



## 2013 Air Quality Progress Report for Charnwood Borough Council

In fulfillment of Part IV of the  
Environment Act 1995  
Local Air Quality Management

Aug 2013

|                                |  |
|--------------------------------|--|
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## Executive Summary

As part of their duties under the Environment Act 1995 local authorities are obliged to produce Air Quality Progress Reports detailing the current air quality within their districts.

Progress Reports are intended to maintain the continuity of the Local Air Quality Management (LAQM) process, and fill in the gaps between the three yearly cycle of Review and Assessment. Progress Reports are required in all years where the authority is not completing and Updating & Screening Assessment (USA). Charnwood Borough Council completed its latest USA in 2012.

The reports ask local authorities to review and assess air quality in their areas in detail, and to determine whether or not the air quality objectives are likely to be achieved. Where exceedences have been recorded or are considered likely, the local authority must then proceed to a Detailed Assessment prior to the declaration of an Air Quality Management Area (AQMA) and the preparation of an Air Quality Action Plan (AQAP), setting out the measures it intends to put in place in pursuit of the objectives.

Charnwood has four Air Quality Management Areas (AQMAs), which were declared because of predicted breaches of national air quality objectives at residential properties in the borough. The causes of these predicted breaches are resulting from both emissions from local traffic and commercial (railway & quarry) sources.

2012 was a disruptive year in terms of the quality data from our own monitoring network, due to an unprecedented sequence of equipment faults.

Nationally corrected monitoring data of nitrogen dioxide at 40 locations in Charnwood demonstrated a breach of UK air quality objectives at 2 sites (a further breach is noted at a site we believe to be short-term affected by current disrupted traffic flows in town). Both sites reporting exceedences fall within the existing Loughborough Air Quality Management Area which was declared in response to (traffic derived) exceedences of the nitrogen dioxide (annual mean) air quality concentration objective.

The recent opening of the Loughborough Eastern Gateway Project has already provided major reductions to NO<sub>2</sub> exposure to those residents living along Ratcliffe Road. Looking further ahead to the completion of the Loughborough Inner Relief Road (LIRR), we are expecting to bring similar measurable air quality improvements to residents living alongside other arterial routes through the town.

Monitoring of NO<sub>2</sub> in Syston continues to be encouraging in that results continue to remain within the 40µgm<sup>-3</sup> objective limit.

Progress with Lafarge quarry in relation to the Mountsorrel (PM<sub>10</sub>) Air Quality Management Area declared in November 2011, is on-going. A dust management plan is now firmly in place and procedural and on-site improvements are now being reflected in much reduced (~32%) concentrations at those sites most exposed.

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# 1 Introduction

## 1.1 Description of Local Authority Area

The Borough of Charnwood is located in the heart of the East Midlands sitting centrally in the triangle formed by Nottingham, Leicester and Derby. The Borough covers an area of 108 square miles and consists of a mix of urban settlements and rural farmland.

### Map of Charnwood Borough in Leicestershire

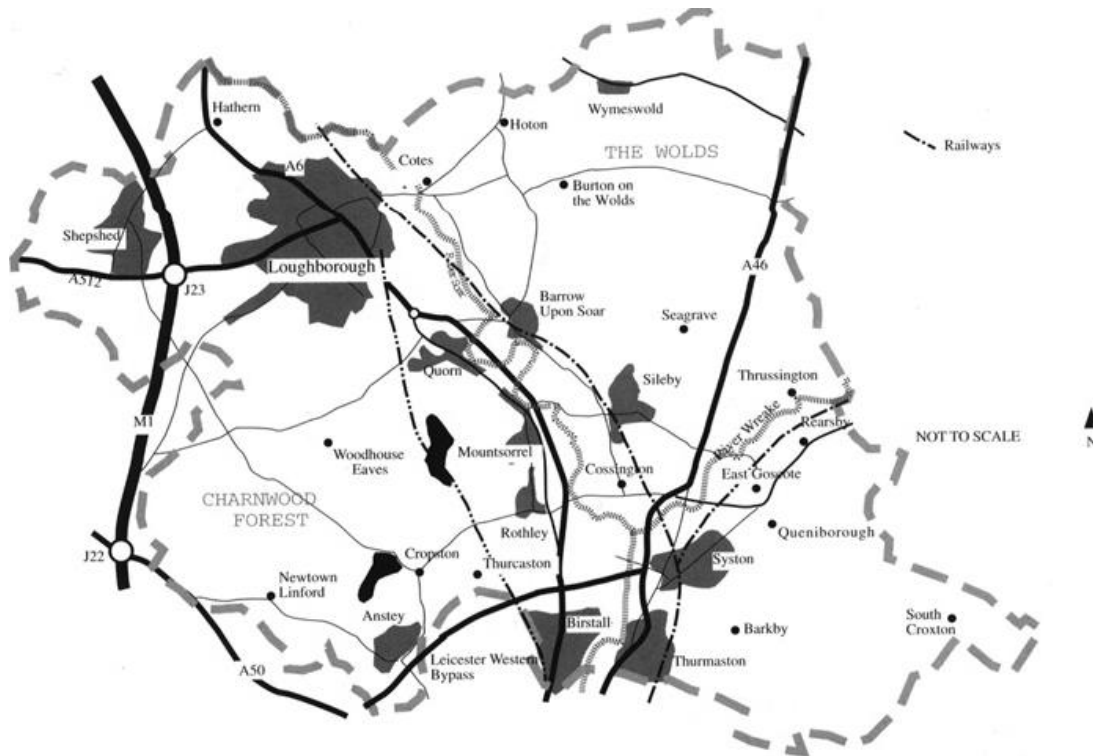


### The Borough of Charnwood

Just over one third of the 155,000+ population live in the thriving university town of Loughborough. The remaining residents are distributed between the northern town of Shepshed and the southern towns and villages on the outskirts of the city of Leicester including Anstey, Birstall, Thurmaston and Syston and the villages located along the Soar and Wreake river valleys.

Charnwood has a wide range of commercial and industrial activities. Loughborough is traditionally associated with the engineering sector, whilst the villages along the Soar and Wreake have long associations with the footwear, hosiery and knitwear

industries. High technology industries are being rapidly attracted into the Borough, mirroring the national experience of the contraction of the traditional heavy industries. The changing industrial infrastructure of the Borough will continue to create challenges in relation to air quality management.



A substantial and varied transport network serves the Borough. The major road links include the M1 motorway, the A6 and the A46 all of which run to a greater or lesser extent through the Borough. The Ivanhoe and Great Central railway lines run through the central spine of the Borough, and the East Midlands airport is located approximately three miles from the north western boundary of Charnwood.

Generally ambient air pollution has never been considered to be of excessive concern for local residents in the Borough. However, as is the case in many parts of the country, the atmospheric emissions from certain individual point sources have caused considerable nuisance for those residents in the immediate vicinity. Some of these individual point sources will not have been highlighted through this report, as they are not producers of any of the seven key pollutants highlighted in the National Air Quality Strategy. This does not indicate a lack of concern by the authors of the report to generate solutions to these problems, but is simply due to the fact that they fall outside the remit of this report.

## 1.2 Purpose of Report

This report fulfils the requirements of the Local Air Quality Management process as set out in Part IV of the Environment Act (1995), the Air Quality Strategy for England, Scotland, Wales and Northern Ireland 2007 and the relevant Policy and Technical Guidance documents. The LAQM process places an obligation on all local authorities to regularly review and assess air quality in their areas, and to determine whether or not the air quality objectives are likely to be achieved. Where exceedences are considered likely, the local authority must then declare an Air Quality Management Area (AQMA) and prepare an Air Quality Action Plan (AQAP) setting out the measures it intends to put in place in pursuit of the objectives.

Progress Reports are required in the intervening years between the three-yearly Updating and Screening Assessment reports. Their purpose is to maintain continuity in the Local Air Quality Management process.

They are not intended to be as detailed as Updating and Screening Assessment Reports, or to require as much effort. However, if the Progress Report identifies the risk of exceedence of an Air Quality Objective, the Local Authority (LA) should undertake a Detailed Assessment immediately, and not wait until the next round of Review and Assessment.

## 1.3 Air Quality Objectives

The air quality objectives applicable to LAQM in England are set out in the Air Quality (England) Regulations 2000 (SI 928), The Air Quality (England) (Amendment) Regulations 2002 (SI 3043), and are shown in Table 1.1. This table shows the objectives in units of microgrammes per cubic metre  $\mu\text{g}/\text{m}^3$  (milligrammes per cubic metre,  $\text{mg}/\text{m}^3$  for carbon monoxide) with the number of exceedences in each year that are permitted (where applicable).



Table 1.1 Air Quality Objectives included in Regulations for the purpose of LAQM in England

| Pollutant                                   | Air Quality Objective   |                     | Date to be achieved by |
|---|---|---------------------|------------------------|
|   | Concentration   | Measured as         |                        |
| Benzene                                     | 16.25 $\mu\text{g}/\text{m}^3$  | Running annual mean | 31.12.2003             |
|   | 5.00 $\mu\text{g}/\text{m}^3$   | Running annual mean | 31.12.2010             |
| 1,3-Butadiene                               | 2.25 $\mu\text{g}/\text{m}^3$   | Running annual mean | 31.12.2003             |
| Carbon monoxide                             | 10.0 $\text{mg}/\text{m}^3$   | Running 8-hour mean | 31.12.2003             |
| Lead  | 0.5 $\mu\text{g}/\text{m}^3$  | Annual mean         | 31.12.2004             |
|   | 0.25 $\mu\text{g}/\text{m}^3$   | Annual mean         | 31.12.2008             |
| Nitrogen dioxide                            | 200 $\mu\text{g}/\text{m}^3$ not to be exceeded more than 18 times a year   | 1-hour mean         | 31.12.2005             |
|   | 40 $\mu\text{g}/\text{m}^3$   | Annual mean         | 31.12.2005             |
| Particles (PM <sub>10</sub> ) (gravimetric) | 50 $\mu\text{g}/\text{m}^3$ , not to be exceeded more than 35 times a year  | 24-hour mean        | 31.12.2004             |
|   | 40 $\mu\text{g}/\text{m}^3$   | Annual mean         | 31.12.2004             |
| Sulphur dioxide                             | 350 $\mu\text{g}/\text{m}^3$ , not to be exceeded more than 24 times a year | 1-hour mean         | 31.12.2004             |
|   | 125 $\mu\text{g}/\text{m}^3$ , not to be exceeded more than 3 times a year  | 24-hour mean        | 31.12.2004             |
|   | 266 $\mu\text{g}/\text{m}^3$ , not to be exceeded more than 35 times a year | 15-minute mean      | 31.12.2005             |

## 1.4 Summary of Previous Review and Assessments

In December 2000 Charnwood Borough Council completed a first Review and Assessment of air quality in the Borough. The object of the project was to determine whether concentrations of seven pollutants identified by UK Government as being most concern to public health were likely to be above air quality objectives set in the National Air Quality Strategy. The objectives of the Strategy are based on levels at which there are considered to be no effect on human health.

Three Air Quality Management Areas were declared in 2001 on the basis of this report.

In May 2003 an Updating and Screening Assessment was issued to review the findings of the original project by taking into consideration any changes that had occurred outside of the three Air Quality Management Areas that had been declared on the basis of the first assessment, as well as any improvements that had been made in the methods of predicting air quality changes.

2004 saw two further detailed assessments published. One provided a detailed review and assessment of traffic related air quality – the Round 1, Stage 4 Review and Assessment. The other provided a detailed review and assessment of air quality around two industrial locations – the Round 2 Detailed Review and Assessment. These reports were undertaken to examine and refine in more detail the predictions of how air quality is likely to change in each of those areas in relation to the possibility of potential breaches against the set objectives, in order to produce an Action Plan implementing changes that would endeavour to see that the objectives are met.

