2010 Air Quality Progress Report

for

Harborough District Council

In fulfilment of Part IV of the Environment Act 1995

Local Air Quality Management

Date (July 2010)

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1 Executive Summary

Under Part IV of the Environment Act 1995 there is a requirement for all Local Authorities to assess their local air quality and to predict future conditions against the National Air Quality Objectives.

This report has been compiled as part of the forth round of the air quality assessment for Harborough District Council. The Progress Report has been carried out in accordance with the requirements of the DEFRA guidance LAQM.TG(09) [6].

Progress Reports are intended to maintain continuity in 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 when the authority is not completing an Updating and Screening Assessment.

The report has found that:

- a detailed assessment of Lutterworth High Street to the south of the Air Quality Management Area is required as Nitrogen Dioxide concentrations above the annual mean air quality objective have been detected outside of the Air Quality Management Area.
- there are no new developments requiring assessment

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2 Introduction

2.1 Description of Local Authority Area

Harborough District Council is a diverse, largely rural authority covering approximately 590Km^2 (230 square miles) of Southern Leicestershire, as shown in Figure. 1. Geographically it is the largest of the Leicestershire districts. Approximately 83, 00 people (estimated June 2009 by The Office for National Statistics [27]) live within the District.

The two major population centres are the market towns of Market Harborough and Lutterworth, providing the main shopping and business services. These two towns, together with the villages of Thurnby, Bushby and Scraptoft adjoining Leicester City, and the villages of Broughton Astley, Great Glen, Kibworth and Fleckney accommodate 67% of the district population. The remaining residents live in villages varying from populations of several hundreds to hamlets comprising of a handful of dwellings.

The District borders on to the suburbs of Leicester in the north, Rutland to the east, Warwickshire to the west and Northamptonshire to the south.

Located at the heart of England, Harborough District has excellent communication links. The M1, M6 “Catthorpe” interchange connects Harborough District to Felixstowe, Birmingham, London and Edinburgh. The M1 and M6 and A14 are all identified on the Trans-European Network. The A5, A6, A5199 and A47 also run through the district which are a major part of the East Midlands road network and consequently are heavily used.

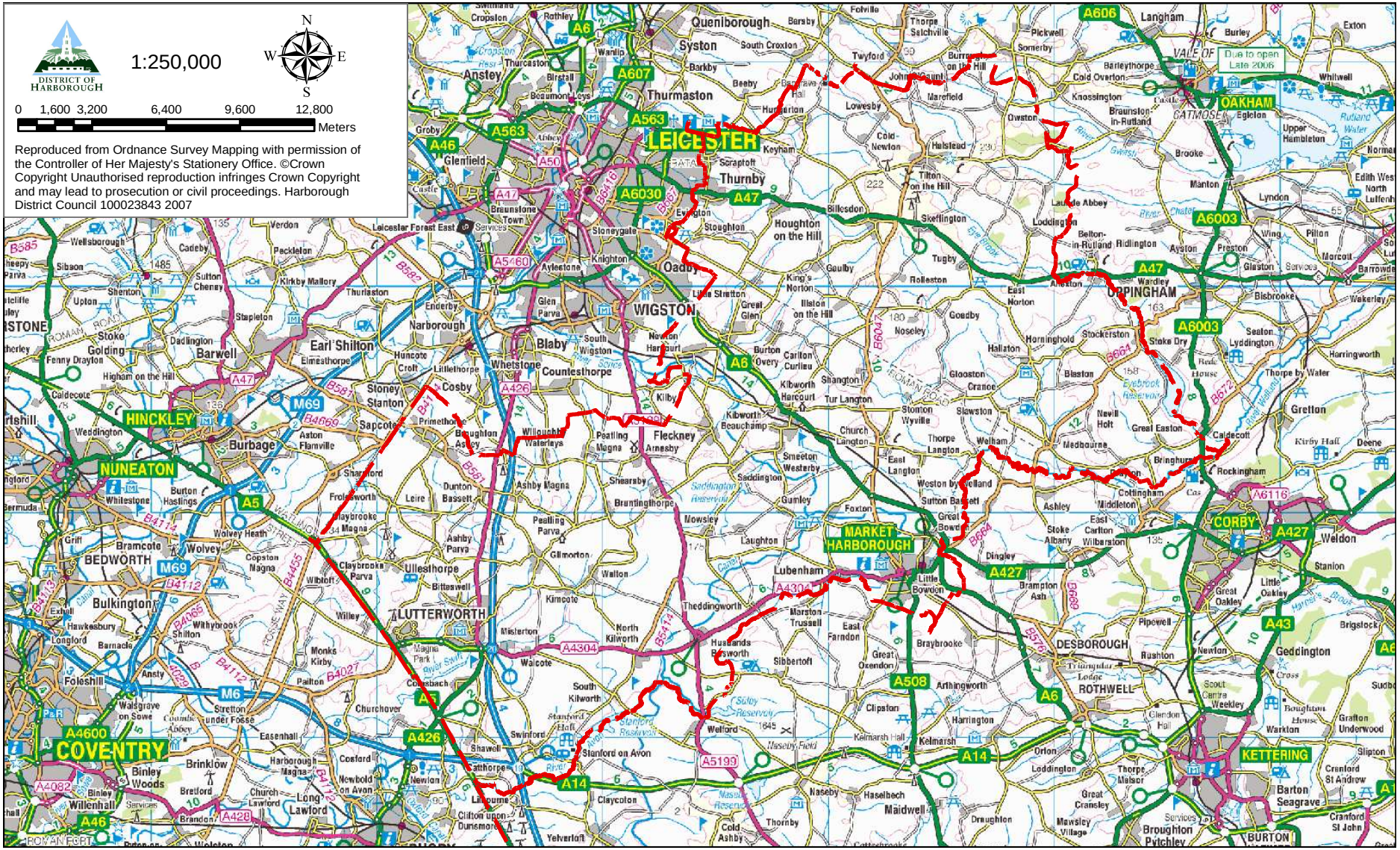
The Midland Main Line railway runs through the district and Market Harborough has an Inter-City station with direct links to London St. Pancras.

These good communication links have encouraged a number of industrial estates to develop, containing medium sized businesses carrying out a range of coating and spraying activities, moulding, and timber processes.

In the south west of the District there is a cluster of mineral activities including sand and gravel extraction, cement batching plants and other associated products.

Although agriculture still plays an important role in the local economy, manufacturing and distribution are of ever increasing importance. At the extreme western side of the District is Magna Park, which is a major warehousing and distribution site, covering approximately 2.3Km^2 (0.9 square miles). A number of the major manufacturers within the UK are located on this site and the 24-hour operation results in a great deal of traffic as most of the products are transported by road. Magna Park is located between the M1 and the A5, therefore a majority of the traffic is directed onto these major roads; however the nearby town of Lutterworth is affected by the increase in road traffic.

Figure. 1. Map of Harborough District



2.2 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.

2.3 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) [2]the Air Quality (England) (Amendment) Regulations 2002 (SI 3043) [3]. They are shown in Table 1. This table shows the objectives in units of microgrammes per cubic metre (μgm^{-3})(for carbon monoxide the units used are milligrammes per cubic metre, mgm^{-3}). Table 1 includes the number of permitted exceedences in any given year (where applicable).

Table 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 μgm^{-3}	Running annual mean	31.12.2003
	5.00 μgm^{-3}	Running annual mean	31.12.2010
1,3-Butadiene	2.25 μgm^{-3}	Running annual mean	31.12.2003
Carbon monoxide	10.0 mgm^{-3}	Running 8-hour mean	31.12.2003
Lead	0.5 μgm^{-3}	Annual mean	31.12.2004
	0.25 μgm^{-3}	Annual mean	31.12.2008
Nitrogen dioxide	200 μgm^{-3} not to be exceeded more than 18 times a year	1-hour mean	31.12.2005
	40 μgm^{-3}	Annual mean	31.12.2005
Particles (PM10) (gravimetric)	50 μgm^{-3} not to be exceeded more than 35 times a year	24-hour mean	31.12.2004
	40 μgm^{-3}	Annual mean	31.12.2004
Sulphur dioxide	350 μgm^{-3} not to be exceeded more than 24 times a year	1-hour mean	31.12.2004
	125 μgm^{-3} not to be exceeded more than 3 times a year	24-hour mean	31.12.2004
	266 μgm^{-3} not to be exceeded more than 35 times a year	15-minute mean	31.12.2005

2.4 Summary of Previous Review and Assessments

The Review and Assessment of the local air quality takes place over a number of stages. The First Stage Review and Assessment carried out in Harborough district concluded that further investigation would be required for Carbon Monoxide, Lead, Particulates and Nitrogen Dioxide. The Second [19] and Third Stage [18] review concluded that with the exception of Nitrogen Dioxide all of the National Air Quality Objectives would be met within the appropriate time frame. As it was anticipated that the national objective for Nitrogen Dioxide was unlikely to be met in Lutterworth Town

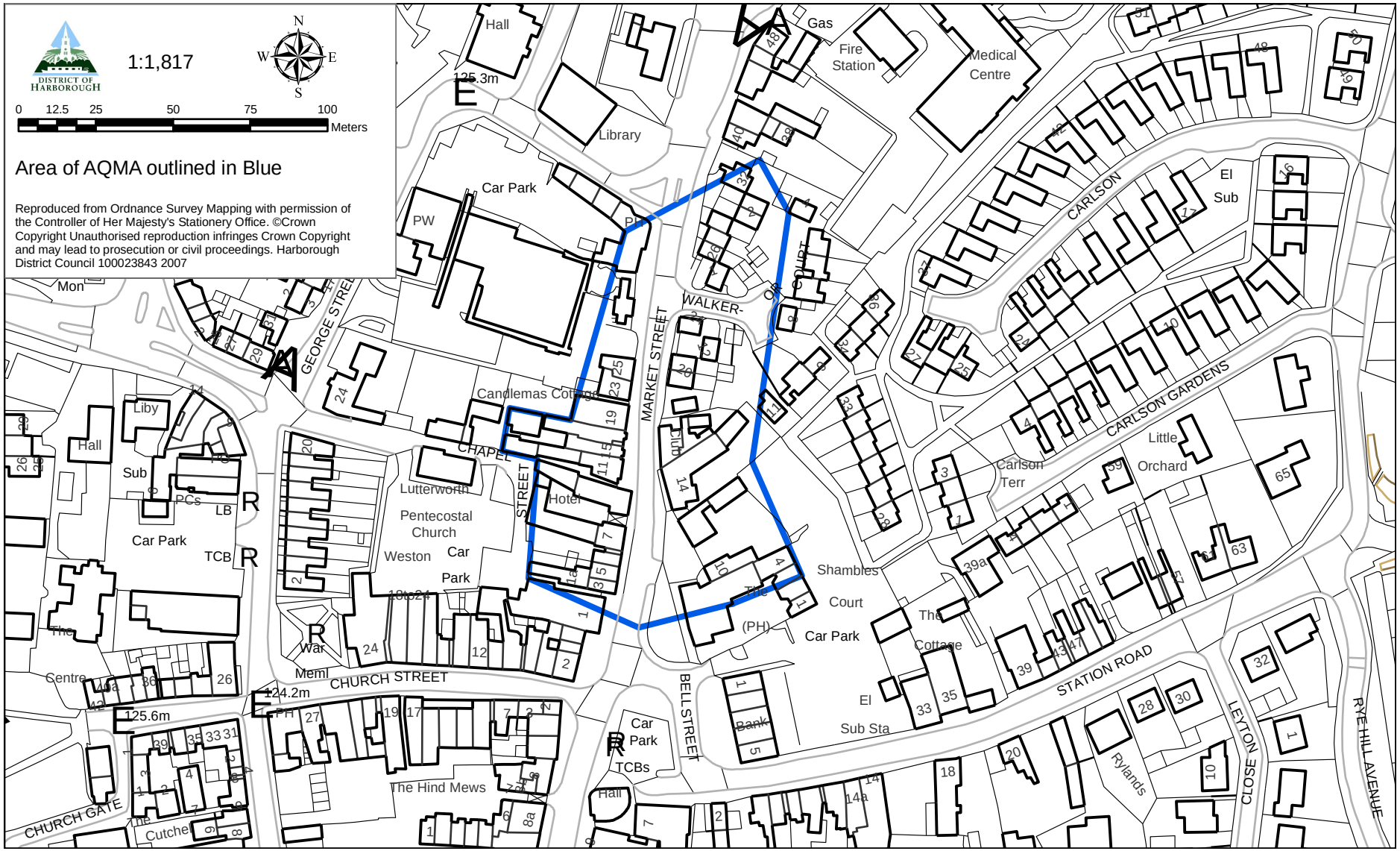
Centre, an Air Quality Management Area (AQMA) was declared in July 2001. Figure. 2

Following the declaration of the Air Quality Management Area a Stage 4 assessment [14] was required to give the council the opportunity to supplement any information already gathered in earlier review and assessment work.

