# 2 Predictions of Nitrogen Dioxide ($NO_2$) and Particles (PM10) in the LBRuT AQMA

## 2.1 Outline of modelling developments

The Stage 4 review represents significant progress beyond the Stage 3 report. As a summary the developments include:

- Major roads on an exact geographic basis Ordnance Survey (OS), to allow an improved assessment of exposure;
- Predictions plotted on OS base maps;
- Improved modelling methods;
- A best estimate of model uncertainty, using Monte Carlo techniques;
- Detailed estimates of effects of traffic management scenarios;
- Additional monitoring data for assisting the modelling.

A detailed explanation of the methods used, including the developments undertaken is given in the appendices.

## 2.2 Annual mean (ppb) in 2005

The predicted concentrations of annual average $NO_2$ for the 2005 base case, assuming that the meteorology of the year 1999 was repeated, are shown in Figure 1 below. The areas coloured yellow to red are those that exceed the AQS objective of 21 ppb. The predictions confirm the Stage 3 findings that the AQS objective will be exceeded adjacent to major roads across the borough. The predicted concentrations at specific locations are given in the next section.

It is clearly illustrated by Figure 1 that the major roads provide the most important contribution to concentrations of $NO_2$. It is also important to note that the locations of the major roads are modelled to a high degree of accuracy and in this case it is within 1m. This enables the concentration contours to be plotted with OS Landline data[2], which gives details of individual houses and allows easy estimation of the exposure of the local population to concentrations above the AQS objective. The pollution contours also show the rapid fall off in concentration from the road and the effect of increased concentrations close to road junctions, where the emissions of two or more roads combine and where slow moving, congested traffic is more likely to occur.

The one-hour mean has not been modelled in this report, as the predictions in the Stage 3 report were below the objective level. This previous analysis is further confirmed by the most recent monitoring results from the London Air Quality Monitoring Network sites, which are presented in Appendix F.

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Specific areas, which exceed the AQS objective and are associated with major roads include:

- Prominent centres including Richmond, Twickenham, North Sheen/ Mortlake and Teddington;
- Across the borough, the A 316 (Clifford Avenue/ Lower Mortlake Road/ Twickenham Road/ Chertsey Road), A205 Upper Richmond Road/ Mortlake Road/ Kew Road), A307 (Kew Road/ Petersham Road), A310 (London Road/ Deep Cross) and A308 (Hampton Court Road);
- Other roads including the A306 Castelnau, A305 Staines Road, A311 Hampton Road, A314 Hanworth Road, A3003 Church Road in Barnes, B350 Lonsdale Road, B358 Bridge Road/ Stanley Road, B321 Richmond Hill and B353 (Queens Road).

### 2.3 Daily mean PM10 Concentrations in 2004

The prediction for the number of days exceeding the 24 hour mean of 50 $\mu g/m^3$ for 2004, assuming that the meteorology of the year 1996 was repeated, are given in Figure 2 below. The areas coloured yellow to red exceed the AQS objective, in this case where PM10 concentrations greater than 50 $\mu g/m^3$ occur for more than 35 days each year. Once again it is clear that major roads provide a significant proportion of PM10 concentrations in the LBRuT's area although the PM10 concentrations differ markedly from that of $NO_2$, with the areas predicted to exceed being much smaller. The main predicted areas are associated with:

- Prominent centres including Richmond;
- Across the borough, the A 316 (Clifford Avenue/ Lower Mortlake Road/ Twickenham Road/ Chertsey Road), A205 Upper Richmond Road/ Mortlake Road/ Kew Road), and A307 (Kew Road/ Petersham Road);
- Other roads including the A306 Castelnau, A3003 Church Road in Barnes, A308 (Hampton Court Road), B358 Bridge Road/ Stanley Road, B321 Richmond Hill and B353 (Queens Road).

The modelling confirms that the annual mean $NO_2$ is the more stringent of the objectives that need to be met.

The annual mean concentration for PM10 has also not been modelled in this report, as the predictions in the Stage 3 report were below the objective level.

