel storage depots within the Council's area (as defined in TG(03)).

Conclusion

The updating and screening assessment for benzene has identified a risk of the 2010 objective being exceeded in the Council's area, close to the petrol station on Fulham Palace Road. The Council will therefore proceed to a Detailed Assessment for this potential exceedence.

Summary of findings for benzene

Screening checklist for benzene	Outcome
Monitoring data	No further action required
Busy roads, junctions	No further action required
Petrol stations	Detailed assessment required
Industrial sources	No further action required
Major petrol storage depots	No further action required

1,3-Butadiene

The air quality objective for 1,3-butadiene remains $2.25\mu\text{g}/\text{m}^3$ as a maximum running annual mean concentration to be achieved by the end of 2003.

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 TG(03)) 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 review and assessment work.

1,3-Butadiene - Methodology Overview

Full details of the methodology employed can be found in TG(03). 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 or 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 review and assessment 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.

A substantial increase in emissions is one where the increase is greater than 30%.

Updating and Screening Assessment of 1,3-Butadiene for the Hammersmith & Fulham Council

No significant sources were screened during the previous round of review and assessment and so relevant exposure was considered unlikely. As a result progression beyond the Stage 2 report was not undertaken.

1. *Monitoring*

The Council has not undertaken specific monitoring of 1,3-butadiene since the last round of review and assessment. Continuous monitoring is undertaken nearby in other parts of London. The annual mean results at the national network 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.

These monitoring results are considered representative of the Council's area. They indicate that the concentrations will not exceed the 1,3-butadiene objective for 2003 and therefore a Detailed Assessment is not required.

The 2003 background from the www.airquality.co.uk/archive/laqm/tools.php site also confirms that 2003 background is less than 1 $\mu\text{g}/\text{m}^3$. The estimated background predictions vary between 0.36 and 0.42 $\mu\text{g}/\text{m}^3$ across the Council's area.

2. *Industrial sources*

As for benzene, there is no new IPC/ Part B/ A2 process or existing process with substantially increased emissions of 1,3-butadiene within the Council's area since the last round of review and assessment. Similarly the Council has not identified significant new industrial sources or existing ones with increased emissions in neighbouring local authority areas.

Conclusion

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

Summary of findings for 1,3 butadiene

Screening checklist for 1,3 butadiene	Outcome
Monitoring data	No further action required
Industrial sources	No further action required

Lead

The current air quality objective for lead is $0.5\mu\text{g}/\text{m}^3$ as an annual mean concentration to be achieved by the end of 2004, with a lower air quality objective of $0.25\mu\text{g}/\text{m}^3$ as an annual mean concentration to be achieved by the end of 2008.

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 TG(03)).

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 for lead in the first round of review and assessment.

Methodology Overview

Full details of the methodology employed can be found in TG(03). 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 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 review and assessment 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. A substantial increase in emissions is one where the increase is greater than 30%.

Updating and Screening Assessment of Lead for the Hammersmith & Fulham Council

The sources identified in the first round of review and assessment in the Council's area, were found to pose a negligible risk in localities where there might be exposure and hence progress beyond the initial Stage 1 review and assessment was not needed.

1. *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. The results from the national network in London (between 1999 and 2001) have confirmed that concentrations do not exceed the objectives for 2003 and 2008. The highest annual mean concentration was 0.068 $\mu\text{g}/\text{m}^3$ at the kerbside site at Cromwell Road in West London in 1999, although concentrations at the London sites have since reduced markedly.

These monitoring results are considered representative of the Council's area. The results indicate that the concentrations will not exceed the lead objectives for 2004 and 2008 and therefore a detailed assessment is not required.

2. *Industrial sources*

There is no new IPC/ Part B/ A2 process or existing process with substantially increased emissions of lead within the Council's area since the last round of review and assessment. Similarly the Council has not identified significant new industrial sources or existing ones with increased emissions of lead in neighbouring local authority areas.

Conclusion

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

Summary of findings for lead

Screening checklist for lead	Outcome
Monitoring data	No further action required
Industrial sources	No further action required

Nitrogen Dioxide

The current air quality objectives for nitrogen dioxide are 40 µg/m³ as an annual mean concentration and a one-hour mean concentration of 200 µg/m³ not to be exceeded more than 18 times per year. The objectives are to be achieved by the end of 2005.

The EU limit values are the same as the above objectives, however the limit values are to be met by the later date of the 1st January 2010.

Perspective

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

The principal source of nitrogen oxides emissions is road transport, which accounted for about 49% of total UK emissions in 2000 (from TG(03)). 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.

Nationally, more than 100 AQMAs were declared in the first round of review and assessment, 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.

The whole of Hammersmith & Fulham was designated as an AQMA for nitrogen dioxide in 2000.

Methodology Overview

Full details of the methodology employed can be found in TG(03). 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 TG(03) 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. The section on roads focuses on specific examples that may not have been fully considered in the first round of review and assessment, these include: narrow congested streets; junctions; busy streets where people may spend an hour or more close to traffic; roads with high flows of buses or HGVs; new roads; and roads close to the objective during the first round of review and assessment. The assessment 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 $40 \mu\text{g}/\text{m}^3$ 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 $40 \mu\text{g}/\text{m}^3$ in 2005 then it is necessary to proceed to the Detailed Assessment stage.
4. For new industrial sources (as listed in TG(03)) 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 TG(03) 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.

Updating and Screening Assessment of Nitrogen Dioxide for the Hammersmith & Fulham Council

The main sources examined in the Council's area during the previous round of review and assessment were road transport sources. The Council undertook a detailed Stage 3 review and assessment in the previous round and identified the sections of roads in its area with relevant exposure where the annual mean objective would be exceeded. Consequently the Council declared an AQMA across the whole borough.

A further review was undertaken using revised emission factors. The results showed that future vehicle emissions will not reduce as much as previously estimated and for NO_2 the area predicted to exceed the annual mean objective was greater than shown by the earlier study.

1. Monitoring

The Council undertakes continuous monitoring of NO₂ within its area at one roadside location on the Hammersmith Broadway, and at an urban background site at Brook Green. Both sites are part of the LAQN and the standards of QA/QC applied meet the requirements of the LAQN.

The monitoring results from the Hammersmith Broadway site are given in Table 3 below. This indicates that the annual mean objective was exceeded for all years (although it should be noted that in 1999 the data capture rate was less than 50% as it was part way through this year when the site was established). 2003 data is included, but this is provisional at this stage and is subject to further validation.

The site also exceeded the hourly standard during the period, except for 2001 and 2002. The data capture for the sites is as given above.

Data from the Brook Green site is not presented as it was only established in mid 2003, and analyser faults restricted data capture for the year.