The findings of the Stage 4 assessment confirmed that the annual average National Air Quality Objective for Nitrogen Dioxide was unlikely to be achieved. New Monitoring Data confirmed the source of the problem was traffic related, then an Action Plan [15] was developed which was incorporated into the Leicestershire County Council Local Transport Plan 2.

In 2009 the Council undertook an update and screening assessment [9] which found that generally the air quality in Harborough district is very good; however the air quality in Lutterworth remains high and exceeds the national air quality objective. During 2008 it became apparent that the diffusion tubes in the area were showing a potential exceedence of the objective levels outside of the existing Air Quality Management Area (AQMA). It was necessary to relocate some of the diffusion tubes to confirm the initial findings, and was recommended that a detailed assessment of Lutterworth high street would be required to confirm whether the existing AQMA needs to be extended.

Figure. 2. Map of AQMA Boundaries



3 New Monitoring Data

3.1 Summary of Monitoring Undertaken

3.1.1 Automatic Monitoring Sites

There was an automatic monitoring station in Lutterworth, continuously measuring levels of Nitrogen Dioxide and PM_{10}'s. The monitoring station was situated on the main road running through Lutterworth. The station was located within the existing Air Quality Management Area and was on a roadside position approximately 3 metres from the kerbside of a busy road. There is a slight canyon effect from neighbouring buildings. The station was situated in the same location since 1999; however ratified data has only been available since 2003. The raw data collected by the monitoring station was validated using consultants, Casella Eti. Details of their quality assurance procedure can be found in appendix A. In addition fortnightly manual calibration checks were carried out on the site. The monitoring station ceased operating on 01/05/2009

In addition there is a second real time monitoring station situated in a rural location to the east of the district and this forms part of the AURN national monitoring network and monitors for nitrogen dioxide, carbon monoxide and ozone. Details of the site can be found at http://aurn.defra.gov.uk/stations/viewStation.php?id=78 (accessed 03rd June 2010).This site is not managed by Harborough District Council.

Figure. 3. Map of Automatic Monitoring Sites

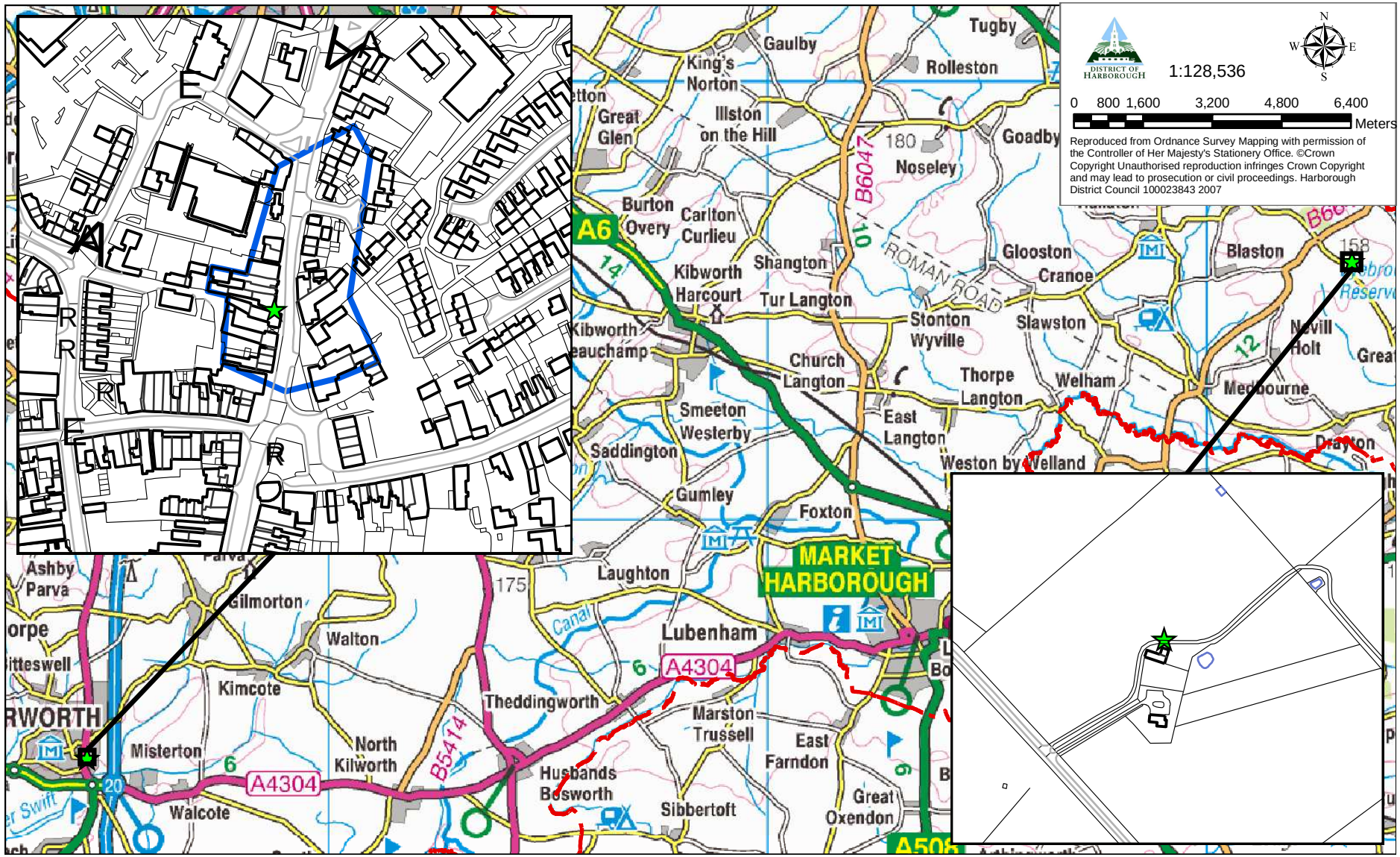


Table 2. Details of Automatic Monitoring Sites

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?
		X	Y						
Lutterworth	Roadside	454473	284544	NO_2	Gas-phase chemilluminescence (ML9841B Nitrogen Oxides Analyzer)	Yes	10m	3m	Y
				NO					
				NO_x					
				PM_{10}	TEOM				
Market Harborough AURN site	Rural	483335	295896	NO	unknown	No	N/A	N/A	N/A
				NO_2					
				CO	unknown				
				Ozone	unknown				

3.1.2 Non-Automatic Monitoring

As part of the assessment of the local air quality, a number of diffusion tubes are located throughout the district. These tubes are a simple and cost effective method for screening air quality and provide a good indication of the annual average levels of Nitrogen Dioxide

The diffusion tube supplier was changed 02 April 2009. Diffusion tubes for the months of January, February and March were analysed by Bureau Veritas Laboratories. Diffusion tubes for the remaining months were analysed by Lambeth Scientific services.

Both laboratories have a defined quality system, which forms part of the UKAS accreditation programme.

Bureau Veritas tubes are prepared by spiking with 20% TEA in water. Lambeth Scientific tubes are prepared by spiking with 50% TEA in acetone

Workplace Analysis Scheme for Proficiency (WASP) rounds 103 to 107 which covered the WASP scheme for October 2008 to October 2009 were all category 1 (good) using the current RPI criteria Lambeth scientific score as acceptable using the new RPI criteria which will come in with round 111 (October 2010). Results as detailed in Table 3

Table 3. Laboratory WASP scores

Laboratory	Performance on basis of RPI, current CRITERIA, best 4 out of the 5 rounds 103-107	Performance on basis of RPI, NEW CRITERIA, best 4 out of the 5 rounds 103-107
Bureau Veritas	Good	Good
Lambeth Scientific Services	Good	Acceptable

Bias adjustment factors are taken form the DEFRA Review and assessment helpdesk bias adjustment factor spreadsheet (http://laqm1.defra.gov.uk/review/tools/no2/baf-national.php)[accessed 28th July 2010]. The Bias adjustment factor for Bureau Veritas 20% TEA in water is 0.81. The Bias adjustment factor for Lambeth Scientific 50% TEA in acetone is 1.03

As 2 different tube methods and suppliers have been used the most conservative of the 2 bias adjustment factors will be used i.e. 1.03.

Figure. 4. Map of Non-Automatic Monitoring Sites

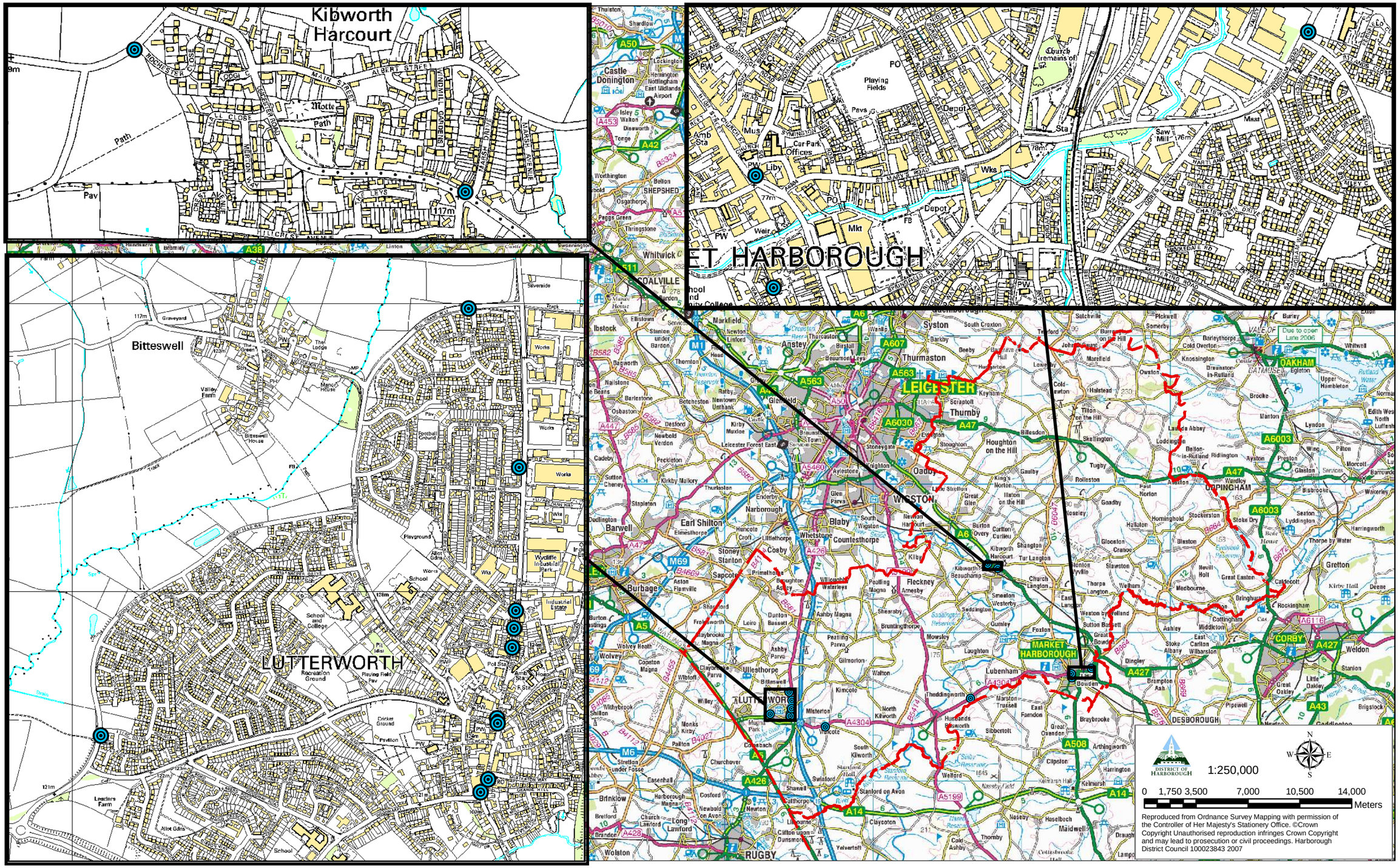


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Table 4. Details of Non- Automatic Monitoring Sites

