Lichfield District Council
Updating And Screening Assessment 2015

Bureau Veritas

July 2015

Move Forward with Confidence

Document Control Sheet

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Submitted to	Neil Wait	Neil Wait
Prepared by	Anna Czerska – Assistant Consultant	Anna Czerska – Assistant Consultant
Signature	A.C.	A.C.
Approved by	Dr Antony Wiatr – Principal Consultant	Dr Antony Wiatr – Principal Consultant
Signature		
Project number	6276005	

Bureau Veritas UK Limited
5th Floor, 66 Prescot Street
London
E1 8HG

Telephone: +44 (0) 207 902 6100
Fax: +44 (0) 207 902 6149
Registered in England 1758622
www.bureauveritas.co.uk

Registered Office
Suite 308 Fort Dunlop
Fort Parkway, Birmingham
B24 9FD

Local Authority Officer	Neil Wait Senior Environmental Protection Officer
Department	Environmental Health
Address	Frog Lane, Lichfield, WS13 6ZE
Telephone	01543 308734
e-mail	neil.wait@lichfielddc.gov.uk
Report Reference	Updating and Screening Assessment Report 2015
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Executive Summary

Part IV of the Environment Act 1995 places a statutory duty on local authorities to review and assess the air quality within their area and take account of Government Guidance when undertaking such work. This Updating and Screening Assessment is a requirement of the Sixth Round of Review and Assessment and is a requirement for all local authorities. The Report has been undertaken in accordance with the Technical Guidance LAQM.TG (09) and associated tools (as updated in 2014).

This Updating and Screening Assessment considers all new monitoring data and assesses the data against the Air Quality Strategy (AQS) objectives. It also considers any changes that may have an impact on air quality.

The review of new diffusion tube monitoring data has identified one location outside the existing AQMA where the AQS annual NO_2 objective was exceeded in 2014 at the façade of a relevant receptor: A38-2A/B – Fradley. As exceedences at this site were recorded in the previous years, a Detailed Assessment undertaken in the 2014 Progress Report recommended that the four properties in the vicinity of this tube on the A38 (Rykneld Street) be declared as an AQMA. However, the appraisal of the 2014 Progress Report further recommended that the Council should investigate whether there were other receptors situated at a similar distance to the road along the A38, further away from the original study area, that experience similar NO_2 concentrations. Therefore, it is recommended that the Council undertakes a dispersion modelling Detailed Assessment for the whole north section of the A38 (Rykneld Street) to determine NO_2 concentrations at the identified relevant receptors. The Council may also consider installing additional monitoring sites at the identified receptors along the length of the north section of the A38 as an alternative to, or to supplement, further dispersion modelling studies.

Concentrations within the AQMA still exceed the annual mean objective for NO_2 at two diffusion tube monitoring locations (MUC-1A/B/C and MUC-3); as such the AQMA should remain. The concentrations in 2014 show a slight increase at most sites when compared to the previous year.

With regards to the assessment of road sources, the South Midlands Route Strategy provides an outline of investment priorities for the route network in the South Midlands. The document sets out what improvements will be delivered and has informed the Road Investment Strategy (2015/16 to 2019/20). The schemes identified in the Strategy are

expected to reduce congestion on the road network in Lichfield and thus improve air quality in the surrounding areas.

Proposed actions arising from the 2015 Updating and Screening Assessment are as follows:

- Continue NO_2 diffusion tube monitoring in the District to identify future changes in pollutant concentrations;
- Continue NO_2 diffusion tube monitoring at site A38-2A/B at Fradley;
- Proceed to a dispersion modelling based Detailed Assessment for the north section of the A38 from the District boundary to the A38/A5127 junction;
- Finalise the Lichfield Air Quality Action Plan;
- Proceed to a Progress Report in 2016.

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1 Introduction

1.1 Description of Local Authority Area

Lichfield District Council (LDC) is situated in the north of the West Midlands, close to some highly industrialised parts of the UK. To the south west lie Walsall and Birmingham. LDC is only moderately industrialized, but there are a number of major roads in the region, including the M6 Toll, A38 and A5. Consequently, road traffic is the main source of air pollution in the area. Burntwood and Lichfield are the two largest urban areas in the District.

1.2 Purpose of Report

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

The objective of this Updating and Screening Assessment is to identify any matters that have changed which may lead to risk of an air quality objective being exceeded. A checklist approach and screening tools are used to identify significant new sources or changes and whether there is a need for a Detailed Assessment. The USA report should provide an update of any outstanding information requested previously in Review and Assessment reports.

1.3 Air Quality Objectives

The air quality objectives applicable to LAQM **in England** are set out in the Air Quality (England) Regulations 2000 (SI 928), The Air Quality (England) (Amendment) Regulations 2002 (SI 3043), and are shown in Table 1.. This table shows the objectives in units of micrograms per cubic metre $\mu g/m^3$ (milligrammes per cubic metre, mg/m^3 for carbon monoxide) with the number of exceedences in each year that are permitted (where applicable).

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

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

1.4 Summary of Previous Review and Assessments

LDC completed the first Updating and Screening Assessment in 2003 (Faber Maunsell, 2003) and concluded that a Detailed Assessment was required for nitrogen dioxide (NO_2), due to the likelihood of exceedences of the objectives at locations near to the A5 and A38.

The Detailed Assessment (Casella Stranger, 2004) predicted that the annual mean NO_2 objective was likely to be exceeded at several properties near to the A5 and at one residence alongside the A38. However, model verification (and hence the conclusions of the study) were based on a short period of continuous monitoring data in the identified areas, prior to the opening of the M6 Toll road. It was recommended that further monitoring should be carried out before making a decision on whether to declare any AQMAs.

Following the collection of further monitoring data another Detailed Assessment (Casella Stranger, 2005) was produced. This assessment predicted exceedences of the annual mean NO_2 objective at the ground floor of the Muckley Corner Hotel, but future projections indicated that the objective would be met by 2010. As a result it was concluded that LDC should not declare an AQMA for NO_2. However, it was decided that further diffusion tube monitoring should be carried out in the area.

In 2006 the Council entered the Third Round of Review and Assessment and produced the 2006 Updating and Screening Assessment (Faber Maunsell, 2006). This included the results of additional monitoring undertaken by the Council. Further exceedences of the annual mean NO_2 objective were recorded at Muckley Corner, indicating the need for a further Detailed Assessment for NO_2 in this area.

The Detailed Assessment (AEA Technology, 2007) concluded that the annual mean NO_2 objective was likely to be exceeded at several properties surrounding the Muckley Corner roundabout and that an AQMA should be declared covering this area (Figure 1.). Modelling results for PM_{10} indicated that the air quality objectives were likely to be achieved for this pollutant and no further action was necessary.

Updated diffusion tube monitoring data presented in the 2009 Updating and Screening Assessment (Faber Maunsell, 2009) indicated that the annual mean NO_2 objective continued to be exceeded at Muckley Corner. The report also indicated the potential for exceedences at residential properties alongside the A38 at Canwell and therefore recommended a Detailed Assessment for NO_2 should be carried out.

In the 2010 Detailed Assessment (AECOM, 2010) one exceedence of the annual mean NO_2 objective was predicted at a residential receptor near to the A38 at Canwell (2 Weeford Park Cottages) in 2009. The modelled results for 2010 predicted that the objective would be met at all receptors. Additionally, the report highlighted that this section of the A38 would be subject to road works over the summer of 2010, which would include a 30 mph speed limit. Staffordshire County Council's plan was to introduce a number of safety measures for the A38 between Weeford Island and Bassett's Pole, including a reduced 60 mph speed limit which would be enforced by average speed cameras.

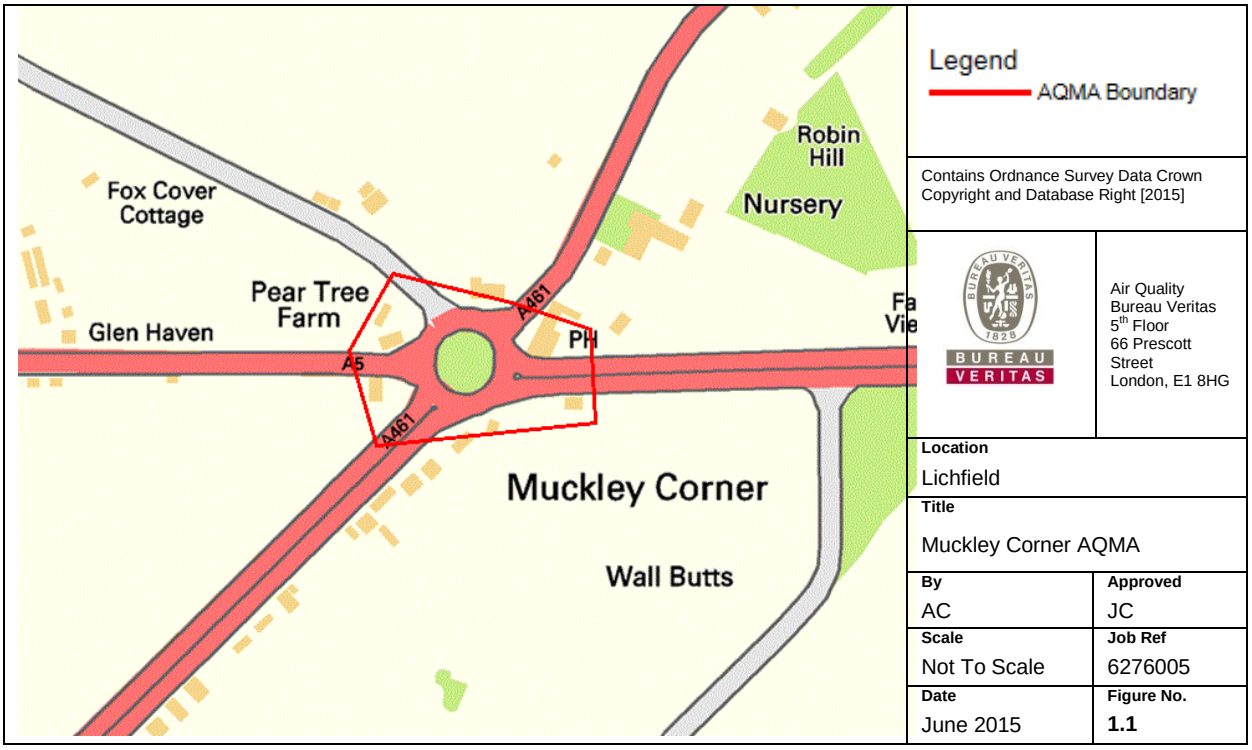
The 2010 diffusion tube dataset, reported in the 2011 Progress Report (AECOM, 2011) showed that 14 diffusion tube sites exceeded the NO_2 annual mean objective. Of these exceedences, four were shown to meet the NO_2 annual mean objective once a facade adjustment was calculated and six were within the boundary of the existing AQMA. Of the remaining

exceedences, three are just outside the existing Muckley Corner AQMA. The final exceedence at Fradley on the A38 was confirmed as exceeding the annual mean objective at relevant exposure. A Detailed Assessment was not proposed at this time. However, to support future decision making, additional diffusion tube monitoring sites were set up.

