CITY OF WOLVERHAMPTON COUNCIL

Response to Request for Information

Reference EIR 000115
Date 09 February 2017

Air Pollution

Request:

Thank you for your request for information about the above. We are dealing with your request under the Environmental Information Regulations 2004 rather than Freedom of Information. In response to your request please find our response below:

I'm interested in finding out more about air pollution in Wolverhampton and wondered if you could help by providing some reports I am looking for. They are annual reports submitted to Defra each year summarising the level of pollution in each local authority and the actions being taken to improve air quality.

I have looked through your website and found some of the reports, but would be very grateful if you could send me those I am still missing:

• 2011 Air Quality Action Plan Progress Report
• 2013 Air Quality Action Plan Progress Report
• 2014 Air Quality Action Plan Progress Report
• 2016 Air Quality Annual Status Report
• Updating and Screening Assessment 2015
See attached

If any air quality reports since 2011 are not available, are you able to say why?

I'm also interested to know what resources are available for Wolverhampton to work on air quality. I imagine that funding air quality work is quite challenging with the deep cuts to local government budgets in recent years.

Do you have any data on the number of staff working on air quality in Wolverhampton each year since 2011?
The number of staff working on air quality per year since 2011 is equivalent to 0.25 of a post.

If there has been a change, can you explain why?
The number of staff working on air quality per year has not changed since 2011.

I'd also really like to know the amount of money spent on air quality reporting each year since 2011, and again why there has been change (if there has been change).
The council spends £25,000 per year on air quality monitoring and reporting, this has not changed since 2011.

2011 Air Quality Progress Report for

Wolverhampton City Council

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

April 2011

Local Authority Officer	Dean Gooch

Department	Food and Environmental Safety
Address	Wolverhampton City Council, Civic Centre, St Peter's Square, Wolverhampton, WV1 1DA
Telephone	01902 554375
e-mail	Environmental.protection@wolverhampton.gov.uk

Report Reference number	WCCPR2011
Date	April 2011

Executive Summary

This progress report has been produced as part of the on going process of the review and assessment of air quality to provide an update on local air quality management within the city of Wolverhampton.

The report presents monitoring data for the year 2010 and considers any new local developments which have taken place in the city since the previous Progress Report published in September 2010.

A review of emission sources has found that there have been no new industrial processes, or any other significant sources granted planning approval which could contribute to poor air quality since the last Progress Report carried out in 2010.

A comprehensive review of all monitoring data gathered since the previous report has been carried out. Areas where the air quality objectives are not being met have been identified together with any significant trends.

Recent monitoring data has identified that air quality improved across the city during 2010. This has resulted in a reduction in the number of areas within Wolverhampton which are exceeding the objectives.

Wolverhampton City Council has concluded that a detailed assessment will not be required.

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1 Introduction

1.1 Description of Local Authority Area

Located to the north of the West Midlands conurbation, Wolverhampton is on the edge of the Black Country, some 15 miles from the regional centre of Birmingham. Wolverhampton functions as a major centre within the Black Country and the northern part of the West Midlands.

The city covers an area of 26 square miles (6,880 hectares) and has a population of around 250,000 residents. Wolverhampton is primarily an urban area with the majority of the land use being residential and industrial. However, there are areas of green space, allotments, sports grounds, isolated pockets of countryside, small lakes and ponds and farm land which make up approximately 13% of the city. These provide a variety of habitats for a wide range of plant and animal species.

Wolverhampton benefits from good communications links, with access to the national motorway network provided by the M6 to the east, the M54 to the north, and the newly completed M6 Toll. Wolverhampton also has a mainline railway station, which provides direct trains to Birmingham, London, the West Country and the north. Proposals are currently underway to introduce a number of improvements to the railway station and its environs through the city Interchange project.

The two principal pollutants affecting the local air quality are nitrogen dioxide (NO2) and fine particles (PM_{10}). The major source of these pollutants is road traffic and there are a number of roads within the city where the air quality objectives for NO2 and PM_{10} are being exceeded. These are primarily narrow congested streets within the town centre which have high levels of bus traffic. In response the Council declared the whole city an Air Quality Management Area (AQMA) in March 2005.

An Air Quality Action Plan (AQAP) has been prepared in conjunction with a cross service officer group and the local transport plan.

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 the Updating and Screening Assessment Report. If the Progress Report identifies the risk of exceedence of an Air Quality Objective, the Local Authority (LA) should undertake a Detailed Assessment immediately, and not wait until the next round of Review and Assessment.

1.3 Air Quality Objectives

The air quality objectives applicable to Local Air Quality Management (LAQM) **in England** are set out in the Air Quality (England) Regulations 2000 (SI 928), and the Air Quality (England) (Amendment) Regulations 2002 (SI 3043). They are shown in

Table 1.1, which includes the number of permitted exceedences in any given year (where applicable).

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

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

1.4 Summary of Previous Review and Assessments

Assessment	Exceedences	Conclusions and Recommendations
Stage 1 Report- March 1999	Non	The report Identified 54 roads and 143 industrial processes within Wolverhampton which have the potential to be significant sources of pollution.
Stage 3 Report July 2001	Non	A recommendation to carryout detailed investigations regarding the levels of NO2 to confirm the prediction of the model. Further monitoring for NO2 and PM_{10} is required along busy roads and roads with high flows of bus traffic
USA May 2003	Nitrogen dioxide, particles	Identified certain areas within the city where the objectives are likely to be exceeded. A Detailed Assessment of NO2 and PM_{10} is required for parts of the city Centre and two of the busiest junctions.
Detailed Assessment 2004	Nitrogen dioxide, particles	The Detailed Assessment confirmed that the objectives for NO2 and PM_{10} were not being met along certain roads within the city centre and recommended the declaration of an AQMA
Section 83 (1) March 2005	Nitrogen dioxide, particles	Order designating the city of Wolverhampton an Air Quality Management Area (Appendix 1)
Annual Progress Report 2005	Nitrogen dioxide, particles	Confirmed conclusions of the Detailed Assessment and highlighted three new key developments for consideration in the 2006 USA
USA, Stage 4 Assessment and Action Plan 2006	Nitrogen dioxide, particles	Analysis of monitoring data showed that NO2 concentrations had reduced from 2003 peak levels but continued to exceed the objectives at certain locations within the city. The levels of PM_{10} fell below the objectives during 2004 and 2005 and projected figures indicated a continuing downward trend. Nine new developments which required air quality assessments were considered. It was concluded that the developments would not result in the air quality objectives being exceeded. The action plan listed 23 actions and incorporated the Local Transport Plan into the long term air quality strategy.
Progress Report 2007	Nitrogen dioxide, particles	Monitoring data for 2006 showed the levels of NO2 and PM_{10} increased contrary to the projected concentrations contained in the 2006 USA. Parts of the city Centre and certain busy road junctions continue to exceed the objectives for NO2 and PM_{10}. There have been no new industrial processes or any other significant developments which could contribute to poor air quality since the 2006 USA.
Progress Report 2008	Nitrogen dioxide, particles	Levels of NO2 and PM_{10} remain stable. There have been no new industrial processes or any other significant developments which could contribute to poor air quality since the 2006 USA.

Assessment	Exceedences	Conclusions and Recommendations
USA, Stage 4 Assessment and Action Plan 2009	Nitrogen dioxide	There are no new or significantly changed sources which could give rise to any potential exceedences outside the existing AQMA and therefore, it is not necessary to proceed to a Detailed Assessment for any of the pollutants listed in Table 1.1 Additional monitoring, or changes to the existing monitoring programme is not required. Wolverhampton City Council intends to submit the 2010 Progress Report as required by the Review and Assessment process. If monitoring data for PM_{10}'s continues to indicate compliance with the air quality objectives, it may be necessary to progress a Detailed Assessment for PM_{10} to determine if PM_{10} can be removed from the AQMA.
Progress Report 2010	Nitrogen dioxide	Recent monitoring data has identified that air quality improved across the city during 2009. This has resulted in a reduction in the number of areas within Wolverhampton which are exceeding the objectives. The Council has concluded that a detailed assessment will not be required

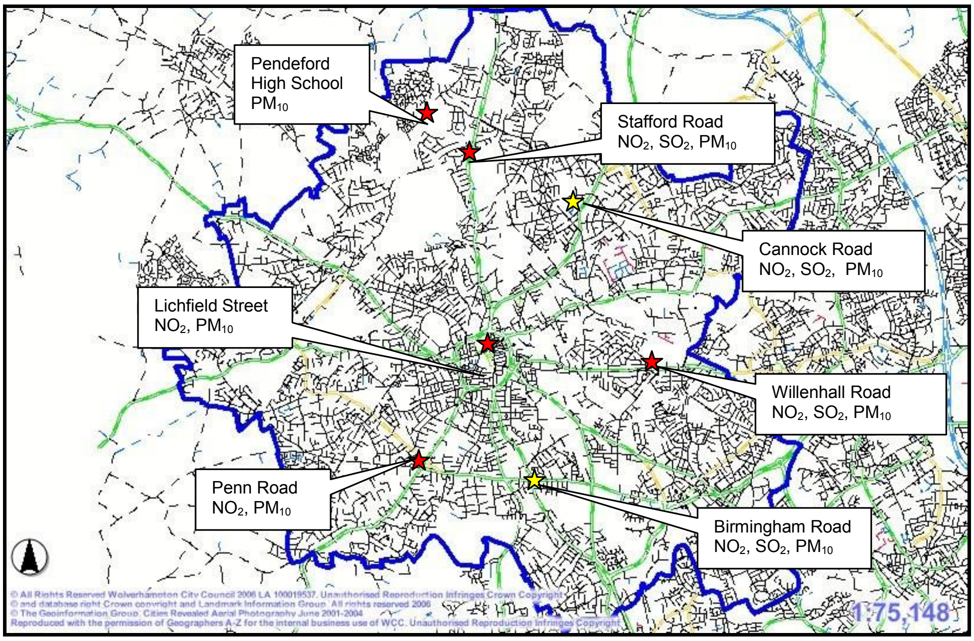
2 New Monitoring Data

2.1 Summary of Monitoring Undertaken

2.1.1 Automatic Monitoring Sites

Wolverhampton CC operates 5 fully automatic monitoring stations, the locations of which are shown in Figure 2.1 below. These sites cover the main arterial roads which link the city with major regional trunk roads and motorways. With the exception of the back ground site at Pendeford High School they have been chosen to represent the worst case locations

Figure 2.1 Location of Automatic Monitoring Sites



★ Current automatic monitoring sites

☆ Closed automatic monitoring sites

Wolverhampton City Boundary

Fixed stations are located on the A449 Stafford Road to the north which links with the M54, the A449 Penn Road to the south, and Lichfield Street which is the main access roads into the bus station and has a high flow of bus traffic.

The Council also operates a mobile monitoring station which is currently located on the A454 Willenhall Road, a main link to the M6 and Walsall. Prior to this the mobile monitor was located on the A4123 Birmingham New Road and the A460 Cannock Road.

In addition to the roadside monitors, a PM_{10} monitor is located at Pendeford High School within the school grounds. This site is about 180m from the nearest road and provides data relating to background levels of particles within the city.

Details of these sites are given in Table 2.1 below.

Table 2.1 Details of Automatic Monitoring Sites

Site ID	Site Name	Site Type	OS Grid Ref	Pollutants Monitored	In an AQMA?	Relevant Exposure?	Distance to kerb of nearest road	Worst-case Location?
	Current sites							
A1	Lichfield Street	Roadside	391647 298784	NO2, PM10	Yes	Yes (5m)	2.6m	Yes
A2	Penn Road	Roadside	390374 296775	NO2, PM10	Yes	Yes (10m)	5m	Yes
A3	Pendeford High School	Urban background	390740 302692	PM10	Yes	No	180m	No
A4	Stafford Road	Roadside	391261 302199	NO2, SO2 PM10	Yes	Yes (15m)	8m	Yes
A5	Willenhall Road	Roadside	394754 298429	NO2, SO2 PM10	Yes	Yes (10m)	10m	Yes
	Closed sites							
A6	Cannock Road	Roadside	393030 300824	NO2, SO2 PM10	Yes	Yes (17m)	6m	Yes
A7	Birmingham New Road	Roadside	392264 296546	NO2, SO2 PM10	Yes	Yes (3m)	6m	Yes
A8	St Peter's Square	Background	391357 298939	NO2, SO2 PM10, CO O3	Yes	No	30m	No

2.1.2 Non-Automatic Monitoring

To complement the automatic sites NO2 sampling is also carried out using passive diffusion tubes supplied and analysed by Gradko. The Council has tubes at 54 locations around the city.

The sites represent a combination of background, intermediate, and roadside locations intended to reflect the worst case situation where the general public are likely to be exposed.

Table 2.2a Details of Non- Automatic Monitoring Sites (Roadside)

Site Name	Site Type	OS Grid Ref		In AQMA?	Relevant Exposure?	Distance to kerb of nearest road	Worst-case Location?
BIL1	Roadside ISA	395057	296541	Y	Y(4m)	4m	Y
BIL2	Roadside ISA	395085	296475	Y	Y(4M)	4.5M	Y
BIL3	Roadside ISA	395102	296495	Y	N	10M	Y
BIL4	Roadside ISA	395117	296454	Y	Y(2.5M)	2.5M	Y
LIC1	Roadside ISA	391698	298776	Y	N	3.5M	Y
LIC2	Roadside ISA	391508	298744	Y	Y(3M)	3M	Y
LIC3	Roadside ISA	391620	298772	Y	N	6M	Y
LIC4	Roadside ISA	391643	298786	Y	Y(1.5M)	3M	Y
LIC5	Roadside ISA	391643	298786	Y	Y(1.5M)	3M	Y
LIC6	Roadside ISA	391643	298786	Y	Y(1.5M)	3M	Y
LIC7	Roadside ISA	391019	296671	Y	N	5M	Y
LIC8	Roadside ISA	391454	298733	Y	N	3M	Y
LIC9	Roadside ISA	390375	296775	Y	Y(3M)	3M	Y
PIP1	Roadside ISA	391768	298662	Y	N	2M	Y
PIP2	Roadside ISA	391794	298560	Y	N	4M	Y
PRI1	Roadside ISA	391548	298940	Y	N	3M	Y
PRI2	Roadside ISA	391566	298795	Y	Y(3M)	3M	Y
PRI3	Roadside ISA	391607	298745	Y	Y(4.5M)	4.5M	Y
PRI4	Roadside ISA	391581	298686	Y	N	5M	Y
PRI5	Roadside ISA	391588	298612	Y	N	2.5M	Y
QUE1	Roadside ISA	391607	298652	Y	Y(2.5)	2.5M	Y
QUE2	Roadside ISA	391622	298639	Y	N	4.5M	Y
QUE3	Roadside ISA	391662	298665	Y	Y(2.5)	2.5M	Y
QUE4	Roadside ISA	391707	298660	Y	N	1.5M	Y
STA1	Roadside ISA	391377	299818	Y	Y(4M)	2M	Y
STA2	Roadside ISA	391270	300718	Y	Y(15M)	6M	Y
STA3	Roadside ISA	391285	301054	Y	Y(13M)	13M	Y
STA4	Roadside ISA	391179	301534	Y	Y(10M)	13M	Y
STA5	Roadside ISA	391261	302199	Y	Y(8.5M)	15M	Y
STA6	Roadside ISA	391261	302199	Y	Y(8.5M)	15M	Y
STA7	Roadside ISA	391261	302199	Y	Y(8.5M)	15M	Y
STA8	Roadside ISA	391317	302631	Y	Y(17M)	17M	Y
STA9	Roadside ISA	391527	303350	Y	Y(12M)	4.5M	Y
TEM1	Roadside ISA	391543	298270	Y	N	1.5M	Y
TEM2	Roadside ISA	391446	298269	Y	N	1.5M	Y
TEM3	Roadside ISA	391268	298274	Y	N	1.5M	Y
WIL1	Roadside ISA	394266	298438	Y	Y(14.5M)	3.5M	Y
WIL2	Roadside ISA	394712	298428	Y	Y(6.5M)	6.5M	Y
WIL3	Roadside ISA	394754	298429	Y	Y(11M)	10M	Y
WIL4	Roadside ISA	394754	298429	Y	Y(11M)	10M	Y
WIL5	Roadside ISA	394754	298429	Y	Y(11M)	10M	Y
BIR	Roadside	392306	296547	Y	Y(4M)	2M	Y
BRI	Roadside	388182	298782	Y	Y(12M)	2M	Y
BRO	Roadside	391676	298865	Y	Y(5.5M)	5.5M	Y
CAN	Roadside	393008	300867	Y	Y(14M)	6.5M	Y
CLE	Roadside	391485	298348	Y	N	5M	Y
CUL	Roadside	393371	297403	Y	Y(2.5M)	2.5M	Y
DUD	Roadside	391541	297267	Y	Y(4.5M)	3.5M	Y
NEA	Roadside	394717	299894	Y	Y(6.5M)	2M	Y
ROC	Roadside	388995	300096	Y	Y(2.5M)	1.5M	Y
TRI	Roadside	395540	296479	Y	Y(10M)	15M	Y
WAT	Roadside	391134	298877	Y	Y(11M)	3M	Y
WOL	Roadside	394031	297172	Y	Y(6M)	2M	Y

Table 2.2b Details of Non- Automatic Monitoring Sites (Intermediate and Background)

Site Name	Site Type	OS Grid Ref		In AQMA?	Relevant Exposure?	Distance to kerb of nearest road	Worst-case Location?
PRO	Intermediate	394633	296089	Y	N	28M	N
SPS	Intermediate	391357	298937	Y	N	30M	N
COL	Background	395855	300586	Y	N	48M	N
COLQ	Background	395855	300586	Y	N	48M	N
MAR	Background	390705	302736	Y	N	165M	N
WAR	Background	389132	296755	Y	N	50M	N
WRE	Background	392090	296095	Y	N	50M	N

Following the 2001 Stage 3 report a number of roads were designated as intensive survey areas (ISA's). The roads which have been targeted are the main arterial routes into the city centre and those streets which are narrow and congested or have a high proportion of heavy duty vehicles (HDV's). A total of 5 diffusion tubes have been sited in a "W" formation along each of these roads.

Wherever possible, diffusion tubes are located on the façades of residential property. Where this is not possible tubes are attached to lampposts or other suitable street furniture.

2.2 Comparison of Monitoring Results with AQ Objectives

2.2.1 Nitrogen Dioxide

Automatic Monitoring Data

Data from the automatic monitoring stations is presented in Table 2.3a and Table 2.3b below; exceedences of the objectives are highlighted in bold. Table 2.3a shows that the annual average continues to exceed the objective level at Penn Road and Willenhall Road. Levels of NO2 have dropped significantly at Lichfield Street due to the temporary road closure to allow improvements to the bus station.

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

Site ID	Location	Within AQMA?	Data Capture 2010 %	Annual mean concentrations (μg/m^3)		
				2008	2009	2010
A1	Lichfield Street	Y	99	**61**	**59**	40
A2	Penn Rd	Y	96	**48**	**46**	**46**
A4	Stafford Rd	Y	99	40	38	38
A5	Willenhall Rd/Neachells Lane	Y	96	40	36	**46**

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

Site ID	Location	Within AQMA?	Data Capture 2010 %	Number of Exceedences of hourly mean (200 µg/m³)		
				2008	2009	2010
A1	Lichfield Street	Y	99	2	6	0
A2	Penn Rd/Goldthorne Hill	Y	96	0	1	0
A4	Stafford Rd/Church Rd	Y	99	0	0	0
A5	Willenhall Rd/Neachells Lane	Y	96	0	1	4

Diffusion Tube Monitoring Data

Diffusion tube results for 2010 are shown in Table 2.4a. The annual average for each site is presented as bias corrected measured value and has been corrected for distance to relevant receptor in accordance with the procedure detailed in Box 2.3 of technical Guidance LAQM.TG(09). Exceedences of the annual mean objective value are highlighted in bold.

The bias is obtained using co-location of triplicate tubes along side the continuous monitoring stations.

Table 2.4b provides a summary of the results from the ISA's, the remaining roadside tubes and the background tubes for 2008, 2009 and 2010. The results are presented as the mean concentration calculated from the individual tubes located along each particular road corrected for bias and distance.

In April 2010 work started on the Wolverhampton interchange project. To enable the works to begin Lichfield Street was closed to bus traffic and temporary bus stop established in Queen Street.

The interchange project is an integral part of the council's air quality management plan. Phase I of the project is due to be completed in summer 2010 and involves the redevelopment of the bus station with a new access road off the ring road. The new access road will reduce the amount of bus traffic within the town centre and improve air quality along several roads within the ring road.

The closure of Lichfield Street has lead to a substantial reduction in NO2 concentrations in Lichfield Street east of the Princess Street junction. However the temporary bus stops in Queen Street have caused an increase in NO2 levels along this road.

The data collected from the automatic monitoring stations and the diffusion tube sites has identified that the annual mean NO2 objective was exceeded during 2010 at the following locations within the city:

Road side ISA's:

- Pipers Row
- Princess Street
- Queen Street

Roadside point locations:

- Broad Street
- Birmingham Road
- Old Hill, Tettenhall
- Penn Road/Goldthorne Hill Junction
- Willenhall Road/Neachells Lane junction

Table 2.4a Results of Nitrogen Dioxide Diffusion Tubes

Site ID	Location	Within AQMA?	Annual mean concentrations (µg/m³) adjusted for bias	
			Measured value	Measured value corrected for distance
BIL1	Lichfield St, Bilston	Y	**46**	**45**
BIL2	Lichfield St, Bilston	Y	38	37
BIL3	Lichfield St, Bilston	Y	36	36
BIL4	Lichfield St, Bilston	Y	39	38
LIC1	Lichfield St	Y	38	38
LIC2	Lichfield St	Y	**47**	**46**
LIC3	Lichfield St	Y	**42**	**41**
LIC4[1]	Lichfield St	Y	**42**	40
LIC7	Lichfield St	Y	40	39
LIC8	Lichfield St	Y	38	37
LIC9	Lichfield St	Y	**41**	**41**
PIP1	Pipers Row	Y	**42**	**42**
PIP2	Pipers Row	Y	**43**	**43**
PRI1	Stafford St	Y	**43**	**42**
PRI2	Princess Sq	Y	**44**	**44**
PRI3	Princess St	Y	39	39
PRI4	Princess St	Y	**50**	**49**
PRI5	Princess St	Y	**43**	**42**
QUE1	Queen St	Y	**44**	**43**
QUE2	Queen St	Y	**47**	**46**
QUE3	Queen St	Y	**56**	**55**
QUE4	Queen St	Y	**49**	**44**
STA1	Stafford Rd	Y	34	33
STA3	Stafford Rd	Y	34	33
STA4	Stafford Rd	Y	29	29
STA5[1]	Stafford Rd	Y	38	37
STA8	Stafford Rd	Y	30	29
STA9	Stafford Rd	Y	38	36
TEM1	Temple St	Y	34	34
TEM2	Temple St	Y	30	30
TEM3	Temple St	Y	32	32
WIL1	Willenhall Rd	Y	27	26
WIL2	Willenhall Rd	Y	**43**	**42**
WIL3[1, 2]	Willenhall Rd	Y	37	37
BIR	Birmingham Rd	Y	**43**	**41**
BRI	Bridgnorth Rd	Y	30	27
BRO	Broad St	Y	**48**	**47**
CAN	Cannock Rd	Y	33	31
CLE	Cleveland St	Y	36	36
CUL	Culwick St	Y	29	29
DUD	Dudley Rd	Y	30	30
NEA	Neachells Lane	Y	27	26
ROC	Old Hill, Tettenhall	Y	**42**	40
TRI	Trinity St	Y	30	30
WAT	Waterloo Rd	Y	40	37
WOL	5 Wolsley Rd	Y	28	26
PRO	Prosser St	Y	28	27
SPS	St Peter's Sq	Y	29	28
COL	Coleman Ave	Y	20	20
MAR	Marsh Lane	Y	18	17
WAR	Warstones Rd	Y	18	17
WRE	W'ton Rd East	Y	20	20

1 Mean of triplicate tubes
2 New site activated March 2009

Table 2.4b Results of Nitrogen Dioxide Diffusion Tubes: ISA, roadside, intermediate and background sites

Location	Within AQMA?	Annual mean concentrations (µg/m³). Corrected for bias and distance to receptor		
		2008	2009	2010
Broad St	Y	**51**	**49**	**47**
Lichfield St, Bilston	Y	40	40	39
Lichfield St, Wolverhampton, East	Y	**56**	**55**	40
Lichfield St, Wolverhampton, West	Y	**46**	**46**	**41**
Princess St/Stafford St	Y	**44**	**45**	**43**
Queen St	Y	39	**42**	**47**
Stafford Rd	Y	33	34	33
Willenhall Rd	Y	**42**	39	35
Pipers Row	Y	**45**	**46**	**42**
Temple St	Y	33	33	32
Roadside sites	Y	35	35	33
Intermediate sites	Y	28	29	28
Background sites	Y	17	18	19

2.2.2 PM10

Tables 2.5a and 2.5b present a summary of TEOM data from the automatic monitoring stations for 2008, 2009 and 2010. This data has been corrected using the King's College volatile correction model (VCM) as required by technical guidance document LAQM.TG(09). The VCM was not available prior to 2008, therefore pre 2008 data has been corrected by applying the 1.3 correction factor to the annual mean in accordance with the previous guidance in LAQM.TG(03).

Table 2.5a Results of PM10 Automatic Monitoring: Comparison with Annual Mean Objective

Site ID	Location	Within AQMA?	Data Capture 2010 %	Annual mean concentrations (µg/m³)		
				2008	2009	2010
A1	Lichfield Street	Y	100	27	29	21
A2	Penn Road	Y	100	24	22	23
A3	Pendeford High School	Y	100	16	16	16
A4	Stafford Road	Y	100	20	21	22
A5	Willenhall Road	Y	94	19	20	21

There have been no exceedences of the PM_{10} annual mean objective during 2008, 2009 or 2010.

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

Site ID	Location	Within AQMA?	Data Capture 2010 %	Number of Exceedences of hourly mean (50 µg/m³) *If data capture < 90%, include the 90th %ile of hourly means in brackets.*		
				2008	2009	2010
A1	Lichfield Street	Y	100	26	**40**	**2**
A2	Penn Road	Y	100	10	6	0
A3	Pendeford High School	Y	100	7	2	0
A4	Stafford Road	Y	100	8	7	0
A5	Willenhall Road	Y	94	2	5	0

There were no exceedences of the 24-hr mean objective during 2008. The number of exceedences increased in 2009 at Lichfield Street due to building works being undertaken close to the monitoring site. However due to the closure of Lichfield Street to bus traffic in 2010 the number of exceedences has dropped significantly.

2.2.3 Sulphur dioxide

There have been no exceedences of the 15 minute, 1 hour or 24 hour objectives during 2008, 2009 or 2010.

Table 2.6 Results of SO_2 Automatic Monitoring: Comparison with Objectives

Site ID	Location	Within AQMA?	Data Capture 2010 %	Number of Exceedences of: (µg/m³)		
				15-minute Objective (266 µg/m³)	1-hour Objective (350 µg/m³)	24-hour Objective (125 µg/m³)
A4	Stafford Road	Y	99	0	0	0
A5	Willenhall Road	Y	98	0	0	0

2.2.4 Benzene

There are no significant sources of benzene in the city therefore the Council does not consider it necessary to monitor for this pollutant.

2.2.5 Other pollutants monitored

Since the previous Updating and Screening Assessment the Department of Environment and Rural Affairs (Defra) closed the Wolverhampton Central automatic monitoring station in October 2007. This monitoring station was located in St Peter's Square Wolverhampton and monitored oxides of nitrogen, sulphur dioxide, PM10 particles, carbon monoxide and ozone. Historical data from this site can be obtained on the Government's air quality web site: www.**airquality**.co.uk.

Since the closure of this site, the levels of carbon monoxide and ozone are no longer monitored in Wolverhampton. As the levels of these pollutants were below the objectives the Council does not intend to continue monitoring for these pollutants.

2.2.6 Summary of Compliance with AQS Objectives

Wolverhampton City Council has examined the results from the air monitoring sites in the city. The concentration of nitrogen dioxide is exceeding the annual mean objective at the following relevant locations within the declared AQMA:

Road side ISA's:

- Pipers Row
- Princess Street
- Queen Street

Roadside point locations:

- Broad Street
- Birmingham Road
- Old Hill, Tettenhall
- Penn Road/Goldthorne Hill Junction
- Willenhall Road/Neachells Lane junction

As the whole of the city has been declared an AQMA based on previous exceedences, it is not necessary to proceed to a detailed assessment at these locations.

3 New Local Developments

3.1 Road Traffic Sources

Wolverhampton City Council confirms that there are no new or newly identified roads which may have an impact on air quality within the Local Authority area.

3.2 Other Transport Sources

Wolverhampton City Council confirms that there are no new or newly identified other transport sources which may have an impact on air quality within the Local Authority area.

3.3 Industrial Sources

Wolverhampton City Council confirms that there are no new or newly identified industrial sources which may have an impact on air quality within the Local Authority area.

3.4 Commercial and Domestic Sources

Wolverhampton City Council confirms that there are no new or newly identified commercial and domestic sources which may have an impact on air quality within the Local Authority area.

3.5 New Developments with Fugitive or Uncontrolled Sources

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

4 Planning Applications

The council did not receive any planning applications during 2010 for which an air quality assessment was submitted or requested.

5 Air Quality Planning Policies

5.1 The Unitary Development Plan (2006)

Policy EP3 of the UDP specifically relates to the National Air Quality Strategy. This will ensure that planning policy works with the air quality management process and will not hinder the Council in working towards achieving the air quality objectives. The specific section and policy on air quality from the UDP is reproduced below.

"5.4 Air Pollution

Policy EP3: Air Pollution
Development which is likely to hinder the achievement of the Council's air quality objectives will not be permitted unless such effects are mitigated to the satisfaction of the Council, through the use of planning obligations and conditions, where appropriate.
Development proposals which may affect an Air Quality Management Area should clearly demonstrate how they will contribute towards the achievement of air quality objectives for that area.

5.4.1 Air pollution can be damaging to human health and well-being, wildlife and the fabric of buildings and has knock-on effects on soil and water quality. Certain types of air pollution also contribute towards global warming, which is causing major changes in climate around the world. Emissions from road transport and industry are the major causes of air pollution in Wolverhampton. Emissions from some industries are controlled by the Council and the Environment Agency through environmental protection legislation.

5.4.2 The 2000 National Air Quality Strategy sets out Government's objectives for concentrations of a wide range of pollutants, below which there are no significant risks to human health. The Strategy sets target dates for achievement of these objectives, depending on the pollutant. In response, the Council has a duty to evaluate local air quality across Wolverhampton, predict pollutant levels against these targets and declare Air Quality Management Areas (AQMA's) in locations where the public will be exposed to air quality that is predicted to fall below national standards. For each AQMA identified, the Council must produce an Action Plan to bring air quality up to acceptable standards. The Council's first review and assessment of air quality was completed in 2000 and concluded that air quality objectives for some pollutants are being met and that others would be met by 2005. However, the Government has proposed a number of changes that may have an impact on whether the Council will need to declare AQMA's, notably changes to targets for particles and changes to vehicle emission factors.

5.4.3 Land use planning has an important role to play in the Council's strategy to achieve air quality objectives. Developments can produce air pollutants either by direct emissions e.g. by certain industrial processes, during construction / demolition, or indirectly, via changes in traffic flows. The Council will seek to ensure that new development does not result in a significant increase in production of air pollutants and that opportunities are taken to improve air quality, where possible. The impact of air pollutants is material to the consideration of planning applications. A detailed air quality assessment should be produced where a proposed development may have a significant adverse effect on air quality, particularly if an AQMA will be affected. This consideration will take into account the results of any Transport Assessment required under Policy AM1. In some cases, an Environmental Impact Assessment may be required (see Policy EP2). Lower concentrations of air pollutants, which do not prejudice air quality objectives but may nevertheless have an adverse affect on people's quality of life and the environment, should also be appropriately mitigated (see EP1).

5.4.4 In some cases, impacts on air quality can be successfully mitigated through measures such as Green Travel Plans (see Policy AM2), contributions to improve public transport and separating polluting uses from residential areas. A key objective of the UDP is to guide development to locations which will minimise the number of car journeys generated, and this is reflected in policies throughout the Plan. Areas of woodland also play an important role by absorbing air pollutants (see Policy N7).

Further guidance is provided in "Air Quality and Land Use Planning" (DETR, 1997) and "Air Quality and Land Use Planning - Good Practice Guide" (ARUP & RTPI, 1999)."

5.2 The Black Country Joint Core Strategy

The Joint Core Strategy which is to be adopted in April 2011 has been developed in conjunction with Dudley, Sandwell, and Walsall Councils'. It is a spatial planning document that will set out the vision, objectives and detailed spatial strategy for future development in The Black Country up to 2026. The document does not just consider land use, but also a comprehensive range of environmental, economic and social issues. The specific policy relating to air quality is reproduced below.

"ENV8: Air Quality

Spatial Objectives

Promoting healthy living is a key element of the Sustainable Communities direction of change which underpins the Vision. Reducing exposure to poor air quality will improve the health and quality of life of the population, and support Spatial Objectives 3, 6, 7 and 8.

Policy

New residential or other sensitive development, such as schools, hospitals and care facilities, should, wherever possible, be located where air quality meets national air quality objectives. Where development is proposed in areas where air quality does not meet (or is unlikely to meet) air quality objectives or where significant air quality impacts are likely to be generated by the development, an appropriate air quality assessment will be required. The assessment must take into account any potential cumulative impacts as a result of known proposals in the vicinity of the proposed development site, and should consider pollutant emissions generated by the development.

If an assessment which is acceptable to the local authority indicates that a proposal will result in exposure to pollutant concentrations that exceed national air quality objectives, adequate and satisfactory mitigation measures which are capable of implementation must be secured before planning permission is granted.

Should permission be granted, as a departure from this policy, this will be conditional upon contributions being secured towards the cost of air quality action planning, to compensate for the additional burden placed on local authority air quality management regimes.

Justification

6.3 The Rogers Review (2007) recommended six national enforcement priorities for local authority regulatory services, one of which is air quality. Within the review it is stated that: "Air quality is a high national political priority and action taken to improve it will also contribute to tackling climate change. Local authorities have a vital role to play in delivering better outcomes. Air quality is a national enforcement priority because it impacts on whole populations, particularly the elderly and those more susceptible to air pollution and its transboundary nature means that local action contributes to national outcomes." The planning system has a key role to play in limiting exposure to poor air quality.

6.38 All the Black Country local authorities have declared their areas as air quality management areas to address the government's national air quality objectives which have been set in order to provide protection for human health. The main cause of poor air quality in the Black Country is traffic and there are a number of air quality hotspots where on-going monitoring is required. The Black Country local authorities are working to reduce pollutant concentrations and to minimise exposure to air quality that does not meet with national objectives.

6.39 For some developments a basic screening assessment of air quality is all that will be required, whereas for other developments a full air quality assessment will need to be carried out, using *advanced dispersion modelling software. An appropriate methodology should be agreed with the relevant Environmental Health / Environmental Protection Officer on a case by case basis.*

6.40 Where a problem is identified mitigation measures might include:

- Increasing the distance between the development façade and the pollution source;
- Using ventilation systems to draw cleaner air into a property;
- Improving public transport access to a development;
- Implementing a travel plan to reduce the number of trips generated;
- Implementing Low Emission Strategies.

Primary Evidence

Annual Progress Report on Air Quality (2008)
Detailed Assessment of Air Quality (2004) and Annual Progress Report (2008) for each of the Black Country local authorities.

Delivery:

Development Management process.

Monitoring
Indicator Target

LOI ENV8 - Proportion of planning permissions granted in accordance with Air Quality Section's recommendations 100%"

6 Local Transport Plans and Strategies

6.1 West Midlands Local Transport Plan 2

The West Midlands Local Transport Plan 2 (LTP2) was published in 2006 and covers the period up to 31st March 2011. It sets out the West Midlands vision for the conurbation, central to which is the provision of an effective transport network.

The LTP2 identifies air quality as an important issue and sets out an air quality strategy which involves:

- working with the Highways Agency to deal with the substantial emissions from motorway traffic
- detailed initiatives to tackle local hotspots through engineering and traffic management
- broader policies to encourage forms of transport that have less impact on air quality, such as alternative-fuel vehicles

The LTP2 target for air quality is to reduce the average NO2 level by 1% between 2004/05 and 2010/11 in areas where NO2 exceeds the national objective. This is ambitious, given rising traffic levels, but can be achieved if congestion and traffic growth targets are met.

6.2 West Midlands Local Transport Plan 3

The West Midlands Metropolitan Area Local Transport Plan (LTP3) will be a statutory document setting out the transport strategy and policies for the Metropolitan Area to 2026. LTP3 will supersede the current LTP2, which expires on 31 March 2011.

A key objective of the LTP3 vision will be air quality and climate change.

6.3 The Black Country Joint Core Strategy

The Joint Core Strategy recognises the key role which the transport network plays in maintaining the economic well being of the region. The strategy contains specific policies for providing an efficient and reliable transport network which link with the LTP, these are reproduced below.

"CSP5 Transport Strategy

Strategic Objectives

From the outset of the Black Country Study it has been acknowledged that transport has a key role in providing a catalyst for the urban renaissance of the Black Country, to support national economic competitiveness and growth by delivering reliable and efficient transport networks. Improved access to key destinations is vital to achieve the required step change in the quality and extent of the areas' transport network to reverse the outward migration of population and to support economic and social aspirations. It is important that this network provides rapid, convenient and sustainable links between the Strategic Centres, housing growth areas, employment areas, local communities and the regional and national transport networks.

The Core Strategy sets the agenda for the transformation of the Black Country transportation network. It identifies the key factors required to enhance the transport infrastructure and assist delivery of the Spatial Objectives for the area:

- *Improved accessibility and connectivity of an integrated public transport network.*
- *Improved road network and links to the national M5 and M6 motorway network.*
- *Improved access to the freight railway network.*
- *Improved walking and cycling provision.*

The overall transport strategy supports all of the Spatial Objectives, particularly 7.

Policy

The large-scale land use changes proposed in the Core Strategy require an effective and integrated transport network which will serve existing and new developments and promote greater use of sustainable transport modes, helping to reduce the growth in car borne journeys. This transport strategy for the Black Country is intended to reflect the following strategic outcomes:

- ***Enabling the expansion of the Strategic Centres;***
- ***Providing communities with improved access to employment, residential services and other facilities and amenities, with travel choices that are attractive, viable and sustainable;***
- ***Improving air quality and helping to address negative impacts on climate change;***
- ***Improving the accessibility of employment sites to residential areas and providing reliable access for freight to the national motorway network;***
- ***Facilitating access to quality employment land;***
- ***Containing congestion by developing and managing transport networks to operate more efficiently;***
- ***Improve road safety;***
- ***Supporting the strategy through demand management and the promotion of sustainable transport;***
- ***Improve access to information relating to travel options for visitors, businesses and local people.***

Justification

2.24 The transport objectives for the Core Strategy reflect:

- *National transport guidance and the West Midlands Local Transport Plan 2;*
- *Regional Spatial Strategy for the West Midlands January 2008;*
- *West Midlands Regional Spatial Strategy Phase 1 Revision - Black Country Study*
- *The Vision and Spatial Objectives for Black Country;*
- *Existing and future transport challenges*
- *The Black Country Investment Plan*

2.25 In particular, they are consistent with the government's DaSTS goals for transport which are summarised as follows:

- *Support economic growth;*
- *Tackle climate change;*
- *Contribute to better safety, security and health;*
- *Promote equality of opportunity; and*
- *Improve quality of life.*

2.26 The transport objectives for the Black Country have guided the formation of the transport strategy. They are intended to deliver specific outcomes, and will be supported by indicators and targets that will be incorporated into a monitoring and review mechanism that will measure the extent to which transport objectives are being delivered. This will be undertaken by the authorities, through joint working, and particularly in conjunction with the Local Transport Plan process covering the West Midlands Metropolitan area as a whole.

2.27 The technical work undertaken by PRISM modelling has demonstrated that the various multimodal networks continue to function during the plan period and that the planned interventions deliver improvements to their performance. An emphasis on "Smarter Choices" and the recognition of the benefits to be secured by embracing and promoting the advantages of new technologies, such as broadband, video conferencing and internet shopping, assists in achieving this outcome. Against this background it is acknowledged that some hotspots will exist and that they will be mitigated through the Transport Assessment process as development comes forward.

2.28 The strategic outcomes within the transport strategy will be achieved by implementing the following measures:

- *Development and promotion of high quality, reliable public transport (including rapid*
- *transit), improving connectivity between residential and employment land.*
- *Promotion of sustainable, viable modes of travel (public transport, walking and cycling) to support reducing congestion, improving air quality and addressing climate change.*
- *Improving strategic traffic management (active traffic management and hard shoulder*
- *running on motorways) and the strategic highway network (junction improvements at key*
- *transition points on the network and urban traffic control) to relieve congestion and improve accessibility.*
- *Improving road safety through auditing of proposals and promotion of road safety*
- *education.*
- *Creating a secure environment.*

2.29 These outcomes for transport underpin the overall focus on regeneration and job creation in the Black Country. The regeneration of the Black Country will make a very significant contribution to improving equality of opportunity in the Region as incomes are currently well below the regional average. Planning land use and transport in an integrated way was a key theme of the Black Country Study with the aim of locating employment, retail and new housing in the locations most accessible by sustainable means of travel, particularly the strategic centres. The pattern of land use proposed in the Core Strategy will be the most sustainable possible by maximising use of new and improved public transport facilities and services. Increased public transport usage, and overall modal share for sustainable transport modes will support additional improvements to the public transport network, further strengthening the accessibility of the Strategic Centres.

2.30 The transport strategy and policies in the Core Strategy reflect the approach in the West Midlands Local Transport Plan 2006-20011 (LTP2), and whilst the LTP covers a much shorter period than the Core Strategy, the underlying principles and its shared vision will remain valid over the longer period. The shared vision is for:

i. a thriving sustainable and vibrant community where people want to live and where business can develop and grow
ii. city, town and local centres that are attractive and vibrant, where high quality public transport is the norm and walking and cycling are common-place
iii. cleaner air and less congested traffic conditions
iv. a safer community with fewer road accidents and with environments in which people feel secure
v. equal opportunities for everyone to gain access to services and facilities and enjoy a better quality of life, with travel choices that are attractive, viable and sustainable.

2.31 It is anticipated that the new Local Transport Plan for the West Midlands (LTP3) which is currently being developed for submission in December 2010 will continue to be based on these enduring principles, with schemes and interventions being considered in terms of their impact and effectiveness.

2.32 Improving the environment and quality of life in the Black Country are considered essential in making the area an attractive place to live. The overall transport strategy proposed for the Black Country is to upgrade public transport and promote "Smarter Choices" initiatives while maximising the capacity of the highway network through strategic traffic management initiatives while improving capacity and operation at key junctions. Transport Assessments and Travel Plans will help to fund some infrastructure.

2.33 The Highways Agency plans for Active Traffic Management and hard shoulder running on the M6 integrate well with this approach. The RSS Phase 1 revision has confirmed the need to improve Junctions 1 and 2 of the M5 and Junctions 9 and 10 on the M6 in the longer term. The nature of these improvements and their timing will be dependent on further studies that include the DaSTS Access to Birmingham study, investigation of the impacts of strategic development proposals and associated

Area Action Plans and future Regional Funding Allocations considerations. Uncommitted transport infrastructure will be subject to detailed investment appraisal and funding opportunity.

2.34 New highway construction, as opposed to improving existing routes, will generally be limited to schemes supporting regeneration by allowing new development to take place or enhancing access from development areas to the principal highway network, particularly in the foci for Advantage West Midlands investment.

2.35 A Black Country long distance walking and cycling network has been identified and will be integrated with plans for Environmental Infrastructure. The land use pattern and transport networks set out in the Core Strategy will encourage healthy and active lifestyles.

2.36 The Core Strategy land use and development proposals were tested using the PRISM land use and transport model, which demonstrated a reduction in the amount of road traffic generated compared to other options tested.

2.37 The Transport Strategy is aimed at managing down and then accommodating the residual traffic demand generated by increases in car ownership, population and the transformational regeneration of the strategic centres. The strategy relies on attracting development to these four centres and this will require the careful phasing of parking supply to allow the management of demand to be adjusted to the availability of better quality public transport.

Primary Evidence

The transport policies respond to the transport objectives and outcomes referred to above and are founded on a robust evidence base derived from transport modelling undertaken as part of the Black Country Study, the Regional Spatial Strategy Phase 2 review of housing proposals and a transport strategy review of the Black Country. These studies have included investigation of a number of land use and transport scenarios for the wider Black Country and West Midlands area. The development of the transport strategy has also been informed by a number of local transport studies, preparation of transport Major Scheme Business Cases and on-going monitoring of transport trends and performance of the transport networks in the area in conjunction with the West Midland Local Transport Plan.

The Black Country Study 2006
Review of Transport Strategy 2009 – Mott MacDonald
PRISM Model testing the Black Country Strategy – 2006
PRISM Black Country Core Strategy Transport Technical Document – July 2009
West Midlands TiF Study
Major Scheme Business Cases:

- *West Midlands Red Routes Package 1*
- *West Midlands Urban Traffic control*
- *A41 Expressway*

CSP5 will be delivered and monitored through arrangements set out within the Transport Policies of the Core Strategy. "

TRAN2: Managing Transport Impacts of New Development

Spatial Objectives

In order to ensure that the transport elements of the Spatial Strategy are deliverable it is essential that new developments and existing facilities demonstrate their travel and transportation impacts together with proposals for mitigation. It is important that accessibility by a choice of sustainable modes of transport is maximised at all developments. Transport Assessments and Travel Plans, produced by developers, employers, schools and facility operators, are essential to bring about sustainable travel solutions and help deliver Spatial Objective 7.

Policy

Planning permission will not be granted for development proposals that are likely to have significant transport implications unless applications are accompanied by proposals to provide an acceptable level of accessibility and safety by all modes of transport to and from all parts of a development including, in particular, access by walking, cycling, public transport

and car sharing. These proposals should be in accordance with an agreed Transport Assessment, where required, and include implementation of measures to promote and improve such sustainable transport facilities through agreed Travel Plans and similar measures.

Justification

5.14 All developments will be assessed both in terms of their impact on the transport network and the opportunities that could be available to ensure that the site is accessible by sustainable modes of transport. The supporting documentation will either take the form of a full Transport Assessment (TA) or a less detailed Transport Statement (TS) and will generally be determined by the size and scale of development or land use. This will be based on Appendix B of the DfT Guidance on Transport Assessment, although a TA may be required instead of a TS for a range of other reasons (for example road safety concerns, existing congestion problems, air quality problems, concerns over community severance or likelihood of off-site parking being generated).

5.16 Depending on the size, nature and location of the development the TA will need to make recommendations for a range of Travel Plan (TP) measures that are capable of achieving either significantly lower than average traffic levels or reduced levels of car use. A Travel Plan is a long term management strategy for an occupier or site that seeks to deliver sustainable transport objectives through positive action and is set out in a document that is regularly reviewed and up-dated. Travel Plans will normally be secured as planning obligations and/or planning conditions along with any remedial transport measures required due to the potential impact of the development.

5.17 The scope of the Travel Plan will be determined by the size, scale and nature of the development, the findings of the Travel Assessment or Statement and through pre-application discussions.

Primary Evidence

The Preparation of Transport Assessments and Travel Plans, Sandwell MBC (October 2006)

Delivery

Through the Development Management process and via Planning Obligations or other legal and funding mechanisms.
Set out in appropriate Supplementary Planning Guidance.

Monitoring
Indicator Target

LOI TRAN2 - Appropriate provision or contributions towards transport works and Travel Plans measures by all relevant permissions.
Travel Plans to be produced for 100% of all planning applications that are required to submit a Transport Assessment or a Transport Statement."

6.4 Help2Travel

The Help2Travel website provides travel information to the public and has been developed as part of a European project for intelligent transport information systems. It provides users with a comprehensive overview of traffic & travel in the West Midlands region. It includes information about roadwork's and incidents on the region's roads, real-time train and bus information, as well as information & links to car parking, cycling and air quality information.

The system also enables up to the minute travel information to be exchanged easily between transport authorities, allowing them to respond more quickly and efficiently to travel problems.

6.5 Wolverhampton TravelWise

TravelWise is a national campaign to promote and encourage sustainable and healthy travel choices, rather than relying on the car for all journeys.

TravelWise helps people to consider what options other than the car might be available to them, particularly for shorter journeys.

The West Midlands TravelWise Group and Wolverhampton TravelWise work closely with Local Authorities in the Region, the West Midlands Passenger Transport Executive, Centro and Public Transport Operators to improve conditions for people who walk, cycle and use public transport. Centro and Travel West Midlands are also key partners in Company TravelWise and offer discounts to the employees of those organisations that sign up to the scheme.

6.6 Wolverhampton Cycling Strategy

The Council adopted the current Cycling Strategy in 1995 and has made good progress in implementing its proposals. The Government published 'The National Cycling Strategy' in 1996 and the Cycling Strategy for the West Midlands set out in the Local Transport Plan. This provides a framework to identify specific problems encountered by cyclists and provides some of the solutions to address these.

6.7 Wolverhampton Walking Strategy

The walking strategy aims to encourage walking by recognising its role as a mode of transport and acknowledging that walking forms part of the solution to tackling traffic congestion.