National AQ archive Site details	location	Site Type	Grid Reference		Our Tube No.	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 ?
			X	Y						
82705- Harborough 01n	Lutterworth Service Shop	Roadside	454475	284560	2	NO_2	Y	0	4.2	Y
82708- Harborough 03n	Brooklands (Home)	Urban background	473418	286956	3	NO_2	N	N/A	N/A	Y
83024- Harborough 05n	Lutterworth Regent Road	Roadside	454418	284303	1	NO_2	N	21	4.3	N
84430- Harborough 06n	Monitoring Station	Roadside	454476	284541	5	NO_2	Y	0	2.6	Y
84431- Harborough 07n	Theddingworth	Roadside	466586	285571	6	NO_2	N	N/A	2	N
84432- Harborough 08n	Lilac Drive	Roadside	453065	284412	7	NO_2	N	7	1.8	Y
84433- Harborough 09n	Maxwell Way	Roadside	454376	285981	8	NO_2	N	11.1	1.2	Y
84435- Harborough 11n	Day Nursery	Roadside	454539	284932	10	NO_2	N	9	1.3	N
84440- Harborough 12n	A6 Kibworth	Roadside	468425	294314	11	NO_2	N	10.7	1.3	Y
84441- Harborough 13n	Rockingham Road	Roadside	474731	287585	12	NO_2	N	9	2.8	Y
84444- Harborough 16n	Walcote	Roadside	456810	283652	15	NO_2	N	12.5	3	Y
84446- Harborough 17n	The Square	Roadside	473373	287231	16	NO_2	N	2.5	3	Y
84448- Harborough 18n	Jazz Hair	Roadside	454443	284348	17	NO_2	N	0	3	Y
86155- Harborough 19n	Wistow Rd Kibworth	Roadside	467739	294611	14	NO_2	N	2.5	5.4	Y
86381- Harborough 20n	3 Leicester road Lutterworth	Roadside	454527	284805	4	NO_2	N	13.7	1.9	Y
86382- Harborough 21n	19 Leicester road Lutterworth	Roadside	454551	285430	13	NO_2	N	13.6	3.3	Y
86383- Harborough 22n	77 Leicester road Lutterworth	Roadside	454533	284872	9	NO_2	N	0	13.5	Y

3.2 Comparison of Monitoring Results with Air Quality Objectives

3.2.1 Nitrogen Dioxide

3.2.1.a Automatic Monitoring Data

The automatic monitor in Lutterworth has shown that, for the 4 months it was in operation during 2009, the AQ objective for NO_2 annual mean concentration was exceeded within the AQMA. Historically the trend for the annual mean concentration is around 50µgm^{-3}. There were no recorded exceedences of the 1-hour mean and the 99.8th percentile of 24 hour means is below the 1-hour mean AQ objective.

Table 5. Results of Automatic Monitoring for Nitrogen Dioxide: Comparison with Annual Mean Objective

Site ID	Location	Within AQMA?	Data Capture for monitoring period [a] %	Data Capture for full calendar year 2009 [b] %	Annual mean concentrations (µgm^{-3})			
					2006 [c, d]	2007 [c, d]	2008 [c,d]	2009 [c]
1	Lutterworth	Y	76%	19%	**55.0**	**50.8**	**50.5**	**53.2** (not annualised as Box 3.2 in TG(09) as no long term site to use for adjustment)
2	Market Harborough – Rural	N			10.9	11.6	10.8	12.0

a) i.e. data capture for the monitoring period, in cases where monitoring was only carried out for part of the year.
b) 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%.)
c) Means should be "annualised" as in Box 3.2 of TG(09), if monitoring was not carried out for the full year.
d) Annual mean concentrations for previous years are optional.

Figure. 5. Trends in Annual Mean Nitrogen Dioxide Concentration Measured at Automatic Monitoring Site.

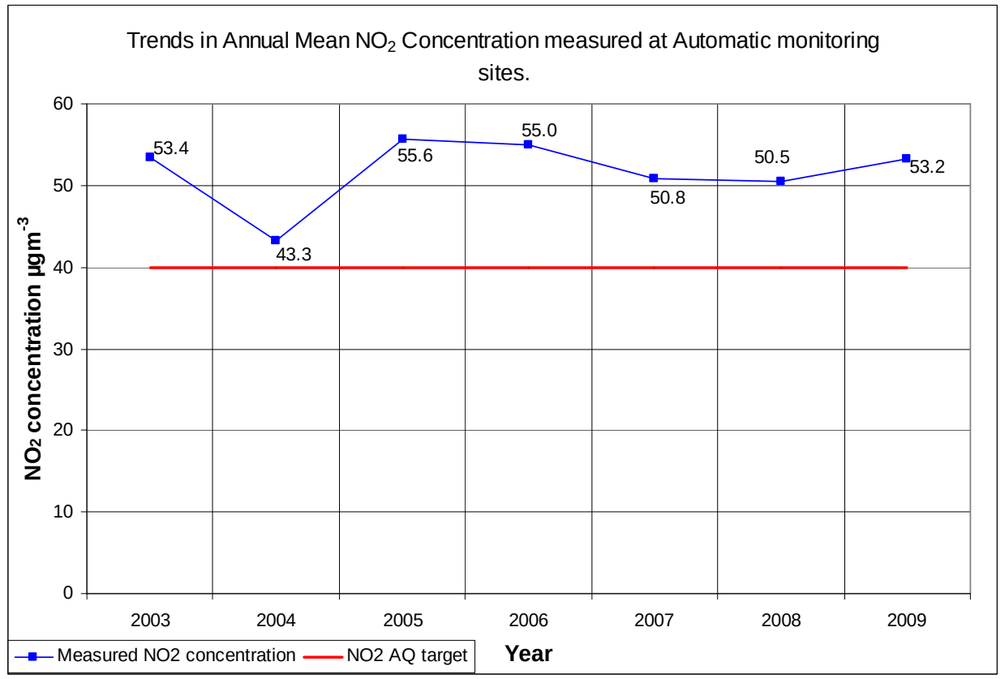

Table 6. Results of Automatic Monitoring for Nitrogen Dioxide: Comparison with 1-hour Mean Objective

Site ID	Location	Within AQMA?	Data Capture for monitoring period [a] %	Data Capture for full calendar year 2009 [b] %	Number of Exceedences of hourly mean (200 µgm^{-3})			
					2006 [cd]	2007 [cd]	2008 [cd]	2009 [d]
1	Lutterworth	Y	76%	19%	6	0	0 (152.82)	0 (145.4)
2	Market Harborough – Rural	N			0	0	0	0

a) i.e. data capture for the monitoring period, in cases where monitoring was only carried out for part of the year.
b) 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%.)
c) Numbers of exceedences for previous years are optional.
d) 99.8th percentile of hourly means given in brackets if the period of valid data is less than 90% of a full year.

3.2.1.b Diffusion Tube Monitoring Data

Some diffusion tubes have undergone a façade correction (presented in Table 8) the corrections were undertaken using the procedure outlined in Box 2.3: Predicting nitrogen dioxide concentrations at different distances from road of the technical guidance [6] (reproduced below for reference).

Box 2.3: Predicting nitrogen dioxide concentrations at different distances from roads

A method has been developed to allow NO_2 measurements made at one distance from a road to be used to predict concentrations at a different distance from the same road. It is appropriate for distances between 0.1 m and 140 m of the kerb.

Step 1: Identify the local background concentration in μgm^{-3}, either from local monitoring or from the national maps published at www.airquality.co.uk. (Note that the background concentration must be less than the measured concentration).

Step 2: apply the following calculation

$$C_z = \left(\frac{C_y - C_b}{-0.5476 \times Ln(D_y) + 2.7171} \right) \times (-0.5476 \times Ln(D_z) + 2.7171) + C_b$$

Where:

C_z is the total predicted concentration (μgm^{-3}) at distance D_z;
C_y is the total measured concentration (μgm^{-3}) at distance D_y;
C_b is the background concentration (μgm^{-3});
D_y is the distance from the kerb at which concentrations were measured; and
D_z is the distance from the kerb (m) at which concentrations are to be predicted.
$Ln(D)$ is the natural log of the number D.

Results derived in this way will have a greater uncertainty than the measured data. Further assistance with this procedure and interpretation of the results can be obtained from the Review and Assessment helpdesk (www.uwe.ac.uk/aqm/review).

Calculator

The equation above is available as a simple calculator (available at http://www.airquality.co.uk/archive/laqm/tools.php) . This is set up to work from 0.1 to 50 m from the kerb, as this is the range that is likely to be relevant for Local Air Quality Management (LAQM) work. Kerbside sites should be treated as being at 0.1 m from the kerb. The calculator works for receptors either closer to or further from the kerb than the monitor. The greater the distance between the receptor and monitor, the greater the uncertainty in the derived receptor concentration. It is therefore recommended that if the receptor is further from the kerb than the monitor it should be no more than 20 m away. If the receptor is closer to the kerb, then it should be no more than 10 m from the monitor.

Modified from Box 2.3 page 2-6 of the technical Guidance 2009 [6] (modification are improved layout of equation and insertion of hyperlinks where footnotes are present in the original.

Diffusion tube monitoring (presented in Appendix B) has shown that the Annual mean objective for NO_2 (Table 7) is being exceeded within the AQMA and at 2 locations south of the AQMA.

The tube located at 3 Leicester Road Lutterworth is to the north of the AQMA recorded a bias adjusted annual mean of 45.58 μgm^{-3} exceeding the annual

mean AQ objective for NO_2, however when a façade correction is undertaken the concentration of NO_2 at the relevant receptor is estimated to be 34.39 μgm^{-3}.

The diffusion tube located near to the A6 in Kibworth recorded a bias adjusted annual mean of 49.34 μgm^{-3} which exceeds the annual mean AQ objective for NO_2, however when a façade correction is undertaken the concentration of NO_2 at the relevant receptor is estimated to be 31.27 μgm^{-3}.

It is noted that the diffusion tube located in Theddingworth has recorded an exceedence of the annual mean however historically this site has been consistently well below the objective (see Table 7 and Figure. 6). It is therefore assumed that this year has been an exception, the council will however monitor the situation and should it appear that Theddingworth will again exceed the AQO it will be necessary to proceed to a detailed assessment.