The 2012 Updating and Screening Assessment (AECOM, 2012) identified possible exceedences of the annual mean nitrogen dioxide objective near to the A38 at Weeford and Fradley. These were based on adjusted data and therefore further monitoring was proposed in these locations in order to collect further data. The results from this monitoring can then be used to ascertain the need for a Detailed Assessment.

The 2013 Progress Report confirmed the exceedence of annual mean NO_2 objective at Fradley and recommended that the Council proceed to a Detailed Assessment for this area. A Detailed Assessment (based upon monitoring data) undertaken in the 2014 Progress Report recommended that the four properties in the vicinity of this tube on the A38 (Rykneld Street) be declared as an AQMA. Subsequently, the appraisal of the 2014 Progress Report further recommended that the Council should investigate whether there were other receptors situated at a similar distance to the road along the A38 further away from the original study area.

Figure 1.1 Map of Muckley Corner AQMA



2 New Monitoring Data

2.1 Summary of Monitoring Undertaken

2.1.1 Automatic Monitoring Sites

There are no permanent continuous monitoring locations in operation in the District and no automatic monitoring was carried out by LDC in 2014.

2.1.2 Non-Automatic Monitoring Sites

Lichfield District Council undertook monitoring at 22 nitrogen dioxide diffusion tube sites in 2014. This includes six duplicate sites and one triplicate site as follows. There have not been any changes to the sites number or location since last year.

The duplicate sites are:

- A38–2 and A38-2(1);
- A38-2A and A38-2B;
- A38-4A and A38-4B;
- A38-4(X) and A38-4(Y);
- A38-5A and A38-5B; and
- A38-6A and A38-6B.

The triplicate site is:

- MUC-1A, MUC-1B and MUC-1C.

Details of the monitoring sites are shown in Table 2.1, whilst their location is provided in Figure 2.1 through to Figure 2..

The diffusion tubes are supplied and analysed by Staffordshire Scientific Services utilising the 20% triethanolamine (TEA) in water preparation method. Quality control procedures, including bias adjustment, are discussed in Appendix A.

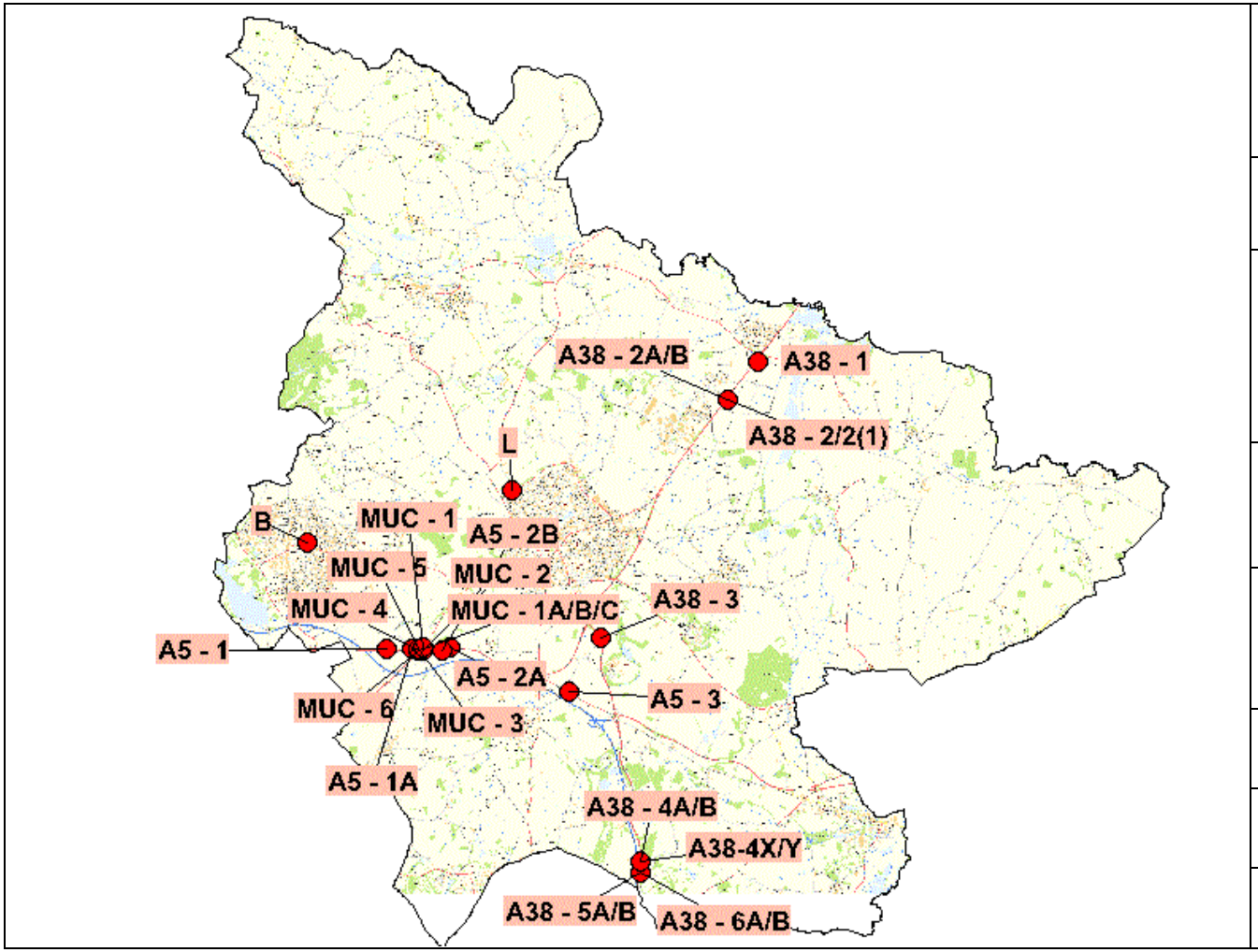
Table 2.1 Details of Non- Automatic Monitoring Sites

Site ID	Site Name	Site Type	X OS Grid Reference	Y OS Grid Reference	Pollutants Monitored	Within AQMA?	Triplicate Tube or Monitoring Co-located with a Continuous Analyser (Y/N)	Relevant Exposure ?	Distance to Kerb of Nearest Road	Does this Location Represent Worst-Case Exposure?
A38 - 1	Alrewas	Roadside	417101	314180	NO_2	N	N	N (9 m)[a]	1 m	Y
A38 - 2/2(1)	Fradley	Roadside	416295	313186	NO_2	N	Duplicate	N (10 m)	5 m	Y
A38 - 2A/B	Fradley	Roadside	416290	313175	NO_2	N	Duplicate	Y	6 m	Y
A38 - 3	Lichfield	Roadside	412891	306817	NO_2	N	N	N (6 m)	2 m	Y
A38 - 4A/B	Canwell	Roadside	413978	300834	NO_2	N	Duplicate	N (10 m)	6.85 m	Y
A38-4X/Y	Canwell	Roadside	413989	300869	NO_2	N	Duplicate	Y	15 m	Y
A38 - 5A/B	Canwell	Roadside	413950	300574	NO_2	N	Duplicate	N (35 m)	10 m	Y
A38 - 6A/B	Canwell	Roadside	413961	300539	NO_2	N	Duplicate	N (10 m)	25 m	Y
A5 - 1	Muckley Corner	Roadside	407208	306513	NO_2	N	N	N[b]	4 m	Y
A5 - 1A	Muckley Corner	Roadside	407895	306516	NO_2	N	N	N (6 m)	1 m	Y
A5 - 2A	Muckley Corner	Roadside	408893	306549	NO_2	N	N	N (12 m)	5 m	Y
A5 - 2B	Muckley Corner	Roadside	408667	306500	NO_2	N	N	N (6 m)	2 m	Y
A5 - 3	Lichfield	Roadside	412063	305379	NO_2	N	N	N (13 m)	10 m	Y
B	Burntwood	Urban background	405086	309344	NO_2	N	N	N (127 m)	N/A	Y
L	Lichfield	Urban background	410544	310760	NO_2	N	N	N (42 m)	N/A	Y

Site ID	Site Name	Site Type	X OS Grid Reference	Y OS Grid Reference	Pollutants Monitored	Within AQMA?	Triplicate Tube or Monitoring Co-located with a Continuous Analyser (Y/N)	Relevant Exposure ?	Distance to Kerb of Nearest Road	Does this Location Represent Worst-Case Exposure?
MUC - 1	Muckley Corner Hotel Ground Floor	Roadside	408164	306513	NO_2	Y	N	N[c]	5 m	Y
MUC - 1A/B/C	Muckley Corner Hotel First Floor	Roadside	408164	306513	NO_2	Y	Triplicate	Y	5 m	Y
MUC - 2	Muckley Corner A5 Westbound	Roadside	408165	306487	NO_2	Y	N	N (9 m)	5 m	Y
MUC - 3	Muckley Corner A461 Southbound	Roadside	408097	306468	NO_2	Y	N	N (10 m)	5 m	Y
MUC - 4	Muckley Corner A5 Westbound	Roadside	408029	306501	NO_2	Y	N	N (2 m)	4 m	Y
MUC - 5	Muckley Corner A5 Eastbound	Roadside	408030	306516	NO_2	Y	N	N (5 m)	2 m	Y
MUC - 6	Muckley Corner A461 Southbound	Roadside	408161	306556	NO_2	Y	N	N (5 m)	2 m	Y

[a] The nearest relevant exposure is over 200m southwest of the monitoring location but is alongside the same road. This exposure is 9m from kerb.
[b] No relevant exposure within 200m of tube location.
[c] Relevant exposure at first floor height.