The Strategy provides a framework for the Council to identify specific problems encountered by pedestrians and factors that deter walking in Wolverhampton and seeks to provide some of the solutions to address these. Many of the solutions are ones of information and maintenance and do not require very technical or major infrastructure solutions.

7 Climate Change Strategies

7.1 Wolverhampton Declaration on Climate Change

In December 2006 the Council signed the Wolverhampton Declaration on Climate change which commits the Council to work to address both the causes and impacts of a changing climate in all its work.

7.2 Climate Change Strategy and Action Plan

The Climate Change Strategy and Action Plan for Wolverhampton 2009-2012 has been developed in fulfilment of the Wolverhampton Declaration on Climate Change.

The Strategy addresses climate change through mitigation (reducing our CO2 emissions) and adaptation to future climate change.

Through the Climate Change Strategy and Action Plan the Council will strive to secure a sustainable quality of life in the long term for everyone associated with the city.

7.3 The Unitary Development Plan (2006)

The UDP includes policies that recognise the importance of ensuring that future development will create sustainable communities. This will be achieved by adherence to existing UDP policies on protecting the environment, controlling pollution, encouraging renewable energy, provision of adequate and convenient community facilities, and the provision of a high quality public transport system. The specific section and policies which relate to climate change are reproduced below.

"5.11 Energy

Policy EP16: Energy Conservation (Part I)

The conservation and efficient use of energy will be maximised by:

- ***Ensuring that the energy demands of developments are minimised through appropriate location, orientation, siting and design;***
- ***Encouraging the production and use of renewable energy.***

5.11.1 PPG22 Renewable Energy (1993) requires local planning authorities to consider the contribution their area can make towards energy conservation, given that current use of fossil fuels is unsustainable, in economic and environmental terms. Transport is a major consumer of fossil fuel resources and UDP policies which guide development to locations where the need to travel is minimised will make a large contribution towards energy conservation.

5.11.2 Buildings generate large demands for energy over their lifespan. Building Regulations ensure that detailed measures for energy conservation, such as insulation, are included in the construction of new buildings. The planning system can also help by promoting energy saving features in the design of developments e.g. orientating buildings so they retain maximum heat from the sun (passive solar gain) and are sheltered from wind chill effects. Design features which improve water efficiency and encourage recycling of waste are also energy efficient. See also Policy D13: Sustainable Development.

Policy EP17: Renewable Energy

Favourable consideration will be given to developments that produce or use renewable energy, where such proposals conform with other Plan policies and are in scale and character with their surroundings.

Where a new development will generate significant energy demands, consideration should be given to the provision of combined heat and power systems and district heating schemes to serve the development. Renewable energy facilities which are of a large size or likely to have a significant impact on the environment should be located within industrial areas.

5.11.3 Another way of conserving energy resources is through encouraging greater use of renewable sources of energy, such as solar, wind and water power or waste incineration. Other renewable sources of energy include wood from local, sustainably-managed woodlands and controlled use of landfill gas, which can supplement gas supplies, generate heat and electricity and also remove the risk of fires and explosions. The Crown Street Energy from Waste facility is a major source of renewable energy in Wolverhampton, generating 7 megawatts of energy each year, sufficient power for 12,000 households. If proposals come forward for further renewable energy facilities, these will be considered favourably, providing they conform with other Plan policies and are located appropriately. An Environmental Impact Assessment may be required for such facilities (see Policy EP2).

5.11.4 The inclusion of appropriate renewable energy features in the design of new development, such as solar panels on buildings or combined heat and power (CHP) facilities, which make use of waste heat e.g. from industrial processes, will also be encouraged. These features allow developments to harness renewable energy for use on site, to the extent that some developments can be self-sufficient or even net producers of energy. This also helps to reduce the large amount of energy wasted during transfer across the national grid. All renewable energy facilities should be carefully located and designed to ensure that no harm is caused to the environment or to the health and well-being of occupants of the site or the surrounding area. "

7.4 The Black Country Joint Core Strategy

The Core Strategy identifies the main ways in which activity in The Black Country contributes towards climate change, together with ways of reducing and adapting to it. The vision statement relating to sustainability and climate change is reproduced below.

"b. Sustainability Principles

2.3 The achievement of this vision requires a number of sustainability challenges to be addressed:

A. Facing up to Climate Change

Meeting the requirements of RSS Policy CC1: Climate Change by ensuring that the spatial approach to development both minimises climate change impacts and is 'climate change proofed' by mitigating and adapting to predicted changes in the climate of the Black Country.

B. Sustainable Development

Ensuring that development meets the social, economic and environmental needs of the present without compromising the ability of future generations to meet their own needs. This will include sustainable management of material resources through minimising waste, making prudent use of minerals, water and energy, using renewable and low-carbon technologies to produce what we need and 'putting the right thing in the right place' to strengthen centres and ensure easy access to facilities.

C. Social Inclusion

Ensuring all members of the community have the best possible access to facilities, housing and opportunities.

D. Brownfield First

Ensuring that previously developed land, particularly where vacant, derelict or underused, is prioritised for development over greenfield sites.

E. Comprehensive Approach to Development

Delivering complex and large-scale redevelopment in a way that ensures new development links well with surrounding areas, makes efficient use of land, improves amenity, avoids a piecemeal approach that could result in blight and constrain neighbouring uses, and provides infrastructure necessary to support individual developments in a co-ordinated way. Site Allocation Documents, Area Action Plans and other planning documents will be promoted as the preferred mechanism to achieve a comprehensive approach in areas of large-scale change.

2.4 The RSS policies and proposals for the Black Country are already grounded in these sustainability principles. The spatial strategy is highly sustainable, concentrating growth in the most accessible locations, within Strategic Centres and along public transport corridors. The vast majority of new housing will be built on brownfield land, concentrated close to existing public transport nodes to minimise climate change impacts. Significant new green infrastructure will be created within developments, which will help to mitigate the effects of climate change and make inner urban areas more attractive places to live. "

7.5 The West Midlands Regional Spatial Strategy (RSS, 2004),

This strategy provides a regional strategic context for local planning decisions, and has a responsibility to help meet national targets for the reduction of greenhouse gases. The Regional Planning Body is expected to consider how the region's activities contribute towards climate change, and how the region might be vulnerable to the impacts of climate change, in working with partners to develop a realistic and responsible approach to climate change in the region. This will require establishing comprehensive and up to date data in order to enable the local authorities and agencies to develop coordinated and effective solutions. Guiding principles were used in developing the Spatial Strategy to ensure that policies to assist the reduction of greenhouse gas emissions are an integral part of the West Midlands Regional Spatial Strategy.

7.6 The Wolverhampton Community Plan 2002-2012

The community plan states that partners "*will work to make sure that the actions of today do not reduce opportunities for future generations".* The aim is to create a sustainable city. As part of the creation of a Green City

In addition, the Community Plan Addendum priorities include effective energy-efficiency measures and measures to combat and adapt to climate change.

~~9~~8 Conclusions and Proposed Actions

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~~9.1~~8.1 Conclusions from New Monitoring Data

Wolverhampton CC has carried out a comprehensive review of all monitoring data gathered since the previous Updating and Screening Assessment in 2010. Areas where the air quality objectives are not being met have been identified together with any significant trends.

Recent monitoring data has identified that air quality continued to improved across the city during 2010. This has resulted in a reduction in the number of areas within Wolverhampton which are exceeding the objectives. The Council has concluded that a detailed assessment will not be required.

~~9.1.1~~8.1.1 Nitrogen dioxide data

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Data collected since the previous Updating and Screening assessment continues to confirm that the following relevant roads and junctions are exceeding the air quality objective for nitrogen dioxide:

Road side ISA's:

- Lichfield Street, Town Centre
- Pipers Row
- Princess Street

Roadside point locations:

- Broad Street
- Birmingham Road
- Old Hill, Tettenhall
- Penn Road/Goldthorne Hill Junction
- Stafford Road Vine Island
- Willenhall Road/Neachells Lane junction

Trend Data

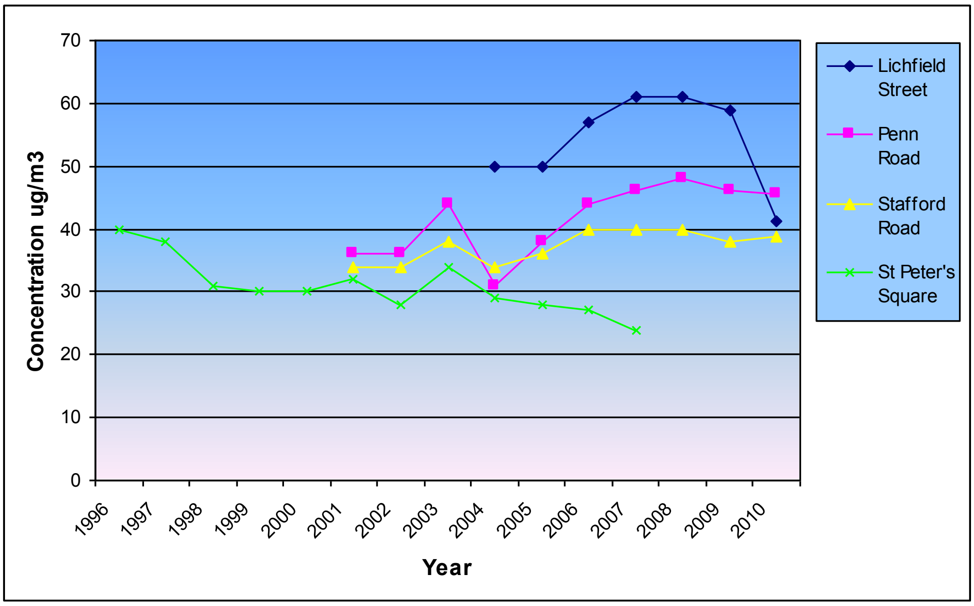
Average NO2 concentrations from the 4 longest running automatic monitoring stations are presented in Figure 10.1a.

The St Peter's Square station was located 30 metres from the ring road and was classified as an intermediate site. It operated from 1996 through to 2007 and the results show an overall reduction in NO2 concentrations over that period.

Penn Road and Stafford Road stations are both roadside sites and the results from them show that roadside levels of NO2 rose steadily between 2004 and 2008. Since 2008 there has been a reduction in NO2 concentrations at both these sites.

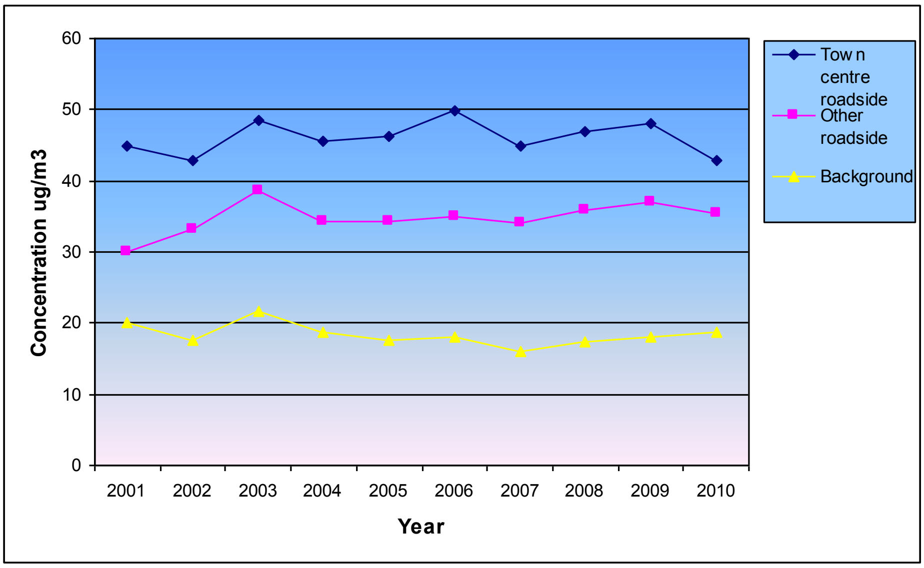
The Lichfield Street station is on one of the main access routes into the bus station. The levels of NO2 in Lichfield Street are considerably higher due to the numbers of buses travelling along the road. The overall trend between 2004 and 2009 is similar to the other roadside sites. However, in 2010 there was a large decrease in NO2 brought about by the closure of Lichfield Street as part of the bus station redevelopment project. This project is due be completed in summer 2011 when the road will be re-opened to bus traffic. It is expected that the numbers of buses using Lichfield Street when it re opens will be around half the previous number.

Figure 10.1a Annual mean concentrations of NO_2 (Automatic Stations).



The diffusion tube data presented in figure 10.1b below shows minor fluctuations in the annual mean concentrations year to year whilst the overall trend at roadside and background locations remains stable. The reduction in the town centre 2010 results reflects the closure of the bus station and access roads.

Figure 10.1b Annual mean concentrations of NO_2 (diffusion tubes).



~~9.1.2~~8.1.2 PM_{10} data

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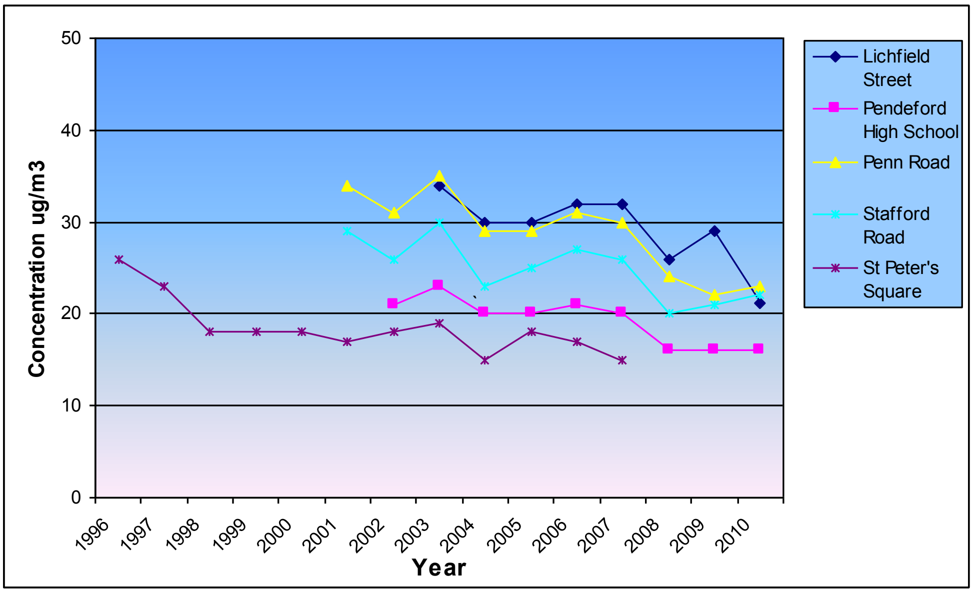
There were no exceedences of the PM_{10} objectives during 2010.

Trend Data

The data corrected using the VCM is significantly lower than the previous data which is reflected in the marked step change in the trend graphs for 2008.

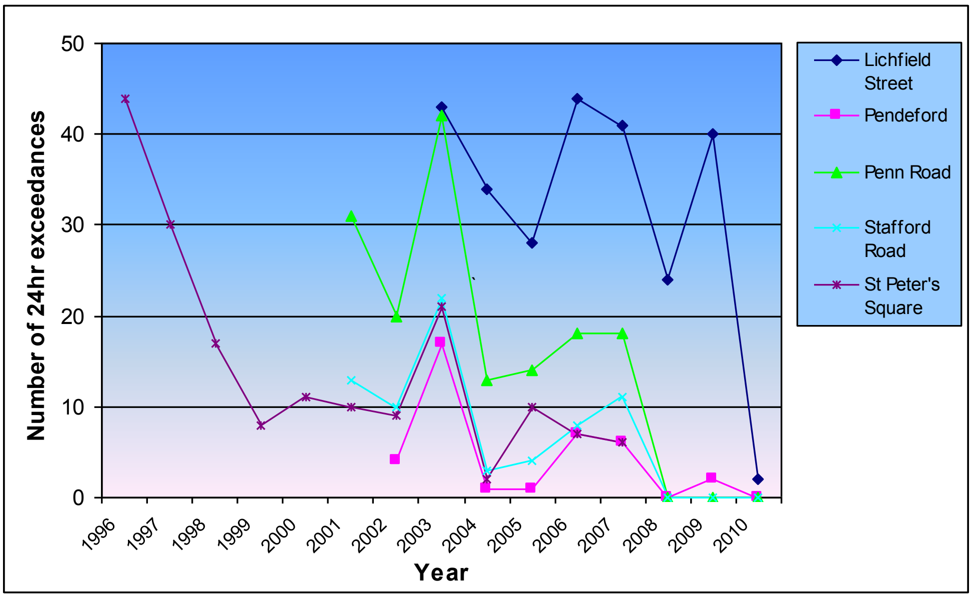
or to 2008 PM_{10} the results were indicating a down ward trend in annual mean PM10 concentrations. Following on from 2008 PM10 concentrations have been fairly stable at the Pendeford School, Penn Road and Stafford Road sites. The concentrations of PM10 at Lichfield Street since 2008 have been rather less stable. In 2009 there was a sharp increase due to construction works near to the monitor which was followed by an equally sharp decrease in 2010. The 2010 decrease was caused by the temporary closure of the bus station.

Figure 10.2a PM_{10} annual mean concentrations



The yearly variations in the number of 24 hour exceedences (Fig 10.2b) are more pronounced however the overall trend is similar to the annual mean concentration. It is noticeable that there was a large increase in exceedences during 2003 due to adverse weather conditions which hampered dispersion.

Figure 10.2b PM_{10} 24 hour exceedences



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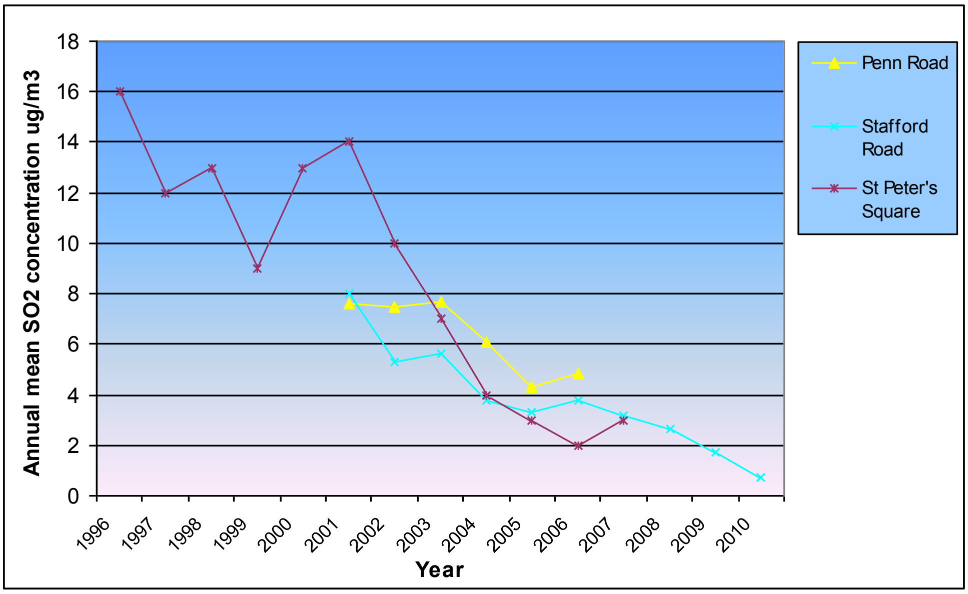
~~9.1.3~~8.1.3 SO2 data

The levels of sulphur dioxide have dropped significantly since the 1990's. The rate of decline has slowed over recent years however the annual mean concentrations of SO_2 are continuing to fall (Fig 10.3).

Figure 10.3 SO_2 annual mean concentrations



8.2 Conclusions relating to New Local Developments

The Progress Report has considered the likely impacts of local developments, road transport, other transport sources, industrial installations, commercial and domestic sources, and fugitive emissions.

The report has concluded that there are no new or significantly changed sources which require a Detailed Assessment.

8.3 Proposed Actions

The Progress Report has confirmed that there are no new locations exceeding the air quality objectives therefore a detailed assessment is not required.

The Progress Report has confirmed that there are a no new locations where additional monitoring is required. Sites which are showing continued compliance with the objectives will be considered for closure at the end of the current year.

Wolverhampton City Council intends to submit the 2012 Updating and Screening Assessment as required by the Review and Assessment process.

~~11~~9 References

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(1) Local Air Quality Management – Technical Guidance LAQM.TG(09), Department for Environment, Food and Rural Affairs 2009.

(2) Air Quality Review & Assessment Updating and Screening Assessment Incorporating Stage 4 Assessment and Action Plan Progress Report 2009. Wolverhampton City Council.

(3) Air Quality Review & Assessment Progress Report 2010 Wolverhampton City Council.

(4) LAQM Tools; Local Air Quality Management website www.airquality.co.uk.

Appendix A: QA/QC Data

Diffusion Tube Bias Adjustment Factors

Diffusion tubes are supplied and analysed by Gradko International Ltd. and are prepared using 50%TEA in acetone. The tubes arrive from Gradko and are stored in a refrigerator prior to being labelled with a site and date code. The tubes are then exposed in accordance with the start and end dates for the national NO_2 survey. Following exposure the tubes are capped and immediately dispatched to Gradko for analysis.

The bias adjustment factor for the tubes and supplier have been obtained from the LAQM tools website, Review & Assessment database, Spreadsheet Version Number: 05/09, these are detailed below.

Table A1.1 National bias adjustment factors

Year	Bias Adjustment Factor
2008	0.93
2009	0.97
2010	0.99

Factor from Local Co-location Studies

Triplicate tubes are exposed at the automatic monitoring stations in order to calculate a bias correction factor. The correction factor is applied to the yearly average to enable comparison with the annual NO_2 objective. The results from the co-location studies for 2009 are shown in the tables below.

The St Peter's Square site is the Wolverhampton Centre AURN station which was closed by Defra in October 2007. Since the closure of this site, co-location tubes have been placed at the Lichfield Street and Willenhall Road automatic stations. The factor applied to the data set is the mean bias adjustment factor from Table A1.2.

Table A1.2 Chemiluminescent v Diffusion Tube Values 2010 (µg/m³)

Location	Bias	Ave	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Automatic Monitor Intercomparison: Diffusion Tube Values (µg/m³)														
Lichfield Street		41	65	74	46	42	33	40	26	32	27	32	44	50
Lichfield Street		41	63	64	50	34	34	33	26	31	35	33	42	59
Lichfield Street		43	63	65	51	38	36	39	25	35	31	36	48	69
Stafford Road		38	49	48	37	33	34	35	39	31	39	33	41	55
Stafford Road		38	47	52	36	37	34	35	33	36	33	33	44	45
Stafford Road		38	50	47	42	34	33	37	35	33	36	38	45	47
Automatic Monitor Intercomparison: Monthly Chemiluminescent Values (µg/m³)														
Lichfield Street		41	57	61	53	42	36	32	21	27	31	36	42	53
Stafford Road		39	50	50	40	40	36	32	27	29	32	34	42	52
Automatic Monitor Intercomparison: Averages of Triplicate Tubes (µg/m³)														
Lichfield Street		42	64	68	49	38	34	37	26	33	31	34	45	59
Stafford Road		38	49	49	38	35	34	36	36	34	36	33	42	50
Automatic Monitor Intercomparison: Bias adjustment factor														
Lichfield Street	0.95		0.90	0.90	1.09	1.11	1.06	0.87	0.81	0.82	0.98	1.08	0.94	0.90
Stafford Road	0.99		1.02	1.01	1.04	1.16	1.08	0.91	0.75	0.85	0.91	1.04	0.99	1.03
Mean	**0.97**		0.96	0.95	1.07	1.13	1.07	0.89	0.78	0.84	0.95	1.06	0.97	0.97

Discussion of Choice of Factor to Use

A comparison of the relevant bias adjustment factors is shown in Table A1.3 below. It should be noted that the national factors have been calculated using data from a number of authorities, with tubes exposed at different types of locations which will have been prepared and analysed in different batches and at different times.

The local bias adjustment factors are derived from triplicate co-located tubes exposed alongside an automatic analyser. These tubes are from the same batch as the measurement tubes and are handled, stored and analysed in the same way.

Table A1.3 National and local bias adjustment factors.

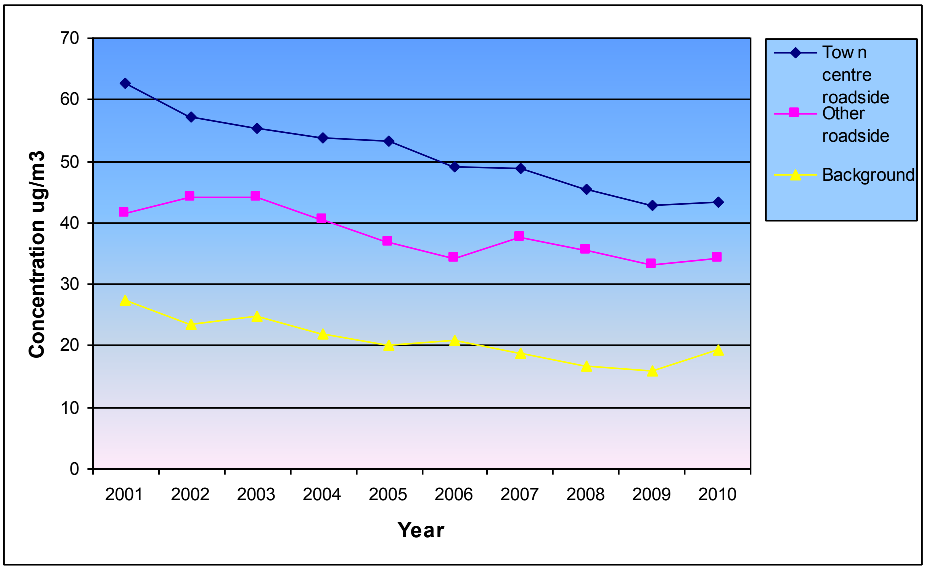
Year	National Bias Adjustment Factor	Local Bias Adjustment Factor
2001	1.45	1.01
2002	1.27	0.95
2003	1.11	0.97
2004	1.10	0.93
2005	1.10	1.00
2006	1.01	1.03
2007	0.99	0.93
2008	0.94	0.97
2009	0.97	1.08
2010	0.99	0.97
Mean	1.09	0.98
Std	0.16	0.05

The locally derived bias adjustment factors indicate that the tubes correlate well with the automatic analysers throughout the period (2001-2010). Generally the tubes over-read slightly, the mean over-read is 2%. The local data set shows a high degree of precision, the mean value is 0.98 and a standard deviation of 0.05, assuming a normal distribution.

The nationally derived bias adjustment factors prior to 2006 suggest that the tubes were significantly under reading, which is not our experience at Wolverhampton. This is particularly evident in 2001 and 2002 during which the tubes appeared to under read by 45% and 27% respectively. The mean value is 1.10 and a standard deviation of 0.16, assuming a normal distribution.

Trend data using both correction factors is presented in Figures A1.1 and A1.2. This shows that the national correction factor artificially raises the NO_2 concentrations at the start of the period, and produces an overall downward trend of between 10 and 20ug/m3 (Figure A1.1).

Figure A1.1 Annual mean NO_2 values using the national bias adjustment factor.



The diffusion tube NO_2 concentrations corrected with the locally derived adjustment factors (Figure A1.2) remained relatively stable over the period. These correction factors produce trend data which is more consistent with the data from the automatic analysers (Figure A1.3).

Figure A1.2 Annual mean NO_2 values using the local bias adjustment factor.

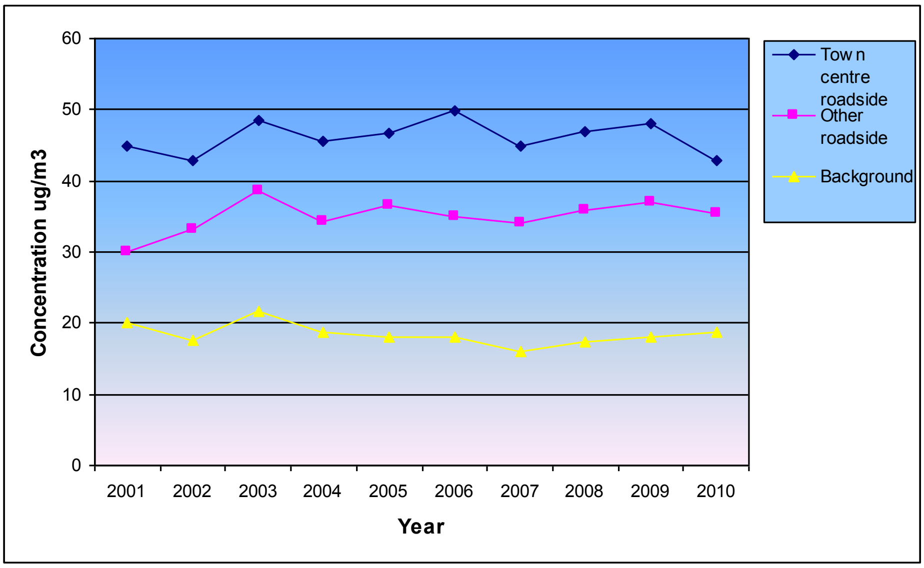
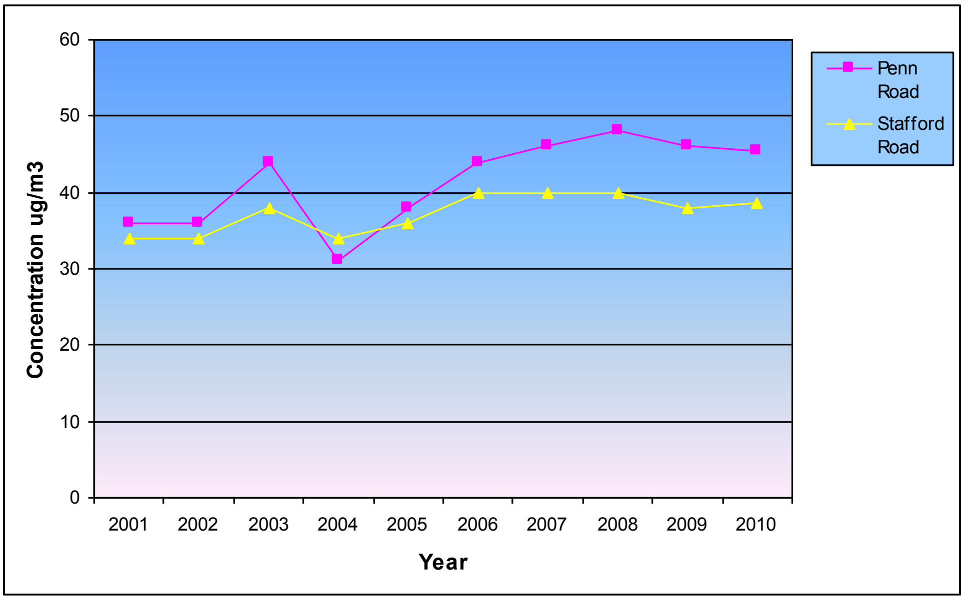


Figure A1.3 Annual mean NO_2 values automatic analysers.



The automatic trend data (Fig A1.3) shows a sharp increase in 2003 due to the exceptional weather conditions during that year. Overall NO_2 concentrations have increased since 2001 at roadside locations.

Similar trends are apparent in the diffusion tube data corrected using the local bias adjustment factor. Figure A1.2 clearly shows the increase in 2003, an overall increase at roadside locations, and a small decrease at background locations.

Based on the analysis of diffusion tube data, it is considered that the local bias adjustment factor better reflects the performance of diffusion tubes at a local level. The locally corrected data provides better resolution and a clearer picture of NO_2 fluctuations and trends.

PM Monitoring Adjustment

Particle monitoring is carried out using Tapered Element Oscillating Microbalance (TEOM) analysers. Data for 2008, 2009 and 2010 has been corrected using the volatile correction model (VCM) as required by LAQM.TG(09). The VCM was not available prior to 2008, therefore pre 2008 data has been corrected by applying the 1.3 correction factor to the annual mean in accordance with the previous guidance in LAQM.TG(03).

Short-term to Long-term Data adjustment

The estimation of annual mean concentrations from short term data has not been required.

QA/QC of automatic monitoring

The chemiluminescent monitors are calibrated on a daily basis using on site calibration gases. This involves feeding a zero air gas, followed by a span gas containing a known concentration of NO_2, through the analyser. A correction factor is then applied based on the analyser's response. The calibration reports are checked on a daily basis to check for drift and the correct application of the correction factor. Data is stored in both the raw and corrected form.

A site visit is made every month to change filters and carry out a manual calibration, which is checked against the automatic daily calibrations. Copies of the calibration reports, calibration gas logs and engineer's reports are retained on file.

All the sites are covered by a service contract provided by Casella ETI Ltd. The sites are serviced every 6 months by a Casella ETI service engineer in accordance with the manufacturer's instructions and warranty conditions. Casella ETI also provides a 48-hour call out response to cover breakdowns.

The aim is to achieve 90% data capture. In order to minimise the loss of data the procedures in box A1.4: of LAQM.TG(09) have been adopted.

Raw data is examined on a daily basis to screen out spurious and unusual measurements having regard to the recommendations in Box A1.6 of LAQM.TG(09).

QA/QC of diffusion tube monitoring

Diffusion tubes are supplied and analysed by Gradko International Ltd. in accordance with the procedures set out in the harmonisation document: "Diffusion Tubes for

Ambient NO_2 Monitoring: Practical Guidance". Gradko International Ltd is a UKAS and Workplace Analysis Scheme for Proficiency (WASP) accredited laboratory and is one of a number of laboratories which take part in the UK NO_2 diffusion tube survey, run by NETCEN.

The WASP scheme involves the use of artificially spiked diffusion tubes to test the analytical performance of the laboratory on a quarterly basis. A summary of the performance in rounds 100-104 covering 2008 has been obtained from the Local Authority Air Quality Support web site. Gradko achieved a performance criteria rating of good for this period, which is the highest rating that can be achieved.

The precision data for the laboratory obtained from the Air Quality Review & Assessment helpdesk shows the results for the 2009 and 2010 studies as having good precision.

The tubes arrive from Gradko and are stored in a refrigerator prior to being labelled with a site and date code. The tubes are then exposed in accordance with the start and end dates for the national NO_2 survey. Following exposure the tubes are capped and immediately dispatched to Gradko for analysis.

Triplicate tubes are exposed at the chemiluminescent monitoring stations in order to calculate bias correction which is applied to the yearly average to enable comparison with the annual NO_2 objective.

2013 Air Quality Progress Report for

Wolverhampton City Council

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

December, 2013

Local Authority Officer	Dean Gooch, Anna Spinks
Department	Environmental Health (Public Protection)
Address	Wolverhampton City Council, Civic Centre, St Peter's Square, Wolverhampton, WV1 1DA
Telephone	01902 554375
e-mail	mailto:environmentalhealth@wolverhampton.gov.uk
Report Reference number	WCCPR2013
Date	December 2013

Executive Summary

This progress report has been produced as part of the on going process of the review and assessment of air quality to provide an update on local air quality management within the city of Wolverhampton.

The report presents monitoring data for the year 2012 and considers any new local developments which have taken place in the city since the previous Updating & Screening Assessment published in December 2012.

A review of emission sources has found that there have been no new industrial processes, or any other significant sources granted planning approval which could contribute to poor air quality.

A comprehensive review of all monitoring data gathered since the previous report has been carried out. Areas where the air quality objectives are not being met have been identified together with any significant trends.

Recent monitoring data has identified that there was a small increase in nitrogen dioxide and particle concentrations across the city in 2012 compared with 2011. This was caused by weather patterns during 2012 which hampered the dispersion of pollutants. A comprehensive review of sources of both pollutants has been carried out and there is no evidence to suggest that emissions have increased. The increase has resulted in 5 new locations within Wolverhampton which are exceeding the objective for nitrogen dioxide.

Despite this NO_2 concentrations have reduced along certain roads within the city centre and three sites which were exceeding the objectives are now compliant. This is a direct result of reducing the number of buses along the roads affected, brought about by the completion of phase 1 of the interchange project which has enabled buses to access the bus station directly from the ring road.

Wolverhampton City Council has concluded that a detailed assessment will not be required.

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Appendices

1 Introduction

1.1 Description of Local Authority Area

Located to the north of the West Midlands conurbation, Wolverhampton is on the edge of the Black Country, some 15 miles from the regional centre of Birmingham. Wolverhampton functions as a major centre within the Black Country and the northern part of the West Midlands.

The city covers an area of 26 square miles (6,880 hectares) and has a population of around 250,000 residents. Wolverhampton is primarily an urban area with the majority of the land use being residential and industrial. However, there are areas of green space, allotments, sports grounds, isolated pockets of countryside, small lakes and ponds and farm land which make up approximately 13% of the city. These provide a variety of habitats for a wide range of plant and animal species.

Wolverhampton benefits from good communications links, with access to the national motorway network provided by the M6 to the east, the M54 to the north, and the M6 Toll. Wolverhampton also has a mainline railway station, which provides direct trains to Birmingham, London, the West Country and the north. Proposals are currently underway to introduce a number of improvements to the railway station and its environs through the city Interchange project. Phase 1 of this has been completed with the opening of the new bus station and access road in 2011.

The two principal pollutants affecting local air quality are nitrogen dioxide (NO_2) and fine particles (PM_{10}). The major source of these pollutants is road traffic and there are a number of roads within the city where the air quality objective for NO_2 is being exceeded. These are primarily narrow congested streets within the town centre which have high levels of bus traffic. In response the Council declared the whole city an Air Quality Management Area (AQMA) in March 2005.

An Air Quality Action Plan (AQAP) has been prepared in conjunction with a cross service officer group and the local transport plan.

1.2 Purpose of Progress Report

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

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

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

1.3 Air Quality Objectives

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

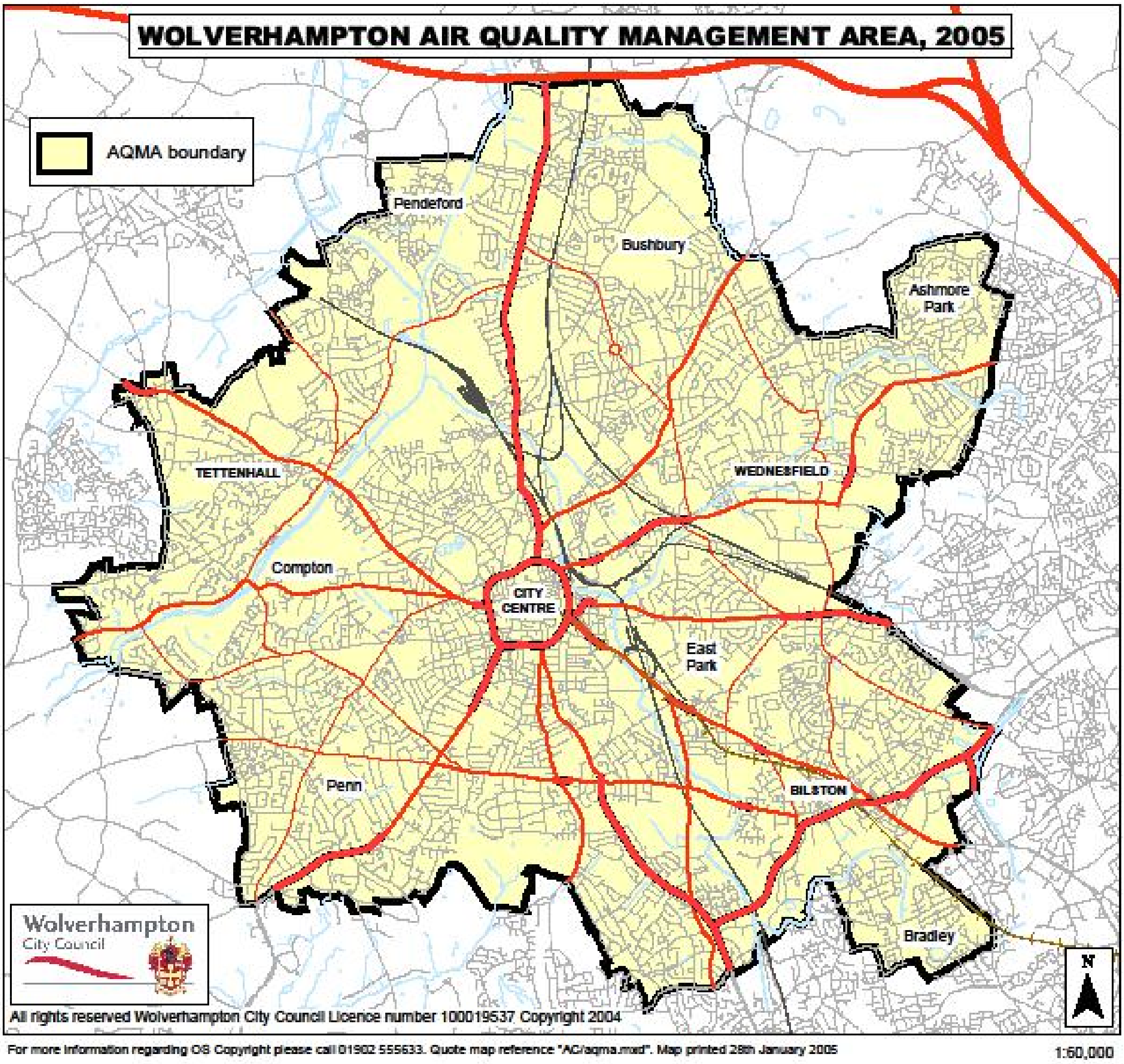
Table 1.1 Air Quality Objectives included in Regulations for the purpose of LAQM in England

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	Annual mean	31.12.2010
1,3-Butadiene	2.25 µg/m^3	Running annual mean	31.12.2003
Carbon monoxide	10 mg/m^3	Running 8-hour mean	31.12.2003
Lead	0.50 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
Particulate Matter (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

Assessment	Exceedences	Conclusions and Recommendations
Stage 1 Report-March 1999	None	The report Identified 54 roads and 143 industrial processes within Wolverhampton which have the potential to be significant sources of pollution.
Stage 3 Report July 2001	None	A recommendation to carryout detailed investigations regarding the levels of NO_2 to confirm the prediction of the model. Further monitoring for NO_2 and PM_{10} is required along busy roads and roads with high flows of bus traffic
USA May 2003	Nitrogen dioxide, particles	Identified certain areas within the city where the objectives are likely to be exceeded. A Detailed Assessment of NO_2 and PM_{10} is required for parts of the city centre and two of the busiest junctions.
Detailed Assessment 2004	Nitrogen dioxide, particles	The Detailed Assessment confirmed that the objectives for NO_2 and PM_{10} were not being met along certain roads within the city centre and recommended the declaration of an AQMA
Section 83 (1) March 2005	Nitrogen dioxide, particles	Order designating the city of Wolverhampton an Air Quality Management Area (Appendix 1)
Annual Progress Report 2005	Nitrogen dioxide, particles	Confirmed conclusions of the Detailed Assessment and highlighted three new key developments for consideration in the 2006 USA
USA, Stage 4 Assessment and Action Plan 2006	Nitrogen dioxide, particles	Analysis of monitoring data showed that NO_2 concentrations had reduced from 2003 peak levels but continued to exceed the objectives at certain locations within the city. The levels of PM_{10} fell below the objectives during 2004 and 2005 and projected figures indicated a continuing downward trend. Nine new developments which required air quality assessments were considered. It was concluded that the developments would not result in the air quality objectives being exceeded. The action plan listed 23 actions and incorporated the Local Transport Plan into the long term air quality strategy.
Progress Report 2007	Nitrogen dioxide, particles	Monitoring data for 2006 showed the levels of NO_2 and PM_{10} increased contrary to the projected concentrations contained in the 2006 USA. Parts of the city Centre and certain busy road junctions continue to exceed the objectives for NO_2 and PM_{10}. There have been no new industrial processes or any other significant developments which could contribute to poor air quality since the 2006 USA.
Progress Report 2008	Nitrogen dioxide, particles	Levels of NO_2 and PM_{10} remain stable. There have been no new industrial processes or any other significant developments which could contribute to poor air quality since the 2006 USA.
USA, Stage 4 Assessment and Action Plan 2009	Nitrogen dioxide	There are no new or significantly changed sources which could give rise to any potential exceedences outside the existing AQMA and therefore, it is not necessary to proceed to a Detailed Assessment for any of the pollutants listed in Table 1.1 Additional monitoring, or changes to the existing monitoring programme is not required.
USA 2012	Nitrogen dioxide	Monitoring data for 2011 has identified that air quality improved across the city during 2011. This has resulted in a reduction in the number of areas within Wolverhampton which are exceeding the objectives. Wolverhampton City Council has concluded that a detailed assessment will not be required.

Figure 1.1 Map of AQMA Boundary



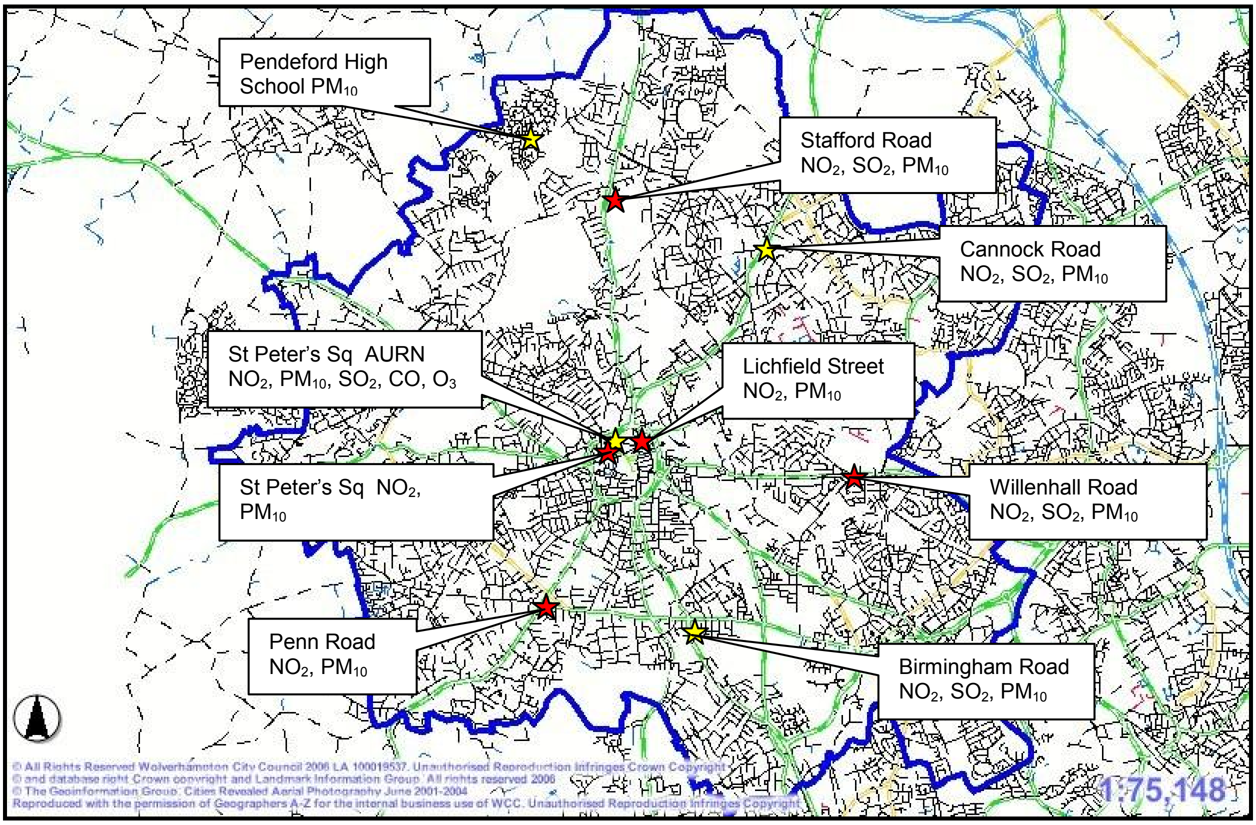
2 New Monitoring Data

2.1 Summary of Monitoring Undertaken

2.1.1 Automatic Monitoring Sites

Wolverhampton Council operates 5 fully automatic monitoring stations, the locations of which are shown in Figure 2.1 below. These sites have been chosen to represent the worst case locations and cover the main arterial roads which link the city with major regional trunk roads and motorways. Details of the sites are given in Table 2.1.

Figure 2.1 Location of Automatic Monitoring Sites



Current automatic monitoring sites

Closed automatic monitoring sites

Wolverhampton City Boundary

Fixed stations are located on the A449 Stafford Road to the north which links with the M54, the A449 Penn Road to the south, and Lichfield Street which was the main access road into the bus station and has a high flow of bus traffic.

The Council also operates a mobile monitoring station which is currently located on the A454 Willenhall Road, a main link to the M6 and Walsall. Prior to this, the mobile station was located on the A4123 Birmingham New Road and the A460 Cannock Road.

Since the previous USA a new site has been established at St Peter's Square to replace the Wolverhampton centre AURN station which closed towards the end of 2008. This site houses a new NOx analyser and the PM_{10} monitor relocated from Pendeford High School. The site is 30m from the city ring road and is classified as an urban background location.

The site at Pendeford High School was a background location which was established in 2001. The annual mean PM_{10} values were consistently below the objectives and have shown little variation over the last 10 years. Consequently it was decided to close the site at the end of 2011 and relocate the PM_{10} monitor to St Peter's Square, which is more representative of background concentrations within the city centre.