Following a Progress Report submitted in 2005, a full review and assessment of air quality in Charnwood was undertaken in the Round 3 Updating and Screening Assessment, completed in 2006. All sources of air pollution were considered in this report, with collated monitoring data from previous years being fully analysed based on the methodology outlined in Technical Guidance LAQM.TG(03) Update – January 2006 published by the Department for the Environment Food and Rural Affairs.

In 2007 a Progress Report was prepared for DEFRA, presenting results from our monitoring network throughout 2006. It was explained as part of the report that an intended Detailed Assessment in relation to PM10 levels in the vicinity of the Lafarge Aggregates quarry at Mountsorrel, which had been identified during previous year's reports, had not been undertaken due to technical issues (data retrieval and software problems) with the on-site monitoring equipment. Subsequently, following a more thorough period of monitoring during 2009-2010; this Detailed Assessment was ultimately completed in 2011 with the recommendation made by Authority that a further AQMA should be declared in respect to exceedences of the 24-hr PM10 objective being accepted by DEFRA. The AQMA was declared in November 2011 with a Further Assessment Report submitted, and accepted by DEFRA during 2013.

The 2009 Detailed Assessment in respect of previously reported NO<sub>2</sub> diffusion tube concentrations around the junction at Humberstone Lane, Thurmaston, had pointed towards there being potential exceedences on the northern side of Humberstone Lane. The outcome of the modelling within this report suggested being in contradiction to local knowledge in that the southern side would be most affected. Recommendations were made to DEFRA that a further period of diffusion tube monitoring would be undertaken, specifically targeting the properties highlighted in the report to be at 'risk', prior to drawing final conclusions. Updated results/comments made as part of our 2010 Progress Report – concluding that concentrations were within the objective levels at the relevant locations - indicated that there was no need to proceed to a declaration of an AQMA in respect to the NO<sub>2</sub> (annual mean). DEFRA accepted these conclusions.

2009 - 2012 also saw the submission of our annual reporting requirements in terms of Updated & Screening Assessments and subsequent Progress Reports. All conclusions and recommendations were accepted by DEFRA.

We therefore approach this particular reporting phase of the policy guidance with four declared Air Quality Management Areas within the Borough:

- 1. Loughborough Air Quality Management Area**  
Designated in relation to a likely breach of the nitrogen dioxide (annual mean) objective as specified in the Air Quality Regulations (England)(Wales) 2000
- 2. GCR Air Quality Management Area**  
Designated in relation to a likely breach of the sulphur dioxide (fifteen minute mean) objective as specified in the Air Quality Regulations (England)(Wales) 2000.
- 3. Syston Air Quality Management Area**  
Designated in relation to a likely breach of the nitrogen dioxide (annual mean) objective as specified in the Air Quality Regulations (England)(Wales) 2000
- 4. Mountsorrel Air Quality Management Area**  
Designated in relation to a likely breach of the particulate matter (PM<sub>10</sub>) (24 hour mean) objective as specified in the Air Quality Regulations (England)(Wales) 2000

All the above reports are available on the Charnwood Borough Council website at the following address: [www.charnwood.gov.uk/environment/airpollution.html](http://www.charnwood.gov.uk/environment/airpollution.html)

## **2 New Monitoring Data**

### **2.1 Summary of Monitoring Undertaken**

#### **2.1.1 Automatic Monitoring Sites**

Charnwood operates 4 automatic monitoring sites, summarised in Table 2.1.

The analysers are serviced under schedule via SupportingU.

Daily “automatic” and fortnightly manual calibrations are also undertaken, the later performed by the Local Authority

Data validation and ratification procedures follow Technical Guidance LAQM.TG(09)

Following latest guidance, the factors used for the gravimetric TEOM data correction are derived from the King’s College London Volatile Correction Model (VCM).

Table 2.1 Details of Automatic Monitoring Sites

| Site Name                  | Site Type          | X OS GridRef | Y OS Grid Ref | Pollutants Monitored                                 | In AQMA? | Monitoring Technique  | Relevant Exposure? (Y/N with distance (m) to relevant exposure) | Distance to kerb of nearest road (N/A if not applicable) | Does this location represent worst-case exposure? |
|----------------------------|--------------------|--------------|---------------|--|----------|---|---|--|---|
| Durham Rd (Loughborough)   | Urban background   | 452352       | 320697        | NO <sub>2</sub> , SO <sub>2</sub> , PM <sub>10</sub> | N        | TEOM (PM <sub>10</sub> )<br><br>UV Fluorescence<br><br>Chemi-Illuminescence | N   | n/a  | N   |
| Baxter Gate (Loughborough) | Roadside           | 453687       | 319672        | NO <sub>2</sub>                                      | Y        | Chemi-Illuminescence  | N<br>(Not in the immediate vicinity of the monitor)             | 1m   | N   |
| Melton Rd (Syston)         | Roadside           | 462540       | 311428        | NO <sub>2</sub>                                      | Y        | Chemi-Illuminescence  | Y (10m)   | 3m   | N   |
| Mountsorrel                | Industrial / Other | 457355       | 315396        | PM <sub>10</sub>                                     | Y        | Volumetric Gravimetric  | Y (~34M)  | n/a  | Y   |

### **2.1.2 Non-Automatic Monitoring Sites**

Since the completion of the first review and assessment of air quality we have sought to continuously update and improve our monitoring network.

During 2012:

- Nitrogen dioxide diffusion tubes were deployed at 40 locations (tubes in triplicate being used at the 3 automatic monitoring sites).

Tubes were located as close as practicable to receptor locations – usually on the façades of residential properties.

Table 2.2 Details of Non-Automatic Monitoring Sites

| Site Name                              | Site Type | X OS Grid Ref | Y OS Grid Ref | Pollutants Monitored | In AQMA? | Is monitoring collocated with a Continuous Analyser (Y/N) | Relevant Exposure? (Y/N with distance (m) to relevant exposure) | Distance to kerb of nearest road (N/A if not applicable) | Does this location represent worst-case exposure? |
|--|-----------|---------------|---------------|----------------------|----------|---|---|--|---|
| Ratcliffe Rd (Loughborough)            | Roadside  | 454087        | 320392        | NO <sub>2</sub>      | Y        | N   | Y (façade)  | ~3m  | Y   |
| Shelthorpe Rd (Loughborough)           | Roadside  | 454234        | 318657        | NO <sub>2</sub>      | N        | N   | Y (~8m)   | ~3m  | Y   |
| Forest Rd (Loughborough)               | Roadside  | 452833        | 318776        | NO <sub>2</sub>      | N        | N   | Y (façade)  | ~6m  | Y   |
| Haydon Rd (Loughborough)               | Roadside  | 452314        | 319620        | NO <sub>2</sub>      | Y        | N   | Y (~8m)   | ~6m  | Y   |
| Alan Moss Rd/Epinal Way (Loughborough) | Roadside  | 452173        | 319924        | NO <sub>2</sub>      | Y        | N   | Y (façade)  | ~15m   | Y   |
| Epinal Way/Ling Rd (Loughborough)      | Roadside  | 453678        | 318194        | NO <sub>2</sub>      | N        | N   | Y (façade)  | ~9m  | Y   |
| Leicester Rd (Loughborough)            | Roadside  | 454002        | 319253        | NO <sub>2</sub>      | Y        | N   | -   | ~3m  | Y   |
| Derby Rd (Loughborough)                | Roadside  | 453231        | 320028        | NO <sub>2</sub>      | Y        | N   | Y (~3m)   | ~3m  | Y   |

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| Site Name                               | Site Type        | X OS Grid Ref | Y OS Grid Ref | Pollutants Monitored | In AQMA? | Is monitoring collocated with a Continuous Analyser (Y/N) | Relevant Exposure? (Y/N with distance (m) to relevant exposure) | Distance to kerb of nearest road (N/A if not applicable) | Does this location represent worst-case exposure? |
|---|------------------|---------------|---------------|----------------------|----------|---|---|--|---|
| Derby Rd/Brisco Avn (Loughborough)      | Roadside         | 452670        | 320527        | NO <sub>2</sub>      | Y        | N   | Y (~3m)   | ~4m  | Y   |
| Durham Rd AQMS 1 (Loughborough)         | Urban Background | 452352        | 320697        | NO <sub>2</sub>      | N        | Y   | N   | n/a  | n/a   |
| Durham Rd AQMS 2 (Loughborough)         | Urban Background | 452352        | 320697        | NO <sub>2</sub>      | N        | Y   | N   | n/a  | n/a   |
| Durham Rd AQMS 3 (Loughborough)         | Urban Background | 452352        | 320697        | NO <sub>2</sub>      | N        | Y   | N   | n/a  | n/a   |
| Alan Moss Rd/A6 Derby Rd (Loughborough) | Roadside         | 452903        | 320212        | NO <sub>2</sub>      | Y        | N   | Y (façade)  | ~8m  | Y   |
| High St (Loughborough)                  | Roadside         | 453730        | 319596        | NO <sub>2</sub>      | Y        | N   | -   | ~3m  | Y   |
| Market Place (Loughborough)             | Urban Centre     | 453611        | 319540        | NO <sub>2</sub>      | Y        | N   | N   | n/a  | n/a   |
|   |                  |               |               |                      |          |   |   |  |   |



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| Site Name                              | Site Type | X OS Grid Ref | Y OS Grid Ref | Pollutants Monitored | In AQMA? | Is monitoring collocated with a Continuous Analyser (Y/N) | Relevant Exposure? (Y/N with distance (m) to relevant exposure) | Distance to kerb of nearest road (N/A if not applicable) | Does this location represent worst-case exposure? |
|--|-----------|---------------|---------------|----------------------|----------|---|---|--|---|
| Ashby Rd<br>(Loughborough)             | Roadside  | 453189        | 319709        | NO <sub>2</sub>      | Y        | N   | Y (façade)  | ~4m  | Y   |
| Cow Hill Lodge<br>(Shepshed)           | Roadside  | 448876        | 318307        | NO <sub>2</sub>      | N        | N   | Y (façade)  | ~10m   | Y   |
| Rosebery St<br>(Loughborough)          | Roadside  | 452697        | 319921        | NO <sub>2</sub>      | N        | N   | Y (~13m)  | ~3m  | Y   |
| Melton Rd<br>Town Centre<br>(Syston)   | Roadside  | 462777        | 311692        | NO <sub>2</sub>      | Y        | N   | Y (~3m)   | ~3m  | Y   |
| 1123 Melton Rd<br>(Syston)             | Roadside  | 462351        | 311213        | NO <sub>2</sub>      | Y        | N   | Y (façade)  | ~6m  | Y   |
| 1116 Melton Rd<br>(Syston)             | Roadside  | 462373        | 311254        | NO <sub>2</sub>      | Y        | N   | Y (façade)  | ~3m  | Y   |
| Loughborough Rd<br>(Birstall)          | Roadside  | 459233        | 309590        | NO <sub>2</sub>      | Y        | N   | Y (façade)  | ~15m   | Y   |
| A6 (Birstall)                          | Roadside  | 459178        | 309890        | NO <sub>2</sub>      | N        | N   | Y (~2m)   | ~5m  | Y   |
| 21<br>Humberstone Lane<br>(Thurmaston) | Roadside  | 460821        | 308757        | NO <sub>2</sub>      | N        | N   | Y (façade)  | ~6m  | Y   |
|  |           |               |               |                      |          |   |   |  |   |