Figure 2.1 Map of Non-Automatic Monitoring Sites: Lichfield District



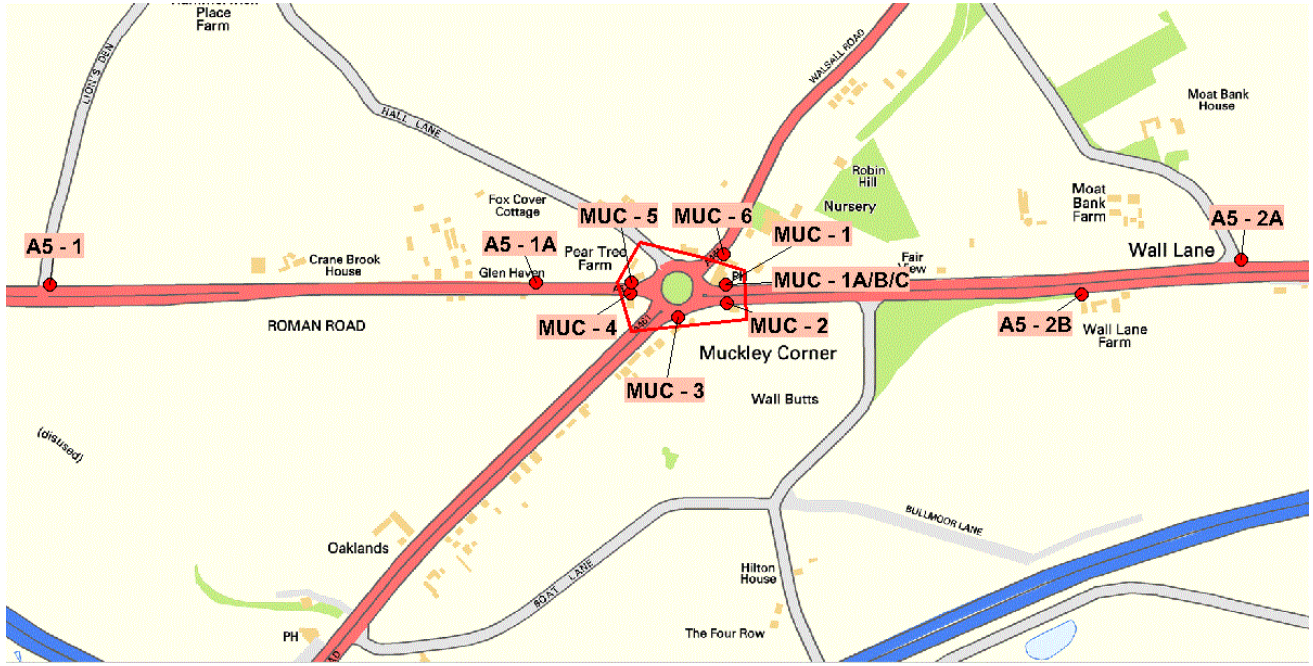
Legend

Diffusion Tube Monitoring Site

Air Quality
Bureau Veritas
5th Floor
66 Prescott Street
London, E1 8HG

Location	**Lichfield District**
Title	**Non-Automatic Monitoring Sites**
By AC	**Approved** JC
Scale Not To Scale	**Job Ref** 6276005
Date June 2015	**Figure No.** **2.1**

Figure 2.2 Map of Non-Automatic Monitoring Sites: Muckley Corner



Legend

Diffusion tube monitoring site

AQMA Boundary

Air Quality
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5th Floor
66 Prescott Street
London, E1 8HG

Location

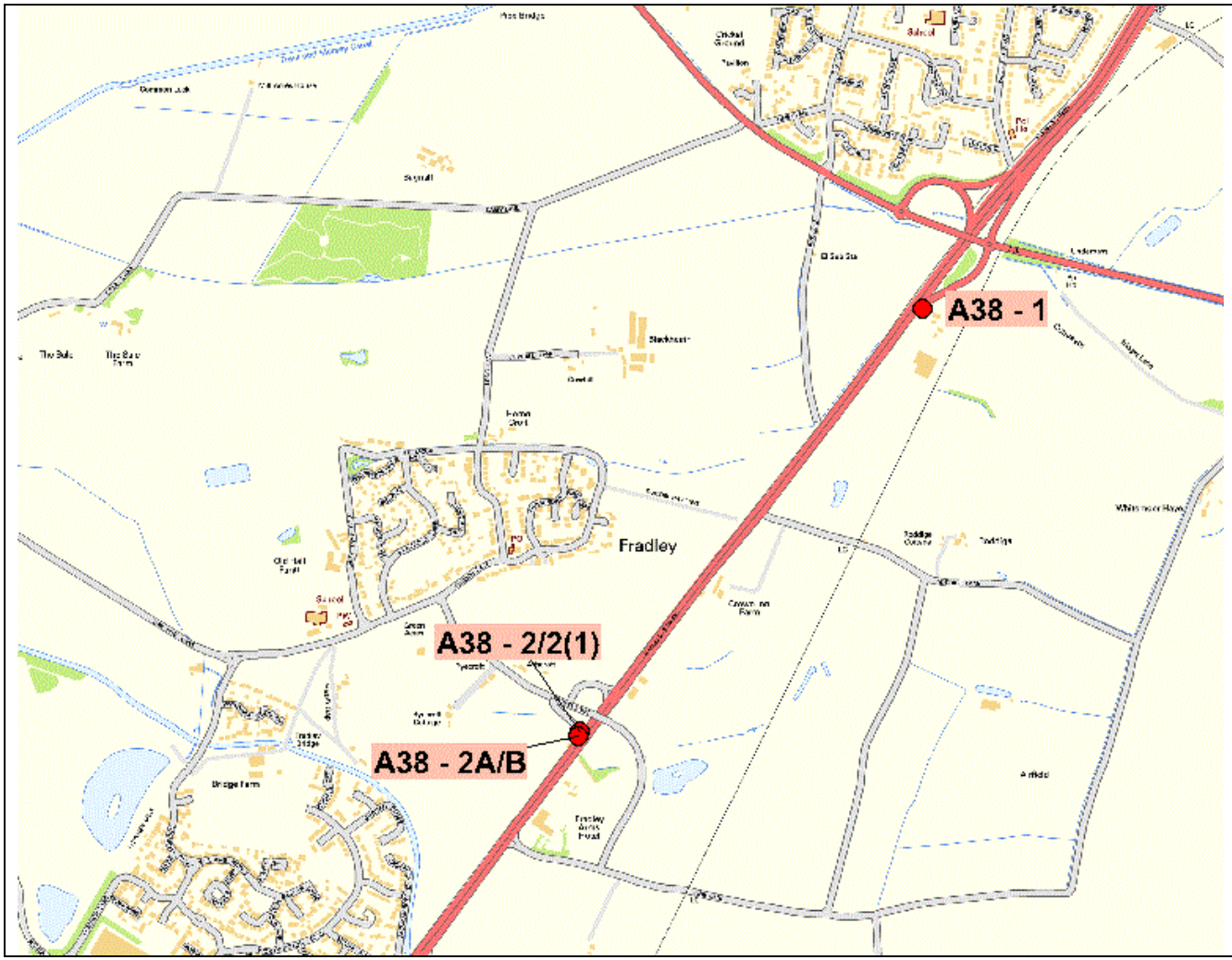
Lichfield District

Title

Non-Automatic Monitoring Sites: Muckley Corner

By	Approved
AC	JC
Scale	**Job Ref**
Not To Scale	6276005
Date	**Figure No.**
June 2015	**2.2**