Table 3 NO₂ continuous monitoring in Hammersmith & Fulham Council area (1999 – 2003) – annual mean objective (µg/m³)

LAQN site	1999	2000	2001	2002	2003
Hammersmith Broadway	92	73	<i>71</i>	59	92

(Note - italics represents < 90% data capture)

Table 4 NO₂ continuous monitoring in Hammersmith & Fulham Council area (1999 – 2003) – hourly mean objective (number of exceedences)

LAQN site	1999	2000	2001	2002	2003
Hammersmith Broadway	27	20	5	0	53

(Note - italics represents < 90% data capture)

The results of diffusion tube monitoring for the most recent years (i.e. from 1999 to 2003) in the borough are given in Table 5 below (note – the results given are the original unbiased results). The diffusion tubes are supplied by Casella Stanger with analysis undertaken by Gradko Scientifics. The method of preparation used is 50% TEA in water. The diffusion tubes are located at 8 roadside sites and 12 background sites across the borough which all represent locations relevant for public exposure. (Note - the diffusion tubes have not been established at all locations for all years).

Table 5 NO₂ diffusion tube monitoring in Hammersmith & Fulham Council area (1999 – 2003) – annual mean objective ($\mu\text{g}/\text{m}^3$)

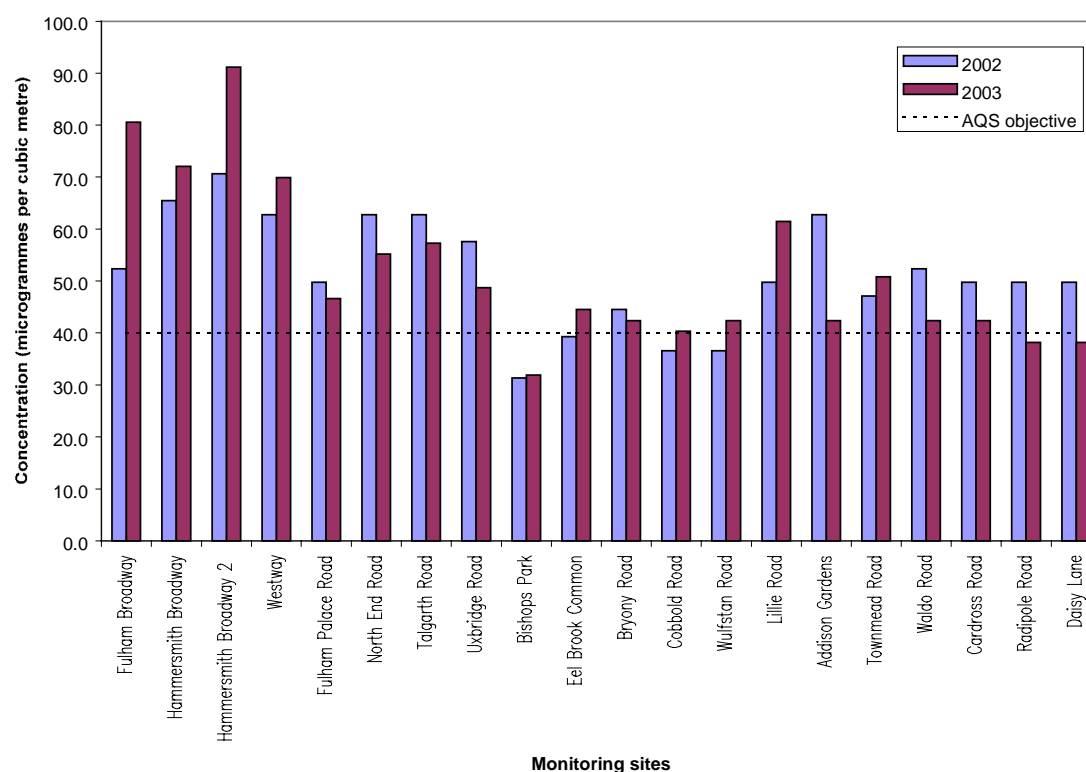
(NB these are not bias corrected)

Site	Type	1999	2000	2001	2002	2003
Fulham Broadway	Roadside		49.7	34.4	38.2	72.6
Hammersmith Broadway	Roadside	57.3	42.0	45.8	47.8	64.9
Hammersmith Broadway 2	Roadside		43.9	45.8	51.6	82.1
Westway	Roadside		45.8	36.3	45.8	63.0
Fulham Palace Road	Roadside				36.3	42.0
North End Road	Roadside				45.8	49.7
Talgarth Road	Roadside				45.8	51.6
Uxbridge Road	Roadside				42.0	43.9
Bishops Park	Background	24.8	22.9	22.9	22.9	28.7
Eel Brook Common	Background	34.4	34.4	28.7	28.7	40.1
Bryony Road	Background	36.3	30.6	30.6	32.5	38.2
Cobbold Road	Background	34.4	30.6	26.7	26.7	36.3
Wulfstan Road	Background	40.1	32.5	34.4	26.7	38.2
Lillie Road	Background	40.1	38.2	32.5	36.3	55.4
Addison Gardens	Background		38.2	43.9	45.8	38.2
Townmead Road	Background		32.5	36.3	34.4	45.8
Waldo Road	Background				38.2	38.2
Cardross Road	Background				36.3	38.2
Radipole Road	Background				36.3	34.4
Daisy Lane	Background				36.3	34.4

(Blank indicates measurement not undertaken; italics represent data for part year only)

The results for the years 2002 and 2003 have been adjusted for bias by using the bias factors calculated from Casella Stanger's London-wide monitoring programme and these adjusted results are presented in Figure 4 below. The factor for 2002 was 1.37 and for 2003 it was 1.11. These factors indicate that the diffusion tube results under read in comparison with automatic chemiluminescence monitoring equipment used at Hammersmith Broadway and Brook Green.

The results for each roadside site indicate that the 40 $\mu\text{g}/\text{m}^3$ standard was exceeded for both years. This is also true for half of the background sites (Bryony Road, Lillie Road, Addison Gardens, Townmead Road, Waldo Road, Cardross Road). Only Bishops Park met the objective in 2002 and 2003.

Figure 4 NO₂ diffusion tube sites (2002 – 2003) – bias adjusted annual mean objective (µg/m³)

The TG(03) guidance also includes correction factors for future years for roadside measurements and thus estimated concentrations for the sites with measured exceedences have been derived and the results are given below in Table 6.

