2011 Air Quality Progress Report

for

Harborough District Council

In fulfilment of Part IV of the Environment Act 1995

Local Air Quality Management

Date (April 2011)

Local Authority Officer	Gareth Rees
Department	Health and Enforcement Services
Address	Council Offices Adam and Eve Street Market Harborough Leicestershire LE16 7AG
Telephone	01858 821174
e-mail	g.rees@harborough.gov.uk
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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 Standards.

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) [9].

Progress Reports are intended to maintain continuity in the 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:

- Air quality in the district is generally within the Air Quality Standard
- That there are exceedences of the air quality standard in and around the Lutterworth AQMA.
- That a detailed assessment is required in Theddingworth to determine if the Air quality Standard is Being exceeded

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1 Introduction

1.1 Description of Local Authority Area

Harborough District Council is a diverse, largely rural authority covering approximately 590 Km^2 (230 square miles) of Southern Leicestershire, as shown in Figure. 1. Geographically it is the largest of the Leicestershire districts. Approximately 83,400 people (estimated June 2009 by The Office for National Statistics [32]) 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 to 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.

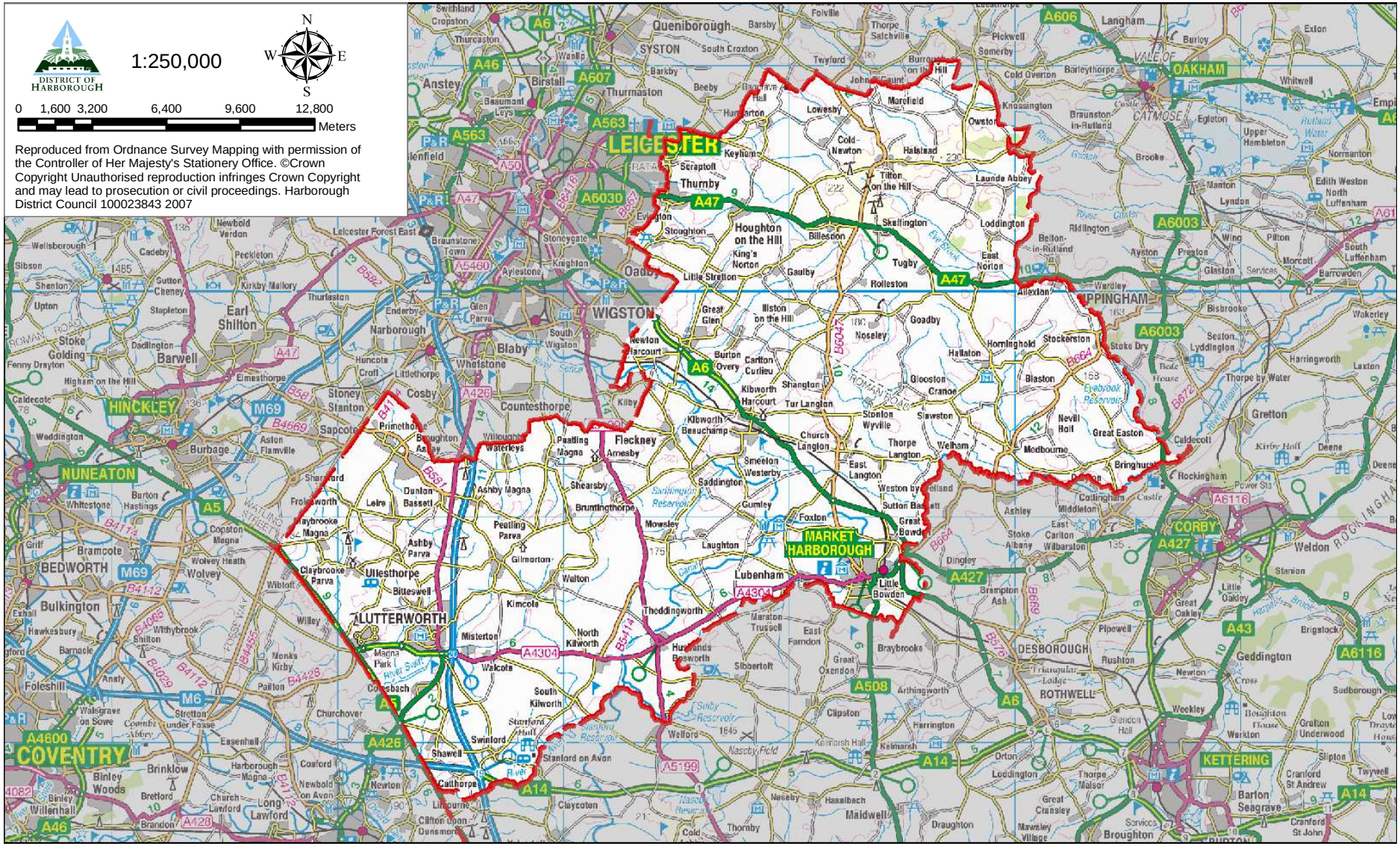
The Midland Main Line railway runs through the district and Market Harborough has an Inter-City station with direct links to London St. Pancras.

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



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 Standards (AQS)

The air quality objectives applicable to Local Air Quality Management (LAQM) in England are set out in:

- the Air Quality (England) Regulations 2000 (SI2000/No.0928)[2],
- the Air Quality (England) (Amendment) Regulations 2002 (SI2002/No.3043)[3],
- The Air Quality Standards Regulations 2007 (SI2007/No.0064)[4], and
- The Air Quality Standards Regulations 2010 (SI2010/No.1001)[5].

They are shown in Table 1. Table 1 includes the number of permitted exceedences in any given year (where applicable).

Table 1. Air Quality Standards (AQS) included in Regulations for the purpose of Local Air Quality Management in England.

Pollutant	Concentration	Measured as	Attainment Date
Benzene	16.25 μgm^{-3}	Running annual mean	31/12/2003
	5.00 μgm^{-3}	Running annual mean	01/01/2010
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	01/01/2010
	40 μgm^{-3}	Annual mean	01/01/2010
Particles (PM_{10}) (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

1.4 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 [24] carried out in Harborough district concluded that further investigation would be required for Carbon Monoxide, Lead, Particulates and Nitrogen Dioxide. The Second and Third Stage review [23] concluded that with the exception of Nitrogen Dioxide all of the National Air Quality Standards 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.[6] Figure. 2.