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| Site Name                              | Site Type | X OS Grid Ref | Y OS Grid Ref | Pollutants Monitored | In AQMA? | Is monitoring collocated with a Continuous Analyser (Y/N) | Relevant Exposure? (Y/N with distance (m) to relevant exposure)                 | Distance to kerb of nearest road (N/A if not applicable) | Does this location represent worst-case exposure? |
|--|-----------|---------------|---------------|----------------------|----------|---|---|--|---|
| 43<br>Humberstone Lane<br>(Thurmaston) | Roadside  | 460861        | 308824        | NO <sub>2</sub>      | N        | N   | Y (façade)  | ~5m  | Y   |
| 38<br>Humberstone Lane<br>(Thurmaston) | Roadside  | 460908        | 308775        | NO <sub>2</sub>      | N        | N   | Y (façade)  | ~5m  | Y   |
| 22<br>Humberstone Lane<br>(Thurmaston) | Roadside  | 460835        | 308784        | NO <sub>2</sub>      | N        | N   | Y (façade)  | ~5m  | Y   |
| Ashby Rd<br>Central<br>(Shepshed)      | Roadside  | 448121        | 318257        | NO <sub>2</sub>      | N        | N   | Y (~12m)  | 2m   | Y   |
| Loughborough Rd<br>(Hathern)           | Roadside  | 450260        | 321922        | NO <sub>2</sub>      | N        | N   | Tube located ~3m from kerb.<br>Nearest receptor is ~30m away and ~13m from kerb |  | Y   |
| Baxter Gate<br>(Loughborough)          | Roadside  | 453682        | 319672        | NO <sub>2</sub>      | Y        | N   | -   | ~2m  | Y   |

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| Site Name                               | Site Type | X OS Grid Ref | Y OS Grid Ref | Pollutants Monitored | In AQMA? | Is monitoring collocated with a Continuous Analyser (Y/N) | Relevant Exposure? (Y/N with distance (m) to relevant exposure) | Distance to kerb of nearest road (N/A if not applicable) | Does this location represent worst-case exposure? |
|---|-----------|---------------|---------------|----------------------|----------|---|---|--|---|
| Barrow St<br>(Loughborough)             | Roadside  | 453901        | 319488        | NO <sub>2</sub>      | N        | N   | Y (façade)  | ~10m   | Y   |
| School St<br>(Loughborough)             | Roadside  | 453946        | 319619        | NO <sub>2</sub>      | N        | N   | Y (façade)  | ~3m  | Y   |
| Fennel St<br>(Loughborough)             | Roadside  | 453694        | 319890        | NO <sub>2</sub>      | N        | N   | Y (façade)  | ~3m  | Y   |
| High St<br>(Syston)                     | Roadside  | 462369        | 311809        | NO <sub>2</sub>      | Y        | N   | Y (façade)  | ~4m  | Y   |
| Syston AQMS 1                           | Roadside  | 462540        | 311428        | NO <sub>2</sub>      | Y        | Y   | Y (~10m)  | ~3m  | Y   |
| Syston AQMS 2                           | Roadside  | 462540        | 311428        | NO <sub>2</sub>      | Y        | Y   | Y (~10m)  | ~3m  | Y   |
| Syston AQMS 3                           | Roadside  | 462540        | 311428        | NO <sub>2</sub>      | Y        | Y   | Y (~10m)  | ~3m  | Y   |
| Baxter Gate<br>AQMS 1<br>(Loughborough) | Kerbside  | 453687        | 319672        | NO <sub>2</sub>      | Y        | Y   | -   | ~1m  | Y   |
| Baxter Gate<br>AQMS 2<br>(Loughborough) | Kerbside  | 453687        | 319672        | NO <sub>2</sub>      | Y        | Y   | -   | ~1m  | Y   |
|   |           |               |               |                      |          |   |   |  |   |

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| Site Name                               | Site Type | X OS Grid Ref | Y OS Grid Ref | Pollutants Monitored | In AQMA? | Is monitoring collocated with a Continuous Analyser (Y/N) | Relevant Exposure? (Y/N with distance (m) to relevant exposure) | Distance to kerb of nearest road (N/A if not applicable) | Does this location represent worst-case exposure? |
|---|-----------|---------------|---------------|----------------------|----------|---|---|--|---|
| Baxter Gate<br>AQMS 3<br>(Loughborough) | Kerbside  | 453687        | 319672        | NO <sub>2</sub>      | Y        | Y   | -   | ~1m  | Y   |
| 33 Nottingham Rd<br>(Loughborough)      | Roadside  | 454000        | 319977        | NO <sub>2</sub>      | N        | N   | -   | ~3m  | Y   |
| 89 Nottingham Rd<br>(Loughborough)      | Roadside  | 454154        | 320116        | NO <sub>2</sub>      | N        | N   | Y (façade)  | ~3m  | Y   |
| 156 Ratcliffe Rd<br>(Loughborough)      | Roadside  | 454285        | 320294        | NO <sub>2</sub>      | N        | N   | Y (façade)  | ~6m  | Y   |
| 156 Meadow Rd<br>(Loughborough)         | Roadside  | 453933        | 320663        | NO <sub>2</sub>      | N        | N   | Y (façade)  | ~8m  | Y   |
| 31 Station Boulevade<br>(Loughborough)  | Roadside  | 454142        | 320593        | NO <sub>2</sub>      | N        | N   | Y (façade)  | ~9m  | Y   |
| 91 Wharnccliffe Rd<br>(Loughborough)    | Roadside  | 454250        | 319682        | NO <sub>2</sub>      | N        | N   | Y (façade)  | ~4m  | Y   |

## 2.2 Comparison of Monitoring Results with AQ Objectives

### 2.2.1 Nitrogen Dioxide

2012 proved a frustrating year in terms of obtaining consistent monitoring data from our real-time analysers within the Borough.

An exceptional number of instrumentation faults across the network have influenced our decision to use the nationally derived bias correction to adjust the 2012 tube concentrations.

- Sample inlet fan failure (*Durham Road*)
- Low flow readings due to a leak (*Melton Rd*)
- Gas regulator failure and subsequent replacement difficulties (*Durham Rd*)
- Span gas supply issues (*Melton Rd*)
- Fault that we believe ultimately led to a CPU board replacement in Feb 2013\* (*Baxter Gate*)

Due to these disruptions our data acquisition rate is correspondingly low as is our confidence in some of the obtained readings (\*especially those at Baxter Gate for the last quarter of the year which we believe are erroneous and should be discarded).

***As can be seen from the following results for 2012; in the whole there have been no diffusion tubes falling outside of an existing AQMA that have exceeded the  $40\mu\text{g}\text{m}^{-3}$  annual mean.***


The exception to this is Site 45 (Nottingham Rd). Over recent years this site has, and continues to be, exposed to traffic disruption due to major roadwork initiatives within Loughborough. In fact, the site was specifically chosen to monitor the expected elevated concentration levels over the period of the works. Until work is completed on the Loughborough Inner Relief Road we would not consider the reported levels to be representative of long term exposure.

The raw data for three sites: Ashby Rd Central (Shepshed), Loughborough Rd (Hathern) and A6 (Birstall) have been distance corrected as they are all roadside locations where the tubes are positioned some distance away from the façade of the nearest receptor – in all cases on a roadside lighting column.

Using the “NO<sub>2</sub> with Distance from Roads Calculator” (Issue 4) available from the UK Air Quality Archive, it is possible for us to calculate the distance NO<sub>2</sub> falloff between these kerbside tubes and the nearest receptors, as follows:

**Ashby Rd Central (Shepshed)**

Using the calculator the concentration at the nearest receptor is shown below to be  $29.5\mu\text{g}/\text{m}^3$

This calculator allows you to predict the annual mean NO<sub>2</sub> concentration for a location ("receptor") that is close to a monitoring site, but nearer or further the kerb than the monitor. The next sheet shows your results on a graph. 

**Enter data into the yellow cells**

|               |   |          |                 |                          |
|---------------|---|----------|-----------------|--------------------------|
| <b>Step 1</b> | <b>How far from the KERB was your measurement made (in metres)?</b>   | (Note 1) | <b>2</b>        | metres                   |
| <b>Step 2</b> | <b>How far from the KERB is your receptor (in metres)?</b>  | (Note 1) | <b>14</b>       | metres                   |
| <b>Step 3</b> | <b>What is the local annual mean background NO<sub>2</sub> concentration (in <math>\mu\text{g}/\text{m}^3</math>)?</b>  | (Note 2) | <b>15.26876</b> | $\mu\text{g}/\text{m}^3$ |
| <b>Step 4</b> | <b>What is your measured annual mean NO<sub>2</sub> concentration (in <math>\mu\text{g}/\text{m}^3</math>)?</b>         | (Note 2) | <b>41.4</b>     | $\mu\text{g}/\text{m}^3$ |
| <b>Result</b> | <b>The predicted annual mean NO<sub>2</sub> concentration (in <math>\mu\text{g}/\text{m}^3</math>) at your receptor</b> | (Note 3) | <b>29.5</b>     | $\mu\text{g}/\text{m}^3$ |

Note 1: In some cases the term "kerb" may be taken to be the edge of the trafficked road - see the FAQ at <http://aqm2.defra.gov.uk/FAQs/Monitoring/Location/index.htm> for further details. Distances should be measured horizontally from the kerb and assumes that the monitor and receptor have similar elevations. Each distance should be greater than 0.1m and less than 50m (In practice, using a value of 0.1m when the monitor is closer to the kerb than this is likely to be reasonable). The receptor is the location for which you wish to make your prediction. The monitor can either be closer to the kerb than the receptor, or further from the kerb than the receptor. The closer the monitor and the receptor are to each other, the more reliable the prediction will be. When your receptor is further from the kerb than your monitor, it is recommended that the receptor and monitor should be within 20m of each other. When your receptor is closer to the kerb than your monitor, it is recommended that the receptor and monitor should be within 10m of each other.


Note 2: The measurement and the background must be for the same year. The background concentration could come from the national maps published at [www.airquality.co.uk](http://www.airquality.co.uk), or alternatively from a nearby monitor in a background location.

Note 3: The calculator follows the procedure set out in Box 2.3 of LAQM TG(09). The results will have a greater uncertainty than the measured data. More confidence can be placed in results where the distance between the monitor and the receptor is small than where it is large.

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**Loughborough Rd (Hathern)**

Using the calculator the concentration at the nearest receptor is shown below to be  $26.7\mu\text{g}/\text{m}^3$

This calculator allows you to predict the annual mean NO<sub>2</sub> concentration for a location ("receptor") that is close to a monitoring site, but nearer or further the kerb than the monitor. The next sheet shows your results on a graph. 

**Enter data into the yellow cells**

|               |   |          |                 |                          |
|---------------|---|----------|-----------------|--------------------------|
| <b>Step 1</b> | <b>How far from the KERB was your measurement made (in metres)?</b>   | (Note 1) | <b>3</b>        | metres                   |
| <b>Step 2</b> | <b>How far from the KERB is your receptor (in metres)?</b>  | (Note 1) | <b>13</b>       | metres                   |
| <b>Step 3</b> | <b>What is the local annual mean background NO<sub>2</sub> concentration (in <math>\mu\text{g}/\text{m}^3</math>)?</b>  | (Note 2) | <b>14.97744</b> | $\mu\text{g}/\text{m}^3$ |
| <b>Step 4</b> | <b>What is your measured annual mean NO<sub>2</sub> concentration (in <math>\mu\text{g}/\text{m}^3</math>)?</b>         | (Note 2) | <b>33.9</b>     | $\mu\text{g}/\text{m}^3$ |
| <b>Result</b> | <b>The predicted annual mean NO<sub>2</sub> concentration (in <math>\mu\text{g}/\text{m}^3</math>) at your receptor</b> | (Note 3) | <b>26.7</b>     | $\mu\text{g}/\text{m}^3$ |

Note 1: In some cases the term "kerb" may be taken to be the edge of the trafficked road - see the FAQ at <http://aqm2.defra.gov.uk/FAQs/Monitoring/Location/index.htm> for further details. Distances should be measured horizontally from the kerb and assumes that the monitor and receptor have similar elevations. Each distance should be greater than 0.1m and less than 50m (In practice, using a value of 0.1m when the monitor is closer to the kerb than this is likely to be reasonable). The receptor is the location for which you wish to make your prediction. The monitor can either be closer to the kerb than the receptor, or further from the kerb than the receptor. The closer the monitor and the receptor are to each other, the more reliable the prediction will be. When your receptor is further from the kerb than your monitor, it is recommended that the receptor and monitor should be within 20m of each other. When your receptor is closer to the kerb than your monitor, it is recommended that the receptor and monitor should be within 10m of each other.