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Table 7. Results of Nitrogen Dioxide Diffusion Tubes

Site ID	Location	Within AQMA ?	Data Capture for monitoring period [a] %	Data Capture for full calendar year 2009 [b] %	Annual mean concentrations (µg/m^3) [c, d, e, f]				
					2005	2006	2007	2008	2009
82705- Harborough 01n	Lutterworth Service Shop	Y	100%	100%	**48.24**	**55.13**	**55.20**	**50.03**	**59.23**
82708- Harborough 03n	Brooklands (Home)	N	100%	100%	17.08	15.98	20.86	14.94	20.00
83024- Harborough 05n	Lutterworth Regent Road	Y	67%	67%	**55.96**	**51.69**	**60.03**	**54.25**	**76.61**
84430- Harborough 06n	Monitoring Station	Y	92%	92%	**49.59**	**46.55**	**56.54**	**41.43**	**57.96**
84431- Harborough 07n	Theddingworth	N	100%	100%	23.49	31.16	33.15	33.55	**41.03**
84432- Harborough 08n	Lilac Drive	N	100%	100%	26.19	27.99	27.15	30.09	27.55
84433- Harborough 09n	Maxwell Way	N	92%	92%	24.38	26.39	27.98	27.74	32.30
84435- Harborough 11n	Day Nursery	N	100%	100%	**43.84**	**47.68**	**44.40**	**48.62**	**36.39**
84440- Harborough 12n	A6 Kibworth	N	83%	83%	**36.94**	35.09	**42.00**	**37.97**	**49.34**
84441- Harborough 13n	Rockingham Road	N	100%	100%	26.46	29.00	33.38	35.69	**43.09**
84444- Harborough 16n	Walcote	N	83%	83%	26.01	24.99	29.88	28.07	32.24
84446- Harborough 17n	The Square	N	58%	58%	29.84	27.55	33.75	30.34	**38.70**
84448- Harborough 18n	Jazz Hair	N	92%	92%	**41.72**	**44.54**	**51.68**	**48.90**	**53.47**
86155- Harborough 19n	Wistow Rd Kibworth	N	92%	92%				25.59	26.03
86381- Harborough 20n	3 Leicester road Lutterworth	N	100%	100%				**37.46**	**45.58**
86382- Harborough 21n	19 Leicester road Lutterworth	N	100%	100%				**38.53**	**39.48**
86383- Harborough 22n	77 Leicester road Lutterworth	N	100%	100%				28.54	27.38

a) i.e. data capture for the monitoring period, in cases where monitoring was only carried out for part of the year.
b) 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%.)
c) Means should be "annualised" as in Box 3.2 of TG(09), if monitoring was not carried out for the full year. Annualised data highlighted in green
d) Annual mean concentrations for previous years are optional.
e) Values exceeding the AQ objective are shown in red
f) Values exceeding 36µgm^{-3} (1 standard deviation below the AQ objective) are shown in Blue.

Table 8. Façade corrected data

Site ID	Location	Within AQMA?	Annual mean concentrations (μgm^{-3}) [a, b,]	
			Annual bias adjusted mean	Façade corrected Annual bias adjusted mean [c]
83024- Harborough 05n	Lutterworth. Regent Road	Y	**66.94**	**44.29**
84432- Harborough 08n	Lilac Drive	N	24.08	21.71
84433- Harborough 09n	Maxwell Way	N	28.23	22.70
84435- Harborough 11n	Day Nursery	N	31.80	30.33
84440- Harborough 12n	A6 Kibworth	N	**43.11**	31.27
84441- Harborough 13n	Rockingham Road	N	**37.65**	34.14
84444- Harborough 16n	Walcote	N	28.17	23.97
84446- Harborough 17n	The Square	N	33.81	34.36
86155- Harborough 19n	Wistow Rd Kibworth	N	22.75	24.28
86381- Harborough 20n	3 Leicester Road Lutterworth	N	**39.83**	34.39
86382- Harborough 21n	19 Leicester Road Lutterworth	N	34.50	32.18

a) Values exceeding the AQ objective are shown in red
b) Values exceeding 36μgm^{-3} (1 standard deviation below the AQ objective) are shown in Blue
c) Calculated following procedure outlined in box 2.3: Predicting nitrogen dioxide concentrations at different distances from roads. Page 2-6 of LAQM.TG(09)

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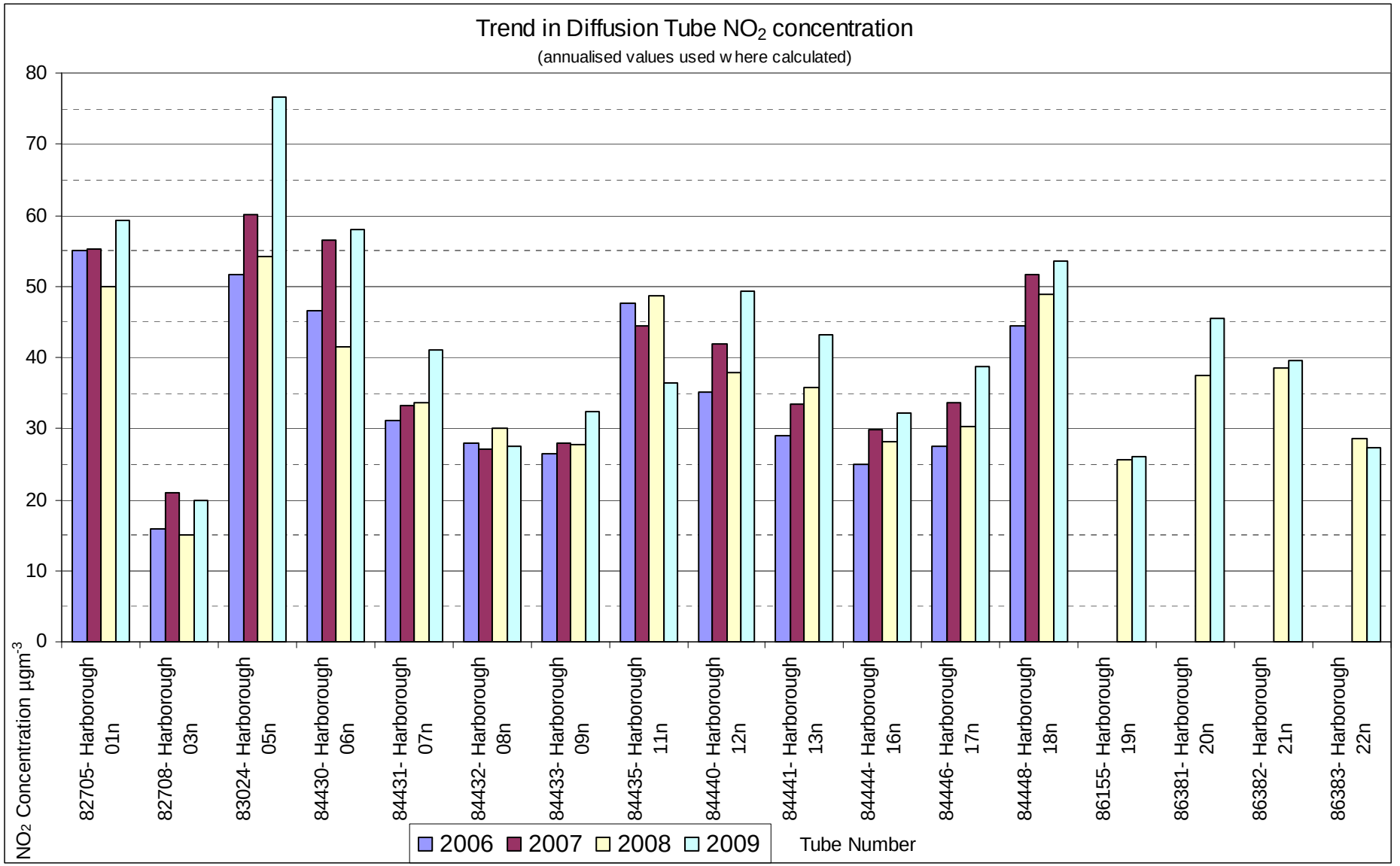
Figure. 6. Trends in Annual Mean Nitrogen Dioxide Concentration Measured at Diffusion Tube Monitoring Sites.



3.2.2 PM_{10}

The Annual mean concentration for PM_{10} is below the air quality objective (Table 1).

There is only 1 exceedence of the 24-hour mean air quality objective and the 90th percentile of the 24-hour mean concentrations is below the 24-hour mean objective.

Table 9. Results of PM_{10} Automatic Monitoring: Comparison with Annual Mean Objective

Site ID	Location	Within AQMA?	Data Capture for monitoring period [a] %	Data Capture for full calendar year 2009 [b] %	Annual mean concentrations (μgm^{-3}) [c, d]			
					2006	2007	2008	2009 [c]
1	Lutterworth	Y	80.22	20	24.2	23.6	19.70	27.6 (not annualised as Box 3.2 in TG(09) as no long term site to use for adjustment)

a) i.e. data capture for the monitoring period, in cases where monitoring was only carried out for part of the year.
b) 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%.)
c) Means should be "annualised" as in Box 3.2 of TG(09), if monitoring was not carried out for the full year.
d) Annual mean concentrations for previous years are optional.

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

Site ID	Location	Within AQMA?	Data Capture for monitoring period [a] %	Data Capture 2009 [b] %	Number of Exceedences of daily mean objective (50 μgm^{-3}) [c, d]			
					2006	2007	2008	2009
1	Lutterworth	Y	80.22	20	7	4	2 (29.7)	1 (40.01)

a) i.e. data capture for the monitoring period, in cases where monitoring was only carried out for part of the year.
b) 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%.)
c) Numbers of exceedences for previous years are optional.
d) 90th percentile of daily means given in brackets if data capture < 90%,.

3.2.3 Sulphur Dioxide

The Authority does not currently monitor for this pollutant.

3.2.4 Benzene

The Authority does not currently monitor for this pollutant.

3.2.5 Other pollutants monitored

The Authority does not currently monitor for any other pollutants.

3.2.6 Summary of Compliance with AQS Objectives

The annual mean air quality objective for NO_2 is not being met in relevant locations outside of the Lutterworth AQMA. As such it is necessary that a detailed assessment is conducted to assess the need to expand the area of the Lutterworth AQMA. The detailed assessment was recommended in the 2009 Update and screening assessment [9] and is currently being undertaken

Harborough District Council has measured concentrations of NO_2 above the annual mean objective at relevant locations outside of the Lutterworth AQMA , and will need to proceed to a Detailed Assessment, for area to the south of the AQMA along High Street and Rugby Road.

4 New Local Developments

4.1 Housing developments

There are no new housing developments that could have an effect on air quality which have not had an air quality impact assessment.

4.2 Road Traffic Sources

There are no newly constructed, proposed or previously un-assessed road in the district

4.3 Other Transport Sources

There are no:

- Airports;
- Locations where diesel or steam trains are regularly stationary for periods of 15 minutes or more, with potential for relevant exposure within 15m;

- Locations with a large number of movements of diesel locomotives, and potential long-term relevant exposure within 30m; or
- Ports for shipping.

located within the district.

4.4 Industrial Sources

There are no new

- Industrial installations: new or proposed installations for which an air quality assessment has been carried out;
- Industrial installations: existing installations where emissions have increased substantially or new relevant exposure has been introduced;
- Industrial installations: new or significantly changed installations with no previous air quality assessment;
- Major fuel storage depots storing petrol;
- Petrol stations; or
- Poultry farms.

within the District.

4.5 Commercial and Domestic Sources

There are no new:

- Biomass combustion plant – individual installations.
- Areas where the combined impact of several biomass combustion sources may be relevant.
- Areas where domestic solid fuel burning may be relevant.
- Start writing your supporting text on new/newly identified commercial and domestic sources here.

within the district.

4.6 New Developments with Fugitive or Uncontrolled Sources

There are no new:

- Landfill sites.

- Quarries.
- Unmade haulage roads on industrial sites.
- Waste transfer stations etc.
- Other potential sources of fugitive particulate emissions.

within the district

Harborough District 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.

5 Local / Regional Air Quality Strategy

The Authority has not currently adopted an Air Quality Strategy and does not participate in a regional Air Quality Strategy.

However the Authority is in the processes of drafting a Climate Change Strategy which will incorporate its Air Quality Strategy as outlined in the Local Air Quality Management Policy Guidance Document LAQM.PG(09) [7]. This will help the authority to deliver improvements to air quality in an integrated manner.

The strategy is being developed in a multi-disciplinary manner involving all relevant authority departments, including Development Control, Waste, and Leicestershire County Council Highways.