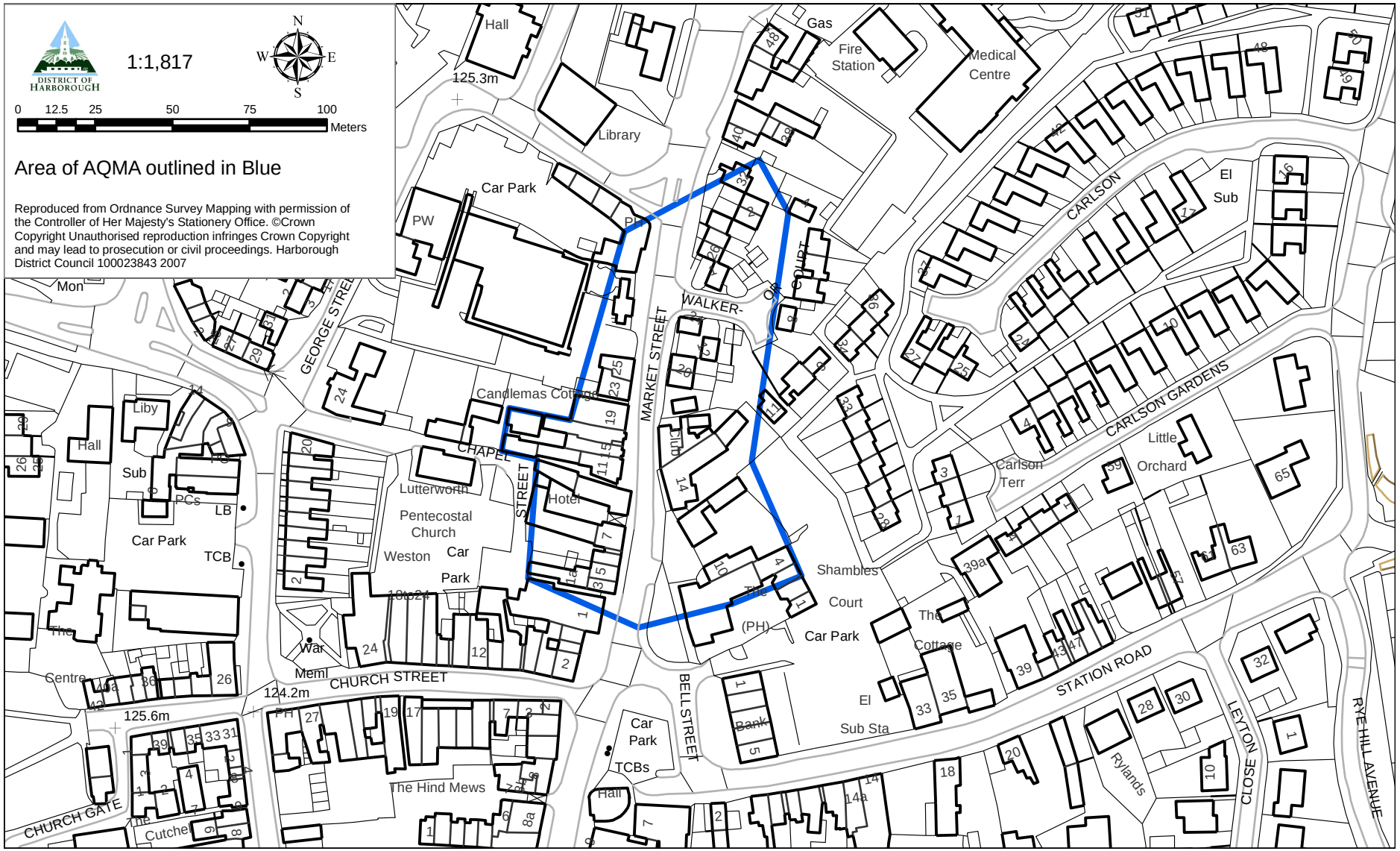
Following the declaration of the Air Quality Management Area a Stage 4 assessment [19] was required to give the council the opportunity to supplement any information already gathered in earlier review and assessment work.

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 [20] was developed which was incorporated into the Leicestershire County Council Local Transport Plan 2.

In 2009 the Council undertook an update and screening assessment [14] 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.

A detailed assessment of Lutterworth was conducted in 2010 [12]. The assessment found that the AQMA did not require extension to the north of the currently declared area but that the air quality standard was being exceeded to the south of the currently declared area. In order to improve the data for the further assessment of the proposed extension to the AQMA it was necessary for several NO_2 diffusion tubes to be relocated.

Figure. 2. Map of AQMA Boundaries



2 New Monitoring Data

2.1 Summary of Monitoring Undertaken

2.1.1 Automatic Monitoring Sites

There is a 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 (correct 09/03/2011). This site is not managed by Harborough District Council.

Figure. 3. Map of Automatic Monitoring Sites

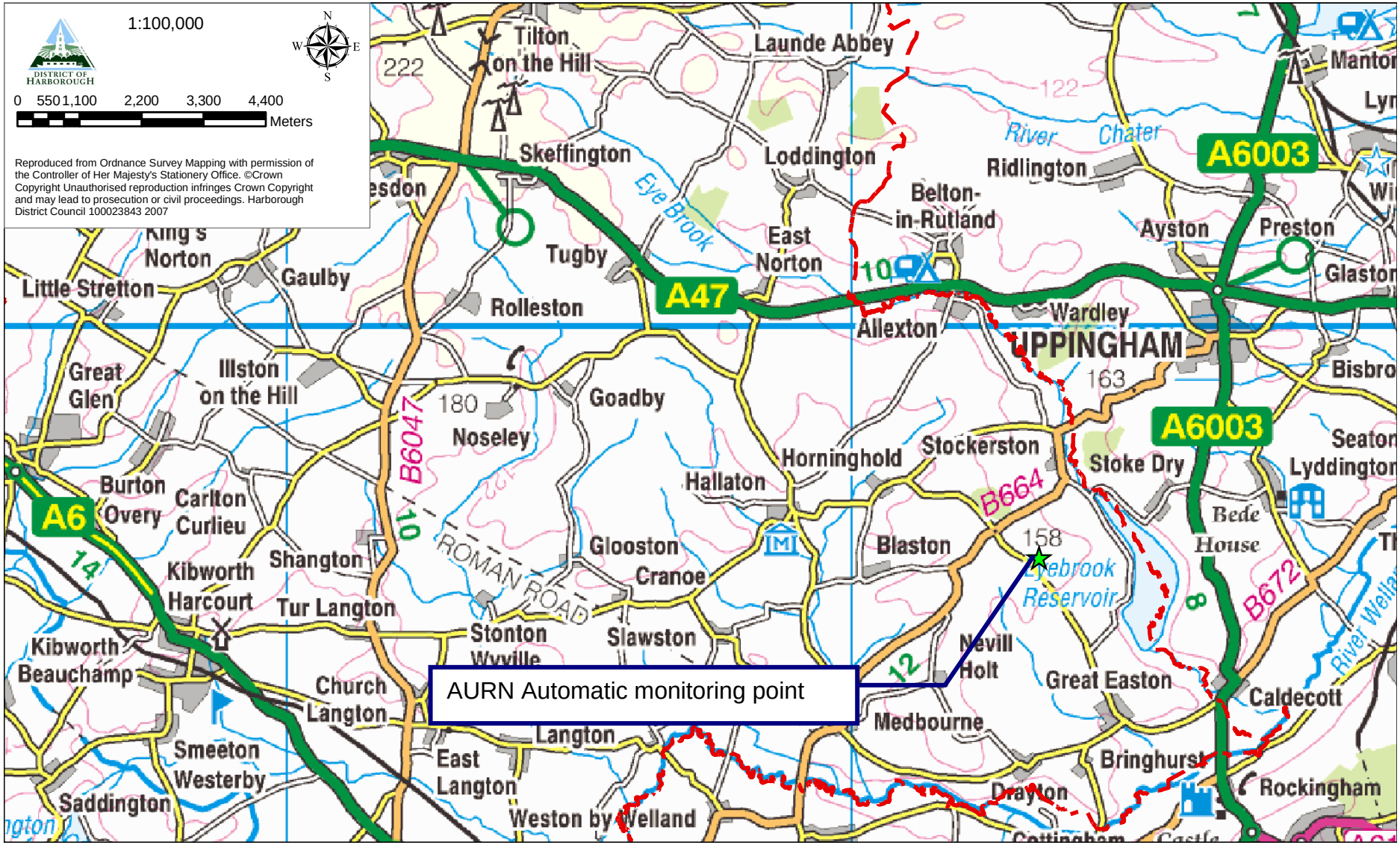


Table 2. Details of Automatic Monitoring Sites

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						
Market Harborough AURN site	Rural	483335	295896	NO	unknown	No	N/A	N/A	N/A
				NO_2					
				Ozone	unknown				

2.1.2 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 supplied and analysed by Lambeth Scientific services by spiking with 50% TEA in acetone.

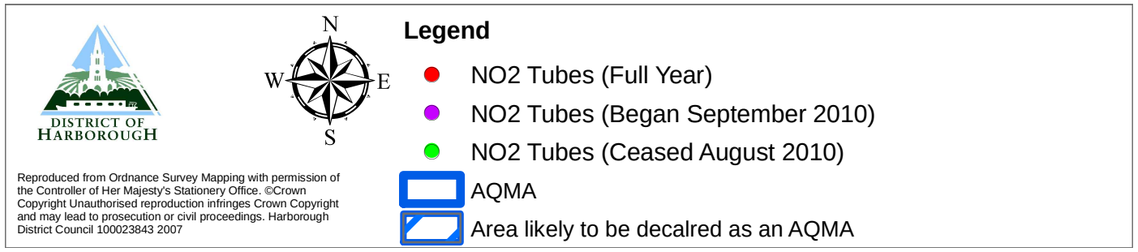
Workplace Analysis Scheme for Proficiency (WASP) rounds 105 to 109 which covered the WASP scheme for April 2009 to April 2010 were all category 1 (good) using the Old RPI criteria. Lambeth scientific score as acceptable using the new RPI criteria which will come in with round 111 (October 2010). Results as detailed in Table 3.