Table 6 Predicted annual mean NO₂ using corrected bias adjusted diffusion tube results for selected sites across the borough (2002 – 2003) (µg/m³)

Site	Type	2005 (Based on 2002)	2005 (Based on 2003)
FULHAM BROADWAY	ROADSIDE	48.2	84.1
HAMMERSMITH B'WAY	ROADSIDE	60.2	75.2
HAMMERSMITH B'WAY2	ROADSIDE	65.0	95.1
WESTWAY	ROADSIDE	57.8	73.0
BISHOPS PARK	BACKGROUND	28.9	33.2
EEL BROOK COMMON	BACKGROUND	36.1	46.5
BRYONY ROAD	BACKGROUND	40.9	44.2
COBBOLD ROAD	BACKGROUND	33.7	42.0
WULFSTAN ROAD	BACKGROUND	33.7	44.2
LILLIE ROAD	BACKGROUND	45.8	64.2
ADDISON GARDENS	BACKGROUND	57.8	44.2
TOWNMEAD ROAD	BACKGROUND	43.4	53.1

(Note – bold indicates > AQS annual mean objective)

The above data corrected to 2005 indicate that all roadside locations will exceed the objective in 2005. Many of the background locations are also predicted to exceed.

The most recent results from the continuous monitoring sites in nearby authorities in the LAQN (plus the Marylebone Road site in central London, which is a kerbside site with high pollution concentrations) are given in Table 7 below. This table gives details of the data capture rate, annual mean and whether or not the annual mean standard was achieved. 2003 data is still provisional.

The results confirm that the kerbside site at Marylebone Road and all other roadside sites failed to meet the 40 $\mu\text{g}/\text{m}^3$ standard. The urban background sites however, apart from those in outer London, all exceeded the standard, thereby suggesting that areas of the borough background concentrations may exceed the standard. The findings for these LAQN sites are considered indicative of the findings for the Council's area – i.e. that high concentrations of NO_2 arise across the borough.

The assessment of NO_2 based on monitoring confirms that there are areas across the borough where the annual mean objective will be exceeded. A Detailed Assessment to revoke the Council's AQMA is therefore not required.

Table 7 Results of NO_2 monitoring from nearby LAQN sites – annual mean objective ($\mu\text{g}/\text{m}^3$)

LAQN site	Type	1999	2000	2001	2002	2003
Marylebone Rd	K			84	80	107
Richmond 11	K				58	
Richmond 9	K				84	
Brent 2	R			65	69	
Ealing 2	R	59.2	53.5	54	51	61.1
Hounslow 1	R	59.2	51.6	54	58	
Hounslow 4	R	55.4	53.5	55	58	82.1
Kens & Chelsea 2	R		74.5	76	72	74.5
Kens & Chelsea 3	R		86	83	85	91.7
Kens & Chelsea 4	R			86	84	97.4
Wandsworth 4	R	49.7	45.8	53	44	51.6
Richmond 1	R		38.2	44	44	47.8
Hounslow 2	S	38.2	36.3	41	43	51.6
Richmond 2	S			29	32	32.5
Richmond 7	S				20	
Brent 1	U	36.3	36.3	37	29	34.4
Brent 3	U			67	51	66.9
Ealing 1	U	45.8	42	40	37	42
Kens & Chelsea 1	U	45.8	40.1	41	39	43.9
Wandsworth 2	U	51.6	49.7	52	52	63

(Note 1– K: kerbside, R: roadside, S: suburban, U: urban background)

(Note 2 – bold indicates > AQS objective; italics < 90% data capture)

2. *Roads including narrow streets/ junctions/ busy streets/ high flows of HGVs and buses/ new roads/ roads close to the objective in first round of review and assessment / roads with significantly changed flows.*

The Stage 3 report for the previous round of review and assessment provided modelling of the main roads in Hammersmith & Fulham. The Stage 4 report updated the earlier predictions and incorporated the revised emission factors. The Stage 4 report addressed the following issues:

- Junctions
- High flows of HGVs and buses
- Roads close to the objective in first round of review and assessment

As a result none of the above issues have been re-examined in this report. The rest of this section focuses on: narrow congested streets; roads that are defined as busy streets and roads with significantly changed flows. The narrow congested streets and busy streets have been identified from local knowledge, whereas the changed flows have been identified from the new London Atmospheric Emissions Inventory (LAEI) referred to in the introductory chapter to the report.

To predict concentrations close to roads an understanding of the future predicted background concentrations of both NO_x and NO₂ for 2005 is required. These details have also been derived from the LAEI as explained earlier.

Narrow congested streets with more than 10,000vpd; have been identified in the Council's area and a DMRB assessment undertaken of these, based on relevant exposure arising at 5m from the kerb. The streets have been examined as both street canyons (as defined using TG(03)) and non-street canyons. For street canyons the road component has been doubled.

Table 8 Predicted annual mean NO₂ at narrow congested streets for 2005 in Hammersmith & Fulham Council area (µg/m³)

Road name	Road number	NO ₂	NO ₂ canyon
WOOD LANE	A40	49.8	56.1
FULHAM HIGH STREET	A219	52.1	61.3
NEW KINGS ROAD (1)	A308	45.9	50.2
KING STREET (1)	A315	46.1	52.2
UXBRIDGE ROAD	A4020	48.6	54.1
HAMMERSMITH BRIDGE ROAD	A306	48.1	52.9
HARROW ROAD	A404	42.0	47.3
HAMMERSMITH ROAD	A315	48.9	54.4
LILLIE ROAD (1)	A3218	51.0	57.6
FULHAM BROADWAY	A304	53.4	61.3
FULHAM ROAD (1)	A304	53.4	61.3
UXBRIDGE ROAD	A40	49.0	54.7
FULHAM PALACE ROAD (1)	A219	49.0	54.6
KING'S ROAD	A308	50.7	56.7
NEW KING'S ROAD (2)	A308	50.7	56.7
WATERFORD ROAD	A308	50.7	56.7
SCRUBS LANE	A219	43.0	48.8
PUTNEY BRIDGE APPROACH	A219	46.8	54.1
FULHAM ROAD (2)	A304	48.6	53.0

GOLDHAWK ROAD	A402	46.8	51.0
LILLIE ROAD (2)	A3218	46.9	51.2
WANDSWORTH BRIDGE ROAD	A217	47.0	52.9
FULHAM PALACE ROAD (2)	A219	51.7	58.8
BUTTERWICK	A219	51.6	58.9
SHEPHERD'S BUSH ROAD	A219	51.6	58.9
FULHAM ROAD (3)	A304	47.6	52.0
KING STREET (2)	A315	47.7	52.3

Table 9 Predicted annual mean NO₂ at busy streets for 2005 in Hammersmith & Fulham Council area (µg/m³)

