2011 Air Quality Progress Report for Charnwood Borough Council

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

August 2011

Local Authority Officer	Peter Weatherill (Environmental Health Technical Officer)

Department	Environmental Health
Address	Charnwood Borough Council Southfield Road Loughborough Leicestershire LE11 2TR
Telephone	01509 634641
e-mail	peter.weatherill@charnwood.gov.uk

Report Reference number	CBC/PR/11
Date	15 August 2011

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 2009.

The LAQM 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.

At the time of writing Charnwood has three Air Quality Management Areas (AQMAs) with a fourth about to be declared. These have been declared because of predicted breaches of national air quality objectives at residential properties in the borough. The causes of these predicted breaches are a result of emissions from local traffic (NO_2), industrial activities (PM_{10}) and commercial (railway) sources (SO_2).

In 2010, the monitoring of nitrogen dioxide at 38 locations in Charnwood demonstrated a breach of UK air quality objectives at 9 sites (an additional 3 sites which recorded a breach during 2010 are shown within the report to be beneath the objective levels when the nearest receptors are considered).

6 of the 9 sites reporting exceedences are within the existing Loughborough Air Quality Management Area.

2 sites fall within an area of Loughborough where extensive redevelopment is underway in connection with the Loughborough Eastern Gateway project and these are likely to reflect in positive improvements in the air quality due to improved traffic flow and reduced congestion once the work is completed in 2012.

The remaining location at the Humberstone Lane junction at Thurmaston falls within an area that was subject to a Detailed Assessment in 2009. Continuing monitoring is showing that measured concentrations are falling beneath the objective levels at relevant locations, and there is therefore no need to proceed to the declaration of an Air Quality Management Area in respect of NO2 (annual mean) at this location.

Table of contents

Appendices

1 Introduction

1.1 Description of Local Authority Area

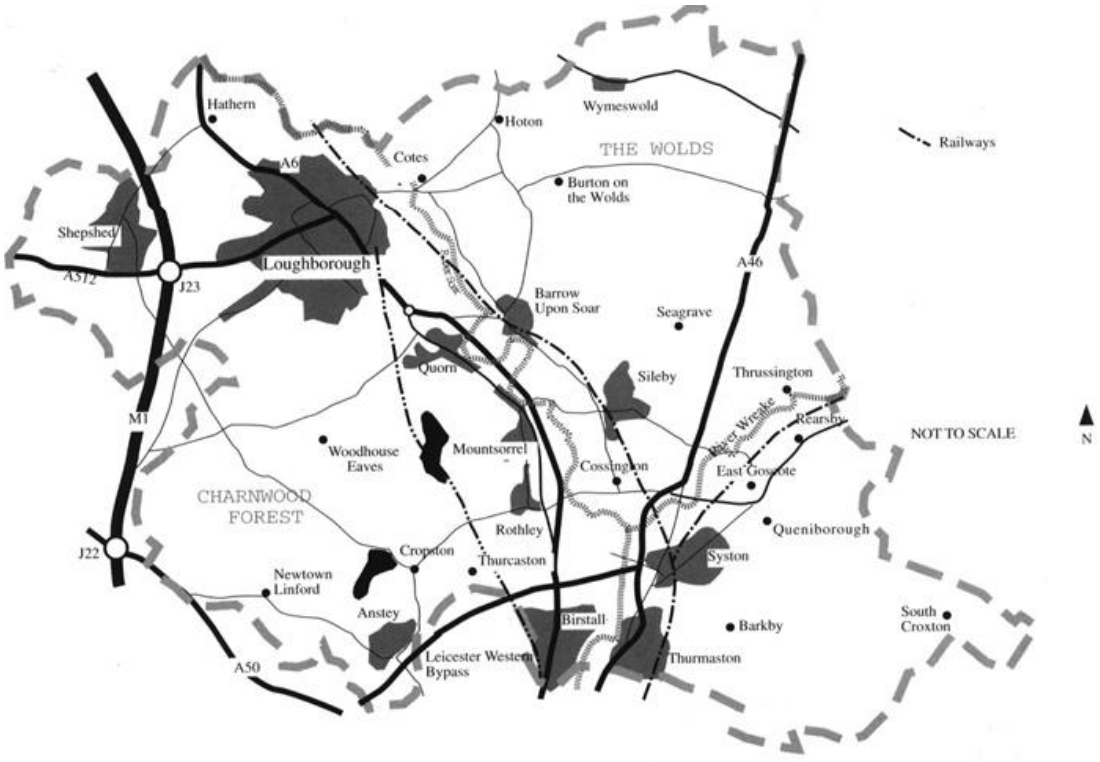
The Borough of Charnwood is located in the heart of the East Midlands sitting centrally in the triangle formed by Nottingham, Leicester and Derby. The Borough covers an area of 108 square miles and consists of a mix of urban settlements and rural farmland.

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 Progress Report

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 Local Air Quality Management (LAQM) **in England** are set out in the Air Quality (England) Regulations 2000 (SI 928), and the Air Quality (England) (Amendment) Regulations 2002 (SI 3043). They are shown in Table 1.1. This table shows the objectives in units of micrograms per cubic metre $\mu g/m^3$ (for carbon monoxide the units used are milligrammes per cubic metre, mg/m^3). Table 1.1. includes the number of permitted exceedences in any given year (where applicable).

Table 1.1 Air Quality Objectives included in Regulations for the purpose of Local Air Quality Management in England.