Figure 2.3 Map of Non-Automatic Monitoring Sites: Alrewas and Fradley



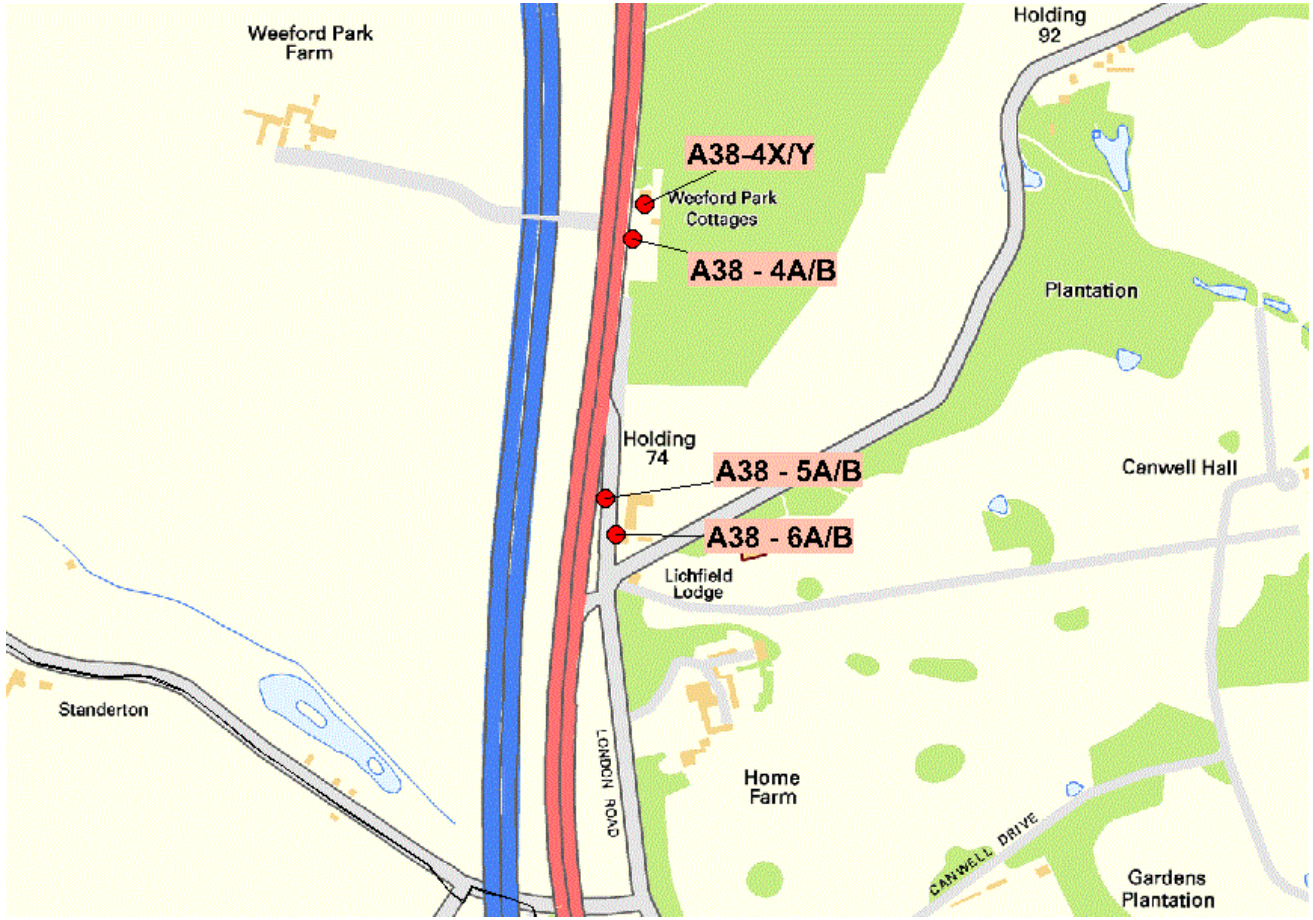
Legend

Diffusion Tube Monitoring Site

Air Quality
Bureau Veritas
5th Floor
66 Prescott Street
London, E1 8HG

Location	**Lichfield District**
Title	**Non-Automatic Monitoring Sites: Alrewas and Fradley**
By AC	**Approved** JC
Scale Not To Scale	**Job Ref** 6276005
Date June 2015	**Figure No.** **2.3**

Figure 2.4 Map of Non-Automatic Monitoring Sites: Canwell



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Diffusion Tube Monitoring Site

Air Quality
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5th Floor
66 Prescott Street
London, E1 8HG

Location

Lichfield District

Title

Non-Automatic Monitoring Sites: Canwell

By	Approved
AC	JC
Scale	**Job Ref**
Not To Scale	6276005
Date	**Figure No.**
June 2015	**2.4**

Figure 2.5 Map of Non-Automatic Monitoring Sites: Lichfield

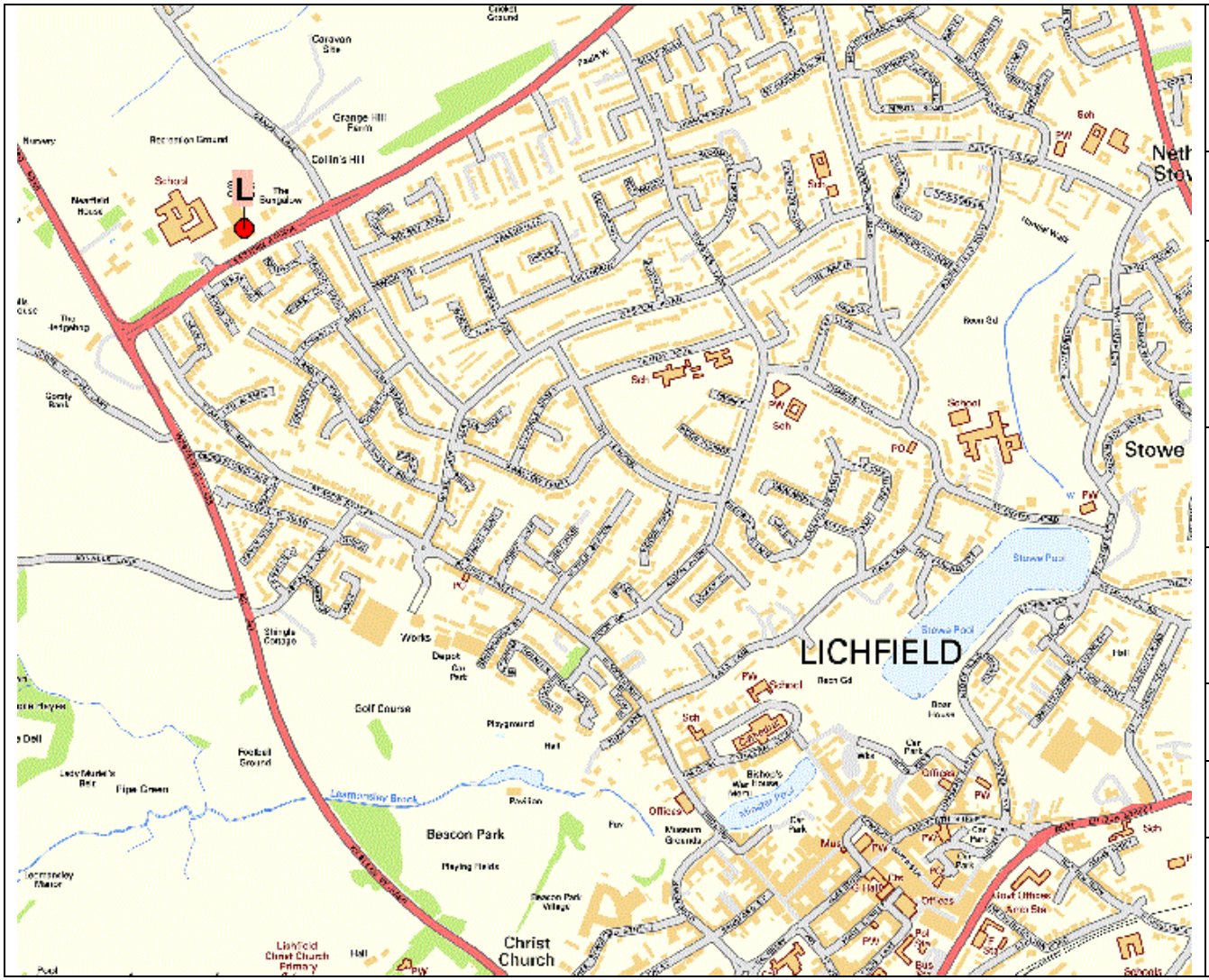
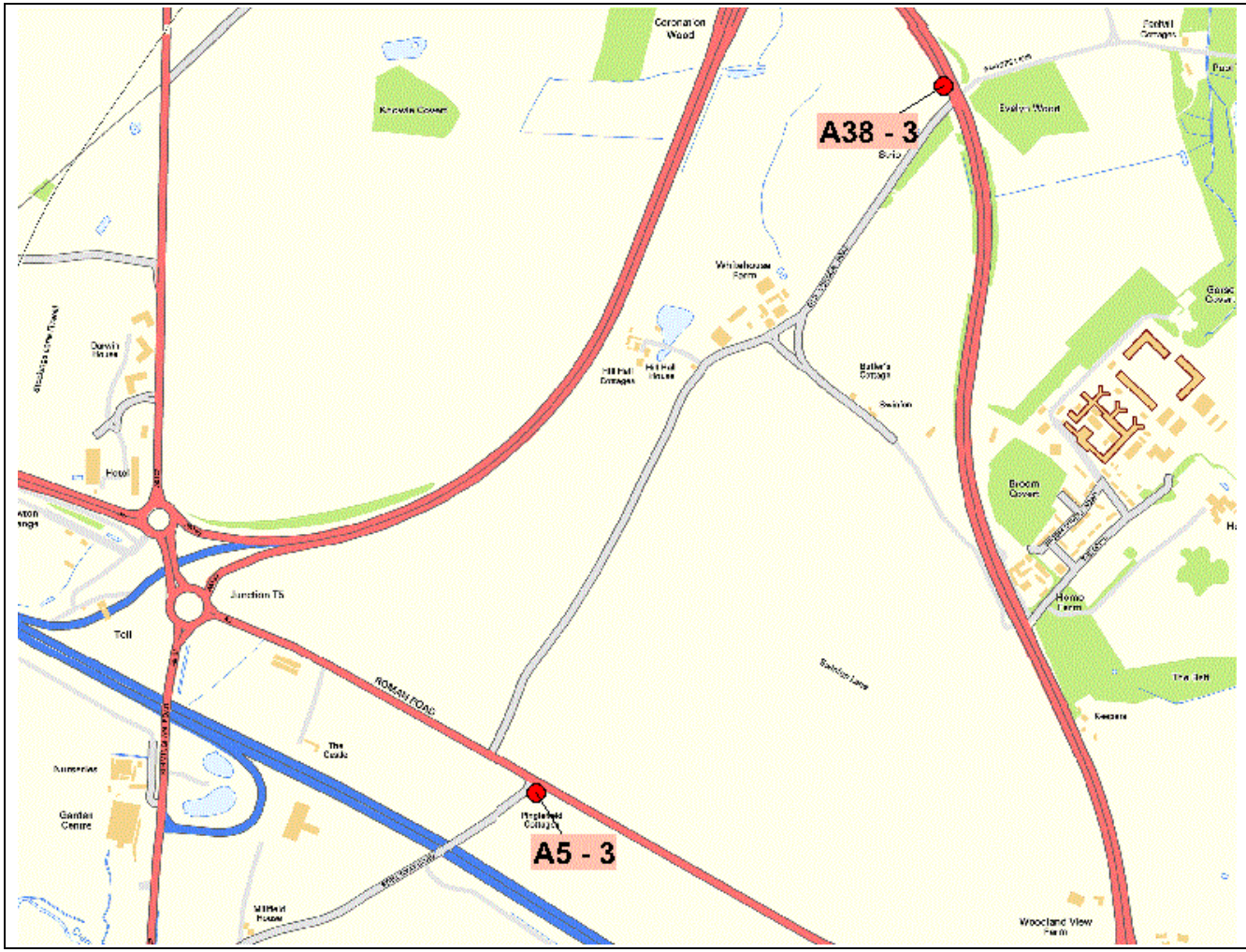


Figure 2.6 Map of Non-Automatic Monitoring Sites. Lichfield & Shenstone



Legend

Diffusion Tube Monitoring Site

Air Quality
Bureau Veritas
5th Floor
66 Prescott Street
London, E1 8HG

Location

Lichfield District

Title

Non-Automatic Monitoring Sites: Lichfield & Shenstone

By	Approved
AC	JC
Scale	**Job Ref**
Not To Scale	6276005
Date	**Figure No.**
June 2015	**2.6**

Figure 2.7 Map of Non-Automatic Monitoring Sites: Burntwood

Legend

Diffusion Tube Monitoring Site

Air Quality
Bureau Veritas
5th Floor
66 Prescott Street
London, E1 8HG

Location	**Lichfield District**
Title	**Non-Automatic Monitoring Sites: Burntwood**
By AC	**Approved** JC
Scale Not To Scale	**Job Ref** 6276005
Date June 2015	**Figure No.** **2.7**

2.2 Comparison of Monitoring Results with Air Quality Objectives

2.2.1 Nitrogen Dioxide

There are two Air Quality Objectives for NO_2, namely:

- the annual mean of 40µg/m^3, and
- the 1-hour mean of 200µg/m^3 not to be exceeded more than 18 times a year.