Table 2.1 Details of Automatic Monitoring Sites

Site ID	Site Name	Site Type	X OS Grid Reference	Y OS Grid Reference	Inlet Height (m)	Pollutants Monitored	In AQMA?	Monitoring Technique	Relevant Exposure? (Y/N with distance (m) from monitoring site to relevant exposure)	Distance to Kerb of Nearest Road (m) (N/A if not applicable)	Does this Location Represent Worst-Case Exposure?
Active sites											
A1	Lichfield Street	Roadside	391647	298784	2.5	NO_2 PM_{10}	Yes	Chemiluminescent TEOM	Yes (2m)	2.5m	Yes
A2	Penn Road	Roadside	390374	296775	2.5	NO_2 PM_{10}	Yes	Chemiluminescent TEOM	Yes (3.5m)	5m	Yes
A4	Stafford Road	Roadside	391261	302199	2.5	NO_2 SO_2 PM_{10}	Yes	Chemiluminescent UV Fluorescence TEOM	Yes (6.5m)	8.5m	Yes
A5	Willenhall Road	Roadside	394754	298429	2.5	NO_2 SO_2 PM_{10}	Yes	Chemiluminescent UV Fluorescence TEOM	Yes (3m)	10m	Yes
A9	St Peter's Square	Urban Background	390740	302692	2.5	NO_2 PM_{10}	Yes	Chemiluminescent TEOM	No	30m	No

Site ID	Site Name	Site Type	X OS Grid Reference	Y OS Grid Reference	Inlet Height (m)	Pollutants Monitored	In AQMA?	Monitoring Technique	Relevant Exposure? (Y/N with distance (m) from monitoring site to relevant exposure)	Distance to Kerb of Nearest Road (m) (N/A if not applicable)	Does this Location Represent Worst-Case Exposure?
Closed sites											
A3	Pendeford High School	Background	390740	302692	2.5m	PM_{10}	Yes	TEOM	No	180m	No
A6	Cannock Road	Roadside	393030	300824	2.5m	NO_2 SO_2 PM_{10}	Yes	Chemiluminescent UV Fluorescence TEOM	Yes (11m)	6m	Yes
A7	Birmingham Road	Roadside	392264	296546	2.5m	NO_2 SO_2 PM_{10}	Yes	Chemiluminescent UV Fluorescence TEOM	Yes (3m)	6m	Yes
A8	St Peter's Square AURN	Urban Centre	391357	298939	2.5m	NO_2 SO_2 PM_{10} CO O_3	Yes	Chemiluminescent UV Fluorescence TEOM	No	30m	No

2.1.2 Non-Automatic Monitoring Sites

To complement the automatic sites NO_2 sampling is also carried out using passive diffusion tubes which are supplied and analysed by Gradko. The council has tubes at 54 locations around the city; these are detailed in Table 2.2.

The sites represent a combination of background, intermediate, and roadside locations intended to reflect the worst case situation where the general public are likely to be exposed.

Following the 2001 Stage 3 report a number of roads were designated as intensive survey areas (ISA's). The roads which have been targeted are the main arterial routes into the city centre and those streets which are narrow and congested or have a high proportion of heavy duty vehicles (HDV's). A total of 5 diffusion tubes have been located in a "W" formation along each of these roads.

Wherever possible, diffusion tubes are located on the façades of residential property. Where this is not possible tubes are attached to lampposts or other suitable street furniture.

Table 2.2 Details of Non- Automatic Monitoring Sites

Site ID	Site Type	X OS Grid Reference	Y OS Grid Reference	Site Height (m)	Pollutants Monitored	In AQMA?	Is Monitoring Co-located with a Continuous Analyser (Y/N)	Relevant Exposure? (Y/N with distance (m) from monitoring site to relevant exposure)	Distance to Kerb of Nearest Road (m) (N/A if not applicable)	Does this Location Represent Worst-Case Exposure?
Active sites										
BIL1	Roadside ISA	395057	296541	3m	NO_2	Y	N	Y(0m)	4m	Y
BIL2	Roadside ISA	395085	296475	3m	NO_2	Y	N	Y(0.5M)	4.5m	Y
BIL3	Roadside ISA	395102	296495	3m	NO_2	Y	N	N	10m	Y
BIL4	Roadside ISA	395117	296454	3m	NO_2	Y	N	Y(0m)	2.5m	Y
LIC1	Roadside ISA	391698	298776	3m	NO_2	Y	N	N	3.5m	Y
LIC2	Roadside ISA	391508	298744	3m	NO_2	Y	N	Y(0m)	3m	Y
LIC3	Roadside ISA	391620	298772	3m	NO_2	Y	N	N	6m	Y
LIC4	Roadside ISA	391643	298786	3m	NO_2	Y	Y	Y(1.5m)	1.5m	Y
LIC5	Roadside ISA	391643	298786	3m	NO_2	Y	Y	Y(1.5m)	1.5m	Y
LIC6	Roadside ISA	391643	298786	3m	NO_2	Y	Y	Y(1.5m)	1.5m	Y
LIC7	Roadside ISA	391019	296671	3m	NO_2	Y	N	N	5m	Y
LIC8	Roadside ISA	391454	298733	3m	NO_2	Y	N	N	3m	Y
LIC9	Roadside ISA	390375	296775	3m	NO_2	Y	N	Y(0m)	3m	Y
PIP1	Roadside ISA	391768	298662	3m	NO_2	Y	N	N	2m	Y
PIP2	Roadside ISA	391794	298560	3m	NO_2	Y	N	N	4m	Y
PRI1	Roadside ISA	391548	298940	3m	NO_2	Y	N	N	3m	Y
PRI2	Roadside ISA	391566	298795	3m	NO_2	Y	N	Y(0m)	3m	Y
PRI3	Roadside ISA	391607	298745	3m	NO_2	Y	N	Y(0m)	4.5M	Y
PRI4	Roadside ISA	391581	298686	3m	NO_2	Y	N	N	5m	Y

Site ID	Site Type	X OS Grid Reference	Y OS Grid Reference	Site Height (m)	Pollutants Monitored	In AQMA?	Is Monitoring Co-located with a Continuous Analyser (Y/N)	Relevant Exposure? (Y/N with distance (m) from monitoring site to relevant exposure)	Distance to Kerb of Nearest Road (m) (N/A if not applicable)	Does this Location Represent Worst-Case Exposure?
PRI5	Roadside ISA	391588	298612	3m	NO_2	Y	N	N	2.5m	Y
QUE1	Roadside ISA	391607	298652	3m	NO_2	Y	N	Y(0m)	2.5m	Y
QUE2	Roadside ISA	391622	298639	3m	NO_2	Y	N	N	4.5m	Y
QUE3	Roadside ISA	391662	298665	3m	NO_2	Y	N	Y(0m)	2.5m	Y
QUE4	Roadside ISA	391707	298660	3m	NO_2	Y	N	N	4.5m	Y
STA1	Roadside ISA	391377	299818	3m	NO_2	Y	N	Y(2m)	2m	Y
STA5	Roadside ISA	391261	302199	3m	NO_2	Y	Y	Y(6.5m)	8.5m	Y
STA6	Roadside ISA	391261	302199	3m	NO_2	Y	Y	Y(6.5m)	8.5m	Y
STA7	Roadside ISA	391261	302199	3m	NO_2	Y	Y	Y(6.5m)	8.5m	Y
STA9	Roadside ISA	391527	303350	3m	NO_2	Y	N	Y(8m)	3.5m	Y
STA9A	Roadside ISA	391536	303348	3m	NO_2	Y	N	Y(0m)	7m	Y
WIL1	Roadside ISA	394266	298438	3m	NO_2	Y	N	Y(14.5m)	14.5m	Y
WIL2	Roadside ISA	394712	298428	3m	NO_2	Y	N	Y(0m)	6.5m	Y
WIL3	Roadside ISA	394754	298429	3m	NO_2	Y	N	Y(1m)	10m	Y
WIL4	Roadside ISA	394754	298429	3m	NO_2	Y	N	Y(1m)	10m	Y
WIL5	Roadside ISA	394754	298429	3m	NO_2	Y	N	Y(1m)	10m	Y
BRI	Roadside	388182	298782	3m	NO_2	Y	N	Y(0m)	11m	Y
BRO	Roadside	391676	298865	3m	NO_2	Y	N	Y(5m)	5.5m	Y
CAN	Roadside	393008	300867	3m	NO_2	Y	N	Y(7.5m)	6.5m	Y
CLE	Roadside	391485	298348	3m	NO_2	Y	N	N	5m	Y

Site ID	Site Type	X OS Grid Reference	Y OS Grid Reference	Site Height (m)	Pollutants Monitored	In AQMA?	Is Monitoring Co-located with a Continuous Analyser (Y/N)	Relevant Exposure? (Y/N with distance (m) from monitoring site to relevant exposure)	Distance to Kerb of Nearest Road (m) (N/A if not applicable)	Does this Location Represent Worst-Case Exposure?
CUL	Roadside	393371	297403	3m	NO_2	Y	N	Y(0m)	2.5m	Y
DUD	Roadside	391541	297267	3m	NO_2	Y	N	Y(1m)	3.5m	Y
HOR	Roadside	392115	298608	3m	NO_2	Y	N	Y(0.5)m	2.7m	Y
NEA	Roadside	394717	299894	3m	NO_2	Y	N	Y(4.5m)	2m	Y
OXF	Roadside	395384	296293	3m	NO_2	Y	N	Y(0m)	3.2m	Y
PAR	Roadside	392306	296547	3m	NO_2	Y	N	Y(10.3m)	2.7m	Y
TET	Roadside	389297	299886	3m	NO_2	Y	N	Y(3.2m)	3.2m	Y
TRI	Roadside	395540	296479	3m	NO_2	Y	N	Y(-1m)	11m	Y
WAT	Roadside	391134	298877	3m	NO_2	Y	N	N	3m	Y
WOL	Roadside	394031	297172	3m	NO_2	Y	N	Y(4m)	2m	Y
PRO	Intermediate	394633	296089	3m	NO_2	Y	N	N	28m	N
SPS	Intermediate	391357	298937	3m	NO_2	Y	N	N	30m	N
COL	Background	395855	300586	3m	NO_2	Y	N	N	48m	N
COLQ	Background	395855	300586	3m	NO_2	Y	N	N	48m	N
MAR	Background	390705	302736	3m	NO_2	Y	N	N	165m	N
WAR	Background	389132	296755	3m	NO_2	Y	N	N	50m	N
WRE	Background	392090	296095	3m	NO_2	Y	N	N	50m	N

2.2 Comparison of Monitoring Results with Air Quality Objectives

2.2.1 Nitrogen Dioxide (NO_2)

Automatic Monitoring Data

The annual mean concentrations from the automatic monitoring stations are presented in Table 2.3, exceedences of the objectives are highlighted in red.

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

Site ID	Location	Within AQMA?	Data Capture 2012 %	Annual mean concentrations (distance corrected) $\mu g/m^3$		
				2010	2011	2012
A1	Lichfield Street	Y	99	40	36	**46**
A2	Penn Rd	Y	51	**46**	38	**43**[1]
A4	Stafford Rd	Y	97	38	34	31
A5	Willenhall Rd	Y	99	**46**	38	**44**
A8	St Peter's Sq	Y	85	No result	No result	32

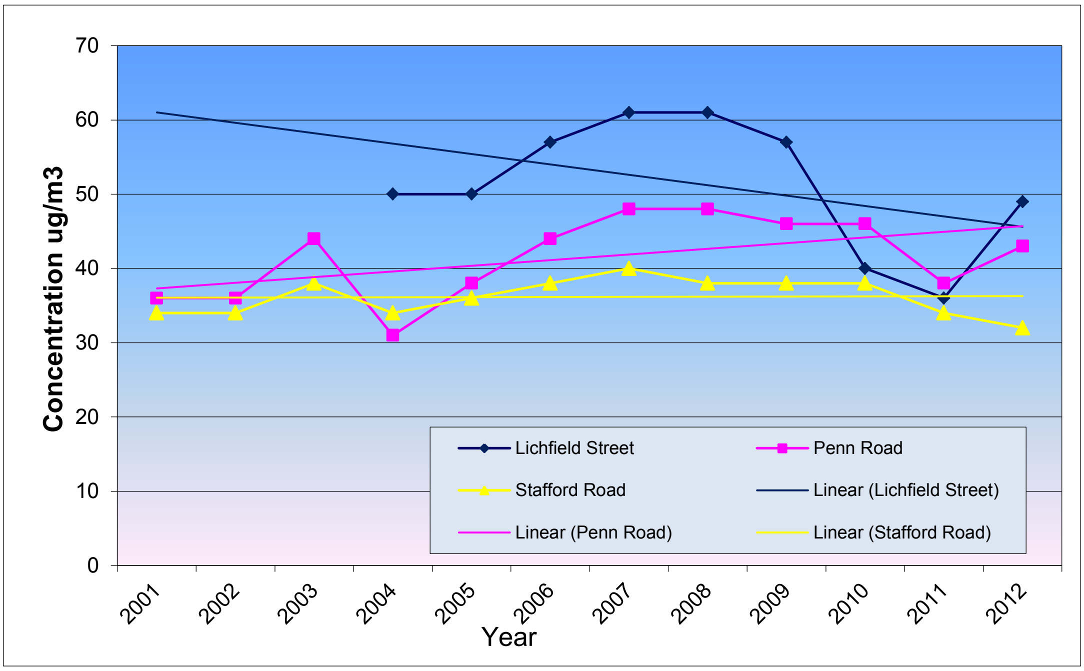
[1] Annualised data (Appendix A)

The yearly mean NO_2 concentrations from the longest running automatic monitoring stations are presented in Figure 2.2.

The long term trend at Penn Road indicates an overall increase in NO_2 concentrations over the last 11 years. Peak concentrations occurred in 2007/8 and since then there has been a reduction in NO_2, although the 2012 mean remains above the 2001 level.

The trend graph for Stafford Road shows that NO_2 levels have remained fairly stable over the last 11 years. There was a small increase in NO_2 concentrations between 2001 and 2007 followed by a gradual decrease, current levels are now 2 $\mu g/m^3$ below the 2001 concentration.

Figure 2.2 Trends in Annual Mean NO_2 Concentrations Measured at Automatic monitoring Sites



Lichfield Street is within the city centre and prior to 2010 was one of the main access routes into the bus station. The levels of NO_2 in Lichfield Street before 2010 were considerably higher than at other roadside locations due to the number of buses travelling along the road.

In 2010 Lichfield Street was closed to traffic during the bus station redevelopment project which resulted in a large decrease in the levels of NO_2. The project was completed in the summer of 2011 and the number of buses now using Lichfield Street has been reduced significantly. The levels of NO_2 remained below the objective in 2011 and then increased in 2012, a trend which occurred at other road side sites across the city. This increase was higher in Lichfield Street than at other roadside sites in the city and is due in part to artificially low levels of NO_2 in 2010 and 2011 caused by the closure of the road for part of that period, and favourable weather conditions during 2011 which helped disperse emissions. It is anticipated that NO_2 concentrations will stabilise at a level below the pre 2010 level.

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

Site ID	Location	Within AQMA?	Data Capture 2012 %	Number of Exceedences of hourly mean (200 μg/m^3)		
				2010	2011	2012
A1	Lichfield Street	Y	99	0	1	1
A2	Penn Rd/Goldthorne Hill	Y	51	0	0	1
A4	Stafford Rd/Church Rd	Y	97	0	0	0
A5	Willenhall Rd/Neachells La	Y	99	4	0	5
A8	St Peter's Sq	Y	85	No result	No result	0

A comparison against the 1-hour mean objective (Table 2.4) shows that exceedences of the hourly mean object were below the allowed 18 exceedences per year at all monitoring sites. The number of hourly means above 200 μg/m3 at the Willenhall Rd site increased to 5 during 2012. A pollution episode which occurred between the 13th and 14th January 2012 accounted for 4 of these exceedences. The dispersion of pollutants was hampered during this period by low temperatures, high pressure and low wind speeds (less than 5mph). This event was picked up at the other automatic monitoring stations although NO_2 concentrations only exceeded the hourly objective at the Willenhall Road site.

Diffusion Tube Monitoring Data

Diffusion tube results for 2010, 2011 and 2012 are shown in Table 2.5. The annual average for each site is presented as the bias corrected measured value, corrected for distance to the nearest relevant receptor in accordance with the procedure detailed in Box 2.3 of technical Guidance LAQM.TG(09). Exceedences of the annual mean objective value are highlighted in red.

The bias correction is obtained from the co-location of triplicate tubes alongside the Stafford Road and Lichfield Street automatic monitoring stations (see Appendix A).

Table 2.5 Results of Nitrogen Dioxide Diffusion Tubes

Site ID	Location	Within AQMA	% Data capture 2012	Annual mean concentration µg/m³ (adjusted for bias and distance)		
				2010 (Bias 0.97)	2011 (Bias 0.89)	2012 (Bias 1.05)
BIL1	Lichfield St, Bilston	Y	100	**45**	37	**42**
BIL2	Lichfield St, Bilston	Y	100	37	32	34
BIL3	Lichfield St, Bilston	Y	75	36	33	**47**[2]
BIL4	Lichfield St, Bilston	Y	100	38	33	37
LIC1	Lichfield St	Y	100	38	33	**42**
LIC2	Lichfield St	Y	100	**46**	**45**	**46**
LIC3	Lichfield St	Y	100	**41**	36	**47**
LIC4[1]	Lichfield St	Y	97	40	32	40
LIC7	Lichfield St	Y	100	39	33	40
LIC8	Lichfield St	Y	100	37	31	36
LIC9	Lichfield St	Y	100	**41**	34	**47**
PIP1	Pipers Row	Y	83	**42**	37	**46**
PIP2	Pipers Row	Y	100	**43**	35	38
PRI1	Stafford St	Y	92	**42**	39	39
PRI2	Princess Sq	Y	100	**44**	38	**41**
PRI3	Princess St	Y	100	39	32	32
PRI4	Princess St	Y	100	**49**	**48**	40
PRI5	Princess St	Y	100	**42**	35	35
QUE1	Queen St	Y	100	**43**	36	32
QUE2	Queen St	Y	75	**46**	**41**	39[2]
QUE3	Queen St	Y	100	**55**	**46**	36
QUE4	Queen St	Y	100	**44**	41	37
STA1	Stafford Rd	Y	100	33	28	30
STA3	Stafford Rd	Y	NA	33	Closed	Closed
STA4	Stafford Rd	Y	NA	29	Closed	Closed
STA5[1]	Stafford Rd	Y	97	37	34	38
STA8	Stafford Rd	Y	NA	29	Closed	Closed
STA9	Stafford Rd	Y	75	No result	**47**	**45**[2]
STA9A	Stafford Rd	Y	100	38	31	35
TEM1	Temple St	Y	NA	34	Closed	Closed
TEM2	Temple St	Y	NA	30	Closed	Closed
TEM3	Temple St	Y	NA	32	Closed	Closed
WIL1	Willenhall Rd	Y	92	26	23	27
WIL2	Willenhall Rd	Y	100	**42**	36	39
WIL3[1,]	Willenhall Rd	Y	100	37	30	34
PAR	Birmingham Rd	Y	92		31	36
BRI	Bridgnorth Rd	Y	100	27	21	22
BRO	Broad St	Y	100	**47**	**44**	**45**
CAN	Cannock Rd	Y	100	31	28	30
CLE	Cleveland St	Y	75	36	31	32[2]
CUL	Culwick St	Y	100	29	23	26
DUD	Dudley Rd	Y	92	30	26	27
HOR	Horseley Fields	Y	100		36[2]	36
NEA	Neachells Lane	Y	100	26	22	24
OXF	Oxford Street	Y	100		25	31
TET	Tettenhall Road	Y	100	**41**	38	39
WAT	Waterloo Rd	Y	92	37	30	35
WOL	5 Wolsley Rd	Y	100	26	19	20
PRO	Prosser St	Y	92	27	25	27
SPS	St Peter's Sq	Y	100	28	23	26
TRI	Trinity St	Y	100	30	24	25
COL	Coleman Ave	Y	100	20	16	18
MAR	Marsh Lane	Y	75	17	13	18[2]
WAR	Warstones Rd	Y	100	17	14	15
WRE	W'ton Rd East	Y	100	20	15	17

[1] Mean of triplicate tubes [2] Annualised data (Appendix A)

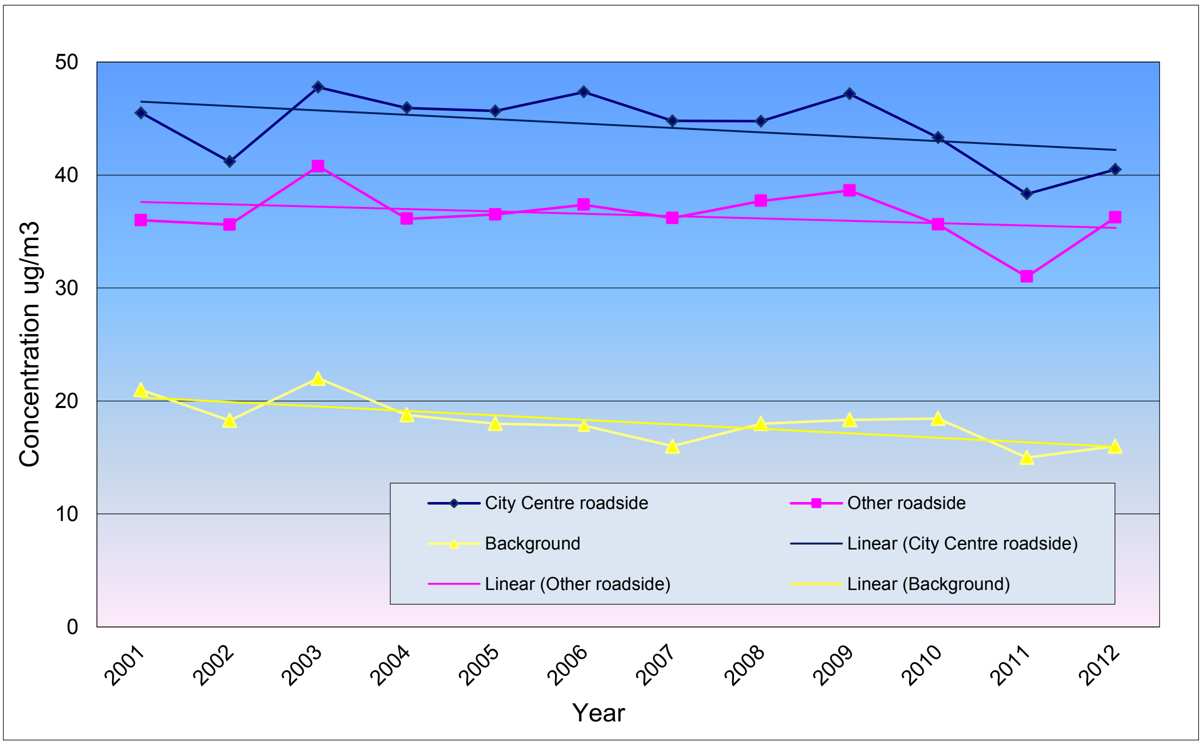
Table 2.6 provides a summary of the results from the intensive survey areas, the remaining roadside tubes and the background tubes for 2010, 2011 and 2012. The results are presented as the annual mean concentration calculated from individual tubes located along each particular road and site type corrected for bias and distance.

The data collected from the automatic monitoring stations and the diffusion tube sites has identified that annual mean NO_2 concentrations in 2012 increased at the majority of locations compared to the 2011 results. This increase was caused by the particular weather conditions during the year which hampered dispersion of pollutants rather than any increase in emissions.

Table 2.6 Results of Nitrogen Dioxide Diffusion Tubes: ISA, Roadside, Intermediate and Background Sites

Location	Within AQMA	Annual mean concentration µg/m^3 (adjusted for bias and distance)		
		2010 (Bias 0.97)	2011 (Bias 0.89)	2012 (Bias 1.05)
Lichfield St, Bilston	Y	39	34	39
Lichfield St, East of Princess Sq	Y	40	34	**43**
Lichfield St, West of Princess Sq	Y	**41**	37	**41**
Princess St/Stafford St	Y	**43**	38	37
Queen St	Y	**47**	**41**	35
Stafford Rd	Y	33	31	36
Willenhall Rd	Y	35	30	34
Pipers Row	Y	**42**	36	**41**
Temple St	Y	32	Discontinued	
Roadside sites	Y	33	29	31
Intermediate sites	Y	28	24	26
Background sites	Y	19	15	16

Figure 2.3 Trends in Annual Mean NO_2 Concentrations at Diffusion Sites



The trend data (Fig 2.3) shows that, despite an increase in 2012, there has been an overall reduction in NO_2 at the diffusion tube sites over the past 11 years.

2.2.2 Particulate Matter (PM_{10})

A summary of the most recent TEOM data from the automatic monitoring stations is presented in Tables 2.7 and 2.8 . The data has been corrected using the King's College volatile correction model (VCM) in accordance with technical guidance document LAQM.TG(09).

Table 2.7 Results of Automatic Monitoring for PM_{10}: Comparison with Annual Mean Objective

Site ID	Location	Within AQMA?	Data Capture 2012 %	Annual mean concentrations (µg/m^3)		
				2010	2011	2012
A1	Lichfield Street	Y	98	21	23	20
A2	Penn Road	Y	52	23	25	22*
A3	St Peter's Car Park	Y	92			19
A4	Stafford Road	Y	98	22	23	21
A5	Willenhall Road	Y	83	21	23	21

* Annualised data (Appendix A)

Table 2.8 Results of Automatic Monitoring for PM_{10}: Comparison with 24-hour Mean Objective

Site ID	Location	Within AQMA?	Data Capture 2010 %	Number of Exceedences of hourly mean (50 $\mu g/m^3$) *If data capture < 90%, include the 90th %ile of hourly means in brackets.*		
				2010	2011	2012
A1	Lichfield Street	Y	98	2	16	7
A2	Penn Road	Y	52	0	15	8*
A3	Pendeford High School	Y	92	0	7	9
A4	Stafford Road	Y	98	0	11	11
A5	Willenhall Road	Y	83	0	14	6

* Annualised data (Appendix A)

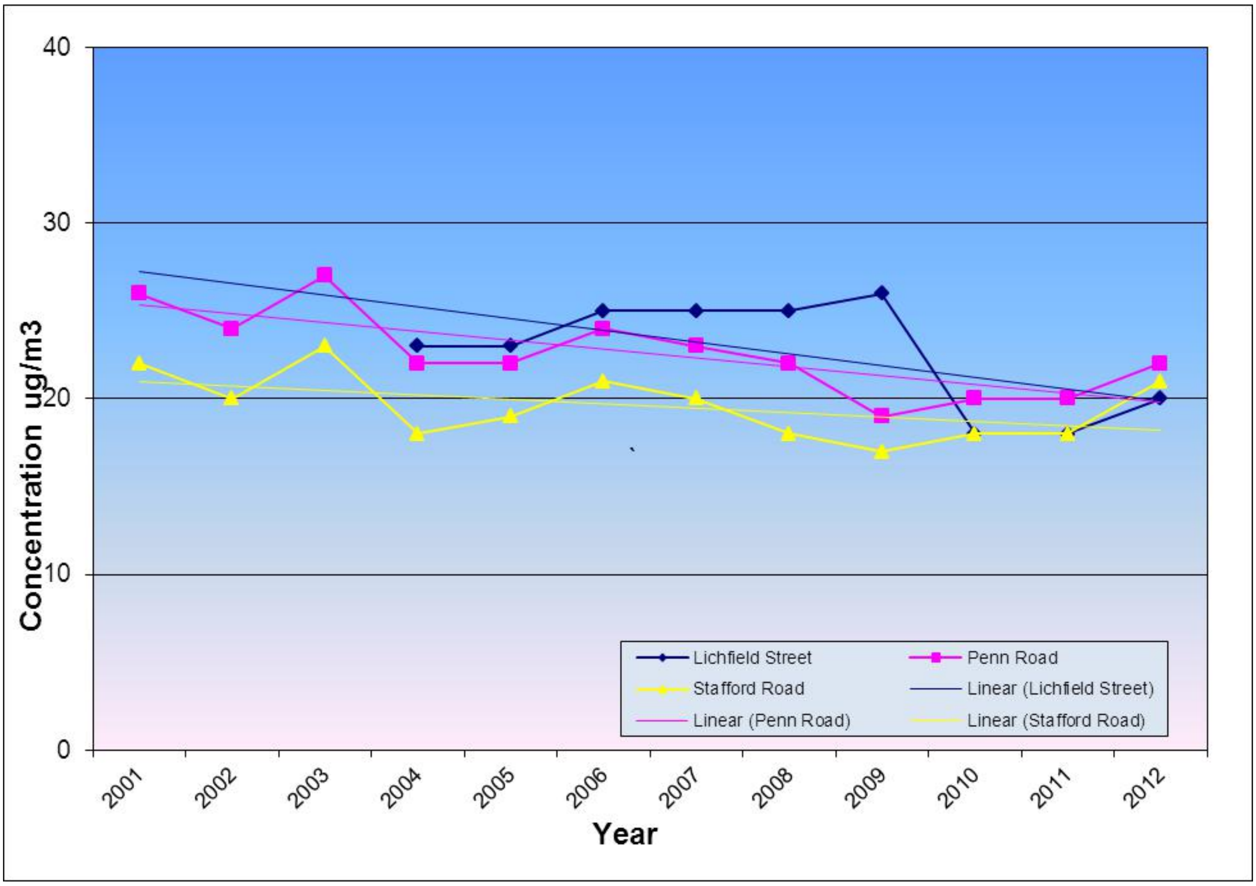
There were no exceedences of the PM_{10} annual mean objective (40µ/m^3) during 2010, 2011 or 2012 (Table 2.7). The number of exceedences of the 24-hr mean objective is below the allowed maximum of 35 per year (Table 2.8).

Long Term Trends

In order to compare the data with objectives, TEOM data has been corrected in accordance with the technical guidance. Prior to 2008 the correction factor was 1.3, which was replaced by the volatile correction model in 2008. The change to the VCM has resulted in a step change in the data therefore, for the purpose of showing long term trends, uncorrected data has been used.

Trend data for the 3 longest running sites is presented in Figure 2.4. In line with the trend in NO_2 concentrations, the overall trend for PM_{10} is downwards despite an increase during 2012. The large reduction in PM_{10} levels at Lichfield Street in 2010 was due to the implementation of the interchange project as discussed in section 2.2.1.

Figure 2.4 Trends in uncorrected annual Mean PM_{10} Concentrations



2.2.3 Sulphur dioxide

A summary of the most recent SO2 monitoring is presented in Table 2.9.

Table 2.9 Results of SO_2 Automatic Monitoring: Comparison with Objectives

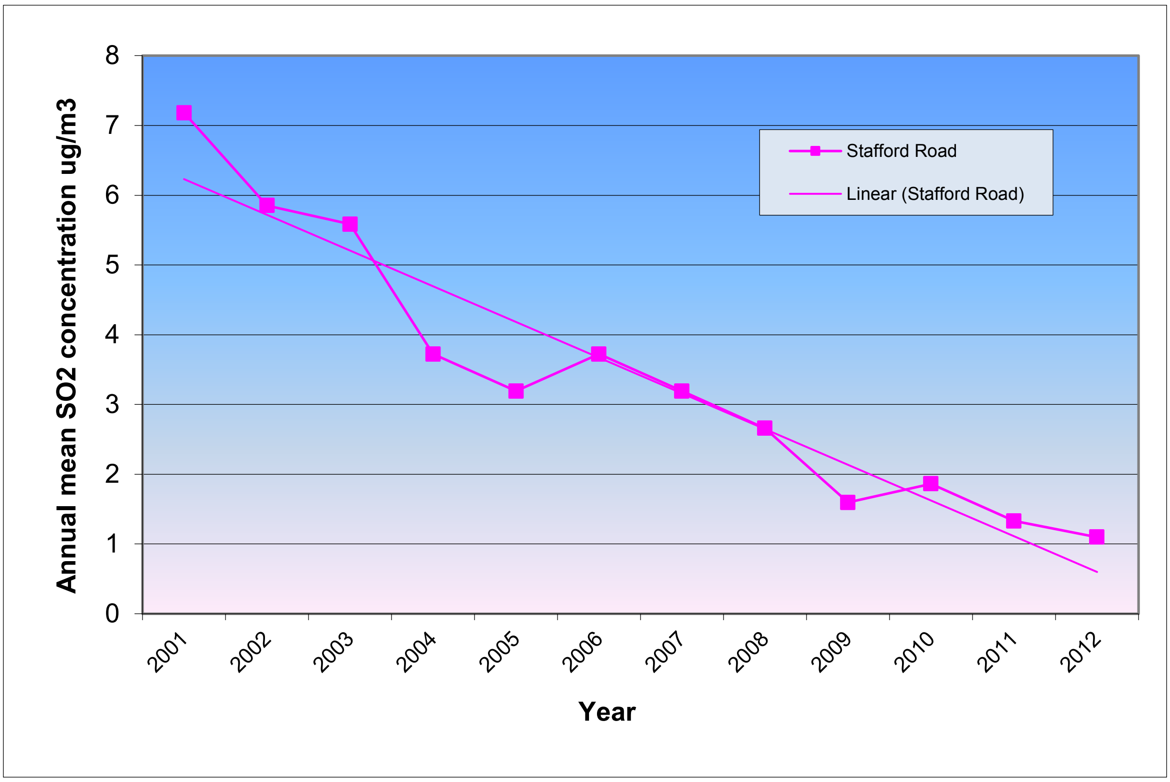
Site ID	Location	Within AQMA?	Data Capture 2012 %	Number of Exceedences of: (μg/m³)		
				15-minute Objective (266 μg/m³)	1-hour Objective (350 μg/m³)	24-hour Objective (125 μg/m³)
A4	Stafford Road	Y		0	0	0
A5	Willenhall Road	Y		0	0	0

As can be seen there were no exceedences of the 15 minute, 1 hour or 24 hour objectives during 2012.

Long term trends

The levels of sulphur dioxide have dropped significantly over the last 10 years. Although the rate of decline has slowed over recent years, the annual mean concentrations of SO_2 are continuing to fall.

Figure 2.5 Trends in annual Mean SO_2 Concentrations



2.2.3 Benzene

There are no significant sources of benzene in the city therefore the Council does not consider it necessary to monitor for this pollutant.

2.2.4 Summary of Compliance with AQS Objectives

Wolverhampton City Council has examined the results from the air monitoring sites in the city. The concentration of nitrogen dioxide is exceeding the annual mean objective at the following relevant locations within the declared AQMA:

- **Lichfield St, East of Princess Sq**
- **Lichfield St, West of Princess Sq**
- **Broad Street**
- **Princess Sq**
- **Penn Road/Goldthorne Hill/Coalway Road Junction**
- **Willenhall Road/Neachells Lane/Moseley Road junction**

As the whole of the city has been declared an AQMA based on previous exceedences, it is not necessary to proceed to a detailed assessment at these locations.

3 New Local Developments

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

Wolverhampton City council confirms that all the following have been considered:

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

4 Regional Air Quality Strategy

Wolverhampton Council is working closely with the 6 other West Midland local authorities to develop a regional Low Emission Strategy (LES) as part of the Defra supported West Midlands Low Emission Towns & Cities Programme (LETCP).

The LETCP seeks to promote joint working to reduce regulated road transport emissions, primarily oxides of nitrogen (NOx) and particulate matter, as well as securing reductions in greenhouse gases and noise emissions where practicable. Building on policies and measures to discourage vehicle use and encourage a shift to sustainable transport modes, the LETCP aims to achieve improvements in emissions from the vehicle fleet through the accelerated take-up of cleaner fuels and technologies and by discouraging the use of high emission vehicles.

The LES comprises of an overarching strategy document, supplementary guidance on procurement and planning, and includes a Low Emission Zone Feasibility Study, a Low Emission Vehicle and Infrastructure Plan and health awareness campaign.

The LETCP will develop a delivery programme for the policies and measures identified in the LES, including setting targets and criteria for evaluating their effectiveness. Subject to consultation, final guidance will be published by the LETCP in 2013/14 as part of the West Midlands Low Emissions Strategy.

5 Planning Applications

Table 3.1 presents the planning applications which have been received by the council since the previous assessment and were accompanied by an air quality assessment, or where one has been requested.

Table 3.1 Planning applications requiring or including an air quality assessment

Site	Application number	Proposal	Air Quality assessment
Bus layover report	09/00484/FUL	Redevelopment of Wolverhampton Bus Station Air Quality Assessment July 2012	Air quality assessment submitted as part of the planning application. The assessment concluded that the development would have no significant adverse effect on air quality
New Street Portobello	12/01241/FUL	Redevelopment of Derelict land as Nursing Home	Air quality assessment submitted as part of the planning application. The assessment concluded that the development would have no significant adverse effect on air quality
Vine Island	NA	Vine Island Air Quality Impact Assessment 47058635/AQIA/VI December 2012	Air quality assessment on the remodelling of the Vine Island road traffic junction. The assessment concluded that the remodelling work would have no significant adverse effect on air quality.

6 Air Quality Planning Policies

6.1 The Black Country Joint Core Strategy

The Black Country Core Strategy, which was adopted in February 2011, has been developed in conjunction with Dudley, Sandwell, and Walsall Councils'. It is a spatial planning document that sets out the vision, objectives and detailed spatial strategy for future development in The Black Country up to 2026. The document does not just consider land use, but also a comprehensive range of environmental, economic and social issues.

The Core Strategy allocates areas for housing where there are good public transport links, and retains employment land where there is good access to motorway networks. This will minimise traffic and congestion and so reduce air quality problems caused by traffic.

Policy ENV8 – Air Quality was developed jointly by air quality and planning officers in the context of the National Air Quality Strategy and the designated air quality management areas covering the Black Country. The Policy requires sensitive development to be located where air quality meets national air quality objectives and clarifies when an air quality impact assessment and mitigation measures will be required.

7 Local Transport Plans and Strategies

7.1 West Midlands Local Transport Plan 3

The West Midlands Local Transport Plan 2011 - 2026 (LTP3) is a statutory document which looks at the transport needs of the Metropolitan Area and sets out a way forward to deliver those needs through short, medium and long term transport solutions.

The LTP3 identifies how our transport network can play its part in the transformation of the West Midlands economy. It demonstrates how this will bring real benefits to people through its contribution to economic revival, creation of jobs, improved accessibility, improved local and national connections by road and rail and better quality of life.

A key objective of the LTP3 vision is air quality and climate change. The LTP3 target for air quality is reproduced below:

“2015/16 Performance Aim
A net reduction of Nitrogen Dioxide (NO_2) in those areas, as confirmed by each local authority within the West Midlands, where the annual average NO_2 values are predicted to exceed 40µg/m^3 between 2008 (baseline) and 2015”.

7.2 The Black Country Joint Core Strategy

The Joint Core Strategy recognises the key role which the transport network plays in maintaining the economic wellbeing of the region. The strategy contains specific policies for providing an efficient and reliable transport network and links in with the LTP3.

7.3 Wolverhampton Cycling Strategy

The Council adopted the current Cycling Strategy in 1995 and has made good progress in implementing its proposals. The Government published 'The National Cycling Strategy' in 1996 and the Cycling Strategy for the West Midlands is set out in the Local Transport Plan. This provides a framework to identify specific problems encountered by cyclists and provides some of the solutions to address these.

In support of this the Black County Core Strategy contains specific targets for creating coherent networks for cycling and for walking. The joint working between the four local authorities will ensure that the Black Country has a comprehensive cycle network based on integrating the four local cycle networks, including common cycle infrastructure design standards.

7.4 Wolverhampton Walking Strategy

The walking strategy aims to encourage walking by recognising its role as a mode of transport and acknowledging that walking forms part of the solution to tackling traffic congestion.

The Strategy provides a framework for the Council to identify specific problems encountered by pedestrians and factors that deter walking in Wolverhampton and seeks to provide some of the solutions to address these. Many of the solutions are ones of information and maintenance and do not require very technical or major infrastructure solutions.

7.5 Network West Midlands

Network West Midlands connects all public transport in the West Midlands metropolitan area. This includes Birmingham, Dudley, Sandwell, Coventry, Walsall, Solihull and Wolverhampton.

It clearly identifies the complete network of bus, rail and Metro services that are easily accessible to most people in the West Midlands region.

7.6 Traveline

Traveline is a partnership of transport operators and local authorities formed to provide impartial and comprehensive information on public transport. It operates across England, Scotland and Wales.

In the West Midlands area the Traveline service is operated by West Midlands Transport Information Services Ltd (WMTIS). WMTIS is a not for profit organisation jointly funded by Centro who are the West Midlands Passenger Transport Executive and the West Midlands Integrated Transport Authority for the region, the local bus operators, County Councils and Unitary Authorities in the region.

WMTIS provides details of all registered bus services within the West Midlands regions an area that includes Herefordshire, Shropshire, Staffordshire, Stoke-on-Trent, Telford and Wrekin, The West Midlands Conurbation, Warwickshire and Worcestershire. They also hold some information on public transport links in other areas of the country.

7.7 Wolverhampton TravelWise

Act TravelWise is a national campaign to promote and encourage sustainable and healthy travel choices, rather than relying on the car for all journeys. Act TravelWise helps people to consider what options other than the car might be available to them, particularly for shorter journeys.

The West Midlands TravelWise Group and Wolverhampton TravelWise work closely with Local Authorities in the Region, Centro and Public Transport Operators to improve conditions for people who walk, cycle and use public transport. Centro and Travel West Midlands are key partners in Company TravelWise and offer discounts to the employees of those organisations that sign up to the scheme.

7.8 Help2Travel

The Help2Travel website provides travel information to the public and has been developed as part of a European project for intelligent transport information systems. It provides users with a comprehensive overview of traffic & travel in the West Midlands region. It includes information about roadwork's and incidents on the region's roads, real-time train and bus information, as well as information & links to car parking, cycling and air quality information.

The system also enables up to the minute travel information to be exchanged easily between transport authorities, allowing them to respond more quickly and efficiently to travel problems.

8 Climate Change Strategies

8.1 Climate Local, Wolverhampton

Climate Local is an initiative run by the Local Government Association to support councils in reducing carbon emissions and improving resilience to the effects of climate.

In April, 2013 the leaders of the council's three political parties signed the Climate Local Wolverhampton commitment on behalf of the city council which commits the council to work to address both the causes and impacts of a changing climate.

8.2 Sustainability Strategy and Implementation Plan

The Sustainability Strategy and Implementation Plan will focus initially on the city council’s own activities and is accompanied by an Implementation Plan that will deliver major changes. It supersedes the following documents which have been withdrawn as council policy:

- Sustainability Charter
- Wolverhampton Declaration on Climate Change
- Carbon Management Strategy and Implementation Plan
- Wolverhampton Environment Strategy
- Climate Change Strategy and Action Plan for Wolverhampton

Other strategies and action plans will remain and be reviewed and replaced as appropriate as part of the Implementation Plan.

8.3 The Black Country Joint Core Strategy

The Core Strategy identifies the main ways in which activity in The Black Country contributes towards climate change, together with ways of reducing and adapting to climate change.

8.4 The West Midlands Regional Spatial Strategy (RSS, 2004)

This strategy provides a regional strategic context for local planning decisions, and has a responsibility to help meet national targets for the reduction of greenhouse gases. The Regional Planning Body is expected to consider how the region's activities contribute towards climate change and how the region might be vulnerable to the impacts of climate change, by working with partners to develop a realistic and responsible approach to climate change in the region. This will require establishing comprehensive and up to date data in order to enable the local authorities and agencies to develop coordinated and effective solutions. Guiding principles were used in developing the Spatial Strategy to ensure that policies to assist the reduction of greenhouse gas emissions are an integral part of the West Midlands Regional Spatial Strategy.

8.5 The Wolverhampton City Strategy 2011-2026

The City Strategy includes, in its implementation plan, action RIC C1.6, the development of an integrated approach to the delivery of sustainability priorities across the city. This refers to the development of a Sustainability Strategy and Implementation Plan as mentioned above.

9 Implementation of Action Plans

The council has completed phase 1 of the interchange project. This has provided improved linkages into the bus station from the city's ring road and has significantly reduced the amount of bus traffic within the town centre. Air quality within the town centre has subsequently improved and the number of locations exceeding the objectives within the town centre area has dropped from 18 in 2009 prior to the start of the interchange project to 7 in 2012.

The council is working closely with the regional West Midlands group authorities to develop a low emissions strategy for the West Midlands as discussed in chapter 4 of this document. The low emissions strategy is intended to form the basis of future revisions to the action plan.

10 Conclusions and Proposed Actions

10.1 Conclusions from New Monitoring Data

The Council has carried out a comprehensive review of all monitoring data gathered during 2012. Areas where the air quality objectives are not being met have been identified together with any significant trends.

10.1.1 Nitrogen dioxide data

Data collected since the previous Updating and Screening Assessment has shown that the number of locations exceeding the air quality objective for nitrogen dioxide has reduced significantly: In 2012 the following relevant locations were exceeding the objective:

Road side ISA's:

- Lichfield St, East of Princess Sq
- Lichfield St, West of Princess Sq
- BRO Broad Street
- PRI2 Princess Sq
- Penn Road/Goldthorne Hill/Coalway Road Junction
- Willenhall Road/Neachells Lane/Moseley Road junction

10.1.2 PM_{10} data

A review of the collected data has shown that there has been no exceedences of the PM_{10} air quality objectives. A detailed examination of trend data has shown that there has been a significant reduction in PM_{10} concentrations in real terms over the last 10 years.

The Council has concluded that PM_{10} concentrations are meeting the air quality objectives.

10.2 Conclusions relating to New Local Developments

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

10.3 Proposed Actions

- The review of monitoring data obtained during 2012 has not identified the need to proceed to a detailed assessment for any of the pollutants listed.
- The new monitoring data has not identified the need for any additional monitoring or changes to the existing monitoring programme.
- The new monitoring data has not identified the need for any changes to the existing AQMA.
- The council will review the PM_{10} data for a further 12 months with the intention of considering amending the AQMA in relation to this pollutant.
- Wolverhampton City Council intends to submit the 2014 Progress Report as required by the review and assessment process.

11 References

(1) Local Air Quality Management – Technical Guidance LAQM.TG(09), Department for Environment, Food and Rural Affairs 2009.

(2) Technical Guidance: Screening Assessment for Biomass Boilers, AEA Energy & Environment 2008

(3) 2012 Air Quality Updating and Screening Assessment for Wolverhampton City Council

(4) LAQM Tools; Local Air Quality Management website www.airquality.co.uk

(5) Diffusion Tubes for Ambient NO_2 Monitoring: Practical Guidance for laboratories and Users. Report to Defra and the Devolved Administrations ED48673043 Issue 1a Feb 2008.

Appendix A: QA:QC Data

Diffusion Tube Bias Adjustment Factors

Diffusion tubes are supplied and analysed by Gradko International Ltd. and are prepared using 50% TEA in acetone. The national 2012 bias adjustment factor for the tubes obtained from the review & assessment database version number 09/12, is 1.02.

Factor from Local Co-location Studies

Triplicate tubes are exposed at the automatic monitoring stations in order to calculate a bias correction factor. The correction factor is applied to the yearly average to enable comparison with the annual NO_2 objective. The results from the co-location studies for 2012 are shown in the Table A1.1. The local bias adjustment factor for 2012 is 1.05.

Table A1.1 Chemiluminescent v's Diffusion Tube Values 2012 (µg/m^3)

Site	Mean	Jan	Feb	Mar	April	May	June	July	Aug	Sept	Oct	Nov	Dec	% data
Automatic Monitor Intercomparison: Diffusion Tube Values µg/m^3														
Lichfield St	**39**	45	43	50	39	40	34		29	36	37	44	38	92
Lichfield St	**41**	49	47	47	30	45	35	31	36	38	25	44	60	100
Lichfield St	**40**	48	42	53	33	42	36	35	21	39	38	47	41	100
Mean		47	44	50	34	43	35	33	28	38	33	45	46	
Standard deviation		1.8	2.6	3.1	4.2	2.5	1.1	2.8	7.2	2.0	6.9	1.9	12.1	
Coefficient of variation		3.9	5.8	6.1	12.3	5.8	3.2	8.5	25.3	5.2	20.8	4.3	26.3	
Data quality		Good	Good	Good	Good	Good	Good	Good	Poor	Good	Poor	Good	Poor	
Stafford Road	**38**	49	45	42	25	32	32	31	33	39	42	42	42	100
Stafford Road	**37**	48	42	44	28		31	31	29	35	42	42	37	92
Stafford Road	**38**	49	40	46	24	34	29	29	31	39	48	45	37	100
Mean		48	42	44	26	33	30	31	31	38	44	43	39	
Standard deviation		0.6	2.4	2.1	2.0	1	2	1	2	2	3	2	3	
Coefficient of variation		1.3	5.7	4.7	7.7	4.6	5.3	3.6	6.8	5.9	7.9	3.5	7.5	
Data quality		Good	Good	Good	Good	Good	Good	Good	Good	Good	Good	Good	Good	
COL	**18**	25	22	23	17	13	12	9	11	13	20	24	20	100
COLQ	**17**	25	20	21	14	14	12	11	12	11	16	22	15	100
Mean		25	21	22	16	14	12	10	12	12	18	23	18	
Standard deviation		0	1	2	2	0	0	1	1	1	2	1	4	
Coefficient of variation		1	7	7	13	2	1	15	6	7	14	6	21	
Data quality		Good	Good	Good	Good	Good	Good	Good	Good	Good	Good	Good	Good	
Mean of triplicate tubes														
Lichfield St	**41**	47	44	50	34	43	35	33		38		45		
Stafford Rd	**38**	48	42	44	26	33	35	33	28	38	32	46	49	
Monthly Chemiluminescent Values														
Lichfield St	**49**	53	50	53	52	48	38	40		48		61		
Stafford Rd	**34**	42	42	42	36	31	25	25	25	31	34	36	34	
Ratios of diffusion Tube Values:Chemiluminescent values														
Lichfield St	**1.20**	1.13	1.13	1.07	1.52	1.12	1.10	1.23		1.27		1.35		
Stafford Rd	**0.89**	0.87	0.99	0.96	1.42	0.93	0.71	0.76	0.87	0.80	1.07	0.79	0.70	
Bias	**1.05**													

Discussion of Choice of Factor to Use

A comparison of the relevant bias adjustment factors is shown in Table A1.2. The national factors have been calculated using data from a number of authorities with tubes which will have been prepared and analysed in different batches and at different times.