Pollutant	Concentration	Measured as	Date to be achieved by
Benzene	16.25 $\mu g/m^3$	Running annual mean	31.12.2003
	5.00 $\mu g/m^3$	Running annual mean	31.12.2010
1,3-Butadiene	2.25 $\mu g/m^3$	Running annual mean	31.12.2003
Carbon monoxide	10.0 mg/m^3	Running 8-hour mean	31.12.2003
Lead	0.5 $\mu g/m^3$	Annual mean	31.12.2004
	0.25 $\mu g/m^3$	Annual mean	31.12.2008
Nitrogen dioxide	200 $\mu g/m^3$ not to be exceeded more than 18 times a year	1-hour mean	31.12.2005
	40 $\mu g/m^3$	Annual mean	31.12.2005
Particles (PM_{10}) (gravimetric)	50 $\mu g/m^3$, not to be exceeded more than 35 times a year	24-hour mean	31.12.2004
	40 $\mu g/m^3$	Annual mean	31.12.2004
Sulphur dioxide	350 $\mu g/m^3$, not to be exceeded more than 24 times a year	1-hour mean	31.12.2004
	125 $\mu g/m^3$, not to be exceeded more than 3 times a year	24-hour mean	31.12.2004
	266 $\mu g/m^3$, 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 2009 Detailed Assessment in respect of previously reported NO_2 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 NO2 (annual mean). DEFRA accepted these conclusions.

2009 and 2010 also saw the submission of our 3 year Updated & Screening Assessment and progress reports. All conclusions and recommendations were accepted by DEFRA.

We therefore approach this particular reporting phase of the policy guidance with three 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

A fourth AQMA in respect of PM10 levels in the vicinity of the Lafarge Aggregates quarry at Mountsorrel is currently being drafted by the Authority.

All the above reports are available on the Charnwood Borough Council website at the following address: 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 3 automatic monitoring sites, summarised in Table 2.1.

The analysers are 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)

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	OS Grid Ref		Pollutants Monitored	Monitoring Technique	In AQMA?	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	X 452352	Y 320697	NO_2, SO_2, PM_{10}	TEOM (PM_{10}) UV Fluorescence Chemi-lluminescence (NO_2)	N	N	N/A	N
Baxter Gate (Loughborough)	Roadside	X 453687	Y 319672	NO_2	Chemi-lluminescence	Y	N (Not in the immediate vicinity of the monitor)	1m	N
Melton Rd (Syston)	Roadside	X 462540	Y 311428	NO_2	Chemi-lluminescence	Y	Y (10m)	3m	N

2.1.2 Non-Automatic Monitoring

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

During 2010:

- Nitrogen dioxide diffusion tubes were deployed at 38 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	OS Grid Ref	Pollutants Monitored	In AQMA?	Relevant Exposure? *(Y/N with distance (m) to relevant exposure)*	Distance to kerb of nearest road *(N/A if not applicable)*	Worst-case Location?
Ratcliffe Rd (Loughborough)	Roadside	X 454087 Y 320392	NO_2	Y	Y (façade)	~3m	Y
Shelthorpe Rd (Loughborough)	Roadside	X 454234 Y 318657	NO_2	N	Y (~8m)	~3m	Y
Forest Rd (Loughborough)	Roadside	X 452833 Y 318776	NO_2	N	Y (façade)	~6m	Y
Haydon Road (Loughborough)	Roadside	X 452314 Y 319620	NO_2	Y	Y (~8m)	~6m	Y
Alan Moss Rd/Epinal Way (Loughborough)	Roadside	X 452173 Y 319924	NO_2	Y	Y (façade)	~15m	Y
Epinal Way/Ling Rd (Loughborough)	Roadside	X 453678 Y 318194	NO_2	N	Y (façade)	~9m	Y
Leicester Rd (Loughborough)	Roadside	X 454002 Y 319253	NO_2	Y	-	~3m	Y
Derby Rd (Loughborough)	Roadside	X 453231 Y 320028	NO_2	Y	Y (~3m)	~3m	Y
Derby Rd/Brisco Avn (Loughborough)	Roadside	X 452670 Y 320527	NO_2	Y	Y (~3m)	~4m	Y
Durham Rd AQMS 1 (Loughborough)	Urban Background	X 452352 Y 320697	NO_2	N	N	n/a	n/a
Durham Rd AQMS 2 (Loughborough)	Urban Background	X 452352 Y 320697	NO_2	N	N	n/a	n/a
Durham Rd AQMS 3 (Loughborough)	Urban Background	X 452352 Y 320697	NO_2	N	N	n/a	n/a
Alan Moss Rd/A6 Derby Rd (Loughborough)	Roadside	X 452903 Y 320212	NO_2	Y	Y (façade)	~8m	Y
High St (Loughborough)	Roadside	X 453730 Y 319596	NO_2	Y	-	~3m	Y
Market Place (Loughborough)	Urban Centre	X 453611 Y 319540	NO_2	Y	N	n/a	n/a
Ashby Rd (Loughborough)	Roadside	X 453189 Y 319709	NO_2	Y	Y (façade)	~4m	Y
Cow Hill Lodge (Shepshed)	Roadside	X 448876 Y 318307	NO_2	N	Y (façade)	~10m	Y
Rosebery St (Loughborough)	Roadside	X 452697 Y 319921	NO_2	N	Y (~13m)	~3m	Y
Melton Rd Town Centre (Syston)	Roadside	X 462777 Y 311692	NO_2	Y	Y (~3m)	~3m	Y
1123 Melton Rd (Syston)	Roadside	X 462351 Y 311213	NO_2	Y	Y (façade)	~6m	Y
1116 Melton Rd (Syston)	Roadside	X 462373 Y 311254	NO_2	Y	Y (façade)	~3m	Y
Loughborough Rd (Birstall)	Roadside	X 459233 Y 309590	NO_2	N	Y (façade)	~15m	Y