**Figure 1** Annual mean nitrogen dioxide (ppb) for 2005 (based on 1999 meteorology.)

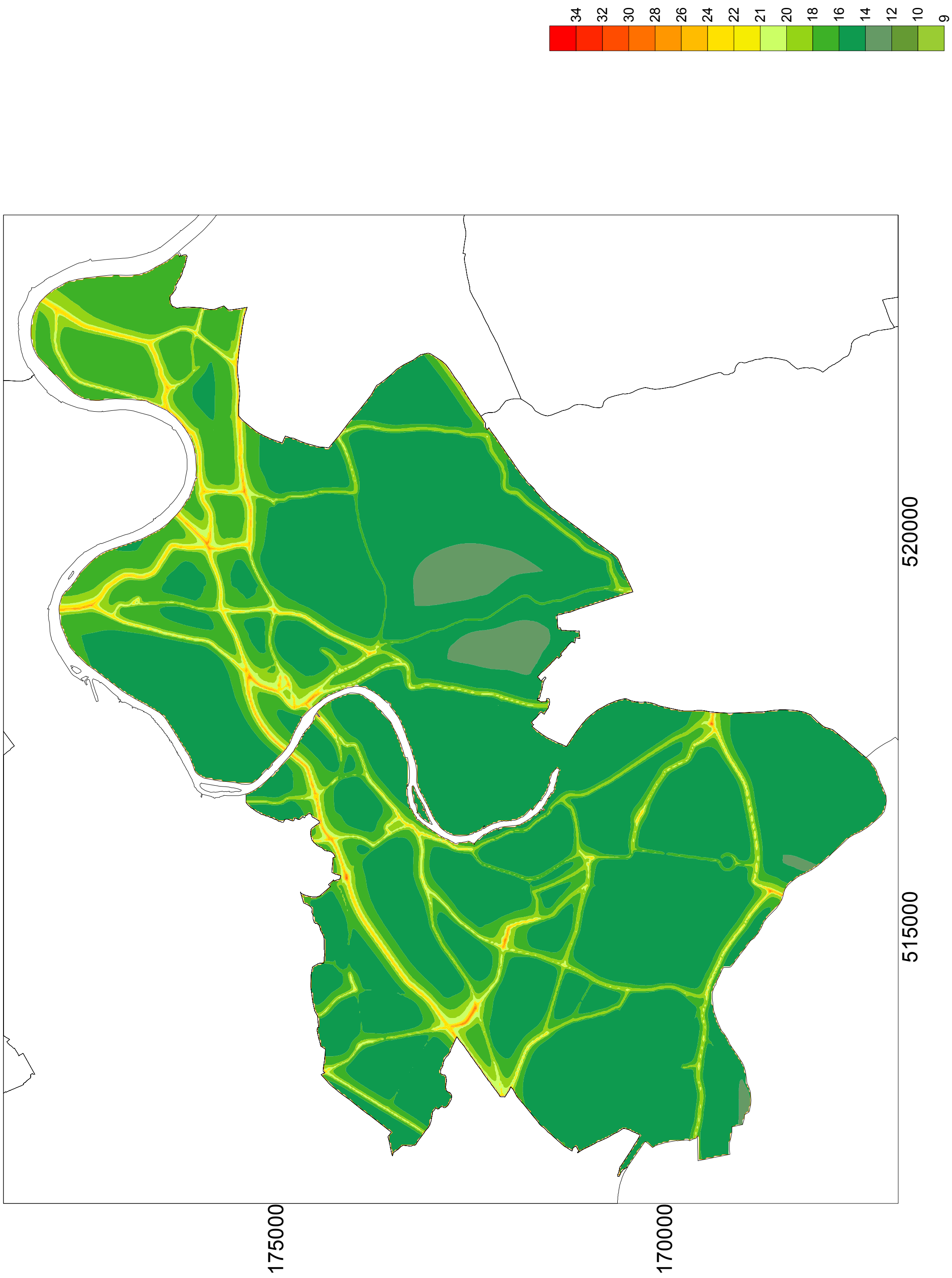
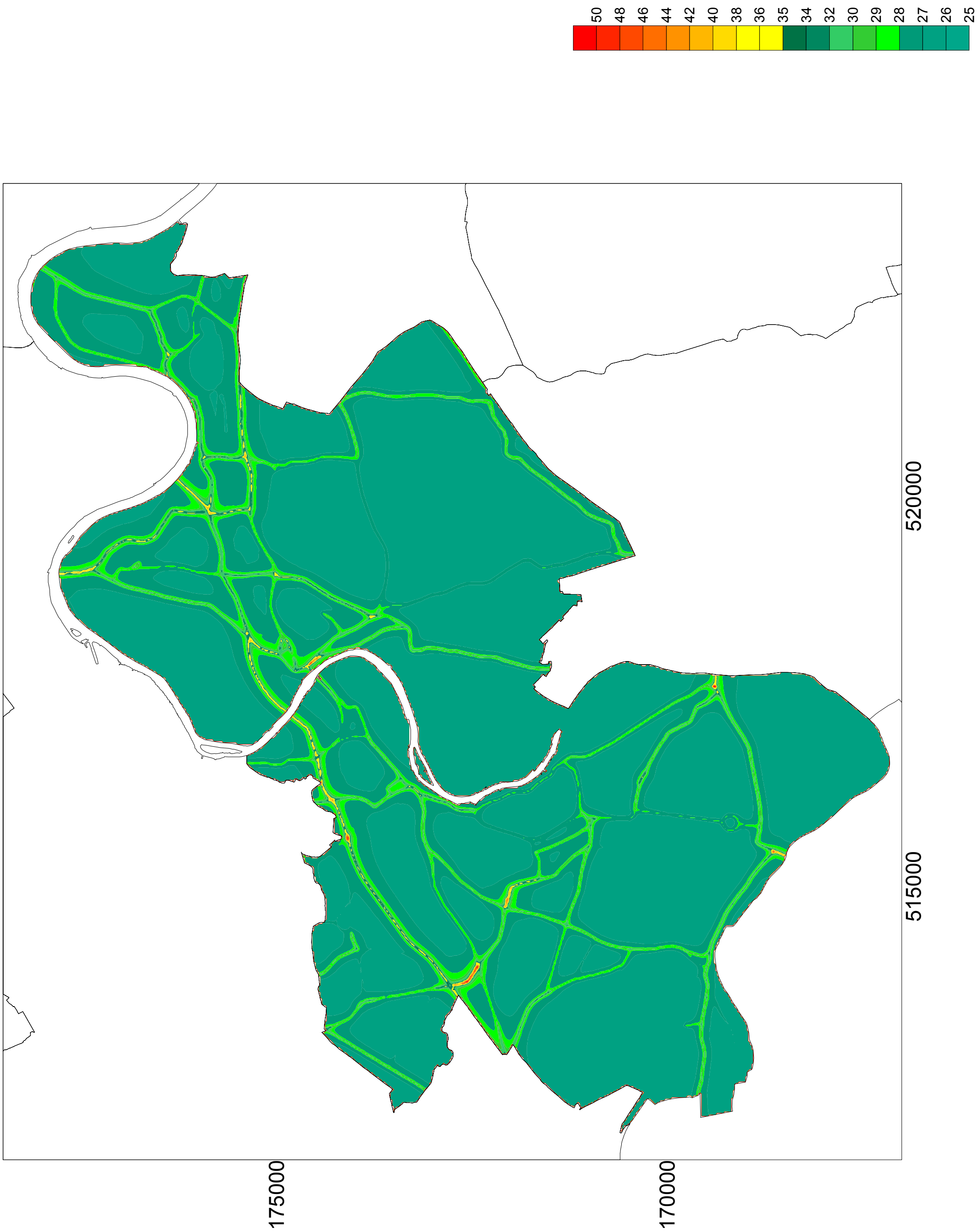