Diffusion Tube Monitoring Data

The NO_2 diffusion tube data are summarised in Table 2.3 and Table 2.4. The full dataset (monthly mean values) are included in Appendix A.

Data capture for 2014 was good (above 75%), with no sites requiring short to long term adjustment (annualisation).

Results for year 2014 have been bias adjusted using a national bias adjustment factor of 0.83. Full details of the bias adjustment and QA/QC procedure are provided in Appendix A.

For the 2014 data set there were seven sites where the annual mean NO_2 objective was exceeded. Five of these sites were located within the existing AQMA. Site MUC - 1A/B/C - Muckley Corner Hotel First Floor – is located at a façade of a relevant receptor (the concentration of 46.8 µg/m^3). Site MUC - 1 - Muckley Corner Hotel Ground Floor does not have relevant receptors; those are covered by MUC - 1A/B/C - Muckley Corner Hotel First Floor. The concentrations at MUC-3, MUC-4 and MUC-5 were distance corrected to estimate the concentration at relevant exposure (Table 2.). Only MUC-3 exceeded the objective at the receptor façade with the concentration of 42.8 µg/m^3. MUC-4 and MUC-5 met the objective at the receptor façade; however, both were very close to an exceedence. All three sites have shown exceedences in previous years; as such an AQMA is still required for this area.

The two sites which showed an exceedence of the annual mean objective and were located outside of the current AQMA were:

- A38-2A/B – Fradley (43.1 µg/m^3); and
- A38-4A/B – Canwell (48.1 µg/m^3).

Both these sites have shown consistent exceedences in the past.

Table 2.2 provides information on Site A38-4A/B – Canwell and Sites MUC 3 to 5 at Muckley Corner. These sites have been distance corrected to the nearest relevant exposure façade. When these sites were used to calculate the concentration at a location of relevant exposure (façade of a residential property), the annual mean concentration fell to below the objective at Site A38-4A/B – Canwell with the result of 39.6 µg/m^3. Although the corrected result did not show an exceedence, it was still very close to the objective. However, another site, Site A38-4X/Y, is located at the façade of the nearest relevant receptor to A38-4A/B. The annual mean at this site was 31.9 µg/m^3 in 2014. There is therefore no requirement to carry out a Detailed Assessment for this location.

Table 2.2 Fall-off with Distance Correction of Sites Exceeding the NO_2 Annual Mean Objective

Site ID	In AQMA?	Distance Kerb-Receptor (m)	Distance Kerb-Monitor (m)	Bias Adjusted Annual Mean (µg/m^3)	Distance Corrected Annual Mean (µg/m^3)
A38-4A/B - Canwell	**N**	10.0	6.9	**48.1**	39.6
MUC – 3 - Muckley Corner A461 Southbound	Y	10.0	5.0	**54.6**	**42.8**
MUC-4 - Muckley Corner A5 Westbound	Y	2.0	4.0	**42.1**	39.4
MUC – 5 - Muckley Corner A5 Eastbound	Y	5.0	2.0	**47.2**	38.8

The site A38-2A/B is located at the façade of a relevant receptor and has therefore not been distance adjusted. The annual mean concentrations of NO_2 at this site have exceeded the objective for all years since the site was added in 2011. It was recommended in the 2013 Progress Report that a Detailed Assessment should be carried out for this area. In view of the limited number of receptors close to the A38 in this area, a monitoring-based Detailed Assessment was undertaken as part of the 2014 Progress Report. In 2013, the annual mean objective of 40µg/m^3 was exceeded at site A38–2A/B, but not at sites A38 – 1 and A382/2(1), which are closer to the A38 than any nearby sensitive receptors. From that it was concluded that the exceedence is an isolated occurrence at the properties close to the monitoring site A38-2A/B. The recommendations of the assessment were that these four properties on the A38 (Rykneld Street) should be declared as an AQMA. The appraisal of the 2014 Progress Report further recommended that the Council should investigate whether there were other receptors situated at a similar distance to the road along the A38 further away from the original study area.

The monitoring results in 2014 again confirmed the exceedence of the annual NO_2 objective at site A38–2A/B, but not at sites A38 – 1 and A382/2(1). The north section of the A38 (Rykneld Street) – from the District boundary to the A38/A5127 junction - is considered to carry similar traffic flows, however the road layout, traffic speed, and queuing may be different; hence the observed variation in monitoring results for the three sites. Within that section of the A38, there are residential properties representing relevant exposure, situated approximately 5m from the road; there are also a number of properties situated 10-15m from the road and located to the north of the A38/A513 junction. Therefore, it is recommended that the Council undertakes a dispersion modelling Detailed Assessment for the whole north section of the A38 to determine existing concentrations at the identified relevant receptors. The modelling will also confirm the areas where an exceedence of the NO_2 objective is likely to occur and help to determine the proposed boundary of the AQMA. The Council may also consider installing additional monitoring sites at the identified receptors along the length of the north section of the A38 as an alternative to, or to supplement, further dispersion modelling studies.

With respect to the hourly NO_2 objective, there could be a potential risk of exceedence where the annual mean concentration is greater than 60$\mu g/m^3$. For the 2014 results there are no sites where the annual mean is greater than 60$\mu g/m^3$; therefore it is unlikely that the hourly mean objective will be exceeded at any of the monitoring sites.

Figure 2.8 shows the trend across the diffusion tube monitoring locations in LDC from 2008 to 2014. From this it can be seen that the majority of sites showed a peak in annual mean concentration between 2008 and 2010. The LAQM Support website states that '*Monitoring results obtained across the country in 2010 indicate that concentrations of NO_x/NO_2 were generally elevated compared to other recent years.*'[1]. This is a result of the meteorological conditions in 2010. This was followed by a general reduction in concentrations in 2011. The 2012 data sets shows that annual mean NO_2 concentrations have increased, but remained lower than those observed in 2010 at majority of sites. The concentrations in 2014 show a slight increase at most sites when compared to the previous year.

[1] LAQM Support Website, FAQ136 http://laqm.defra.gov.uk/laqm-faqs/faq136.html

Table 2.3 Results of NO_2 Diffusion Tubes 2014

Site ID	Site Name	Site Type	Within AQMA?	Triplicate or Co-located Tube?	Full Calendar Year Data Capture 2014 (Number of Months)	2014 Annual Mean Concentration (µg/m^3) - Bias Adjustment factor = 0.83
A38 - 1	Alrewas	Roadside	N	N	12	37.1
A38 - 2/2(1)	Fradley	Roadside	N	Duplicate	12	35.9
A38 - 2A/B	Fradley	Roadside	N	Duplicate	12	**43.1**
A38 - 3	Lichfield	Roadside	N	N	12	31.1
A38 - 4A/B	Canwell	Roadside	N	Duplicate	12/10	**48.1**
A38-4X/Y	Canwell	Roadside	N	Duplicate	12	31.9
A38 - 5A/B	Canwell	Roadside	N	Duplicate	12	37.3
A38 - 6A/B	Canwell	Roadside	N	Duplicate	12	31.7
A5 - 1	Muckley Corner	Roadside	N	N	12	34.3
A5 - 1A	Muckley Corner	Roadside	N	N	12	37.2
A5 - 2A	Muckley Corner	Roadside	N	N	12	32.1
A5 - 2B	Muckley Corner	Roadside	N	N	12	38.5
A5 - 3	Lichfield	Roadside	N	N	11	30.5
B	Burntwood	Urban background	N	N	9	16.6
L	Lichfield	Urban background	N	N	12	17.3
MUC - 1	Muckley Corner Hotel Ground Floor	Roadside	Y	N	12	**41.5**
MUC - 1A/B/C	Muckley Corner Hotel First Floor	Roadside	Y	Triplicate	12	**46.8**

