

Stage 4 Review and Assessment for the London Borough of Richmond upon Thames



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1 Introduction to Stage 4 – further assessment of air quality

1.1 Overview to Stage 4

This is the Stage 4 report for the London Borough of Richmond upon Thames (LBRuT). This report is intended to fulfil the statutory requirement for this, the LBRuT's next step, of the Local Air Quality Management (LAQM) process.

1.2 Background – national perspective

Section 84(1) of the Environment Act 1995 requires local authorities to undertake a further assessment, where the local authority has designated an air quality management area (AQMA); this is now termed the Stage 4 assessment. The LBRuT designated the whole of its area an Air Quality Management Area by order on the 31st December 2000, following the production of its Stage 3 report. That report confirmed that areas across the borough are likely to exceed relevant future AQS objectives.

Under the Act local authorities are required to report the results of this assessment within 12 months of the designation by order of the AQMA. Section 84(1) requires the local authority to undertake the Stage 4 to supplement the information it has on the AQMA.

The Department of Environment, Food and Rural Affairs (DEFRA) has produced specific guidance on the Stage 4 assessment for local authorities (see www.defra.gov.uk/environment/airquality/laqm/stage4/index.htm).

The following provides a check list of the requirements for the Stage 4, as given in the DEFRA guidance:

- To allow the LBRuT to confirm the original assessment of air quality against the prescribed objectives and thus to ensure that they were right to designate the AQMA in the first place;
- To calculate more accurately how much of an improvement in air quality would be needed to deliver air quality objectives within the AQMA;
- To refine the knowledge of the sources of pollution so that air quality action plans can be properly targeted;
- To take account of any new national policy developments, which have come to light since the AQMA declaration and the Stage 3 report, were prepared;

- To take account as far as possible of any new local policy developments which are likely to affect air quality by the relevant date, and which were not fully factored into the Stage 3 report;
- To respond to comments from statutory consultees in respect of the Stage 3 report;
- To check the other assumptions previously made on which the designation of the AQMA has been based and to check that the designation is still correct;
- To carry out further monitoring in problem areas to check earlier findings.

1.3 Background – L.B of Richmond upon Thames perspective

LBRuT has undertaken the earlier stages of review and assessment of the Local Air Quality Management (LAQM) process within its area (see the individual Stage 1, 2 and 3 reports prepared between 1998 and 2000). These reports present the staged approach whereby the seven air pollutants in the Government's Air Quality Strategy (AQS) related to LAQM, were assessed and screened as to their relative importance to air quality within the LBRuT's area.

The Stage 3 report assessed air quality across the whole of the LBRuT's area in accordance with DEFRA (formerly DETR) guidance. The findings of the Stage 3 report were that the statutory objectives (see Table 1) for both nitrogen dioxide (NO₂) and PM10 only were exceeded, specifically the annual mean objective for NO₂ and the 24-hour mean objective for PM10. The area predicted to exceed relates mainly to areas adjacent to major roads across the borough.

The other five AQS pollutants (benzene, 1,3 butadiene, carbon monoxide, lead and sulphur dioxide) were only considered at earlier stages of the review and assessment. The finding for all these pollutants was that none were found likely to lead to the AQS objectives being exceeded and therefore no further action was required in respect of these pollutants.

Table 1 Table of air quality objectives relevant to Stage 4

	Concentration	Measured as	Date to be achieved by
Nitrogen dioxide (NO ₂)	40µg/m ³ (21ppb)	Annual mean	31-Dec-05
	200µg/m ³ (105ppb) not be exceeded more than 18 times a year	1 hour mean	31-Dec-05
Particles (PM10) ¹	40 µg/m ³	Annual mean	31-Dec-04
	50 µg/m ³ not to be exceeded more than 35 times a year	24 hour mean	31-Dec-04

1.4 National Policy Developments

There are a number of key developments that have taken place since the Stage 3 report was first produced.