**Figure 2** Number of days with daily mean PM10 >50($\mu g/m^3$) for 2004 (based on 1996 meteorology.)



## 2.4 Source Apportionment for $NO_X$ and PM10 in LBRuT

### 2.4.1 Methodology

To better understand the improvement needed at a location, to achieve the AQS objectives, it is necessary to determine the individual source emissions that contribute to the overall predicted pollution concentration. Both pollutant emissions and atmospheric processes, including meteorology, determine the pollution concentration at any given location. Traditionally pollution is determined only from an understanding of emissions derived from local sources and background influences. This however provides only a simplistic understanding within London, as the pollution climate is further complicated by the actual size of London itself and the huge numbers of varying activities contributing to the source of emissions.

The pollutants under investigation in this stage of the LAQM process, i.e. PM10 and $NO_2$, further complicate the understanding of source apportionment. For $NO_2$, the contribution that the different sources make to the predicted concentrations can only be understood by examining the contribution of $NO_x$ sources as the primary emission. This reflects the fact that the relationship between $NO_2$ and $NO_x$ is non-linear and determined by photochemistry that is highly location dependent. The modelling undertaken to derive the predictions of $NO_2$ reflect this aspect and this is explored more fully in the model description given in Appendix A.

For PM10 it is necessary to understand the influence of the primary, secondary and coarse components, which contribute to the total concentration. It is the 24-hour mean objective, which is predicted to be exceeded. However the source apportionment undertaken is based on annual mean PM10, which is averaged over a longer timescale and therefore less affected by specific events.