Road name	Road number	NO ₂	NO ₂ canyon
WOOD LANE	A40	49.8	56.1
FULHAM HIGH STREET	A219	52.1	61.3
NEW KINGS ROAD	A308	45.9	50.2
NEW KING'S ROAD	A308	45.9	50.2
KING STREET	A315	46.1	52.2
SHEPHERD'S BUSH GREEN	A40	59.4	70.8
UXBRIDGE ROAD	A4020	48.6	54.1
HAMMERSMITH BRIDGE ROAD	A306	48.1	52.9
HARROW ROAD	A404	42.0	47.3
HAMMERSMITH FLYOVER	A4	50.0	56.2
HAMMERSMITH ROAD	A315	48.9	54.4
LILLIE ROAD	A3218	51.0	57.6
FULHAM BROADWAY	A304	53.4	61.3
FULHAM ROAD	A304	53.4	61.3
UXBRIDGE ROAD	A40	49.0	54.7
FULHAM PALACE ROAD	A219	49.0	54.6
HAMMERSMITH BRIDGE ROAD	A306	47.5	52.0
KING'S ROAD	A308	50.7	56.7
NEW KING'S ROAD	A308	50.7	56.7
WATERFORD ROAD	A308	50.7	56.7
SCRUBS LANE	A219	43.0	48.8
TALGARTH ROAD	A4	51.0	57.8
WEST CROMWELL ROAD	A4	51.0	57.8
PUTNEY BRIDGE APPROACH	A219	46.8	54.1
FULHAM ROAD	A304	48.6	53.0
GOLDHAWK ROAD	A402	46.8	51.0
LILLIE ROAD	A3218	46.9	51.2
OLD BROMPTON ROAD	A3218	46.9	51.2
TALGARTH ROAD	A219	46.6	50.2
WANDSWORTH BRIDGE ROAD	A217	47.0	52.9
FULHAM PALACE ROAD	A219	51.7	58.8
HAMMERSMITH BRIDGE ROAD	A306	52.1	59.6
BUTTERWICK	A219	51.6	58.9
HAMMERSMITH ROAD	A219	51.6	58.9

SHEPHERD'S BUSH ROAD	A219	51.6	58.9
	A219	47.6	52.0
FULHAM ROAD	A304	47.6	52.0
KING STREET	A315	47.7	52.3

The above results indicate that all roads exceed the 40 $\mu\text{g}/\text{m}^3$ annual mean objective for all the roads tested, thus indicating that there is a potential exceedence of the hourly objective of more than 18 hours above 200 $\mu\text{g}/\text{m}^3$.

A comparison has been undertaken between the supplied 1999 and 2001 LAEI traffic data to identify any roads where the traffic flow data has increased by more than 25%.

The following roads have been identified and are listed below.

WESTWAY	A40 (M)
WESTWAY	A40 (T)
FULHAM PALACE ROAD	A219
WANDSWORTH BRIDGE ROAD	A217

A DMRB assessment has been made of these roads assuming relevant exposure arises at 5m from the kerb. The results of the assessment are given in Table 10 below.

Table 10 Predicted annual mean NO_2 of roads with substantial changes for 2005 in the Council's area ($\mu\text{g}/\text{m}^3$)

Road Name	Road	NO_2
WESTWAY	A40 (M)	45.1
WESTWAY	A40 (T)	45.1
FULHAM PALACE ROAD	A219	51.7
WANDSWORTH BRIDGE ROAD	A217	45.4

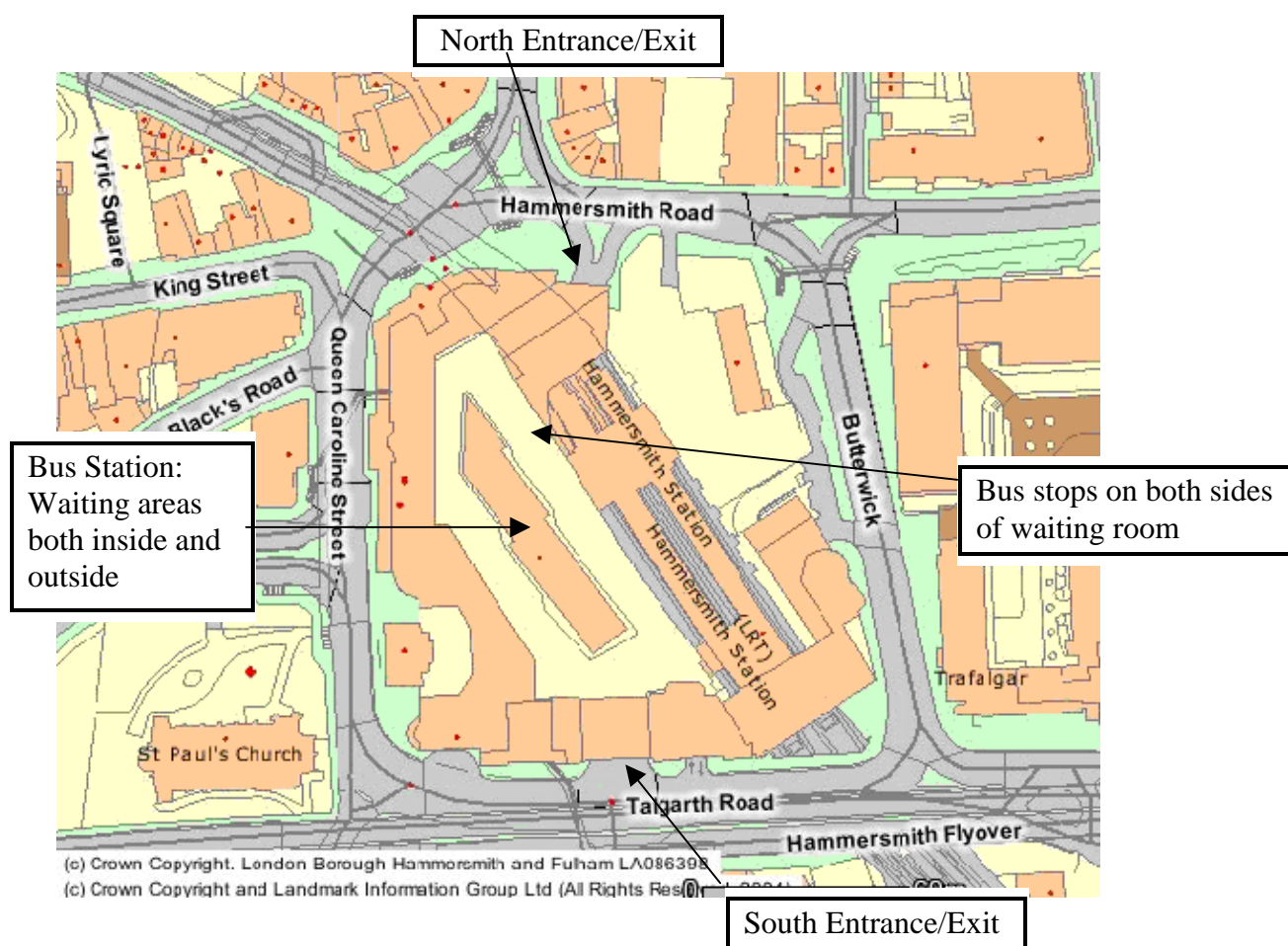
The above result indicates that the road with substantial changes in traffic flows will exceed the 40 $\mu\text{g}/\text{m}^3$ annual mean objective.