6 Planning Applications

There are no planning applications awaiting approval that will affect the AQMA or air quality within the district.

7 Air Quality Planning Policies

There are currently no adopted Local Plan policies dealing specifically with air quality.

The emerging Local Development Framework (LDF) currently does not have any adopted Development Plan Documents. However work on establishing sites and/or broad areas for future developments is very likely to include an appraisal of whether the sites in question will adversely

affect, or be adversely affected by, local air quality issues and whether particular types of development of a site could help address existing air quality issues.

8 Local Transport Plans and Strategies

Air quality measures for the AQMA in Lutterworth were included in Leicestershire County Council Local Transport Plan 2 (2006-2011)(LTP2) [20] Details on the progress made on the actions included in LTP2 [20] is presented in Table 11 Action Plan Progress.

Harborough District Council is currently liaising with Leicestershire County Council for inclusion of air quality measures relating to the AQMA to be included in Leicestershire County Council Local Transport Plan 3 (2011-2026) (LTP3)

9 Climate Change Strategies

The council is currently in the processes of drafting its climate change strategy with the aim of publishing the completed document by April 2011. The current draft has provision for the inclusion of a section on transport and air quality.

10 Implementation of Action Plans

In 2006 the Action Plan was incorporated into the Leicestershire County Council Local Transport Plan 2 (2006-2011)[20]. The potential options were evaluated on a cost/benefit basis and ranked in accordance with the perceived improvements to air quality. The NO_2 impacts have been estimated for Local Transport Plan purposes and give an indication on the likely improvement in air quality as a result of the action.

Table 11. Action Plan Progress

No.	Measure	Lead authority	Target annual emission reduction in the AQMA	Progress to date	Progress in last 12 months	Status
1	Completion of Lutterworth Western Relief Road to divert traffic from the town centre	County Council	>2 µgm^{-3}	During Winter 2007/08 a traffic study of Lutterworth was completed to look at the cost and feasibility of providing a bypass to remove traffic, in particular HGVs, from the town centre. Three options were considered – a Western Relief Road, a new Western Bypass and an Eastern Bypass incorporating a split junction on the M1 Motorway. The study included an analysis of traffic patterns and this, combined with initial consultation, suggest that completing the Western Relief Road will not solve the problem of reducing HGV nuisance in Lutterworth, but would move it to another part of the town and would effectively constrain Lutterworth within a triangle of roads all with a high proportion of HGVs using them. The new Western route would also be unattractive due to the length of diversions that would be necessary. The Eastern option would provide the best overall traffic benefit to the town and received the most support during the initial consultation. However, this is a very expensive option and it will be difficult to secure funding. Leicestershire County Council Highways Department are now discussing with Harborough District Council the possibility of abandoning the reservation for the Western Relief Road and taking forward a longer-term aspiration of an Eastern Bypass. Leicestershire County Council highways department are discussing the options to formally consult on this through the Local Development Framework consultation on the Core Strategy to ensure it is considered in the context of wider planning for Lutterworth. It is also being considered in the development of Leicestershire County Councils longer-term transport plan. In the short-term, Leicestershire County Council made an undertaking at the Harborough Highway Forum in April 2008 to have a look at the surface and utility's equipment in the town centre to see if there were any improvements that could be made, predominantly to reduce noise and vibration. From an initial inspection there are some utility covers that are lower than the road surface and could be reset and a small area of surfacing that requires attention. There are very few other options that can be pursued in the short-term to improve levels of air quality.	Following the transport study, consultation on abandoning the reservation of the Western Relief Road and seeking views on the eastern option has taken place through the Harborough LDF process. The results from this are still awaited.	Revised time scale to 2025
2	7.5 tonne weight limit to divert lorries from A426 through the town centre.	County Council	>2 µgm^{-3}	Diverting lorries away from the town centre would depend on providing an alternative route. The traffic study outlined in Action 1 suggests that completing the Western Relief Road and removing the 7.5 tonne weight restriction would only move the nuisance to another part of the Lutterworth. Initial consultation suggests that this option would meet with strong local opposition. Consultation on abandoning the Western Relief Road reservation is to take place and the Eastern option would be a longer-term proposal. This measure is therefore considered unfeasible in the short-term by Leicestershire County Council.		Subject to action No.1
3	Lower emissions from district and it's contractor vehicle fleets	Harborough District	<0.2 µgm^{-3}	It is a condition of all new contract renewals that vehicles use Euro 4 standard engines. PEST control, dog warden and refuse contracts have recently been renewed		Completed 2008
4	Cleaner vehicles in town centre with Low Emission Zone	County Council	>2 µgm^{-3}	A Low Emission Zone would only allow access to the town centre by vehicles which meet the most recent emission standards. This would have severe implications for the goods vehicles and buses which currently provide for the essential needs of the town. Such a proposal would only be feasible in the longer term when vehicles become less polluting (i.e. beyond end of LTP2).		ongoing 2016

No.	Measure	Lead authority	Target annual emission reduction in the AQMA	Progress to date	Progress in last 12 months	Status
5	Planning Controls to reduce traffic impact of new development on AQMA	Harborough District	<0.2 μgm^{-3}	Planning controls to reduce traffic impact from new development have been used successfully in the past through the application of lorry route agreements for new developments at the nearby Magna Park, which all exclude the use of the A426 through the town centre. Similar agreements will be imposed on future new developments of this type. See also action 12.		completed 2008 Measures ongoing
6	Road side emission testing of goods vehicles	VOSA	1 – 0.2 μgm^{-3}	Roadside emission testing has been raised with the Vehicle and Operating Services Agency (VOSA) and further consideration will be given to the inclusion of the A426 in their programme of roadside emission testing. The District Council undertook a VOSA 'dirty diesel' advertising campaign to get people to report polluting vehicles in 2008.		2008
7	Work with bus companies to reduce bus emissions	County Council	1 – 0.2 μgm^{-3}	Although the major cause of air quality problems in Lutterworth has been identified as HGV lorries, reductions in bus emissions will help to improve the overall position. Bus operators either have or are developing strategies that include initiatives to improve fuel efficiency and are designing training to reduce fuel consumption by better driving styles to help reduce emissions. An example of this is information on timetables for drivers to turn off engines if they will be at bus stops for longer than 2 minutes. The City Council are letting a study to investigate the use of alternative, fuel efficient vehicles for the new Park & Ride Site at Enderby which is being jointly delivered by the City and County Councils. As work develops to improve engine efficiency the Quality Bus Partnership provides the mechanism for local operators to share and develop best practice / experience. Bus operators are working to modernise their fleets. By working in partnership over a number of areas Arriva invested £9.6m in 54 new vehicles in 2006/07 which has significantly reduced the average age of their vehicle fleet. Older vehicles have been replaced with new vehicles containing lower emission Euro 4 engines.		Implemented 2008 Measures ongoing
8	Network management for road works, incidents and planned events	County Council	<0.2μgm^{-3}	Network management is not a major issue for Lutterworth as there are no large venues and it is a relatively small market town. As part of the Network Management Duty Leicestershire county council highways co-ordinate streetworks, manage planned events, and have procedures for dealing with incidents. Leicestershire county council highways roadworks protocol aims to provide improved roadworks information to the public and greater involvement for the public in their approach to delivering roadworks.		2008
9	School travel planning with investment in walking and cycle routes	County Council	<0.2μgm^{-3}	**School travel planning** Concerted efforts continue to increase the number of schools with travel plans across the County. We work closely with schools to encourage and support them in the development of plans. To further encourage them to do so our capital investment programme for safer routes to school is focused on those who have travel plans or are developing them.	68% of schools in Harborough have travel plans in place, which is an increase from 61% in July 2008.	2008

No.	Measure	Lead authority	Target annual emission reduction in the AQMA	Progress to date	Progress in last 12 months	Status
				Cycling A key plank of Leicestershire county council highways strategy to tackle congestion is to encourage much greater levels of cycling across the County by improving the cycling facilities available. A Cycling Network Plan which shows existing cycle routes and identifies other possible layouts for routes in Lutterworth has been developed by the Lutterworth Cycling Network Working Group as part of the Lutterworth Improvement Partnership. The group will continue to work with the County Council, District Council and SUSTRANS to identify funding sources for the implementation of the plan. This will form part of a wider transport strategy for Lutterworth that is in the process of being developed. A cycle park has been installed at the Lutterworth One-Stop-Shop to encourage cycle use in the town and Harborough District Council took part in 'Bike to Work Week'. Harborough have also introduced 'Cyclescheme' to allow employees to purchase tax free bikes. The intention is to roll this scheme out to local businesses.	Data on cycling levels in Harborough is limited but based on figures to the end of 2008, there has been a 15% increase in cycling at counting sites in the County since 2000-03 (LTP2 base). However, this increase should be considered in the context of the inclusion of additional count sites as LTP2 has developed, significant growth that has been achieved at a couple of sites and the relatively small number of trips involved at certain sites (leading to big % changes). Further work is ongoing to identify the impact of these factors on the overall figure but these increases represent a significant achievement following a period of static growth in levels of cycling across the County during LTP1 (2006-2011).	
10	Smarter Choices and promotion building on working travel plans	County Council	<0.2µgm^{-3}	Leicestershire County Council highways, transportation and development guide for developers requires a travel plan for new developments over a certain area or number of dwellings. Furthermore, national planning guidance (PPG13) specifies that even smaller developments will require travel plans where they might generate significant amounts of traffic in, or near to, air quality management areas. Work continues to encourage major employers across the County to put workplace travel plans in place to reduce congestion. We are working closely with District Councils where planning applications are involved.	41% of major employers (>250 employees) across the County now have travel plans in place, which is an increase from 39% in July 2008. We are on track to achieve our target for 50% of major employers to have travel plans by the end of 2010/11.	Implemented 2008 Measures ongoing
11	Better vehicle use of roadspace for less disruption to free flowing traffic	County Council	<0.2µgm^{-3}	**CPE** Civil Parking Enforcement (CPE) was introduced in Leicestershire from July 2007. This has seen the enforcement of parking regulations pass from the Police to the County and District Councils. We are undertaking a data gathering exercise to allow us to monitor the effectiveness of CPE. We will need at least two years worth of data before we can start identify trends and whether CPE is achieving a change in behaviour. The increased number of traffic wardens in the district will result in fewer obstructions and less disruption to the free flow from illegally parked vehicles Reduction in congestion and improved air quality, with efficient junction designs and smarter electronic controls making best use of a junction's capacity and increasing the throughput of traffic. **Junction improvements** The County Council's ongoing transport improvement programme includes schemes which are aimed at improving traffic flows through improvements to traffic signal and Intelligent Transport Systems, and major and minor junctions.		Implemented 2008 measures ongoing
12	Land use planning for no unnecessary additional traffic through town centre.	Harborough District	1 – 0.2 µgm^{-3}	Within Local Development Frameworks it is necessary for any major development, residential or commercial, to carryout a Sustainability Appraisal as part of the planning application process. This will further reduce the impact any new major development will have on the air quality within the Air Quality Management Areas.		ongoing 2011

11 Conclusions and Proposed Actions

11.1 Conclusions from New Monitoring Data

New monitoring data has confirmed that the detailed assessment recommended in the 2009 Update and Screening Assessment [9] is required

11.2 Conclusions relating to New Local Developments

There are no new Developments requiring consideration in the next update and screening assessment

11.3 Other Conclusions

11.3.1 Implementation of Air Quality Action Plans

The implementation of the Air quality Action Plan has now stalled waiting for Leicestershire County Council Highways Department.

11.3.2 Local Transport Plan

Air quality issues are being included in the Leicestershire County Council Local Transport Plan 3 (2011-2026) (LTP3). This requires liaison with Leicestershire County Council Highways Department.

11.3.3 Relevant updates of planning policies that relate to air quality.

The emerging Local Development Framework (LDF) currently does not have any adopted Development Plan Documents. However work on establishing sites and/or broad areas for future developments is very likely to include an appraisal of whether the sites in question will adversely affect, or be adversely affected by, local air quality issues and whether particular types of development of a site could help address existing air quality issues.