The source apportionment methodology used here is based on both:

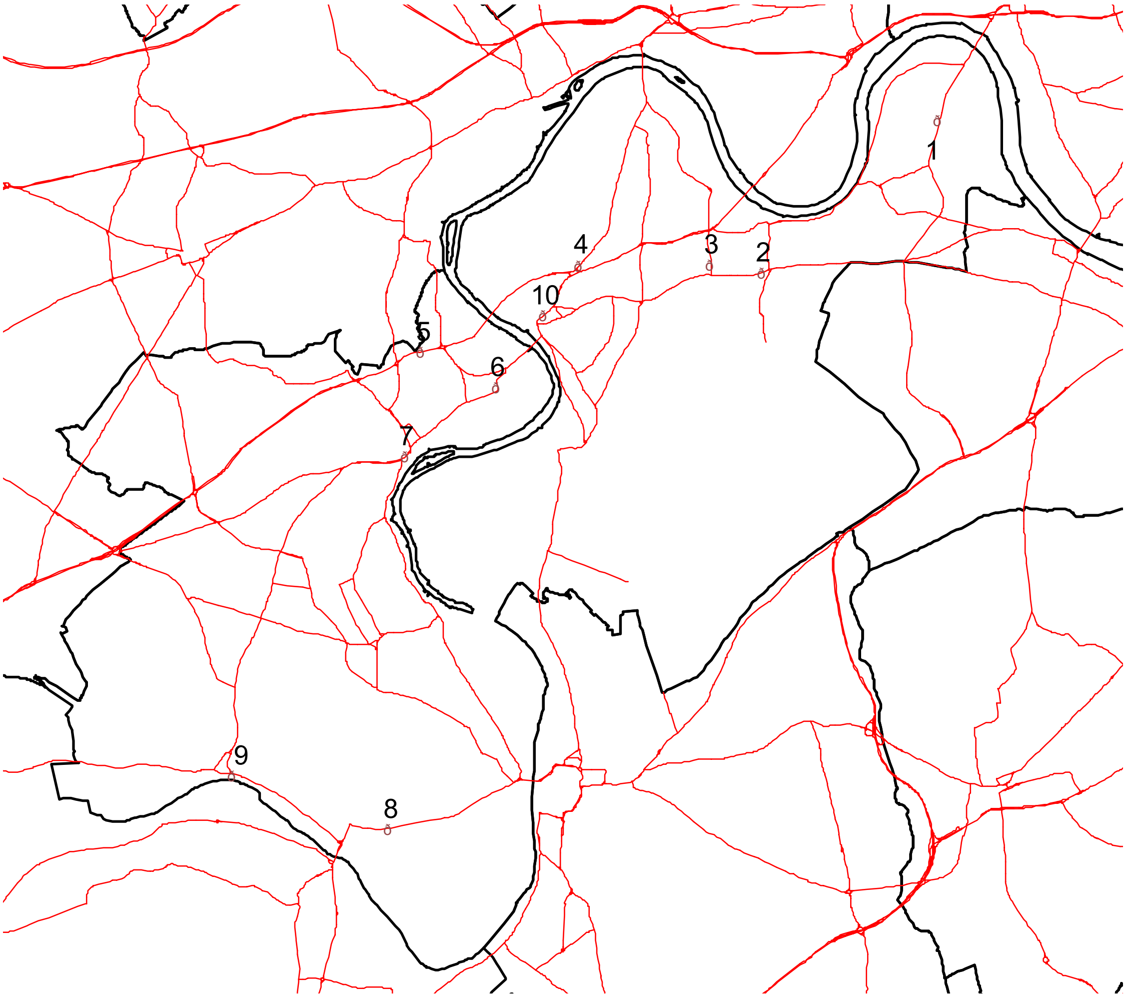
a) Determining the source apportionment for individual categories of the vehicle fleet, which of course recognises the major influence of road transport (as the dominant local source) and

b) Further determining the source apportionment in relation to the so called background sources, this recognises that this is influenced by both near and far sources, including road transport beyond the immediate location, which is therefore not considered as a local source. This contribution is specifically determined by deriving the pollution from all roads outside the borough, but within the Greater London area.

In all instances the determination of the influences of the different sources is undertaken by modelling sources independently of one another and establishing the predicted concentration at a given point. This is necessary since the influence of the different sources varies between locations due to their proximity to the sources; hence the apportionment is location dependent.

A series of specific point locations were selected for investigation to provide a representative understanding. The selection of these locations was undertaken by the LBRuT, with the points chosen considered to be those representative of areas with predicted high concentrations of pollution. The specific locations are shown in Figure 3 below and listed in Table 2.