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

3. *Bus stations*

There is one bus station in the Council's area where there can be considered to be relevant exposure – the bus station at Hammersmith Broadway. Over twenty bus routes operate from the station and the estimated numbers of buses using the station is about 1700 buses per day (from timetabled information). An enclosed waiting room is provided for passengers, although some passengers wait outside next to the bus stands.

Figure 5 shows the layout of the bus station.

Figure 5 Hammersmith Broadway bus station

A DMRB assessment has been undertaken, which assumes that the distance to the kerb is 3m and that buses pass through once. The result of the assessment is that the annual mean objective exceeds $40 \mu\text{g}/\text{m}^3$. On this basis and using TG(03) guidance a further assessment is required.

4. Industrial sources

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

5. Aircraft

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

Conclusion

The updating and screening assessment for nitrogen dioxide has identified a risk that the 2005 annual mean objective will be exceeded in the Council's area. This is consistent with the Council's previous local air quality management findings and actions. The Council therefore need not undertake a Detailed Assessment in respect of nitrogen dioxide with a view to revoking its AQMA. The assessment has also identified that the Hammersmith Broadway bus station is at risk of exceeding the 2005 hourly mean objective.

Summary of findings for nitrogen dioxide

Screening checklist for NO ₂	Outcome
Monitoring data	No further action required
Roads	No further action required
Bus stations	Detailed assessment required
Industrial sources	No further action required
Air craft	No further action required

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Sulphur Dioxide

The current air quality objectives for sulphur dioxide are a 15 minute mean concentration of 266 $\mu\text{g}/\text{m}^3$ not to be exceeded more than 35 times per year, this is to be achieved by the end of 2005. Additional objectives include a one hour mean concentration of 350 $\mu\text{g}/\text{m}^3$ not to be exceeded more than 24 times per year and a 24 hour mean concentration of 125 $\mu\text{g}/\text{m}^3$ not to be exceeded more than 3 times per year. These latter objectives, equivalent to the EU limit values, are all to be achieved by the end of 2004.

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 TG(03)). This is associated with widespread domestic coal burning. The 15-minute objective is the most stringent for SO_2 . A small number of AQMAs 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.

Methodology Overview

Full details of the methodology employed can be found in TG(03). 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 TG(03) 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 TG(03) 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 TG(03) provides nomograms for an assessment.
5. Both diesel and coal fired locomotives emit SO₂ 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.

Updating and Screening Assessment of Sulphur Dioxide for the Hammersmith & Fulham Council

The main sources examined during the previous round were Part A or B processes. No boilers greater than 5MW (thermal) were identified as a significant emission source of SO₂ in the Council's area. The assessment of SO₂ therefore ended at Stage 3 of the review and assessment, following the Council's acceptance of the Environment Agency's report assessing air quality in London and the East Thames corridor (2000).

1. Monitoring

The Council undertakes SO₂ continuous monitoring at the roadside site at Hammersmith Broadway. The results for the period 2001 and 2002 based on ratified data indicate that the 15-minute mean standard was not exceeded; similarly there were no periods when the one-hour and 24 hour mean standards were exceeded. Similar conclusions can be drawn from the provisional data for 2003.

Monitoring is also undertaken in nearby local authorities in the LAQN. The monitoring results relating to the 15-minute mean objective are given in Table 11 below. The 15-minute objective is for no more than 35 exceedences of 266µg/m³. As with the Council's site, exceedences of this objective are very rare and there has also been no instances where the one-hour or 24 hour mean objectives have been exceeded.

Table 11 SO₂ monitoring from LAQN in neighbouring areas

LAQN site	Type	1999	2000	2001	2002	2003
Brent 1	U	0	0	0	0	0
Brent 2	R			<i>0</i>	<i>1</i>	
Brent 3	U			<i>0</i>	<i>0</i>	<i>0</i>
Ealing 1	U	0	0	0	<i>0</i>	<i>0</i>
Hounslow 2	S	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>1</i>
Hounslow 4	R	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>
Kens & Chelsea 1	U	0	0	0	0	0
Kens & Chelsea 2	R			0	<i>0</i>	<i>0</i>
Richmond 11	K				<i>0</i>	
Richmond 7	S				<i>0</i>	
Richmond 9	K				<i>0</i>	
Wandsworth 2	U	0	<i>0</i>	0	0	0

(Note – italics represents <90% data capture)

The results for all the above sites can be considered representative of the Council's area and these confirm that the SO₂ objectives were achieved.

2. *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 review and assessment. There are also no existing relevant IPC/ Part B/ A2 processes within the Council's area or nearby in neighbouring authorities where there have been substantially increased emissions.

3. *Domestic sources*

The whole borough is covered by a smoke control order and local knowledge and professional judgement indicates that significant domestic coal burning is not undertaken across the Council's area.

4. *Boilers*

No specific new boilers have been identified in the Council's area since the last round of review and assessment.

5. *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.

Conclusion

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

Summary of findings for sulphur dioxide

Screening checklist for SO₂	Outcome
Monitoring data	No further action required
Industrial sources	No further action required
Domestic sources	No further action required
Boilers	No further action required
Railway locomotives	No further action required

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Particles (PM₁₀)

The current air quality objectives for PM₁₀ are an annual mean concentration of 40 µg/m³ and a 24 hour mean concentration of 50 µg/m³ not to be exceeded more than 35 times per year. Both objectives are to be achieved by the end of 2004 and are based upon measurements by the European gravimetric transfer reference sampler or equivalent.

The EU has also set indicative limits (Stage 2 limit values) to be achieved by beginning of 2010. These limit values are more stringent than the existing objectives. The government has adopted these as provisional objectives for England, Wales and Northern Ireland (excluding London), although it has not brought them into regulation for the purposes of LAQM. Specific objectives have been included for London; these are an annual mean concentration of 23 µg/m³ and a 24 hour mean concentration of 50 µg/m³ not to be exceeded more than 10 times per year. The TG(03) guidance suggests that local authorities however consider them as part of this second round of review and assessment as the findings will provide valuable information, particularly when assessing future local development proposals.