A6 (Birstall)	Roadside	X 459178 Y 309890	NO_2	N	Y ~2m	~5m	Y
21 Humberstone Lane (Thurmaston)	Roadside	X 460821 Y 308757	NO_2	N	Y (façade)	~6m	Y
5 Wayside Dr (Thurmaston)	Roadside	X 460861 Y 308824	NO_2	N	Y (façade)	~6m	N
43 Humberstone Ln (Thurmaston)	Roadside	X 460861 Y 308824	NO_2	N	Y (façade)	~5m	Y
38 Humberstone Ln (Thurmaston)	Roadside	X 460908 Y 308775	NO_2	N	Y (façade)	~5m	Y
22 Humberstone Ln (Thurmaston)	Roadside	X 460835 Y 308784	NO_2	N	Y (façade)	~5m	Y
Ashby Rd Central (Shepshed)	Roadside	X 448121 Y 318257	NO_2	N	Y (~12m)	2m	Y
Loughborough Rd (Hathern)	Roadside	X 450260 Y 321922	NO_2	N	Tube located ~3m from kerb Nearest receptor is approx 30m away and approx 13m from kerb		Y
Baxter Gate (Loughborough)	Roadside	X 453682 Y 319672	NO_2	Y	-	~2m	Y
Barrow St (Loughborough)	Roadside	X 453901 Y 319488	NO_2	N	Y (façade)	~10m	Y
School St (Loughborough)	Roadside	X 453946 Y 319619	NO_2	N	Y (façade)	~3m	Y
Fennel St (Loughborough)	Roadside	X 453694 Y 319890	NO_2	N	Y (façade)	~3m	Y
High St (Syston)	Roadside	X 462369 Y 311809	NO_2	Y	Y (façade)	~4m	Y
Syston AQMS 1	Roadside	X 462540 Y 311428	NO_2	Y	Y (~10m)	~3m	Y
Syston AQMS 2	Roadside	X 462540 Y 311428	NO_2	Y	Y (~10m)	~3m	Y
Syston AQMS 3	Roadside	X 462540 Y 311428	NO_2	Y	Y (~10m)	~3m	Y
Baxter Gate AQMS 1 (Loughborough)	Kerbside	X 453687 Y 319672	NO_2	Y	-	~1m	Y
Baxter Gate AQMS 2 (Loughborough)	Kerbside	X 453687 Y 319672	NO_2	Y	-	~1m	Y
Baxter Gate AQMS 3 (Loughborough)	Kerbside	X 453687 Y 319672	NO_2	Y	-	~1m	Y
33 Nottingham Rd (Loughborough)	Roadside	X 454000 Y 319977	NO_2	N	-	~3m	Y
89 Nottingham Rd (Loughborough)	Roadside	X 454154 Y 320116	NO_2	N	Y (façade)	~3m	Y
156 Ratcliffe Rd (Loughborough)	Roadside	X 454285 Y 320294	NO_2	N	Y (façade)	~ 6m	Y
156 Meadow Rd (Loughborough)	Roadside	X 453933 Y 320663	NO_2	N	Y (façade)	~ 8m	Y

2.2 Comparison of Monitoring Results with Air Quality Objectives

2.2.1 Nitrogen Dioxide

There are no sites recording more than 18 1-hour means above 200µgm^{-3}, however as can be seen from the following 2010 data results there are a number of exceedences of the 40µgm^{-3} annual mean, the majority of which are in areas already declared as part of an AQMA.

Three sites: Ashby Rd Central (Shepshed), Loughborough Rd (Hathern) and A6 (Birstall) 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_2 with Distance from Roads Calculator" (Issue 4) available from the UK Air Quality Archive, it is possible for us to calculate the distance NO_2 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 31.5µg/m^{-3}

This calculator allows you to predict the annual mean NO_2 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.

Air Quality CONSULTANTS

Enter data into the yellow cells

Step 1	How far from the KERB was your measurement made (in metres)?	(Note 1)	2	metres
Step 2	How far from the KERB is your receptor (in metres)?	(Note 1)	14	metres
Step 3	What is the local annual mean background NO_2 concentration (in µg/m^3)?	(Note 2)	11.90472	µg/m^3
Step 4	What is your measured annual mean NO_2 concentration (in µg/m^3)?	(Note 2)	48	µg/m^3
Result	The predicted annual mean NO_2 concentration (in µg/m^3) at your receptor	(Note 3)	31.5	µg/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://laqm2.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, 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.

Issue 4: 25/01/11. Created by Dr Ben Marner; Approved by Prof Duncan Laxen. Contact: benmarner@aqconsultants.co.uk

Loughborough Rd (Hathern)

Using the calculator the concentration at the nearest receptor is shown below to be 29.9µg/m^{-3}

This calculator allows you to predict the annual mean NO_2 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.

Air Quality CONSULTANTS

Enter data into the yellow cells

Step 1	How far from the KERB was your measurement made (in metres)?	(Note 1)	3	metres
Step 2	How far from the KERB is your receptor (in metres)?	(Note 1)	13	metres
Step 3	What is the local annual mean background NO_2 concentration (in µg/m^3)?	(Note 2)	13.22378	µg/m^3
Step 4	What is your measured annual mean NO_2 concentration (in µg/m^3)?	(Note 2)	40.1	µg/m^3
Result	The predicted annual mean NO_2 concentration (in µg/m^3) at your receptor	(Note 3)	29.9	µg/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://laqm2.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, 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.

Issue 4: 25/01/11. Created by Dr Ben Marner; Approved by Prof Duncan Laxen. Contact: benmarner@aqconsultants.co.uk

A6 (Birstall)

Using the calculator the concentration at the nearest receptor is shown below to be 39.7µg/m^{-3}

This calculator allows you to predict the annual mean NO_2 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.