The local bias adjustment factors are derived from triplicate co-located tubes exposed alongside automatic analysers at Lichfield St and Stafford Rd. These tubes are from the same batch as the measurement tubes and are handled, stored and analysed in the same way.

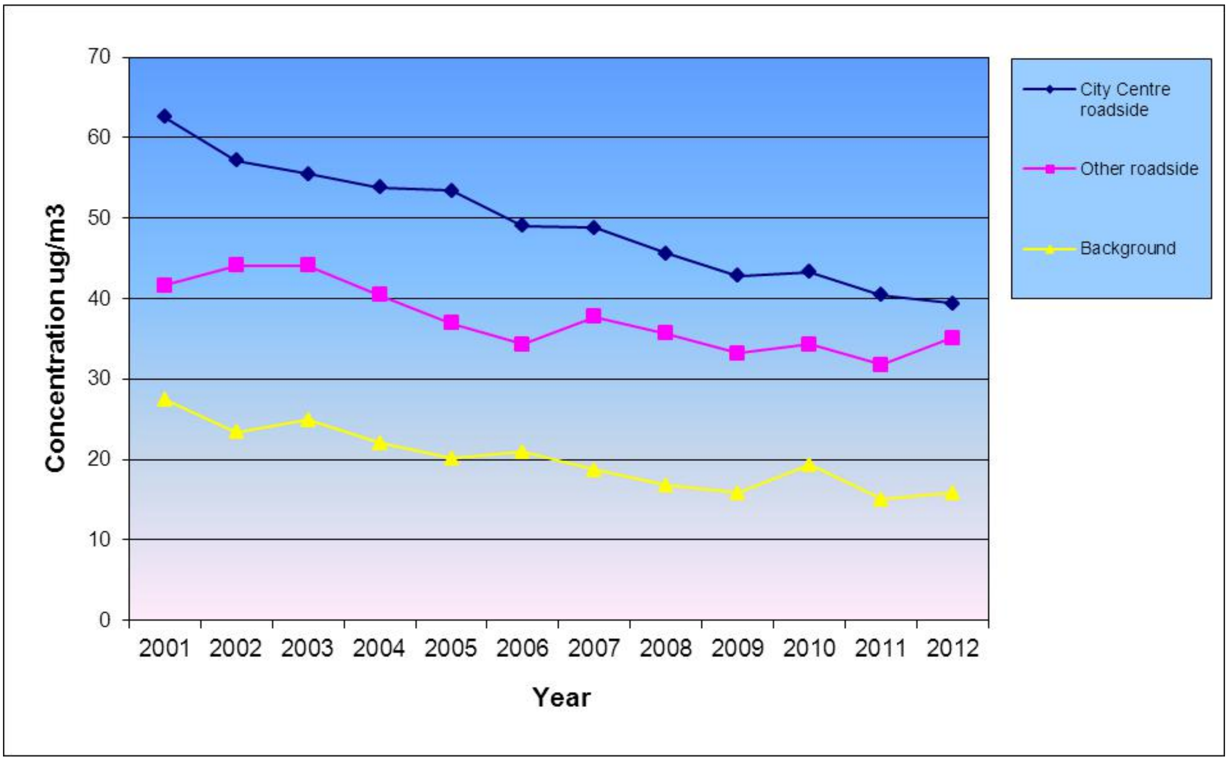
Table A1.2 National and Local Bias Adjustment Factors.

Year	National Bias Adjustment Factor	Local Bias Adjustment Factor
2001	1.45	1.01
2002	1.27	0.95
2003	1.11	0.97
2004	1.10	0.93
2005	1.10	1.00
2006	1.01	1.03
2007	0.99	0.93
2008	0.94	0.97
2009	0.97	1.08
2010	0.99	0.97
2011	0.94	0.89
2012	1.02	1.05
Mean	1.07	0.98
Std	0.15	0.05

The nationally derived bias adjustment factors prior to 2006 suggest that the tubes were significantly under reading, which is not our experience at Wolverhampton. This is particularly evident in 2001 and 2002 when the tubes appeared to under read by 45% and 27% respectively.

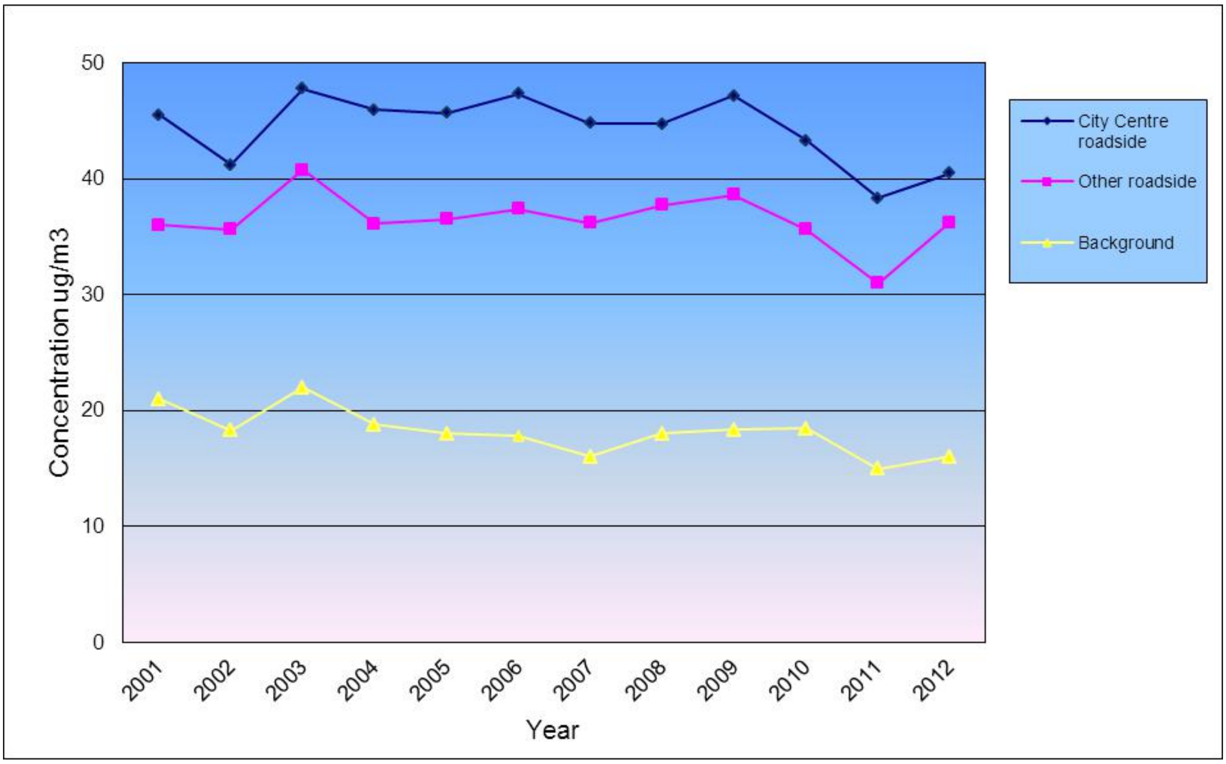
Trend data using both correction factors is presented in Figures A1.1 and A1.2. This shows that the national correction factor artificially raises the NO_2 concentrations at the start of the period, and produces an overall downward trend of between 10 and 20 $\mu g/m^3$ (Figure A1.1).

Figure A1.1 Annual Mean NO_2 Values - National Bias Adjustment Factor.



The diffusion tube NO_2 concentrations corrected with the locally derived adjustment factors (Figure A1.2) show trend data which is more consistent with the data from the automatic analysers. The locally corrected data provides better resolution and a clearer picture of NO_2 fluctuations and trends. Based on this assessment the local correction factors have been used to correct the diffusion tube data.

Figure A1.2 Annual Mean NO_2 Values - Local Bias Adjustment Factor.



PM Monitoring Adjustment

Particle monitoring is carried out using Tapered Element Oscillating Microbalance (TEOM) analysers. Data for 2009 onwards has been corrected using the volatile correction model (VCM) as required by LAQM.TG(09).

Short-term to Long-term Data adjustment

Data capture for the BIL3, CLE, QUE2, STA9 and MAR diffusion tube sites and Penn Road automatic site were below the minimum requirement of 75% data capture. The results have been adjusted to provide an estimated annual mean concentration in accordance with the method outlined in Box 3.2 of the guidance manual, using data from the closest available continuous monitoring background sites. The correction factors for each site are calculated below.

Table A.1.3 Short-Term to Long-Term Monitoring Data Adjustment for diffusion tube site ref BIL3

Site	Site Type	Annual Mean (µg/m^3)	Period Mean (µg/m^3)	Ratio
Birmingham Tyburn Rd	Background urban	32.3	29.8	1.08
Birmingham Acocks Green	Background urban	31.8	28.2	1.13
Average				**1.11**

Table A.1.4 Short-Term to Long-Term Monitoring Data Adjustment for diffusion tube site ref CLE

Site	Site Type	Annual Mean (µg/m^3)	Period Mean (µg/m^3)	Ratio
Birmingham Tyburn Rd	Background urban	32.3	31.9	1.01
Birmingham Acocks Green	Background urban	31.8	29.7	1.07
Average				**1.04**

Table A.1.5 Short-Term to Long-Term Monitoring Data Adjustment for diffusion tube site ref QUE2

Site	Site Type	Annual Mean (µg/m^3)	Period Mean (µg/m^3)	Ratio
Birmingham Tyburn Rd	Urban Background	32.3	30.5	1.06
Birmingham Acocks Green	Background urban	31.8	29.2	1.09
Average				**1.08**

Table A.1.6 Short-Term to Long-Term Monitoring Data Adjustment for diffusion tube site ref STA9

Site	Site Type	Annual Mean (µg/m^3)	Period Mean (µg/m^3)	Ratio
Birmingham Tyburn Rd	Urban Background	32.3	29.8	1.08
Birmingham Acocks Green	Background urban	31.8	31.4	1.01
Average				**1.05**

Table A.1.7 Short-Term to Long-Term Monitoring Data Adjustment for diffusion tube site ref MAR

Site	Site Type	Annual Mean (µg/m^3)	Period Mean (µg/m^3)	Ratio
Birmingham Tyburn Rd	Urban Background	32.3	35.2	0.92
Birmingham Acocks Green	Background urban	31.8	36.1	0.88
Average				**0.90**

Table A.1.8 Short-Term to Long-Term Monitoring Data Adjustment for Penn Road Automatic monitoring site NO2 monitor.

Site	Site Type	Annual Mean (µg/m^3)	Period Mean (µg/m^3)	Ratio
Birmingham Tyburn Rd	Urban Background	32.3	32.2	1.00
Birmingham Acocks Green	Urban Background	31.8	34.3	0.93
Average				**0.97**

Table A.1.9 Short-Term to Long-Term Monitoring Data Adjustment for Penn Road Automatic monitoring site PM_{10} monitor.

Site	Site Type	Annual Mean ($\mu g/m^3$)	Period Mean ($\mu g/m^3$)	Ratio
Birmingham Tyburn Rd	Urban Background	18.6	21.8	0.86
Stoke on Trent Central	Urban Background	19.4	21.4	0.91
Average				**0.88**

QA/QC of automatic monitoring

The chemiluminescent monitors are calibrated on a daily basis using on site calibration gases. This involves feeding a zero air gas, followed by a span gas containing a known concentration of NO_2, through the analyser. A correction factor is then applied based on the analyser's response. The calibration reports are checked on a daily basis to check for drift and the correct application of the correction factor. Data is stored in both the raw and corrected form.

A site visit is made every month to change filters and carry out a manual calibration, which is checked against the automatic daily calibrations. Copies of the calibration reports, calibration gas logs and engineer's reports are retained on file.

All the sites are covered by a service contract provided by Enviro Technology Services plc (ET). The sites are serviced every 6 months by an ET service engineer in accordance with the manufacturer's instructions and warranty conditions. ET also provide a 48-hour call out response to cover breakdowns.

The aim is to achieve 90% data capture and in order to minimise the loss of data the procedures in box A1.4: of LAQM.TG(09) have been adopted.

Raw data is examined on a daily basis to screen out spurious and unusual measurements having regard to the recommendations in Box A1.6 of LAQM.TG(09).

QA/QC of diffusion tube monitoring

Diffusion tubes are supplied and analysed by Gradko International Ltd. in accordance with the procedures set out in the harmonisation document: "Diffusion Tubes for Ambient NO_2 Monitoring: Practical Guidance".

Gradko International Ltd is a UKAS and Workplace Analysis Scheme for Proficiency (WASP) accredited laboratory and is one of a number of laboratories which take part in the UK NO_2 diffusion tube survey.

The WASP scheme involves the use of artificially spiked diffusion tubes to test the analytical performance of the laboratory on a quarterly basis. A summary of the performance in rounds 116 - 120 covering 2012 has been obtained from the Local Authority Air Quality Support web site. During this period 100% of the results submitted were determined to be **satisfactory** based upon a z-score of ± 2. The results indicate that Gradko's analytical procedures do not have any systematic sources of bias.

The results from the nitrogen dioxide diffusion tube collocation studies for Gradko obtained from the LAQM support web site show the laboratory as generally having good precision.

The tubes arrive from Gradko and are stored in a refrigerator prior to being labelled with a site and date code. The tubes are then exposed in accordance with the start and end dates for the national NO_2 survey. Following exposure the tubes are capped and immediately dispatched to Gradko for analysis.

Triplicate tubes are exposed at the chemiluminescent monitoring stations in order to calculate bias correction which is applied to the yearly average to enable comparison with the annual NO_2 objective. The data from the duplicate and triplicate tubes covering the period of this report show that 92% of results have good precision.

2014 Air Quality Progress Report for

Wolverhampton City Council

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

March, 2014

Local Authority Officer	Dean Gooch, Anna Spinks
Department	Environmental Health (Public Protection)
Address	Wolverhampton City Council, Civic Centre, St Peter's Square, Wolverhampton, WV1 1DA
Telephone	01902 554375
e-mail	mailto:environmentalhealth@wolverhampton.gov.uk
Report Reference number	WCCPR2014
Date	March 2014

Executive Summary

This progress report has been produced as part of the on-going process of the review and assessment of air quality, to provide an update on local air quality management within the city of Wolverhampton.

The report presents monitoring data for the year 2013 and considers any new local developments which have taken place in the city since the previous Updating & Screening Assessment published in December 2013.

A review of emission sources has found that there have been no new industrial processes, or any other significant sources granted planning approval which could contribute to poor air quality.

A comprehensive review of all monitoring data gathered since the previous report has been carried out. Areas where the air quality objectives are not being met have been identified together with any significant trends.

Since the previous progress report published in 2013 the levels of nitrogen dioxide have reduced compared with 2012. This has resulted in the number of locations exceeding the objective level for nitrogen dioxide falling from 6 to 2.

The improvements brought about by the completion of phase 1 of the interchange project have continued. All roads within the city centre with the exception of Broad Street are now compliant.

Wolverhampton City Council has concluded that a detailed assessment will not be required.

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Appendices

1 Introduction

1.1 Description of Local Authority Area

Located to the north of the West Midlands conurbation, Wolverhampton is on the edge of the Black Country, some 15 miles from the regional centre of Birmingham. Wolverhampton functions as a major centre within the Black Country and the northern part of the West Midlands.

The city covers an area of 26 square miles (6,880 hectares) and has a population of around 250,000 residents. Wolverhampton is primarily an urban area with the majority of the land use being residential and industrial. However, there are areas of green space, allotments, sports grounds, isolated pockets of countryside, small lakes and ponds and farm land which make up approximately 13% of the city. These provide a variety of habitats for a wide range of plant and animal species.

Wolverhampton benefits from good communications links, with access to the national motorway network provided by the M6 to the east, the M54 to the north, and the M6 Toll. Wolverhampton also has a mainline railway station, which provides direct trains to Birmingham, London, the West Country and the north. Proposals are currently underway to introduce a number of improvements to the railway station and its environs through the city Interchange project. Phase 1 of this has been completed with the opening of the new bus station and access road in 2011.

The two principal pollutants affecting local air quality are nitrogen dioxide (NO_2) and fine particles (PM_{10}). The major source of these pollutants is road traffic and there are a number of roads within the city where the air quality objective for NO_2 is being exceeded. In response the Council declared the whole city an Air Quality Management Area (AQMA) in March 2005.

An Air Quality Action Plan (AQAP) has been prepared in conjunction with a cross service officer group and the local transport plan.

1.2 Purpose of Progress Report

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

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

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

1.3 Air Quality Objectives

The air quality objectives applicable to LAQM **in England** are set out in the Air Quality (England) Regulations 2000 (SI 928), The Air Quality (England) (Amendment) Regulations 2002 (SI 3043), and are shown in Table 1.1. This table shows the objectives in units of microgrammes per cubic metre $\mu g/m^3$ (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

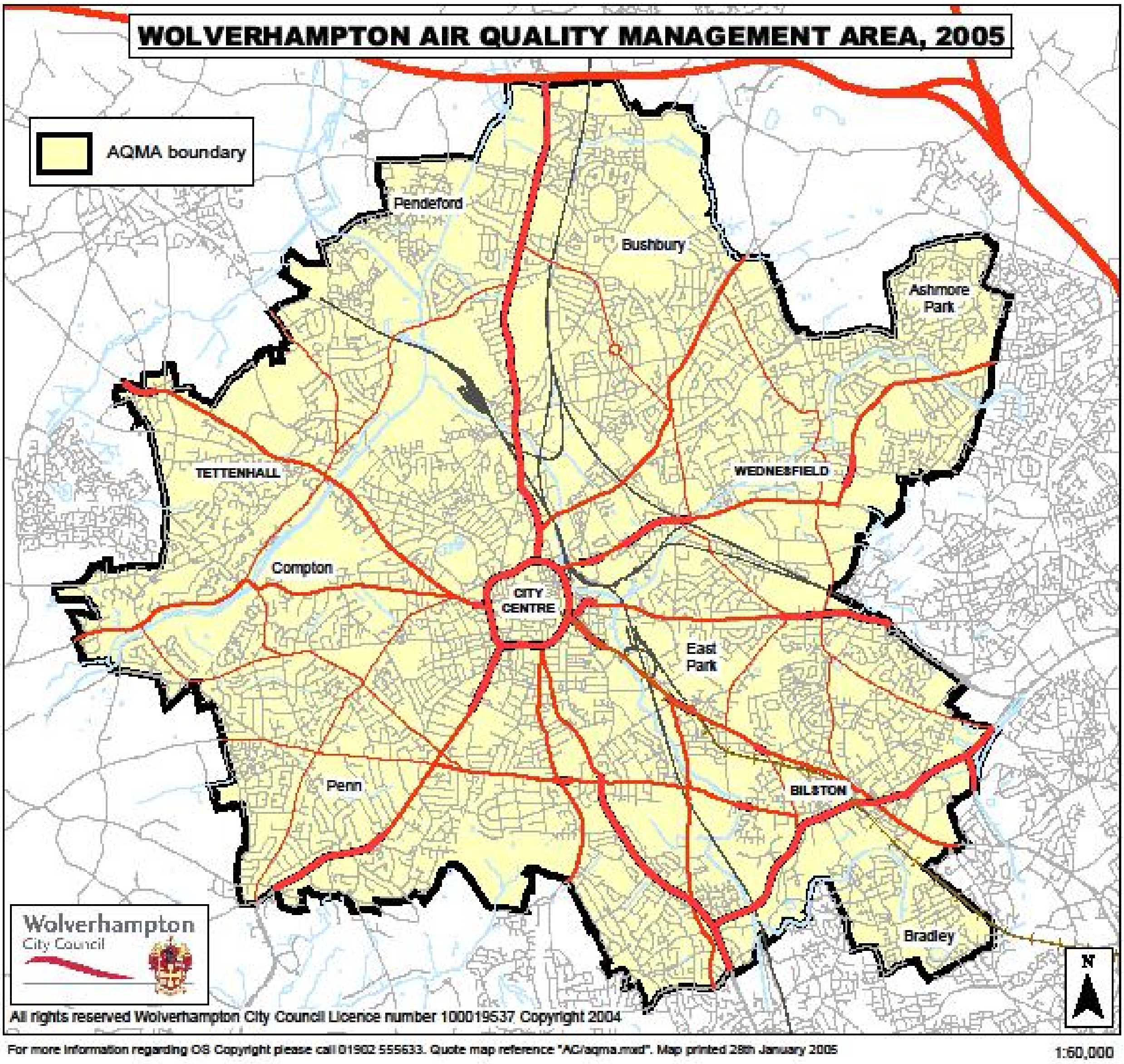
Pollutant	Air Quality Objective		Date to be achieved by
	Concentration	Measured as	
Benzene	16.25 µg/m^3	Running annual mean	31.12.2003
	5.00 µg/m^3	Annual mean	31.12.2010
1,3-Butadiene	2.25 µg/m^3	Running annual mean	31.12.2003
Carbon monoxide	10 mg/m^3	Running 8-hour mean	31.12.2003
Lead	0.50 µg/m^3	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
Particulate Matter (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

Assessment	Exceedences	Conclusions and Recommendations
Stage 1 Report- March 1999	None	The report Identified 54 roads and 143 industrial processes within Wolverhampton which have the potential to be significant sources of pollution.
Stage 3 Report July 2001	None	A recommendation to carryout detailed investigations regarding the levels of NO_2 to confirm the prediction of the model. Further monitoring for NO_2 and PM_{10} is required along busy roads and roads with high flows of bus traffic
USA May 2003	Nitrogen dioxide, particles	Identified certain areas within the city where the objectives are likely to be exceeded. A Detailed Assessment of NO_2 and PM_{10} is required for parts of the city centre and two of the busiest junctions.
Detailed Assessment 2004	Nitrogen dioxide, particles	The Detailed Assessment confirmed that the objectives for NO_2 and PM_{10} were not being met along certain roads within the city centre and recommended the declaration of an AQMA
Section 83 (1) March 2005	Nitrogen dioxide, particles	Order designating the city of Wolverhampton an Air Quality Management Area (Appendix 1)
Annual Progress Report 2005	Nitrogen dioxide, particles	Confirmed conclusions of the Detailed Assessment and highlighted three new key developments for consideration in the 2006 USA
USA, Stage 4 Assessment and Action Plan 2006	Nitrogen dioxide, particles	Analysis of monitoring data showed that NO_2 concentrations had reduced from 2003 peak levels but continued to exceed the objectives at certain locations within the city. The levels of PM_{10} fell below the objectives during 2004 and 2005 and projected figures indicated a continuing downward trend. Nine new developments which required air quality assessments were considered. It was concluded that the developments would not result in the air quality objectives being exceeded. The action plan listed 23 actions and incorporated the Local Transport Plan into the long term air quality strategy.
Progress Report 2007	Nitrogen dioxide, particles	Monitoring data for 2006 showed the levels of NO_2 and PM_{10} increased contrary to the projected concentrations contained in the 2006 USA. Parts of the city Centre and certain busy road junctions continue to exceed the objectives for NO_2 and PM_{10}. There have been no new industrial processes or any other significant developments which could contribute to poor air quality since the 2006 USA.
Progress Report 2008	Nitrogen dioxide, particles	Levels of NO_2 and PM_{10} remain stable. There have been no new industrial processes or any other significant developments which could contribute to poor air quality since the 2006 USA.

Assessment	Exceedences	Conclusions and Recommendations
USA, Stage 4 Assessment and Action Plan 2009	Nitrogen dioxide	There are no new or significantly changed sources which could give rise to any potential exceedences outside the existing AQMA and therefore, it is not necessary to proceed to a Detailed Assessment for any of the pollutants listed in Table 1.1 Additional monitoring, or changes to the existing monitoring programme is not required.
USA 2012	Nitrogen dioxide	Monitoring data for 2011 has identified that air quality improved across the city during 2011. This has resulted in a reduction in the number of areas within Wolverhampton which are exceeding the objectives. Wolverhampton City Council has concluded that a detailed assessment will not be required.
Progress Report 2013	Nitrogen dioxide	Monitoring data for 2012 has identified that there was a small increase in nitrogen dioxide and particle concentrations across the city in 2012 compared with 2011. This was caused by weather patterns during 2012 which hampered the dispersion of pollutants. A comprehensive review of sources of both pollutants has been carried out and there is no evidence to suggest that emissions have increased. This has resulted in 6 locations which are exceeding the objective for nitrogen dioxide.

Figure 1.1 Map of AQMA Boundary



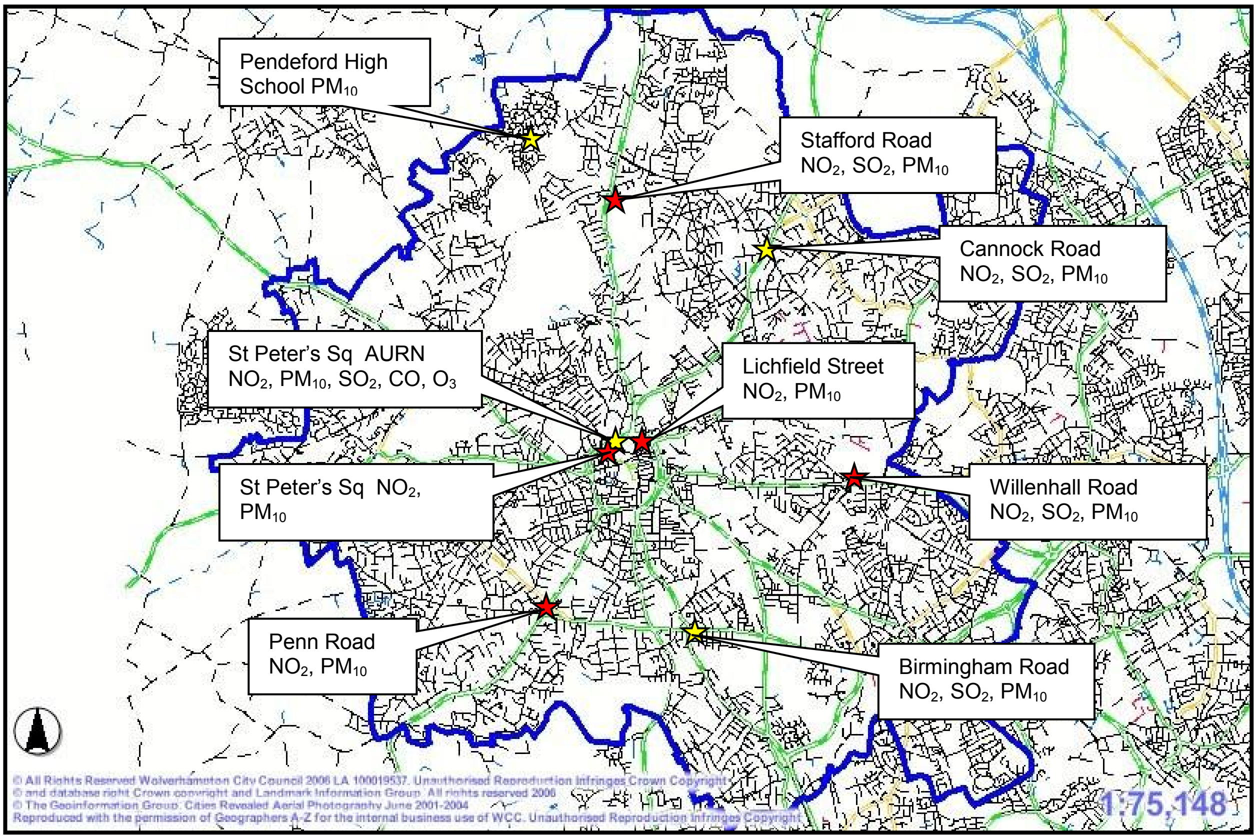
2 New Monitoring Data

2.1 Summary of Monitoring Undertaken

2.1.1 Automatic Monitoring Sites

Wolverhampton Council operates 5 fully automatic monitoring stations, the locations of which are shown in Figure 2.1 below. These sites have been chosen to represent the worst case locations and cover the main arterial roads which link the city with major regional trunk roads and motorways. Details of the sites are given in Table 2.1.

Figure 2.1 Location of Automatic Monitoring Sites



★ Current automatic monitoring sites

☆ Closed automatic monitoring sites

Wolverhampton City Boundary

Fixed stations are sited at roadside locations on the A449 Stafford Road to the north which links with the M54, the A449 Penn Road to the south, and Lichfield Street which was the main access road into the bus station and has a high flow of bus traffic.

The Council also operates a mobile monitoring station which is currently located on the A454 Willenhall Road, a main link to the M6 and Walsall. Prior to this, the mobile station was previously located on the A4123 Birmingham New Road and the A460 Cannock Road.

An additional station is located at St Peter's Square in the city centre. This site is 30m from the ring road and is classified as an urban background site.

Table 2.1 Details of Automatic Monitoring Sites

Site ID	Site Name	Site Type	X OS Grid Reference	Y OS Grid Reference	Inlet Height (m)	Pollutants Monitored	In AQMA?	Monitoring Technique	Relevant Exposure? (Y/N with distance (m) from monitoring site to relevant exposure)	Distance to Kerb of Nearest Road (m) (N/A if not applicable)	Does this Location Represent Worst-Case Exposure?
Active sites											
A1	Lichfield Street	Roadside	391647	298784	2.5	NO_2 PM_{10}	Yes	Chemiluminescent TEOM	Yes (2m)	2m	Yes
A2	Penn Road	Roadside	390374	296775	2.5	NO_2 PM_{10}	Yes	Chemiluminescent TEOM	Yes (6.5m)	6.5m	Yes
A4	Stafford Road	Roadside	391261	302199	2.5	NO_2 SO_2 PM_{10}	Yes	Chemiluminescent UV Fluorescence TEOM	Yes (5m)	8.5m	Yes
A5	Willenhall Road	Roadside	394754	298429	2.5	NO_2 SO_2 PM_{10}	Yes	Chemiluminescent UV Fluorescence TEOM	Yes (5m)	9.5m	Yes
A9	St Peter's Square	Urban Background	390740	302692	2.5	NO_2 PM_{10}	Yes	Chemiluminescent TEOM	No	30m	No

Site ID	Site Name	Site Type	X OS Grid Reference	Y OS Grid Reference	Inlet Height (m)	Pollutants Monitored	In AQMA?	Monitoring Technique	Relevant Exposure? (Y/N with distance (m) from monitoring site to relevant exposure)	Distance to Kerb of Nearest Road (m) (N/A if not applicable)	Does this Location Represent Worst-Case Exposure?
Closed sites											
A3	Pendeford High School	Background	390740	302692	2.5m	PM_{10}	Yes	TEOM	No	180m	No
A6	Cannock Road	Roadside	393030	300824	2.5m	NO_2 SO_2 PM_{10}	Yes	Chemiluminescent UV Fluorescence TEOM	Yes (11m)	6m	Yes
A7	Birmingham Road	Roadside	392264	296546	2.5m	NO_2SO_2 PM_{10}	Yes	Chemiluminescent UV Fluorescence TEOM	Yes (3m)	6m	Yes
A8	St Peter's Square AURN	Urban Centre	391357	298939	2.5m	NO_2SO_2 PM_{10} CO O_3	Yes	Chemiluminescent UV Fluorescence TEOM	No	30m	No

2.1.2 Non-Automatic Monitoring Sites

To complement the automatic sites NO_2 sampling is also carried out using passive diffusion tubes which are supplied and analysed by Gradko. The council has tubes at 54 locations around the city; these are detailed in Table 2.2.

The sites represent a combination of background, intermediate, and roadside locations intended to reflect the worst case situation where the general public are likely to be exposed.

Following the 2001 Stage 3 report a number of roads were designated as intensive survey areas (ISA's). The roads which have been targeted are the main arterial routes into the city centre and those streets which are narrow and congested or have a high proportion of heavy duty vehicles (HDV's). A total of 5 diffusion tubes have been located in a "W" formation along each of these roads.

Wherever possible, diffusion tubes are located on the façades of residential property. Where this is not possible tubes are attached to lampposts or other suitable street furniture.

During 2013 7 additional sites were established within the city centre to assess the impact of the proposed alterations to the traffic flow within the ring road. The proposed changes are detailed in Figure 2.2 and 2.3 and involve the creation of a new one way system, pedestrian zones and new bus stops along Princess Street, Market Street and Queen Street. These proposals will reduce vehicle traffic in these roads particularly Princess Street.

Figure 2.2 Wolverhampton City Centre Scheme

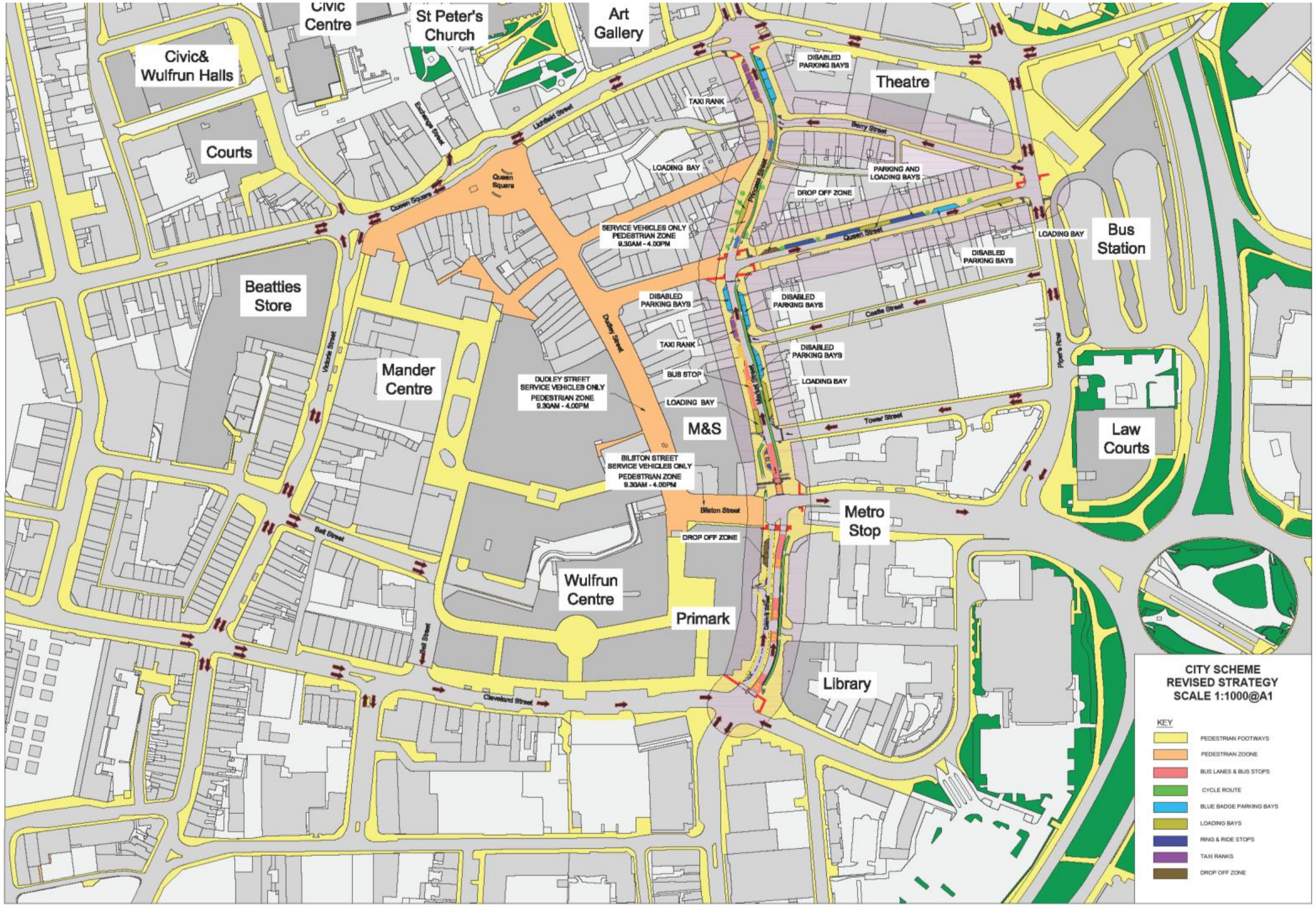


Figure 2.3 Wolverhampton City Centre scheme expanded view

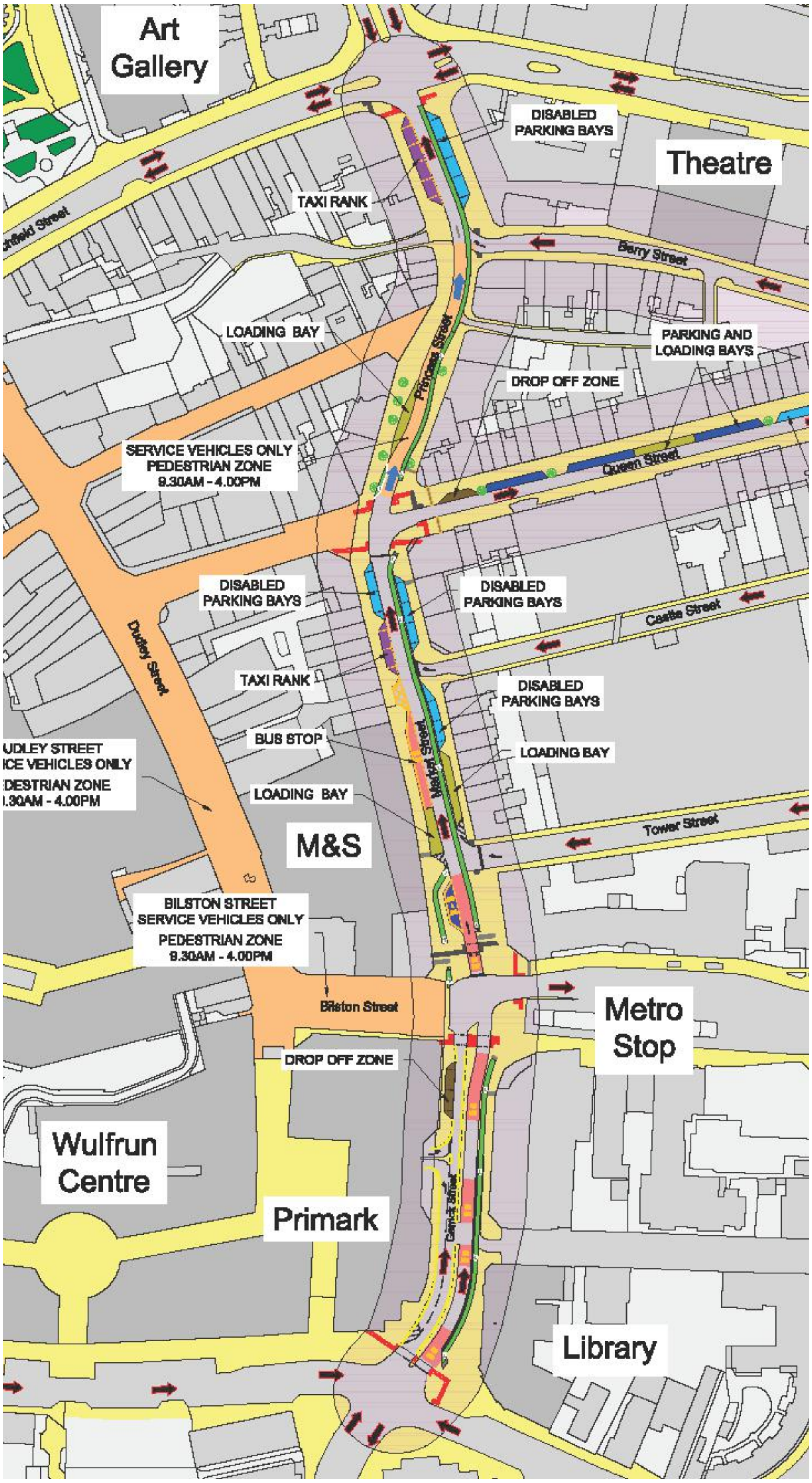


Table 2.2 Details of Non- Automatic Monitoring Sites

Site ID	Site Type	X OS Grid Reference	Y OS Grid Reference	Site Height (m)	Pollutants Monitored	In AQMA?	Is Monitoring Co-located with a Continuous Analyser (Y/N)	Relevant Exposure? (Y/N with distance (m) from monitoring site to relevant exposure)	Distance to Kerb of Nearest Road (m) (N/A if not applicable)	Does this Location Represent Worst-Case Exposure?
Active sites - existing										
BIL1	Roadside ISA	395057	296541	3m	NO_2	Y	N	Y(0m)	4m	Y
BIL2	Roadside ISA	395085	296475	3m	NO_2	Y	N	Y(0.5M)	4.5m	Y
BIL3	Roadside ISA	395102	296495	3m	NO_2	Y	N	N	10m	Y
BIL4	Roadside ISA	395117	296454	3m	NO_2	Y	N	Y(0m)	2.5m	Y
LIC1	Roadside ISA	391698	298776	3m	NO_2	Y	N	N	3.5m	Y
LIC2	Roadside ISA	391508	298744	3m	NO_2	Y	N	Y(0m)	3m	Y
LIC3	Roadside ISA	391620	298772	3m	NO_2	Y	N	N	6m	Y
LIC4	Roadside ISA	391643	298786	3m	NO_2	Y	Y	Y(1.5m)	1.5m	Y
LIC5	Roadside ISA	391643	298786	3m	NO_2	Y	Y	Y(1.5m)	1.5m	Y
LIC6	Roadside ISA	391643	298786	3m	NO_2	Y	Y	Y(1.5m)	1.5m	Y
LIC7	Roadside ISA	391019	296671	3m	NO_2	Y	N	N	5m	Y
LIC8	Roadside ISA	391454	298733	3m	NO_2	Y	N	N	3m	Y
LIC9	Roadside ISA	390375	296775	3m	NO_2	Y	N	Y(0m)	3m	Y
PIP1	Roadside ISA	391768	298662	3m	NO_2	Y	N	N	2m	Y
PIP2	Roadside ISA	391794	298560	3m	NO_2	Y	N	N	4m	Y
PRI1	Roadside ISA	391548	298940	3m	NO_2	Y	N	N	3m	Y

Site ID	Site Type	X OS Grid Reference	Y OS Grid Reference	Site Height (m)	Pollutants Monitored	In AQMA?	Is Monitoring Co-located with a Continuous Analyser (Y/N)	Relevant Exposure? (Y/N with distance (m) from monitoring site to relevant exposure)	Distance to Kerb of Nearest Road (m) (N/A if not applicable)	Does this Location Represent Worst-Case Exposure?
PRI2	Roadside ISA	391566	298795	3m	NO_2	Y	N	Y(0m)	3m	Y
PRI3	Roadside ISA	391607	298745	3m	NO_2	Y	N	Y(0m)	4.5M	Y
PRI4	Roadside ISA	391581	298686	3m	NO_2	Y	N	N	5m	Y
PRI5	Roadside ISA	391588	298612	3m	NO_2	Y	N	N	2.5m	Y
QUE1	Roadside ISA	391607	298652	3m	NO_2	Y	N	Y(0m)	2.5m	Y
QUE2	Roadside ISA	391622	298639	3m	NO_2	Y	N	N	4.5m	Y
QUE3	Roadside ISA	391662	298665	3m	NO_2	Y	N	Y(0m)	2.5m	Y
QUE4	Roadside ISA	391707	298660	3m	NO_2	Y	N	N	4.5m	Y
STA1	Roadside ISA	391377	299818	3m	NO_2	Y	N	Y(2m)	2m	Y
STA5	Roadside ISA	391261	302199	3m	NO_2	Y	Y	Y(6.5m)	8.5m	Y
STA6	Roadside ISA	391261	302199	3m	NO_2	Y	Y	Y(6.5m)	8.5m	Y
STA7	Roadside ISA	391261	302199	3m	NO_2	Y	Y	Y(6.5m)	8.5m	Y
STA9	Roadside ISA	391527	303350	3m	NO_2	Y	N	Y(8m)	3.5m	Y
STA9A	Roadside ISA	391536	303348	3m	NO_2	Y	N	Y(0m)	7m	Y
WIL1	Roadside ISA	394266	298438	3m	NO_2	Y	N	Y(14.5m)	14.5m	Y
WIL2	Roadside ISA	394712	298428	3m	NO_2	Y	N	Y(0m)	6.5m	Y
BRI	Roadside	388182	298782	3m	NO_2	Y	N	Y(0m)	11m	Y
BRO	Roadside	391676	298865	3m	NO_2	Y	N	Y(5m)	5.5m	Y
CAN	Roadside	393008	300867	3m	NO_2	Y	N	Y(7.5m)	6.5m	Y

Site ID	Site Type	X OS Grid Reference	Y OS Grid Reference	Site Height (m)	Pollutants Monitored	In AQMA?	Is Monitoring Co-located with a Continuous Analyser (Y/N)	Relevant Exposure? (Y/N with distance (m) from monitoring site to relevant exposure)	Distance to Kerb of Nearest Road (m) (N/A if not applicable)	Does this Location Represent Worst-Case Exposure?
CLE	Roadside	391485	298348	3m	NO_2	Y	N	N	5m	Y
CUL	Roadside	393371	297403	3m	NO_2	Y	N	Y(0m)	2.5m	Y
DUD	Roadside	391541	297267	3m	NO_2	Y	N	Y(1m)	3.5m	Y
HOR	Roadside	392115	298608	3m	NO_2	Y	N	Y(0.5)m	2.7m	Y
NEA	Roadside	394717	299894	3m	NO_2	Y	N	Y(4.5m)	2m	Y
OXF	Roadside	395384	296293	3m	NO_2	Y	N	Y(0m)	3.2m	Y
PAR	Roadside	392306	296547	3m	NO_2	Y	N	Y(10.3m)	2.7m	Y
TET	Roadside	389297	299886	3m	NO_2	Y	N	Y(3.2m)	3.2m	Y
TRI	Roadside	395540	296479	3m	NO_2	Y	N	Y(-1m)	11m	Y
WAT	Roadside	391134	298877	3m	NO_2	Y	N	N	3m	Y
WOL	Roadside	394031	297172	3m	NO_2	Y	N	Y(4m)	2m	Y
PRO	Intermediate	394633	296089	3m	NO_2	Y	N	N	28m	N
SPS	Intermediate	391357	298937	3m	NO_2	Y	N	N	30m	N
COL	Background	395855	300586	3m	NO_2	Y	N	N	48m	N
COLQ	Background	395855	300586	3m	NO_2	Y	N	N	48m	N
MAR	Background	390705	302736	3m	NO_2	Y	N	N	165m	N
WAR	Background	389132	296755	3m	NO_2	Y	N	N	50m	N
WRE	Background	392090	296095	3m	NO_2	Y	N	N	50m	N

Active sites - new for 2013										
CC1	Roadside	391379	298687	3m	NO_2	Y	N	N	5.9m	Y
CC2	Roadside	391309	298554	3m	NO_2	Y	N	Y (0)	2.8m	Y
CC3	Roadside	391467	298374	3m	NO_2	Y	N	N	5.8m	Y
CC4	Roadside	391461	298369	3m	NO_2	Y	N	N	1.2m	Y
CC5	Roadside	391538	298327	3m	NO_2	Y	N	N	9.5m	Y
CC6	Roadside	391539	298372	3m	NO_2	Y	N	N	4.8m	Y
CC7	Roadside	391597	298579	3m	NO_2	Y	N	Y (0)	2.9m	Y
Closed sites										
WIL3	Roadside ISA	394754	298429	3m	NO_2	Y	N	Y(1m)	10m	Y
WIL4	Roadside ISA	394754	298429	3m	NO_2	Y	N	Y(1m)	10m	Y
WIL5	Roadside ISA	394754	298429	3m	NO_2	Y	N	Y(1m)	10m	Y

2.2 Comparison of Monitoring Results with Air Quality Objectives

2.2.1 Nitrogen Dioxide (NO_2)

Automatic Monitoring Data

The annual mean concentrations from the automatic monitoring stations for the previous 3 years are presented in Table 2.3, exceedences of the objectives are highlighted in red.