**Figure 3** The location of facades identified within the LBRuT AQMA




(Note the numbered points refer to the locations given in Table 2)

**Table 2** Location of sites used for source apportionment

| Location | Road Name | Easting | Northing |
|---|---|---|---|
| 1 | Castelnau, Barnes | 522508 | 177164 |
| 2 | Upper Richmond Road West A205, between Sheen Lane and Clifford Avenue | 520435 | 175376 |
| 3 | Clifford Avenue A205 | 519821 | 175461 |
| 4 | Kew Road A307 near junction with A316 | 518271 | 175457 |
| 5 | Chertsey Road A316 (just west of junction with St Margaret's Road A3004) | 516418 | 174436 |
| 6 | Richmond Road A305, near junction with A3004 | 517295 | 174020 |
| 7 | King Street A310 | 516227 | 173210 |
| 8 | Hampton Court Road A308 (near Hampton Court and Bushy Park entrance) | 516034 | 168820 |
| 9 | Hampton Court Road A308 (near junction with Church Street A311) | 514192 | 169447 |
| 10 | George Street, Richmond, A305 | 517852 | 174868 |

#### 2.4.2 Annual mean $NO_2$ at identified locations within the LBRuT AQMA

To calculate more accurately how much improvement in air quality would be needed to deliver the air quality objective within an AQMA; it is necessary first to confirm the concentration of $NO_2$ at specific sites. This can be established from the modelling undertaken above and the concentrations are given in Table 3 below.

**Table 3** Predicted $NO_2$ concentration at identified locations within the AQMA

| Location | Base case |
|---|---|
| 1 | 22.2 |
| 2 | 25.0 |
| 3 | 24.4 |
| 4 | 21.4 |
| 5 | 24.5 |
| 6 | 19.7 |
| 7 | 22.5 |
| 8 | 22.1 |
| 9 | 20.2 |
| 10 | 21.6 |

The predicted results for the 2005 base year (from Table 3 above) show that for those locations exceeding the objective, the amount is between approximately 0.4 and 4 ppb. Both locations 6 and 9 however are predicted to meet the AQS objective in 2005 based on existing proposed changes in the vehicle fleet.

### 2.4.3 Source apportionment of $NO_x$ at the identified locations

The understanding of $NO_x$ is undertaken for the base case of 1999 (for which accurate traffic estimates are available, including; vehicle flows and stock information. This is described more fully in Appendix D). The method for calculating the emissions incorporates the many different categories in the vehicle fleet using the road, however for the purposes of understanding source contributions more straightforwardly the following grouping has been applied to the sources:

- HGV (i.e. all HGVs and LGVs other than cars, taxis and motorcycles)
- Cars (including all cars, taxis and motorcycles) and
- Buses and coaches.

A series of model runs for the base case were undertaken for each of the components described above, plus a separate run to determine the gross background contribution. The individual contribution for each category is given in Table 4 below.

**Table 4** Predicted $NO_x$ concentration (ppb) for the different sources

| Location | Base case | Buses | Cars | HGVs | Background |
|---|---|---|---|---|---|
| 1 | 65.2 | 5.8 | 19.9 | 4.0 | 35.7 |
| 2 | 94.4 | 8.5 | 27.0 | 29.0 | 30.1 |
| 3 | 90.7 | 2.7 | 27.1 | 30.4 | 30.6 |
| 4 | 71.7 | 5.6 | 25.0 | 11.5 | 29.6 |
| 5 | 104.5 | 5.2 | 46.6 | 22.8 | 29.9 |
| 6 | 58.7 | 11.1 | 14.0 | 4.4 | 29.3 |
| 7 | 82.8 | 15.8 | 27.3 | 10.5 | 29.3 |
| 8 | 84.3 | 6.4 | 34.1 | 14.8 | 29.0 |
| 9 | 66.7 | 3.5 | 22.3 | 12.0 | 28.9 |
| 10 | 67.1 | 19.4 | 10.9 | 7.0 | 29.8 |

The results highlight that the vehicle related contributions vary by location, with the background contribution between 29 and almost 36 ppb. The Car and HGV categories greatly dominate contribution for locations 2, 3, 5 and 8. For locations 4, 7 and 9 this contribution also exceeds the background, although the background exceeds the individual totals. However for the other locations (i.e. 1, 6, and 10) the background contribution dominates the total prediction. This can be more clearly seen in Table 5 and, as can be seen from Table 3, these locations also have the lowest total concentrations. The most polluted locations (2, 3 and 5) are on the A205 and A316 Chertsey Road respectively. The Car contribution substantially dominates the HGV category on the A316, reflecting the large numbers of this type of vehicle using this road. However this is not the case for locations (2 and 3) on the A 205 that have a slightly higher proportion of emissions from the HGV category, although the difference is less marked in this instance.

Buses and coaches form only a minor contribution (approximately 3 to 9 ppb) at most locations, although for locations 7 and 10 (in the centres of Twickenham and Richmond respectively) the bus contribution greatly exceeds that of HGVs.

As would be expected for those locations closest to the largest trunk roads (locations 2, 3 and 5) the total pollution concentration is increased. Location 1 the furthest eastward of all locations has the highest background contribution reflecting its slightly closer proximity to the centre of London. Table 5 below, gives the relative proportions in percentage terms. (It should be noted there is a slight rounding effect with these figures.)