Air Quality CONSULTANTS

Enter data into the yellow cells

Step 1	How far from the KERB was your measurement made (in metres)?	(Note 1)	4	metres
Step 2	How far from the KERB is your receptor (in metres)?	(Note 1)	7	metres
Step 3	What is the local annual mean background NO_2 concentration (in µg/m^3)?	(Note 2)	17.53089	µg/m^3
Step 4	What is your measured annual mean NO_2 concentration (in µg/m^3)?	(Note 2)	43.8	µg/m^3
Result	The predicted annual mean NO_2 concentration (in µg/m^3) at your receptor	(Note 3)	39.7	µg/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://laqm2.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, 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.

Issue 4: 25/01/11. Created by Dr Ben Marner; Approved by Prof Duncan Laxen. Contact: benmarner@aqconsultants.co.uk

2 further tubes along the area of Nottingham Rd and its junction with Ratcliffe Rd have also shown exceedences during 2010. As previously reported, traffic in this area of town is expected to benefit from a combination of both the ***Loughborough Eastern Gateway Scheme*** and the proposed ***Loughborough Inner Relief Road***

At the time of writing; work on the ***Eastern Gateway*** is progressing (due for scheme completion in 2012) and the ***Loughborough Inner Relief*** **Road** scheme was announced by the Transport Secretary to be included within the DfT funded development pool. The DfT has requested the submission of a final funding bid by September 2011.

The government has said that suitable schemes will be selected by the end of 2012, and if chosen the Loughborough scheme will receive entry onto the government programme and progress to the next stage in the design process.

We therefore maintain our view (as discussed with DEFRAs consultants in 2008) that due to these significant material changes to the potential traffic flow around the key Loughborough transport routes, we feel would be no benefit in proceeding to a Detailed Assessment at this time when traffic flow in the area will soon be dramatically altered.

A further tube showing an exceedence during 2010 was that at 25 Humberstone Lane, Thurmaston. Concentrations at this particular location have been fluctuating either side of the objective level for a number of years. A previous Detailed Assessment in 2009 concluded, by using modeling techniques, that any likely exceedence are likely to impact at properties on the northern side of the road, rather than this southerly positioned tube.

On-going monitoring data at the properties highlighted to be potentially affected (tubes 23a-23d) continue to show levels beneath the threshold objective.

Automatic Monitoring Data

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

Site ID	Location	Within AQMA?	Data Capture for monitoring period %	Data Capture for full calendar year 2010 %	Annual mean concentrations (μg/m^3)		
					2008	2009	2010
11	Durham Rd, L'boro	N	(Full Year)	92.9	26.7	28.7	28.7
34-36	Melton Rd, Syston	Y	(Full Year)	97.6	34.4	32.5	34.4
37-39	Baxter Gate, L'boro	Y	(Full Year)	97.5	**47.8**	**42.0**	**51.6**

Table 2.3b Results of Automatic Monitoring for Nitrogen Dioxide: Comparison with 1-hour Mean Objective

Site ID	Location	Within AQMA?	Data Capture for monitoring period %	Data Capture for full calendar year 2010 [b] %	Number of Exceedences of hourly mean (200 μg/m^3) If the period of valid data is less than 90% of a full year, include the 99.8th percentile of hourly means in brackets.		
					2008	2009	2010
11	Durham Rd, L'boro	N	(Full Year)	95.0	0	0	0
34-36	Melton Rd, Syston	Y	(Full Year)	100	6	0	0
37-39	Baxter Gate, L'boro	Y	(Full Year)	99.9	0	0 (107)	0

Diffusion Tube Monitoring Data

Table 2.4 Results of Nitrogen Dioxide Diffusion Tubes

Site ID	Location	Within AQMA?	Data Capture for monitoring period [a] %	Data Capture for full calendar year 2010 [b] %	Annual mean concentrations (μg/m^3)		
					2008	2009	2010
1	Ratcliffe Rd (Loughborough)	Y	(Full Year)	100	48.0	46.3	**42.3**
2	Shelthorpe Rd (Loughborough)	N	(Full Year)	83	31.9	31.4	28.3
3	Forest Rd (Loughborough)	N	(Full Year)	100	35.3	37.3	31.6
5	Haydon Road (Loughborough)	Y	(Full Year)	92	37.2	38.3	34.8
6	Alan Moss Rd/Epinal Way (Loughborough)	Y	(Full Year)	100	31.8	32.4	31.2
7	Epinal Way/Ling Rd (Loughborough)	N	(Full Year)	100	33.6	36.0	34.3
8	Leicester Rd (Loughborough)	Y	(Full Year)	100	41.2	43.1	**43.2**
9	Derby Rd (Loughborough)	Y	(Full Year)	92	38.9	46.1	**43.1**
10	Derby Rd/Brisco Avn (Loughborough)	Y	(Full Year)	83	36.3	39.7	36.8
11 i	Durham Rd AQMS 1 (Loughborough)	N	(Full Year)	100	26.7	28.3	28.6
11 ii	Durham Rd AQMS 2 (Loughborough)	N	(Full Year)	100	27.2	29.0	28.6
11 iii	Durham Rd AQMS 3 (Loughborough)	Y	(Full Year)	100	26.5	28.9	28.7
12	Alan Moss Rd/A6 Derby Rd (Loughborough)	Y	(Full Year)	100	44.5	40.2	39.6
13	High St (Loughborough)	Y	(Full Year)	100	65.9	76.2	**66.0**
14	Market Place (Loughborough)	Y	(Full Year)	92	28.6	29.8	29.5
15	Ashby Rd (Loughborough)	Y	(Full Year)	92	46.6	48.3	**42.0**
16	Cow Hill Lodge (Shepshed)	N	(Full Year)	92	36.1	36.3	37.1
17	Rosebery St (Loughborough)	N	(Full Year)	92	27.5	26.7	26.1
18	Melton Rd Town Centre (Syston)	Y	(Full Year)	100	33.3	35.7	34.8
19	1123 Melton Rd (Syston)	Y	(Full Year)	100	30.6	30.4	32.4
20	1116 Melton Rd (Syston)	Y	(Full Year)	100	32.7	35.4	37.2
21	Loughborough Rd (Birstall)	N	(Full Year)	100	30.7	32.2	34.4
22	A6 (Birstall)	N	(Full Year)	100	36.4	37.6	**43.8**