Note 2: The measurement and the background must be for the same year. The background concentration could come from the national maps published at [www.airquality.co.uk](http://www.airquality.co.uk), or alternatively from a nearby monitor in a background location.


Note 3: The calculator follows the procedure set out in Box 2.3 of LAQM TG(09). The results will have a greater uncertainty than the measured data. More confidence can be placed in results where the distance between the monitor and the receptor is small than where it is large.

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**A6 (Birstall)**

Using the calculator the concentration at the nearest receptor is shown below to be  $34.2\mu\text{g}/\text{m}^3$

This calculator allows you to predict the annual mean NO<sub>2</sub> concentration for a location ("receptor") that is close to a monitoring site, but nearer or further the kerb than the monitor. The next sheet shows your results on a graph.



**Enter data into the yellow cells**

|               |   |          |                 |                          |
|---------------|---|----------|-----------------|--------------------------|
| <b>Step 1</b> | <b>How far from the KERB was your measurement made (in metres)?</b>   | (Note 1) | <b>4</b>        | metres                   |
| <b>Step 2</b> | <b>How far from the KERB is your receptor (in metres)?</b>  | (Note 1) | <b>7</b>        | metres                   |
| <b>Step 3</b> | <b>What is the local annual mean background NO<sub>2</sub> concentration (in <math>\mu\text{g}/\text{m}^3</math>)?</b>  | (Note 2) | <b>19.27922</b> | $\mu\text{g}/\text{m}^3$ |
| <b>Step 4</b> | <b>What is your measured annual mean NO<sub>2</sub> concentration (in <math>\mu\text{g}/\text{m}^3</math>)?</b>         | (Note 2) | <b>36.99</b>    | $\mu\text{g}/\text{m}^3$ |
| <b>Result</b> | <b>The predicted annual mean NO<sub>2</sub> concentration (in <math>\mu\text{g}/\text{m}^3</math>) at your receptor</b> | (Note 3) | <b>34.2</b>     | $\mu\text{g}/\text{m}^3$ |

Note 1: In some cases the term "kerb" may be taken to be the edge of the trafficked road - see the FAQ at <http://Maqm2.defra.gov.uk/FAQs/Monitoring/Location/index.htm> for further details. Distances should be measured horizontally from the kerb and assumes that the monitor and receptor have similar elevations. Each distance should be greater than 0.1m and less than 50m (In practice, using a value of 0.1m when the monitor is closer to the kerb than this is likely to be reasonable). The receptor is the location for which you wish to make your prediction. The monitor can either be closer to the kerb than the receptor, or further from the kerb than the receptor. The closer the monitor and the receptor are to each other, the more reliable the prediction will be. When your receptor is further from the kerb than your monitor, it is recommended that the receptor and monitor should be within 20m of each other. When your receptor is closer to the kerb than your monitor, it is recommended that the receptor and monitor should be within 10m of each other.

Note 2: The measurement and the background must be for the same year. The background concentration could come from the national maps published at [www.airquality.co.uk](http://www.airquality.co.uk), or alternatively from a nearby monitor in a background location.

Note 3: The calculator follows the procedure set out in Box 2.3 of LAQM TG(09). The results will have a greater uncertainty than the measured data. More confidence can be placed in results where the distance between the monitor and the receptor is small than where it is large.

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**Table 2.3 Results of Automatic Monitoring of Nitrogen Dioxide: Comparison with Annual Mean Objective**

| Site ID | Site Location       | Valid Data Capture for period of monitoring % <sup>a</sup> | Valid Data Capture 2012 % <sup>b</sup> | Annual Mean Concentration $\mu\text{g}/\text{m}^3$ |      |      |      |                 |
|---------|---------------------|--|--|--|------|------|------|-----------------|
|         |                     |  |  | 2008   | 2009 | 2010 | 2011 | 2012            |
| 11      | Durham Rd, L'boro   | Full Year  | 73.1                                   | 26.7   | 28.7 | 28.7 | 24.8 | 24.83           |
| 34-36   | Melton Rd, Syston   | Full Year  | 78.1                                   | 34.4   | 32.5 | 34.4 | 30.6 | 34.38           |
| 37-39   | Baxter Gate, L'boro | Full Year  | 91.0                                   | 47.8   | 42.0 | 51.6 | 53.5 | 76.4 (see note) |

**Table 2.4 Results of Automatic Monitoring for Nitrogen Dioxide: Comparison with 1-hour mean Objective**

| Site ID | Site Location       | Valid Data Capture for period of monitoring % <sup>a</sup> | Valid Data Capture 2012 % <sup>b</sup> | Number of Exceedences of Hourly Mean ( $200 \mu\text{g}/\text{m}^3$ ) |         |      |      |                      |
|---------|---------------------|--|--|---|---------|------|------|----------------------|
|         |                     |  |  | 2008  | 2009    | 2010 | 2011 | 2012                 |
| 11      | Durham Rd, L'boro   | Full Year  | 73.1                                   | 0   | 0       | 0    | 0    | 0 (86.0)             |
| 34-36   | Melton Rd, Syston   | Full Year  | 78.1                                   | 6   | 0       | 0    | 0    | 0 (99.3)             |
| 37-39   | Baxter Gate, L'boro | Full Year  | 91.0                                   | 0   | 0 (107) | 0    | 184  | 336 (386) (see note) |

<sup>a</sup> i.e. data capture for the monitoring period, in cases where monitoring was only carried out for part of the year.

<sup>b</sup> i.e. data capture for the full calendar year (e.g. if monitoring was carried out for six months the maximum data capture for the full calendar year would be 50%.)

<sup>c</sup> If the period of valid data is less than 90%, the 99.8<sup>th</sup> percentile of hourly means is shown in brackets

**Note:** Data from the Baxter Gate analyser gives a gentle but steady deterioration in NO<sub>2</sub> concentrations from approx. late Aug 2012. In the last quarter, 307 hourly exceedences were logged which we believe are erroneous and should be discarded. This pattern culminated with an analyser failure in Jan/Feb 2013 and a subsequent CPU board replacement has since returned the output values to be more in-keeping with values of expected magnitude.



## Diffusion Tube Monitoring Data

Table 2.5 Results of Nitrogen Dioxide Diffusion Tubes in 2012

| Site ID | Location                               | Site Type | Within AQMA? | Triplicate or Collocated Tube | Data Capture 2012 (Number of Months) | Data with less than 9 months has been annualised (Y/N) | Confirm if data has been distance corrected (Y/N) | Annual mean concentration (Bias Adjustment factor) |
|---------|--|-----------|--------------|-------------------------------|--------------------------------------|--|---|--|
|         |  |           |              |                               |                                      |  |   | 2012 ( $\mu\text{g}/\text{m}^3$ )                  |
| 1       | Ratcliffe Rd (Loughborough)            | Roadside  | Y            | -                             | 11                                   | n/a  | n/a   | 26.9 (0.97)  |
| 2       | Shelthorpe Rd (Loughborough)           | Roadside  | N            | -                             | 11                                   | n/a  | n/a   | 25.8 (0.97)  |
| 3       | Forest Rd (Loughborough)               | Roadside  | N            | -                             | 11                                   | n/a  | n/a   | 29.2 (0.97)  |
| 5       | Haydon Rd (Loughborough)               | Roadside  | Y            | -                             | 11                                   | n/a  | n/a   | 29.0 (0.97)  |
| 6       | Alan Moss Rd/Epinal Way (Loughborough) | Roadside  | Y            | -                             | 11                                   | n/a  | n/a   | 27.1 (0.97)  |
| 7       | Epinal Way/Ling Rd (Loughborough)      | Roadside  | N            | -                             | 11                                   | n/a  | n/a   | 28.8 (0.97)  |
| 8       | Leicester Rd (Loughborough)            | Roadside  | Y            | -                             | 11                                   | n/a  | n/a   | 35.9 (0.97)  |

Charnwood Borough Council

| Site ID | Location                                      | Site Type           | Within AQMA? | Triplicate or Collocated Tube | Data Capture 2012 (Number of Months) | Data with less than 9 months has been annualised (Y/N) | Confirm if data has been distance corrected (Y/N) | Annual mean concentration (Bias Adjustment factor) |
|---------|---|---------------------|--------------|-------------------------------|--------------------------------------|--|---|--|
|         |   |                     |              |                               |                                      |  |   | 2012 ( $\mu\text{g}/\text{m}^3$ )                  |
| 9       | Derby Rd<br>(Loughborough)                    | Roadside            | Y            | -                             | 11                                   | n/a  | n/a   | 36.8<br>(0.97)                                     |
| 10      | Derby Rd/Brisco<br>Avn<br>(Loughborough)      | Roadside            | Y            | -                             | 11                                   | n/a  | n/a   | 30.4<br>(0.97)                                     |
| 11 i    | Durham Rd<br>AQMS 1<br>(Loughborough)         | Urban<br>Background | N            | Triplicate                    | 11                                   | n/a  | n/a   | 21.9<br>(0.97)                                     |
| 11 ii   | Durham Rd<br>AQMS 2<br>(Loughborough)         | Urban<br>Background | N            | Triplicate                    | 10                                   | n/a  | n/a   | 23.6<br>(0.97)                                     |
| 11 iii  | Durham Rd<br>AQMS 3<br>(Loughborough)         | Urban<br>Background | N            | Triplicate                    | 10                                   | n/a  | n/a   | 23.1<br>(0.97)                                     |
| 12      | Alan Moss Rd/A6<br>Derby Rd<br>(Loughborough) | Roadside            | Y            | -                             | 10                                   | n/a  | n/a   | 34.8<br>(0.97)                                     |
| 13      | High St<br>(Loughborough)                     | Roadside            | Y            | -                             | 11                                   | n/a  | n/a   | <b>56.3</b><br>(0.97)                              |
| 14      | Market Place<br>(Loughborough)                | Urban<br>Centre     | Y            | -                             | 10                                   | n/a  | n/a   | 25.2<br>(0.97)                                     |

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| Site ID | Location                         | Site Type | Within AQMA? | Triplicate or Collocated Tube | Data Capture 2012 (Number of Months) | Data with less than 9 months has been annualised (Y/N) | Confirm if data has been distance corrected (Y/N) | Annual mean concentration (Bias Adjustment factor) |
|---------|----------------------------------|-----------|--------------|-------------------------------|--------------------------------------|--|---|--|
|         |                                  |           |              |                               |                                      |  |   | 2012 ( $\mu\text{g}/\text{m}^3$ )                  |
| 15      | Ashby Rd (Loughborough)          | Roadside  | Y            | -                             | 11                                   | n/a  | n/a   | 34.2 (0.97)  |
| 16      | Cow Hill Lodge (Shepshed)        | Roadside  | N            | -                             | 11                                   | n/a  | n/a   | 29.2 (0.97)  |
| 17      | Rosebery St (Loughborough)       | Roadside  | N            | -                             | 11                                   | n/a  | n/a   | 23.7 (0.97)  |
| 18      | Melton Rd Town Centre (Syston)   | Roadside  | Y            | -                             | 11                                   | n/a  | n/a   | 29.3 (0.97)  |
| 19      | 1123 Melton Rd (Syston)          | Roadside  | Y            | -                             | 11                                   | n/a  | n/a   | 27.5 (0.97)  |
| 20      | 1116 Melton Rd (Syston)          | Roadside  | Y            | -                             | 11                                   | n/a  | n/a   | 29.0 (0.97)  |
| 21      | Loughborough Rd (Birstall)       | Roadside  | Y            | -                             | 11                                   | n/a  | n/a   | 33.8 (0.97)  |
| 22      | A6 (Birstall)                    | Roadside  | N            | -                             | 11                                   | n/a  | Y   | 34.2   |
| 23      | 21 Humberstone Lane (Thurmaston) | Roadside  | N            | -                             | 11                                   | n/a  | n/a   | 35.2 (0.97)  |