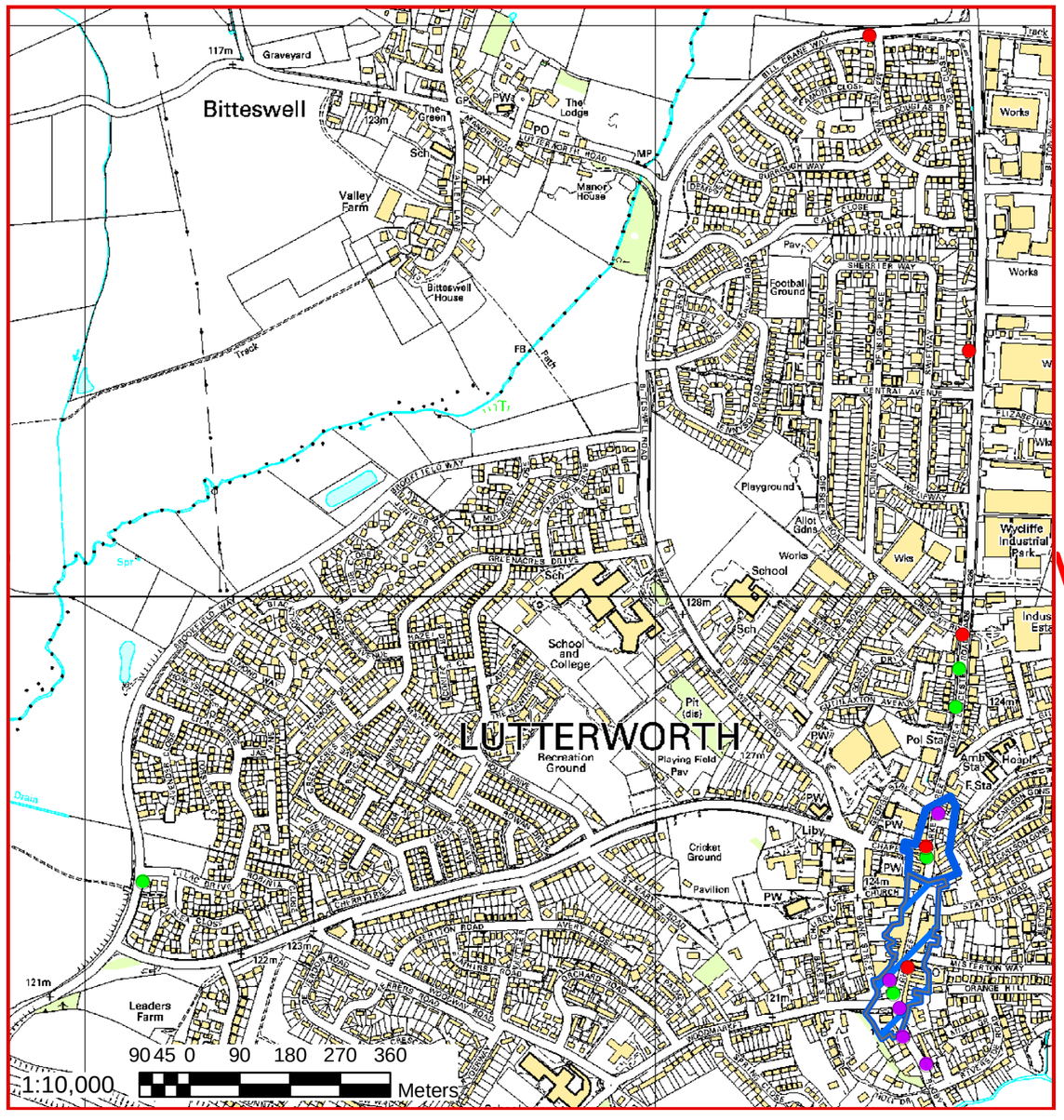
Table 3. Laboratory WASP scores

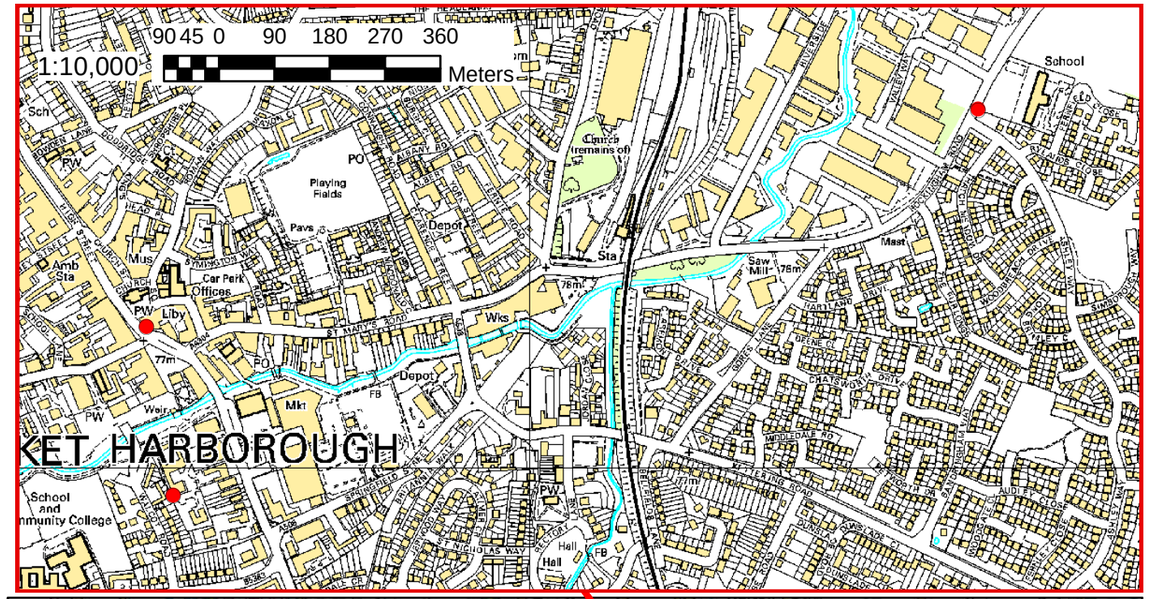
Laboratory	Performance on basis of RPI, current CRITERIA, best 4 out of the 5 rounds 105-109	Performance on basis of RPI, NEW CRITERIA, best 4 out of the 5 rounds 105-109
Lambeth Scientific Services	Good	Acceptable

The DEFRA Review and assessment helpdesk National Diffusion Tube Bias Adjustment Factor Spreadsheet [34] does not have any data for Lambeth Scientific Services in 2010. The spreadsheet recommends that in this situation it is reasonable to use data for the nearest year. The nearest year the spreadsheet has data for is 2009. The Bias correction factor for 2009 is 1.02.