11.4 Proposed Actions

- Submit a Detailed Assessment for NO_2 for Lutterworth High Street extending to the north and south of the current AQMA. This assessment is currently being undertaken.
- Liaise with Leicestershire County Council for the Lutterworth Air Quality Management Area to be included in the Local Transport Plan 3 and subsequent Action Plan.
- Monitor the situation in Theddingworth, should it appear that the AQO is going to be exceeded progress to a Detailed Assessment
- Submit the 2011 Progress Report

12 References

12.1 Legislation and Statutory Instruments

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13 Appendices

Air Quality Monitoring Station Report for Harborough District Council

Air Quality Monitoring Station at Lutterworth

January, February, March & April 2009

Casella Monitor Data Services,
Regent House, Wolseley Road, Kempston, Bedford, MK42 7JY
Tel: 01234 844100 Fax: 01234 841490

Data Management Report for Lutterworth Air Quality Monitoring Station

Contents

Appendices

1. Introduction

This report is a summary of air quality data from the ambient Air Quality Monitoring Station (A.Q.M.S.) located at the following site:

LUTTERWORTH

The Harborough District Council A.Q.M.S. is situated on the main road running through the market town of Lutterworth, Leicestershire. The station is located within an existing Air Quality Management Area and is on a roadside position approximately Three metres from the kerbside of a busy road. There is a slight canyon effect from neighbouring buildings.

The station has been at the same location since June 1999. The monitoring equipment is housed in an air-conditioned, purpose built static cabin.

Pollutants and other parameters monitored at this site are:

- NO_x (Oxides of Nitrogen)
- NO (Nitric Oxide)
- NO_2 (Nitrogen Dioxide)
- PM_{10} (Particles)

The objectives included in the Air Quality Regulations for the purpose of Local Air Quality Management are as follows

Pollutant	Air Quality Objectives			Date to be achieved by
	Concentration	Exceedance	Measured As	
Nitrogen Dioxide	200 µgm3	18 times a year	1 hour mean	31/12/2005
	40 µg/m3		annual	31/12/2005
Particles (Gravimetric)	50 μgm^3	35 times a year	24 hour mean	31/12/2004
	40 μgm^3		annual	31/12/2004

Table 1: Air Quality Objectives

The Lutterworth station uses a Tapered Element Oscillating Microbalance (TEOM) to monitor the Particles. As per TG09 the TEOM fails the equivalence criteria for PM_{10} monitoring and the data collected should be adjusted using the Volatile Correction Model (VCM). The corrected concentrations may be considered equivalent to the objectives.

The data in this report has been adjusted using the VCM so it can be compared to the Air Quality Objectives.

For the purpose of consistency in relation to UK Automatic Urban and Rural Network Air Quality Monitoring Stations, gaseous data and calibration results are measured and logged as ppb (parts per billion) or ppm (parts per million) concentrations and not as $\mu g/m^3$ (micrograms per cubic metre). Data for gas concentrations for this report that is reported as a weight / volume figure has been converted from ppb or ppm to $\mu g/m^3$ concentrations.

2. Data Summary

2.1 Nitrogen Dioxide (NO_2)

OBJECTIVES:
When expressed as an hourly mean the NO_2 objective is 200 micrograms per cubic metre or less. This is not to be exceeded more than eighteen times a year to be achieved by 31st December 2005. 40 micrograms per cubic metre or less, when expressed as an annual mean, to be achieved by 31st December 2005.

	NO_2 Maximum ($\mu g/m^3$)	**NO_2 Minimum ($\mu g/m^3$)**	**NO_2 Average ($\mu g/m^3$)**	**Number of Exceedance of 1 hour mean ($200\mu g/m^3$)**
January	144.0	7.3	49.6	0
February	146.3	0.7	51.8	0
March	156.5	3.5	52.7	0
April	132.2	13.9	62.3	0

Table 2: Summary of NO_2 (One hour mean) data statistics for January, February, March, and April 2009

There was no exceedance of the National Air Quality Standard (N.A.Q.S.) for the one hour mean objective recorded for the Lutterworth A.Q.M.S. for the months of January, February, March, and April 2009.

2009	**NO_2 Monthly Mean ($\mu g/m^3$)**	**Number of Exceedance of 1 hour mean ($200\mu g/m^3$)**
January	49.6	0
February	51.8	0
March	52.7	0
April	62.3	0
May	-	-
June	-	-
July	-	-
August	-	-
September	-	-
October	-	-
November	-	-
December	-	-
	Average to date: 53.2	**Total: 0**

Table 3: Summary of NO_2 (1-hour mean) data statistics for 2009

2.2 Particles (PM_{10})

OBJECTIVES:
When expressed as a twenty four hour mean the PM_{10} objective is 50 micrograms per cubic metre or less. This is not to be exceeded more than thirty five times a year to be achieved by 31st December 2004. 40 micrograms per cubic metre or less, when expressed as an annual mean, to be achieved by 31st December 2004.

	PM_{10} Maximum ($\mu g/m^3$)	**PM_{10} Minimum ($\mu g/m^3$)**	**PM_{10} Average ($\mu g/m^3$)**	**Number of Exceedance of 24 hour mean ($50\mu g/m^3$)**
January	48.6	9.2	24.7	0
February	47.9	15.4	28.0	0
March	51.3	14.1	30.7	1
April	0 *	0 *	0 *	0 *

Table 4: Summary of PM_{10} (24-hour mean) data statistics for January, February, March and April 2009

There was one exceedance of the National Air Quality Standard for the 24 hour mean objective recorded for Lutterworth A.Q.M.S for the months of January, February, March and April 2009.

2009	**PM_{10} Monthly Mean ($\mu g/m^3$)**	**Number of Exceedance of 24 hour mean ($50\mu g/m^3$)**
January	24.7	0
February	28.0	0
March	30.7	1
April	0 *	0
May	-	-
June	-	-
July	-	-
August	-	-
September	-	-
October	-	-
November	-	-
December	-	-
	Average to date: 27.6	**Total: 1**

Table 5: Summary of PM_{10} (24-hour mean) data statistics for 2009

* Please note the TEOM was switched off 2nd April 2009

2.3 Data Capture

Data capture statistics are for all valid data. When the analysers are in calibration or there are visits to the station by service engineers, data can be excluded.
Data is stored in the data logger by communication between the logger and the analysers. Data loss can occur if the data cannot be stored onto the logger. This can occur when there are:

- Power cuts to the A.Q.M.S.
- Analyser faults
- Logger faults

The following is a summary of the data capture statistics during January, February, March and April 2009 for Lutterworth A.Q.M.S.

Measured Parameter	January	February	March	April	2009
Nitrogen Oxides (NO_x)	97.4 %	73.2 %	77.0 %	55.3 %	76.0 %
Nitric Oxide (NO)	97.4 %	73.2 %	77.0 %	55.3 %	76.0 %
Nitrogen Dioxide (NO_2)	97.4 %	73.2 %	77.0 %	55.3 %	76.0 %
Particles (PM_{10})	93.5 %	71.4 %	77.4 %	0 %	60.8 %

Table 6: Data capture statistics for January, February, March and April 2009

* Please note the TEOM was switched off 2nd April 2009

* Please note that there were several power failures during February, March and April resulting in reduced data capture.

2.4 Calibrations

Data from an analyser is stored on the logger as ‘raw’ or ‘uncorrected’ data, therefore data needs to be corrected or ‘validated’. To validate data, the analysers need to be checked against a referenced standard of ‘zero’ air and ‘span’ gas.

There are two methods available to correct data by using calibration checks to verify that the analyser is corrected for any response change:

- Daily automatic calibration checks
- Fortnightly manual calibration checks

An automatic daily calibration check is conducted to verify the response of the analyser in reference to the ‘zero’ and ‘span’ by introducing a high concentration of NO gas. The daily calibration check produces an actual zero and actual span response value which is stored on a calibration file on the logger.

A fortnightly manual calibration is also performed at the A.Q.M.S. at Lutterworth. This check is performed to verify the response of the analyser in reference to the ‘zero’ and ‘span’ by introducing a high concentration of NO gas.

These results are also used to validate the data for the NO_x analyser.

All of the calibration results are then used to create a calibration factor, which is used to rescale the data.

Appendices

1. Graphical Reports for January, February, March & April 2009

    1.1 Monthly plots of comparative 1 hour NO_2 mean ($\mu g/m^3$) in reference to N.A.Q.S. guideline values

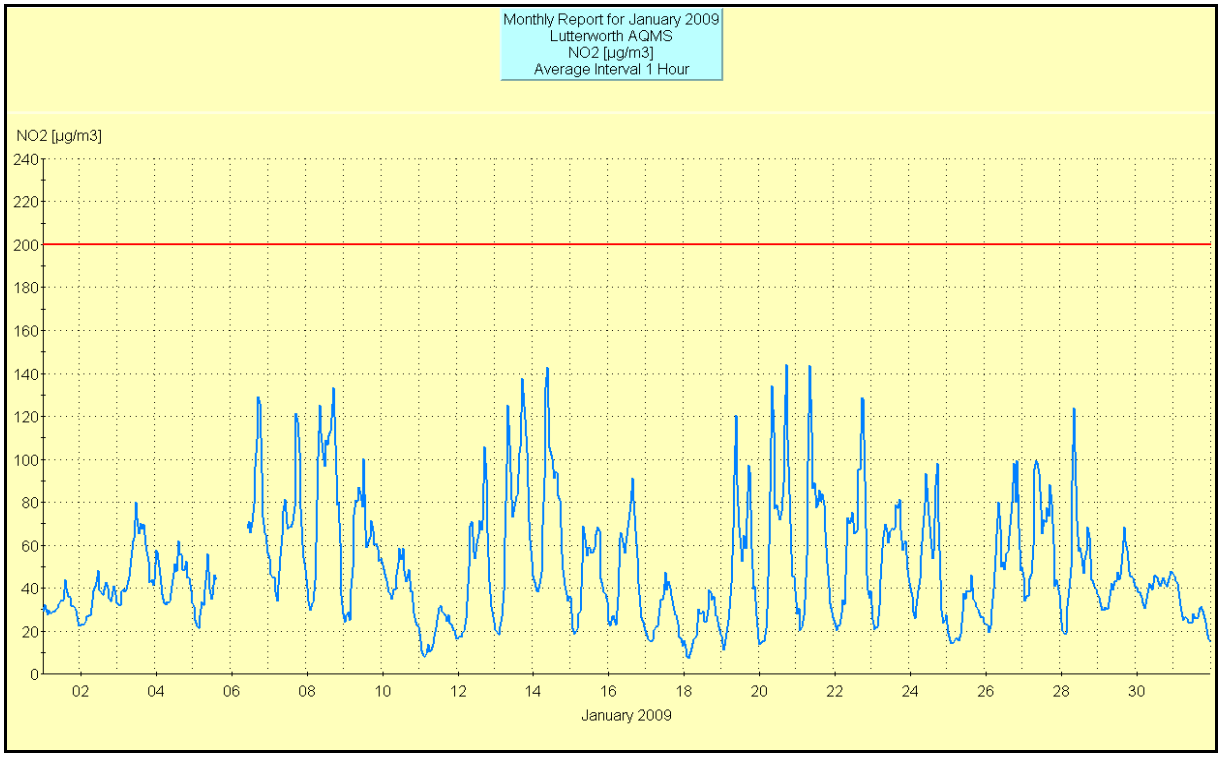
    1.2 Monthly plot of comparative 24 hour PM_{10} means ($\mu g/m^3$) in reference to N.A.Q.S. guideline values