23	21 Humberstone Lane (Thurmaston)	N	(Full Year)	100	37.4	39.8	**40.3**
23a	5 Wayside Dr (Thurmaston)	N	(Full Year)	100	26.5	30.3	30.9
23b	43 Humberstone Ln (Thurmaston)	N	(Full Year)	100	33.9	37.1	36.4
23c	38 Humberstone Ln (Thurmaston)	N	(Full Year)	100	-	27.9	28.7
23d	22 Humberstone Ln (Thurmaston)	N	(Full Year)	100	-	30.6	32.1
26	Ashby Rd Central (Shepshed)	N	(Full Year)	100	47.6	49.9	**48.0**
27	Loughborough Rd (Hathern)	N	(Full Year)	100	38.2	42.2	**40.1**
28	Baxter Gate (Loughborough)	Y	(Full Year)	100	49.8	56.1	**53.4**
29	Barrow St (Loughborough)	N	(Full Year)	100	36.5	35.8	33.4
30	School St (Loughborough)	N	(Full Year)	100	30.7	31.2	30.9
31	Fennel St (Loughborough)	N	(Full Year)	100	35.1	35.8	33.9
33	High St (Syston)	Y	(Full Year)	100	30.0	31.6	32.5
34	Syston AQMS 1	Y	(Full Year)	100	36.5	37.0	35.0
35	Syston AQMS 2	Y	(Full Year)	100	33.9	34.7	35.2
36	Syston AQMS 3	Y	(Full Year)	100	33.2	35.9	33.3
37	Baxter Gate AQMS 1 (Loughborough)	Y	(Full Year)	100	46.4	55.2	**52.5**
38	Baxter Gate AQMS 2 (Loughborough)	Y	(Full Year)	100	48.5	54.1	**52.4**
39	Baxter Gate AQMS 3 (Loughborough)	Y	(Full Year)	100	48.5	52.0	**50.3**
44	33 Nottingham Rd (Loughborough)	N	(Full Year)	100	-	43.5	**41.5**
45	89 Nottingham Rd (Loughborough)	N	(Full Year)	100	-	48.1	**48.8**
46	156 Ratcliffe Rd (Loughborough)	Y	(Full Year)	100	-	40.6	36.5
47	156 Meadow Rd (Loughborough)	N	(Full Year)	100	-	35.6	29.8

[a] data capture for the monitoring period, in cases where monitoring was only carried out for part of the year.

[b] 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%.)

2010

Results for tubes 1-3, 7-9, 13-15, 28-31, and 37-49 have been corrected against the Baxter Gate automatic monitor (factor = 1.04)

Results for tubes 18-23, 23a-d and 33-36 have been corrected against the Syston automatic monitor (factor = 1.01)

All other tubes are corrected against the Durham Road automatic monitor (factor = 1.09)

Note: The National Diffusion Tube Bias Adjustment Factor Spreadsheet v04/11 gives a factor of 0.92 (from 39 studies) for Gradko analysed 20% TEA in water samples for 2010.

The choice of individual correction factors has been decided upon based on the geographical distance to the nearest real-time analyser with triplicates. Also, as most of our sites can be classed as 'roadside' locations we have given consideration to diffusion tube guidance to correct against analysers of similar site type.

2009

Results for tubes 18-23, 23a-d and 33-36 have been corrected against the Syston automatic monitor (factor = 1.00)

All other tubes are corrected against the Durham Road automatic monitor (factor = 1.17)

Note: Results for tubes 13, 28, and 37-39 would normally be corrected against the **Baxter Gate automatic monitor** (factor = 0.92) however as data capture was < 90% in 2009, we have opted to use the factor from Durham Rd instead.

2008

Results for tubes 13, 28, and 37-39 have been corrected against the Baxter Gate automatic monitor (factor = 1.08)

Results for tubes 18-23, 23a-d and 33-36 have been corrected against the Syston automatic monitor (factor = 0.94)

All other tubes are corrected against the Durham Road automatic monitor (factor = 1.13)

2.2.2 PM_{10}

In 2010 there were no recorded breaches of either the annual mean or 24-hour mean on objectives at our only long-term automatic (TEOM) monitoring site.

The monitoring site is an urban background site just outside of the Loughborough NO_2 AQMA.

A separate Detailed Assessment in respect of PM_{10} levels in the vicinity of the Lafarge Quarry in Mountsorrel has recently been accepted by DEFRA and can be viewed as a separate document on our website

Table 2.5a Results of PM_{10} Automatic Monitoring: Comparison with Annual Mean Objective

Site ID	Location	Within AQMA?	Data Capture for monitoring period %	Data Capture for full calendar year 2010 %	Annual mean concentrations ($\mu g/m^3$)		
					2008	2009	2010
11	Durham Rd, L'boro	N	95	95	16.9	17.8	17.8

Table 2.5b Results of PM_{10} Automatic Monitoring: Comparison with 24-hour Mean Objective

Site ID	Location	Within AQMA?	Data Capture for monitoring period %	Data Capture 2010 %	Number of Exceedences of daily mean objective (50 $\mu g/m^3$)		
					2008	2009	2010
11	Durham Rd, L'boro	N	95	95	1	8	1

Notes:

i. Figures for 2008 have been derived by using the default 1.3 gravimetric correction factor

ii. 2009 and 2010 figures are calculated by using the King's College London Volatile Correction Model (VCM).