**Table 5** Proportions of source contributions (%)

| Location | Buses | Cars | HGVs | Background |
|---|---|---|---|---|
| 1 | 8.9 | 30.5 | 6.1 | 54.7 |
| 2 | 9.0 | 28.5 | 30.7 | 31.9 |
| 3 | 2.9 | 29.9 | 33.5 | 33.7 |
| 4 | 7.9 | 34.9 | 16.1 | 41.2 |
| 5 | 5.0 | 44.6 | 21.8 | 28.6 |
| 6 | 18.9 | 23.8 | 7.5 | 49.9 |
| 7 | 19.1 | 33.0 | 12.7 | 35.3 |
| 8 | 7.6 | 40.5 | 17.6 | 34.4 |
| 9 | 5.3 | 33.4 | 18.1 | 43.4 |
| 10 | 29.0 | 16.3 | 10.4 | 44.4 |

The background component comprises emissions from the following sectors:

- Domestic (including heating and cooking)
- Commercial/ industrial sources (termed industrial for both gas and oil)
- Other transport sources (Railways, airports and shipping)
- Part B industrial processes (which are authorised by the LBRuT)
- Background roads

Background roads include the contribution to the total pollutant concentration, which is derived from those roads beyond those modelled as directly influencing the location. This includes those roads that are outside the borough, which contribute to the overall background concentration for London. In addition a separate contribution termed “Other background” is also included. This is the contribution which is that derived from natural/ rural emissions outside of London. This contribution is considered constant for all locations across London. The method for deriving this contribution is also more fully explained in Appendix A on the model development.

Part A sources are included within the categories rather than specifically included as a separate category. The predicted $NO_x$ contribution in the LBRuT for all Part A sources was predicted as being 0.2ppb for 2005 and therefore can be considered as a minor source (Carslaw, Beevers and Hedley, 2000).

Table 6 below gives the individual contributions for the 10 identified locations.

**Table 6** Predicted $NO_x$ concentration (ppb) for the different background sources

| Location | Background roads | Domestic heating | Industrial Gas | Industrial Oil | Airports | Railways | Part Bs | Other Background |
|---|---|---|---|---|---|---|---|---|
| 1 | 20.1 | 2.3 | 1.2 | 1.3 | 0.3 | 0.3 | 0.0 | 10.0 |
| 2 | 15.2 | 2.4 | 1.4 | 0.2 | 0.5 | 0.3 | 0.0 | 10.0 |
| 3 | 16.5 | 2.0 | 1.1 | 0.1 | 0.6 | 0.3 | 0.1 | 10.0 |
| 4 | 15.6 | 1.8 | 1.0 | 0.2 | 0.7 | 0.3 | 0.1 | 10.0 |
| 5 | 15.2 | 2.1 | 1.0 | 0.4 | 1.0 | 0.2 | 0.1 | 10.0 |
| 6 | 15.1 | 1.9 | 1.0 | 0.2 | 0.8 | 0.2 | 0.1 | 10.0 |
| 7 | 14.3 | 2.2 | 1.0 | 0.3 | 1.0 | 0.2 | 0.1 | 10.0 |
| 8 | 15.2 | 1.8 | 0.8 | 0.1 | 0.8 | 0.2 | 0.0 | 10.0 |
| 9 | 14.6 | 2.0 | 0.8 | 0.2 | 1.1 | 0.2 | 0.1 | 10.0 |
| 10 | 15.6 | 1.9 | 1.0 | 0.2 | 0.8 | 0.2 | 0.1 | 10.0 |

The contribution to the background component from domestic, commercial/ industrial, other transport and Part B sources for all locations is small (approximately 5 ppb) compared to the contributions from the Other background and Background roads.

Table 7 provides the relative importance within the background component of $NO_x$ from road transport and non-road transport related sources.

**Table 7** Predicted $NO_x$ contributions (%) for the different background sources

| Location | % Non road related | % Road related |
|---|---|---|
| 1 | 43.6 | 56.4 |
| 2 | 49.5 | 50.5 |
| 3 | 46.1 | 53.9 |
| 4 | 47.3 | 52.7 |
| 5 | 49.3 | 50.7 |
| 6 | 48.4 | 51.6 |
| 7 | 50.7 | 49.3 |
| 8 | 47.6 | 52.4 |
| 9 | 49.5 | 50.5 |
| 10 | 47.6 | 52.4 |

The above proportions indicate that for all locations, approximately half of the background component is from road transport related sources. This is obviously in addition to the road transport related sources modelled locally to the identified locations and therefore this absolutely confirms the major influence of this sector in the LBRuT area.