Charnwood Borough Council

| Site ID | Location                         | Site Type | Within AQMA? | Triplicate or Collocated Tube | Data Capture 2012 (Number of Months) | Data with less than 9 months has been annualised (Y/N) | Confirm if data has been distance corrected (Y/N) | Annual mean concentration (Bias Adjustment factor) |
|---------|----------------------------------|-----------|--------------|-------------------------------|--------------------------------------|--|---|--|
|         |                                  |           |              |                               |                                      |  |   | 2012 ( $\mu\text{g}/\text{m}^3$ )                  |
| 23b     | 43 Humberstone Lane (Thurmaston) | Roadside  | N            | -                             | 11                                   | n/a  | n/a   | 33.4 (0.97)  |
| 23c     | 38 Humberstone Lane (Thurmaston) | Roadside  | N            | -                             | 11                                   | n/a  | n/a   | 25.7 (0.97)  |
| 23d     | 22 Humberstone Lane (Thurmaston) | Roadside  | N            | -                             | 11                                   | n/a  | n/a   | 28.9 (0.97)  |
| 26      | Ashby Rd Central (Shepshed)      | Roadside  | N            | -                             | 10                                   | n/a  | Y   | 29.5   |
| 27      | Loughborough Rd (Hathern)        | Roadside  | N            | -                             | 11                                   | n/a  | Y   | 26.7   |
| 28      | Baxter Gate (Loughborough)       | Roadside  | Y            | -                             | 10                                   | n/a  | n/a   | <b>45.0</b> (0.97)                                 |
| 29      | Barrow St (Loughborough)         | Roadside  | N            | -                             | 10                                   | n/a  | n/a   | 27.7 (0.97)  |
| 30      | School St (Loughborough)         | Roadside  | N            | -                             | 11                                   | n/a  | n/a   | 23.3 (0.97)  |
| 31      | Fennel St (Loughborough)         | Roadside  | N            | -                             | 10                                   | n/a  | n/a   | 28.4 (0.97)  |

Charnwood Borough Council

| Site ID | Location                          | Site Type | Within AQMA? | Triplicate or Collocated Tube | Data Capture 2012 (Number of Months) | Data with less than 9 months has been annualised (Y/N) | Confirm if data has been distance corrected (Y/N) | Annual mean concentration (Bias Adjustment factor) |
|---------|-----------------------------------|-----------|--------------|-------------------------------|--------------------------------------|--|---|--|
|         |                                   |           |              |                               |                                      |  |   | 2012 ( $\mu\text{g}/\text{m}^3$ )                  |
| 33      | High St (Syston)                  | Roadside  | Y            | -                             | 11                                   | n/a  | n/a   | 31.9<br>(0.97)                                     |
| 34      | Syston AQMS 1                     | Roadside  | Y            | Triplicate                    | 11                                   | n/a  | n/a   | 33.6<br>(0.97)                                     |
| 35      | Syston AQMS 2                     | Roadside  | Y            | Triplicate                    | 11                                   | n/a  | n/a   | 32.5<br>(0.97)                                     |
| 36      | Syston AQMS 3                     | Roadside  | Y            | Triplicate                    | 11                                   | n/a  | n/a   | 31.5<br>(0.97)                                     |
| 37      | Baxter Gate AQMS 1 (Loughborough) | Kerbside  | Y            | Triplicate                    | 11                                   | n/a  | n/a   | <b>43.7</b><br>(0.97)                              |
| 38      | Baxter Gate AQMS 2 (Loughborough) | Kerbside  | Y            | Triplicate                    | 11                                   | n/a  | n/a   | <b>42.6</b><br>(0.97)                              |
| 39      | Baxter Gate AQMS 3 (Loughborough) | Kerbside  | Y            | Triplicate                    | 11                                   | n/a  | n/a   | <b>43.6</b><br>(0.97)                              |
| 44      | 33 Nottingham Rd (Loughborough)   | Roadside  | N            | -                             | 10                                   | n/a  | n/a   | 35.9<br>(0.97)                                     |
| 45      | 89 Nottingham Rd (Loughborough)   | Roadside  | N            | -                             | 11                                   | n/a  | n/a   | <b>42.9</b><br>(0.97)                              |

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| Site ID | Location                            | Site Type | Within AQMA? | Triplicate or Collocated Tube | Data Capture 2012 (Number of Months) | Data with less than 9 months has been annualised (Y/N) | Confirm if data has been distance corrected (Y/N) | Annual mean concentration (Bias Adjustment factor) |
|---------|-------------------------------------|-----------|--------------|-------------------------------|--------------------------------------|--|---|--|
|         |                                     |           |              |                               |                                      |  |   | 2012 ( $\mu\text{g}/\text{m}^3$ )                  |
| 46      | 156 Ratcliffe Rd (Loughborough)     | Roadside  | N            | -                             | 11                                   | n/a  | n/a   | 25.5 (0.97)  |
| 47      | 156 Meadow Rd (Loughborough)        | Roadside  | N            | -                             | 11                                   | n/a  | n/a   | 27.7 (0.97)  |
| 48      | 31 Station Boulevade (Loughborough) | Roadside  | N            | -                             | 11                                   | n/a  | n/a   | 29.3 (0.97)  |
| 49      | 91 Wharnccliffe Rd (Loughborough)   | Roadside  | N            | -                             | 11                                   | n/a  | n/a   | 28.9 (0.97)  |

<sup>a</sup> i.e. data capture for the monitoring period, in cases where monitoring was only carried out for part of the year.

<sup>b</sup> i.e. data capture for the full calendar year (e.g. if monitoring was carried out for six months the maximum data capture for the full calendar year would be 50%.)

<sup>c</sup> Means are to be “annualised” as in Box 3.2 of TG(09), if monitoring was not carried out for the full year.

Table 2.6 Results of Nitrogen Dioxide Diffusion Tubes (2008 to 2012)

| Site ID | Location                                     | Within AQMA? | Annual mean concentration $\mu\text{g}/\text{m}^3$ |      |      |      |      |
|---------|--|--------------|--|------|------|------|------|
|         |  |              | 2008   | 2009 | 2010 | 2011 | 2012 |
| 1       | Ratcliffe Rd<br>(Loughborough)               | Y            | 48.8   | 46.3 | 42.3 | 30.8 | 26.9 |
| 2       | Shelthorpe Rd<br>(Loughborough)              | N            | 31.9   | 31.4 | 28.3 | 22.5 | 25.8 |
| 3       | Forest Rd<br>(Loughborough)                  | N            | 35.3   | 37.3 | 31.6 | 25.4 | 29.2 |
| 5       | Haydon Rd<br>(Loughborough)                  | Y            | 37.2   | 38.3 | 34.8 | 33.9 | 29.0 |
| 6       | Alan Moss<br>Rd/Epinal Way<br>(Loughborough) | Y            | 31.8   | 32.4 | 31.2 | 30.2 | 27.1 |
| 7       | Epinal<br>Way/Ling Rd<br>(Loughborough)      | N            | 33.6   | 36.0 | 34.3 | 25.3 | 28.1 |
| 8       | Leicester Rd<br>(Loughborough)               | Y            | 41.2   | 43.1 | 43.2 | 31.8 | 35.9 |
| 9       | Derby Rd<br>(Loughborough)                   | Y            | 38.9   | 46.1 | 43.1 | 31.4 | 26.8 |

| Site ID | Location                                | Within AQMA? | Annual mean concentration $\mu\text{g}/\text{m}^3$ |             |             |             |             |
|---------|---|--------------|--|-------------|-------------|-------------|-------------|
|         |   |              | 2008   | 2009        | 2010        | 2011        | 2012        |
| 10      | Derby Rd/Brisco Avn (Loughborough)      | Y            | 36.3   | 39.7        | 36.8        | 32.7        | 30.4        |
| 11 i    | Durham Rd AQMS 1 (Loughborough)         | N            | 26.7   | 28.3        | 28.6        | 25.1        | 21.9        |
| 11 ii   | Durham Rd AQMS 2 (Loughborough)         | N            | 27.2   | 29.0        | 28.6        | 23.8        | 23.6        |
| 11 iii  | Durham Rd AQMS 3 (Loughborough)         | N            | 26.5   | 28.9        | 28.7        | 25.5        | 23.1        |
| 12      | Alan Moss Rd/A6 Derby Rd (Loughborough) | Y            | <b>44.5</b>  | <b>40.2</b> | 39.6        | <b>40.6</b> | 34.8        |
| 13      | High St (Loughborough)                  | Y            | <b>65.9</b>  | <b>76.2</b> | <b>66.0</b> | <b>52.6</b> | <b>56.3</b> |
| 14      | Market Place (Loughborough)             | Y            | 28.6   | 29.8        | 29.5        | 21.3        | 25.2        |



| Site ID | Location                                  | Within AQMA? | Annual mean concentration $\mu\text{g}/\text{m}^3$ |      |      |      |      |
|---------|---|--------------|--|------|------|------|------|
|         |   |              | 2008   | 2009 | 2010 | 2011 | 2012 |
| 15      | Ashby Rd<br>(Loughborough)                | Y            | 46.6   | 48.3 | 42   | 31.9 | 34.2 |
| 16      | Cow Hill Lodge<br>(Shepshed)              | N            | 36.1   | 36.3 | 37.1 | 33.8 | 29.2 |
| 17      | Rosebery St<br>(Loughborough)             | N            | 27.5   | 26.7 | 26.1 | 24.3 | 23.7 |
| 18      | Melton Rd<br>Town Centre<br>(Syston)      | Y            | 33.3   | 35.7 | 34.8 | 30.4 | 31.1 |
| 19      | 1123 Melton Rd<br>(Syston)                | Y            | 30.6   | 30.4 | 32.4 | 26.0 | 29.2 |
| 20      | 1116 Melton Rd<br>(Syston)                | Y            | 32.7   | 35.4 | 37.2 | 29.0 | 30.7 |
| 21      | Loughborough<br>Rd (Birstall)             | N            | 30.7   | 32.3 | 34.4 | 30.9 | 35.9 |
| 22      | A6 (Birstall)                             | N            | 36.4   | 37.6 | 39.7 | 30.6 | 34.2 |
| 23      | 21<br>Humberstone<br>Lane<br>(Thurmaston) | N            | 37.4   | 39.8 | 40.3 | 32.5 | 37.4 |

| Site ID | Location                               | Within AQMA? | Annual mean concentration $\mu\text{g}/\text{m}^3$ |      |      |      |      |
|---------|--|--------------|--|------|------|------|------|
|         |  |              | 2008   | 2009 | 2010 | 2011 | 2012 |
| 23b     | 43<br>Humberstone Lane<br>(Thurmaston) | N            | 33.9   | 37.1 | 46.4 | 30.0 | 35.5 |
| 23c     | 38<br>Humberstone Lane<br>(Thurmaston) | N            | -  | 27.9 | 28.7 | 23.7 | 27.3 |
| 23d     | 22<br>Humberstone Lane<br>(Thurmaston) | N            | -  | 30.6 | 32.1 | 25.5 | 30.7 |
| 26      | Ashby Rd<br>Central<br>(Shepshed)      | N            | 32.7   | 33.0 | 31.5 | 32.8 | 29.5 |
| 27      | Loughborough Rd (Hathern)              | N            | 38.2   | 31.6 | 29.9 | 28.5 | 26.7 |