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

Site ID	Location	Within AQMA?	Data Capture 2013 %	Annual mean concentrations (distance corrected) $\mu g/m^3$		
				2011	2012	2013
A1	Lichfield Street	Y	86	36	**48**	39
A2	Penn Rd	Y	73	38	**43**[1]	**45**
A4	Stafford Rd	Y	99	34	31	31
A5	Willenhall Rd	Y	97	38	**46**	37
A8	St Peter's Sq	Y	99	No result	32	31

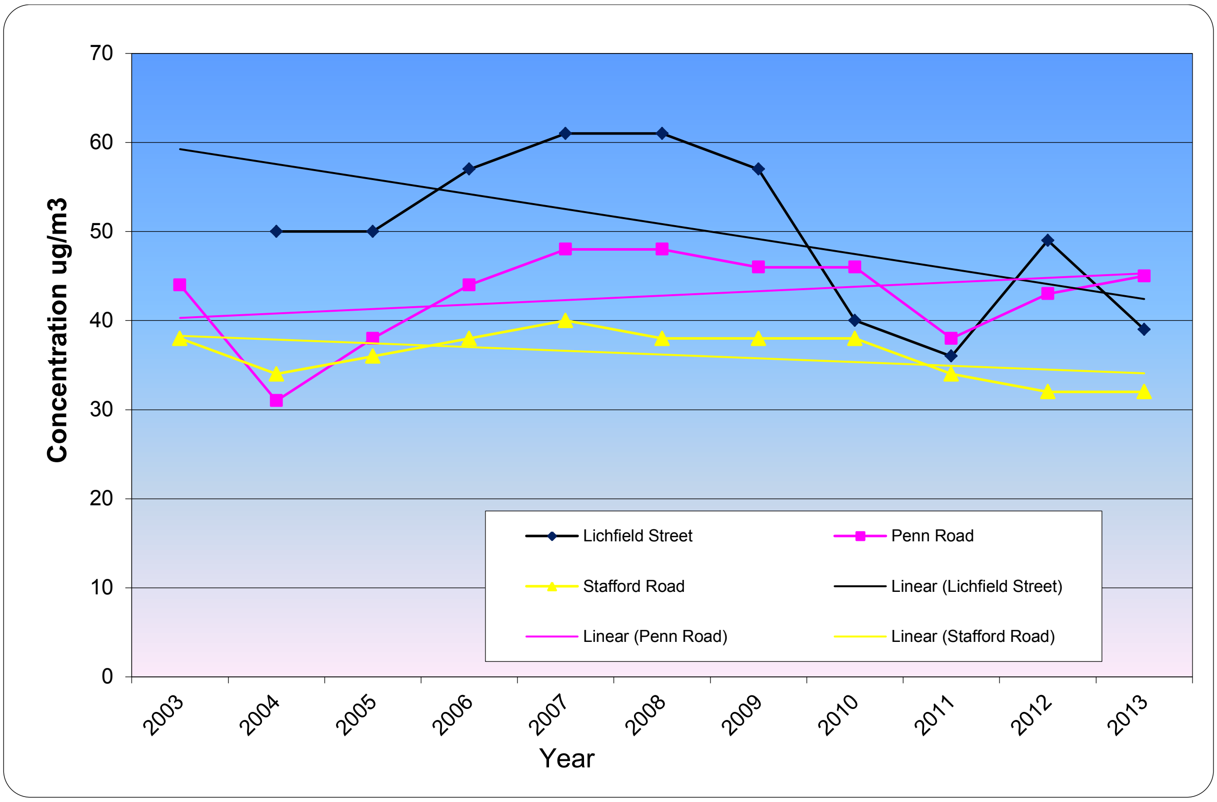
[1] Annualised data (Appendix A)

The yearly mean NO_2 concentrations from the longest running automatic monitoring stations are presented in Figure 2.2.

The long term trend at Penn Road indicates an overall increase in NO_2 concentrations since monitoring began in 2001. Levels of NO_2 dropped in 2011 however there has been an increase over the last 2 years.

The trend graph for Stafford Road shows that NO_2 levels have remained fairly stable. There was a small increase in NO_2 concentrations between 2001 and 2007 followed by a gradual decrease. Current levels are now 2 $\mu g/m^3$ below the 2001 concentration.

Figure 2.4 Trends in Annual Mean NO_2 Concentrations Measured at Automatic Monitoring Sites



Lichfield Street is within the city centre and prior to 2010 was one of the main access routes into the bus station. The levels of NO_2 in Lichfield Street before 2010 were considerably higher than at other roadside locations due to the number of buses travelling along the road.

In 2010 Lichfield Street was closed to traffic during the bus station redevelopment project which resulted in a large decrease in the levels of NO_2. The project was completed in the summer of 2011 and the number of buses now using Lichfield Street has been reduced significantly. The levels of NO_2 remained below the objective in 2011 and then increased in 2012, a trend which occurred at other road side sites across the city. This increase was higher in Lichfield Street than at other roadside sites in the city and is due in part to artificially low levels of NO_2 in 2010 and 2011 caused by the closure of the road for part of that period, and favourable weather conditions during 2011 which helped disperse emissions.

The 2013 results show a reduction in NO_2 and levels are now below the air quality objective for NO_2.

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

Site ID	Location	Within AQMA?	Data Capture 2013 %	Number of Exceedences of hourly mean (200 $\mu g/m^3$)		
				2011	2012	2013
A1	Lichfield Street	Y	86	1	1	0
A2	Penn Road/Goldthorne Hill	Y	83	0	1	0
A4	Stafford Road/Church Road	Y	99	0	0	0
A5	Willenhall Road/Neachells Lane	Y	97	0	5	1
A8	St Peter's Square	Y	99	No result	0	0

A comparison against the 1-hour mean objective (Table 2.4) shows that exceedences of the hourly mean object were below the allowed 18 exceedences per year at all monitoring sites.

Diffusion Tube Monitoring Data

Diffusion tube results for the previous 3 years are shown in Table 2.5. The annual average for each site is presented as the bias corrected measured value, corrected for distance to the nearest relevant receptor in accordance with the procedure detailed in Box 2.3 of technical Guidance LAQM.TG(09). Exceedences of the annual mean objective value are highlighted in red.

The bias correction is obtained from the co-location of triplicate tubes alongside the Stafford Road and Lichfield Street automatic monitoring stations (see Appendix A).

Table 2.5 Results of Nitrogen Dioxide Diffusion Tubes

Site ID	Location	Within AQMA	% Data capture 2013	Annual mean concentration µg/m³ (adjusted for bias and distance)		
				2011 (Bias 0.89)	2012 (Bias 1.05)	2013 (Bias 0.92)
BIL1	Lichfield St, Bilston	Y	92	37	**42**	**43**
BIL2	Lichfield St, Bilston	Y	92	32	34	33
BIL3	Lichfield St, Bilston	Y	100	33	**47**[2]	36
BIL4	Lichfield St, Bilston	Y	100	33	37	33
LIC1	Lichfield Street	Y	92	33	**42**	**41**
LIC2	Lichfield Street	Y	92	**45**	**46**	39
LIC3	Lichfield Street	Y	100	36	**47**	40
LIC4[1]	Lichfield Street	Y	92	32	40	38
LIC7	Lichfield Street	Y	100	33	40	37
LIC8	Lichfield Street	Y	100	31	36	29
LIC9	Lichfield Street	Y	92	34	**47**	41
PIP1	Pipers Row	Y	92	37	**46**	41
PIP2	Pipers Row	Y	100	35	38	36
PRI1	Stafford Street	Y	100	39	39	36
PRI2	Princess Square	Y	100	38	**41**	36
PRI3	Princess Street	Y	100	32	32	32
PRI4	Princess Street	Y	100	**48**	40	36
PRI5	Princess Street	Y	83	35	35	35
QUE1	Queen Street	Y	100	36	32	30
QUE2	Queen Street	Y	100	**41**	39[2]	33
QUE3	Queen Street	Y	100	**46**	36	31
QUE4	Queen Street	Y	100	41	37	28
STA1	Stafford Road	Y	92	28	30	27
STA5[1]	Stafford Road	Y	100	34	38	31
STA9	Stafford Road	Y	100	**47**	**45**[2]	30
STA9A	Stafford Road	Y	100	31	35	32
WIL1	Willenhall Road	Y	100	23	27	23
WIL2	Willenhall Road	Y	100	36	39	37
WIL3[1,]	Willenhall Road	Y	100	30	34	closed
PAR	Birmingham Road	Y	83	31	36	30
BRI	Bridgnorth Road	Y	100	21	22	20
BRO	Broad Street	Y	100	**44**	**45**	41
CAN	Cannock Road	Y	92	28	30	27
CLE	Cleveland Street	Y	92	31	32[2]	26
CUL	Culwick Street	Y	100	23	26	21
DUD	Dudley Road	Y	100	26	27	25
HOR	Horseley Fields	Y	100	36[2]	36	35
NEA	Neachells Lane	Y	100	22	24	21
OXF	Oxford Street	Y	100	25	31	30
TET	Tettenhall Road	Y	100	38	39	34
WAT	Waterloo Road	Y	92	30	35	34
WOL	5 Wolsley Road	Y	100	19	20	19
PRO	Prosser Street	Y	92	25	27	25
SPS	St Peter's Square	Y	100	23	26	26
TRI	Trinity Street	Y	92	24	25	22
COL	Coleman Avenue	Y	100	16	18	16
MAR	Marsh Lane	Y	83	13	18[2]	15
WAR	Warstones Road	Y	83	14	15	13
WRE	W'ton Rd East	Y	92	15	17	16
CC1	Queen Square	Y	83	No Result	No Result	29
CC2	Victoria Street	Y	83	No Result	No Result	27
CC3	Cleveland Street	Y	83	No Result	No Result	29
CC4	Cleveland Street	Y	83	No Result	No Result	29
CC5	Cleveland Street	Y	83	No Result	No Result	28
CC6	Cleveland Street	Y	75	No Result	No Result	31[2]
CC7	Market Street	Y	83	No Result	No Result	31

[1] Mean of triplicate tubes [2] Annualised data (Appendix A)

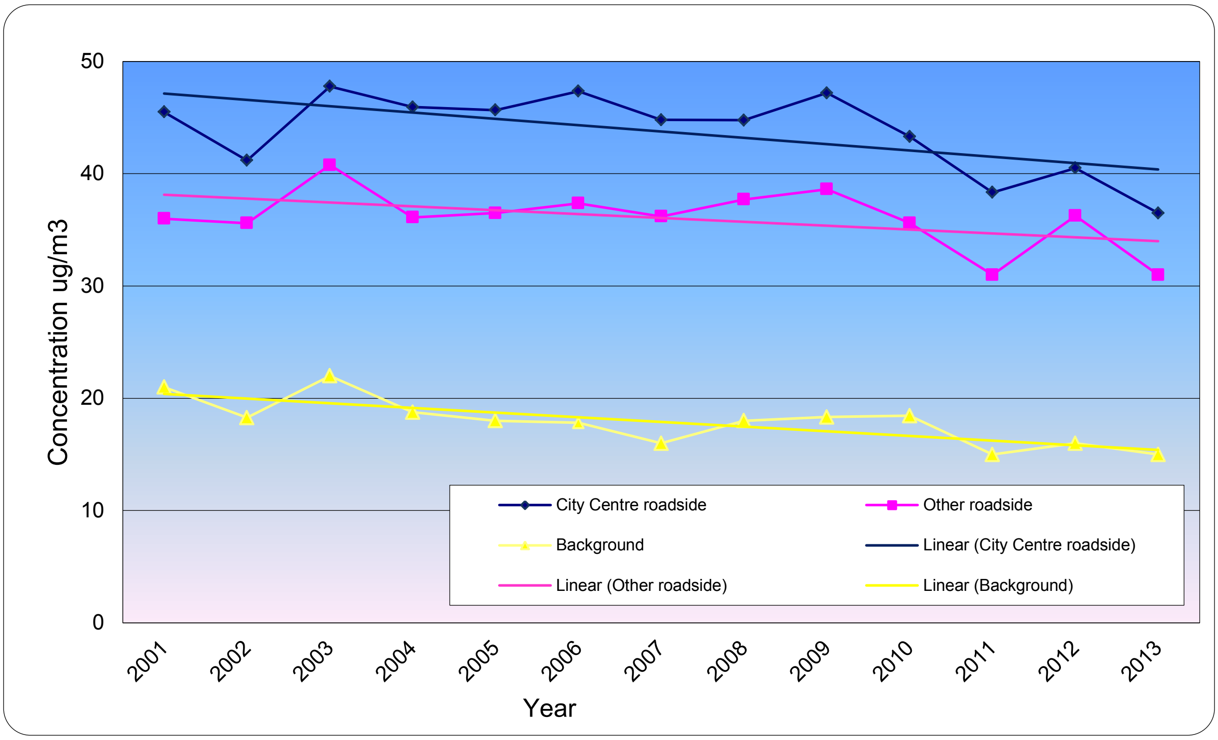
Table 2.6 provides a summary of the results from the intensive survey areas, the remaining roadside tubes and the background tubes for 2011, 2012 and 2013. The results are presented as the annual mean concentration calculated from individual tubes located along each particular road and site type corrected for bias and distance.

The data collected from the automatic monitoring stations and the diffusion tube sites shows that annual mean NO_2 concentrations decreased in 2013 at the majority of locations compared to 2012.

Table 2.6 Results of Nitrogen Dioxide Diffusion Tubes: ISA, Roadside, Intermediate and Background Sites

Location	Within AQMA	Annual mean concentration $\mu g/m^3$ (adjusted for bias and distance)		
		2011 (Bias 0.89)	2012 (Bias 1.05)	2013 (Bias 0.92)
Lichfield Street, Bilston	Y	34	39	36
Lichfield Street, East of Princess Square	Y	34	**43**	39
Lichfield Street, West of Princess Square	Y	37	**41**	34
Princess Street/Stafford Street	Y	38	37	35
Queen Street	Y	**41**	35	31
Stafford Road	Y	31	36	30
Willenhall Road	Y	30	34	29
Pipers Row	Y	36	**41**	38
Other Roadside sites	Y	29	31	26
Intermediate sites	Y	24	26	24
Background sites	Y	15	16	15

Figure 2.5 Trends in Annual Mean NO_2 Concentrations at Diffusion Sites



The trend data (Fig 2.3) shows an overall reduction in NO_2 at the diffusion tube sites over the past 12 years.

2.2.2 Particulate Matter (PM_{10})

A summary of the most recent TEOM data from the automatic monitoring stations is presented in Tables 2.7 and 2.8. The data has been corrected using the King's College volatile correction model (VCM) in accordance with technical guidance document LAQM.TG(09).

Table 2.7 Results of Automatic Monitoring for PM_{10}: Comparison with Annual Mean Objective

Site ID	Location	Within AQMA?	Data Capture 2013 %	Annual mean concentrations ($\mu g/m^3$) VCM corrected		
				2011	2012	2013
A1	Lichfield Street	Y	94	23	20	21
A2	Penn Road	Y	88	25	22*	23
A3	St Peter's Car Park	Y	99		19	19
A4	Stafford Road	Y	99	23	21	22
A5	Willenhall Road	Y	96	23	21	20

* Annualised data (Appendix A)

Table 2.8 Results of Automatic Monitoring for PM_{10}: Comparison with 24-hour Mean Objective

Site ID	Location	Within AQMA?	Data Capture 2010 %	Number of Exceedences of hourly mean (50 $\mu g/m^3$) *If data capture < 90%, include the 90th %ile of hourly means in brackets.*		
				2011	2012	2013
A1	Lichfield Street	Y	94	16	7	8
A2	Penn Road	Y	88	15	8*	10(38)
A3	Pendeford High School	Y	99	7	9	6
A4	Stafford Road	Y	99	11	11	5
A5	Willenhall Road	Y	96	14	6	6

* Annualised data

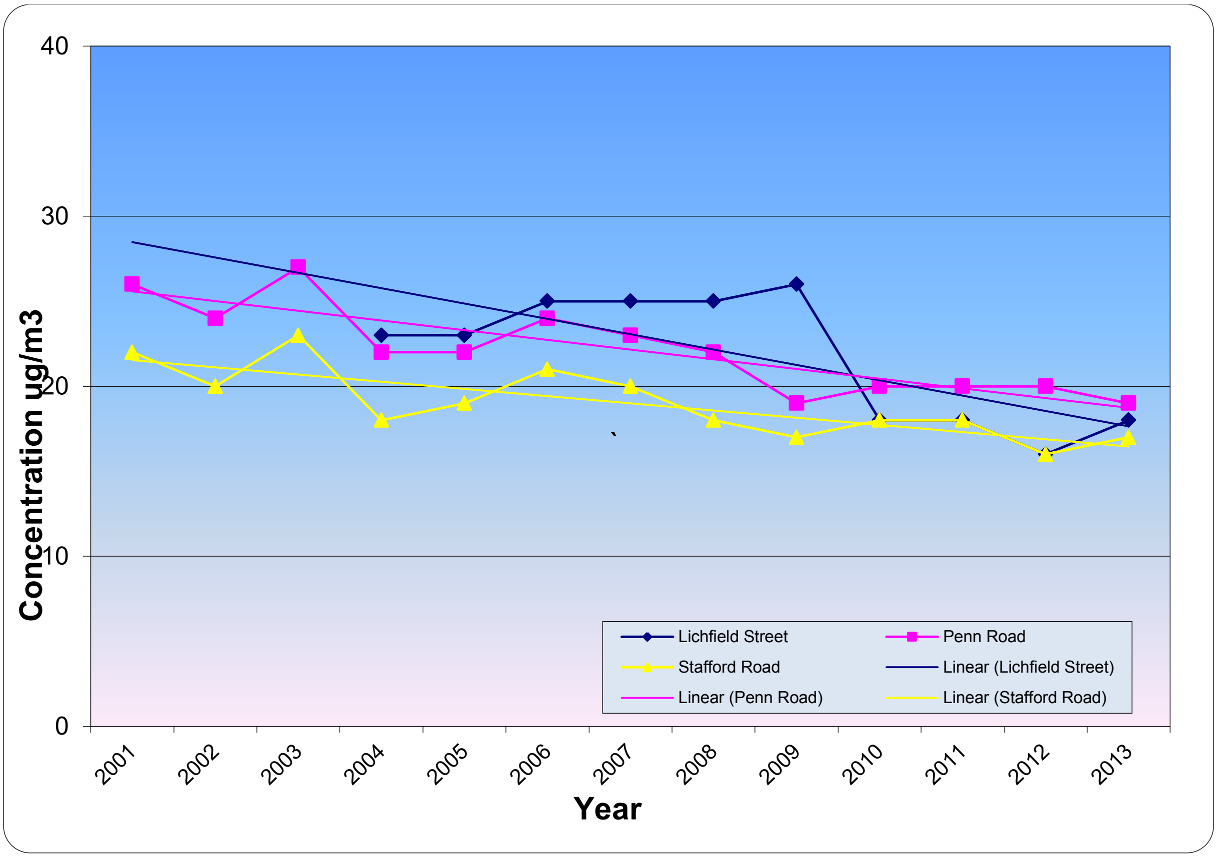
There were no exceedences of the PM_{10} annual mean objective (40μ/m^3) during 2011, 2012 or 2013 (Table 2.7). The number of exceedences of the 24-hr mean objective is below the allowed maximum of 35 per year (Table 2.8).

Long Term Trends

In order to compare the data with objectives, TEOM data has been corrected in accordance with the technical guidance. Prior to 2008 the correction factor was 1.3, which was replaced by the volatile correction model in 2008. The change to the VCM has resulted in a step change in the data therefore, for the purpose of showing long term trends, uncorrected data has been used.

Trend data for the 3 longest running sites is presented in Figure 2.4. In line with the trend in NO_2 concentrations, the overall trend for PM_{10} is downwards. The large reduction in PM_{10} levels at Lichfield Street in 2010 was due to the implementation of the interchange project as discussed in section 2.2.1.

Figure 2.6 Trends in uncorrected annual Mean PM_{10} Concentrations



2.2.3 Sulphur dioxide

A summary of the most recent SO2 monitoring data is presented in Table 2.9. There were no exceedences of the 15 minute, 1 hour or 24 hour objectives during 2013.

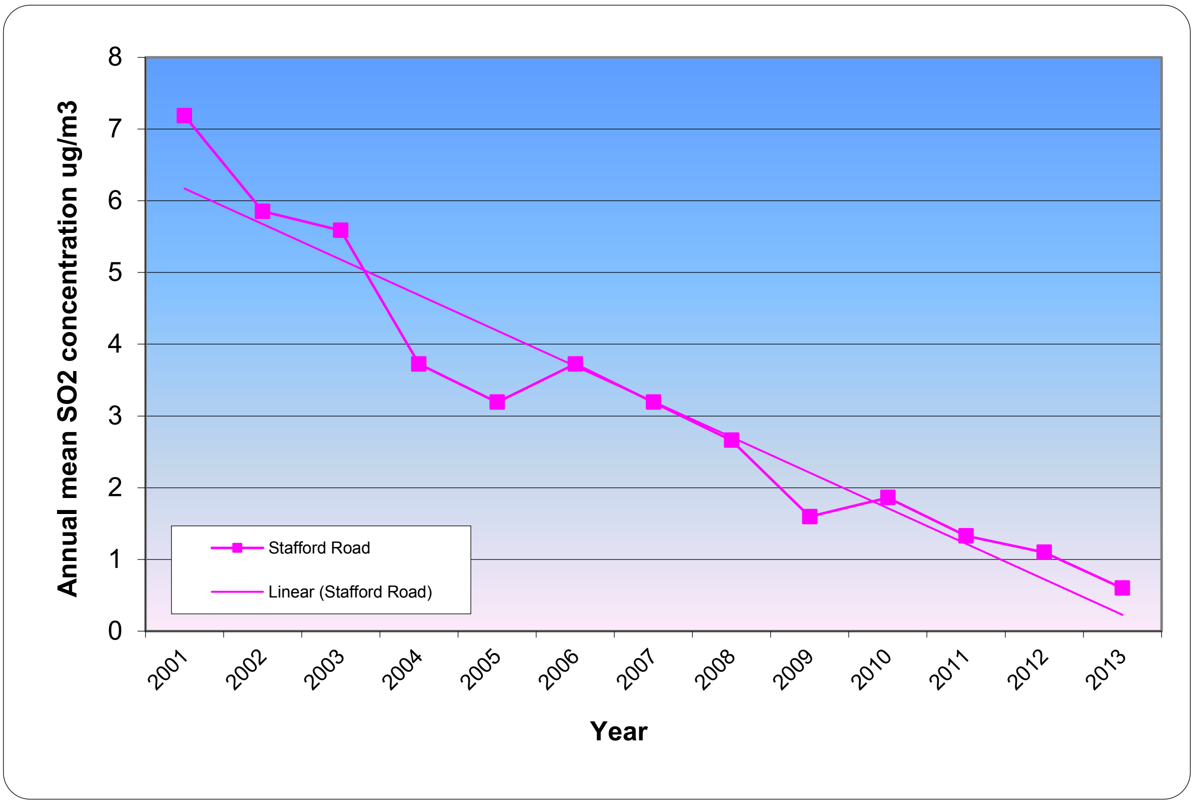
Table 2.9 Results of SO_2 Automatic Monitoring: Comparison with Objectives

Site ID	Location	Within AQMA?	Data Capture 2013 %	Number of Exceedences of: (µg/m³)		
				15-minute Objective (266 µg/m³)	1-hour Objective (350 µg/m³)	24-hour Objective (125 µg/m³)
A4	Stafford Road	Y	98%	0	0	0
A5	Willenhall Road	Y	95%	0	0	0

Long term trends

The levels of sulphur dioxide have dropped significantly over the last 12 years. Although the rate of decline has slowed over recent years the annual mean concentrations of SO_2 are continuing to fall.

Figure 2.7 Trends in annual Mean SO_2 Concentrations



Benzene

There are no significant sources of benzene in the city therefore the Council does not consider it necessary to monitor for this pollutant.

2.2.3 Summary of Compliance with AQS Objectives

Wolverhampton City Council has examined the results from the air monitoring sites in the city. The concentration of nitrogen dioxide is exceeding the annual mean objective at the following relevant locations within the declared AQMA:

- **Broad Street**
- **Penn Road/Goldthorn Hill/Coalway Road Junction**

This is a significant reduction from the previous year during which there were 6 areas exceeding the objective for nitrogen dioxide.

As the whole of the city has already been declared an AQMA, it is not necessary to proceed to a detailed assessment at these locations.

3 New Local Developments

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

Wolverhampton City Council confirms that all the following have been considered:

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

4 Regional Air Quality Strategy

Wolverhampton Council is working closely with the 6 other West Midland local authorities to develop a regional Low Emission Strategy (LES) as part of the Defra supported West Midlands Low Emission Towns & Cities Programme (LETCP).

The LETCP seeks to promote joint working to reduce regulated road transport emissions, primarily oxides of nitrogen (NOx) and particulate matter, as well as securing reductions in greenhouse gases and noise emissions where practicable. Building on policies and measures to discourage vehicle use and encourage a shift to sustainable transport modes, the LETCP aims to achieve improvements in emissions from the vehicle fleet through the accelerated take-up of cleaner fuels and technologies and by discouraging the use of high emission vehicles.

The LES comprises of an overarching strategy document, supplementary guidance on procurement and planning, and includes a Low Emission Zone Feasibility Study, a Low Emission Vehicle and Infrastructure Plan and health awareness campaign.

The LETCP will develop a delivery programme for the policies and measures identified in the LES, including setting targets and criteria for evaluating their effectiveness.

The LETCP published the Good Practice Air Quality Planning Guidance in May 2014. The council is currently working in conjunction with Dudley, Sandwell and Walsall council's to develop a Black Country supplementary planning guide to adopt this guidance into planning policy.

A good practice guide for procurement is expected to be published in 2015 together with the over-arching Low Emissions Strategy document. These documents along with the planning guide are intended to form the basis of the council's revised Air Quality Management Plan.

In addition to the good practice guides the group has commissioned AEA Technology to undertake a detailed low emission zone feasibility study. The effectiveness of low emissions zones on air quality is being assessed at selected locations within the West Midlands area, using detailed road traffic data, dispersion modelling and source apportionment. The first stage, which has now been completed, was to determine the contribution of the different types and ages of road vehicles to atmospheric nitrogen dioxide concentrations.

All vehicles in the UK must comply with European emission standards. Depending on the age of the vehicle, cars and light goods vehicles must meet Euro 1-6, and heavy duty vehicles must meet Euro I to VI. Euro 1/I being the oldest most polluting, and Euro 6/VI being the newest and least polluting. The emissions of nitrogen dioxide from different Euro class vehicles have been compared in order to identify which ones emit the highest levels of nitrogen dioxide and would offer the greatest benefits by being controlled by a low emission zone. The findings of this work stream have now been published and have identified diesel cars and buses to be the most significant source of nitrogen dioxide emissions within the West Midlands.

The next stage of the assessment is to project forwards to 2018 and 2026 using assumptions for the age composition of the vehicle fleet and emission performance of future vehicles. These are based on projections from the National Atmospheric Emissions Inventory and provide predicted reductions in pollution concentrations based on the normal rate of replacement of older vehicles.

The final stage of the assessment, which is currently on going, will be to determine the reduction in nitrogen dioxide concentrations brought about by introducing low emission zones where future pollution levels are predicted to remain above air quality objectives in future years. Low emissions zones in effect accelerate the rate that older vehicles are replaced with newer less polluting vehicles in a specific geographically defined area, by penalizing certain classes of older vehicles that may enter the area.

The classes of vehicles being considered are older buses, HGV’s and private cars which meet Euro 4 or less. The reductions brought about by introducing a LEZ will be compared with the baseline reductions expected from the “do nothing” scenario to determine if a LEZ will be effective. As part of this assessment a cost benefit analysis will be carried out where accelerated improvements are indicated.

5 Planning Applications

The council did not receive or request an air quality assessment in relation to a planning application during 2013.

6 Air Quality Planning Policies

6.1 The Black Country Joint Core Strategy

The Black Country Core Strategy, which was adopted in February 2011, has been developed in conjunction with Dudley, Sandwell, and Walsall Councils. It is a spatial planning document that sets out the vision, objectives and detailed spatial strategy for future development in The Black Country up to 2026. The document does not just consider land use, but also a comprehensive range of environmental, economic and social issues.

The Core Strategy allocates areas for housing where there are good public transport links, and retains employment land where there is good access to motorway networks. This will minimise traffic and congestion and so reduce air quality problems caused by traffic.

Policy ENV8 – Air Quality was developed jointly by air quality and planning officers in the context of the National Air Quality Strategy and the designated air quality management areas covering the Black Country. The Policy requires sensitive development to be located where air quality meets national air quality objectives and clarifies when an air quality impact assessment and mitigation measures will be required.

7 Local Transport Plans and Strategies

7.1 West Midlands Local Transport Plan 3

The West Midlands Local Transport Plan 2011 - 2026 (LTP3) is a statutory document which looks at the transport needs of the Metropolitan Area and sets out a way forward to deliver those needs through short, medium and long term transport solutions.

The LTP3 identifies how our transport network can play its part in the transformation of the West Midlands economy. It demonstrates how this will bring real benefits to people through its contribution to economic revival, creation of jobs, improved accessibility, improved local and national connections by road and rail and better quality of life.

A key objective of the LTP3 vision is air quality and climate change. The LTP3 target for air quality is reproduced below:

"2015/16 Performance Aim
A net reduction of Nitrogen Dioxide (NO_2) in those areas, as confirmed by each local authority within the West Midlands, where the annual average NO_2 values are predicted to exceed 40µg/m^3 between 2008 (baseline) and 2015".

7.2 The Black Country Joint Core Strategy

The Joint Core Strategy recognises the key role which the transport network plays in maintaining the economic wellbeing of the region. The strategy contains specific policies for providing an efficient and reliable transport network and links in with the LTP3.

7.3 Wolverhampton Cycling Strategy

The Council adopted the current Cycling Strategy in 1995 and has made good progress in implementing its proposals. The Government published 'The National Cycling Strategy' in 1996 and the Cycling Strategy for the West Midlands is set out in the Local Transport Plan. This provides a framework to identify specific problems encountered by cyclists and provides some of the solutions to address these.

In support of this the Black County Core Strategy contains specific targets for creating coherent networks for cycling and for walking. The joint working between the four local authorities will ensure that the Black Country has a comprehensive cycle network based on integrating the four local cycle networks, including common cycle infrastructure design standards.

7.4 Wolverhampton Walking Strategy

The walking strategy aims to encourage walking by recognising its role as a mode of transport and acknowledging that walking forms part of the solution to tackling traffic congestion.

The Strategy provides a framework for the Council to identify specific problems encountered by pedestrians and factors that deter walking in Wolverhampton and seeks to provide some of the solutions to address these. Many of the solutions are ones of information and maintenance and do not require very technical or major infrastructure solutions.

7.5 Network West Midlands

Network West Midlands connects all public transport in the West Midlands metropolitan area. This includes Birmingham, Dudley, Sandwell, Coventry, Walsall, Solihull and Wolverhampton.

It clearly identifies the complete network of bus, rail and Metro services that are easily accessible to most people in the West Midlands region.

7.6 Traveline

Traveline is a partnership of transport operators and local authorities formed to provide impartial and comprehensive information on public transport. It operates across England, Scotland and Wales.

In the West Midlands area the Traveline service is operated by West Midlands Transport Information Services Ltd (WMTIS). WMTIS is a not for profit organisation jointly funded by Centro who are the West Midlands Passenger Transport Executive and the West Midlands Integrated Transport Authority for the region, the local bus operators, County Councils and Unitary Authorities in the region.

WMTIS provides details of all registered bus services within the West Midlands regions an area that includes Herefordshire, Shropshire, Staffordshire, Stoke-on-Trent, Telford and Wrekin, The West Midlands Conurbation, Warwickshire and Worcestershire. They also hold some information on public transport links in other areas of the country.

7.7 Wolverhampton TravelWise

Act TravelWise is a national campaign to promote and encourage sustainable and healthy travel choices, rather than relying on the car for all journeys. Act TravelWise helps people to consider what options other than the car might be available to them, particularly for shorter journeys.

The West Midlands TravelWise Group and Wolverhampton TravelWise work closely with Local Authorities in the Region, Centro and Public Transport Operators to improve conditions for people who walk, cycle and use public transport. Centro and Travel West Midlands are key partners in Company TravelWise and offer discounts to the employees of those organisations that sign up to the scheme.

7.8 Help2Travel

The Help2Travel website provides travel information to the public and has been developed as part of a European project for intelligent transport information systems. It provides users with a comprehensive overview of traffic & travel in the West Midlands region. It includes information about roadwork's and incidents on the region's roads, real-time train and bus information, as well as information & links to car parking, cycling and air quality information.

The system also enables up to the minute travel information to be exchanged easily between transport authorities, allowing them to respond more quickly and efficiently to travel problems.

8 Climate Change Strategies

8.1 Climate Local, Wolverhampton

Climate Local is an initiative run by the Local Government Association to support councils in reducing carbon emissions and improving resilience to the effects of climate.

In April, 2013 the leaders of the council's three political parties signed the Climate Local Wolverhampton commitment on behalf of the city council which commits the council to work to address both the causes and impacts of climate change.

8.2 Sustainability Strategy and Implementation Plan

The Sustainability Strategy and Implementation Plan will focus initially on the city council’s own activities and is accompanied by an Implementation Plan that will deliver major changes. It supersedes the following documents which have been withdrawn as council policy:

- Sustainability Charter
- Wolverhampton Declaration on Climate Change
- Carbon Management Strategy and Implementation Plan
- Wolverhampton Environment Strategy
- Climate Change Strategy and Action Plan for Wolverhampton

Other strategies and action plans will remain and be reviewed and replaced as appropriate as part of the Implementation Plan.

8.3 The Black Country Joint Core Strategy

The Core Strategy identifies the main ways in which activity in The Black Country contributes towards climate change, together with ways of reducing and adapting to climate change.

8.4 The West Midlands Regional Spatial Strategy (RSS, 2004)

This strategy provides a regional strategic context for local planning decisions, and has a responsibility to help meet national targets for the reduction of greenhouse gases. The Regional Planning Body is expected to consider how the region's activities contribute towards climate change and how the region might be vulnerable to the impacts of climate change, by working with partners to develop a realistic and responsible approach to climate change in the region. This will require establishing comprehensive and up to date data in order to enable the local authorities and agencies to develop coordinated and effective solutions. Guiding principles were used in developing the Spatial Strategy to ensure that policies to assist the reduction of greenhouse gas emissions are an integral part of the West Midlands Regional Spatial Strategy.

8.5 The Wolverhampton City Strategy 2011-2026

The City Strategy 2011-2026, launched in October 2011, is the overarching strategy for the city council and the wider Wolverhampton Partnership. This superseded the Sustainable Communities Strategy. It has an overarching goal of 'Prosperity for all' with three Key Themes and priority actions relevant to sustainable development:
Theme 1: Encouraging Enterprise and Business
Theme 2: Empowering People and Communities
Theme 3: Re-invigorating the City

9 Implementation of Action Plans

The council has completed phase 1 of the interchange project. This has provided improved linkages into the bus station from the city's ring road and has significantly reduced the amount of bus traffic within the town centre. Air quality has improved significantly with the number of locations exceeding the objectives within the town centre area dropping from 18 in 2009 prior to the start of the interchange project, to 1 in 2013.

The council is working closely with the regional West Midlands group authorities to develop a low emissions strategy for the West Midlands as discussed in chapter 4 of this document.

The LETCP published the "Good Practice Air Quality Planning Guidance" in May 2014, and intends to publish a good practice guide for procurement together with an over-arching Low Emissions Strategy document in 2015. The low emissions strategy is intended to form the basis of future revisions to the action plan.

10 Conclusions and Proposed Actions

10.1 Conclusions from New Monitoring Data

The Council has carried out a comprehensive review of all monitoring data gathered during 2013. Areas where the air quality objectives are not being met have been identified together with any significant trends.

10.1.1 Nitrogen dioxide data

Data collected since the previous Updating and Screening Assessment has shown that the number of locations exceeding the air quality objective for nitrogen dioxide has reduced significantly: In 2013 the following relevant locations were exceeding the objective:

Road side ISA's:

- BRO Broad Street
- Penn Road/Goldthorne Hill/Coalway Road Junction

10.1.2 PM_{10} data

A review of the collected data has shown that there have been no exceedences of the PM_{10} air quality objectives. A detailed examination of trend data has shown that there has been a significant reduction in PM_{10} concentrations in real terms over the last 10 years.

The Council has concluded that PM_{10} concentrations are meeting the air quality objectives.

10.2 Conclusions relating to New Local Developments

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

10.3 Proposed Actions

- The review of monitoring data obtained during 2013 has not identified the need to proceed to a detailed assessment for any of the pollutants listed.

- The new monitoring data has not identified the need for any additional monitoring or changes to the existing monitoring programme.

- The new monitoring data has not identified the need for any changes to the existing AQMA.

- The council will review the PM_{10} data for a further 12 months with the intention of considering amending the AQMA in relation to this pollutant.

- Wolverhampton City Council intends to submit the 2015 Updating and Screening Report as required by the review and assessment process.

11 References

(1) Local Air Quality Management – Technical Guidance LAQM.TG(09), Department for Environment, Food and Rural Affairs 2009.

(2) Technical Guidance: Screening Assessment for Biomass Boilers, AEA Energy & Environment 2008

(3) 2012 Air Quality Updating and Screening Assessment for Wolverhampton City Council

(4) LAQM Tools; Local Air Quality Management website www.airquality.co.uk

(5) Diffusion Tubes for Ambient NO_2 Monitoring: Practical Guidance for laboratories and Users. Report to Defra and the Devolved Administrations ED48673043 Issue 1a Feb 2008.

Appendix A: QA:QC Data

Diffusion Tube Bias Adjustment Factors

Diffusion tubes are supplied and analysed by Gradko International Ltd. and are prepared using 50% TEA in acetone. The national 2013 bias adjustment factor for the tubes obtained from the review & assessment database version number 09/14, is 1.01.

Factor from Local Co-location Studies

Triplicate tubes are exposed at the automatic monitoring stations in order to calculate a bias correction factor. The correction factor is applied to the yearly average to enable comparison with the annual NO_2 objective. The results from the co-location studies for 2013 are shown in the Table A1.1. The local bias adjustment factor for 2013 is 0.92.

Table A1.1 Chemiluminescent v's Diffusion Tube Values 2013 (µg/m^3)

Site	Mean	Jan	Feb	Mar	April	May	June	July	Aug	Sept	Oct	Nov	Dec	% data
Automatic Monitor Intercomparison: Diffusion Tube Values µg/m^3														
Lichfield St	**40**	39	50	50	48	39	37	43	42	39		57	33	92
Lichfield St	**39**	45	60	48	34	38	39	43	38	42	36	56	36	100
Lichfield St	**40**	47	49	46	44	38	38	45	38	44	40	56	33	100
Mean		44	53	48	42	38	38	44	39	42	38	56	34	
Standard deviation		3.9	6.1	2.0	6.9	0.7	0.8	1.2	2.0	2.1	3.0	0.6	1.5	
Coefficient of variation		8.9	11.6	4.2	16.5	1.8	2.0	2.7	5.1	5.1	7.9	1.1	4.5	
Data quality		Good	Good	Good	Good	Good	Good	Good	Good	Good	Good	Good	Good	
Stafford Rd	**32**	38	44	30	34	28	28	32	34	36	36	44	38	100
Stafford Rd	**32**	38	38	31	34	35	28	32	34	37	33	47		92
Stafford Rd	**32**	39	40	36	30	31	27	31	35	34	34	45	34	100
Mean		38	41	32	32	31	28	32	34	36	34	45	36	
Standard deviation		0.6	2.6	3.3	2.4	3.3	0.7	0.4	0.6	1.2	1.5	1.2	2.6	
Coefficient of variation		1.6	6.5	10.1	7.3	10.6	2.4	1.3	1.8	3.5	4.3	2.6	7.2	
Data quality		Good	Good	Good	Good	Good	Good	Good	Good	Good	Good	Good	Good	
Mean of triplicate tubes														
Lichfield St	**43**	44	53	48	42	38	38	No result	39	42	38	56	34	
Stafford Rd	**35**	38	41	32	32	31	28	32	34	36	34	45	36	
Monthly Chemiluminescent Values														
Lichfield St	**48**	55	55	34	36	34	44	No result	38	32	40	27	48	92
Stafford Rd	**36**	36		31	27	23	29	29	34	31	44	31	36	92
Ratios of diffusion Tube Values:Chemiluminescent values														
Lichfield St	**0.93**	1.09	1.04	1.15	0.82	0.94	0.90	1.01		0.92	0.85	0.71	0.78	
Stafford Rd	**0.90**	0.95	0.89		0.94	0.86	0.83	0.91	0.83	0.96	0.90	0.97	0.85	
Bias	**0.92**													

Discussion of Choice of Factor to Use

A comparison of the relevant bias adjustment factors is shown in Table A1.2. The national factors have been calculated using data from a number of authorities with tubes which will have been prepared and analysed in different batches and at different times.

The local bias adjustment factors are derived from triplicate co-located tubes exposed alongside automatic analysers at Lichfield St and Stafford Rd. These tubes are from the same batch as the measurement tubes and are handled, stored and analysed in the same way.

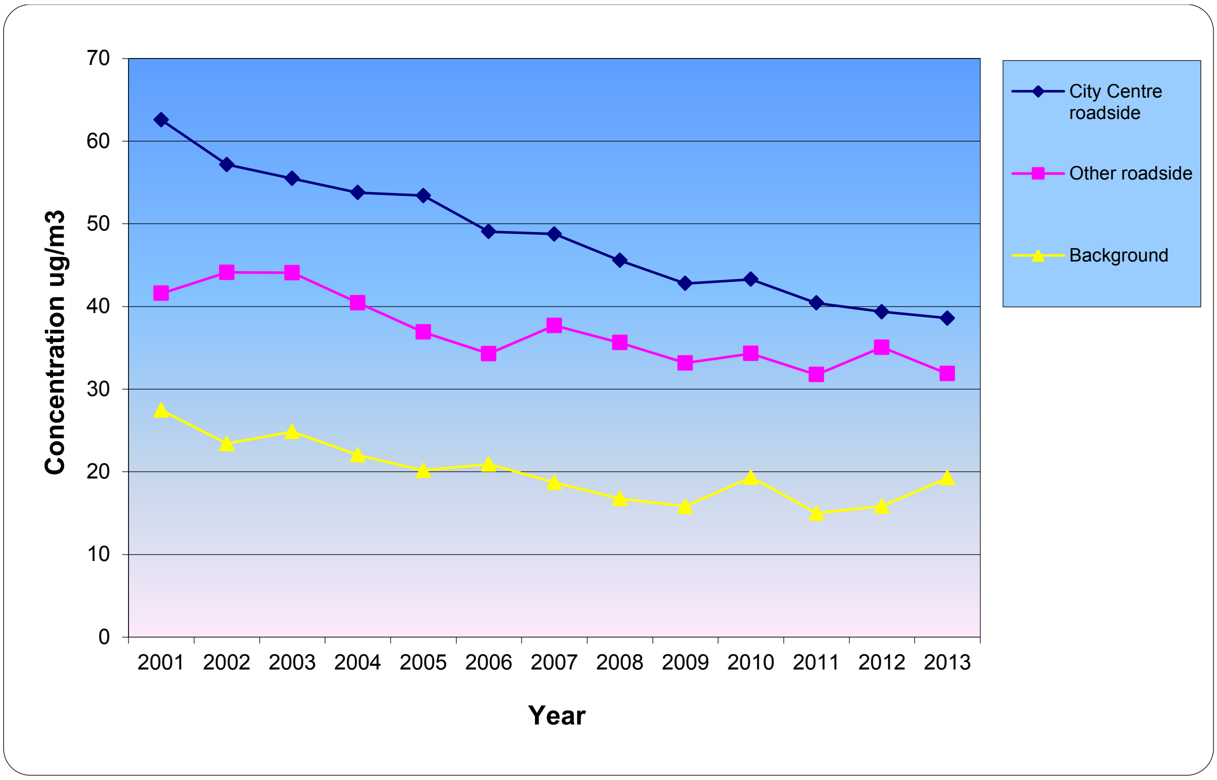
Table A1.2 National and Local Bias Adjustment Factors.

Year	National Bias Adjustment Factor	Local Bias Adjustment Factor
2001	1.45	1.01
2002	1.27	0.95
2003	1.11	0.97
2004	1.10	0.93
2005	1.10	1.00
2006	1.01	1.03
2007	0.99	0.93
2008	0.94	0.97
2009	0.97	1.08
2010	0.99	0.97
2011	0.94	0.89
2012	1.02	1.05
2013	1.01	0.92
Mean	1.07	0.98
Std	0.15	0.05

The nationally derived bias adjustment factors prior to 2006 suggest that the tubes were significantly under reading, which is not our experience at Wolverhampton. This is particularly evident in 2001 and 2002 when the tubes appeared to under read by 45% and 27% respectively.

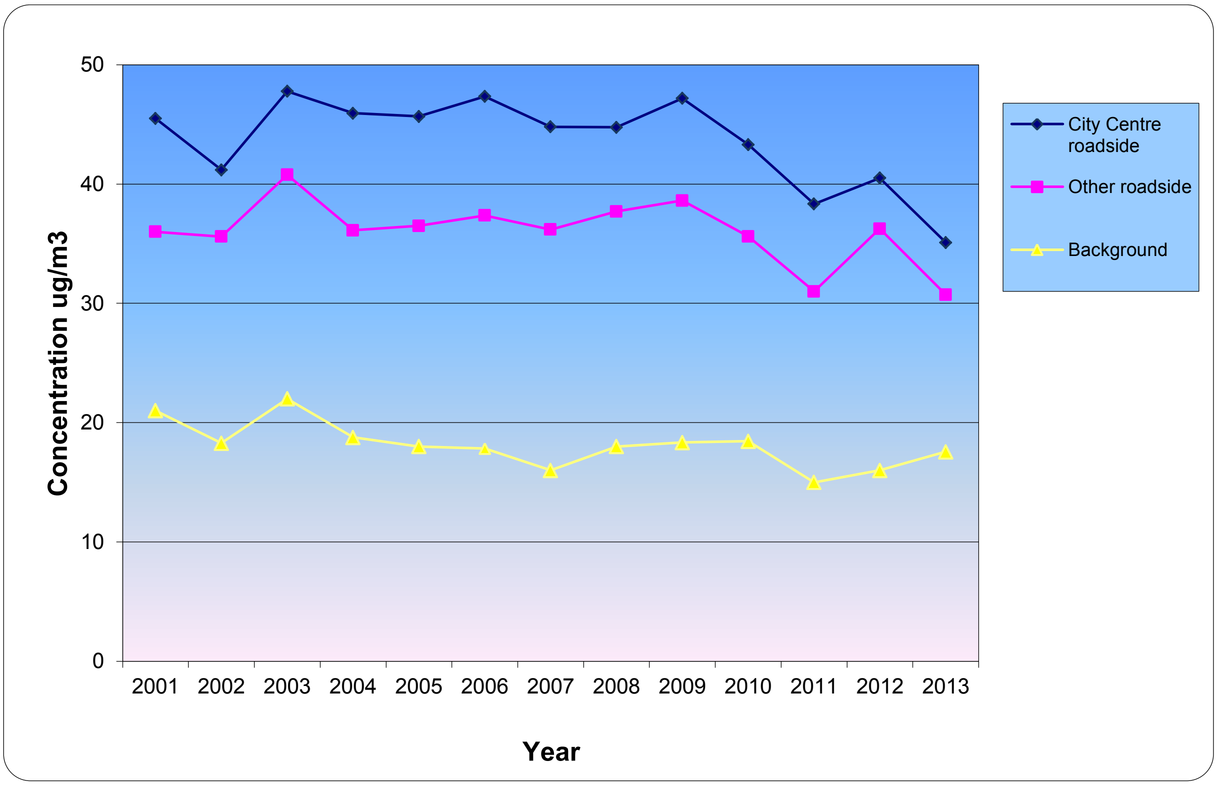
Trend data using both correction factors is presented in Figures A1.1 and A1.2. This shows that the national correction factor artificially raises the NO_2 concentrations at the start of the period, and produces an overall downward trend of between 10 and 20 $\mu g/m^3$ (Figure A1.1).

Figure A1.1 Annual Mean NO_2 Values - National Bias Adjustment Factor.



The diffusion tube NO_2 concentrations corrected with the locally derived adjustment factors (Figure A1.2) show trend data which is more consistent with the data from the automatic analysers. The locally corrected data provides better resolution and a clearer picture of NO_2 fluctuations and trends. Based on this assessment the local correction factors have been used to correct the diffusion tube data.

Figure A1.2 Annual Mean NO_2 Values - Local Bias Adjustment Factor.



PM Monitoring Adjustment

Particle monitoring is carried out using Tapered Element Oscillating Microbalance (TEOM) analysers. Data for 2009 onwards has been corrected using the volatile correction model (VCM) as required by LAQM.TG(09).

Short-term to Long-term Data adjustment

Data capture for the diffusion tube site CC6 was below the minimum requirement of 75% data capture. The results have been adjusted to provide an estimated annual mean concentration in accordance with the method outlined in Box 3.2 of the guidance manual, using data from the closest available continuous monitoring background sites. The correction factor is calculated below.

Table A.1.3 Short-Term to Long-Term Monitoring Data Adjustment for diffusion tube site ref CC6

Site	Site Type	Annual Mean (μg/m^3)	Period Mean (μg/m^3)	Ratio
Birmingham Tyburn Rd	Background urban	32.3	34.69	1.02
Birmingham Acocks Green	Background urban	31.8	27.10	1.06
Average				**1.04**

QA/QC of automatic monitoring

The chemiluminescent monitors are calibrated on a daily basis using on site calibration gases. This involves feeding a zero air gas, followed by a span gas containing a known concentration of NO_2, through the analyser. A correction factor is then applied based on the analyser's response. The calibration reports are checked on a daily basis to check for drift and the correct application of the correction factor. Data is stored in both the raw and corrected form.