2.2.3 Sulphur Dioxide

In 2010 there were no recorded breaches of either the 15 minute, 1-hour or 24-hour Mean objectives at our automatic SO_2 monitoring site.

The monitoring site is an urban background site just outside of the Loughborough NO_2 AQMA.

Table 2.6 Results of Automatic Sulphur Dioxide Monitoring

2010	
Maximum 15 minute mean concentration	167.6µgm^{-3}
Exceedences of 15 minute concentration @ 266µgm^{-3}	0
Maximum 1 hour mean concentration	31.9µgm^{-3}
Exceedences of 1 hour concentration @ 350µgm^{-3}	0
Maximum 24-hour mean concentration	16.0µgm^{-3}
Exceedences of 24-hour concentration @ 125µgm^{-3}	0
Data capture	92.9%

(A conversion factor of 2.66 has been applied to the raw data originally measured as ppb, as per Annex1: 1.163 / Box A1.5 (pg A1-36) LAQM.TG assuming 20°C and 101.3 kPa)

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 this particular Air Quality Standards 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 previously been subject to a previous Detailed Assesment and/or discussed and agreed with DEFRA that there is no need to proceed to a Detailed Assessment.

3 New Local Developments

3.1 Road Traffic Sources

3.1.1 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.

3.1.2 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.

3.1.3 Roads with a High Flow of Buses and/or HGVs.

Charnwood Borough Council confirms that there are no new/newly identified roads with high (>20%) flow of buses/HDVs, which have not been adequately considered in previous rounds of Review and Assessment.

3.1.4 Junctions

Charnwood Borough Council confirms that there are no new/newly identified busy junctions (>10,000 vehicles) that have not been adequately considered in previous rounds of Review and Assessment.

3.1.5 New Roads Constructed or Proposed Since the Last Round of Review and Assessment

Charnwood Borough Council confirms that there have been no relevant new roads constructed or proposed since the Last Review and Assessment, further to those previously identified.

3.1.6 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 25% increase in traffic flow), which have not been adequately considered in previous rounds of Review and Assessment.

3.1.7 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.

3.2 Other Transport Sources

3.2.1 Airports

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

3.2.2 Railways (Diesel and Steam Trains)

3.2.2.a Stationary Trains

The GCR AQMA

The GCR AQMA came into effect on 30th 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.***

3.2.2.b 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))

3.3 Ports (Shipping)

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

4 Industrial Sources

4.1 Industrial Installations

4.1.1 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.

4.1.2 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.

4.1.3 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.

4.2 Major Fuel (Petrol) Storage Depots

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

4.3 Petrol Stations

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

i.e. with an annual throughput of 2000m^3, 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).

4.4 Poultry Farms

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

5 Commercial and Domestic Sources

5.1 Biomass Combustion – Individual Installations

Charnwood Borough Council confirms that there are no biomass combustion plants meeting the specified criteria in the Local Authority area.

5.2 Biomass Combustion – Combined Impacts

Charnwood Borough Council confirms that there are no biomass combustion plants in the Local Authority area.

5.3 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.

6 New Developments with Fugitive or Uncontrolled Sources

Charnwood Borough Council confirms that there are no new or newly identified local developments which may have an impact on air quality within the Local Authority area.

Although, please note our comments under section 7.2

Charnwood Borough Council confirms that all the following have been considered –

- **Road traffic sources**
- **Other transport sources**
- **Industrial sources**
- **Commercial and domestic sources**
- **New developments with fugitive or uncontrolled sources.**

7 Conclusions and Proposed Actions

7.1 Conclusions from New Monitoring Data

New (2010) monitoring data shows that the 40µgm-^{1} annual mean objective for NO_2 was exceeded at the following monitored locations:

1. Baxter Gate (Loughborough)
2. High St (Loughborough)
3. Ratcliffe Rd (Loughborough)

4&5 Nottingham Rd (Loughborough) (2 sites)

6. Leicester Rd (Loughborough)
7. Derby Rd (Loughborough)
8. Ashby Rd (Loughborough)

9 21 Humberstone Lane, Thurmaston

10. Ashby Rd Central (Shepshed) *
11. Loughborough Rd (Hathern) *
12. A6 Birstall *

* As shown under 2.2.1; when considering the nearest receptors, the result from the roadside tubes at Shepshed and Hathern fall within the objective level when the "NO_2 with Distance from Roads Calculator" (Issue 2) is applied to the data.

The other locations fall within the existing Loughborough Air Quality Management Area with the exception of the tubes on Nottingham Rd (Loughborough) and the tube at 21 Humberstone Lane.

Following a previously submitted Detailed Assessment and further communications with DEFRA to review these tubes in detail, it has been agreed that further progression is not required at this time.

7.2 Conclusions relating to New Local Developments

In response to previously identified local developments in our 2009 report, i.e.

a. Energy Recovery Facility (ERF) at Shepshed
b. Recycling and household waste site (RHWS) at Granite Way, Mountsorrel

Detailed air quality reports submitted as part of the planning process reported in both instances that there are will be "negligible" or no "significant" air quality effects.

Charnwood Borough Council have instigated long-term monitoring programmes to cover potential air quality issues in the vicinity of these operations. This will allow both "before" and "after" comparisons to be made with observed monitored results which will be submitted in future air quality reports.