Figure. 4. Map of Non-Automatic Monitoring Sites







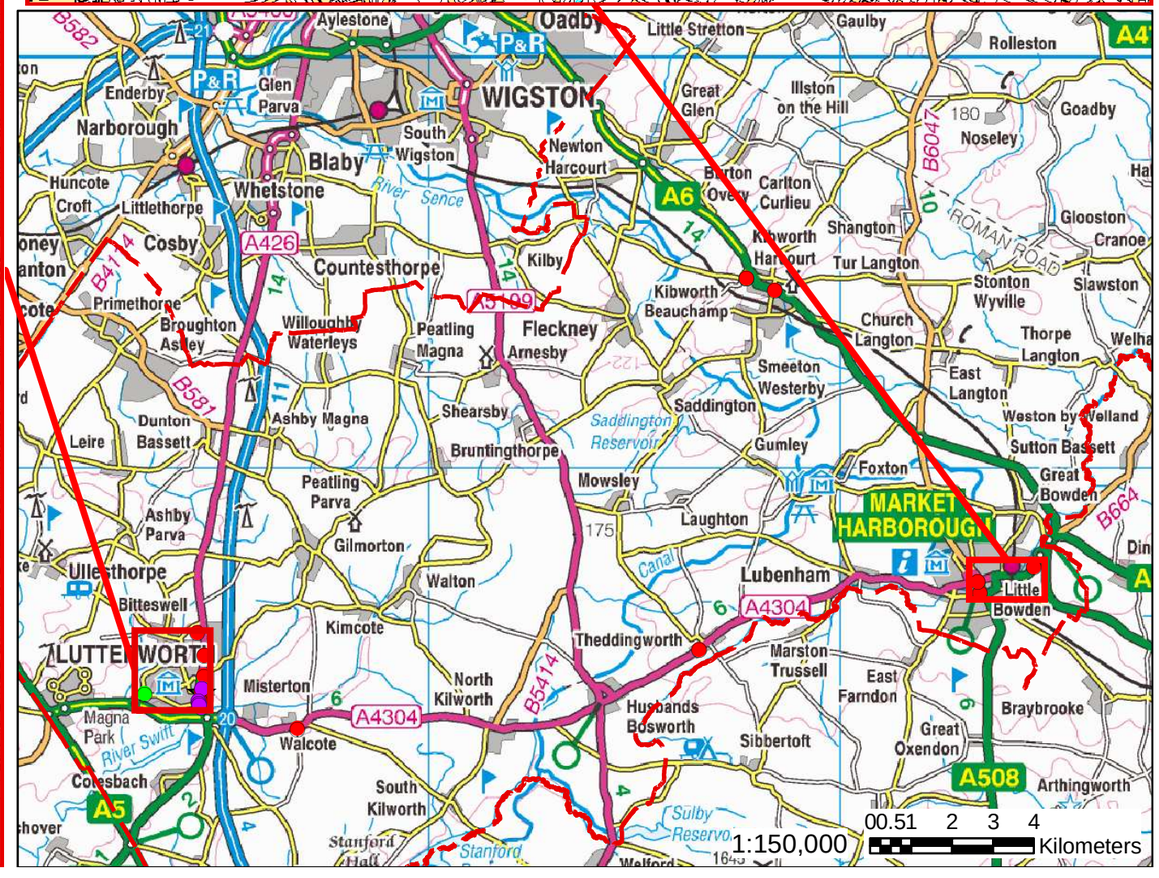


Table 4. Details of Non- Automatic Monitoring Sites

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 (m) (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 Rugby Road	Roadside	454418	284303	1	NO_2	Y	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	0	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
86930 - Harborough 23n	6 The Terrace Rugby Road	Roadside	454428	284274	1	NO_2	N	0	2.5	Y
86931 - Harborough 24n	4-9 regent court	Roadside	454410	284326	4	NO_2	N	0	16.25	Y
86932 - Harborough 25n	26 Market Street Lutterworth	Roadside	454497	284618	5	NO_2	Y	1.6	4.8	Y
86933 - Harborough 26n	24 Rugby Road Lutterworth	Roadside	454432	284229	13	NO_2	N	0	2	Y
86934 - Harborough 27n	17 Rugby road Lutterworth	Roadside	454476	284178	7	NO_2	N	3.7	5.2	Y

2.2 Comparison of Monitoring Results with Air Quality Standards

2.2.1 Nitrogen Dioxide

2.2.1.a Automatic Monitoring Data

The AURN automatic monitor recorded an annual mean of 13.3 μgm^{-3} (Table 5) and recorded no exceedences of the 1-hour mean standard (Table 6).

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 2010 [b] %	Annual mean concentrations (μgm^{-3})				
					2006 [c, d]	2007 [c, d]	2008 [c, d]	2009 [c, d]	2010 [c]
1	Market Harborough – Rural	N	93.42	93.42	10.9	11.6	10.8	12.0	13.3

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 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 [c, d]	2007 [c, d]	2008 [c, d]	2009 [c, d]	2010 [d]
1	Market Harborough – Rural	N	93.42	93.42	0	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.

2.2.1.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 [9] (reproduced in Figure. 5 for reference).

Figure. 5. Box 2.3: Predicting nitrogen dioxide concentrations at different distances from road of the technical guidance [9]

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 [9] (modification are improved layout of equation and insertion of hyperlinks where footnotes are present in the original.

Where diffusion tube data does not cover the whole year it is possible to estimate the annual mean using the method in Box 3.2 Estimation of

annual mean concentrations from short-term monitoring data of the technical guidance [9] (reproduced in Figure. 6 for reference).

Figure. 6. Estimation of annual mean concentrations from short-term monitoring data

Box 3.2: Estimation of annual mean concentrations from short-term monitoring data

Example

It has only been possible to carry out a monitoring survey (automatic or diffusion tube) at site **S** for six months between July and December 2008. The measured mean concentration **M** for this period is 30.2μgm^{-3}. How can this be used to estimate the annual mean for this location?

Adjustment to estimate annual mean

The adjustment is based on the fact that patterns in pollutant concentrations usually affect a wide region. Thus if a six month period is above average at one place it will almost certainly be above average at other locations in the region. The adjustment procedure is as follows:

1. Identify two to four nearby, long-term, continuous monitoring sites, ideally those forming part of the national network. These should be background sites to avoid any very local effects that may occur at roadside sites, and should, wherever possible lie within a radius of about 50 miles.
2. Obtain the annual means, **Am,** for the calendar year for these sites, 2008 in this example.
3. Work out the period means, **Pm,** for the period of interest, in this case July to December 2008. [It may be necessary to use unratified automatic data.]
4. Calculate the ratio, **R,** of the annual mean to the period mean (**Am**/**Pm**) for each of the sites.
5. Calculate the average of these ratios, $\mathbf{R_a}$**.** This is then the adjustment factor.
6. Multiply the measured period mean concentration **M** by this adjustment factor $\mathbf{R_a}$ to give the estimate of the annual mean for 2008.

Long term site	Annual mean 2008 (Am)	Period Mean 2008 (Pm)	Ratio (Am/Pm)
A	28.6	29.7	0.963
B	22.0	22.8	0.965
C	26.9	28.9	0.931
D	23.7	25.9	0.915
		Average (R_a)	**0.944**

For this example the best estimate of the annual mean for site **S** in 2008 will be $\mathbf{M \times R_a}$ = 30.2×0.944 = 28.5μgm^{-3}.

Notes

- Monitoring data for the long-term sites must have adequate data capture rates: above 90% is preferable; sites with data capture below 75% should not be used.
- It may be appropriate to use diffusion tube results from a long-term survey to adjust short-term diffusion tube results. To allow for the greater uncertainty of diffusion tubes results from four or more sites should be used. Ensure that the tubes are from the same supplier using the same method of preparation.
- If the short-term period covers, for instance, February to June 2009, and the work is being carried out in August 2009, then an annual mean for 2009 will not be available. The calculation can then be carried out using the ratio to the 2008 annual mean, but the result is then an estimate of the 2008 annual mean at the short-term site.

Modified from Box 3.2 page 3-4 of the technical Guidance 2009 [9].

Diffusion tube monitoring (presented in Appendix A) 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.

Lutterworth North of AQMA

(Tubes 86383- Harborough 22n, 86381- Harborough 20n 86382- Harborough 21n, 84435- Harborough 11n, 84433- Harborough 09n)

Tube 86383- Harborough 22n, located at 77 Leicester Road Lutterworth, did not record an exceedence of the AQS.