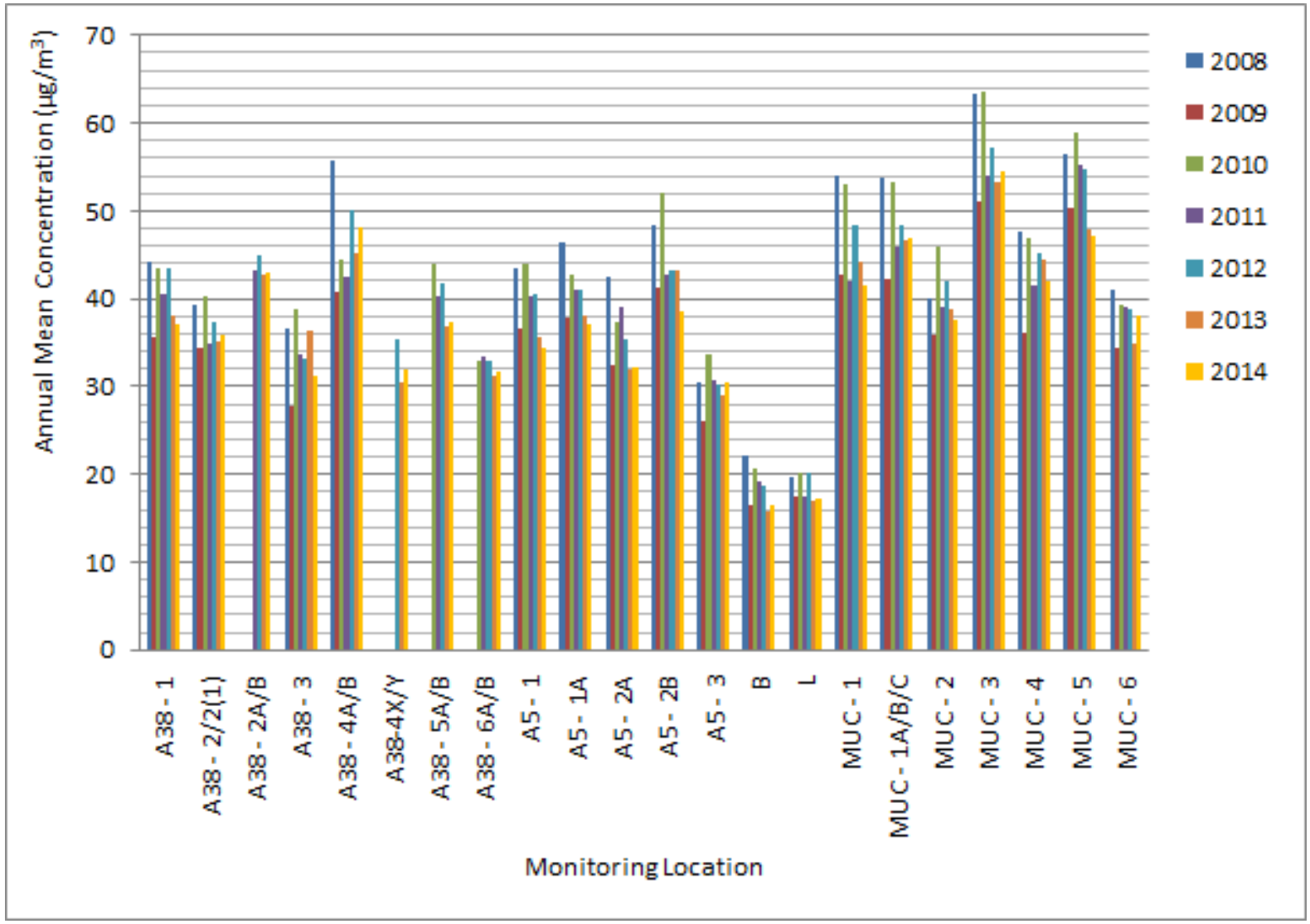
Site ID	Site Name	Site Type	Within AQMA?	Triplicate or Co-located Tube?	Full Calendar Year Data Capture 2014 (Number of Months)	2014 Annual Mean Concentration (µg/m^3) - Bias Adjustment factor = 0.83
MUC - 2	Muckley Corner A5 Westbound	Roadside	Y	N	12	37.6
MUC - 3	Muckley Corner A461 Southbound	Roadside	Y	N	12	**54.6**
MUC - 4	Muckley Corner A5 Westbound	Roadside	Y	N	12	**42.1**
MUC - 5	Muckley Corner A5 Eastbound	Roadside	Y	N	12	**47.2**
MUC - 6	Muckley Corner A461 Southbound	Roadside	Y	N	12	38.0

Table 2.4 Results of NO_2 Diffusion Tubes (2008 to 2014)

Site ID	Site Type*	Triplicate or Co-located Tube	Within AQMA?	Annual Mean Concentration (µg/m^3) - Adjusted for Bias						
				2008 (Bias Adjustment Factor = 1.03)	2009 (Bias Adjustment Factor = 0.81)	2010 (Bias Adjustment Factor = 0.85)	2011 (Bias Adjustment Factor = 0.88)	2012 (Bias Adjustment Factor = 0.86)	2013 (Bias Adjustment Factor = 0.87)	2014 (Bias Adjustment Factor = 0.83)
A38 - 1	R	N	N	**44.3**	35.7	**43.4**	**40.5**	**43.5**	38.1	37.1
A38 - 2/2(1)	R	Duplicate	N	39.3	34.4	**40.4**	35.0	37.4	35.1	35.9
A38 - 2A/B	R	Duplicate	N	N/A	N/A	N/A	**43.3**	**45.0**	**42.7**	**43.1**
A38 - 3	R	N	N	36.5	27.8	38.8	33.7	33.1	36.4	31.1
A38 - 4A/B	R	Duplicate	N	**55.8**	**40.8**	**44.5**	**42.4**	**50.1**	**45.3**	**48.1**
A38- 4X/Y	R	Duplicate	N	N/A	N/A	N/A	N/A	35.5	30.5	31.9
A38 - 5A/B	R	Duplicate	N	N/A	N/A	**43.9**	**40.4**	**41.7**	36.8	37.3
A38 - 6A/B	R	Duplicate	N	N/A	N/A	33.0	33.5	32.9	31.1	31.7
A5 - 1	R	N	N	**43.5**	36.5	**44.0**	**40.2**	**40.6**	35.6	34.3
A5 - 1A	R	N	N	**46.5**	37.8	**42.8**	**41.1**	**41.1**	38.1	37.2
A5 - 2A	R	N	N	**42.5**	32.4	37.3	39.0	35.5	31.9	32.1
A5 - 2B	R	N	N	**48.3**	**41.2**	**52.0**	**42.7**	**43.3**	**43.2**	38.5
A5 - 3	R	N	N	30.4	26.0	33.6	30.6	30.2	29.0	30.5
B	B	N	N	22.2	16.5	20.6	19.2	18.6	15.8	16.6
L	B	N	N	19.7	17.4	20.1	17.6	20.1	17.0	17.3
MUC - 1	R	N	Y	**54.1**	**42.7**	**53.1**	**42.1**	**48.4**	**44.2**	**41.5**
MUC - 1A/B/C	R	Triplicate	Y	**53.7**	**42.3**	**53.4**	**45.9**	**48.3**	**46.6**	**46.8**
MUC - 2	R	N	Y	**40.1**	**35.9**	**45.9**	**39.1**	**41.9**	38.7	37.6

Site ID	Site Type*	Triplicate or Co-located Tube	Within AQMA?	Annual Mean Concentration (µg/m^3) - Adjusted for Bias						
				2008 (Bias Adjustment Factor = 1.03)	2009 (Bias Adjustment Factor = 0.81)	2010 (Bias Adjustment Factor = 0.85)	2011 (Bias Adjustment Factor = 0.88)	2012 (Bias Adjustment Factor = 0.86)	2013 (Bias Adjustment Factor = 0.87)	2014 (Bias Adjustment Factor = 0.83)
MUC - 3	R	N	Y	**63.4**	**51.0**	**63.5**	**54.0**	**57.2**	**53.3**	**54.6**
MUC - 4	R	N	Y	**47.7**	**36.0**	**46.9**	**41.6**	**45.1**	**44.4**	**42.1**
MUC - 5	R	N	Y	**56.4**	**50.3**	**58.9**	**55.3**	**54.8**	**48.0**	**47.2**
MUC - 6	R	N	Y	**41.0**	**34.5**	**39.4**	**39.1**	**38.7**	34.9	38.0
In **bold**, exceedence of the NO_2 annual mean AQS objective of 40µg/m^3 * R- Roadside, B – Urban background										

Figure 2.8 Trends in Annual Mean Nitrogen Dioxide Concentrations Measured at Diffusion Tube Monitoring Sites



2.2.2 PM_{10}

No monitoring of particulate matter was undertaken by Lichfield District Council in 2013 as previous monitoring showed no risk to compliance with the objectives.

2.2.1 Sulphur Dioxide (SO_2)

No monitoring of sulphur dioxide was undertaken by Lichfield District Council in 2013 as there are no significant sources and no locations where air quality objectives are likely to be exceeded.

2.2.2 Benzene

No monitoring of benzene was undertaken by Lichfield District Council in 2013 as there are no locations where air quality objectives are likely to be exceeded.

2.2.3 Summary of Compliance with AQS Objectives

Lichfield District Council has measured concentrations of nitrogen dioxide above the annual mean objective at a relevant location outside of the AQMA at Site A38-2A/B – Fradley. The annual mean concentrations of nitrogen dioxide at this site also exceeded the objective in previous years. The 2014 Progress Report recommended that the four properties in the vicinity of this tube on the A38 (Rykneld Street) are declared as an AQMA. However, the appraisal of the 2014 Progress Report further recommended that the Council should investigate whether there were other receptors situated at a similar distance to the road along the A38 further away from the original study area.

Therefore, it is recommended that the Council undertakes a dispersion modelling based Detailed Assessment for the whole north section of the A38 to determine existing concentrations at the identified relevant receptors. The Council may also consider installing additional monitoring sites at the identified receptors along the length of the north section of the A38 as an alternative to, or to supplement, further dispersion modelling studies.

Concentrations within the AQMA still exceed the annual mean objective for NO_2 at two diffusion tube monitoring locations (MUC-1A/B/C and MUC-3); as such the AQMA should remain.

3 Road Traffic Sources

3.1 Narrow Congested Streets with Residential Properties Close to the Kerb

Lichfield District Council confirms that there are no new/newly identified congested streets with a flow above 5,000 vehicles per day and residential properties close to the kerb, that have not been adequately considered in previous rounds of Review and Assessment.

3.1 Busy Streets Where People May Spend 1-hour or More Close to Traffic

Lichfield District Council confirms that there are no new/newly identified busy streets where people may spend 1 hour or more close to traffic.

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

Lichfield District Council confirms that there are no new/newly identified roads with high flows of buses/HGVs.

3.3 Junctions

Lichfield District Council confirms that there are no new/newly identified busy junctions/busy roads.

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

Lichfield District Council confirms that there are no new/proposed roads.

3.5 Roads with Significantly Changed Traffic Flows

South Midlands Route Strategy

The South Midlands Route Strategy[2] provides an outline of investment priorities for the route network in South Midlands. The document sets out what improvements will be delivered and has informed the Road Investment Strategy – Investment Plan for Road Period 1 (2015/16 to 2019/20).