7.3 Proposed Actions

This Progress report 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
c. Circumstances already discussed with DEFRA with agreement that no further action be taken at present.

Our next report (Updating & Screening Report) will be submitted in April 2012.

8 References

LAQM Technical Guidance document TG(09)
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

LAQM Support - NO_2 Diffusion Tube QA/QC
www.laqmsupport.org.uk/no2qaqc.php

Appendices

Appendix A: QA/QC Data

Appendix B: Unadjusted Monthly Mean NO_2 Tube Data (2010)

Appendix A: QA:QC Data

Diffusion Tube Bias Adjustment Factors

All NO_2 diffusion tubes are supplied and analysed by Gradko using 20% TEA in water preparation.

Factor from Local Co-location Studies (if available)

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

Site ID	Location	Triplicate annual mean average (µg/m^3) (Dm)	Automatic analyser annual mean concentration (µg/m^3) (Cm)	Bias correction factor (Cm / Dm)
11	Durham Rd, L'boro	26.3	28.7	1.09
34/36	Melton Rd, Syston	34.2	34.4	1.01
37/39	Baxter Gate, L'boro	49.8	51.6	1.04

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 ***using locally derived factors***.

- 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

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.

It should be noted however that historically our correction factors have been considerably higher than those that can be obtained via the national correction spreadsheet.

For example: The National Diffusion Tube Bias Adjustment Factor Spreadsheet v04/11 gives a factor of 0.92 (from 39 studies) for Gradko analysed 20% TEA in water samples for 2010.

We therefore feel that our corrected results may be marginally (at least) exaggerated.

PM Monitoring Adjustment

The 2009 and 2010 figures shown in tables 2.5a & 2.5b have bee adjusted by using the King's College London Volatile Correction Model (VCM).

Figures for 2008 have 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 diffusion tube sites monitored during 2010 that would have been considered "short term". Therefore no further data adjustment is necessary for seasonal variation etc.

QA/QC of automatic monitoring

The analysers are serviced under schedule via Casella Ltd.
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.

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 97 - 100 (Apr 2007 - Apr 2008)	:	Good
WASP Rounds 98 - 102 (Jul 2007 - Jul 2008)	:	Good
WASP Rounds 99 - 103 (Oct 2007 - Oct 2008)	:	Good
WASP Rounds 100 - 104 (Jan 2008 - Jan 2009)	:	Good
WASP Rounds 101 - 105 (Apr 2008 - Apr 2009)	:	Good
WASP Rounds 102 - 106 (Jul 2008 - Jul 2009)	:	Good
WASP Rounds 103 - 107 (Oct 2008 - Oct 2009)	:	Good
WASP Rounds 104 - 108 (Jan 2009 - Jan 2010)	:	Good
WASP Rounds 105 - 109 (April 2009 - April 2010)	:	Good

Appendix B: Unadjusted Monthly Mean NO_2 Tube Data (2010)