A site visit is made every month to change filters and carry out a manual calibration, which is checked against the automatic daily calibrations. Copies of the calibration reports, calibration gas logs and engineer's reports are retained on file.

All the sites are covered by a service contract provided by Enviro Technology Services plc (ET). The sites are serviced every 6 months by an ET service engineer in accordance with the manufacturer's instructions and warranty conditions. ET also provide a 48-hour call out response to cover breakdowns.

The aim is to achieve 90% data capture and in order to minimise the loss of data the procedures in box A1.4: of LAQM.TG(09) have been adopted.

Raw data is examined on a daily basis to screen out spurious and unusual measurements having regard to the recommendations in Box A1.6 of LAQM.TG(09).

QA/QC of diffusion tube monitoring

Diffusion tubes are supplied and analysed by Gradko International Ltd. in accordance with the procedures set out in the harmonisation document: “Diffusion Tubes for Ambient NO_2 Monitoring: Practical Guidance”.

Gradko International Ltd is a UKAS and Workplace Analysis Scheme for Proficiency (WASP) accredited laboratory and is one of a number of laboratories which take part in the UK NO_2 diffusion tube survey.

The WASP scheme involves the use of artificially spiked diffusion tubes to test the analytical performance of the laboratory on a quarterly basis. A summary of the performance in rounds 120 - 123 covering 2013 has been obtained from the Local Authority Air Quality Support web site. During this period 100% of the results submitted were determined to be **satisfactory** based upon a z-score of □± 2. The results indicate that Gradko’s analytical procedures do not have any systematic sources of bias.

The results from the nitrogen dioxide diffusion tube collocation studies for Gradko obtained from the LAQM support web site show the laboratory as generally having good precision.

Summary of Precision Results for Nitrogen Dioxide Diffusion Tube Collocation Studies, by Laboratory

The tubes arrive from Gradko and are stored in a refrigerator prior to being labelled with a site and date code. The tubes are then exposed in accordance with the start and end dates for the national NO_2 survey. Following exposure the tubes are capped and immediately dispatched to Gradko for analysis.

Triplicate tubes are exposed at the chemiluminescent monitoring stations in order to calculate bias correction which is applied to the yearly average to enable comparison with the annual NO_2 objective. The data from the duplicate and triplicate tubes covering the period of this report show that 92% of results have good precision.

CITY OF WOLVERHAMPTON COUNCIL

2015 Air Quality Updating and Screening Assessment for: Wolverhampton City Council

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

January 2016

Local Authority Officer	Anna Spinks Dean Gooch
Department	Public Protection
Address	Wolverhampton City Council, Civic Centre, St Peter's Square, Wolverhampton, WV1 1DA
Telephone	01902 551155
e-mail	environmentalhealth@wolverhampton.gov.uk
Report Reference number	WCCUSA2015
Date	January 2016

Executive Summary

This report has been produced as part of the on-going process of the review and assessment of air quality within the city of Wolverhampton.

The report presents monitoring data for the year 2014 and considers any new local developments which have taken place in the city since the previous Updating and Screening Assessment published in December 2012.

A review of emission sources has found that there have been no new industrial processes, or any other significant sources granted planning approval which could contribute to poor air quality since the last Updating and Screening Assessment.

A comprehensive review of all monitoring data collected since the previous Updating and Screening Assessment (USA) in 2012 has been carried out. Areas where the air quality objectives are not being met have been identified, together with any significant trends.

Recent monitoring data has identified that air quality improved across the city since the previous USA, resulting in a reduction in the number of areas which are exceeding the objectives for nitrogen dioxide.

The report has not identified any new areas where the nitrogen dioxide objectives are being exceeded; consequently the council has concluded that a detailed assessment for this pollutant will not be required.

A detailed assessment of PM_{10} concentrations has confirmed that PM_{10} concentrations are consistently meeting the air quality objectives. The council has decided to continue to monitor the levels of this pollutant for a further twelve months prior to considering what action to take regarding the air quality management area with respect to this pollutant.

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1 Introduction

1.1 Description of Local Authority Area

Located to the north of the West Midlands conurbation, Wolverhampton is on the edge of the Black Country, some 15 miles from the regional centre of Birmingham. Wolverhampton functions as a major centre for the Black Country and the northern part of the West Midlands.

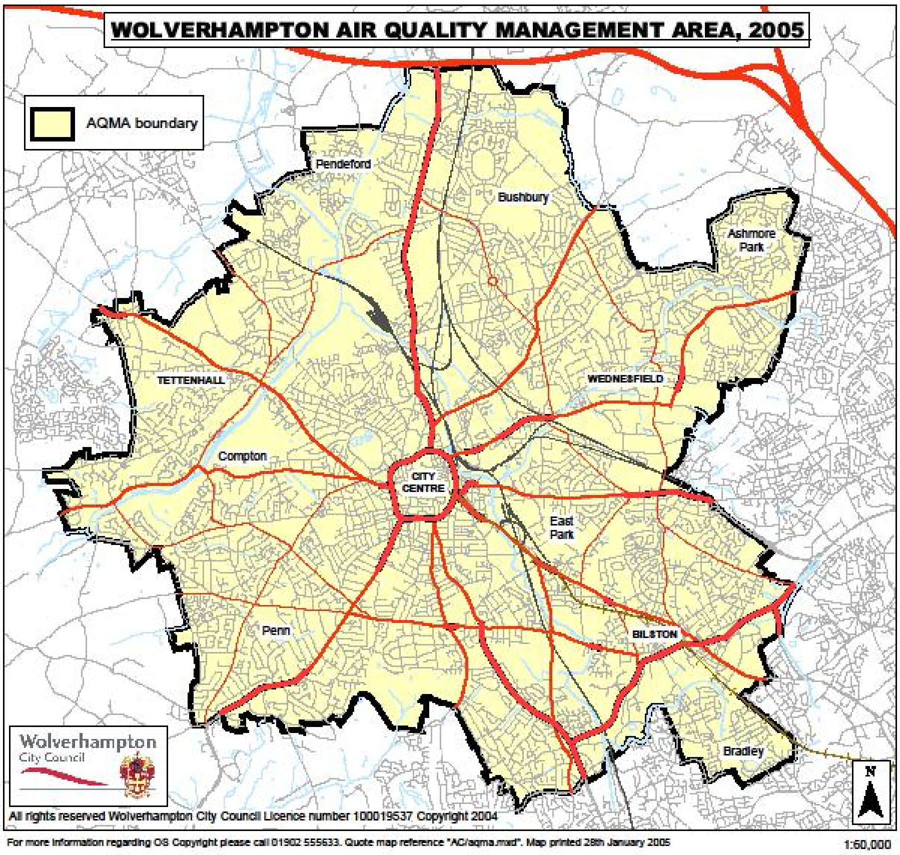
The City covers an area of 26 square miles (6,880 hectares) and has a population of around 250,000 residents. Wolverhampton is primarily an urban area with the majority of the land use being residential and industrial. However, there are areas of green space, allotments, and sports grounds, isolated pockets of countryside, small lakes and ponds and farm land which make up approximately 13% of the city. These provide a variety of habitats for a wide range of plant and animal species.

Wolverhampton benefits from good communication links, with access to the national motorway network provided by the M6 and M6 toll to the east and the M54 to the north. Wolverhampton also has a mainline railway station, which provides direct trains to Birmingham, London, the West Country and the north. Proposals are currently underway to introduce a number of improvements to the railway station and its environs through the 'Wolverhampton Interchange' project.

The principal pollutant affecting the local air quality in Wolverhampton is nitrogen dioxide (NO_2). The major source of this pollutant is road traffic and there are a number of roads within the city where the air quality objective for NO_2 is being exceeded. These are primarily narrow congested streets within the city centre which have high levels of bus traffic. In response the Council declared the whole city an Air Quality Management Area (AQMA) in March 2005.

An Air Quality Action Plan (AQAP) has been prepared in conjunction with an Air Quality Stakeholder Group with close reference to the West Midlands Local Transport Plan.

Figure 1.1 Map of AQMA Boundaries



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 which may require a detailed assessment to determine their impact on air quality.

1.3 Air Quality Objectives

The air quality objectives applicable to LAQM **in England** are set out in the Air Quality (England) Regulations 2000 (SI 928), The Air Quality (England) (Amendment) Regulations 2002 (SI 3043), and are shown in Table 1.1. This table shows the objectives in units of microgrammes per cubic metre $\mu g/m^3$ (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 $\mu g/m^3$	Running annual mean	31.12.2003
	5.00 $\mu g/m^3$	Running annual mean	31.12.2010
1,3-Butadiene	2.25 $\mu g/m^3$	Running annual mean	31.12.2003
Carbon monoxide	10.0 mg/m^3	Running 8-hour mean	31.12.2003
Lead	0.5 $\mu g/m^3$	Annual mean	31.12.2004
	0.25 $\mu g/m^3$	Annual mean	31.12.2008
Nitrogen dioxide	200 $\mu g/m^3$ not to be exceeded more than 18 times a year	1-hour mean	31.12.2005
	40 $\mu g/m^3$	Annual mean	31.12.2005
Particles (PM_{10}) (gravimetric)	50 $\mu g/m^3$, not to be exceeded more than 35 times a year	24-hour mean	31.12.2004
	40 $\mu g/m^3$	Annual mean	31.12.2004
Sulphur dioxide	350 $\mu g/m^3$, not to be exceeded more than 24 times a year	1-hour mean	31.12.2004
	125 $\mu g/m^3$, not to be exceeded more than 3 times a year	24-hour mean	31.12.2004
	266 $\mu g/m^3$, not to be exceeded more than 35 times a year	15-minute mean	31.12.2005

1.4 Summary of Previous Review and Assessments

Assessment	Exceedences	Conclusions and Recommendations
Stage 1 Report-March 1999	Non	The report Identified 54 roads and 143 industrial processes within Wolverhampton which have the potential to be significant sources of pollution.
Stage 3 Report July 2001	Non	A recommendation to carryout detailed investigations regarding the levels of NO_2 to confirm the prediction of the model. Further monitoring for NO_2 and PM_{10} is required along busy roads and roads with high flows of bus traffic
USA May 2003	Nitrogen dioxide, particles	Identified certain areas within the city where the objectives are likely to be exceeded. A Detailed Assessment of NO_2 and PM_{10} is required for parts of the city Centre and two of the busiest junctions.
Detailed Assessment 2004	Nitrogen dioxide, particles	The Detailed Assessment confirmed that the objectives for NO_2 and PM_{10} were not being met along certain roads within the city centre and recommended the declaration of an AQMA
Section 83 (1) March 2005	Nitrogen dioxide, particles	Order designating the city of Wolverhampton an Air Quality Management Area (Appendix 1)
Annual Progress Report 2005	Nitrogen dioxide, particles	Confirmed conclusions of the Detailed Assessment and highlighted three new key developments for consideration in the 2006 USA
USA, Stage 4 Assessment and Action Plan 2006	Nitrogen dioxide, particles	Analysis of monitoring data showed that NO_2 concentrations had reduced from 2003 peak levels but continued to exceed the objectives at certain locations within the city. The levels of PM_{10} fell below the objectives during 2004 and 2005 and projected figures indicated a continuing downward trend. Nine new developments which required air quality assessments were considered. It was concluded that the developments would not result in the air quality objectives being exceeded. The action plan listed 23 actions and incorporated the Local Transport Plan into the long term air quality strategy.
Progress Report 2007	Nitrogen dioxide, particles	Monitoring data for 2006 showed the levels of NO_2 and PM_{10} increased contrary to the projected concentrations contained in the 2006 USA. Parts of the city Centre and certain busy road junctions continue to exceed the objectives for NO_2 and PM_{10}. There have been no new industrial processes or any other significant developments which could contribute to poor air quality since the 2006 USA.
Progress Report 2008	Nitrogen dioxide, particles	Levels of NO_2 and PM_{10} remain stable. There have been no new industrial processes or any other significant developments which could contribute to poor air quality since the 2006 USA.

Assessment	Exceedences	Conclusions and Recommendations
USA, Stage 4 Assessment and Action Plan 2009	Nitrogen dioxide	There are no new or significantly changed sources which could give rise to any potential exceedences outside the existing AQMA and therefore, it is not necessary to proceed to a Detailed Assessment for any of the pollutants listed in Table 1.1 Additional monitoring, or changes to the existing monitoring programme is not required.
Progress Report 2010	Nitrogen dioxide	Monitoring data for 2009 has identified that air quality improved across the city during 2009. This has resulted in a reduction in the number of areas within Wolverhampton which are exceeding the objectives. Wolverhampton City Council has concluded that a detailed assessment will not be required.
USA 2012	Nitrogen dioxide	Monitoring data for 2011 has identified that air quality improved across the city during 2011. This has resulted in a reduction in the number of areas within Wolverhampton which are exceeding the objectives. Wolverhampton City Council has concluded that a detailed assessment will not be required.
Progress Report 2013	Nitrogen dioxide	Monitoring data for 2012 has identified that there was a small increase in nitrogen dioxide and particle concentrations across the city in 2012 compared with 2011. This was caused by weather patterns during 2012 which hampered the dispersion of pollutants and has resulted in 6 locations which are exceeding the objective for nitrogen dioxide A comprehensive review of sources of both pollutants has been carried out and there is no evidence to suggest that emissions have increased.
Progress Report 2014	Nitrogen dioxide	The levels of nitrogen dioxide have reduced since the previous progress report. This has resulted in the number of locations exceeding the objective level for nitrogen dioxide falling from 6 to 2. The improvements brought about by the completion of phase 1 of the interchange project have continued. All roads within the city centre with the exception of Broad Street are now compliant. Wolverhampton City Council has concluded that a detailed assessment will not be required.

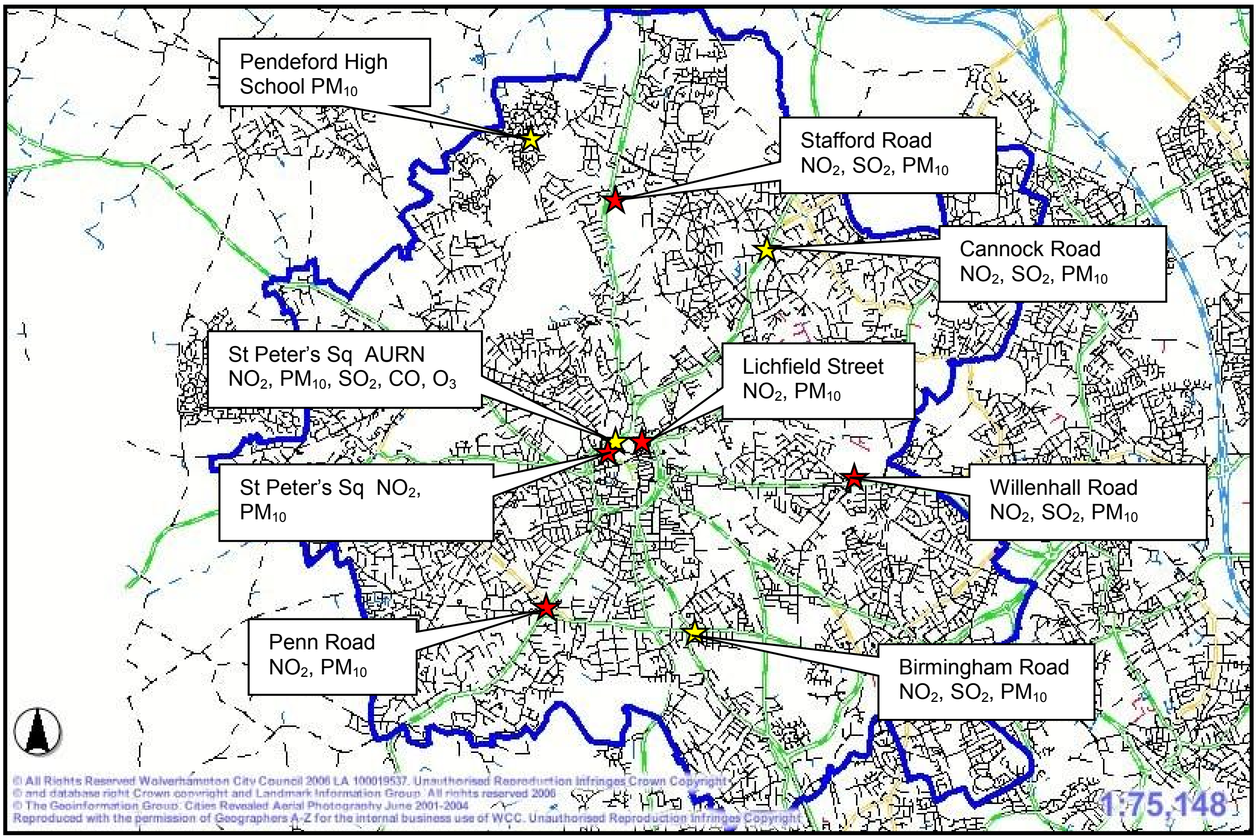
2 New Monitoring Data

2.1 Summary of Monitoring Undertaken

2.1.1 Automatic Monitoring Sites

Wolverhampton Council operates 5 fully automatic monitoring stations, the locations of which are shown in Figure 2.1 below. These sites have been chosen to represent the worst case locations and cover the main arterial roads which link the city with major regional trunk roads and motorways. Details of the sites are given in Table 2.1.

Figure 2.1 Location of Automatic Monitoring Sites



★ Current automatic monitoring sites

☆ Closed automatic monitoring sites

— Wolverhampton City Boundary

Fixed stations are located on the A449 Stafford Road to the north which links with the M54, the A449 Penn Road to the south, and Lichfield Street which was the main access road into the bus station and has a high flow of bus traffic.

The Council also operates a mobile monitoring station which is currently located on the A454 Willenhall Road, a main link to the M6 and Walsall. Prior to this, the mobile station was located on the A4123 Birmingham New Road and the A460 Cannock Road.

An additional station is located at St Peter's Square in the city centre. This site is 30m from the ring road and is classified as an urban background site.

Table 2.1 Details of Automatic Monitoring Sites

Site ID	Site Name	Site Type	X OS Grid Reference	Y OS Grid Reference	Inlet Height (m)	Pollutants Monitored	In AQMA?	Monitoring Technique	Relevant Exposure? (Y/N with distance (m) from monitoring site to relevant exposure)	Distance to Kerb of Nearest Road (m) (N/A if not applicable)	Does this Location Represent Worst-Case Exposure?
Active sites											
A1	Lichfield Street	Roadside	391647	298784	2.5	NO_2 PM_{10}	Yes	Chemiluminescent TEOM	Yes (2m)	2m	Yes
A2	Penn Road	Roadside	390374	296775	2.5	NO_2 PM_{10}	Yes	Chemiluminescent TEOM	No	6.5m	Yes
A4	Stafford Road	Roadside	391261	302199	2.5	NO_2 SO_2 PM_{10}	Yes	Chemiluminescent UV Fluorescence TEOM	Yes (5m)	8.5m	Yes
A5	Willenhall Road	Roadside	394754	298429	2.5	NO_2 SO_2 PM_{10}	Yes	Chemiluminescent UV Fluorescence TEOM	Yes (5m)	9.5m	Yes
A9	St Peter's Square	Urban Background	390740	302692	2.5	NO_2 PM_{10}	Yes	Chemiluminescent TEOM	No	30m	No

Site ID	Site Name	Site Type	X OS Grid Reference	Y OS Grid Reference	Inlet Height (m)	Pollutants Monitored	In AQMA?	Monitoring Technique	Relevant Exposure? (Y/N with distance (m) from monitoring site to relevant exposure)	Distance to Kerb of Nearest Road (m) (N/A if not applicable)	Does this Location Represent Worst-Case Exposure?
Closed sites											
A3	Pendeford High School	Background	390740	302692	2.5m	PM_{10}	Yes	TEOM	No	180m	No
A6	Cannock Road	Roadside	393030	300824	2.5m	NO_2 SO_2 PM_{10}	Yes	Chemiluminescent UV Fluorescence TEOM	Yes (11m)	6m	Yes
A7	Birmingham Road	Roadside	392264	296546	2.5m	NO_2 SO_2 PM_{10}	Yes	Chemiluminescent UV Fluorescence TEOM	Yes (3m)	6m	Yes
A8	St Peter's Square AURN	Urban Centre	391357	298939	2.5m	NO_2 SO_2 PM_{10} CO O_3	Yes	Chemiluminescent UV Fluorescence TEOM	No	30m	No

2.1.2 Non-Automatic Monitoring Sites

To complement the automatic sites, NO_2 sampling is also carried out using passive diffusion tubes which are supplied and analysed by ESG. The council has tubes at 54 locations around the city, which are detailed in Table 2.2.

The sites represent a combination of background, intermediate, and roadside locations intended to reflect the worst case situation where the general public are likely to be exposed.

Following the 2001 Stage 3 report a number of roads were designated as intensive survey areas (ISA’s). The roads which have been targeted are the main arterial routes into the city centre and those streets which are narrow and congested or have a high proportion of heavy duty vehicles (HDV’s). A total of 5 diffusion tubes have been located in a “W” formation along each of these roads.

Wherever possible, diffusion tubes are located on the façades of residential property. Where this is not possible tubes are attached to lampposts or other suitable street furniture.

Since the previous updating and screening assessment in 2012, 8 sites have been closed and the tubes relocated. These sites were in locations were the NO2 concentrations had dropped significantly or were well below the objective level. The tubes from these sites have been relocated to new sites within the city centre, to assess the impact of the changes to the traffic flow within the ring road.

These changes are detailed in Figure 2.2 and 2.3 and involve the creation of a new one way system, pedestrian zones and new bus stops along Princess Street, Market Street and Queen Street. This has reduced vehicle traffic within the city centre, particularly on Princess Street.

Figure 2.2 Wolverhampton City Centre Scheme

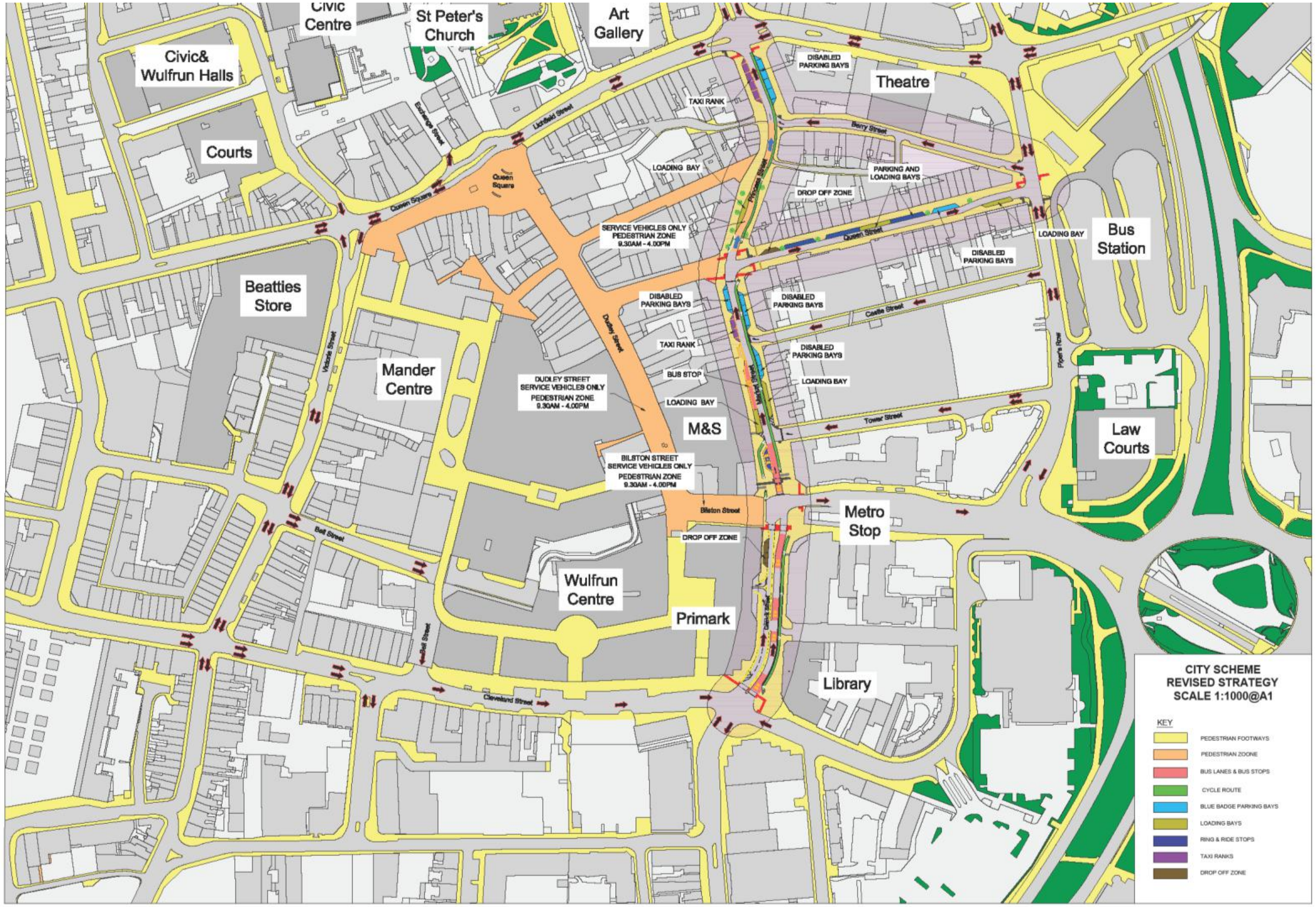
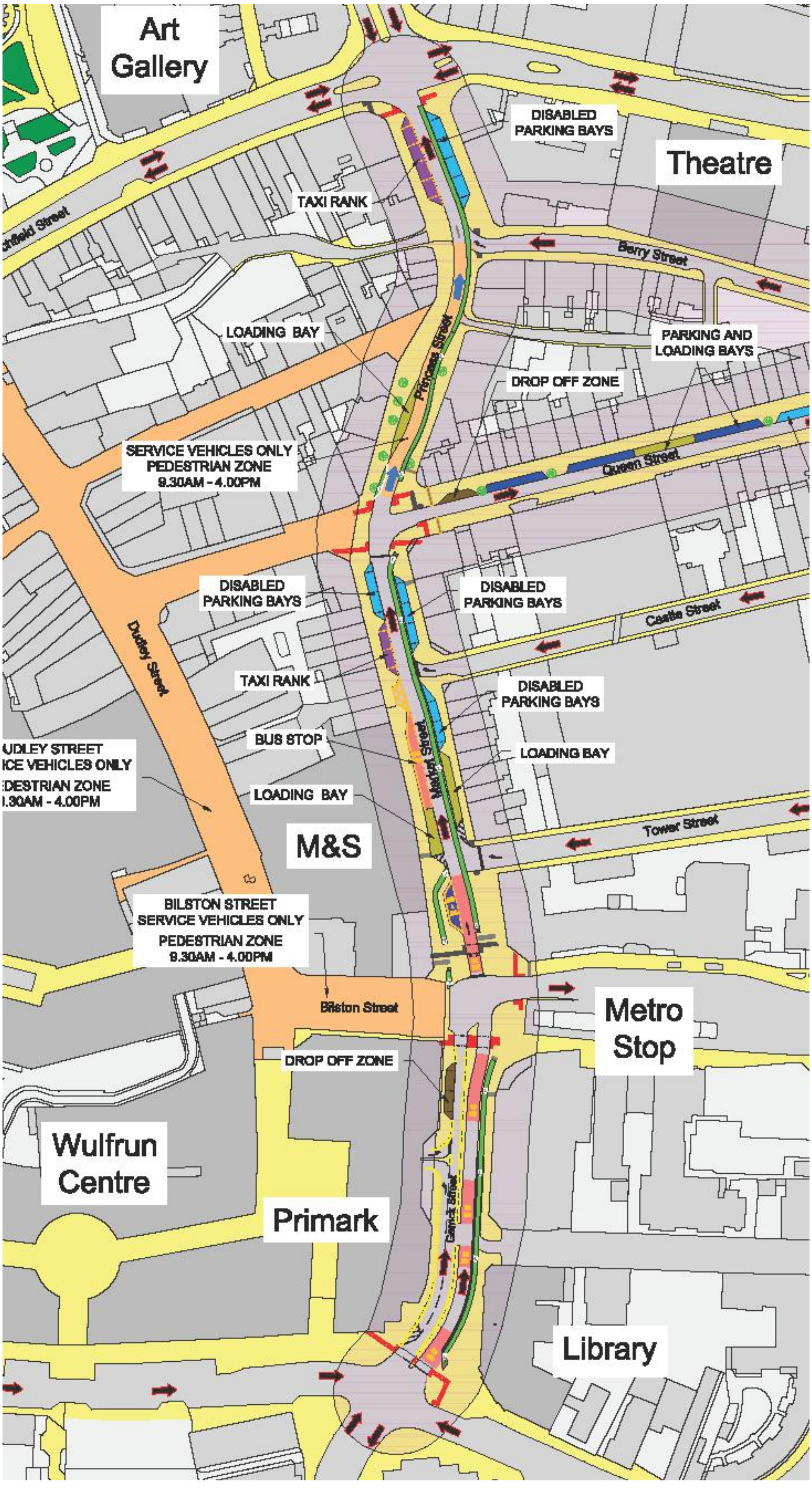


Figure 2.3 Wolverhampton City Centre scheme expanded view



A new site has also been started at the junction with Penn Rd and Goldthorn Hill on the opposite corner to the Penn Road automatic monitoring station. This site better reflects the exposure at the nearest residential property to the junction.

It is not possible to locate the automatic monitoring station on the same side of the junction as the residential property as the foot path is too narrow. This has led to concerns that the results are over estimating the exposure at 197 Goldthorn Hill, which is the closest residential property to the junction. The new site is on the next door commercial property as it was not possible to obtain permission to site the tube on 197 Goldthorn Hill. The location of the new site relative to the junction and residential property is shown in Figure 2.4.

Figure 2.4 Penn Road/Goldthorn Hill Junction layout

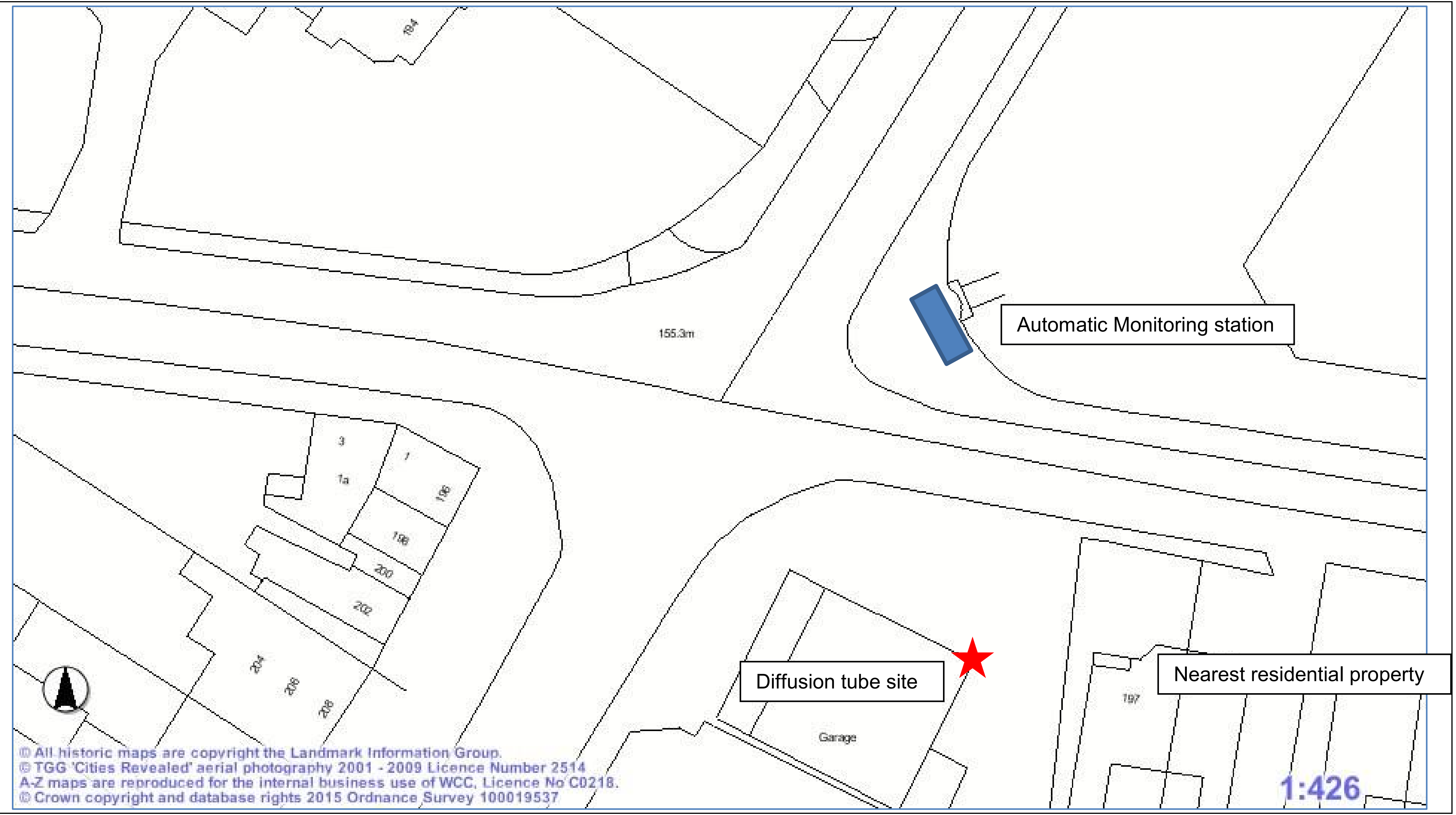


Table 2.2 Details of Non- Automatic Monitoring Sites

Site ID	Site Type	X OS Grid Reference	Y OS Grid Reference	Site Height (m)	Pollutants Monitored	In AQMA?	Is Monitoring Co-located with a Continuous Analyser (Y/N)	Relevant Exposure? (Y/N with distance (m) from monitoring site to relevant exposure)	Distance to Kerb of Nearest Road (m) (N/A if not applicable)	Does this Location Represent Worst-Case Exposure?
Active sites - existing										
BIL1	Roadside ISA	395057	296541	3m	NO_2	Y	N	Y(0m)	4m	Y
BIL2	Roadside ISA	395085	296475	3m	NO_2	Y	N	Y(0.5M)	4.5m	Y
BIL3	Roadside ISA	395102	296495	3m	NO_2	Y	N	N	10m	Y
BIL4	Roadside ISA	395117	296454	3m	NO_2	Y	N	Y(0m)	2.5m	Y
LIC1	Roadside ISA	391698	298776	3m	NO_2	Y	N	N	3.5m	Y
LIC2	Roadside ISA	391508	298744	3m	NO_2	Y	N	Y(0m)	3m	Y
LIC3	Roadside ISA	391620	298772	3m	NO_2	Y	N	N	6m	Y
LIC4	Roadside ISA	391643	298786	3m	NO_2	Y	Y	Y(1.5m)	1.5m	Y
LIC5	Roadside ISA	391643	298786	3m	NO_2	Y	Y	Y(1.5m)	1.5m	Y
LIC6	Roadside ISA	391643	298786	3m	NO_2	Y	Y	Y(1.5m)	1.5m	Y
LIC7	Roadside ISA	391663	298766	3m	NO_2	Y	N	N	5m	Y
LIC8	Roadside ISA	391454	298733	3m	NO_2	Y	N	N	3m	Y
LIC9	Roadside ISA	391706	298757	3m	NO_2	Y	N	N	3m	Y
PIP1	Roadside ISA	391768	298662	3m	NO_2	Y	N	N	2m	Y
PRI1	Roadside ISA	391548	298940	3m	NO_2	Y	N	N	3m	Y
PRI2	Roadside ISA	391566	298795	3m	NO_2	Y	N	Y(0m)	3m	Y
PRI4	Roadside ISA	391581	298686	3m	NO_2	Y	N	N	5m	Y

Site ID	Site Type	X OS Grid Reference	Y OS Grid Reference	Site Height (m)	Pollutants Monitored	In AQMA?	Is Monitoring Co-located with a Continuous Analyser (Y/N)	Relevant Exposure? (Y/N with distance (m) from monitoring site to relevant exposure)	Distance to Kerb of Nearest Road (m) (N/A if not applicable)	Does this Location Represent Worst-Case Exposure?
QUE1	Roadside ISA	391607	298652	3m	NO_2	Y	N	Y(0m)	2.5m	Y
QUE2	Roadside ISA	391622	298639	3m	NO_2	Y	N	N	4.5m	Y
QUE3	Roadside ISA	391662	298665	3m	NO_2	Y	N	Y(0m)	2.5m	Y
QUE4	Roadside ISA	391707	298660	3m	NO_2	Y	N	N	4.5m	Y
STA1	Roadside ISA	391377	299818	3m	NO_2	Y	N	Y(2m)	2m	Y
STA5	Roadside ISA	391261	302199	3m	NO_2	Y	Y	Y(6.5m)	8.5m	Y
STA6	Roadside ISA	391261	302199	3m	NO_2	Y	Y	Y(6.5m)	8.5m	Y
STA7	Roadside ISA	391261	302199	3m	NO_2	Y	Y	Y(6.5m)	8.5m	Y
STA9	Roadside ISA	391527	303350	3m	NO_2	Y	N	Y(8m)	3.5m	Y
STA9A	Roadside ISA	391536	303348	3m	NO_2	Y	N	Y(0m)	7m	Y
WIL1	Roadside ISA	394266	298438	3m	NO_2	Y	N	Y(14.5m)	14.5m	Y
WIL2	Roadside ISA	394712	298428	3m	NO_2	Y	N	Y(0m)	6.5m	Y
BRI	Roadside	388182	298782	3m	NO_2	Y	N	Y(0m)	11m	Y
BRO	Roadside	391676	298865	3m	NO_2	Y	N	Y(5m)	5.5m	Y
CAN	Roadside	393008	300867	3m	NO_2	Y	N	Y(7.5m)	6.5m	Y
CLE	Roadside	391485	298348	3m	NO_2	Y	N	N	5m	Y
CUL	Roadside	393371	297403	3m	NO_2	Y	N	Y(0m)	2.5m	Y
DUD	Roadside	391541	297267	3m	NO_2	Y	N	Y(1m)	3.5m	Y
HOR	Roadside	392115	298608	3m	NO_2	Y	N	Y(0.5)m	2.7m	Y
NEA	Roadside	394717	299894	3m	NO_2	Y	N	Y(4.5m)	2m	Y

Site ID	Site Type	X OS Grid Reference	Y OS Grid Reference	Site Height (m)	Pollutants Monitored	In AQMA?	Is Monitoring Co-located with a Continuous Analyser (Y/N)	Relevant Exposure? (Y/N with distance (m) from monitoring site to relevant exposure)	Distance to Kerb of Nearest Road (m) (N/A if not applicable)	Does this Location Represent Worst-Case Exposure?
OXF	Roadside	395384	296293	3m	NO_2	Y	N	Y(0m)	3.2m	Y
PAR	Roadside	392306	296547	3m	NO_2	Y	N	Y(10.3m)	2.7m	Y
TET	Roadside	389297	299886	3m	NO_2	Y	N	Y(3.2m)	3.2m	Y
TRI	Roadside	395540	296479	3m	NO_2	Y	N	Y(-1m)	11m	Y
WAT	Roadside	391134	298877	3m	NO_2	Y	N	N	3m	Y
WOL	Roadside	394031	297172	3m	NO_2	Y	N	Y(4m)	2m	Y
PRO	Intermediate	394633	296089	3m	NO_2	Y	N	N	28m	N
COL	Background	395855	300586	3m	NO_2	Y	N	N	48m	N
MAR	Background	390705	302736	3m	NO_2	Y	N	N	165m	N
WAR	Background	389132	296755	3m	NO_2	Y	N	N	50m	N
WRE	Background	392090	296095	3m	NO_2	Y	N	N	50m	N
Active sites - new for 2014										
CC1	Roadside	391379	298687	3m	NO_2	Y	N	N	5.9m	Y
CC2	Roadside	391309	298554	3m	NO_2	Y	N	Y (0)	2.8m	Y
CC3	Roadside	391467	298374	3m	NO_2	Y	N	N	5.8m	Y
CC4	Roadside	391461	298369	3m	NO_2	Y	N	N	1.2m	Y
CC5	Roadside	391538	298327	3m	NO_2	Y	N	N	9.5m	Y
CC6	Roadside	391539	298372	3m	NO_2	Y	N	N	4.8m	Y
CC7	Roadside	391597	298579	3m	NO_2	Y	N	Y (0)	2.9m	Y
PEN	Roadside	390379	296752	2.5m	NO_2	Y	N	Y (0)	11.7m	Y

Site ID	Site Type	X OS Grid Reference	Y OS Grid Reference	Site Height (m)	Pollutants Monitored	In AQMA?	Is Monitoring Co-located with a Continuous Analyser (Y/N)	Relevant Exposure? (Y/N with distance (m) from monitoring site to relevant exposure)	Distance to Kerb of Nearest Road (m) (N/A if not applicable)	Does this Location Represent Worst-Case Exposure?
Closed sites										
COLQ	Background	395855	300586	3m	NO_2	Y	N	N	48m	N
PIP2	Roadside ISA	391794	298560	3m	NO_2	Y	N	N	4m	Y
PRI3	Roadside ISA	391607	298745	3m	NO_2	Y	N	Y(0m)	4.5M	Y
PRI5	Roadside ISA	391588	298612	3m	NO_2	Y	N	N	2.5m	Y
SPS	Intermediate	391357	298937	3m	NO_2	Y	N	N	30m	N
WIL3	Roadside ISA	394754	298429	3m	NO_2	Y	N	Y(1m)	10m	Y
WIL4	Roadside ISA	394754	298429	3m	NO_2	Y	N	Y(1m)	10m	Y
WIL5	Roadside ISA	394754	298429	3m	NO_2	Y	N	Y(1m)	10m	Y

2.2 Comparison of Monitoring Results with Air Quality Objectives

2.2.1 Nitrogen Dioxide (NO_2)

Automatic Monitoring Data

The annual mean concentrations from the automatic monitoring stations for the previous 3 years are presented in Table 2.3; exceedences of the objectives are highlighted in red.

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

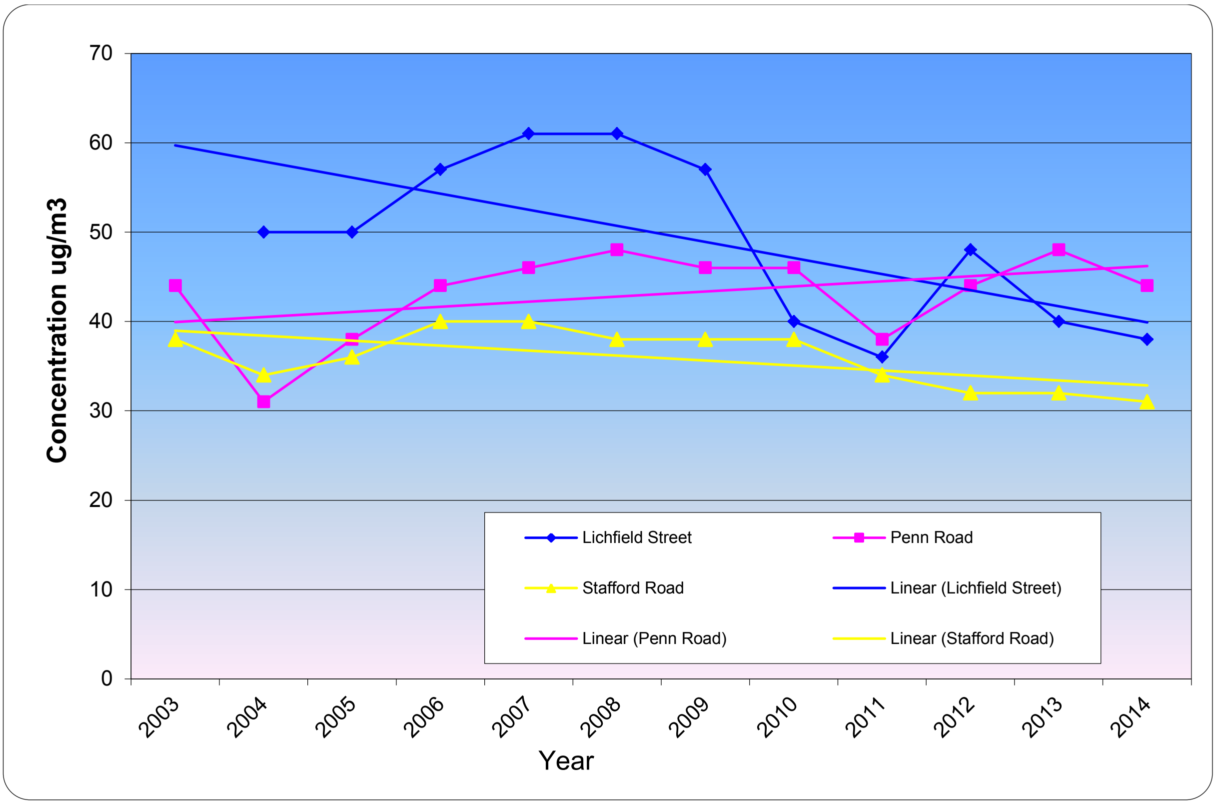
Site ID	Location	Within AQMA?	Data Capture 2014 %	Annual mean concentrations (distance corrected) µg/m^3		
				2012	2013	2014
A1	Lichfield Street	Y	99	**46**	39	37
A2	Penn Rd	Y	99	**43**	**45**	**42**
A4	Stafford Rd	Y	99	31	31	29
A5	Willenhall Rd	Y	95	**44**	37	28
A8	St Peter's Sq	Y	99	32	31	27

The yearly mean NO_2 concentrations from the longest running automatic monitoring stations are presented in Figure 2.5.

The long term trend line at Penn Road indicates a small increase in NO_2 concentrations since 2003. This reflects the yearly variations in levels which are more significant at this site however the 2014 mean level remains the same as in 2003. As discussed in section 2.1.2 a new diffusion tube site has been started close to the Penn Road automatic site to better reflect the exposure at the nearest relevant receptor to this junction (Figure 2.4). The results for 2014 from this site (Site ID PEN) has shown that the NO2 objective is not being exceeded at the nearest relevant receptor.

The trend graph for Stafford Road shows that NO_2 levels have remained fairly stable. There was a small increase in NO_2 concentrations between 2003 and 2007 followed by a gradual decrease. Current levels are now 2 µg/m^3 below the 2003 concentration.

Figure 2.5 Trends in Annual Mean NO_2 Concentrations (uncorrected) Measured at Automatic Monitoring Sites



Lichfield Street is within the city centre and prior to 2010 was one of the main access routes into the bus station. The levels of NO_2 in Lichfield Street before 2010 were considerably higher than at other roadside locations due to the number of buses travelling along the road.

In 2010 Lichfield Street was closed to traffic during the bus station redevelopment project which resulted in a large drop in the levels of NO_2. The project was completed in the summer of 2011 and the number of buses now using Lichfield Street has been reduced significantly. The levels of NO_2 remained below the objective in 2011 and then increased in 2012, a trend which occurred at other road side sites across the city. This increase was higher in Lichfield Street due in part to artificially low levels of NO_2 in 2010 and 2011 caused by the closure of the road for part of that period, and favourable weather conditions during 2011 which helped disperse emissions. In 2013 and 2014 there was a reduction in NO_2 levels, and concentrations are now below the air quality objective.

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

Site ID	Location	Within AQMA?	Data Capture 2014 %	Number of Exceedences of hourly mean (200 $\mu g/m^3$)		
				2012	2013	2014
A1	Lichfield Street	Y	99	1	0	0
A2	Penn Road/Goldthorn Hill	Y	99	1	0	0
A4	Stafford Road/Church Road	Y	99	0	0	0
A5	Willenhall Road/Neachells Lane	Y	95	5	1	1
A8	St Peter's Square	Y	99	0	0	0

A comparison against the 1-hour mean objective (Table 2.4) shows that exceedences of the hourly mean object were below the allowed 18 per year at all monitoring sites.

Diffusion Tube Monitoring Data

Diffusion tube results for the previous 3 years are shown in Table 2.5. The annual average for each site is presented as the bias corrected measured value, corrected for distance to the nearest relevant receptor in accordance with the procedure detailed in Box 2.3 of technical Guidance LAQM.TG(09). Exceedences of the annual mean objective value are highlighted in red.

The bias correction is obtained from the co-location of triplicate tubes alongside the Stafford Road and Lichfield Street automatic monitoring stations (see Appendix A).