#### 2.4.4 Source apportionment of PM10 at the identified locations

The source apportionment for PM10 has been derived using the same methodology as that described earlier (sections 2.4.1 and 2.4.3). The locations given in the following tables are therefore those identified in Table 2 and Figure 3.

Table 8 provides the results for the 1999 base case with the relative contributions for the road transport source categories, plus background. In this instance the road transport sources provide the major proportion of the primary component, the background contribution includes the remainder of the primary, plus secondary and coarse components. The background contribution remains almost constant for all the locations investigated (between 24.1 and 24.6 $\mu g/m^3$).

The most polluted locations are 2, 3, 5 and 7 (all approximately 32-3 $\mu g/m^3$), on the A205 Clifford Avenue, A316 Chertsey Road and A310 King Street (in Twickenham). These same locations also exhibit the highest contributions from the HGV category (which also includes all LGVs other than cars, taxis and motorcycles), thus reflecting the relatively higher proportion of HGVs on these roads. Location 7 also has the second highest contribution from Buses.

For locations 2 and 3 the HGV category contribution exceeds that of cars. However for locations 5 and 7 the HGV in combination with the Bus contribution exceeds that of Cars. In all locations other than 10 (in George Street, Richmond) the contribution from Cars exceeds that of Buses.

**Table 8** Predicted annual mean PM10 concentration (μg/m$^3$) for different sources

| Location | Base case | Buses | Cars | HGVs | Background |
|---|---|---|---|---|---|
| 1 | 27.5 | 0.6 | 1.4 | 0.9 | 24.6 |
| 2 | 32.9 | 1.0 | 3.0 | 4.7 | 24.2 |
| 3 | 32.8 | 0.3 | 3.2 | 5.0 | 24.3 |
| 4 | 29.0 | 0.6 | 2.0 | 2.1 | 24.2 |
| 5 | 32.7 | 0.5 | 4.0 | 3.9 | 24.3 |
| 6 | 27.4 | 1.2 | 1.2 | 0.9 | 24.2 |
| 7 | 31.9 | 2.0 | 3.3 | 2.3 | 24.2 |
| 8 | 29.6 | 0.6 | 2.4 | 2.5 | 24.2 |
| 9 | 28.2 | 0.4 | 1.7 | 2.0 | 24.1 |
| 10 | 29.5 | 2.6 | 1.3 | 1.4 | 24.2 |

Table 9 provides the same information in relative terms for the sites however as previously explained the variation between proportions can be partly explained by both the contributions themselves, i.e. proximity of the individual locations as well as by the actual magnitude of the local sources investigated.

**Table 9** Proportions of source contributions (%)

| Location | All road transport | Background | Buses | Cars | HGVs |
|---|---|---|---|---|---|
| 1 | 10.4 | 89.6 | 2.0 | 5.2 | 3.2 |
| 2 | 26.3 | 73.7 | 3.0 | 9.0 | 14.4 |
| 3 | 25.9 | 74.1 | 0.9 | 9.8 | 15.1 |
| 4 | 16.4 | 83.6 | 2.2 | 6.9 | 7.4 |
| 5 | 25.6 | 74.4 | 1.6 | 12.1 | 11.9 |
| 6 | 11.8 | 88.2 | 4.3 | 4.3 | 3.2 |
| 7 | 24.1 | 75.9 | 6.4 | 10.5 | 7.2 |
| 8 | 18.5 | 81.5 | 2.1 | 8.0 | 8.4 |
| 9 | 14.3 | 85.7 | 1.2 | 6.0 | 7.1 |
| 10 | 17.8 | 82.2 | 8.9 | 4.4 | 4.6 |

In all instances it can be clearly seen that the Background contribution greatly dominates even when compared with the All road transport total. The most polluted locations are also those most influenced by the contribution from road transport (i.e. locations 2, 3, 5 and 7).

The proportion of vehicle category contributions to the total for All road transport can be seen below in Table 10. This highlights the expected dominance of the HGV category (even excluding buses) for all locations other than locations 1, 7 and 10. Location 1 is Castelnau (A306), close to the Hammersmith Bridge, which has a weight restriction, thus leading to a reduced number of HGVs using the road. At location 7, the proportion of HGVs is similar to that of Buses, whereas for location

10 in the centre of Richmond, the contribution from Buses exceeds that of both Cars and HGVs, and is almost 50% of the total.