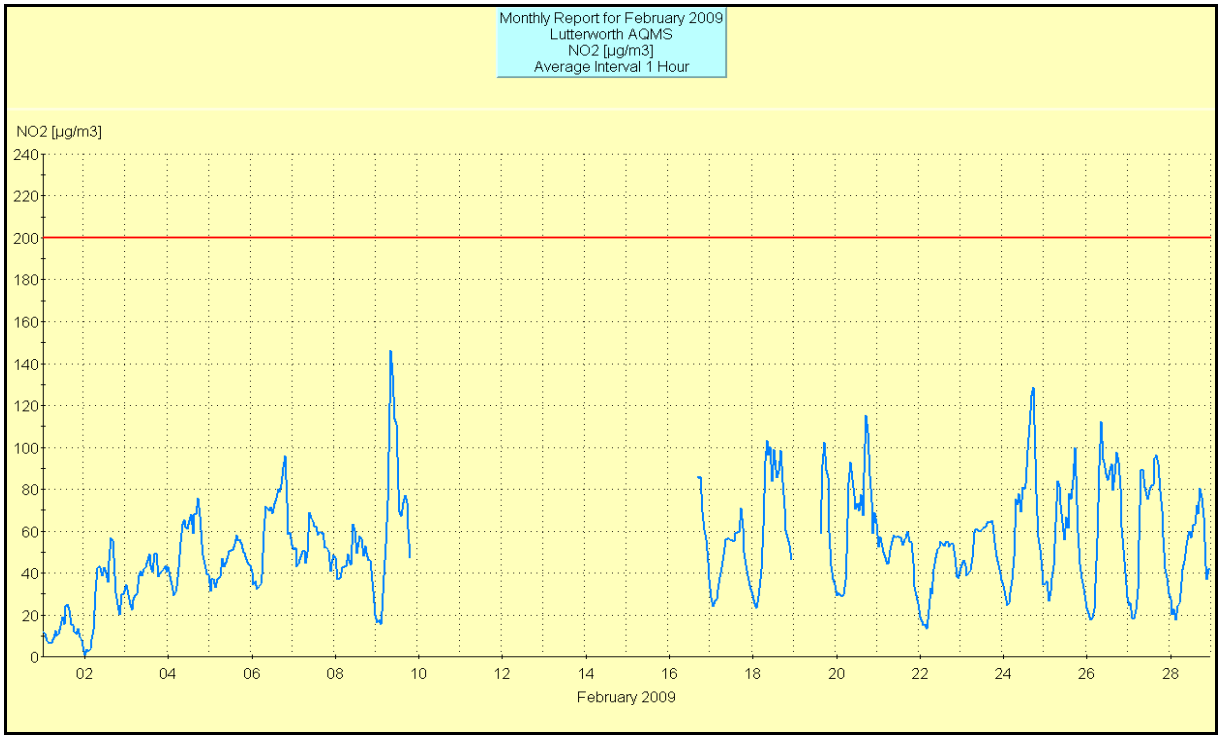
2. Conversion Factors from ppb to $\mu g/m^3$

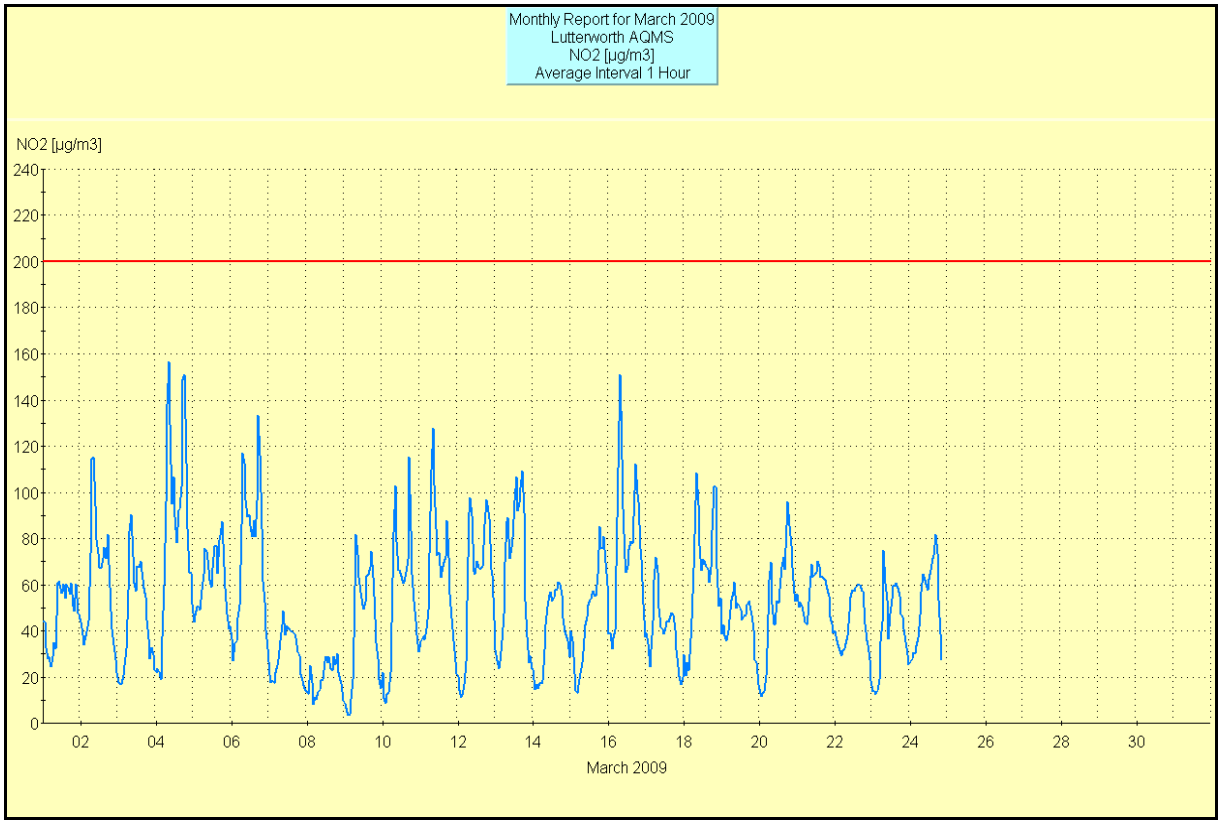
Appendix 1 Graphical Reports for January, February, March and April 2009

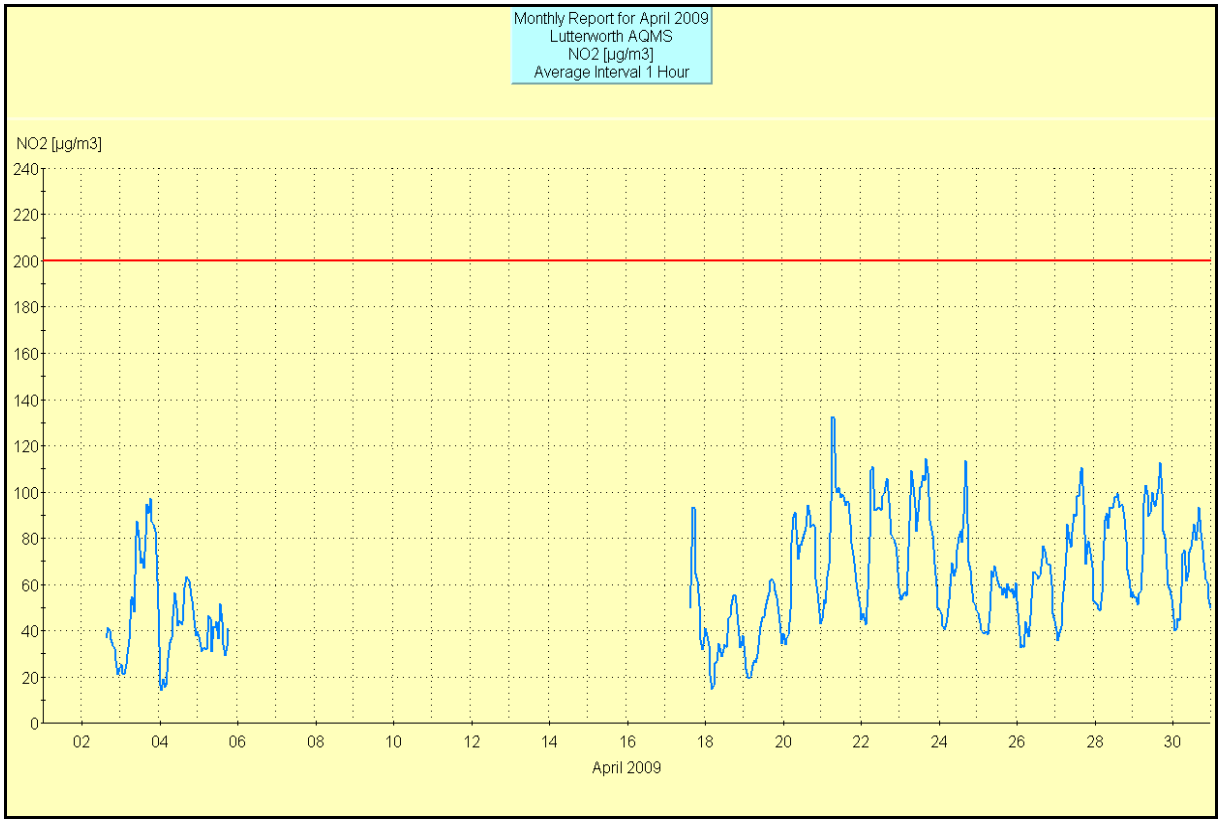
1.1 Monthly plots for Nitrogen Dioxide (NO_2)

- When expressed as an hourly mean the NO_2 objective is 200 micrograms per cubic metre or less. This is not to be exceeded more than eighteen times a year.
- Monthly plots of comparative one hour NO_2 average values ($\mu g/m^3$), objective expressed by the red limit line.