Table 2.5 Results of Nitrogen Dioxide Diffusion Tubes

Site ID	Location	Within AQMA	% Data capture 2014	Annual mean concentration µg/m³ (adjusted for bias and distance)		
				2012 (Bias 1.05)	2013 (Bias 0.92)	2014 (Bias Jan - March 0.92 April - Dec 0.71)
BIL1	Lichfield St, Bilston	Y	100	**42**	**43**	35
BIL2	Lichfield St, Bilston	Y	100	34	33	28
BIL3	Lichfield St, Bilston	Y	100	**47**[2]	36	39
BIL4	Lichfield St, Bilston	Y	92	37	33	31
LIC1	Lichfield Street	Y	100	**42**	**41**	**46**
LIC2	Lichfield Street	Y	92	**46**	39	38
LIC3	Lichfield Street	Y	83	**47**	40	**41**
LIC4[1]	Lichfield Street	Y	92	40	38	38
LIC7	Lichfield Street	Y	100	40	37	38
LIC8	Lichfield Street	Y	83	36	29	29
LIC9	Lichfield Street	Y	92	**47**	**41**	**43**
PIP1	Pipers Row	Y	83	**46**	**41**	38
PIP2	Pipers Row	Y	NA	38	36	closed
PRI1	Stafford Street	Y	83	39	36	38
PRI2	Princess Square	Y	100	**41**	36	36
PRI3	Princess Street	Y	NA	32	32	closed
PRI4	Princess Street	Y	67	40	36	34[2]
PRI5	Princess Street	Y	NA	35	35	closed
QUE1	Queen Street	Y	83	32	30	28
QUE2	Queen Street	Y	92	39[2]	33	33
QUE3	Queen Street	Y	100	36	31	28
QUE4	Queen Street	Y	100	37	28	29
STA1	Stafford Road	Y	100	30	27	27
STA5[1]	Stafford Road	Y	97	38	31	29
STA9	Stafford Road	Y	100	**45**[2]	30	29
STA9A	Stafford Road	Y	100	35	32	30
WIL1	Willenhall Road	Y	100	27	23	22
WIL2	Willenhall Road	Y	100	39	37	37
WIL3[1,]	Willenhall Road	Y	NA	34	closed	closed
PAR	Birmingham Road	Y	100	36	30	30
BRI	Bridgnorth Road	Y	92	22	20	21
BRO	Broad Street	Y	100	**45**	41	40
CAN	Cannock Road	Y	100	30	27	27
CLE	Cleveland Street	Y	83	32[2]	26	30
CUL	Culwick Street	Y	100	26	21	21
DUD	Dudley Road	Y	100	27	25	25
HOR	Horseley Fields	Y	100	36	35	34
NEA	Neachells Lane	Y	100	24	21	21
OXF	Oxford Street	Y	100	31	30	30
TET	Tettenhall Road	Y	100	39	34	34
WAT	Waterloo Road	Y	100	35	34	33
WOL	5 Wolsley Road	Y	92	20	19	17
PEN	Penn Road	Y	67	No result	No result	23[2]
PRO	Prosser Street	Y	100	27	25	23
SPS	St Peter's Square	Y	NA	26	26	closed
TRI	Trinity Street	Y	100	25	22	23
COL	Coleman Avenue	Y	100	18	16	16
MAR	Marsh Lane	Y	100	18[2]	15	14
WAR	Warstones Road	Y	100	15	13	13
WRE	W'ton Rd East	Y	100	17	16	16
CC1	Queen Square	Y	100	No result	29	31
CC2	Victoria Street	Y	100	No result	27	27
CC3	Cleveland Street	Y	92	No result	29	31
CC4	Cleveland Street	Y	NA	No result	29	closed
CC5	Cleveland Street	Y	100	No result	28	28
CC6	Cleveland Street	Y	NA	No result	31[2]	closed
CC7	Market Street	Y	100	No result	31	30

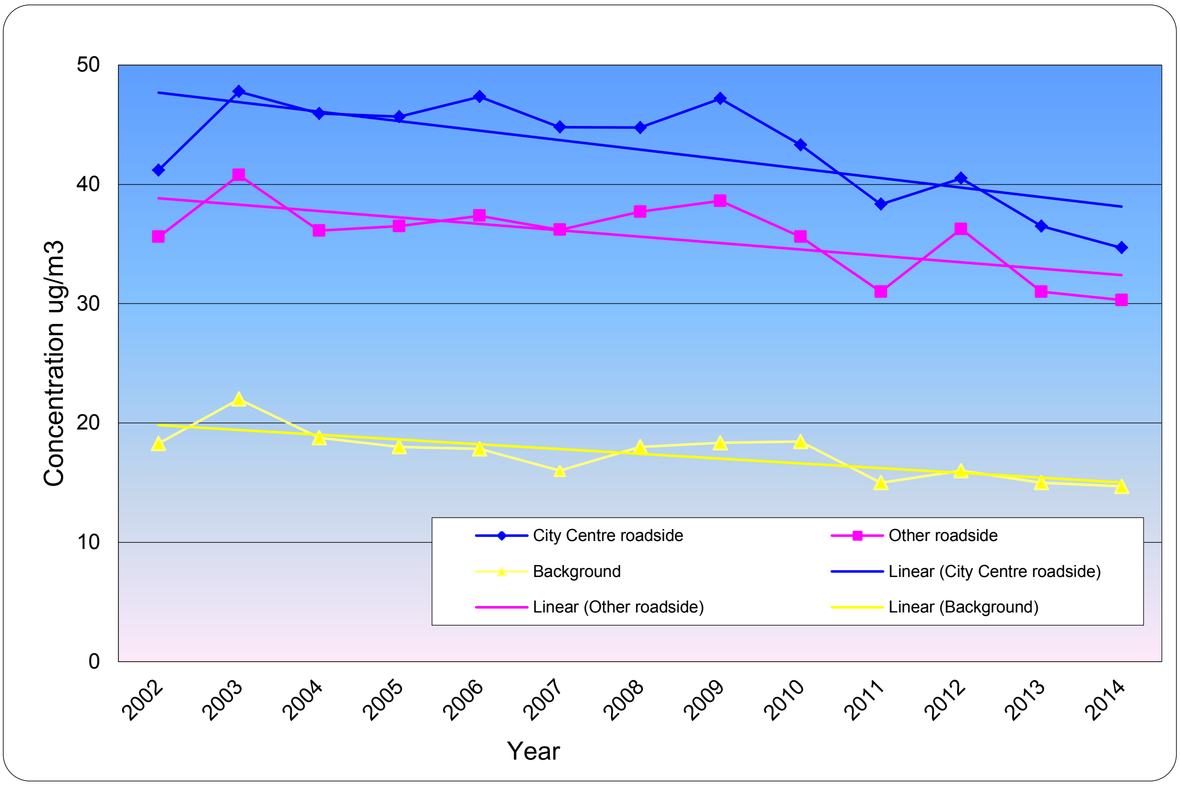
[1] Mean of triplicate tubes [2] Annualised data (Appendix A)

Table 2.6 provides a summary of the results from the intensive survey areas, the remaining roadside tubes and the background tubes for 2012, 2013 and 2014. The results are presented as the annual mean concentration calculated from individual tubes located along each particular road and site type corrected for bias and distance. Lichfield Street east of Princess Square is shown as exceeding the objective.

Table 2.6 Results of Nitrogen Dioxide Diffusion Tubes: ISA, Roadside, Intermediate and Background Sites

Location	Within AQMA	Annual mean concentration µg/m^3 (adjusted for bias and distance)		
		2012 (Bias 1.05)	2013 (Bias 0.92)	2014 (Bias 0.71)
Lichfield Street, Bilston	Y	39	36	33
Lichfield Street, East of Princess Square	Y	**43**	39	**41**
Lichfield Street, West of Princess Square	Y	**41**	34	34
Princess Street/Stafford Street	Y	37	35	36
Queen Street	Y	35	31	30
Stafford Road	Y	36	30	29
Willenhall Road	Y	34	29	29
Pipers Row	Y	**41**	38	38
Other Roadside sites	Y	31	26	28
Intermediate sites	Y	26	24	23
Background sites	Y	16	15	15

Figure 2.6 Trends in Annual Mean NO_2 Concentrations at Diffusion Sites



The trend data (Fig 2.5) shows an overall reduction in NO_2 at the diffusion tube sites over the past 12 years.

2.2.2 Particulate Matter (PM_{10})

A summary of the most recent TEOM data from the automatic monitoring stations is presented in Tables 2.7 and 2.8. The data has been corrected using the King's College volatile correction model (VCM) in accordance with technical guidance document LAQM.TG(09).

Table 2.7 Results of Automatic Monitoring for PM_{10}: Comparison with Annual Mean Objective

Site ID	Location	Within AQMA?	Data Capture 2014 (%)	Annual mean concentrations (µg/m^3) VCM corrected		
				2012	2013	2014
A1	Lichfield Street	Y	99	20	21	20
A2	Penn Road	Y	99	22[1]	23	21
A3	St Peter's Car Park	Y	65	19	19	18[1]
A4	Stafford Road	Y	99	21	22	20
A5	Willenhall Road	Y	94	21	20	20

[1] Annualised data

There were no exceedences of the PM_{10} annual mean objective (40µ/m^3) during 2012, 2013 or 2014 (Table 2.7). The number of exceedences of the 24-hr mean objective is below the allowed maximum of 35 per year (Table 2.8).

Table 2.8 Results of Automatic Monitoring for PM_{10}: Comparison with 24-hour Mean Objective

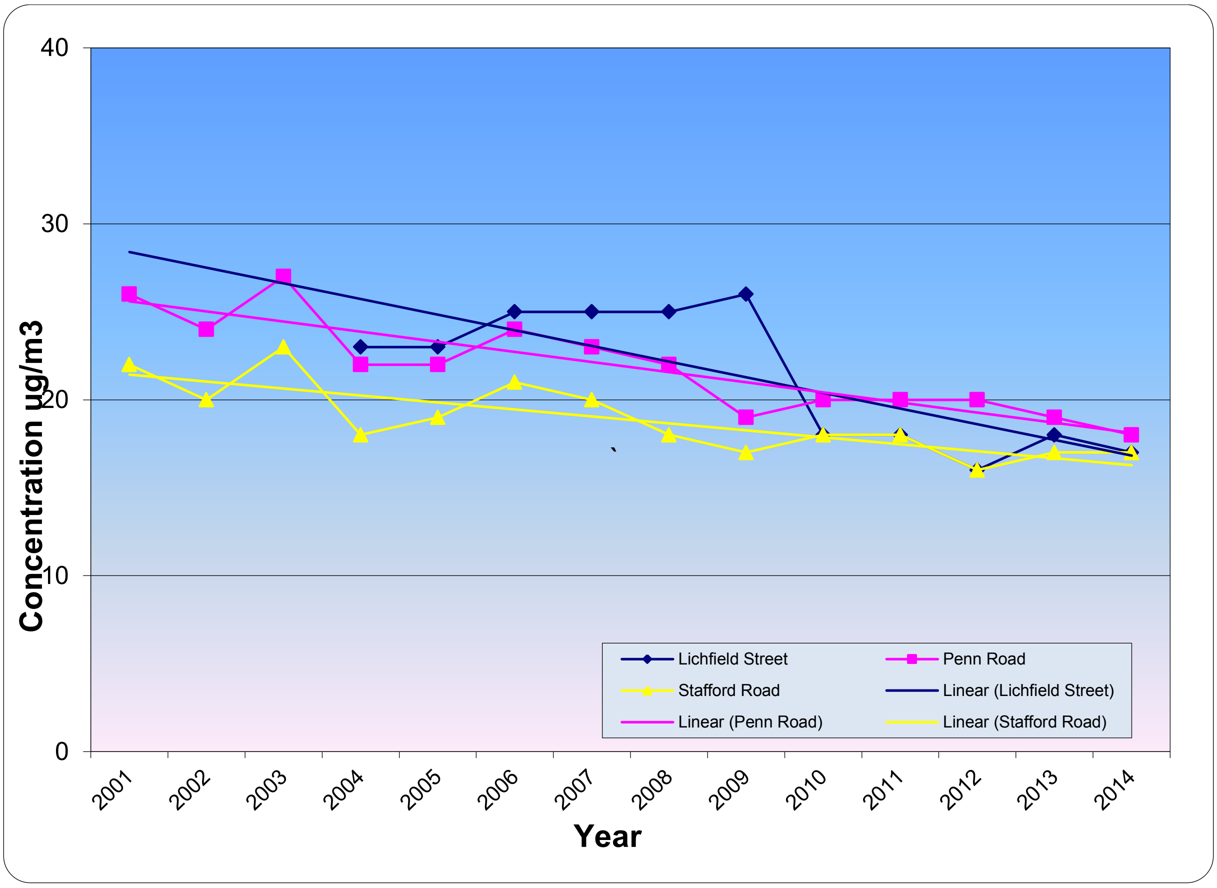
Site ID	Location	Within AQMA?	Data Capture 2014 (%)	Number of Exceedences of 24 hour mean (50 µg/m^3) *If data capture < 90%, include the 90th %ile of hourly means in brackets.*		
				2012	2013	2014
A1	Lichfield Street	Y	99	7	8	10
A2	Penn Road	Y	99	8	10(38)	8
A3	St Peter's Car Park	Y	65	9	6	5(30)
A4	Stafford Road	Y	99	11	5	6
A5	Willenhall Road	Y	94	6	6	11

Long Term Trends

In order to compare the data with objectives, TEOM data has been corrected in accordance with the technical guidance. Prior to 2008 the correction factor was 1.3, which was replaced by the volatile correction model in 2008. The change to the VCM has resulted in a step change in the data therefore, for the purpose of showing long term trends, uncorrected data has been used.

Trend data for the 3 longest running sites is presented in Figure 2.4. In line with the trend in NO_2 concentrations, the overall trend for PM_{10} is downwards. The large reduction in PM_{10} levels at Lichfield Street in 2010 was due to the implementation of the interchange project as discussed in section 2.2.1.

Figure 2.7 Trends in uncorrected annual Mean PM_{10} Concentrations



2.2.3 Sulphur dioxide

A summary of the most recent SO2 monitoring data is presented in Table 2.9. There were no exceedences of the 15 minute, 1 hour or 24 hour objectives during 2013.

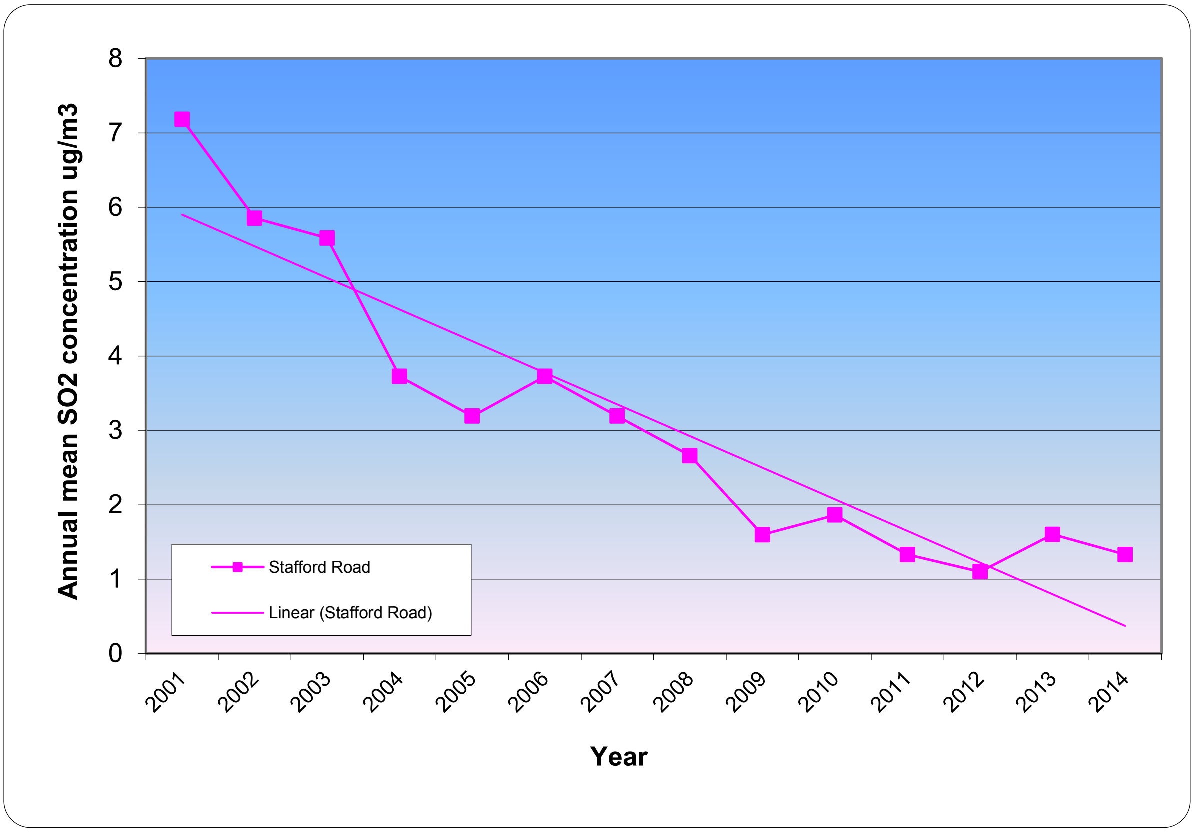
Table 2.9 Results of SO_2 Automatic Monitoring: Comparison with Objectives

Site ID	Location	Within AQMA?	Data Capture 2013 (%)	Number of Exceedences of: (µg/m^3)		
				15-minute Objective (266 µg/m^3)	1-hour Objective (350 µg/m^3)	24-hour Objective (125 µg/m^3)
A4	Stafford Road	Y	98%	0	0	0
A5	Willenhall Road	Y	95%	0	0	0

Long term trends

The levels of sulphur dioxide have dropped significantly over the last 12 years. Since 2009 the rate of decline has slowed and has remained relatively stable over the last 4 years.

Figure 2.8 Trends in annual Mean SO_2 Concentrations



2.2.4 Benzene

There are no significant sources of benzene in the city therefore the Council does not consider it necessary to monitor for this pollutant.

2.2.5 Summary of Compliance with AQS Objectives

Wolverhampton City Council has examined the results from the air monitoring sites in the city. The concentration of nitrogen dioxide is exceeding the annual mean objective at the following relevant locations within the declared AQMA:

- **Lichfield Street East**

As the whole of the city has already been declared an AQMA, it is not necessary to proceed to a detailed assessment at these locations.

3 Road Traffic Sources

LAQM.TG(09) requires the road types detailed below (sections 3.1-3.6) to be identified and considered in terms of their emissions. At the beginning of the Review and Assessment process, traffic data was obtained from the West Midlands Joint Data Team and used to model NO_2 and PM_{10} concentrations across the region.

Table 3.1 presents the planning applications which have been received by the council since the previous assessment and were accompanied by an air quality assessment, or where one has been requested.

Table 3.1 Planning applications requiring or including an air quality assessment

Site	Application number	Proposal	Air Quality assessment
Bus layover report	09/00484/FUL	Redevelopment of Wolverhampton Bus Station Air Quality Assessment	Air quality assessment submitted as part of the planning application. The assessment concluded that the development would not have a significant adverse effect on air quality
New Street Portobello	12/01241/FUL	Redevelopment of Derelict land as Nursing Home	Air quality assessment submitted as part of the planning application. The assessment concluded that the development would not have a significant adverse effect on air quality
Vine Island	NA	Re modelling of junction	The assessment concluded that the development would not have a significant adverse effect on air quality
Aldersley Leisure village	13/01148/FUL	Installation of a plant room containing a 199kw biomass boiler.	Air quality assessment submitted as part of the planning application. The assessment concluded that the development would not have a significant adverse effect on air quality
Northern Steel Stocks, Cross Street, Eastfield.	14/00935/FUL	Standing reserve power plant.	Air quality assessment submitted as part of the planning application. The assessment indicated that the development would increase the yearly average significantly and lead to exceedences of the 1 hour average.

3.1 Narrow Congested Streets with Residential Properties Close to the Kerb

The City of Wolverhampton 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.

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

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

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

A review of the available traffic data (Appendix B) has identified 8 new roads where the proportion of heavy duty vehicles (HDV) exceeds 20% of the traffic flow; these are detailed in Table 3.2

Table 3.2 Road with a proportion of buses and/or HGV's > 20% 2012-2014

Description	Ref	Date	12hr Total	LGV Total	HGV Total	% HGV
HIGH STREET (South of Junction at Lichfield Rd/Neachells Lane)	TCN2266	02/12/2013	1088	30	518	48
CLEVELAND STREET (East of Junction at Worcester St/Salop St/Victoria St)	TCN2208	17/07/2012	1272	9	509	40
VICTORIA STREET (North of Junction at Bell St/Victoria St S/Skinner St)	TCR2404	10/07/2012	959	12	329	34
WOODHOUSE ROAD - South of Kingsley Avenue	CAR27229A	12/07/2012	1507	1161	346	23
WOODHOUSE ROAD - South of Kingsley Avenue	CAR27229	04/07/2012	1511	1170	341	23
PENN ROAD - East of Church Hill	CAR27350 CAR27205	13/10/2014 24/10/2014	16463	12519	3611	22
FINCHFIELD LANE - South of Woodland Road	CAR27223	12/06/2012	5753	4570	1183	21
MACROME ROAD - South of Lawnswood Avenue	CAR27220	08/05/2012	770	619	151	20

Table A.3 of the Technical Guidance document TG (09) requires roads which have a flow of HDVs greater than 2500 vehicles per day and have relevant exposure within 10m of the road to be assessed. Penn Rd is the only one of the 8 roads identified which meets these criteria, and has been assessed using the DMRB model. The predicted concentrations (Table 3.3) from DMRB indicate that the air quality objectives will not be exceeded. The DMRB calculations and model verification are presented in Appendix D.

Table 3.3 Roads with a high flow of HDV's – predicted concentrations.

Receptor number	Description	Year	NO_x	NO_2	PM_{10}	
			Annual mean µg/m³	Annual mean µg/m³	Annual mean µg/m³	Days >50µg/m³
1	Penn Road	2014	31.17	20.38	16.05	0.33

The City of Wolverhampton Council has assessed newly identified roads with high flows of buses or HDV's in busy streets where people may spend 1 hour or more close to traffic that have not previously been assessed, and concluded that it will not be necessary to proceed to a Detailed Assessment.

3.4 Junction

The City of Wolverhampton Council confirms that there are no new/newly identified busy junctions/busy roads.

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

The City of Wolverhampton Council confirms that there are no new/proposed roads.

3.6 Roads with Significantly Changed Traffic Flows

The most recent traffic data is presented in Appendix B, this shows that there has been an overall reduction of 1.7% in road traffic between 2010 and 2014.

The technical guidance note LAQM.TG(09) requires any road where traffic has increased by more than 25% since the previous assessment to be considered further. A comparison of the available traffic counts shows that traffic on 2 roads has increased by more than 25% since the previous USA.

These roads have not previously been identified as being at risk of exceeding the objectives; they are not narrow or congested, there are no locations along them were people are likely to spend 1 hour or more, and the traffic flows were below 10,000 vehicles per day when the previous USA was carried out.

Table 3.4 Roads with significantly changed traffic flows.

Description	Count Ref	2010	2012	2014	% increase
Coalway Road east of Beckminster Road	AUTOPROG L7079	8152	10310	10846	33.0
Linthouse Lane north of Olinthus Avenue	AUTOPROG L7066	9816	12244	12907	31.5

The increase in traffic has taken the traffic flows above 10,000 vehicles per day. The DMRB screening model has been used to predict the annual mean NO2 and PM10 concentrations at the nearest residential properties along both roads, the results are presented in Table 3.5.

Table 3.5 Roads with significantly changed traffic flows – predicted concentrations.

Receptor number	Description	Year	NO_x	NO_2	PM_{10}	
			Annual mean µg/m^3	Annual mean µg/m^3	Annual mean µg/m^3	Days >50µg/m^3
1	Coalway Road	2014	31.17	20.38	16.05	0.33
2	Linthouse lane	2014	40.13	25.77	18.00	1.40

The predicted NO2 and PM10 concentrations are below the air quality objectives, therefore a detailed assessment is not required.

The City of Wolverhampton 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.

3.7 Bus and Coach Stations

The City of Wolverhampton Council confirms that there are no new/newly identified bus stations.

4 Other Transport Sources

4.1 Airports

Wolverhampton City Council confirms that there are no airports in the Local Authority area.

4.2 Railways (Diesel and Steam Trains)

4.2.1 Stationary Trains

Wolverhampton City 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

Wolverhampton City 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)

Wolverhampton City 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

Wolverhampton City 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

Wolverhampton City 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

Wolverhampton City 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

Wolverhampton City Council confirms that there are no petrol stations meeting the specified criteria.

5.4 Poultry Farms

Wolverhampton City Council confirms that there are no poultry farms meeting the specified criteria.

6 Commercial and Domestic Sources

6.1 Biomass Combustion – Individual Installations

The Council has identified the following biomass combustion plants within the City.

Table 6.1 Biomass combustion plant within Wolverhampton City boundary

Location	Type	Distance to relevant receptors
ACT Office Furniture Manufacturers Ltd., Unit A Salop Street, Bilston Wolverhampton WV14 0TQ	Talbott T500	47m
All Saints Action Network, All Saints Road, All Saints Wolverhampton. WV2 1EL.	Talbott CA	22m
Goodrich Actuation Systems Ltd., Stafford Road Wolverhampton WV10 7EH.	Talbott T300	230m
Heath Town Flats, 1 Hobgate Road, Wednesfield, Wolverhampton WV10 0PR	Fröling Lambdamat 1000	20m
Midland Joinery Services Ltd, Unit L, Cross Street, Atlas Trading Estate, Bilston, West Midlands, WV14 8TJ.	Talbott T3A	65m
Swift Save UK Ltd, Bell Pl, Wolverhampton, WV2 4LY	Talbott T500	45m
The Willows Energy Centre, Stowlawn Primary School, Green Park Avenue, Bilston WV14 6EH	KWB TDS Powerfire 150 biomas boiler	40m
Blakenhall Community Resource Centre Haggar Street Wolverhampton West Midlands WV2 3ET	Herz Firematic FM151	23m
Bilston Retail Market, Market Way Wolverhampton West Midlands WV14 DEN	Herz Firematic FM151	30m
Bradley Resource Centre Lord Street Bradley Bilston WV14 SD	Herz Firematic FM151	35m
Aldersley Leisure Village Aldersley Road Wolverhampton West Midlands WV NOW	Herz Firematic FM 199	60m

Table 6.2 Biomass combustion plant close to Wolverhampton City boundary

Location	Type	Distance to relevant receptors
Pendeford Farm Children's Home, Wobaston Road Wolverhampton	Hoval Biolyt 50	65m

These have been screened for NO_2 and PM_{10} in accordance with Technical Guidance: "Screening assessment for biomass boilers" (Appendix C). The maximum emission rates of NO_2 and PM_{10} have been estimated for each plant using the appropriate emission factors from the technical guidance note. These have been compared with the target emission for the appliance which has been obtained from the biomass calculator.

The screening assessment indicates that the emissions from each appliance do not exceed their respective target emission and therefore a detailed assessment is not required.

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

6.2 Biomass Combustion – Combined Impacts

Approximately 75% of the city is covered by smoke control orders which preclude the burning of coal and wood on appliances which are not exempt by Statutory Instruments under the Clean Air Act 1993. Exempt appliances have passed tests to confirm that they are capable of burning coal or wood which are inherently smoky solid fuels, without emitting smoke. The locations of the appliances identified in section 6.1 above are not concentrated in clusters. The Council is not aware of any other significant concentrations of biomass combustion appliances within the commercial and domestic sectors of the city.

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

6.3 Domestic Solid-Fuel Burning

As discussed in section 6.2 above, 75% of the city is covered by smoke control orders. Those areas of the city which are not subject to smoke control orders are predominantly industrial and commercial consequently domestic coal burning is not significant.

Wolverhampton City Council confirms that there are no areas of significant domestic solid fuel use within its area.

7 Fugitive or Uncontrolled Sources

Wolverhampton City Council confirms that there are no potential sources of fugitive particulate matter emissions within its area.

8 Conclusions and Proposed Actions

8.1 Conclusions from New Monitoring Data

The Council has carried out a comprehensive review of all monitoring data gathered since the previous Updating and Screening Assessment in 2012. Areas where the air quality objectives are not being met have been identified together with any significant trends.

8.1.1 Nitrogen dioxide data

Monitoring data collected since the previous Updating and Screening assessment has shown that nitrogen dioxide concentrations across the city have continued to fall. In 2014 the following relevant locations were exceeding the air quality objective for nitrogen dioxide:

- **Lichfield Street East**

Although the annual mean result for the Penn Road automatic monitoring site is above the objective, this location has has not been declared as recent monitoring data from the new site (PEN) has shown that the objective is not being exceeded at the nearest relevant location to the junction.

8.1.2 PM_{10} data

A review of the collected data has shown that there have been no exceedences of the PM_{10} air quality objectives. A detailed examination of trend data has shown that there has been a significant reduction in PM_{10} concentrations in real terms over the last 10 years.

The Council has concluded that PM_{10} concentrations are meeting the air quality objectives.

8.2 Conclusions from the assessment of sources

The Updating and Screening Assessment has considered the likely impacts of local developments, road transport, other transport sources, industrial installations, commercial and domestic sources, and fugitive emissions.

The assessment has concluded that there are no new or significantly changed sources which could give rise to any potential exceedences outside the existing AQMA.

8.3 Proposed Actions

The Updating and Screening Assessment has confirmed that there are no new locations exceeding the air quality objectives therefore a detailed assessment is not required.

The Updating and Screening Assessment has confirmed that there are a no new locations where additional monitoring is required.

Wolverhampton City Council intends to submit the 2016 Progress Report as required by the Review and Assessment process.

9 References

(1) Local Air Quality Management – Technical Guidance LAQM.TG(09), Department for Environment, Food and Rural Affairs 2009.

(2) Technical Guidance: Screening Assessment for Biomass Boilers, AEA Energy & Environment 2008.

(3) 2012 Updating and Screening Assessment, Wolverhampton City Council.

(4) 2014 Progress Report, Wolverhampton City Council.

(5) LAQM Tools; Local Air Quality Management website www.airquality.co.uk

Appendices

Appendix A: QA/QC Data

Diffusion Tube Bias Adjustment Factors

The council uses diffusion tubes prepared using 50% TEA in acetone which since 1 April 2014, are supplied by ESG Didcot. Prior to this they were supplied by Gradko International Ltd.

The tubes arrive from ESG and are stored in a refrigerator prior to being labelled with a site and date code. The tubes are then exposed in accordance with the start and end dates for the national NO_2 survey. Following exposure the tubes are capped and immediately dispatched to ESG for analysis.

The bias adjustment factor for the tubes and supplier have been obtained from the LAQM tools website, Review & Assessment database, Spreadsheet Version Number: 09/15, these are detailed below.

Factor from Local co-location Studies

Triplicate tubes are exposed at the automatic monitoring stations in order to calculate a bias correction factor. The correction factor is applied to the yearly average to enable comparison with the annual NO_2 objective. The results from the co-location studies for 2012-14 are shown in the table below.

Prior to its closure in 2007 the Wolverhampton Centre AURN station was used for the co-location study. Since 2007 co-location tubes have been placed at the Lichfield Street and Stafford Road automatic stations. The factor applied to the data set is the mean bias adjustment factor from Tables A1.1 to A1.3.

Table A1.1 Chemiluminescent v Diffusion Tube Values 2012 (μg/m³)

Site	Mean	Jan	Feb	Mar	April	May	June	July	Aug	Sept	Oct	Nov	Dec	%
Diffusion Tube Values μg/m³														
LIC4	45	43	50	39	40	34		29	36	37	44	38	45	92
LIC5	49	47	47	30	45	35	31	36	38		44		49	83
LIC6	48	42	53	33	42	36	35		39	38	47	41	48	92
Mean		47	44	50	34	43	35	33	32	38	37	45	39	
Standard deviation		1.8	2.6	3.1	4.2	2.5	1.1	2.8	5.0	2.0	0.8	1.9	2.3	
Coefficient of variation		3.9	5.8	6.1	12.3	5.8	3.2	8.5	15.6	5.2	2.1	4.3	6.0	
Data quality		Good	Good	Good	Good	Good	Good	Good	Good	Good	Good	Good	Good	
STA5	49	45	42	25	32	32	31	33	39	42	42	42	49	100
STA6	48	42	44	28		31	31	29	35	42	42	37	48	92
STA7	49	40	46	24	34	29	29	31	39	48	45	37	49	100
Mean		48	42	44	26	33	30	31	31	38	44	43	39	
Standard deviation		0.6	2.4	2.1	2.0	1	2	1	2	2	3	2	3	
Coefficient of variation		1.3	5.7	4.7	7.7	4.6	5.3	3.6	6.8	5.9	7.9	3.5	7.5	
Data quality		Good	Good	Good	Good	Good	Good	Good	Good	Good	Good	Good	Good	
Mean of triplicate tubes														
Lichfield St	41	47	44	50	34	43	35	33		38		45		75
Stafford Rd	38	48	42	44	26	33	35	33	34	38	37	46	40	100
Monthly Chemiluminescent Values														
Lichfield St	49	53	50	53	52	48	38	40		48		61		75
Stafford Rd	34	42	42	42	36	31	25	25	25	31	34	36	34	100
Ratios of diffusion Tube Values:Chemiluminescent values														
Lichfield St	1.20	1.13	1.13	1.07	1.52	1.12	1.10	1.23		1.27		1.35		1.13
Stafford Rd	0.88	0.87	0.99	0.96	1.42	0.93	0.71	0.76	0.73	0.80	0.92	0.79	0.86	0.87
Bias	1.05													

Table A1.2 Chemiluminescent v Diffusion Tube Values 2013 (μg/m³)

Site	Mean	Jan	Feb	Mar	April	May	June	July	Aug	Sept	Oct	Nov	Dec	%
Diffusion Tube Values μg/m³														
LIC4	40	39	50	50	48	39	37	43	42	39		57	33	92
LIC5	39	45	60	48	34	38	39	43	38	42	36	56	36	100
LIC6	40	47	49	46	44	38	38	45	38	44	40	56	33	100
Mean		40	44	53	48	42	38	38	44	39	42	38	56.4	34.1
Standard deviation			3.9	6.1	2.0	6.9	0.7	0.8	1.2	2.0	2.1	3.0	0.6	1.5
Coefficient of variation			8.9	11.6	4.2	16.5	1.8	2.0	2.7	5.1	5.1	7.9	1.1	4.5
Data quality			Good	Good	Good	Good	Good	Good	Good	Good	Good	Good	Good	Good
STA5	32	38	44	30	34	28	28	32	34	36	36	44	38	100
STA6	32	38	38	31	34	35	28	32	34	37	33	47		92
STA7	32	39	40	36	30	31	27	31	35	34	34	45	34	100
Mean		32	38	41	32	32	31	28	32	34	36	34	45	36
Standard deviation			0.6	2.6	3.3	2.4	3.3	0.7	0.4	0.6	1.2	1.5	1.2	2.6
Coefficient of variation			1.6	6.5	10.1	7.3	10.6	2.4	1.3	1.8	3.5	4.3	2.6	7.2
Data quality			Good	Good	Good	Good	Good	Good	Good	Good	Good	Good	Good	Good
Mean of triplicate tubes														
Lichfield St	**43**	44	53	48	42	38	38	44		42	38	56	34	92

Site	Mean	Jan	Feb	Mar	April	May	June	July	Aug	Sept	Oct	Nov	Dec	%
Stafford Rd	**35**	38	41		32	31	28	32	34	36	34	45	36	92
Monthly Chemiluminescent Values														
Lichfield St		48	55	55	34	36	34	44		38	32	40	27	92
Stafford Rd		36	36		31	27	23	29	29	34	31	44	31	92
Ratios of diffusion Tube Values:Chemiluminescent values														
Lichfield St		1.09	1.04	1.15	0.82	0.94	0.90	1.01		0.92	0.85	0.71	0.78	
Stafford Rd			0.95	0.89		0.94	0.86	0.83	0.91	0.83	0.96	0.90	0.97	0.85
Bias	0.92													

Table A1.3 Chemiluminescent v Diffusion Tube Values 2014 ($\mu g/m^3$)

Site	Mean	Jan	Feb	Mar	April	May	June	July	Aug	Sept	Oct	Nov	Dec	%
Diffusion Tube Values $\mu g/m^3$														
LIC4		36	NA	45	56	48	45	39	47	95	44	79		83
LIC5		41	28	44	56	51	54	50	49	94	43	62	55	100
LIC6		37	NA	53	54	56	39	46	43	90	41	76	45	92
Mean		38		47	55	52	46	45	46	93	42	72.4	50.0	
Standard deviation		2.5		5.2	1.2	4.1	7.7	5.6	2.7	2.2	1.9	9.2	7.1	
Coefficient of variation		6.5		11.0	2.2	7.9	16.8	12.5	5.8	2.4	4.4	12.7	14.3	
Data quality		Good		Good	Good	Good	Good	Good	Good	Good	Good	Good	Good	
STA5		34	31	36	41	36	25	35	36	37	44	50		92
STA6		43	33	43	45	33	32	29	38	35	40	52	60	100
STA7		35	34	38	49	36	33	28	40	39	47	53	58	100
Mean		37	33	39	45	35	30	31	38	37	44	51	59	
Standard deviation		4.5	1.8	3.7	3.7	2	4	4	2	2	3	2	1	
Coefficient of variation		12.1	5.3	9.5	8.3	4.7	14.2	13.4	5.2	5.5	7.4	2.9	1.9	
Data quality		Good	Good	Good	Good	Good	Good	Good	Good	Good	Good	Good	Good	
Mean of triplicate tubes														
Lichfield St		36		46	36	32	40	38	31	59	36	50	32	92
Stafford Rd		31	29	36	34	31	27	25	23	27	29	32	38	100
Monthly Chemiluminescent Values														
Lichfield St		38		47	55	52	46	45	46	93	42	72	50	92
Stafford Rd		37	33	39	45	35	30	31	38	37	44	51	59	100
Ratios of diffusion Tube Values:Chemiluminescent values														
Lichfield St		0.95		0.97	0.66	0.62	0.87	0.85	0.66	0.64	0.86	0.69	0.65	0.95
Stafford Rd		0.82	0.87	0.93	0.77	0.88	0.89	0.81	0.61	0.73	0.66	0.63	0.65	0.82
Bias		0.92 (Gradko)			0.71 (ESG Didcot)									

Discussion of Choice of Factor to Use

A comparison of the relevant bias adjustment factors is shown in Table A1.2 below. The national factors have been calculated using data from a number of authorities with tubes which will have been prepared and analysed in different batches and at different times.

The local bias adjustment factors are derived from triplicate co-located tubes exposed alongside an automatic analyser. These tubes are from the same batch as the measurement tubes and are handled, stored and analysed in the same way.

Table A1.4 National and local bias adjustment factors.

Year	National Bias Adjustment Factor	Local Bias Adjustment Factor
2001	1.45	1.01
2002	1.27	0.95
2003	1.11	0.97
2004	1.10	0.93
2005	1.10	1.00
2006	1.01	1.03
2007	0.99	0.93
2008	0.94	0.97
2009	0.97	1.08
2010	0.99	0.97
2011	0.94	0.89
2012	1.02	1.05
2013	1.01	0.92
2014	0.98 (Gradko) 0.81 (ESG)	0.92 (Gradko, January to March) 0.71 (ESG Dicot, April to December)
Mean	1.06	0.99
Std	0.14	0.10

The locally derived bias adjustment factors indicate that the tubes correlate well with the automatic analysers throughout the period.

Trend data using both correction factors is presented in Figures A1.1 and A1.2. This shows that the national correction factor artificially raises the NO_2 concentrations at the start of the period, and produces an overall downward trend of 23 $\mu g/m^3$ at roadside locations and 11$\mu g/m^3$ at background locations (Figure A1.1).

The diffusion tube NO_2 concentrations corrected with the locally derived adjustment factors (Figure A1.2) give a downward trend of 7μg/m^3 at roadside locations and 3μg/m^3 at background locations. These correction factors produce trend data which is more consistent with the data from the automatic analyser which is shown for comparison.

Based on this assessment local correction factors have been used to correct the diffusion tube data.

Figure A1.1 Annual mean NO_2 values using national bias adjustment factor.

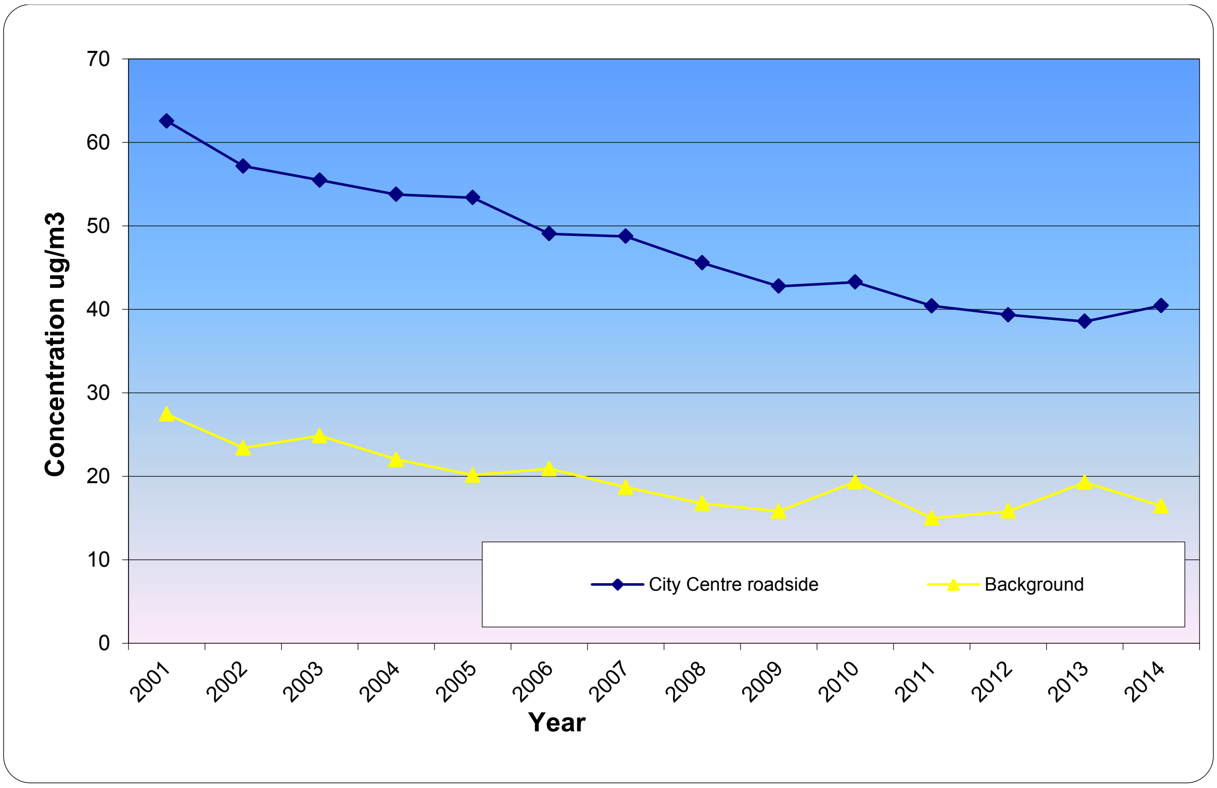
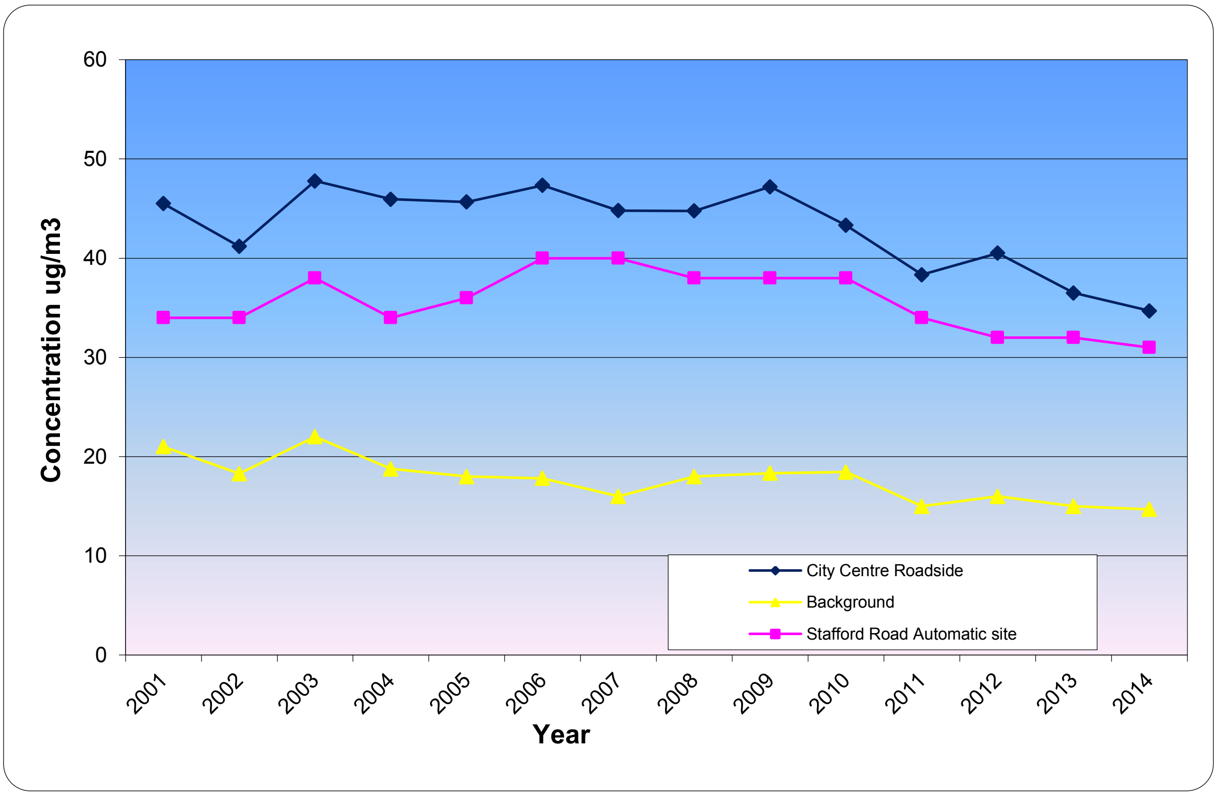


Figure A1.2 Annual mean NO_2 values using local bias adjustment factor.



PM Monitoring Adjustment

Particle monitoring is carried out using Tapered Element Oscillating Microbalance (TEOM) analysers. Data for 2012, 2013 and 2014 has been corrected using the volatile correction model (VCM) as required by LAQM.TG(09). The VCM was not available prior to 2008, therefore pre 2008 data has been corrected by applying the 1.3 correction factor to the annual mean in accordance with the previous guidance in LAQM.TG(03).

Short-term to Long-term Data adjustment

Data capture for the PRI4 and PEN NO2 diffusion tube sites was 67% during 2014. As this is below the minimum requirement of 75% data capture, the results have been adjusted to provide an estimated annual mean concentration in accordance with the method outlined in Box 3.2 of the guidance manual, using data from the closest available continuous monitoring background sites. The correction factors for each site are calculated below.

Table A.1.5 Short-Term to Long-Term Monitoring Data Adjustment for diffusion tube site ref PRI4

Site	Site Type	Annual Mean (µg/m^3)	Period Mean (µg/m^3)	Ratio
Birmingham Acocks Green	Background urban	43.11	41.19	1.05
Birmingham Tyburn Rd	Background urban	29.91	31.44	0.95
Average				**1.00**

Table A.1.6 Short-Term to Long-Term Monitoring Data Adjustment for diffusion tube site ref PEN

Site	Site Type	Annual Mean (µg/m^3)	Period Mean (µg/m^3)	Ratio
Birmingham Acocks Green	Urban Background	43.11	41.53	1.04
Birmingham Tyburn Rd	Background urban	29.91	26.98	1.11
Average				**1.07**

Table A.1.7 Short-Term to Long-Term Monitoring Data Adjustment for St Peters Sq PM10 automatic site

Site	Site Type	Annual Mean (µg/m^3)	Period Mean (µg/m^3)	Ratio
Birmingham Tyburn Rd	Urban Background	19	19	1.00
Stoke-on-Trent Centre	Background urban	18	19	0.97
Average				**0.98**

QA/QC of automatic monitoring

The chemiluminescent monitors are calibrated on a daily basis using on site calibration gases. This involves feeding a zero air gas, followed by a span gas containing a known concentration of NO_2, through the analyser. A correction factor is then applied based on the analyser's response. The calibration reports are checked on a daily basis to check for drift and the correct application of the correction factor. Data is stored in both the raw and corrected form.

A site visit is made every month to change filters and carry out a manual calibration, which is checked against the automatic daily calibrations. Copies of the calibration reports, calibration gas logs and engineer's reports are retained on file.

All the sites are covered by a service contract provided by Enviro Technology Services plc (ET). The sites are serviced every 6 months by an ET service engineer in accordance with the manufacturer's instructions and warranty conditions. ET also provide a 48-hour call out response to cover breakdowns.

The aim is to achieve 90% data capture and in order to minimise the loss of data the procedures in box A1.4: of LAQM.TG(09) have been adopted.

Raw data is examined on a daily basis to screen out spurious and unusual measurements having regard to the recommendations in Box A1.6 of LAQM.TG(09).

QA/QC of diffusion tube monitoring

From April 2014 diffusion tubes have been supplied and analysed by ESD Dicot. Prior to this they were supplied and analysed by Gradko International Ltd. in accordance with the procedures set out in the harmonisation document: "Diffusion Tubes for Ambient NO_2 Monitoring: Practical Guidance". Both laboratories are UKAS accredited and take part in the AIR/WASP NO2 Proficiency Testing scheme operated by LGC Standards and supported by the Health and Safety Laboratory (HSL).