The government released its revised Air Quality Strategy in January 2000. This revision included a reappraisal of the objective pollutants (DETR, 2000). As a result many of these were changed to reflect both the U.K.'s commitments to the EU and also that the objectives for many of the pollutants were already being met or close to being met. One principal change however was the amendment of the previous PM10 objective to equate with both the EU Daughter Directive and an improved scientific understanding. The effect of this was to make this objective far less stringent and therefore easier to meet than the previous objective.

Both the NO₂ and PM10 objectives however remained provisional, with the PM10 objective subject to a further review. The Environment Minister subsequently announced in January 2001 that the PM10 objective would remain to give local authorities a period of stability (ENDS, 2001), however consultation on a new objective for the longer term is already underway, following release of the latest Air Quality Strategy consultation for: particles, benzene, carbon monoxide and PAHs (polycyclic aromatic hydrocarbons) (DEFRA, 2001).

The latest health evidence shows that particles are likely to have significant long-term effects on health: probably many times more severe than the short-term effects on which policy has previously concentrated. The above mentioned consultation document explains the changes that the government proposes for the Strategy's objectives to take account of the latest health evidence. The proposals also seek to set a longer-term focus to the Strategy to reflect recent developments at the

¹ PM10 to be measured using the European gravimetric system or equivalent

European Union (EU) level and to influence the development of wider policies that impact on air quality.

Of key importance for London and therefore to LBRuT are the proposals to strengthen substantially the AQS objectives for particles by supplementing the present objectives with new provisional objectives. These are:

- for all parts of the UK, except London and Scotland, a 24-hour mean of $50\mu\text{g}/\text{m}^3$ not to be exceeded more than 7 times per year and an annual mean of $20\mu\text{g}/\text{m}^3$, both to be achieved by the end of 2010;
- for London, a 24-hour mean of $50\mu\text{g}/\text{m}^3$ not to be exceeded more than 10-14 times per year and an annual mean of $23\text{-}25\mu\text{g}/\text{m}^3$, both to be achieved by the end of 2010.

It is also proposed that the Mayor and London boroughs should work towards a target of $20\mu\text{g}/\text{m}^3$ after 2010, with the aim of achieving it by 2015 where cost effective and proportionate local action can be identified.

In addition the government's Expert Panel on Air Quality Standards (EPAQS) separately reported on an appropriate measurement upon which to base the airborne particle standard. The Panel concluded that the metric PM10 should remain, although it should be kept under active review due to the likelihood of important advances in the understanding of particles and health in the next few years (EPAQS, 2001).

The government also revised the road traffic emission factors at the end of February 2002 and required their use by local authorities when reviewing and assessing local air quality. These are discussed further in the next section.

1.5 Use of New Emission Factors

On initial inspection the new factors as released appear to be quite different from the previous factors. Briefly, these cover:

- Petrol cars (small, medium and large) Euro I, Euro II and Euro II.
- Diesel cars: (small and large) Euro I, Euro II and Euro II.
- LGVs (petrol and diesel) Euro I
- HGVs (rigid and articulated) Euro I and Euro II.
- Buses: Euro I and Euro II

To provide a complete breakdown of Euro classes it is necessary to use the old factors for pre-Euro I vehicles. As a result the new factors for NO_x and PM10 were considered in detail.

By way of an example, initial calculations were made of the total road transport emissions in London based on the new factors for NO_x and PM₁₀. These have been based on the same flows and vehicle stock, with only the emissions factors changed.

For NO_x, the following observations can be made:

- Total emissions for 1999 have increased by over 25 %.
- All vehicle types show an increase in NO_x except motorcycles.
- The most significant increase is for HGV emissions.
- LGV are also significantly higher than previous estimates
- Re-calculated 2005 total emissions have increased significantly.

In summary the outcome is that there are increases in emissions of both pollutants.

These findings therefore have important implications for dispersion modelling and the management of emissions from road traffic sources. The application of the new factors would be expected to increase predicted concentrations for the future, although detailed modelling is required to quantify the magnitude of this increase. The effect on individual links could be large. For example, the increase in emissions for HGVs is likely to have a larger impact where the flows of HGVs are highest. Another important aspect is the allocation of emissions between the different vehicle classes. Compared with the previous inventory there are marked differences between the shares of emissions for different vehicle classes, particularly for PM₁₀.