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|    |   |   |             |             |             |      |             |
|----|---|---|-------------|-------------|-------------|------|-------------|
| 28 | Baxter Gate<br>(Loughborough)           | Y | <b>49.8</b> | <b>56.1</b> | <b>53.4</b> | 39.1 | <b>45.0</b> |
| 29 | Barrow St<br>(Loughborough)             | N | 36.5        | 35.8        | 33.4        | 24.5 | 27.7        |
| 30 | School St<br>(Loughborough)             | N | 30.7        | 31.2        | 30.9        | 21.4 | 23.3        |
| 31 | Fennel St<br>(Loughborough)             | N | 35.1        | 35.8        | 33.9        | 25.1 | 28.4        |
| 33 | High St<br>(Syston)                     | Y | 30.0        | 31.6        | 32.5        | 26.7 | 33.8        |
| 34 | Syston AQMS 1                           | Y | 36.5        | 37.0        | 35.0        | 31.5 | 35.7        |
| 35 | Syston AQMS 2                           | Y | 33.9        | 34.7        | 35.2        | 30.3 | 34.5        |
| 36 | Syston AQMS 3                           | Y | 33.2        | 35.9        | 33.3        | 30.3 | 33.4        |
| 37 | Baxter Gate<br>AQMS 1<br>(Loughborough) | Y | <b>46.4</b> | <b>55.2</b> | <b>52.5</b> | 38.6 | <b>43.7</b> |
| 38 | Baxter Gate<br>AQMS 2<br>(Loughborough) | Y | <b>48.5</b> | <b>54.1</b> | <b>52.4</b> | 37.3 | <b>42.6</b> |
| 39 | Baxter Gate<br>AQMS 3<br>(Loughborough) | Y | <b>48.5</b> | <b>52.0</b> | <b>50.3</b> | 36.9 | <b>43.6</b> |
| 44 | 33 Nottingham<br>Rd<br>(Loughborough)   | N | -           | <b>43.5</b> | <b>41.5</b> | 31.1 | 35.9        |

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|    |  |   |   |      |      |      |      |
|----|--|---|---|------|------|------|------|
| 45 | 89 Nottingham Rd<br>(Loughborough)     | N | - | 48.1 | 48.8 | 39.3 | 42.9 |
| 46 | 156 Ratcliffe Rd<br>(Loughborough)     | N | - | 40.6 | 36.5 | 25.8 | 25.5 |
| 47 | 156 Meadow Rd<br>(Loughborough)        | N | - | 35.6 | 29.8 | 26.0 | 27.7 |
| 48 | 31 Station Boulevade<br>(Loughborough) | N | - | -    | -    | -    | 29.3 |
| 49 | 91 Wharnccliffe Rd<br>(Loughborough)   | N | - | -    | -    | -    | 28.9 |

## 2.2.2 PM<sub>10</sub>

In 2012 there were no recorded breaches of either the annual mean or 24-hour mean objectives at our established automatic (TEOM) monitoring site.

This site is an urban background site just outside of the Loughborough NO<sub>2</sub> AQMA

### Mountsorrel Quarry

In addition to this monitor; since 26th October 2011 we have been operating a Partisol unit in the vicinity of the Lafarge Quarry in Mountsorrel to monitor PM<sub>10</sub> levels in connection with the Mountsorrel AQMA.

Our latest published update reports that for the 365 days previous to 27th June 2013 (inclusive) our recorded results indicate **15 exceedences** of the 24-hr mean National Air Quality Objective from 324 valid sampling days (a data capture rate of ~89% for this period). This would be the equivalent to 17 exceedences per annum assuming a 100% data capture rate, compared to the permitted maximum of 35. The annual average concentration for this period is 22.40 µg/m<sup>3</sup>

Results obtained during our study in 2009/10 (against which results the Air Quality Monitor was declared against) showed **60 exceedences** in a corresponding period of time from 313 valid sampling days, the equivalent to 70 exceedences per annum. The annual average concentration for this period was 33.18 µg/m<sup>3</sup>

Results to date would suggest that since closer working with the quarry management team and the implementation of the Quarry's Dust Management Plan that we have been able to achieve a significant reduction (~32%) in the average concentration of PM<sub>10</sub> at the sampling site (which is considered to be a worse case position) when compared to results prior to the declaration of the Air Quality Management Area (AQMA).

**Table 2.7 Results of Automatic Monitoring of PM<sub>10</sub>: Comparison with Annual Mean Objective**

| Site ID | Site Type                            | Within AQMA? | Valid Data Capture for monitoring Period % <sup>a</sup> | Valid Data Capture 2012 % <sup>b</sup> | Confirm Gravimetric Equivalent (Y or NA) | Annual Mean Concentration µg/m <sup>3</sup> |      |      |      |      |
|---------|--------------------------------------|--------------|---|--|--|---|------|------|------|------|
|         |                                      |              |   |  |  | 2008  | 2009 | 2010 | 2011 | 2012 |
| 11      | Durham Rd, L'boro (Urban Background) | N            | 72  | 72                                     | Y  | 16.9  | 17.8 | 17.8 | 19.1 | 10.2 |

**Table 2.8 Results of Automatic Monitoring for PM<sub>10</sub>: Comparison with 24-hour mean Objective**

| Site ID | Site Type                            | Within AQMA? | Valid Data Capture for monitoring Period % <sup>a</sup> | Valid Data Capture 2012 % <sup>b</sup> | Confirm Gravimetric Equivalent | Number of Exceedences of 24-Hour Mean (50 µg/m <sup>3</sup> ) |      |      |      |      |
|---------|--------------------------------------|--------------|---|--|--------------------------------|---|------|------|------|------|
|         |                                      |              |   |  |                                | 2008  | 2009 | 2010 | 2011 | 2012 |
| 11      | Durham Rd, L'boro (Urban Background) | N            | 72  | 72                                     | Y                              | 1   | 8    | 1    | 5    | 0    |

<sup>a</sup> i.e. data capture for the monitoring period, in cases where monitoring was only carried out for part of the year.

<sup>b</sup> i.e. data capture for the full calendar year (e.g. if monitoring was carried out for six months the maximum data capture for the full calendar year would be 50%.)

**2.2.3 Sulphur Dioxide**

In 2012 there were no recorded breaches of the 15 minute, 1 hour or 24-hour mean objectives at our automatic SO<sub>2</sub> monitoring site.

The monitoring site is an urban background site just outside of the Loughborough NO<sub>2</sub> AQMA

**Table 2.9 Results of Automatic Monitoring of SO<sub>2</sub>: Comparison with Annual Mean Objective**

| Site ID | Site Type                                  | Within AQMA? | Valid Data Capture for monitoring Period % <sup>a</sup> | Valid Data Capture 2012 % <sup>b</sup> | Number of Exceedences<br>(percentile in bracket µg/m <sup>3</sup> ) <sup>c</sup> |  |   |
|---------|--|--------------|---|--|--|--|---|
|         |  |              |   |  | 15-minute Objective<br>(266 µg/m <sup>3</sup> )                                  | 1-hour Objective<br>(350 µg/m <sup>3</sup> ) | 24-hour Objective<br>(125 µg/m <sup>3</sup> ) |
| 11      | Durham Rd,<br>L'boro<br>(Urban Background) | N            | 73.1  | 73.1                                   | 0 (31.92)  | 0 (23.06)                                    | 0 (7.98)                                      |

<sup>a</sup> i.e. data capture for the monitoring period, in cases where monitoring was only carried out for part of the year.

<sup>b</sup> i.e. data capture for the full calendar year (e.g. if monitoring was carried out for six months the maximum data capture for the full calendar year would be 50%.)

<sup>c</sup> if data capture is less than 90%, include the relevant percentile in brackets (15min = 99.9%, 1hr = 99.73%, 24hr = 99.18%)



#### **2.2.4 Benzene**

Charnwood Borough Council no longer monitor for Benzene. This decision was based on significant historic monitoring data indicating that any likely breach of the particular Air Quality Standard would be improbable.

#### **2.2.5 Summary of Compliance with AQS Objectives**

Charnwood Borough Council has examined the results from monitoring in the Borough.

Concentrations outside of existing AQMAs are either below the objectives at relevant locations, or have been subjected to a previous Detailed Assessment and/or discussed with DEFRA that there is no need to proceed to a Detailed Assessment.

### **3 Road Traffic Sources**

#### **3.1 Narrow Congested Streets with Residential Properties Close to the Kerb**

Charnwood Borough Council confirms that there are no new/newly identified congested streets with a flow above 5,000 vehicles per day and residential properties close (within 2m) to the kerb, that have not been adequately considered in previous rounds of Review and Assessment or are not subject to current monitoring.

#### **3.2 Busy Streets Where People May Spend 1-hour or More Close to Traffic**

Charnwood Borough Council confirms that there are no new/newly identified busy streets (>10,000 vehicles per day) where people may spend 1 hour or more close (within 5m) to traffic, that have not been adequately considered in previous rounds of Review and Assessment or are not subject to current monitoring.

#### **3.3 Roads with a High Flow of Buses and/or HGVs.**

Charnwood Borough Council confirms that there are no new/newly identified roads with high flows (>20%) of buses/HGVs, that have not been adequately considered in previous rounds of Review and Assessment or are not subject to current monitoring.

#### **3.4 Junctions**

Charnwood Borough Council confirms that there are no new/newly identified busy junctions/busy roads, which have not been adequately considered in previous rounds of Review and Assessment or are not subject to current monitoring.

### **3.5 New Roads Constructed or Proposed Since the Last Round of Review and Assessment**

#### **Loughborough Eastern Gateway**

The Loughborough Eastern Gateway link road officially opened in November 2011 to traffic as part of the major £20 million Eastern Gateway scheme to revamp the eastern approach to Loughborough.

Work on the road, called Station Boulevard, which now links Meadow Lane and Nottingham Road began in September 2010 and means Burder Street and Ratcliffe Road are now closed to through-traffic, bringing relief to residents.

Ratcliffe Road is currently designated as part of the Loughborough AQMA in respect to likely breaches of nitrogen dioxide (annual mean) concentrations.

Additional diffusion tubes along this new route are now part of our monitoring network to validate the conclusions the Environmental Assessment submitted as part of the planning application process.

The existing diffusion tube situated on Ratcliffe Road has been left in place to monitor the expected reduction of NO<sub>2</sub> at this site where results are indicating a significantly reduced NO<sub>2</sub> concentration.

#### **Loughborough Inner Relief Road**

Plans originally submitted in August 2007 were put on hold following the Government's spending review in autumn 2010. An updated £15 million bid was submitted to the Government in September 2011 and granted approval by the Department for Transport during December 2011.

The enhanced development and regeneration of the improvement scheme is hoped to reduce traffic demand on the town centre network by removing traffic from A6 Market Place by diverting it to a new purpose built Inner Relief Road. This will be combined with related junction improvements on the Loughborough A6004 Ring Road at Forest Road and Belton Road West Extension.

Early site clearance started in the town in April 2012 to make way for the construction of the relief road, with the main work starting in October 2012.

The three main elements to the scheme i.e. the A6004 junction improvements, the completion of the inner relief road and the improvements to the town centre are expected to continue until early 2015.

Further scheme details can be seen at [www.leics.gov.uk/major\\_transport\\_projects](http://www.leics.gov.uk/major_transport_projects)

Charnwood Borough Council has assessed new/proposed roads meeting the criteria in Section A.5 of Box 5.3 in TG(09), further to those previously identified (above), and concluded that it will not be necessary to proceed to a Detailed Assessment.

### **3.6 Roads with Significantly Changed Traffic Flows**

Charnwood Borough Council confirms that there are no new/newly identified roads with significantly changed traffic flows (i.e roads with more than 10,000 vehicles per day that have experienced more than a 25% increase in traffic flow), which have not been adequately considered in previous rounds of Review and Assessment or are not subject to current monitoring.

### **3.7 Bus and Coach Stations**

Charnwood Borough Council confirms that there are no relevant bus stations (un-enclosed / close to relevant exposure, including nearby residential properties) in the Local Authority area.

## 4 Other Transport Sources

### 4.1 Airports

There are no airports in the Local Authority or relevant exposure within 1,000m of an airport boundary.