The South Midlands route includes the A5 and the A38 from Lichfield to Derby (including the A5148). Key routes which will reach the end of their design life by 2021 include the A5 between the M42 and A38, and the A38 from Lichfield to Burton-upon-Trent. It has also been identified[3] that new development, notably the Twin Rivers development alongside the A38 in Lichfield, which will provide 7,500 new dwellings, will potentially increase congestion on the link; also new development in Lichfield is likely to put pressure on the A38, in particular the junctions at Wall Street, Streethay and Fradley, and Muckley Corner junction on the A5.

The investment priorities listed in the Route Strategy include the A5 Dodwells to Longshoot, which will bring the widening of a short section of the A5 near Hinckley, which carries the traffic of both the A5 and A47, to dual carriageway. The schemes identified in the Strategy are expected to reduce congestion on the road network in Lichfield and thus improve air quality in the surrounding areas.

Lichfield District Council has assessed new/newly identified roads with significantly changed traffic flows, and concluded that it will not be necessary to proceed to a Detailed Assessment at this time.

3.6 Bus and Coach Stations

Lichfield District Council confirms that there are no relevant bus stations in the Local Authority area meeting the criteria for bus / coach stations.

[2] Highways Agency (2015) *South Midlands Route Strategy*
[3] Highways Agency (2014) *South Midlands Route Strategy Evidence Report. April 2014*

4 Other Transport Sources

4.1 Airports

Lichfield District Council confirms that there are no airports in the Local Authority area.

4.2 Railways (Diesel and Steam Trains)

4.2.1 Stationary Trains

Lichfield District Council confirms that there are no locations where diesel or steam trains are regularly stationary for periods of 15 minutes or more, with potential for relevant exposure within 15m.

4.2.2 Moving Trains

Lichfield District Council confirms that there are no locations with a large number of movements of diesel locomotives, and potential long-term relevant exposure within 30m.

4.3 Ports (Shipping)

Lichfield District Council confirms that there are no ports or shipping that meet the specified criteria within the Local Authority area.

5 Industrial Sources

5.1 Industrial Installations

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

Lichfield District Council confirms that there are no new or proposed industrial installations for which planning approval has been granted within its area or nearby in a neighbouring authority.

5.1.2 Existing Installations Where Emissions Have Increased Substantially or New Relevant Exposure Has Been Introduced

Lichfield District Council confirms that there are no industrial installations with substantially increased emissions or new relevant exposure in their vicinity within its area or nearby in a neighbouring authority.

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

Lichfield District Council confirms that there are no new or proposed industrial installations for which planning approval has been granted within its area or nearby in a neighbouring authority.

5.2 Major Fuel (Petrol) Storage Depots

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

5.3 Petrol Stations

Lichfield District Council confirms that there are no petrol stations meeting the specified criteria**.**

5.4 Poultry Farms

Lichfield District Council confirms that there are no poultry farms meeting the specified criteria.

6 Commercial and Domestic Sources

6.1 Biomass Combustion – Individual Installations

Lichfield District Council confirms that there are no biomass combustion plants in the Local Authority area.

6.2 Biomass Combustion – Combined Impacts

Lichfield District Council confirms that there are no biomass combustion plants in the Local Authority area requiring combined assessment.

6.3 Domestic Solid-Fuel Burning

Lichfield District Council confirms that there are no areas of significant domestic fuel use in the Local Authority area.

7 Fugitive or Uncontrolled Sources

Lichfield District Council confirms that there are no potential sources of fugitive particulate matter emissions in the Local Authority area.

8 Conclusions and Proposed Actions

8.1 Conclusions from New Monitoring Data

Outside of the AQMA, the review of new diffusion tube monitoring data has identified one location where the AQS annual NO_2 objective was exceeded in 2014 at the façade of a relevant receptor: A38-2A/B – Fradley. As exceedences at this site were recorded in the previous years, a monitioring-based Detailed Assessment undertaken in the 2014 Progress Report recommended that the four properties in the vicinity of this tube on the A38 (Rykneld Street) are declared as an AQMA. However, the appraisal of the 2014 Progress Report further recommended that the Council should investigate whether there were other receptors situated at a similar distance to the road along the A38 further away from the original study area.

Within the north section of the A38 (Rykneld Street) - from the District boundary to the A38/A5127 junction - there are residential properties representing relevant exposure and situated approximately 5m from the road; there are also a number of properties situated 10-15m from the road and located to the north of the A38/A513 junction. Therefore, it is recommended that the Council undertakes a dispersion modelling Detailed Assessment for the whole north section of the A38 to determine existing concentrations at the identified relevant receptors. The Council may also consider installing additional monitoring sites at the identified receptors along the length of the north section of the A38 as an alternative to, or to supplement, further dispersion modelling studies.

Concentrations within the AQMA still exceed the annual mean objective for NO_2 at two diffusion tube monitoring locations (MUC-1A/B/C and MUC-3); as such the AQMA should remain.

8.2 Conclusions from Assessment of Sources

The South Midlands Route Strategy[4] provides an outline of investment priorities for the route network in South Midlands. The document sets out what improvements will be delivered and has informed the Road Investment Strategy (2015/16 to 2019/20).

The schemes identified in the Strategy are expected to reduce congestion on the road network in Lichfield and thus improve air quality in the surrounding areas.

[4] Highways Agency (2015) *South Midlands Route Strategy*

8.3 Proposed Actions

Proposed actions arising from the 2015 Updating and Screening Assessment are as follows:

- Continue NO_2 diffusion tube monitoring in the district to identify future changes in pollutant concentrations;
- Continue NO_2 diffusion tube monitoring at site A38-2A/B at Fradley;
- Proceed to a dispersion modelling based Detailed Assessment for the north section of the A38 from the District boundary to the A38/A5127 junction;
- Finalise the Lichfield Air Quality Action Plan;
- Proceed to a Progress Report in 2016.

9 References

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- Lichfield Borough Council (2012) *Lichfield District Local Plan. Our Strategy*.
- Lichfield District Council (2014) *Schedule of Proposed 'Other/Additional' Modifications to the Local Plan: Strategy.*
- Staffordshire County Council *(2011) Local Transport Plan.*
- Staffordshire County Council *(2011) Local Transport Plan Implementation Plan.*

10 Glossary of Terms

APR – Annual Progress Report

AQAP – Air Quality Action Plan

AQMA – Air quality Management Area

AQS – Air Quality Strategy

Defra – Department for Environment, Food and Rural Affairs

LAQM – Local Air Quality Management

LDC – Lichfield District Council

LDF – Local Development Framework

LTP – Local Transport Plan

$\mu g/m^3$ – Micrograms per cubic meter

NO_2 – Nitrogen Dioxide

PM_{10} - Particulate Matter less than 10µm in aerodynamic diameter

Appendices

Appendix A: QA/QC Data

Appendix B: Diffusion Tube Results

Appendix C: Monitoring Results – Distance Correction

Appendix A: QA/QC Data

Diffusion Tube Bias Adjustment Factors

The diffusion tubes are supplied and analysed by Staffordshire Scientific Services utilising the 20% triethanolamine (TEA) in water preparation method.

As there are no automatic monitoring stations within Lichfield District, a local bias adjustment factor has not been calculated. A bias adjustment of 0.83 for the year 2014 (based on 15 studies; this includes 13 triplicate tube studies and 2 single tube studies) has been obtained from the national bias adjustment calculator[5]. National bias adjustment factors were also used in the previous years.

For previous data, years 2008 to 2013, the bias adjustment factors have been taken from the Council's previous LAQM annual reports. The factors used were 1.03 (2008), 0.81 (2009), 0.85 (2010), 0.88 (2011), 0.86 (2012) and 0.87 (2013).

Short to Long Term Adjustment

There were no monitoring sites requiring annualisation in 2014.

QA/QC of Diffusion Tube Monitoring

Staffordshire Scientific Services is a UKAS accredited laboratory and participates in the in the new AIR-PT Scheme (a continuation of the Workplace Analysis Scheme for Proficiency (WASP)) for NO_2 tube analysis and the Annual Field Inter-Comparison Exercise. These provide strict performance criteria for participating laboratories to meet, thereby ensuring NO_2 concentrations reported are of a high calibre. The lab follows the procedures set out in the Harmonisation Practical Guidance. Staffordshire Scientific Services scored 100% in the WASP/AIR-PT rounds WASP 124 (January to March 2014) and AIR-PT AR001 (April to May 2014), 25% in AR 003 (July to August 2014) and 100% in AR004 (October to November 2014). The percentage score reflects the results deemed to be satisfactory based upon the z-score of $< \pm 2$. Based on 13 triplicate tube studies, 100% of all local Authority co-location studies in 2014 were rated as 'good' (tubes are considered to have "good" precision where the coefficient of variation of duplicate or triplicate diffusion tubes for eight or more periods during the year is less than 20%). The tube precision for the NO_2 Annual Field Inter-comparison at Marylebone Road was rated as 'Good'.

[5] National Diffusion Tube Bias Adjustment Factor Spreadsheet, version 03/15 published in March 2015.