	NITROGEN DIOXIDE RESULTS MICROGRAMS/CUBIC METRES												
Site ref		Jan-10	Feb-10	Mar-10	Apr-10	May-10	Jun-10	Jul-10	Aug-10	Sep-10	Oct-10	Nov-10	Dec-10	UNBIASED ANN.AVE
1	RATCLIFFE RD,LOUGHBOROUGH	54.61	48.28	46.33	38.66	36.06	33.74	32.66	31.45	35.95	33.67	37.14	59.89	40.7
2	SHELTHORPE RD,LOUGHBOROUGH	43.07	30.74	31.16	nd	24.33	21.47	18.44	19.33	21.18	26.22	35.71	nd	27.2
3	FOREST RD,LOUGHBOROUGH	44.79	39.66	31.14	31.26	27.76	27.22	20.38	11.59	27.37	28.82	34.15	40.36	30.4
5	HAYDON RD, LOUGHBOROUGH	45.25	32.54	36.25	nd	25.21	24.52	22.78	24.67	29.68	31.22	35.03	44.04	31.9
6	ALAN MOSS RD/EPINAL WAY, LOUGHI	40.76	32.76	26.73	28.38	22.77	20.51	21.98	22.5	21.96	27.86	36.35	40.94	28.6
7	EPINAL WAY/LING RD	43.55	38.39	33.65	30.23	30.2	24.33	21.24	25.23	29.46	34.31	39.02	45.7	32.9
8	LEICESTER RD,LOUGHBOROUGH	53.37	49.11	42.27	41.85	38.72	37.02	28.35	31.77	36.06	42.02	45.43	52.88	41.6
9	DERBY RD, LOUGHBOROUGH 1	57.44	47	nd	41.92	39.69	39.05	24.44	30.42	36.01	36.23	53.32	50.81	41.5
10	DERBY RD/BRISCOE AVE 2	45.68	38.84	nd	32.99	26.85	22.71	21.94	24.37	nd	28.3	43.79	52.47	33.8
11 i	DURHAM RD, LOUGHBOROUGH	41.06	32.62	25.98	24.46	22.16	15.83	16.02	18.25	19.64	22.38	35.5	41.13	26.3
11 ii	DURHAM RD 2, LOUGHBOROUGH	37.44	32.03	25.08	25.31	19.04	18.04	14.69	19.34	19.87	25.63	34.01	44.28	26.2
11 iii	DURHAM RD 3, LOUGHBOROUGH	36.59	33.05	27.09	24.82	21.47	18.7	14.45	20.03	15.58	27.14	35.18	42.21	26.4
12	ALAN MOSS RD/A6	51.93	45.05	37.97	36.16	33.28	30.25	20.79	27.85	21.96	35.72	44.86	50.45	36.4
13	HIGH ST,LOUGHBOROUGH	67.95	68.92	71.67	57.16	58.08	51.8	55.69	56.88	74.38	56.6	72.14	70.38	63.5
14	MARKET PLACE,LOUGHBOROUGH	36.06	34.87	27.89	25.47	21.81	19.74	16.36	nd	21.44	25.38	38.81	44.52	28.4
15	ASHBY RD, LOUGHBOROUGH	44.82	43.97	43.81	39.22	36.39	37.28	nd	29.73	34.82	35.91	48.35	49.52	40.3
16	LODGE HOUSE SHEPSHED	38.95	39.45	39.89	34.5	29.56	26.39	nd	25.42	29.47	30.19	39.97	40.65	34.0
17	ROSEBERY ST,LOUGHBOROUGH	34.82	nd	27.89	21.92	18.49	16.52	14.96	16.74	16.44	24.78	31.28	39.46	23.9
18	MELTON RD TOWN CENTRE,SYSTON	43.85	38.49	33.04	36.31	30.63	28.84	23.31	27	30.25	34.85	39.67	47.17	34.5
19	1123 MELTON RD/ADJ ST PETERS RD,	41.89	34.01	31.06	28.33	24.92	24.52	22.08	24.34	27.66	37.55	39.2	48.93	32.0
20	1116 MELTON RD SYSTON 3	48.83	42.14	32.33	37.23	32.75	29.96	20.72	28.04	22.93	34.9	44.63	67.04	36.8
21	LOUGHBOROUGH RD,BIRSTALL	40.87	38.01	37.94	32.53	30.47	26.05	26.84	29.1	26.16	35.54	37.35	47.46	34.0
22	BIRSTALL A6	51.62	46.75	47.89	44.46	41.1	37.19	29.46	32.5	37.32	45.74	45.25	61.27	43.4
23	HUMBERSTONE LANE,THURMASTON	46.58	40.91	46.36	44.42	33.86	29.71	32.26	36.4	34.09	40.24	43.18	50.4	39.9
23a	5 WAYSIDE DR, THURMASTON	38	34.1	31.83	29.46	22.41	21.98	21.55	24.74	23.49	30.84	41.42	47.01	30.6
23b	43 HUMBERSTONE LANE, THURMAST	47.21	34.65	38.09	36.33	35.18	30.77	26.81	28.42	30.22	38.22	40.44	46.6	36.1
23c	38 HUMBERSTONE LANE, THURMAST	36.47	36.03	29.13	24.96	21.09	16.32	19.45	21.07	25.83	28.51	38.18	43.72	28.4
23d	22 HUMBERSTONE LANE, THURMAST	43.16	37.13	34.37	33.63	27.3	21.9	20.76	24.83	24	31.38	36.65	46.6	31.8
26	ASHBY RD CENTRAL,SHEPSHED	51.62	46.96	46.48	41.23	43.16	44.7	33.82	35.25	41.68	42.85	51.64	49.52	44.1
27	LOUGHBOROUGH RD,HATHERN	43.44	44.29	36.9	34.23	33.73	31.39	22.95	28.78	29.65	35.5	47.59	53.5	36.8
28	BAXTERGATE, LOUGHBOROUGH	64.89	55.01	48.23	56.55	48.51	46.51	37.86	39.58	51.08	50.96	58.54	58.55	51.4
29	BARROW ST, LOUGHBOROUGH	40.94	34.45	30.96	30.45	28.89	24.08	21.33	23.52	21.53	31.1	43.62	54.2	32.1
30	SCHOOL ST, LOUGHBOROUGH	38.24	37.68	28.54	29.43	22.9	19.91	18.8	21.21	20.52	31.17	41.16	46.97	29.7
31	FENNEL ST, LOUGHBOROUGH	42.86	38.21	34.52	29.85	27.64	24.33	21	22.59	23.03	34.59	44.2	48.09	32.6
33	HIGH STREET, SYSTON	40.75	35.5	33.89	23.42	24.47	23.61	24.42	26.73	28.12	43.53	37.51	44.07	32.2
34	SYSTON AQMS1	41.08	34.12	37.7	33.4	25.32	25.49	29	23.81	38.23	39.82	41.97	45.65	34.6
35	SYSTON AQMS2	47.7	34.69	38.02	31.52	27.75	25.69	26.76	28.26	37.04	31.39	43.01	46.89	34.9
36	SYSTON AQMS3	44.84	34.16	31.39	30.17	30.37	26.18	25.87	25.39	33.31	34.55	37.77	42.14	33.0
37	LOUGHBOROUGH AQMS1	60.68	54.65	52.11	54.34	47.36	48.19	38.26	40.32	49.47	45.55	55.19	59.76	50.5
38	LOUGHBOROUGH AQMS2	58.17	56.58	53.71	51.72	52.97	44.74	37.48	37.41	44.46	50.93	61.38	54.78	50.4
39	LOUGHBOROUGH AQMS3	44.84	46.96	55.26	52.86	45.22	47.05	35.09	40.3	42.51	47.24	61.57	61.99	48.4
44	33 NOTTINGHAM RD, LOUGHBOROU	51.47	48.11	48.77	39.56	35.66	29.9	21.13	24.29	32.64	38.59	53.23	55.02	39.9
45	89 NOTTINGHAM RD, LOUGHBOROU	55.37	50.91	50.06	51.47	46.87	40.39	34.06	39.02	43.68	43.48	55.23	52.66	46.9
46	156 RATCLIFFE RD, LOUGHBOROUGH	42.71	40.81	36.99	34.23	28.73	27.64	24.17	30.56	32.85	32.68	43.28	46.45	35.1
47	156 MEADOW LANE, LOUGHBOROUG	38.3	34.92	31.62	30.15	23.32	20.16	18.7	20.38	24.24	25.77	36.27	39.75	28.6