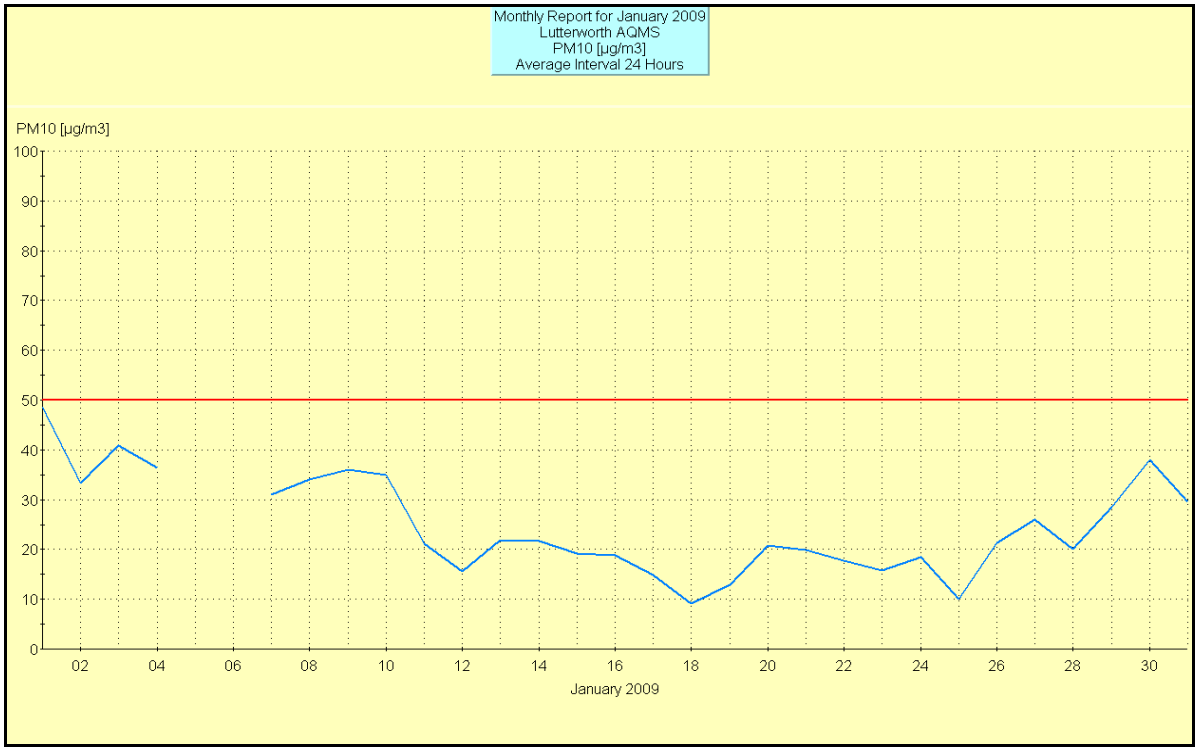


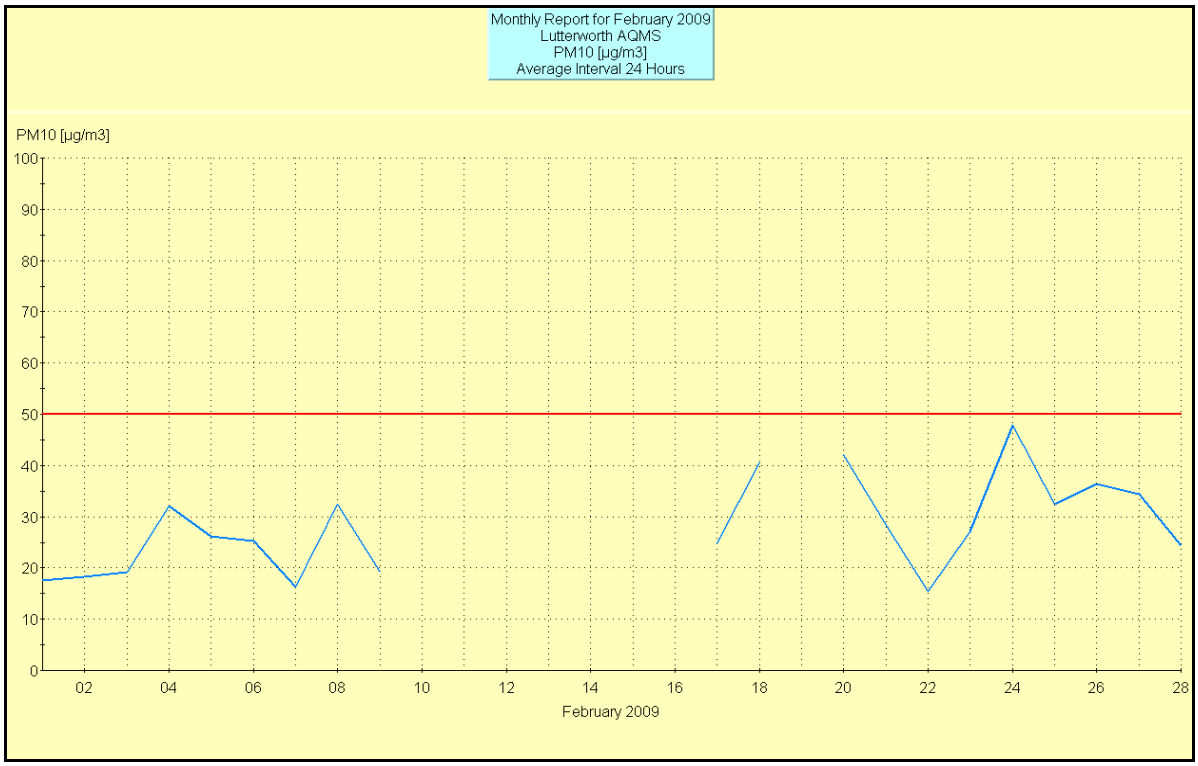

Monthly Report for March 2009
Lutterworth AQMS
NO2 [µg/m3]
Average Interval 1 Hour
NO2 [µg/m3]
240
220
200
180
160
140
120
100
80
60
40
20
0
02
04
06
08
10
12
14
16
18
20
22
24
26
28
30
March 2009

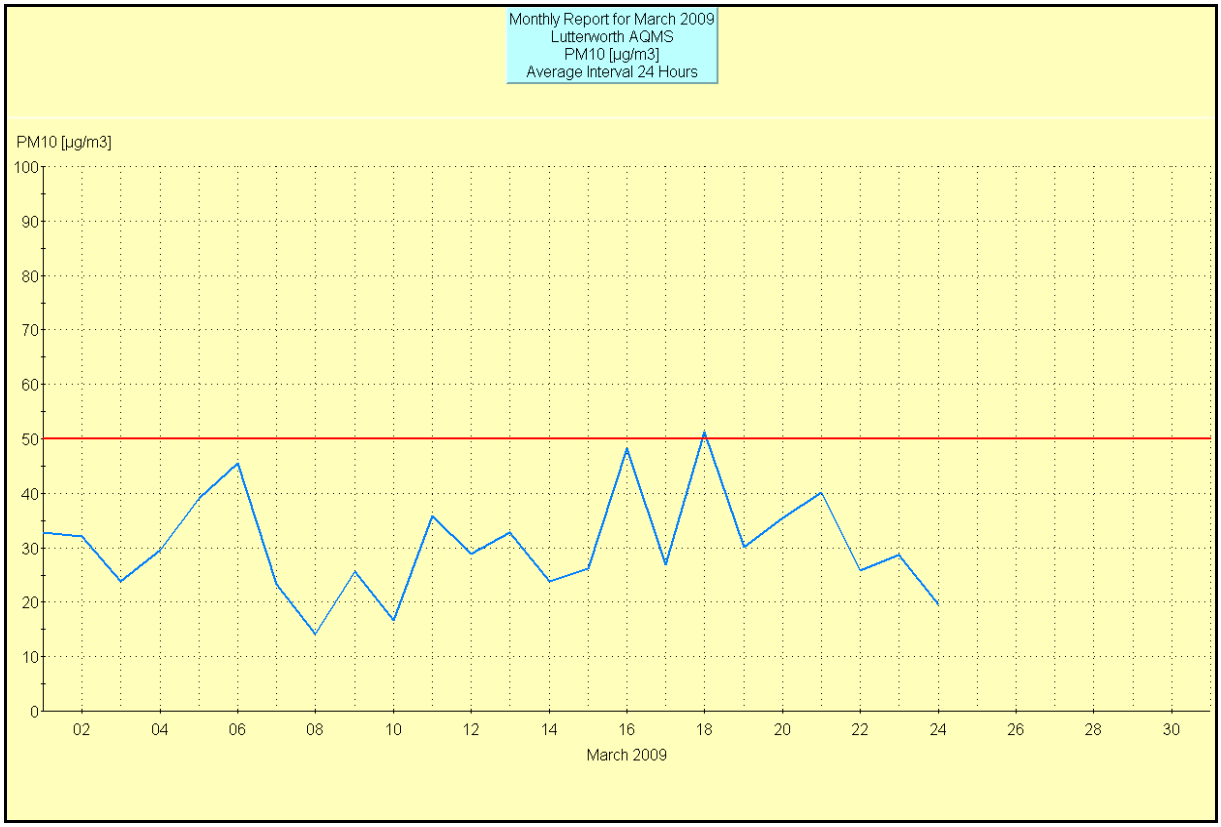

Monthly Report for April 2009
Lutterworth AQMS
NO2 [µg/m3]
Average Interval 1 Hour
NO2 [µg/m3]
240
220
200
180
160
140
120
100
80
60
40
20
0
02
04
06
08
10
12
14
16
18
20
22
24
26
28
30
April 2009

1.2 Monthly plots for Particles (PM_{10})

- When expressed as a twenty four hour mean the PM_{10} objective is 50 micrograms per cubic metre or less. This is not to be exceeded more than thirty five times a year to be achieved by 31st December 2004.
- Monthly plots of comparative 24-hour PM_{10} average values ($\mu g/m^3$), objective expressed by the red limit line.







* Please note the TEOM was switched off 2nd April 2009

Appendix 2 Conversion factors for ppb to µg/m^3

Conversion rates at 20°C and 101.3kPa:

- NO_2
  1.91 x ppb = µg/m^3

Kelly Petts
Casella Data Management Services
July 2009
Version 1

END OF REPORT

Appendix A. Lutterworth Real time monitoring data Report

Appendix B. NO_2 Diffusion Tube Data

National AQ archive Site details	location	Site Type	Grid Reference		Our Tube No.	Pollutants Monitored	= Bureau Veritas labs tubes 20% TEA in water (2009 bias 0.81)	= Lambeth Scientific Tubes 50% TEA in Acetone (2009 bias 1.03)											arithmetic mean (μgm^{-3})	Bias adjusted arithmetic Mean (μgm^{-3}) (1.03 used)	Standard Deviation	sample size	% data coverage
							Measurement Period (μgm^{-3})																
			X	Y			Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec					
82705-Harborough 01n	Lut. Service Shop	Roadside	454475	284560	2	NO_2	77	90	80	53	58	52	37	53	48	26	58	58	57.50	**59.23**	17.88	12	100%
82708-Harborough 03n	Brooklands (Home)	Urban background	473418	286956	3	NO_2	32	38	24	13	12	16	11	12	15	14	19	27	19.42	20.00	8.87	12	100%
83024-Harborough 05n	Lut. Regent Road	Roadside	454418	284303	1	NO_2	98	110	89	54		57		43			63	81	74.38	**76.61**	23.65	8	67%
84430-Harborough 06n	Monitoring Station	Roadside	454476	284541	5	NO_2	70	90	67	47	48	42	54	48	38		59	56	56.27	**57.96**	14.88	11	92%
84431-Harborough 07n	Theddingworth	Roadside	466586	285571	6	NO_2	56	62	52	34	33	31	28	29	33	21	54	45	39.83	**41.03**	13.30	12	100%
84432-Harborough 08n	Lilac Drive	Roadside	453065	284412	7	NO_2	45	49	32	23	19	16	19	16	23	15	28	36	26.75	27.55	11.52	12	100%
84433-Harborough 09n	Maxwell Way	Roadside	454376	285981	8	NO_2	50	46	31		25	33	16	17	24	21	42	40	31.36	32.30	11.82	11	92%
84435-Harborough 11n	Day Nursery	Roadside	454539	284932	10	NO_2	73	75	71	27	20	21	18	18	24	15	25	37	35.33	**36.39**	23.41	12	100%
84440-Harborough 12n	A6 Kibworth	Roadside	468425	294314	11	NO_2	68	93	47	47	38		36	24	38		41	47	47.90	**49.34**	19.43	10	83%
84441-Harborough 13n	Rockingham Road	Roadside	474731	287585	12	NO_2	68	65	56	32	33	30	33	34	35	25	45	46	41.83	**43.09**	14.25	12	100%
84444-Harborough 16n	Walcote	Roadside	456810	283652	15	NO_2	54	52	41	22	23			22	23	18	31	27	31.30	32.24	13.10	10	83%
84446-Harborough 17n	The Square	Roadside	473373	287231	16	NO_2	56	51			34			23	26	20		53	37.57	**38.70**	15.41	7	58%
84448-Harborough 18n	Jazz Hair	Roadside	454443	284348	17	NO_2	83	83	67	52	42	55	34	31	49	30	45		51.91	**53.47**	18.88	11	92%
86155-Harborough 19n	Wistow Rd Kibworth	Roadside	467739	294611	14	NO_2	47	42	34	17		17	12	17	21	17	23	31	25.27	26.03	11.55	11	92%
86381-Harborough 20n	3 Leicester road Lutterworth	Roadside	454527	284805	4	NO_2	73	74	57	38	42	44	32	25	37	30	28	51	44.25	**45.58**	16.53	12	100%
86382-Harborough 21n	19 Leicester road Lutterworth	Roadside	454551	285430	13	NO_2	57	65	48	37	35	33	20	26	31	22	36	50	38.33	**39.48**	13.96	12	100%
86383-Harborough 22n	77 Leicester road Lutterworth	Roadside	454533	284872	9	NO_2	42	43	29	27	20	21	18	18	24	15	25	37	26.58	27.38	9.47	12	100%