Tube 86381- Harborough 20n, located at 3 Leicester Road Lutterworth, recorded a bias adjusted annualised mean of 42.13 μgm^{-3} which is an exceedence of the AQS for NO_2, however when a façade correction is undertaken the concentration of NO_2 at the relevant receptor is estimated to be 26.24 μgm^{-3}.

Tube 86382- Harborough 21n, located at 19 Leicester Road Lutterworth, recorded a bias adjusted annualised mean of 39.26 μgm^{-3} which approaches the AQS for NO_2, however when a façade correction is undertaken the concentration of NO_2 at the relevant receptor is estimated to be 26.16 μgm^{-3}.

Tube 84435- Harborough 11n, located at the Day Nursery, did not record an exceedence of the AQS for NO_2.

Tube 84433- Harborough 09n, located at Maxwell Way, did not record an exceedence of the AQS for NO_2.

Lutterworth Within the AQMA

(Tubes 82705- Harborough 01n, 84430- Harborough 06n, 86932- Harborough 25n)

Tube 82705- Harborough 01n, located at the Lutterworth service shop, recorded a bias adjusted annual mean of 55.85 μgm^{-3} which exceeds the AQS for NO_2.

Tubes 84430- Harborough 06n, located at the monitoring station, recorded a bias adjusted annualised mean of 55.54 µgm^{-3} which exceeded the AQS for NO_2

Tubes 86932- Harborough 25n, located at 26 Market Street, recorded a bias adjusted annualised mean of 41.76 µgm^{-3} which exceeded the AQS for NO_2.

Lutterworth within the area likely to be declared as an AQMA
(Tubes 83024- Harborough 05n, 84448- Harborough 18n, 86930- Harborough 23n, 86931- Harborough 24n)

Tube 83024- Harborough 05n, located at Rugby Road Lutterworth, recorded a bias adjusted annualised mean of 57.54 µgm^{-3} which exceeded the AQS for NO_2

Tube 84448- Harborough 18n, located at Jazz Hair, High Street, Lutterworth, recorded a bias adjusted annual mean of 50.35 µgm^{-3} which exceeds the AQS for NO_2.

Tube 86930- Harborough 23n, located at 6 The Terrace Rugby Road, Lutterworth, recorded a bias adjusted annualised mean of 39.66 µmg^{-3} which is within 1 standard deviation of the 40 µgm^{-3}. This means the true mean may exceed the AQS for NO_2.

Tube 86931- Harborough 24n, located at 4-9 regent court, Stoney Hollow, Lutterworth, recorded a bias adjusted annualised mean of 28.40 µgm^{-3}, which does not exceed the AQS for NO_2.

Lutterworth Other
(Tubes 84432 - Harborough 08n, 86933 - Harborough 26n, and 86934 - Harborough 27n)

Tube 84432 - Harborough 08n, located at Lilac Drive, recorded a bias adjusted annualised mean of 26.68 µgm^{-3} which does not exceed the AQS for NO_2.

Tube 86933 - Harborough 26n, located at 24 Rugby Road, Lutterworth, recorded a bias adjusted annualised mean of 46.28 µgm^{-3} which exceeds the AQS for NO_2.

Tube 86934 - Harborough 27n, located at 17 Rugby Road, Lutterworth, recorded a bias adjusted annualised mean of 41.69 µgm^{-3} which exceeds the AQS for NO_2.

Kibworth

(Tubes 84440 - Harborough 12n and 86155 - Harborough 19n)

Tube 84440 - Harborough 12n, located along the A6 in Kibworth, recorded a bias adjusted annual mean of 45.99 µgm^{-3} which exceeds the annual mean AQS for NO_2, however when a façade correction is undertaken the concentration of NO_2 at the relevant receptor is estimated to be 29.13 µgm^{-3}

Tube 86155 - Harborough 19n, located along Wistow Road, Kibworth, did not record an exceedence of the AQS for NO_2.

Market Harborough

(Tubes 82708 - Harborough 03n, 84441 - Harborough 13n, 84446 - Harborough 17n)

Tube 82708 - Harborough 03n, which is located at Brooklands Residential Home, Market Harborough did not record an exceedence of the AQS for NO_2.

Tube 84441 - Harborough 13n, located at Rockingham Road, market Harborough, recorded a bias adjusted annual mean of 41.06 µgm^{-3} which exceeds the AQS for NO_2. However when a façade correction is applied the result modelled at the façade of the nearest receptor is 31.16 µgm^{-3}.

Tube 84446 - Harborough 17n, located in The Square, Market Harborough, did not record an exceedence of the AQS for NO_2.

Other Tubes

(Tubes 84431 - Harborough 07n, 84444 - Harborough 16n)

Tube 84431 - Harborough 07n, located at Theddingworth, recorded a Bias adjusted mean of 39.44 μgm^{-3} which is within 1 standard deviation of the AQS for NO_2.

Tube 84444 - Harborough 16n, located in Walcote, recorded a bias adjusted annual mean of 30.77 μgm^{-3} which does not exceed the AQS for NO_2.

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 2010 [b] %	Annual mean concentrations (µgm^{-3}) [c, d, e, f]					
					2005	2006	2007	2008	2009	2010
82705- Harborough 01n	Lutterworth Service Shop	Y	100%	100%	**48.24**	**55.13**	**55.20**	**50.03**	**51.75**	**55.85**
82708- Harborough 03n	Brooklands (Home)	N	92%	92%	17.08	15.98	20.86	14.94	17.48	21.61
83024- Harborough 05n	Lutterworth Rugby Road	Y	88%	58%	**55.96**	**51.69**	**60.03**	**54.25**	**66.94**	**57.53**
84430- Harborough 06n	Monitoring Station	Y	100%	67%	**49.59**	**46.55**	**56.54**	**41.43**	**50.65**	**55.54**
84431- Harborough 07n	Theddingworth	N	100%	100%	23.49	31.16	33.15	33.55	35.85	**39.44**
84432- Harborough 08n	Lilac Drive	N	100%	67%	26.19	27.99	27.15	30.09	24.08	26.67
84433- Harborough 09n	Maxwell Way	N	100%	100%	24.38	26.39	27.98	27.74	28.23	31.03
84435- Harborough 11n	Day Nursery	N	100%	100%	**43.84**	**47.68**	**44.40**	**48.62**	31.80	27.71
84440- Harborough 12n	A6 Kibworth	N	100%	100%	**36.94**	35.09	**42.00**	**37.97**	**43.11**	**45.99**
84441- Harborough 13n	Rockingham Road	N	100%	100%	26.46	29.00	33.38	35.69	**37.65**	**41.06**
84444- Harborough 16n	Walcote	N	100%	100%	26.01	24.99	29.88	28.07	28.17	30.77
84446- Harborough 17n	The Square	N	83%	83%	29.84	27.55	33.75	30.34	33.81	33.15
84448- Harborough 18n	Jazz Hair	N	92%	92%	**41.72**	**44.54**	**51.68**	**48.90**	**46.72**	**50.35**
86155- Harborough 19n	Wistow Rd Kibworth	N	100%	100%				25.59	22.75	25.76
86381- Harborough 20n	3 Leicester road Lutterworth	N	100%	67%				**37.46**	**39.83**	**42.13**
86382- Harborough 21n	19 Leicester road Lutterworth	N	100%	67%				**38.53**	34.50	**39.26**
86383- Harborough 22n	77 Leicester road Lutterworth	N	100%	100%				28.54	23.93	27.71
86930- Harborough 23n	6 The Terrace Rugby Road	N	75%	25%						**39.66**
86931- Harborough 24n	4-9 regent court	N	100%	33%						28.39
86932- Harborough 25n	26 Market Street Lutterworth	Y	75%	25%						**41.76**
86933- Harborough 26n	24 Rugby Road Lutterworth	N	75%	25%						**46.27**
86934- Harborough 27n	17 Rugby road Lutterworth	N	100%	33%						**41.69**