Appendix B: Diffusion Tube Results

Monthly Diffusion Tube Results 2014

Site Ref	NO_2 Concentrations µg/m^3													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	COUNT	AVERAGE
A38 - 1	41.9	41.6	42.6	37.6	51.4	41.5	40.9	48.2	47.5	50.7	40.0	52.8	12	44.7
A38 - 2	53.6	43.5	45.9	45.0	45.5	37.4	20.9	30.3	46.8	48.3	61.6	40.1	12	43.2
A38 - 2(1)	52.0	42.3	48.0	45.7	46.4	35.7	13.0	30.0	44.3	38.3	83.1	39.1	12	43.2
A38 - 2A	47.0	55.1	57.1	52.4	57.7	47.9	41.1	39.6	54.8	58.6	62.9	54.1	12	52.4
A38 - 2B	59.9	54.7	59.5	51.5	56.7	40.8	46.6	42.1	53.6	53.5	52.9	47.4	12	51.6
A38 - 3	41.6	34.8	44.0	44.0	34.5	38.5	36.9	23.5	44.1	28.2	48.0	31.0	12	37.4
A38 - 4A	63.1	63.0	51.0	48.6	88.6	47.9	60.2	44.7	56.1	54.1	62.6	52.4	12	57.7
A38 - 4B	58.1	50.9	58.0			49.1	60.4	54.1	60.7	64.6	57.9	67.6	10	58.1
A38-4(X)	44.4	37.8	36.1	31.8	34.5	29.8	32.2	34.8	38.8	41.4	41.8	41.1	12	37.0
A38-4(Y)	55.8	40.0	37.1	34.1	42.2	34.9	37.0	33.9	39.3	46.6	38.6	39.3	12	39.9
A38 - 5A	61.6	38.5	41.1	39.1	46.9	40.2	39.9	43.7	44.0	43.1	39.1	51.5	12	44.1
A38 - 5B	55.8	48.4	47.0	41.1	34.1	40.2	50.1	41.9	45.6	42.6	50.5	51.7	12	45.8
A38 - 6A	47.5	49.7	30.3	31.2	34.3	27.4	33.3	34.3	35.4	42.6	36.3	51.9	12	37.9
A38 - 6B	53.2	46.8	36.3	31.5	46.2	28.5	37.3	34.2	25.4	44.6	30.9	47.1	12	38.5
A5 - 1	52.2	48.2	46.9	43.0	14.7	31.3	29.7	39.0	40.5	56.6	48.8	44.4	12	41.3
A5 - 1A	51.8	51.4	46.3	38.5	60.1	30.1	33.3	36.8	36.0	49.4	57.2	46.6	12	44.8
A5 - 2A	50.5	42.2	32.1	38.2	40.9	28.1	25.5	36.8	34.9	43.3	48.0	43.8	12	38.7
A5 - 2B	41.6	43.4	57.3	44.5	38.6	47.0	47.8	43.0	62.5	46.2	41.4	42.8	12	46.3
A5 - 3	34.7	29.8	39.1	33.6	53.5	32.2		24.6	37.1	35.3	46.2	38.6	11	36.8
B	7.3	22.1	21.5	16.5		13.1		26.3	19.8		26.4	27.4	9	20.0
L	30.9	23.9	23.4	18.1	17.7	15.6	13.4	13.0	18.6	21.1	29.9	24.8	12	20.9
MUC - 1	47.8	44.6	50.7	55.1	45.1	51.8	58.6	49.8	53.2	52.4	42.1	49.4	12	50.1
MUC - 1A	46.9	40.2	56.9	56.4	72.7	50.9	62.7	41.4	57.9	66.5	80.5	43.6	12	56.4
MUC - 1B	58.6	48.9	54.4	60.9	59.9	54.5	58.9	50.4	62.1	52.6	57.8	58.3	12	56.4
MUC - 1C	48.5	39.0	60.1	55.9	62.7	51.6	63.7	47.2	54.6	52.7	63.5	49.5	12	54.1
MUC - 2	32.1	30.5	53.2	43.8	67.8	45.1	46.5	38.8	54.5	38.1	48.5	45.3	12	45.4
MUC - 3	58.7	68.2	74.8	64.9	56.3	62.5	66.5	60.4	75.9	66.3	71.0	63.3	12	65.7
MUC - 4	56.5	39.8	68.2	55.9	44.9	49.8	54.7	36.2	57.8	45.1	55.3	43.9	12	50.7
MUC - 5	70.8	70.1	52.6	53.4	30.4	50.8	53.2	61.1	51.5	62.5	66.4	59.0	12	56.8
MUC - 6	46.0	47.0	39.5	34.9	59.3	35.2	29.9	39.3	38.4	58.8	46.0	75.3	12	45.8

Appendix C: Monitoring Results – Distance Correction

Site A38-4A/B - Canwell

This calculator allows you to predict the annual mean NO_2 concentration for a location ("receptor") that is close to a monitoring site, but nearer or further the kerb than the monitor. The next sheet shows your results on a graph.

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Enter data into the yellow cells

Step 1	How far from the KERB was your measurement made (in metres)?	(Note 1)	6.9	metres
Step 2	How far from the KERB is your receptor (in metres)?	(Note 1)	16.9	metres
Step 3	What is the local annual mean background NO_2 concentration (in µg/m^3)?	(Note 2)	19.441545	µg/m^3
Step 4	What is your measured annual mean NO_2 concentration (in µg/m^3)?	(Note 2)	48.1	µg/m^3
Result	The predicted annual mean NO_2 concentration (in µg/m^3) at your receptor	(Note 3)	39.6	µg/m^3

Note 1: In some cases the term "kerb" may be taken to be the edge of the trafficked road – see the FAQ at http://laqm2.defra.gov.uk/FAQs/Monitoring/Location/index.htm for further details. Distances should be measured horizontally from the kerb and assumes that the monitor and receptor have similar elevations. Each distance should be greater than 0.1m and less than 50m (In practice, using a value of 0.1m when the monitor is closer to the kerb than this is likely to be reasonable). The receptor is the location for which you wish to make your prediction. The monitor can either be closer to the kerb than the receptor, or further from the kerb than the receptor. The closer the monitor and the receptor are to each other, the more reliable the prediction will be. When your receptor is further from the kerb than your monitor, it is recommended that the receptor and monitor should be within 20m of each other. When your receptor is closer to the kerb than your monitor, it is recommended that the receptor and monitor should be within 10m of each other.

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

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

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Site MUC – 3 - Muckley Corner A461 Southbound

This calculator allows you to predict the annual mean NO_2 concentration for a location ("receptor") that is close to a monitoring site, but nearer or further the kerb than the monitor. The next sheet shows your results on a graph.

Air Quality CONSULTANTS

Enter data into the yellow cells

Step 1	**How far from the KERB was your measurement made (in metres)?**	(Note 1)	5	metres
Step 2	**How far from the KERB is your receptor (in metres)?**	(Note 1)	15	metres
Step 3	**What is the local annual mean background NO_2 concentration (in µg/m^3)?**	(Note 2)	18.474937	µg/m^3
Step 4	**What is your measured annual mean NO_2 concentration (in µg/m^3)?**	(Note 2)	54.6	µg/m^3
Result	**The predicted annual mean NO_2 concentration (in µg/m^3) at your receptor**	(Note 3)	42.8	µg/m^3

Note 1: In some cases the term "kerb" may be taken to be the edge of the trafficked road – see the FAQ at http://laqm2.defra.gov.uk/FAQs/Monitoring/Location/index.htm for further details. Distances should be measured horizontally from the kerb and assumes that the monitor and receptor have similar elevations. Each distance should be greater than 0.1m and less than 50m (In practice, using a value of 0.1m when the monitor is closer to the kerb than this is likely to be reasonable). The receptor is the location for which you wish to make your prediction. The monitor can either be closer to the kerb than the receptor, or further from the kerb than the receptor. The closer the monitor and the receptor are to each other, the more reliable the prediction will be. When your receptor is further from the kerb than your monitor, it is recommended that the receptor and monitor should be within 20m of each other. When your receptor is closer to the kerb than your monitor, it is recommended that the receptor and monitor should be within 10m of each other.

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

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

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Site MUC-4 - Muckley Corner A5 Westbound

This calculator allows you to predict the annual mean NO_2 concentration for a location ("receptor") that is close to a monitoring site, but nearer or further the kerb than the monitor. The next sheet shows your results on a graph.

Air Quality CONSULTANTS

Enter data into the yellow cells

Step 1	How far from the KERB was your measurement made (in metres)?	(Note 1)	4	metres
Step 2	How far from the KERB is your receptor (in metres)?	(Note 1)	6	metres
Step 3	What is the local annual mean background NO_2 concentration (in $\mu g/m^3$)?	(Note 2)	18.474937	$\mu g/m^3$
Step 4	What is your measured annual mean NO_2 concentration (in $\mu g/m^3$)?	(Note 2)	42.1	$\mu g/m^3$
Result	The predicted annual mean NO_2 concentration (in $\mu g/m^3$) at your receptor	(Note 3)	39.4	$\mu g/m^3$

Note 1: In some cases the term "kerb" may be taken to be the edge of the trafficked road – see the FAQ at http://laqm2.defra.gov.uk/FAQs/Monitoring/Location/index.htm for further details. Distances should be measured horizontally from the kerb and assumes that the monitor and receptor have similar elevations. Each distance should be greater than 0.1m and less than 50m (In practice, using a value of 0.1m when the monitor is closer to the kerb than this is likely to be reasonable). The receptor is the location for which you wish to make your prediction. The monitor can either be closer to the kerb than the receptor, or further from the kerb than the receptor. The closer the monitor and the receptor are to each other, the more reliable the prediction will be. When your receptor is further from the kerb than your monitor, it is recommended that the receptor and monitor should be within 20m of each other. When your receptor is closer to the kerb than your monitor, it is recommended that the receptor and monitor should be within 10m of each other.

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

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

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Site MUC – 5 - Muckley Corner A5 Eastbound

This calculator allows you to predict the annual mean NO_2 concentration for a location ("receptor") that is close to a monitoring site, but nearer or further the kerb than the monitor. The next sheet shows your results on a graph.

Air Quality CONSULTANTS

Enter data into the yellow cells

Step 1	**How far from the KERB was your measurement made (in metres)?**	(Note 1)	2	metres
Step 2	**How far from the KERB is your receptor (in metres)?**	(Note 1)	7	metres
Step 3	**What is the local annual mean background NO_2 concentration (in µg/m^3)?**	(Note 2)	18.474937	µg/m^3
Step 4	**What is your measured annual mean NO_2 concentration (in µg/m^3)?**	(Note 2)	47.2	µg/m^3
Result	**The predicted annual mean NO_2 concentration (in µg/m^3) at your receptor**	(Note 3)	38.8	µg/m^3

Note 1: In some cases the term "kerb" may be taken to be the edge of the trafficked road – see the FAQ at http://laqm2.defra.gov.uk/FAQs/Monitoring/Location/index.htm for further details. Distances should be measured horizontally from the kerb and assumes that the monitor and receptor have similar elevations. Each distance should be greater than 0.1m and less than 50m (In practice, using a value of 0.1m when the monitor is closer to the kerb than this is likely to be reasonable). The receptor is the location for which you wish to make your prediction. The monitor can either be closer to the kerb than the receptor, or further from the kerb than the receptor. The closer the monitor and the receptor are to each other, the more reliable the prediction will be. When your receptor is further from the kerb than your monitor, it is recommended that the receptor and monitor should be within 20m of each other. When your receptor is closer to the kerb than your monitor, it is recommended that the receptor and monitor should be within 10m of each other.

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

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

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