Perspective

There is a wide range of emission sources that contribute to PM₁₀ 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, which comprise principally of sulphates and nitrates. (iii) Coarse particles comprise of emissions from a wide range of sources, including re-suspended dusts from road traffic, construction works, material handling processes such as mineral extraction, 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 SO₂ and NO_x 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 (TG(03)). 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 PM₁₀ 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 sites 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 PM₁₀ objective. The majority of these are in combination with nitrogen dioxide and are associated with road transport sources. Other AQMAs have been declared in relation to industrial activities and fugitive sources around a quarry and from port handling activities.

Methodology Overview

Full details of the methodology employed can be found in TG(03). 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 TG(03) 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. The section on roads focuses on specific examples that may not have been fully considered in the first round of review and assessment including: junctions; roads with high flows of buses or HGVs; new roads; and roads close to the objective during the first round of review and assessments. These relate 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/m³ 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 TG(03) 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 TG(03) 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 dependent 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.

Updating and Screening Assessment of PM₁₀ for the Hammersmith & Fulham Council

Detailed modelling of sources across the Council's area was undertaken in the Stage 3 for the 2004 objectives. This showed exceedences of the 24-hour mean objective for PM₁₀ close to major roads in the borough. As a result the Council declared the whole of the borough an AQMA.

Subsequent modelling was undertaken in the Stage 4 further assessment using new emissions information and revised emission factors. This also indicated exceedences of the 24-hour mean objective for PM₁₀ close to major roads in the borough.

1. Monitoring

The Council declared an AQMA for PM₁₀ during the first round of review and assessment and therefore the monitoring undertaken only applies to areas inside an AQMA. The Council undertakes continuous monitoring of PM₁₀ at a roadside location at Hammersmith Broadway and at a background location near Brook Green.

The following table presents the results from the Hammersmith Broadway monitoring station for the period 1999 – 2003. (2003 data is included, but this is provisional at this stage and is subject to further validation). The site uses a TEOM instrument for monitoring PM₁₀; the results are therefore presented as a gravimetric equivalent, i.e. TEOM times 1.3. The data capture rates are given in Appendix 1. The results confirm that the 2004 annual mean objective of 40 µg/m³ is being met. It also confirms that there were days when the 24-hour mean standard of 50 µg/m³ was exceeded and during 2001 and 2003 the number of such days exceeded the 2004 objective of more than 35.

Data from the Brook Green site is not presented as it was only established in mid 2003, and analyser faults restricted data capture for the year.

Table 12 PM₁₀ monitoring at the Hammersmith & Fulham Council site (1999 – 2003)

Site	1999		2000		2001		2002		2003	
	Days > 50 µg/m ³	Annual mean (µg/m ³)	Days > 50 µg/m ³	Annual mean (µg/m ³)	Days > 50 µg/m ³	Annual mean (µg/m ³)	Days > 50 µg/m ³	Annual mean (µg/m ³)	Days > 50 µg/m ³	Annual mean (µg/m ³)
Hammersmith Broadway	2	22	<i>31</i>	<i>33.8</i>	37	35	24	35	54	37

(Note - italics represent < 90% data capture)

The TG(03) guidance indicates that the monitoring results can be used to estimate future concentrations for the purposes of the updating and screening assessment. The results of this are given in the following table.

Table 13 Estimated PM₁₀ results at the Hammersmith & Fulham Council site for 2004 (using TG(03))

2004	Annual mean (µg/m³)	No. of days > 50 µg/m³
Hammersmith Broadway	33.3	41.2

The above results indicate an exceedence of the 2004 objective for the 24-hour mean but not the annual mean objective at the monitoring site in the borough.

The details of the estimated annual mean PM₁₀ concentrations in 2010 using a similar methodology are given in the following table:

Table 14 Estimated PM₁₀ results at the Hammersmith & Fulham Council site for 2010 (using TG(03) methodology)

2010	Annual mean (µg/m³)	No. of days > 50 µg/m³
Hammersmith Broadway	30.3	28.6

Despite the predicted reduction resulting from future emission changes the estimates for the roadside site indicate that the 2010 annual mean and 24 hour mean objective for London will be exceeded at the monitoring site in the borough.

The following table provides results from monitoring between 1999 and 2003 in nearby areas. 2003 data is provisional at this stage.

Table 15 PM₁₀ monitoring in neighbouring local authorities – 24 hour mean objective – number of days >50 µg/m³

LAQN site	Type	Type	1999	2000	2001	2002	2003
Marylebone Rd	K	T		157	106	111	161
Marylebone Rd	K	G -Partisol				65	
Marylebone Rd	K	G- KFG				51	
Richmond 11	K	T				0	
Richmond 9	K	T				1	
Brent 2	R	T			37	37	
Ealing 2	R	T	25	19	29	19	61
Hounslow 3	R	T	20	41	47	27	
Hounslow 4	R	T	6	18	28	18	49
Kens & Chelsea 2	R	G - Partisol		30	34	14	56
Kens & Chelsea 3	R	T				36	

Kens & Chelsea 4	R	G - Partisol					28
Richmond 1	R	T		3	15	4	28
Wandsworth 4	R	T	17	19	28	17	45
Hounslow 2	S	T	4	4	11	6	22
Richmond 2	S	T			3	1	34
Richmond 7	S	T				1	
Brent 1	U	T	0	7	9	11	25
Brent 3	U	T			0	16	37
Kens & Chelsea 1	U	T		11	15	8	29

(For Type: T represents TEOM and G – gravimetric)

The above table indicates that the objective has been exceeded mainly at kerbside and roadside sites during the period 1999 to 2003. The results for all but one urban and suburban locations met the objective.

Table 16 PM₁₀ monitoring in neighbouring local authorities – annual mean objective (µg/m³)

LAQN site	Type	1999	2000	2001	2002	2003
Marylebone Rd	K		48	43	44	48
Marylebone Rd	K				44	
Marylebone Rd	K				37	
Richmond 11	K				29	
Richmond 9	K				29	
Brent 2	R			38	38	
Ealing 2	R	30	29	30	30	34
Hounslow 3	R	34	34	36	33	
Hounslow 4	R	30	30	32	32	36
Kens & Chelsea 2	R		35	35	25	
Kens & Chelsea 3	R				37	
Kens & Chelsea 4	R				36	
Richmond 1	R		23	26	25	28
Wandsworth 4	R	26	27	28	27	32
Hounslow 2	S	23	22	23	23	27
Richmond 2	S			29	20	28
Richmond 7	S				20	
Brent 1	U	23	22	23	24	26
Brent 3	U			20	31	34
Kens & Chelsea 1	U		25	26	25	28

The results in the above table indicate that the annual mean objective has only been exceeded at the very busy kerbside site at Marylebone Road during the period 1999 to 2003. All other roadside, urban and suburban locations met the objective.

2. Roads

The Stage 3 and 4 reports for the previous round of review and assessment provided modelling of the main roads in Hammersmith & Fulham and addressed the following issues: junctions and high flows of HGVs and buses. The TG(03) guidance requires an assessment of

roads close to the objective during the first round of review and assessment and this was undertaken in the Council's Stage 4 report. Hence no further examination of these will be undertaken in this report.