### 4.2 Railways (Diesel and Steam Trains)

#### 4.2.1 Stationary Trains

##### The GCR AQMA

The GCR AQMA came into effect on 30<sup>th</sup> November 2005 in respect of likely breaches of the sulphur dioxide (fifteen minute mean). This decision was based upon a monitoring study conducted between December 2004 and April 2005 during which time a UV fluorescence sulphur dioxide monitor was located 50 metres away from the location at which steam locomotives are brought “into steam” at the Great Central Railway engine sheds.

No further periods of monitoring have been conducted since the declaration of this AQMA. It is however felt that the results (which are discussed fully in our previously submitted “Progress Report and Round 2 Further Assessment”) in conjunction with the current operational procedures at GCR, are broadly representative of the current air quality of the area.

Charnwood Borough Council confirms that there are no locations where diesel or steam trains are regularly stationary for periods of 15 minutes or more, with potential for relevant exposure within 15m, that have not been adequately considered in previous rounds of Review and Assessment ***or are subject to an existing AQMA.***

#### 4.2.2 Moving Trains

Charnwood Borough Council confirms that there are no locations with a large number of movements of diesel locomotives, and potential long-term relevant exposure within 30m. (As per the rail lines listed in Table 5.1 of the LAQM.TG(09))

### 4.3 Ports (Shipping)

There are no ports or shipping within the Local Authority area.

## 5 Industrial Sources

### 5.1 Industrial Installations

#### 5.1.1 New or Proposed Installations for which an Air Quality Assessment has been carried out

Charnwood Borough Council confirms that they have assessed any new/proposed industrial installations for which an Air Quality Assessment has been carried out, and concluded that it will not be necessary to proceed to any Detailed Assessments.

#### 5.1.2 Existing Installations where Emissions have Increased Substantially or New Relevant Exposure has been Introduced

Charnwood Borough Council confirms that there are no industrial installations with substantially increased (greater than 30%) emissions or new relevant exposure in their vicinity within its area or nearby in a neighbouring authority.

#### 5.1.3 New or Significantly Changed Installations with No Previous Air Quality Assessment

Charnwood Borough Council have assessed new/proposed industrial installations, and concluded that it will not be necessary to proceed to any Detailed Assessment.

### 5.2 Major Fuel (Petrol) Storage Depots

There are no major fuel (petrol) storage depots within the Local Authority area.

### 5.3 Petrol Stations

Charnwood Borough Council confirms that there are no petrol stations meeting the specified criteria.

i.e. with an annual throughput of 2000m<sup>3</sup>, close to a road with more than 30,000 vehicles and with relevant exposure within 10m of the pumps (ignoring petrol stations with Stage 2 recovery systems fitted).

## 5.4 Poultry Farms

***Sunrise Poultry Farms, Seagrave Road, Sileby.  
Environmental Agency Licence No. RP3237MG/V004  
Permit Date 25/04/12***

The above facility is permitted for 362,224 laying hens. The houses have side extraction ventilation systems.

As the farm has less than 400, 000 birds and is mechanically ventilated without any relevant residential properties within 100m then it will therefore not be necessary to proceed to a Detailed Assessment.

Charnwood Borough Council confirms that there are no poultry farms meeting the specified criteria.



## **6 Commercial and Domestic Sources**

### **6.1 Biomass Combustion – Individual Installations**

Charnwood Borough Council has previously assessed any relevant biomass combustion plants and concluded that it will not be necessary to proceed to a Detailed Assessment.

### **6.2 Biomass Combustion – Combined Impacts**

Charnwood Borough Council has assessed the biomass combustion plant, and concluded that it will not be necessary to proceed to a Detailed Assessment.

### **6.3 Domestic Solid-Fuel Burning**

Charnwood Borough Council confirms that there are no areas of significant domestic fuel use (any area of about 500x500m with more than 50 houses burning coal/smokeless fuels as their primary source of heating) in the Local Authority area.

## **7 Fugitive or Uncontrolled Sources**

Charnwood Borough Council confirms that there are no potential sources of fugitive particulate matter emissions in the Local Authority area which have not been considered by previous rounds of review and assessment.

## 8 Conclusions and Proposed Actions

### 8.1 Conclusions from New Monitoring Data

#### Nitrogen Dioxide

New (2012) monitoring data shows that the  $40\mu\text{g}\text{m}^{-3}$  annual mean objective for  $\text{NO}_2$  was exceeded at the following 3 monitored locations:

1. High Street, Loughborough
2. Baxter Gate, Loughborough (Comprises 4 tubes at same site)
3. Nottingham Road, Loughborough

Both the first two locations fall within the existing Loughborough AQMA, the third is located at a site that has been susceptible to major traffic diversions around Loughborough over the past 3 years due to the creation of the Loughborough Eastern Gateway and now associated work with the town's inner relief road.

No further monitoring has identified any potential or actual exceedences at relevant locations outside of existing AQMAs.

Whilst it is difficult to draw many conclusions from the 2012 town centre results due to the use this year of the national bias correction factor instead of locally derived factors; it is encouraging to note that the tubes in the Borough are generally continuing to show progressive long term reductions in concentrations.

#### PM<sub>10</sub>

Results from the Partisol monitor at Mountsorrel are indicating that there has been a significant improvement (~32%) in dust concentrations within the village.

Regular update meetings continue to be held with the quarry management team to appraise both process and operational improvements that have been implemented (and continue to be so) under the quarry dust management plan. Much of the plan was formulated as a direct response to anticipate conclusions to the 2011 Detailed Assessment and was therefore already at an advanced stage.

Further information regarding the continuing monitoring data and improvement work has already been presented this year in our 2013 Further Assessment Report, which was accepted by DEFRA in April.

## 8.2 Conclusions from Assessment of Sources

Outside of the existing SO<sub>2</sub> AQMA (The Loughborough GCR AQMA) we consider that no other new/existing/significantly changed sources are leading to (or will lead to) potential exceedences of the Air Quality Objective within the Borough.

## 8.3 Proposed Actions

The Updating and Screening Assessment has not identified the need to proceed to a Detailed Assessment for any pollutant in this round of review. We also do not feel that any changes are required to existing AQMAs in terms of boundary changes/revocation at this time.

Currently all pollutants/monitoring sites/objectives are either:

- a. Compliant
- b. Already within an existing AQMA

Our diffusion tube monitoring network is annually reviewed to consider potential developing 'hotspots' or in preparation for larger infrastructure schemes such as the Eastern Gateway Project (EGP) and the Loughborough Inner Relief road (LIRR).

With the recent opening of the EGP and work having now commenced on the LIRR; monitoring sites have already been identified and were underway from early 2012 to monitor the outcome of these projects for inclusion in future review reports.

Further to an outstanding formal Action Plan in respect of the Mountsorrel AQMA for PM<sub>10</sub>; our next action will be the submission of our 2014 Progress Report.

## 9 References

LAQM Technical Guidance document TG(09)

[www.defra.gov.uk/environment/airquality/local/guidance/pdf/tech-guidance-laqm-tg-09.pdf](http://www.defra.gov.uk/environment/airquality/local/guidance/pdf/tech-guidance-laqm-tg-09.pdf)

Charnwood Borough Council - Previous Air Quality Review & Assessment documents (including Final AQ Action Plan)

[www.charnwood.gov.uk/pages/airpollution](http://www.charnwood.gov.uk/pages/airpollution)

LAQM Support - NO<sub>2</sub> Diffusion Tube QA/QC

[www.laqmsupport.org.uk/no2qaqc.php](http://www.laqmsupport.org.uk/no2qaqc.php)

# Appendices

## Appendix A: QA:QC Data

### Diffusion Tube Bias Adjustment Factors

All NO<sub>2</sub> diffusion tubes are supplied and analysed by Gradko using 20% TEA in water preparation.

Note that no tube results were obtained for July 2012 on the advice that the supplied batch had been substandard.

### Factor from Local Co-location Studies

Triplicates are co-located at our 3 automatic monitoring sites:

| Site ID | Location            | Triplicate annual mean average (µg/m <sup>3</sup> )<br>(Dm) | Automatic analyser annual mean concentration (µg/m <sup>3</sup> )<br>(Cm) | Bias correction factor<br>(Cm / Dm)          |
|---------|---------------------|---|---|--|
| 11      | Durham Rd, L'boro   | 23.56   | 24.8  | 1.05 (calculated)<br>0.97 (used – see below) |
| 34-36   | Melton Rd, Syston   | 33.54   | 34.4  | 1.03<br>0.97 (used – see below)              |
| 37-39   | Baxter Gate, L'boro | 44.64   | 76.4  | 1.71 (calculated)<br>0.97 (used – see below) |

### Discussion of Choice of Factor to Use

Consideration was given to the advisory documents on the LAQM Support website when defining and considering whether to use local or national co-location bias adjustment factors.

The following factors were part of our decision for deciding on which factors to use:

- Tube exposure time
- Length of the monitoring study
- QA/QC of the chemiluminescence analyser
- QA/QC of diffusion tubes
- Siting of the co-location study
- Siting of other tubes in the survey

Historically, due to having 3 monitors in the Borough, we have chosen to apply the most appropriate correction factor against each of the individual tubes i.e. tubes in the south of the Borough are corrected against the Syston station factor, rather than the using the factors from the monitors in the north of the Borough.

However, we experienced an exceptional number of instrumentation faults across the analyser network during 2012; a sample inlet fan failure, low flow readings due to a leak, a gas regulator failure (and subsequent replacement difficulties), span gas supply issues, and a fault that we believe ultimately led to a CPU board replacement in Feb 2013. Due to these disruptions our data acquisition rate is correspondingly low and the confidence in some of the obtained readings around these periods is also open to question.

Therefore for correction of the 2012 diffusion tubes, we are electing to make ALL tube corrections against the factor derived from The National Diffusion Tube Bias Adjustment Factor Spreadsheet version 07/13 which gives a factor of 0.97 (from 34 studies) for Gradko analysed 20% TEA in water.

**Important note:** Our choice of using the National Correction over the locally measured factors from either Syston or Durham Rd has made no difference as to whether any of the tubes fail to meet the objective limits.

### **PM Monitoring Adjustment**

2009 to 2012 figures shown in tables 2.7 & 2.8 have been adjusted by using the King's College London Volatile Correction Model (VCM).

The figure for 2008 has been derived by using the default 1.3 gravimetric correction factor as advised in previous editions of the Technical Guidance.

### **Short-term to Long-term Data adjustment**

There were no monitoring sites during 2012 that would have been "short term".

Therefore no further data adjustment is necessary for seasonal variation

### **QA/QC of automatic monitoring**

The analysers were serviced under schedule via Casella Ltd. and SupportingU.

Daily "automatic" and fortnightly manual calibrations are also undertaken, the later performed by the Local Authority.

Data validation and ratification procedures follow Technical Guidance LAQM.TG(09)

### **QA/QC of diffusion tube monitoring**

The independent Workplace Analysis Scheme for Proficiency (WASP), operated by the Health and Safety Laboratory, is yearly assessment against agreed performance criteria that is aimed at the analytical laboratories that supply and analyse the diffusion tubes.