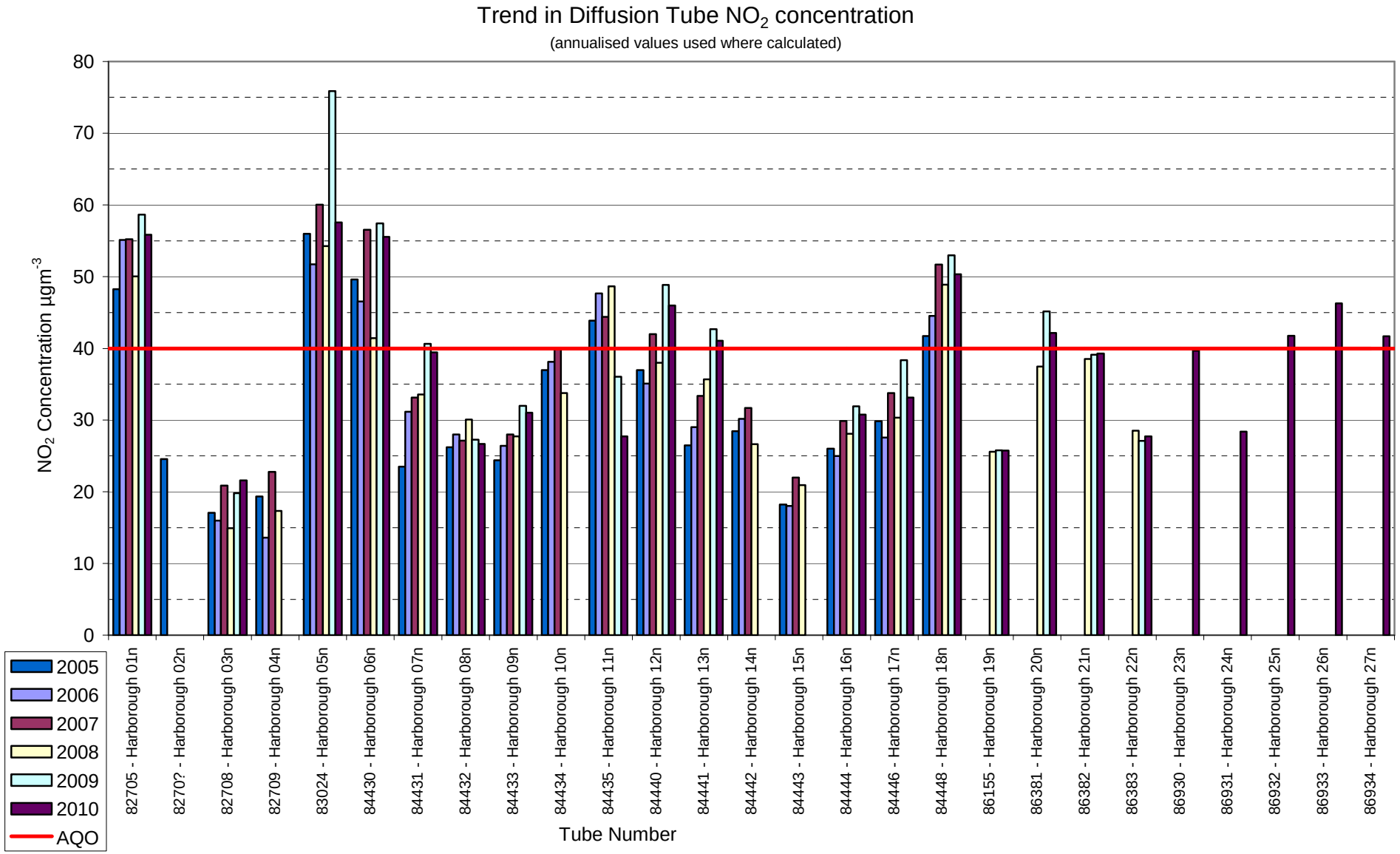
a) i.e. data capture for the monitoring period, in cases where monitoring was only carried out for part of the year.
b) i.e. data capture for the full calendar year (e.g. if monitoring was carried out for six months the maximum data capture for the full calendar year would be 50%.)
c) Means should be "annualised" as in Box 3.2 of TG(09) pg3-4, if monitoring was not carried out for the full year. Annualised data highlighted in green (see Appendix B for calculations)
d) Annual mean concentrations for previous years are optional.
e) Values exceeding the AQ objective are shown in red
f) Values exceeding 36 µgm^{-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]	Façade corrected Annualised bias adjusted mean
83024- Harborough 05n	Lutterworth. Rugby Road	Y	**53.62**	32.43	34.37
84432- Harborough 08n	Lilac Drive	N	24.86	19.68	20.84
84433- Harborough 09n	Maxwell Way	N	31.03	21.59	
84435- Harborough 11n	Day Nursery	N	27.71	21.03	
84440- Harborough 12n	A6 Kibworth	N	**45.99**	29.13	
84441- Harborough 13n	Rockingham Road	N	**41.06**	31.16	
84444- Harborough 16n	Walcote	N	30.77	24.69	
84446- Harborough 17n	The Square	N	33.15	29.55	
86155- Harborough 19n	Wistow Rd Kibworth	N	25.76	23.95	
86381- Harborough 20n	3 Leicester road Lutterworth	N	**39.27**	26.24	27.71
86382- Harborough 21n	19 Leicester road Lutterworth	N	**36.59**	26.16	27.68
86932- Harborough 25n	26 Market Street Lutterworth	Y	**47.26**	**44.32**	**39.29**
86934- Harborough 27n	17 Rugby road Lutterworth	N	**47.18**	**41.43**	**36.83**

a) Values exceeding the AQS are shown in red
b) Values exceeding 36 µgm^{-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).

Figure. 7. Trends in Annual Mean Nitrogen Dioxide Concentration Measured at Diffusion Tube Monitoring Sites.



2.2.2 PM_{10}

The Authority does not currently monitor for this pollutant.

2.2.3 Sulphur Dioxide

The Authority does not currently monitor for this pollutant.

2.2.4 Benzene

The Authority does not currently monitor for this pollutant.

2.2.5 Other pollutants monitored

The Authority does not currently monitor for any other pollutants.

2.2.6 Summary of Compliance with AQS Objectives

The tubes located within the currently declared AQMA and the area which has been assessed in the Detailed Assessment have all recorded exceedences of the annual mean AQS for NO_2.

Tubes placed to the south of the area assessed have recorded exceedences however these tubes are short exposures and in order to assess the impact at the nearest receptor a façade correction is required. These sites will be assessed in the further assessment following the likely expansion of the AQMA.

The tube in Theddingworth has recorded an exceedence of the annual mean AQS last year and was within 1 standard deviation of the AQS

Harborough District Council has measured concentrations of NO_2 above the annual mean objective at relevant locations outside of the Lutterworth AQMA, and are being looked at in a Detailed Assessment of the area to the south of the AQMA along High Street and Rugby Road and the subsequent Further Assessment.

Harborough District Council has measured concentrations of NO_2 above the annual mean objective in Theddingworth and a Detailed assessment is required

3 New Local Developments

3.1 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.

3.2 Road Traffic Sources

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

3.3 Other Transport Sources

There are no new

- 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.

3.4 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;
- Poultry farms.

within the district.

3.4.1 Petrol stations

There is 1 new petrol station has been built in Market Harborough by Tesco. Grid Reference 474901 287821.

3.5 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.

within the district.

3.6 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 has identified the following new or previously unidentified local developments which may impact on air quality in the Local Authority area.

- Tesco Petrol Station

These will be taken into consideration in the next Updating and Screening Assessment, scheduled for 2012.

4 Local / Regional Air Quality Strategy

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

5 Planning Applications

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

6 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.

7 Local Transport Plans and Strategies

Air quality measures for the AQMA in Lutterworth were included in LTP2 [25] however budget constraints have meant that many of these have yet to be completed. Harborough District Council is currently liaising with Leicestershire County Council for inclusion of Air quality measures relating to the AQMA in LTP3.

8 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.