**Table 10** Proportion (%) of vehicle category contributions to predicted PM10 concentrations

| Location | Buses | Cars | HGVs |
|---|---|---|---|
| 1 | 19.6 | 49.9 | 30.6 |
| 2 | 11.4 | 34.1 | 54.5 |
| 3 | 3.6 | 38.0 | 58.4 |
| 4 | 13.3 | 41.7 | 45.0 |
| 5 | 6.2 | 47.3 | 46.5 |
| 6 | 36.3 | 36.3 | 27.5 |
| 7 | 26.6 | 43.5 | 29.8 |
| 8 | 11.3 | 43.5 | 45.2 |
| 9 | 8.7 | 41.9 | 49.4 |
| 10 | 49.6 | 24.4 | 26.0 |

The background component for PM10 varies from that of $NO_x$ as it includes both secondary and coarse components. These are in addition to the other primary components, which also include the influence of traffic beyond the borough boundary. The background contribution comprises emissions from the following sectors:

- Commercial/ industrial sources (termed industrial for both gas and oil)
- Other transport sources (Railways, airports and shipping)
- Part B industrial processes (which are authorised by the LBRuT)
- Background roads
- Rural background primary
- Secondary and coarse

It should also be noted that other sectors were considered including contributions from the domestic sector, however these found to comprise very small proportions (i.e. less than 0.01 $\mu g/m^3$). As a consequence these contributions have not been included in Table 11 of the predicted contributions to background PM10.

Background roads include the contribution to the total pollutant concentration, which is derived from those roads beyond those modelled as directly influencing the location. This includes those roads that are outside the borough, which contribute to the overall background concentration for London. In addition separate contributions termed “Secondary/ Coarse” and “Rural background primary” are also included. These are the contributions that are derived from natural/ rural emissions outside of London (including transboundary contributions). These contributions are therefore considered constant for all locations across London.

**Table 11** Predicted PM10 concentration (µg/$m^3$) at the identified locations for the different background sources

| Location | Background roads | Industrial Oil | Airports | Railways | PartBs | Rural Background primary | Secondary/ coarse |
|---|---|---|---|---|---|---|---|
| 1 | 2.13 | 0.26 | 0.01 | 0.03 | 0.05 | 1.17 | 20.93 |
| 2 | 1.93 | 0.05 | 0.02 | 0.03 | 0.08 | 1.17 | 20.93 |
| 3 | 2.02 | 0.05 | 0.03 | 0.03 | 0.09 | 1.17 | 20.93 |
| 4 | 1.90 | 0.07 | 0.03 | 0.03 | 0.09 | 1.17 | 20.93 |
| 5 | 1.78 | 0.16 | 0.04 | 0.02 | 0.19 | 1.17 | 20.93 |
| 6 | 1.85 | 0.07 | 0.04 | 0.02 | 0.08 | 1.17 | 20.93 |
| 7 | 1.76 | 0.12 | 0.05 | 0.02 | 0.15 | 1.17 | 20.93 |
| 8 | 1.90 | 0.03 | 0.04 | 0.02 | 0.08 | 1.17 | 20.93 |
| 9 | 1.82 | 0.04 | 0.06 | 0.02 | 0.11 | 1.17 | 20.93 |
| 10 | 1.90 | 0.07 | 0.04 | 0.02 | 0.08 | 1.17 | 20.93 |

It can be seen from Table 11 that the secondary/ coarse contributions are of greatest significance, totally dominating the overall background contribution. This apportionment was based on 1999 meteorology and therefore it would be expected to be even greater for the worst-case meteorology scenario i.e. for 1996. The PM10 measurements in London for that year were dominated by the transboundary secondary episodes, due to the higher than normal frequency of easterly winds from Europe during the year.

The relative proportions for the above categories are given in Table 12. In this instance the local commercial/ industrial and other transport categories have been combined. The second most significant contribution to the background is that from the Background roads, these approximate to about 7-9% of the total for all locations. The Other transport/ commercial contribution approximates to 0.7- 1.5% for all locations. As indicated above the secondary/ coarse component greatly dominates at all locations (about 85% of the total).

**Table 12** Proportion (%) of source category contributions

| Location | Background roads | Other transport/ commercial | Rural Background primary | Secondary/ coarse |
|---|---|---|---|---|
| 1 | 8.7 | 1.5 | 4.8 | 85.1 |
| 2 | 8.0 | 0.8 | 4.8 | 86.4 |
| 3 | 8.3 | 0.8 | 4.8 | 86.1 |
| 4 | 7.8 | 0.9 | 4.8 | 86.4 |
| 5 | 7.3 | 1.7 | 4.8 | 86.1 |
| 6 | 7.7 | 0.9 | 4.8 | 86.6 |
| 7 | 7.3 | 1.4 | 4.8 | 86.5 |
| 8 | 7.9 | 0.7 | 4.8 | 86.6 |
| 9 | 7.5 | 0.9 | 4.8 | 86.7 |
| 10 | 7.9 | 0.9 | 4.8 | 86.4 |