## **Charnwood Borough Council**

This scheme allows national co-ordination within a quality assurance/quality control (QA/QC) framework

Quarterly performance summaries in the WASP scheme for the laboratory chosen to prepare and analyse diffusion tubes on behalf of Charnwood Borough Council (Gradko) over the preceding 12 months, prepared by AEA, are as follows:

[WASP-Rounds-113-120-\(April-2011 - March-2013\)](#) :



## Appendix B: Unadjusted Monthly Mean NO<sub>2</sub> Diffusion Tube Data (2012)

| NITROGEN DIOXIDE RESULTS MICROGRAMS/CUBIC METRES |   |        |        |        |        |        |        |        |        |        |        |        |        |                 |  |
|--|---|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|-----------------|--|
| Site ref   |   | Jan-12 | Feb-12 | Mar-12 | Apr-12 | May-12 | Jun-12 | Jul-12 | Aug-12 | Sep-12 | Oct-12 | Nov-12 | Dec-12 | UNBIASED ANNAVE |  |
| 1  | RATCLIFFE RD, LOUGHBOROUGH                | 38.63  | 38.38  | 35.97  | 29.72  | 19.21  | 17.72  | 0      | 22.71  | 26.39  | 26     | 32.5   | 18.07  | 27.75           |  |
| 2  | SHELTHORPE RD, LOUGHBOROUGH               | 33.67  | 37.19  | 32.03  | 26.2   | 20.48  | 16.53  | 0      | 19.6   | 21.21  | 27.2   | 33.77  | 24.35  | 26.57           |  |
| 3  | FOREST RD, LOUGHBOROUGH                   | 37.66  | 36.67  | 0      | 30.24  | 26.54  | 23.75  | 0      | 25.65  | 28.26  | 29.62  | 32.79  | 29.59  | 30.08           |  |
| 5  | HAYDON RD, LOUGHBOROUGH                   | 35     | 43.66  | 40.73  | 29.94  | 20.55  | 20.74  | 0      | 27.08  | 19.1   | 31.44  | 35.79  | 24.73  | 29.89           |  |
| 6  | ALAN MOSS RD/EPINAL WAY, LOUGHBOROUGH     | 35.62  | 36.16  | 34.67  | 27.05  | 19.62  | 16.14  | 0      | 25.23  | 26.07  | 26.95  | 32.92  | 27.06  | 27.95           |  |
| 7  | EPINAL WAY/LING RD                        | 35.39  | 40.22  | 40.48  | 28.23  | 22.51  | 22.44  | 0      | 27.62  | 26.59  | 26.95  | 33.74  | 22.14  | 29.66           |  |
| 8  | LEICESTER RD, LOUGHBOROUGH                | 42.35  | 47.49  | 47.42  | 34.85  | 31.81  | 23.71  | 0      | 31.85  | 33.07  | 38.14  | 39.58  | 37.13  | 37.04           |  |
| 9  | DERBY RD, LOUGHBOROUGH I                  | 49     | 51.99  | 45.16  | 34.53  | 31.83  | 26.89  | 0      | 30.63  | 32.03  | 39.52  | 41.63  | 34.5   | 37.97           |  |
| 10   | DERBY RD/BRISCOE AVE 2                    | 40.64  | 45.76  | 40.2   | 29.06  | 22.84  | 14.27  | 0      | 24.93  | 27.4   | 30.2   | 37.32  | 31.82  | 31.31           |  |
| 11 i   | DURHAM RD, LOUGHBOROUGH                   | 29.93  | 34.13  | 31.81  | 22.79  | 16.06  | 14.47  | 0      | 17.18  | 18.03  | 21.83  | 23.79  | 18.52  | 22.59           |  |
| 11 ii  | DURHAM RD 2, LOUGHBOROUGH                 | 31.37  | 30.93  | 31.15  | 23.04  | 16.91  | 0      | 0      | 16.87  | 18.26  | 22.45  | 27.96  | 24.12  | 24.31           |  |
| 11 iii   | DURHAM RD 3, LOUGHBOROUGH                 | 31.43  | 35.24  | 31.32  | 21.4   | 17.93  | 13.65  | 0      | 15.85  | 0      | 23.99  | 25.7   | 21.42  | 23.79           |  |
| 12   | ALAN MOSS RD/A6                           | 46.08  | 46.59  | 41.54  | 36.12  | 28.46  | 0      | 0      | 26.2   | 31.52  | 34.15  | 36.73  | 31.05  | 35.84           |  |
| 13   | HIGH ST, LOUGHBOROUGH                     | 77.88  | 69.03  | 65.75  | 58.21  | 41.27  | 48.66  | 0      | 38.45  | 61.47  | 62.53  | 58.52  | 56.76  | 58.05           |  |
| 14   | MARKET PLACE, LOUGHBOROUGH                | 31.62  | 34.29  | 33.26  | 25.1   | 19.94  | 15.97  | 0      | 20.23  | 0      | 26.62  | 31.39  | 20.96  | 25.94           |  |
| 15   | ASHBY RD, LOUGHBOROUGH                    | 37.06  | 42.5   | 45.25  | 35.61  | 26.31  | 31.72  | 0      | 32.53  | 32.62  | 41.44  | 44.25  | 18.36  | 35.24           |  |
| 16   | LODGE HOUSE SHEPshed                      | 33.17  | 34.81  | 37.79  | 30.43  | 24.16  | 26.91  | 0      | 29.53  | 29.01  | 31.58  | 29.04  | 24.52  | 30.09           |  |
| 17   | ROSEBERRY ST, LOUGHBOROUGH                | 31.95  | 43.53  | 31.51  | 23.26  | 15.32  | 13.99  | 0      | 17.13  | 18.9   | 25.58  | 29.57  | 18.15  | 24.44           |  |
| 18   | MELTON RD TOWN CENTRE, SYSTON I           | 39.08  | 21.97  | 22.51  | 35.81  | 27.12  | 20.77  | 0      | 30.18  | 31.75  | 33.61  | 38.17  | 31.1   | 30.19           |  |
| 19   | 1123 MELTON RD/ADJ ST PETERS RD, SYSTON I | 34.69  | 37.98  | 39.1   | 30.52  | 19.25  | 19.32  | 0      | 22.98  | 27.09  | 27.58  | 32.17  | 20.75  | 28.31           |  |
| 20   | 1116 MELTON RD SYSTON 3                   | 40.22  | 46.43  | 39.72  | 37.74  | 23.06  | 21.07  | 0      | 25.66  | 30.54  | 32.1   | 41.22  | 20.45  | 29.85           |  |
| 21   | LOUGHBOROUGH RD, BIRSTALL                 | 41.2   | 45.14  | 45.47  | 36.93  | 25.82  | 27.35  | 0      | 28.37  | 17.65  | 35.91  | 39.51  | 40.32  | 34.88           |  |
| 22   | BIRSTALL A6                               | 43.42  | 45.55  | 50.18  | 39.54  | 31.45  | 25.29  | 0      | 33.74  | 30.81  | 35.41  | 41.66  | 29.88  | 36.99           |  |
| 23   | HUMBERSTONE LANE, THURMASTON              | 38.56  | 48.31  | 47.06  | 36.83  | 22.67  | 28.36  | 0      | 33.66  | 30.15  | 39.81  | 36.79  | 36.83  | 36.28           |  |
| 23b  | 43 HUMBERSTONE LANE, THURMASTON           | 40.92  | 48.12  | 44.03  | 36.44  | 24.21  | 29.28  | 0      | 32.16  | 31.71  | 35.69  | 33.1   | 23.46  | 34.47           |  |
| 23c  | 38 HUMBERSTONE LANE, THURMASTON           | 29.98  | 38.01  | 36.45  | 26.58  | 13.71  | 16.69  | 0      | 21.19  | 24.2   | 27.34  | 29.09  | 28.27  | 26.50           |  |
| 23d  | 22 HUMBERSTONE LANE, THURMASTON           | 35.3   | 44.07  | 40.34  | 32.31  | 21.04  | 19.21  | 0      | 23.31  | 22.88  | 30.29  | 32.5   | 26.35  | 29.78           |  |
| 26   | ASHBY RD CENTRAL SHEPshed                 | 42.55  | 48.89  | 52.87  | 39     | 0      | 34.48  | 0      | 36.69  | 40.04  | 45.9   | 39.05  | 46.86  | 42.63           |  |
| 27   | LOUGHBOROUGH RD, HATHERN                  | 40.35  | 45.62  | 43.32  | 34.53  | 24.78  | 21.97  | 0      | 29.9   | 31.96  | 35.79  | 40.6   | 35.37  | 34.93           |  |
| 28   | BAXTERGATE, LOUGHBOROUGH                  | 49.22  | 60.29  | 58.41  | 47.61  | 39.76  | 35.04  | 0      | 42.28  | 0      | 46.05  | 43.29  | 42.24  | 46.42           |  |
| 29   | BARROW ST, LOUGHBOROUGH                   | 32.28  | 43.83  | 38.48  | 29.78  | 20.98  | 21.51  | 0      | 24.76  | 25.81  | 0      | 25.64  | 22.04  | 28.51           |  |
| 30   | SCHOOL ST, LOUGHBOROUGH                   | 31.63  | 38.23  | 32.99  | 27.1   | 17.08  | 15.29  | 0      | 19.09  | 9.49   | 26.03  | 28.89  | 18.48  | 24.03           |  |
| 31   | FENNEL ST, LOUGHBOROUGH                   | 33.79  | 42.25  | 39.42  | 29.87  | 20.88  | 20.25  | 0      | 23.56  | 0      | 29.11  | 31.94  | 22.05  | 29.31           |  |
| 33   | HIGH STREET, SYSTON                       | 35.81  | 44.16  | 42.81  | 32.64  | 20.9   | 21.36  | 0      | 27.29  | 30.74  | 34.67  | 40.41  | 30.54  | 32.85           |  |
| 34   | SYSTON AQMS1                              | 38.2   | 48.07  | 47.32  | 33.93  | 23.52  | 24.7   | 0      | 31.35  | 32.81  | 31.47  | 40.32  | 29.44  | 34.65           |  |
| 35   | SYSTON AQMS2                              | 38.4   | 48.19  | 39.42  | 29.04  | 23.73  | 23.93  | 0      | 26.27  | 33.21  | 35.24  | 33.32  | 38.05  | 33.53           |  |
| 36   | SYSTON AQMS3                              | 39.12  | 43.97  | 40.44  | 32.97  | 22.09  | 22.54  | 0      | 31.25  | 23.02  | 34.67  | 35.52  | 31.3   | 32.44           |  |
| 37   | LOUGHBOROUGH AQMS1                        | 45.64  | 54.86  | 58.34  | 48.86  | 37.27  | 35.55  | 0      | 42.63  | 39.9   | 44.02  | 48.95  | 39.45  | 45.04           |  |
| 38   | LOUGHBOROUGH AQMS2                        | 43.86  | 56.58  | 59.1   | 49.12  | 35.58  | 38.7   | 0      | 35.65  | 38.61  | 44.26  | 45.79  | 36.4   | 43.97           |  |
| 39   | LOUGHBOROUGH AQMS3                        | 44.42  | 57.01  | 59.92  | 49.37  | 40.4   | 33.55  | 0      | 41.42  | 39.64  | 45.22  | 48.81  | 34.12  | 44.90           |  |
| 44   | 33 NOTTINGHAM RD, LOUGHBOROUGH            | 0      | 44.28  | 56.05  | 37.58  | 28.87  | 29.44  | 0      | 34.87  | 32.67  | 30.29  | 46.04  | 30.43  | 37.05           |  |
| 45   | 89 NOTTINGHAM RD, LOUGHBOROUGH            | 49     | 60.14  | 61.09  | 43.59  | 32.6   | 38.46  | 0      | 42.28  | 38.02  | 42.48  | 47.3   | 31.67  | 44.24           |  |
| 46   | 156 RATCLIFFE RD, LOUGHBOROUGH            | 28.83  | 34.78  | 36.87  | 30.67  | 20.94  | 18.03  | 0      | 19.54  | 22.68  | 26.42  | 29.27  | 21.05  | 26.28           |  |
| 47   | 156 MEADOW LANE, LOUGHBOROUGH             | 35.53  | 42.38  | 39.61  | 26.53  | 19.01  | 17.23  | 0      | 23     | 23.01  | 30.35  | 30.68  | 26.88  | 28.56           |  |
| 48   | STATION BOULEVADE                         | 32.67  | 40.95  | 40.53  | 30.59  | 18.92  | 15.64  | 0      | 23.9   | 25.02  | 45.22  | 33.56  | 25.35  | 30.21           |  |
| 49   | WHARNCLIFFE ROAD, LOUGHBOROUGH            | 40.25  | 38.45  | 39.22  | 29.12  | 21.9   | 20.75  | 0      | 26.38  | 21.07  | 28.38  | 36.78  | 25.65  | 29.81           |  |