9 Implementation of Action Plans

In 2006 the Action Plan was incorporated into the Leicestershire County Council Local Transport Plan 2 (2006-2011)[25]. 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 9. 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.	No progress by County Council Highways due to implementation of LTP3	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.	No progress by County Council Highways due to implementation of LTP3	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).	No progress by County Council Highways due to implementation of LTP3	ongoing 2016
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

No.	Measure	Lead authority	Target annual emission reduction in the AQMA	Progress to date	Progress in last 12 months	Status
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.	No progress by County Council Highways due to implementation of LTP3	Implemented 2008 Measures ongoing
8	Network management for road works, incidents and planned events	County Council	<0.2 μgm^{-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.	No progress by County Council Highways due to implementation of LTP3	2008
9	School travel planning with investment in walking and cycle routes	County Council	<0.2 μgm^{-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 had travel plans in place at the end of 2009, which is an increase from 61% in July 2008.	No progress by County Council Highways due to implementation of LTP3	2008
				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).	No progress by County Council Highways due to implementation of LTP3	

No.	Measure	Lead authority	Target annual emission reduction in the AQMA	Progress to date	Progress in last 12 months	Status
10	Smarter Choices and promotion building on working travel plans	County Council	<0.2 μgm^{-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 had travel plans in place, at the end of 2009 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.	No progress by County Council Highways due to implementation of LTP3	Implemented 2008 Measures ongoing
11	Better vehicle use of roadspace for less disruption to free flowing traffic	County Council	<0.2 μgm^{-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.	No progress by County Council Highways due to implementation of LTP3	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.	Required Air quality assessment of planning applications likely to impact on the AQMA.	ongoing 2011

10 Conclusions and Proposed Actions

10.1 Conclusions from New Monitoring Data

In the vicinity of the Lutterworth AQMA the Air Quality Standards are not being met. A Detailed Assessment of the area around the AQMA found that the area to the south of the AQMA is exceeding the annual mean Air Quality Standard for NO_2 and Harborough District Council is in the process of amending the AQMA. Following the completion of the Detailed Assessment it was recommended that monitoring points be established in the area further to the south of the area assessed. These monitoring points have indicated that there is an exceedence of the annual mean air quality standard however these will be assessed in the Further Assessment following the amendment of the AQMA.

The monitoring point in Theddingworth exceeded the Annual Mean Air Quality Standard for NO_2 in 2009 and was within 1 standard deviation of the Air Quality Standard in 2010 as such it is necessary that a Detailed Assessment is undertaken.

10.2 Conclusions relating to New Local Developments

There is 1 new Development (a petrol station) requiring consideration in the next update and screening assessment

10.3 Other Conclusions

10.3.1 Implementation of Air Quality Action Plans

The implementation of the Air quality Action Plan has now stalled waiting for Leicestershire County Council Highways Department and the publication of LTP3.

10.3.2 Local Transport Plan

Air quality issues are being included in the LTP3. This requires liaison with Leicestershire County Council Highways Department.

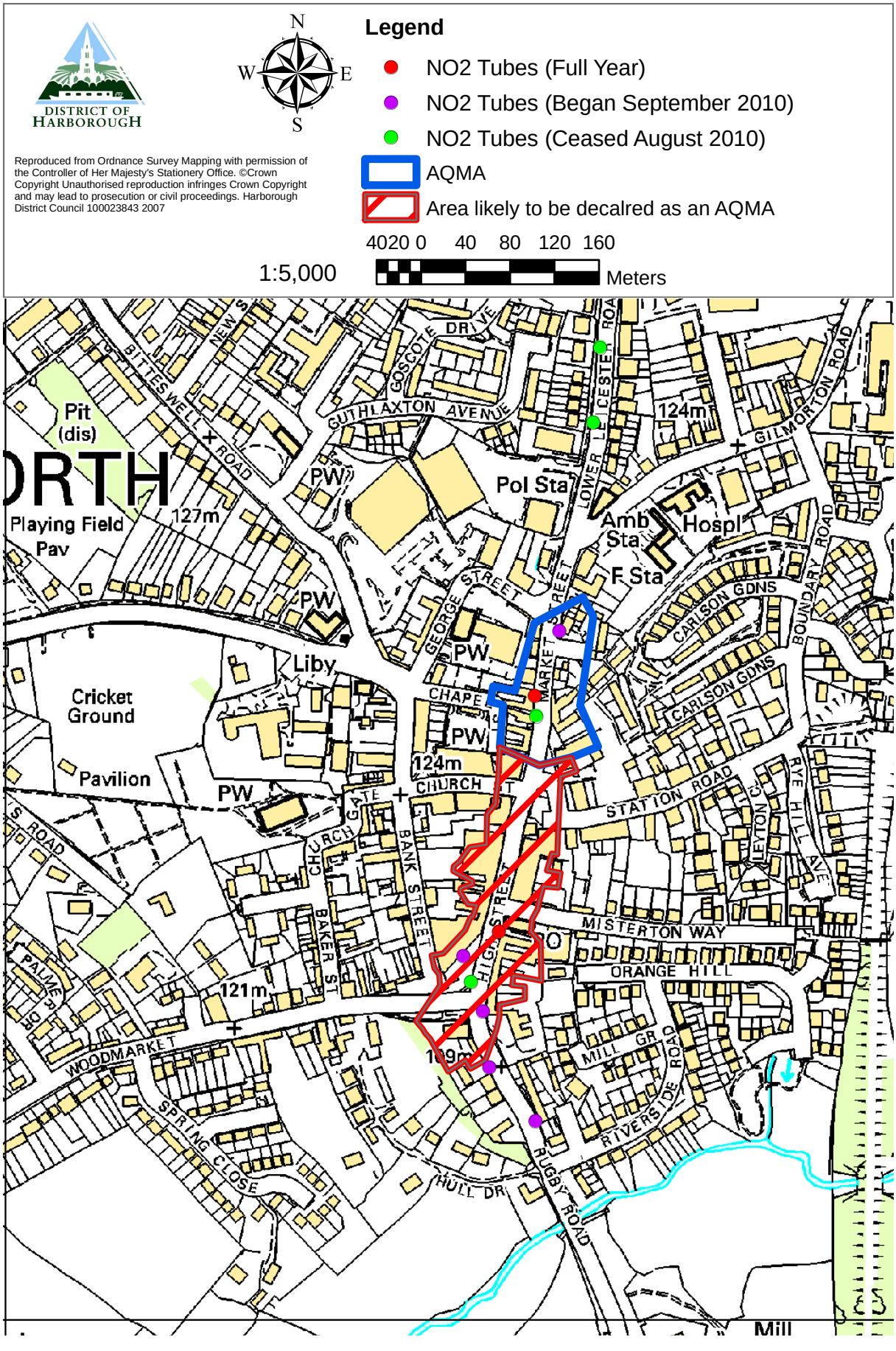
10.3.3 Relevant updates of planning policies that relate to air quality.

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.

10.4 Proposed Actions

- To amend the Lutterworth AQMA to include the area indicated in Figure. 8
- To complete a Further Assessment of the amended AQMA
- To Amend the Action Plan following the amendment of the AQMA
- To submit the 2012 Update and screening assessment
- Undertake a Detailed Assessment Theddingworth.