The rest of this section focuses on roads with significantly changed flows. The changed flows have been identified from the new London Atmospheric Emissions Inventory (LAEI) referred to in the introductory chapter to the report.

No roads have been identified where the actual flows have increased significantly. However there are a number of roads with significantly changed flows since the previous round of review and assessment. These have arisen due to a revision of traffic data in the emission inventory. To identify these roads a comparison has been undertaken between the supplied 1999 and 2001 LAEI traffic data where the traffic flow has increased by more than 25%.

The traffic data for these roads is given in Appendix 2. The results of the DMRB assessment for the roads are given in Table 17 below. The receptor positions are assumed at 5m from the kerb.

Table 17 Predicted number of 24-hour means of PM₁₀ exceeding 50 µg/m³ for 2004 for roads with substantial changes in Hammersmith & Fulham

Road name	Road number	No. of days > 50µg/m ³
WESTWAY	A40(M)	18
WESTWAY	A40(T)	18
FULHAM PALACE ROAD	A219	19
WANDSWORTH BRIDGE ROAD	A217	15

The estimates for the roads with substantial changes indicate that the 2004 objective will not be exceeded.

There are no new 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.

3. *Industrial sources*

No new relevant processes have started in or close to the Council's area since the last round of review and assessment. An examination of the Environment Agency's Pollution Inventory and the Part B processes on the Council's Public Register has identified that there are no existing processes with substantially increased emissions of PM₁₀ within the Council's or neighbouring local authority areas since the last round of review and assessment.

4. *Domestic sources*

As stated earlier in the section for sulphur dioxide the whole borough is covered by a smoke control order and from local knowledge and professional judgement, significant domestic burning of solid fuels is not undertaken across the Council's area. There is therefore no need for further assessment.

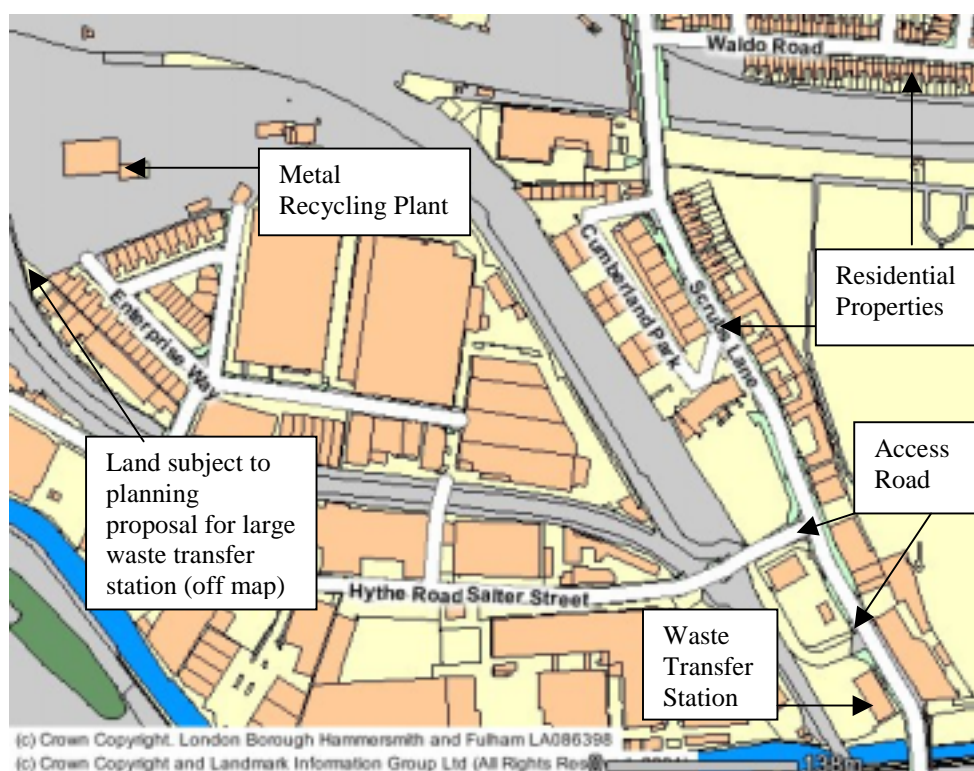
5. Quarries/ landfill sites/ handling of dusty cargoes, etc

There are no quarries or landfill sites within the borough. However, there is a waste transfer station and a metal recycling plant located in the north of the borough where substantial amounts of materials are handled on a daily basis.

Dust complaints have been received in the past about the activities of these 2 sites, and it is possible that the dust generated includes a PM₁₀ fraction. There is also a risk that dust is being re-suspended along the access roads by the large number of HGV movements throughout the day, not only to the 2 sites mentioned above, but also a number of other industrial estates and commercial units in this area. In addition, it is possible that land adjacent to the metal recycling plant could be re-developed to be used as another waste transfer station, with access via the same road.

The nearest relevant exposure is to the current sources are within 200m (see Figure 6) and the estimated annual mean background concentration for 2004 is less than 26µg/m³. As a result and using TG(03) guidance further Detailed Assessment is required.

Figure 6 Fugitive sources in north of the borough



6. 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.

Conclusion

The updating and screening assessment for PM₁₀ has identified a risk that the 2004 objectives will be exceeded in the Council's area. This is consistent with the Council's previous local air quality management findings and actions. The Council therefore need not undertake a Detailed Assessment in respect of PM₁₀ with a view to revoking its AQMA. The updating and screening assessment for PM₁₀ has additionally identified an additional risk of the objectives being exceeded by 2004 from fugitive sources in the north of the borough and that there is a risk that the 2010 objectives will be exceeded across parts of the Council's area.

Summary of findings for PM₁₀

Screening checklist for PM ₁₀	Outcome
Monitoring data	No further action required other than to note that there is a risk that the 2010 objectives will be exceeded
Roads	No further action required
Industrial sources	No further action required
Domestic sources	No further action required
Quarries, landfill sites, etc	Detailed assessment required
Aircraft	No further action required

Conclusion and Recommendations

This report follows the technical guidance (TG(03)) 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, 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 have identified the following:

- For the 2010 benzene objective there is a risk that this objective will be exceeded close to a petrol station in Fulham Palace Road;
- For the nitrogen dioxide annual mean and hourly objectives there is a risk that these objectives will be exceeded at locations with relevant public exposure. The Council has previously designated the whole of the borough an AQMA for nitrogen dioxide. The findings of the updating and screening assessment are therefore consistent with this action. The assessment has also indicated that there is a risk that the hourly objective will be exceeded at the Hammersmith Broadway bus station.
- For the PM₁₀ 2004 daily objective there is a risk that the objective will be exceeded at locations with relevant public exposure. For the 2004 objective the Council has previously designated the whole of the borough an AQMA for PM₁₀. The findings of the updating and screening assessment are also consistent with this action. An additional risk in relation to fugitive emission sources in the north of the borough has been identified.
- For the PM₁₀ 2010 objectives there is a risk that these objectives will be exceeded at locations with relevant public exposure. The Council however are not required to undertake a Detailed Assessment for these PM₁₀ objectives at this stage. The findings for PM₁₀ however should be noted for longer term planning.