Figure. 8. Map of the Lutterworth AQMA and proposed Amendment



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11.6 Models

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12 Appendices

Appendix A. NO_2 Diffusion Tube Data

National AQ archive Site details	location	Site Type	Grid Reference		Our Tube No.	Pollutant	Measurement Period (µgm^{-3})												arithmetic mean (µgm^{-3})	Bias adjusted arithmetic Mean (µgm^{-3})(1.02 used)	Standard Deviation	sample size	% annual data coverage
			X	Y			Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec					
82705- Harborough 01n	Lutterworth. Service Shop	Roadside	454475	284560	2	NO_2	58	63	65	50	51	48	45	41	58	53	67	58	54.75	**55.85**	8.11	12	100%
82708- Harborough 03n	Brooklands (Home)	Urban background	473418	286956	3	NO_2	29	24	20	13	14	14		20	18	18	29	34	21.18	21.61	6.98	11	92%
83024- Harborough 05n	Lutterworth Regent Road	Roadside	454418	284303	1	NO_2	72		64	51	54	49	41	37					52.57	**53.62**	12.26	7	58%
84430- Harborough 06n	Monitoring Station	Roadside	454476	284541	5	NO_2	92	58	50	45	45	40	37	39					50.75	**51.77**	17.98	8	67%
84431- Harborough 07n	Theddingworth	Roadside	466586	285571	6	NO_2	49	41	45	30	39	37	29	28	39	36	47	44	38.67	**39.44**	7.02	12	100%
84432- Harborough 08n	Lilac Drive	Roadside	453065	284412	7	NO_2	36	31	27	22	22	20	18	19					24.38	24.86	6.39	8	67%
84433- Harborough 09n	Maxwell Way	Roadside	454376	285981	8	NO_2	44	45	29	24	26	25	15	18	27	24	46	42	30.42	31.03	10.92	12	100%
84435- Harborough 11n	Day Nursery	Roadside	454539	284932	10	NO_2	37	37	31	27	24	21	16	15	22	24	36	36	27.17	27.71	8.10	12	100%
84440- Harborough 12n	A6 Kibworth	Roadside	468425	294314	11	NO_2	46	60	55	42	36	36	34	34	40	41	60	57	45.08	**45.99**	10.22	12	100%
84441- Harborough 13n	Rockingham Road	Roadside	474731	287585	12	NO_2	47	44	45	31	35	23	34	28	31	43	71	51	40.25	**41.06**	12.92	12	100%
84444- Harborough 16n	Walcote	Roadside	456810	283652	15	NO_2	40	35	36	21	24	22	17	22	30	33	38	44	30.17	30.77	8.76	12	100%
84446- Harborough 17n	The Square	Roadside	473373	287231	16	NO_2	42	35	33	28	32		20	20		32	43	40	32.50	33.15	8.14	10	83%
84448- Harborough 18n	Jazz Hair	Roadside	454443	284348	17	NO_2	62	50		47	50	44	36	34	50	49	68	53	49.36	**50.35**	9.85	11	92%
86155- Harborough 19n	Wistow Rd Kibworth	Roadside	467739	294611	14	NO_2	33	30	24	27	19	20	17	16	20	26	35	36	25.25	25.76	7.05	12	100%
86381- Harborough 20n	3 Leicester road Lutterworth	Roadside	454527	284805	4	NO_2	50	53	45	37	43	27	29	24					38.50	**39.27**	10.95	8	67%
86382- Harborough 21n	19 Leicester road Lutterworth	Roadside	454551	285430	13	NO_2	40	42	46	42	31	32	27	27					35.88	**36.59**	7.47	8	67%
86383- Harborough 22n	77 Leicester road Lutterworth	Roadside	454533	284872	9	NO_2	37	37	31	27	24	21	16	15	22	24	36	36	27.17	27.71	8.10	12	100%
86930 - Harborough 23n	6 The Terrace Rugby Road	Roadside	454428	284274	1	NO_2									35		49	48	44.00	**44.88**	7.81	3	25%
86931 - Harborough 24n	4-9 regent court	Roadside	454410	284326	4	NO_2									23	24	39	40	31.50	32.13	9.26	4	33%
86932 - Harborough 25n	26 Market Street Lutterworth	Roadside	454497	284618	5	NO_2									41	46		52	46.33	**47.26**	5.51	3	25%
86933 - Harborough 26n	24 Rugby Road Lutterworth	Roadside	454432	284229	13	NO_2									44	46	64		51.33	**52.36**	11.02	3	25%
86934 - Harborough 27n	17 Rugby road Lutterworth	Roadside	454476	284178	7	NO_2									33	42	55	55	46.25	**47.18**	10.75	4	33%

Appendix B. Annualisation calculations

Annualisation is conducted inline with LAQM.TG(09) Box 3.2 page 3 - 4 (reproduced for reference in section 2.2.1.b)

Calculation of Annualisation Ratio.

Only sites with at least 75% annual data coverage have been used.

National AQ archive Site details	location	Measurement Period (µgm^{-3})												Arithmetic mean (µgm^{-3})			Ratio (Annual Mean /Period Mean)	
		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual	Jan - Aug	Sep - Dec	Jan - Aug	Sep - Dec
82705- Harborough 01n	Lutterworth. Service Shop	58	63	65	50	51	48	45	41	58	53	67	58	54.75	52.625	59.000	1.040	0.928
82708- Harborough 03n	Brooklands (Home)	29	24	20	13	14	14		20	18	18	29	34	21.18	19.143	24.750	1.107	0.856
84431- Harborough 07n	Theddingworth	49	41	45	30	39	37	29	28	39	36	47	44	38.67	37.250	41.500	1.038	0.932
84433- Harborough 09n	Maxwell Way	44	45	29	24	26	25	15	18	27	24	46	42	30.42	28.250	34.750	1.077	0.875
84435- Harborough 11n	Day Nursery	37	37	31	27	24	21	16	15	22	24	36	36	27.17	26.000	29.500	1.045	0.921
84440- Harborough 12n	A6 Kibworth	46	60	55	42	36	36	34	34	40	41	60	57	45.08	42.875	49.500	1.052	0.911
84441- Harborough 13n	Rockingham Road	47	44	45	31	35	23	34	28	31	43	71	51	40.25	35.875	49.000	1.122	0.821
84444- Harborough 16n	Walcote	40	35	36	21	24	22	17	22	30	33	38	44	30.17	27.125	36.250	1.112	0.832
84446- Harborough 17n	The Square	42	35	33	28	32		20	20		32	43	40	32.50	30.000	38.333	1.083	0.848
84448- Harborough 18n	Jazz Hair	62	50		47	50	44	36	34	50	49	68	53	49.36	46.143	55.000	1.070	0.898
86155- Harborough 19n	Wistow Rd Kibworth	33	30	24	27	19	20	17	16	20	26	35	36	25.25	23.250	29.250	1.086	0.863
86383- Harborough 22n	77 Leicester road Lutterworth	37	37	31	27	24	21	16	15	22	24	36	36	27.17	26.000	29.500	1.045	0.921
																Mean Ration (R_a)	1.073	0.884

Annualisation of Tubes exposed Jan – Aug.

National AQ archive Site details	location	Measurement Period (µgm^{-3})												Arithmetic mean (µgm^{-3})	Bias Adjusted Annualised mean (µgm^{-3}) (Arithmetic mean × Bias (1.02) × R_a)
		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
83024- Harborough 05n	Lutterworth. Regent Road	72		64	51	54	49	41	37					**52.57**	**57.54**
84430- Harborough 06n	Monitoring Station	92	58	50	45	45	40	37	39					**50.75**	**55.54**
84432- Harborough 08n	Lilac Drive	36	31	27	22	22	20	18	19					24.38	26.68
86381- Harborough 20n	3 Leicester road Lutterworth	50	53	45	37	43	27	29	24					**38.50**	**42.14**
86382- Harborough 21n	19 Leicester road Lutterworth	40	42	46	42	31	32	27	27					35.88	**39.26**

Annualisation of Tubes exposed Sept – Dec.

National AQ archive Site details	location	Measurement Period (µgm^{-3})												Arithmetic mean (µgm^{-3})	Bias Adjusted Annualised mean (µgm^{-3}) (Arithmetic mean × Bias (1.02) × R_a)
		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
86930 - Harborough 23n	6 The Terrace Rugby Road									35		49	48	**44.00**	**39.66**
86931 - Harborough 24n	4-9 regent court									23	24	39	40	31.50	28.40
86932 - Harborough 25n	26 Market Street Lutterworth									41	46		52	**46.33**	**41.77**
86933 - Harborough 26n	24 Rugby Road Lutterworth									44	46	64		**51.33**	**46.28**
86934 - Harborough 27n	17 Rugby road Lutterworth									33	42	55	55	**46.25**	**41.69**