For pollutants not requiring detailed assessments the LAQM guidance requires the production of annual air quality progress reports by the end of April 2005, prior to undertaking the next updating and screening assessment by the end of April 2006.

The TG(03) guidance advises that a Detailed Assessment is required to determine with reasonable certainty whether or not there is a likelihood of the objectives not being achieved. 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 for 2010 benzene objective close to the petrol station in Fulham Palace Road.

3. Undertake a Detailed Assessment for 2005 nitrogen dioxide hourly objective in relation to the Hammersmith Broadway bus station.
4. Undertake a Detailed Assessment for 2004 PM₁₀ daily objective in relation to fugitive emission sources in the north of the borough.

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Glossary

AADT	Annual Average Daily Traffic (vehicles per day)
APEG	Airborne Particles Expert Group
AQMA	Air Quality Management Area
AQS	Air Quality Strategy
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
LAEI	London Atmospheric Emissions Inventory
LAQM	Local Air Quality Management
mg/m ³	Milligrams of the pollutant per cubic metre of air
µg/m ³	Micrograms of the pollutant per cubic metre of air
ppb	Parts per billion
ppm	Parts per million
NO	Nitric oxide
NO ₂	Nitrogen dioxide
PM ₁₀	Particles with diameter less than 10µm
QA/QC	Quality Assurance / Quality Control
R&A	Review and Assessment
SO ₂	Sulphur dioxide
TEOM	Tapered Element Oscillating Microbalance

Appendix 1**Table 18** Data capture rates (%) for the NO₂ continuous monitoring site (1999-2003)

LAQN site	1999	2000	2001	2002	2003
Hammersmith Broadway	34	82	93	80	73

Table 19 Data capture rates (%) for the PM₁₀ continuous monitoring site (1999-2003)

LAQN site	1999	2000	2001	2002	2003
Hammersmith Broadway	94	89	92	82	85

Appendix 2**Table 20** Estimated 2005 traffic data for Hammersmith & Fulham Council's roads

Road name	Road number	Total vehicles	Percent HGVs
WOOD LANE	A40	21033	7.0
FULHAM HIGH STREET	A219	31092	15.6
NEW KINGS ROAD	A308	22464	3.9
KING STREET	A315	16544	10.0
SHEPHERD'S BUSH GREEN	A40	34757	17.9
UXBRIDGE ROAD	A4020	24292	6.0
HAMMERSMITH BRIDGE ROAD	A306	26434	4.6
HARROW ROAD	A404	22702	4.8
HAMMERSMITH ROAD	A315	26937	5.6
LILLIE ROAD	A3218	19133	9.8
FULHAM BROADWAY	A304	16742	15.7
FULHAM ROAD	A304	16742	15.7
UXBRIDGE ROAD	A40	29882	6.1
FULHAM PALACE ROAD	A219	24278	5.7
KING'S ROAD	A308	33674	3.7
NEW KING'S ROAD	A308	33674	3.7
WATERFORD ROAD	A308	33674	3.7
SCRUBS LANE	A219	28232	5.6
PUTNEY BRIDGE APPROACH	A219	47132	6.0
FULHAM ROAD	A304	17849	5.0
GOLDHAWK ROAD	A402	27506	3.9
LILLIE ROAD	A3218	14454	5.1
WANDSWORTH BRIDGE ROAD	A217	19398	6.2
FULHAM PALACE ROAD	A219	30527	6.4
BUTTERWICK	A219	25569	6.6
SHEPHERD'S BUSH ROAD	A219	25569	6.6
FULHAM ROAD	A304	16052	4.7
KING STREET	A315	16218	5.7
NEW KING'S ROAD	A308	22464	3.9
HAMMERSMITH FLYOVER	A4	88322	3.5
FULHAM PALACE ROAD	A219	24278	5.7
TALGARTH ROAD	A4	99062	3.4
WEST CROMWELL ROAD	A4	99062	3.4
TALGARTH ROAD	A219	13333	3.6
FULHAM PALACE ROAD	A219	30527	6.4
HAMMERSMITH BRIDGE ROAD	A306	41157	6.0
HAMMERSMITH ROAD	A219	25569	6.6
	A219	16052	4.7

(From LAEI supplied by the GLA)

Appendix 3**Table 21** Part B processes in the Hammersmith & Fulham Council area

OPERATOR NAME	PROCESS
Holland Park Ltd 39-40 Hythe Road, NW10 6UN	Re-spraying of road vehicles PG6/34(97) (Number of spray booths increased from 3 to 6) Grid Reference E1182280 N522100
Klasse of Fulham 238 Dawes Road, SW6 7RG	Waste Oil Burner (less than 0.4MW) PG1/1 (95)
Ready Mixed Concrete Ltd Townmead Road, SW6 2QL	Blending, packing and loading and use of bulk cement. PG3/1(95) (Cement storage increased to 500 tonnes by the erection of an additional silo) Grid Reference E175750 N525980

Table 22 Authorised petrol stations in the Hammersmith & Fulham Council area

OPERATOR NAME	Grid Reference
Cromwell North Service Station (BP) Great West Road, W6 9TQ	N522370 E178425
Cromwell South Service Station (BP) Great West Road, W6 9TQ	N522370 E178380
Flyover Service Station (BP) 161 Talgarth Road, W6 8TL	N523805 E178360
Bush Centre Service Station (BP) Shepherds Bush Green, W12 8PP	N523540 E179800
Four Seasons Service Station (ESSO) 601-615 Kings Road, SW6 2EJ	N525840 E177000
Shell Fulham (SHELL) 923/931 Fulham Road, SW6 2TY	N524480 E176350
Shell Fulham Cross (SHELL) 222/224 Fulham Palace Road, W6 9PA	N523760 E177570
White City Service Station (ESSO) 62 Wood Lane, W12 TRH	N523300 E180750
Scrubs Lane Service Station (TEXACO), 235A Scrubs Lane, W10 6AH	N522990 E181670
Jet Petrol Station 176-182 Goldhawk Road, W12 9NS	N522690 E179490
Du Cane Road Service Station Du Cane Road, W12 OGL	N522780 E181180