A summary of the performance in rounds R116 to R124 and AIRPT AR001 to AR004 covering the period 1st January 2012 to 31st December 2014 has been obtained from the Local Authority Air Quality Support web site. The results indicate that both laboratories analytical procedures do not have any systematic sources of bias.

Triplicate tubes are exposed at the chemiluminescent monitoring stations in order to calculate bias correction which is applied to the yearly average to enable comparison with the annual NO_2 objective. The data from the triplicate tubes covering the period of this report show good precision.

Appendix B: Road Traffic Data

Table B1.1. Roads with Daily Traffic Flows (AADT) > 5000 vehicles/day

Description	Ref	2010 AADT	2011 AADT	2012 AADT	2013 AADT	2014 AADT	% change from 2010
A41 OXFORD STREET EAST OF LOXDALE STREET	AUTOPROG L7001	23652		21808		23190	-2.0
A463 BLACK COUNTRY ROUTE - North of Hare Street	AUTOPROG L7002	33035		32634		33174	0.4
A4123 BIRMINGHAM NEW ROAD - South of Shaw Road	AUTOPROG L7003	27383		30010		28879	5.5
A4039 MILLFILDS ROAD - West of Ward Street	AUTOPROG L7004	22790		21937		21694	-4.8
A454 WILLENHALL ROAD - West of Deans Road	AUTOPROG L7005	32895		20396		19077	-42.0
A4124 LICHFIELD ROAD - West of Peacock Avenue	AUTOPROG L7006	15662		16441		16436	4.9
A460 CANNOCK ROAD - South of Underhill Lane	AUTOPROG L7007	17779		15697		17797	0.1
A4039 GOLDTHORN HILL - West of Park Street South	AUTOPROG L7008	23117		21796		21401	-7.4
A459 WOLVERHAMPTON RD EAST - South of Dovedale Road	AUTOPROG L7009	14711		16260		16195	10.1
A449 STAFFORD ROAD - North of West Street	AUTOPROG L7015	38299		37988		38375	0.2
A460 CANNOCK ROAD - East of Nine Elms Lane	AUTOPROG L7016			22118		22900	
A460 CANNOCK ROAD - East of Stafford Road	AUTOPROG L7016	23314					
A4124 WEDNESFIELD ROAD - South of Woden Road	AUTOPROG L7017	24195		24871		23925	-1.1
A41 BILSTON ROAD - West of Eagle Street	AUTOPROG L7018	18644			19803	19932	6.9
A449 PENN ROAD - West of Hollybush Lane	AUTOPROG L7019	18512		17478		18641	0.7
A41 TETTENHALL ROAD - South of Balfour Road	AUTOPROG L7020	17335		17504		17413	0.4
A454 BRIDGNORTH ROAD - West of Windmill Lane	AUTOPROG L7021	14762		13769		15131	2.5
A41 WERGS ROAD - West of Woodthorne Road	AUTOPROG L7022	14134		13467		12865	-9.0
A449 STAFFORD ROAD - North of Springfield Lane	AUTOPROG L7024	34234		32811		34233	0.0
A4123 BIRMINGHAM NEW ROAD - North of Needwood Drive	AUTOPROG L7025		23433		23910		
A4039 PARKFIELD ROAD - West of Windsor Road	AUTOPROG L7026		18949		18080		
A4126 ETTINGSHALL ROAD - North of Frost Street	AUTOPROG L7027		9272		8775		
A41 WELLINGTON ROAD - West of Bell Street	AUTOPROG L7028		14440		14163		
A463 BLACK COUNTRY ROUTE - East of Bankfield Road	AUTOPROG L7029		35905		34230		
A4444 BLACK COUNTRY NEW ROAD - S/O Black Country Route	AUTOPROG L7030		18897		19790		

Description	Ref	2010 AADT	2011 AADT	2012 AADT	2013 AADT	2014 AADT	% change from 2010
ROOKERY STREET - West of Hall Street	AUTOPROG L7031		8095		7765		
A460 CANNOCK ROAD - North of Inchlaggan Road	AUTOPROG L7032		14940		15523		
A454 WILLENHALL ROAD - East of Lower Walsall Street	AUTOPROG L7033		20253		24685		
A4039 PARKFIELD ROAD - East of Beaconsfield Drive	AUTOPROG L7036	19985		20287		20244	1.3
A449 PENN ROAD - North of Bromley Place	AUTOPROG L7037		21866		20923		
A449 PENN ROAD - North of Claremont Road	AUTOPROG L7038		23229		23150		
A459 DUDLEY ROAD - North of Byrne Road	AUTOPROG L7039	17873		16452		15398	-13.8
A41 CHAPEL ASH - East of Lovatt Street	AUTOPROG L7040	31086		30085		30551	-1.7
A449 STAFFORD ROAD - North of Springfield Lane	AUTOPROG L7042	30293		30560		29956	-1.1
A449 STAFFORD STREET - South of The Maltings	AUTOPROG L7043		37078		36902		
A454 COMPTON ROAD - West of Ashfield Road	AUTOPROG L7044		13853		11239		
A41 THE ROCK - East of Stockwell Road	AUTOPROG L7045		19066		18704		
A4123 BIRMINGHAM ROAD - North of Lever Street	AUTOPROG L7046		26586		36288		
A463 BLACK COUNTRY ROUTE - North of Overfield Drive	AUTOPROG L7047		23461		22784		
B4163 HIGHFIELDS ROAD - East of Dudley Street	AUTOPROG L7048	19946		19308		19267	-3.4
B4484 WILLENHALL ROAD - West of St Chad's Road	AUTOPROG L7049	8084		8258		8441	4.4
B4484 WADDENS BROOK LANE - East of Vale Drive	AUTOPROG L7050	11117		10909		11433	2.8
B4484 AMOS LANE - South of Bellamy Lane	AUTOPROG L7051	12041		11320		11762	-2.3
FINCHFIELD ROAD - East of Broad Lane	AUTOPROG L7052	7405		6981		7334	-1.0
B4161 FINCHFIELD HILL - North of The Terrace	AUTOPROG L7053		11892		10492		
B4161 BIRCHES BARN - East of St Phillips Avenue	AUTOPROG L7054		15247		15625		
B4156 BLACKHALVE LANE - East of Blackwood Avenue	AUTOPROG L7055		11230		11343		
B4162 WOLVERHAMPTON STREET - North of Park Road	AUTOPROG L7056		12398		10301		
B4161 HENWOOD ROAD - North of Henwood Close	AUTOPROG L7057		10554		9787		
BRADLEY LANE - East of Sterling Road	AUTOPROG L7058	7893		8370		8411	6.6
BROAD LANES - South of Withy Road	AUTOPROG L7059	13134		12562		13168	0.3
STOW HEATH LANE - North of Bedford Street	AUTOPROG L7060	11272		11009		11337	0.6
PROUD'S LANE - North of Wassall Road	AUTOPROG L7061	5482		5889		6431	17.3

Description	Ref	2010 AADT	2011 AADT	2012 AADT	2013 AADT	2014 AADT	% change from 2010
VULCAN ROAD - South of Dale Street	AUTOPROG L7062	14204		14276		14922	5.0
MOSELEY ROAD - West of Dilloway's Lane	AUTOPROG L7063	10598		10179		9641	-9.0
NEACHELLS LANE - South of Strawberry Lane	AUTOPROG L7064	25139		24104		23979	-4.6
BROAD LANE SOUTH - North of Birchfield Road	AUTOPROG L7065	10693		10960		10915	2.1
LINTHOUSE LANE - North of Olinthus Avenue	AUTOPROG L7066	9816		12244		12907	**31.5**
LINTHOUSE LANE - West of Springhill Lane	AUTOPROG L7067	11817		12138		12185	3.1
UNDERHILL LANE - North of Highfield Avenue	AUTOPROG L7069	10334		10559		8919	-13.7
PRIMROSE LANE - South of Ruskin Road	AUTOPROG L7070	7252		7003		7258	0.1
BUSHBURY ROAD - South of Shawbury Road	AUTOPROG L7071	14515		13870		14278	-1.6
BUSHBURY LANE - South of Hellier Road	AUTOPROG L7074	8985		9051		9504	5.8
BUSHBURY LANE - North of Fordhouse Road	AUTOPROG L7075	9862		9951		10145	2.9
DOVEDALE ROAD - South of Ward Grove	AUTOPROG L7078	6756		5862		6675	-1.2
COALWAY ROAD - East of Beckminster Road	AUTOPROG L7079	8152		10310		10846	**33.0**
WARSTONES ROAD - South of Warstones Drive	AUTOPROG L7080	11753		13906		14663	24.8
WOOD ROAD - North of Haywood Drive	AUTOPROG L7081	6257		6492		6446	3.0
BLAYDON ROAD - North of Emsworth Crescent	AUTOPROG L7082	8729		8721		10125	16.0
CRADDOCK STREET - South of Dunstall Road	AUTOPROG L7083	9048		8997		9737	7.6
NEW HAMPTON ROAD EAST - East of Rugby Street	AUTOPROG L7084	13762		13460			
WINDMILL LANE - South of Castlecroft Lane	AUTOPROG L7085	10805		10582		11351	5.1
WOBASTON ROAD - West of Pendeford Road	AUTOPROG L7087	13567		14320		14148	4.3
THREE TUNS LANE - East of Sheley Road	AUTOPROG L7088		14229		14328		
OXLEY MOOR ROAD - East of Beech Road	AUTOPROG L7089		11004		11321		
THE DROVEWAY - South of Armstead Road	AUTOPROG L7090		12198		11662		
BARNHURST LANE - South of Ryefield	AUTOPROG L7091		9961		11792		
ALDERSLEY ROAD - North of Lynton Avenue	AUTOPROG L7093		7519		6787		
CODSALL ROAD - North of Sandy Lane	AUTOPROG L7094		14528		14454		
CODSALL ROAD - North of Belvedere Gardens	AUTOPROG L7095		6829		8479		
CASTLECROFT ROAD - East of White Oak Drive	AUTOPROG L7098		9623		10765		

Description	Ref	2010 AADT	2011 AADT	2012 AADT	2013 AADT	2014 AADT	% change from 2010
BHYLLS LANE - South pf Bellencroft Gardens	AUTOPROG L7099		7999		8760		
COALWAY ROAD - West of Coalway Gardens	AUTOPROG L7100		11225		10575		
NEW HAMPTON ROAD WEST - West of Riches Street	AUTOPROG L7102		10270		12017		
HORDERN ROAD - South of Court Road	AUTOPROG L7103		6789		6973		
PAGET ROAD - West of Tettenhall Road	AUTOPROG L7104		6329		6474		
WATERLOO ROAD - North of Staveley Road	AUTOPROG L7106		17445		16514		
ELSTON HALL LANE - West of Short Road	AUTOPROG L7108		9566		12055		
KEMPTHORNE AVENUE - South of Hammond Avenue	AUTOPROG L7109		11753		11938		
PRESTWOOD ROAD - West of Victoria Road	AUTOPROG L7111		12460		11997		
DEANS ROAD - South of Lewis Avenue	AUTOPROG L7112		11688		10832		
OLD HEATH ROAD - North of Burcot Avenue	AUTOPROG L7113		7379		7676		
HIGHFIELDS ROAD - West of Ambleside Close	AUTOPROG L7114		6036		5996		
BROAD LANE NORTH - North of Peach Road	AUTOPROG L7115		5974		6272		
ANCHOR ROAD - North of Biddings Lane	AUTOPROG L7116		12907		12620		
WOBASTON ROAD - East of Patshull Avenue	AUTOPROG L7117		20035		17726		
A4126 SPRING ROAD - North of Lanesfield Drive	AUTOPROG L7118	9544		9317		9267	-2.9
A41 TETTENHALL ROAD - South of Balfour Crescent	AUTOPROG WV01	17414		17521		17410	0.0
NEW HAMPTON ROAD WEST - West of Evans Street	AUTOPROG WV02	15770		15582		15572	-1.3
DUNSTALL ROAD - North of Evans Street	AUTOPROG WV03	6281		6366		6324	0.7
A449 STAFFORD ROAD - North of West Street	AUTOPROG WV04	39343		38874		38701	-1.6
A460 CANNOCK ROAD - East of Cambridge Street	AUTOPROG WV05	23868		23246		23797	-0.3
A4124 WEDNESFIELD ROAD - East of Sun Street	AUTOPROG WV07	22202		23575		22246	0.2
A454 WILLENHALL ROAD - East of Colliery Road	AUTOPROG WV08	24698		25001		24431	-1.1
A41 BILSTON ROAD - North of Jenner Street	AUTOPROG WV09	20896			19803	19855	-5.0
STEELHOUSE LANE - South of Jenner Street	AUTOPROG WV10	5090		5316		5635	10.7
A4123 BIRMINGHAM ROAD - North of Derry Street	AUTOPROG WV12	20112		21395		21006	4.4
A459 DUDLEY ROAD - North of Drayton Street	AUTOPROG WV13	18668		18143		18152	-2.8
A449 PENN ROAD - North of Ablow Street	AUTOPROG WV14	27817		32195		29221	5.0

Description	Ref	2010 AADT	2011 AADT	2012 AADT	2013 AADT	2014 AADT	% change from 2010
GREAT BRICKILN STREET - East of Ashland Street	AUTOPROG WV15	7248		5707		7595	4.8
MERRIDALE ROAD - South of Merridale Lane	AUTOPROG WV16	19352		19725		19269	-0.4
A454 COMPTON ROAD - East of Richmond Road	AUTOPROG WV17	17559		17685		17472	-0.5
ALDERSLEY ROAD - North of Lynton Avenue	CAR 8380			7018			
TUDOR ROAD - South of Church Street	CAR1296		6240				
BROAD LANE SOUTH - North of Birchfield Road	CAR17053				11303		
GREENFIELD LANE - East of Primrose Lane	CAR17140			5420		5991	
WOOD HAYES ROAD - North of Blackhalve Lane	CAR225						
BROAD LANE SOUTH - South of Pool Hayes Lane	CAR27018						
BROAD LANE SOUTH - South of Pool Hayes Lane	CAR27018A						
BROAD LANE SOUTH - South of Pool Hayes Lane	CAR27018B						
BROAD LANE SOUTH - North of Stubby Lane	CAR27019						
BROAD LANE SOUTH - North of Stubby Lane	CAR27019A						
BROAD LANE SOUTH - North of Stubby Lane	CAR27019B						
A4124 LICHFIELD ROAD - South of Lyndale Drive	CAR27020						
A4124 LICHFIELD RD - East of Moathouse Lane East	CAR27021						
A4124 LICHFIELD ROAD - West of Broad Lane North	CAR27022						
WATERLOO ROAD - North of Oxley Street	CAR27023						
WELLINGTON ROAD - East of Ward St	CAR27028						
WELLINGTON ROAD - East of Ward St	CAR27028A						
A41 WELLINGTON ROAD - West of Dover St	CAR27029						
STAFFORD ROAD - North of Springfield Lane	CAR27030						
WIGHTWICK BANK - South of Elmsdale	CAR27038						
WIGHTWICK BANK - North of Old Lane	CAR27039			6037			
PAGET ROAD - West of Hatton Road	CAR27042						
LICHFIELD ROAD - North of Neachells Lane	CAR27043						
WOLVERHAMPTON ROAD - North of Mill Street	CAR2705	14559					
UPPER VILLIERS STREET - South of Cross Street South	CAR27078A	6289					

Description	Ref	2010 AADT	2011 AADT	2012 AADT	2013 AADT	2014 AADT	% change from 2010
UPPER VILLIERS STREET - South of Cross Street South	CAR27078B	6238					
DARLASTON LANE - East of Hunters Close	CAR27081	7947					
THE HOLLOWAY - South of Sandy Hollow	CAR27084	7891					
LUNT ROAD - North of St Chads Road	CAR27085	8663					
AMOS LANE - South of Amos Lane	CAR27088	11596					
WOLVERHAMPTON ROAD EAST - North of Dovedale Road	CAR27090	13916					
PENN ROAD - North of Stubbs Road	CAR27092	20712					
PENN ROAD - South of Stubbs Road	CAR27093	22090					
BRADLEY LANE - East of Wallace Road	CAR27094	7315					
CASTLECROFT LANE - North of Pool Hall Road	CAR27099	5118					
BRIDGNORTH ROAD - East of Tinacre Hill	CAR27103	14469					
THE HOLLOWAY - North of Bramstead Avenue	CAR27104	9835					
WOOD ROAD - North of Woodcote Road	CAR27106	6708					
ALDERSLEY ROAD - South of Hugh Porter Way	CAR27112		7180				
LICHFIELD ROAD - West of Thetford Gardens	CAR27114		8402				
OXLEY MOOR ROAD - West of Kyle Close	CAR27117		11095				
PRESTWOOD ROAD WEST - South of Mill Lane	CAR27123		12235				
LONG KNOWLE LANE - North of Long Mill Avenue	CAR27125		12612	12271			
HENWOOD ROAD - North of College View	CAR27133		10837				
SPRING ROAD - South of Wood Street	CAR27136		8950				
STUBBY LANE - North of Colman Avenue	CAR27138		6443				
COALWAY ROAD - West of Church Road	CAR27144		13409				
BHYLLS LANE - West of School Close	CAR27145		7334				
TUDOR ROAD - North of Powell Street	CAR27146		6834				
CHURCH STREET - South of Tudor Road	CAR27147		7916				
FINCHFIELD HILL - North of Broadway	CAR27150		11400				
HORDERN ROAD - South of Court Road	CAR27153		7793				
ELSTON HALL LANE - East of Wood Lane	CAR27162		10315				

Description	Ref	2010 AADT	2011 AADT	2012 AADT	2013 AADT	2014 AADT	% change from 2010
THREE TUNS LANE - East of Church Road	CAR27163		14226				
LOXDALE STREET - South of Chapel Street	CAR27164		17554				
MOSELEY ROAD - North of Prouds Lane	CAR27165		14774				
MOSELEY ROAD - West of Waite Road	CAR27166		10598				
LOWER STREET - North of Lowlands Avenue	CAR27167		15716				
PENN ROAD - East of Buttons Farm Road (Westbound only)	CAR27169		8266				
PENDEFORD AVENUE - South of Windermere Road	CAR27170		9907				
BIDDINGS LANE - East of Meadow Lane	CAR27171		13026				
ASPEN WAY - West of Owen Road	CAR27174		8005				
BROMLEY STREET - East of Baggot Street	CAR27179			5058			
OLD HEATH ROAD - North of Brickkheath Road	CAR27183			7107			
OLD HEATH ROAD - South of Ashbourne Road	CAR27184			7114			
DUDLEY ROAD - North of Ranelagh Road	CAR27188			15057			
MARSH LANE - South of St Annes Road	CAR27198			5231			
NORTHYCOTE LANE - South of Abbeyfield Road	CAR27200			10283		10819	
THREE TUNS LANE - West of Crathorne Avenue (Westbound Only)	CAR27201			8329		8878	
THREE TUNS LANE - West of Shelley Road (Eastbound Only)	CAR27202			7121		7247	
PENN ROAD - West of Woodland Cottages (Eastbound Only site vandalised partial data)	CAR27204			10234			
PENN ROAD - West of Woodlands Cottages (Eastbound Only)	CAR27204A			10361			
PENN ROAD - East of Manor Road (Westbound Only)	CAR27205			10271		10748	
WINDMILL LANE - North of Hazelmere Drive	CAR27207			10794			
WARSTONES ROAD - North of Bryan Avenue	CAR27208			11743			
WARSTONES ROAD - North of Buckley Road	CAR27209			13429			
FINCHFIELD ROAD - Between Arms of Finchfield Gardens	CAR27210			6539			
ROOKERY ROAD - South of Bayliss Avenue	CAR27211			5815			
BLAYDON ROAD - at End of Ashwells Grove	CAR27212			8429			
LEA ROAD - South of Lyndhurst Road	CAR27216			9689			
PRESTWOOD ROAD WEST - North of Victoria Road	CAR27217			11564			

Description	Ref	2010 AADT	2011 AADT	2012 AADT	2013 AADT	2014 AADT	% change from 2010
THE DROVEWAY - West of Armstead Road	CAR27221			11699			
BLAYDON ROAD - South of Whitburn Close	CAR27222			11339			
FINCHFIELD LANE - South of Woodland Road	CAR27223			7395			
TRYSULL ROAD - North of Langley Gardens	CAR27224			5726			
MOSELEY ROAD - East of Hill Road	CAR27227			10287			
FINCHFIELD ROAD WEST - West of Linden Lea	CAR27230			15141			
HALL LANE - South of Robert Wynd	CAR27233			6013			
WOOD ROAD - South of Woodcote Road	CAR27239			6183			
STAFFORD ROAD - South of McLean Road (Northbound Only)	CAR27242			14450			
LAKEFIELD ROAD - South of Green Meadow	CAR27245A			19568			
TRYSULL ROAD - West of Bamber Close	CAR27246			5667			
WOOD LANE - North of Lincoln Green	CAR27251			5540			
WARSTONES ROAD - South of Billy Wright Close	CAR27252			15265			
LINTOUSE LANE - East of Spondon Road	CAR27254			12923			
NORTHYCOTE LANE - North of Abbeyfield Road	CAR27256			10661			
LADYMOOR ROAD - North of Birmingham Canal	CAR27257			12274			
COMPTON ROAD - East of Richmond Road	CAR27259			16965			
THE DROVEWAY - North of Southern Arm of Clewley Drive	CAR27261			11144			
PENN ROAD - West of Pinfold Avenue (One Way Westbound Only)	CAR27262			8856			
NEW HAMPTON ROAD - West of McBean Road	CAR27264				7386		
BROMLEY STREET - West of Dudley Road	CAR27266A				5183		
CODSALL ROAD - South of Knights Avenue	CAR27269				15564		
TETTENHALL ROAD - East of Connaught Road	CAR27280				16815		
TETTENHALL ROAD - east of Connaught Road	CAR27280A				17024		
LOXDALE STREET - North of Loxdale Sidings	CAR27283				17688		
BUSHBURY LANE - North of Collingwood Road	CAR27285				8560		
STOURBRIDGE ROAD - West of Springhill Lane (One Way Eastbound Only)	CAR27286				8026		
PENN ROAD - West of Buttons Farm Road (One Way Westbound Only)	CAR27287				8324		

Description	Ref	2010 AADT	2011 AADT	2012 AADT	2013 AADT	2014 AADT	% change from 2010
TETTENHALL ROAD - East of Connaught Road	CAR27288				17656		
BROAD LANES - North of Broadmore Road	CAR27289				13569		
BROAD LANE NORTH - North of Peach Road	CAR27290				6136		
WOOD LANE - North of Moreton Road	CAR27291				6294		
SCHOOL ROAD - South of Shaw Road	CAR27293				6301		
ALDERSLEY ROAD - North of Sandy Lane	CAR27294				8762		
YEW TREE LANE - South of Wrottesley Road West	CAR27295				7078		
LOWER STREET - South of Lower Green	CAR27296				12233		
DUDDING ROAD - West of Hall Road	CAR27301				5458		
UNDERHILL LANE - North of Highfield Avenue	CAR27303				10816		
CANNOCK ROAD - North of Grassy Lane	CAR27308				14429		
CRADDOCK STREET - North of Jackson Street	CAR27311				8985		
CASTLECROFT ROAD - West of Eastern Arm of Castlecroft Gardens	CAR27316				9491		
LEGS LANE - West of Egerton Road	CAR27329					5225	
ASPEN WAY - East of Owen Road	CAR27331					9051	
GREAT BRICKKILN STREET - East of Lord Street	CAR27333					5698	
WOLVERHAMPTON STREET - North of Bell Street	CAR27340					9697	
BRADLEY LANE - East of Stirling Road	CAR27341					7243	
FINCHFIELD HILL - South of The Terrace	CAR27343					10918	
ROOKERY STREET - West of Well Lane	CAR27349					7685	
PENN ROAD - East of Church Hill (One Way Eastbound Only)	CAR27350					10413	
WOOD LANE - South of Fairfax Road	CAR27353					7226	
EVANS STREET - East of Brockhurst Drive	CAR27355					6808	
FINCHFIELD ROAD - West of Finchfield Gardens (Western Arm)	CAR27356					8015	
CASTLECROFT ROAD - East of Castlecroft Gardens (Western Arm)	CAR27357					9505	
LICHFIELD ROAD - West of Fletcher Road	CAR28101	16303					
LICHFIELD ROAD - West of Fletcher Road	CAR28101A	15956					
LICHFIELD ROAD - West of Fletcher Road Prism	CAR28101B	11677					

Description	Ref	2010 AADT	2011 AADT	2012 AADT	2013 AADT	2014 AADT	% change from 2010
WARSTONE ROAD - North of Old Ladywood Lane	CAR28102A	18483					
WARSTONE ROAD - North of Old Ladywood Lane	CAR28102B	17969					
WARSTONE ROAD - Northy of Old Ladywood Lane	CAR28102C	16542					
OLD LANDYWOOD LANE - East of Warstones Road	CAR28103	6788					
OLD LANDYWOOD LANE - East of Warstones Road	CAR28103A	6684					
STAFFORD ROAD - South of Long Lane	CAR28104A	14188					
STAFFORD ROAD - South of Long Lane	CAR28104B	14224					
STAFFORD ROAD - South of Long Lane	CAR28104C	10317					
STOURBRIDGE ROAD - South of Lloyd Drive	CAR28105	28788					
STOURBRIDGE ROAD - South of Lloyd Drive	CAR28105A	27589					
STOURBRIDGE ROAD - South of Lloyd Drive	CAR28105B	21608					
WERGS ROAD - West of Keepers Lane	CAR28106	14605					
WERGS ROAD - West of Keepers Lane	CAR28106A	13603					
WERGS ROAD - West of Keepers Lane	CAR28106B	11620					
BRIDGNORTH ROAD - West of Sabrina Road	CAR28107	12681					
BRIDGNORTH ROAD - West of Sabrina Road	CAR28107A	12342					
BRIDGNORTH ROAD - West of Sabrina Road	CAR28107B	11310					
DUDLEY ROAD - East of Stourbridge Road	CAR28108A	15821					
DUDLEY ROAD - East of Stourbridge Road	CAR28108B	14548					
BRIDGNORTH ROAD - East of Tom Lane	CAR28109	11936					
BRIDGNORTH ROAD - East of Tom Lane	CAR28109A	11386					
BRIDGNORTH ROAD - East of Tom Lane	CAR28109B	11116					
WODEHOUSE LANE - East of Stourbridge Road	CAR28110	14222					
WODEHOUSE LANE - East of Stourbridge Road	CAR28110A	13636					
WODEHOUSE LANE - East of Stourbrisge Road	CAR28110B	11762					
CODSALL ROAD - North of Windermere Drive	CAR28111	8896					
CODSALL ROAD - North of Windermere Drive	CAR28111A	6938					
CODSALL ROAD - North of Windermere Drive	CAR28111B	8571					

Description	Ref	2010 AADT	2011 AADT	2012 AADT	2013 AADT	2014 AADT	% change from 2010
WOBASTON ROAD - East of Pendeford Lane	CAR28112	14661					
WOBASTON ROAD - East of Pendeford Lane	CAR28112A	12190					
WOBASTON ROAD - East of Pendeford Lane	CAR28112B	13870					
STAFFORD ROAD - North of Farmbrook Avenue (Partial Data Site Vandalised)	CAR28113	34779					
STAFFORD ROAD - North of Farmbrook Avenue (Partial Data Site Vandalised)	CAR28113A	28746					
STAFFORD ROAD - North of Farmbrook Avenue	CAR28113B	31784					
CANNOCK ROAD - North of Hilton Cross (Northbound Only)	CAR28114	10017					
CANNOCK ROAD - North of Hilton Cross (Northbound Only)	CAR28114A	8859					
CANNOCK ROAD - North of Hilton Cross (Northbound Only)	CAR28114B	9186					
CANNOCK ROAD - South of M54 Junction 1 (Southbound Only)	CAR28115	11914					
CANNOCK ROAD - South of M54 Junction 1 (Southbound Only)	CAR28115A	11099					
CANNOCK ROAD - South of M54 Junction 1 (Southbound Only)	CAR28115B	11645					
BURSNIPS ROAD - North of Hobnock Road	CAR28169			18434			
YEW TREE LANE - South of Wergs Road	CAR28172			7000			
HORSELEY HEATH - West of Arnham Way	CAR29026			28523			
HORSELEY HEATH - West of Arnham Way	CAR29026A			28102			
HORSELEY HEATH - West of Arnham Way	CAR29026B			27901			
HORSELEY HEATH - West of Arnham Way	CAR29026C			28656			
HORDERN ROAD - South of Court Road	CAR2959				7780		
HIGH STREET - South of Upper Green	CAR3377		6922				
WOOD END ROAD - North of Lynton Avenue	CAR7147			6945			
RING ROAD ST JOHNS - West of Church Lane	CSL7010		31046		35416		
RING ROAD ST MARKS - North of Great Brickkiln Street	CSL7011		36914		39194		
A4150 RING ROAD ST PETERS - West of Stafford Street	CSL7012		31010		27136		
RING ROAD ST PATRICKS - East of Stafford Street	CSL7013		36121		38257		
RING ROAD ST GEORGES - South of Bilston Street Island	CSL7034		33522		36334		
RING ROAD ST ANDREWS - North of Bath Road	CSL7041		25177		24045		
A449 PENN ROAD - South of Manor Road	CSR1288						

Description	Ref	2010 AADT	2011 AADT	2012 AADT	2013 AADT	2014 AADT	% change from 2010
TUDOR ROAD - South of Church Street	CSR1296		6240				
BROAD LANE - South of Birchfield Road	CSR17053				11302		
GREENFIELD LANE- East of Primrose Lane	CSR17140			5420		5992	
BROAD LANE SOUTH - South of Pool Hayes	CSR27018						
BROAD LANE SOUTH - South of Pool Hayes	CSR27018A						
BROAD LANE SOUTH - South of Pool Hayes	CSR27018B						
BROAD LANE SOUTH - North of Stubby Lane	CSR27019						
BROAD LANE SOUTH - North of Stubby Lane (Partial data)	CSR27019A						
BROAD LANE SOUTH - North of Stubby Lane	CSR27019B						
A4124 LICHFIELD ROAD - South of Lyndale Drive	CSR27020						
A4124 LICHFIELD ROAD - East of Moathouse Lane East	CSR27021						
A4124 LICHFIELD ROAD - West of Broad Lane North	CSR27022						
WATERLOO ROAD - North of Oxley Street	CSR27023						
FINCHFIELD ROAD - West of Bantock Gardens	CSR27024						
FINCHFIELD ROAD - West of Bantock Gardens - Partial Data	CSR27024A						
FINCHFIELD ROAD - West of Bantock Gardens	CSR27024B						
WELLINGTON ROAD - East of Ward Street	CSR27028						
WELLINGTON ROAD - East of Ward Street	CSR27028A						
A41 WELLINGTON ROAD - West of Dover Street	CSR27029						
STAFFORD ROAD - North of Springfield Lane	CSR27030						
OAKLANDS ROAD - West of Bromford Rise	CSR27036						
WIGHTWICK BANK - North of Bridgnorth Road	CSR27037						
WIGHTWICK BANK - South of Elmsdale	CSR27038						
WIGHTWICK BANK - South of Elmsdale	CSR27038A						
WIGHTWICK BANK - North of Old Lane	CSR27039			6039			
BROAD LANE NORTH - South of Len Davies Road	CSR27041						
PAGET ROAD - West of Hatton Road	CSR27042						
LICHFIELD ROAD - North of Neachells Lane	CSR27043						

Description	Ref	2010 AADT	2011 AADT	2012 AADT	2013 AADT	2014 AADT	% change from 2010
WOLVERHAMPTON STREET - North of Mill Street	CSR2705	14558					
CASTLECROFT LANE - South of Pool Hall Road	CSR27072	5053					
CRADDOCK STREET - West of Jackson Street	CSR27073	11144					
UPPER VILLIERS STREET - South of Cross Street South	CSR27078A	6288					
UPPER VILLIERS STREET - South of Cross Street South	CSR27078B	6239					
DARLASTON LANE - East of Hunters Close	CSR27081	7946					
THE HOLLOWAY - South of Sandy Hollow	CSR27084	7888					
LUNT ROAD - North of St Chads Road	CSR27085	8666					
AMOS LANE - South of Amos Avenue	CSR27088	11594					
WOLVERHAMPTON ROAD EAST - North of Dovedale Road	CSR27090	13911					
PENN ROAD - North of Stubbs Road	CSR27092	20713					
PENN ROAD - South of Stubbs Road	CSR27093	22091					
BRADLEY LANE - East of Wallace Road	CSR27094	7308					
COMPTON ROAD WEST - East of Waterdale	CSR27097	14604					
CASTLECROFT LANE - North of Pool Hall Road	CSR27099	5120					
BRIDGNORTH ROAD - East of Tinacre Hill	CSR27103	14468					
THE HOLLOWAY - North of Bramstead Avenue	CSR27104	9835					
WOOD ROAD - North of Woodcote Road	CSR27106	6708					
ALDERSLEY ROAD - South of Hugh Porter Way	CSR27112		7179				
LICHFIELD ROAD - West of Thetford Gardens	CSR27114		8404				
OXLEY MOOR ROAD - West of Kyle Close	CSR27117		11099				
PRESTWOOD ROAD WEST - South of Mill Lane	CSR27123		12237				
LONG KNOWLE LANE - North of Long Mill Avenue	CSR27125		12608	12270			
HENWOOD ROAD - North of College View	CSR27133		10839				
SPRING ROAD - South of Wood Street	CSR27136		8950				
STUBBY LANE - North of Colman Avenue	CSR27138		6446				
COALWAY ROAD - West of Church Road	CSR27144		13415				
BHYLLS LANE - West of School Close	CSR27145		7335				

Description	Ref	2010 AADT	2011 AADT	2012 AADT	2013 AADT	2014 AADT	% change from 2010
TUDOR ROAD - NORTH OF POWELL STREET	CSR27146		6834				
CHURCH STREET - South of Tudor Road	CSR27147		7918				
FINCHFIELD HILL - North of Broadway	CSR27150		11401				
HORDERN ROAD - SOUTH OF COURT ROAD	CSR27153		7794				
ELSTON HALL LANE - East of Wood Lane	CSR27162		10314				
THREE TUNS LANE - East of Church Road	CSR27163		14233				
LOXDALE STREET - South of Chapel Street	CSR27164		17554				
MOSELEY ROAD - North of Prouds Lane	CSR27165		14771				
MOSELEY ROAD - West of Waite Road	CSR27166		10596				
LOWER STREET - North of Lowlands Avenue	CSR27167		15717				
PENN ROAD - East of Buttons Farm Road (Westbound Only)	CSR27169		8263				
PENDEFORD AVENUE - South of Windermere Road	CSR27170		9909				
BIDDINGS LANE - East of Meadow Lane	CSR27171		13024				
ASPEN WAY - West of Owen Road	CSR27174		8001				
BROMLEY STREET - East of Baggot Street	CSR27179			5058			
OLD HEATH ROAD - North of Brickheath Road	CSR27183			7104			
OLD HEATH ROAD - South of Ashbourne Road	CSR27184			7111			
DUDLEY ROAD - North of Ranelagh Road	CSR27188			15059			
MARSH LANE - South of St Annes Road	CSR27198			5230			
NORTHYCOTE LANE - South of Abbeyfield Road	CSR27200			10279		10817	
THREE TUNS LANE - West of Crathorne Avenue (Westbound Only)	CSR27201			8332		8877	
THREE TUNS LANE - West of Shelley Road (Eastbound Only)	CSR27202			7120		7248	
PENN ROAD - West of Woodland Cottages (Eastbound Only - Site Vandalised Partial Data)	CSR27204			10234			
PENN ROAD - West of Woodland Cottages (Eastbound Only - Site Vandalised Partial Data)	CSR27204A			10359			
PENN ROAD - East of Manor Road (Westbound Only)	CSR27205			10269		10747	
WINDMILL LANE - North of Hazelmere Drive	CSR27207			10797			
WARSTONES ROAD - North of Bryan Avenue	CSR27208			11739			
WARSTONES ROAD - North of Buckley Road	CSR27209			13431			

Description	Ref	2010 AADT	2011 AADT	2012 AADT	2013 AADT	2014 AADT	% change from 2010
FINCHFIELD ROAD - Between Arms of Finchfield Gardens	CSR27210			6541			
CRADDOCK STREET - North of Jackson Street	CSR27211				8988		
ROOKERY ROAD - South of Bayliss Avenue	CSR27211			5748			
ROOKERY ROAD - South of Bayliss Avenue	CSR27211A			5816			
BLAYDON ROAD - At the end of Ashwells Grove	CSR27212			8427			
LEA ROAD - South of Lyndhurst Road	CSR27216			9692			
PRESTWOOD ROAD WEST - North of Victoria Road	CSR27217			11566			
THE DROVEWAY - West of Armstead Road	CSR27221			11701			
BLAYDON ROAD - South of Whitburn Close	CSR27222			11341			
FINCHFIELD LANE - South of Woodland Road	CSR27223			7396			
TRYSULL ROAD - North of Langley Gardens	CSR27224			5726			
MOSELEY ROAD - East of Hill Road	CSR27227			10284			
FINCHFIELD ROAD WEST - West of Linden Lea	CSR27230			15135			
HALL LANE - South of Robert Wynd	CSR27233			6010			
WOOD ROAD - South of Woodcote Road	CSR27239			6181			
STAFFORD ROAD - South of McClean Road (Northbound Only)	CSR27242			14449			
LAKEFIELD ROAD - South of Green Meadow	CSR27245A			19568			
TRYSULL ROAD - West of Bamber Close	CSR27246			5665			
WOOD LANE - North of Lincoln Green	CSR27251			5542			
WARSTONES ROAD - South of Billy Wright Close	CSR27252			15267			
LINTHOUSE LANE - East of Spondon Road	CSR27254			12922			
NORTHYCOTE LANE - North of Abbeyfield Road	CSR27256			10662			
LADYMOOR ROAD - North of Birmingham Canal	CSR27257			12274			
COMPTON ROAD - East of Richmond Road	CSR27259			16964			
THE DROVEWAY - North of Southern Arm of Clewley Drive	CSR27261			11143			
PENN ROAD - West of Pinfold Avenue (Westbound Only)	CSR27262			8860			
NEW HAMPTON ROAD WEST - East of McBean Road	CSR27264				7387		
BROMLEY STREET - West of Dudley Road	CSR27266A				5185		

Description	Ref	2010 AADT	2011 AADT	2012 AADT	2013 AADT	2014 AADT	% change from 2010
CODSALL ROAD - South of Knights Avenue	CSR27269				15562		
TETTENHALL ROAD - East of Connaught Road (Partial Data)	CSR27280				16821		
TETTENHALL ROAD - East of Connaught Road (Partial Data)	CSR27280A				17027		
LOXDALE STREET - North of Loxdale Sidings	CSR27283				17686		
BUSHBURY LANE - North of Collingwood Road	CSR27285				8557		
STOURBRIDGE ROAD - West of Springhill Lane (Eastbound Only)	CSR27286				8026		
PENN ROAD - West of Buttons Farm Road (Westbound Only)	CSR27287				8323		
TETTENHALL ROAD - East of Connaught Road	CSR27288				17657		
BROAD LANES - North of Broadmoor Road	CSR27289				13568		
BROAD LANE NORTH - North of Peach Road	CSR27290				6134		
WOOD LANE - North of Moreton Road	CSR27291				6293		
SCHOOL ROAD - South of Shaw Lane	CSR27293				6298		
ALDERSLEY ROAD - North of Sandy Lane	CSR27294				8766		
YEW TREE LANE - South of Wrottesley Road West	CSR27295				7077		
LOWER STREET - South of Lower Green	CSR27296				12235		
DUDDING ROAD - West of Hall Road	CSR27301				5459		
UNDERHILL LANE - North of Highfield Avenue	CSR27303				10815		
CANNOCK ROAD - North of Grassy Lane	CSR27308				14428		
CASTLECROFT ROAD - West of Eastern Arm of Castlecroft Gardens	CSR27316				9494		
LEGS LANE - West of Egerton Road	CSR27329					5225	
ASPEN WAY - West of Owen Road	CSR27331					9051	
GREAT BRICKKILN STREET - East of Lord Street	CSR27333					5699	
WOLVERHAMPTON STREET - North of Bell Street	CSR27340					9697	
BRADLEY LANE - East of Stirling Road	CSR27341					7242	
FINCHFIELD HILL - South of The Terrace	CSR27343					10919	
ROOKERY STREET - West of Well Lane	CSR27349					7689	
PENN ROAD - East of Church Hill (One Way Eastbound Only)	CSR27350					10411	
WOOD LANE - South of Fairfax Road	CSR27353					7229	

Description	Ref	2010 AADT	2011 AADT	2012 AADT	2013 AADT	2014 AADT	% change from 2010
EVANS STREET - East of Brockhurst Drive	CSR27355					6808	
FINCHFIELD ROAD - West of Finchfield Gardens (Western Arm)	CSR27356					8014	
CASTLECROFT ROAD - East of Castlecroft Gardens (Western Arm)	CSR27357					9506	
EBSTREE ROAD - West of Dimmingsdale Road	CSR28168						
BURSNIPS ROAD - North of Hobnock Road	CSR28169						
LONG LANE - East of Broad Lane	CSR28170						
YEW TREE LANE - South of Wergs Road	CSR28172						
HORDERN ROAD - South of Court Road	CSR2959				7780		
HIGH STREET - South of Upper Green	CSR3377		6918				
WOOD END ROAD - North of Orchard Road	CSR7147			6942			
ALDERSLEY ROAD - North of Lynton Avenue	CSR8380			7013			
RING ROAD ST PETERS	L7012	38443					
CODSALL ROAD - 0-50M West of Knights Avenue	PCN3101						
LICHFIELD ROAD - East of Stubby Lane	PCR1078						
CANNOCK ROAD - South of Mill Lane	PCR1269						
THOMPSON AVENUE - at Silver Birch Road DTP	PCR1307						
BLAYDON ROAD - North of Oxley Moor Road DTP	PCR1338						
CHAPEL ASH - East of Bath Road DTP	PCR1579	30961					
BLACKHALVE LANE - East of Cannock Road	PCR17001						
BLACKHALVE LANE - East of Cannock Road	PCR17001						
DOVEDALE ROAD - at Woodcross Street	PCR17065						
DUDLEY ROAD - South	PCR17065						
WATERLOO ROAD - at Molineux Alley	PCR17072						
MOUNT PLEASANT - West of James Street DTP	PCR17076	9204					
GOLDTHORN AVENUE	PCR17084						
MOUNT PLEASANT - Just East of Etruria Way DTP	PCR17095						
WOLVERHAMPTON ROAD EAST - Off New Cross Avenue	PCR17101						
BIRMINGHAM NEW ROAD - at Needwood Drive DTP	PCR17106	25589					

Description	Ref	2010 AADT	2011 AADT	2012 AADT	2013 AADT	2014 AADT	% change from 2010
CASTLECROFT ROAD - Near The Avenue	PCR17112						
WILLENHAL ROAD - at Griffin Street WV08	PCR1824	24517		24521		23765	-3.1
MOSELEY ROAD - Just South of Hill Road DTP	PCR2234						
WIGHTWICK BANK - at Elmsdale DTP	PCR2244						
CANNOCK ROAD - at Cambridge Street WV05	PCR2248	23955		23306		23985	0.1
BIRMINGHAM ROAD - Near Prestons Row Footpath DTB	PCR2439	28941					
RING ROAD ST ANDREWS - at Birch Street DTP	PCR2459						
BRADLEY LANE - DTP	PCR2575						
WELLINGTON ROAD - at Bilston Campus Entrance	PCR27028						
WELLINGTON ROAD - at Dover Road	PCR27029						
OAKLANDS ROAD - East of Lea Road	PCR27036						
WIGHTWICK BANK - North of Bridgnorth Road	PCR27037				6874		
STAFFORD ROAD - at West Street DTP	PCR277						
FINCHFIELD LANE - Just North of Trysull Road	PCR2782						
UPPER VILLIERS - South of Sunbeam Street	PCR2783						
COMPTON ROAD - East of Westland Road DTP	PCR2902						
BIRMINGHAM NEW ROAD - North of Hessian Close DTP	PCR2910	32969					
WERGS ROAD - Near Coppice Lane DTP	PCR2977						
WATERLOO ROAD - Near Oxley Street DTP	PCR3085	16992					
LUNT ROAD - at Lonsdale Road	PCR3169						
WEDNESFIELD ROAD - at Lincoln Street WV07	PCR3207	21596		23120		22062	2.2
SHAW ROAD - at Hinchliffe Lane	PCR3398						
WEDNESFIELD ROAD - Near Burton Road	PCR3551	23638					
DUDLEY ROAD - Just South of Bromley Street DTP	PCR3573						
OLD FALLINGS LANE - South of Leacroft Avenue DTP	PCR3588						
NEACHELLS LANE - Near Phoenix Road DTP	PCR3612	19161					
CRADDOCK STREET - Just South of Jackson Street	PCR3622						
BIRCHES BARN ROAD - Just North of The Minster DTP	PCR3637	12722					

Description	Ref	2010 AADT	2011 AADT	2012 AADT	2013 AADT	2014 AADT	% change from 2010
PEACOCK AVENUE - North of Lichfield Road	PCR3662						
CANNOCK ROAD - at Bridge Street DTP	PCR3988						
BLACK COUNTRY ROUTE - at Porkets Bridge DTP	PCR414	46856					
STAFFORD STREET - at the Maltings DTP	PCR4508	41915					
PENN ROAD - Near Bromley Place DTP	PCR4509						
RING ROAD ST GEORGES - DTP	PCR4730	35614		10451			
THE HOLLOWAY - at Cygnet Close	PCR571A						
BRIDGENORTH ROAD - at The Holloway	PCR571A						
BLACKHALVE LANE - at Belton Avenue	PCR6995						
BARNHURST LANE - Just North of Railway	PCR6998						
GRIFFITHS DRIVE - at Adey Road DTP	PCR7075						
UNDERHILL LANE - Near the Talisman Public House	PCR7173						
WILLENHALL ROAD - at Noose Lane DTP	PCR765						
GOLDTHORN HILL - Just East of Upper Villiers Street	PCR773	24523					
BRADMORE ROAD - at Merridale Road (Vehicles)	PCR8193						
AMOS LANE - 0-50M South of Cottage Close	PCR8234						
LADYMOOR ROAD - at Bridge DTP	PCR838	12455					
WILLENHALL ROAD - East of Hurstbourne Crescent	PCR8401						
COALWAY ROAD - DTP	PCR8648						
BARNHURST LANE - at Bridge	PCR8845				9587		
MILLFIELDS ROAD - at Village Way	PCR9456	22870					
RING ROAD ST PATRICKS (Eastbound) East of Stafford Street	SMASWV20	48080	41410	44125	44839	44321	-7.8
RING ROAD ST PATRICKS (Westbound) East of Stafford Street (Data Stops at 25/05/14)	SMASWV21	33099	26947	30916	30893	29697	-10.3
RING ROAD ST PETERS (Eastbound) West of Stafford Road)	SMASWV22	39846	33359	28958	25307	29857	-25.1
RING ROAD ST PETERS (Westbound) West of Stafford Street	SMASWV23	29785	27802	28262	28181	27545	-7.5
RING ROAD ST ANDREWS (Northbound) North of Bath Road (Data starts at 03/05/10)	SMASWV24	19369	21839	18743	18371	17602	-9.1
RING ROAD ST ANDREWS (Southbound) North of Bath Road (Data starts at 03/05/10)	SMASWV25	28404	28596	27053	27306	26625	-6.3
RING ROAD ST MARKS (Northbound) North of Great Brickkiln Street	SMASWV26	43153	46149	41851	42186	41486	-3.9

Description	Ref	2010 AADT	2011 AADT	2012 AADT	2013 AADT	2014 AADT	% change from 2010
RING ROAD ST MARKS (Southbound) South of Salop Street (Data starts 03/05/10)	SMASWV27	28837	30341	27753	28582	27955	-3.1
RING ROAD ST JOHNS (Eastbound & Westbound) West of Church Lane	SMASWV28	64620	66802	64986	66853	67850	5.0
RING ROAD ST GEORGES (Northbound) South of Bilston St Island (Data starts 03/05/10)	SMASWV29	30073	26482	29674	30324	29770	-1.0
RING ROAD ST GEORGES (Southbound) South of Bilston St Island (Data starts 03/05/10)	SMASWV30	39832	37263	39362	39931	41897	5.2
BLACKHALVE LANE (East of Junction at Wood End Rd/Blackhalve Ln W/ Wood Hayes Rd)	TCN1036						
WOOD END ROAD (South of Junction at Blackhalve Ln/Wood Hayes Rd/ Blackhalve Ln)	TCN1036						
BLACKHALVE LANE (West of Junction at Wood Hayes Rd/Blackhalve Ln E/ Wood End Rd)	TCN1036						
NEACHELLS LANE	TCN1130	24078					
VULCAN ROAD (North of Junction Oxford St/Loxdale St)	TCN2200		14711				
LOXDALE STRET (South of Junction Oxford St/Vulcan Rd)	TCN2200		17262				
OXFORD STREET (West of Junction Vulcan Rd/Loxdale St)	TCN2200		18806				
ETTINGSHALL ROAD (South of Junction Dixon St/Bilston Road N/Bilston Rd E)	TCN2205		6710				
BILSTON ROAD (East of JunctionEttingshall Rd/Dixon St/Bilston Rd N)	TCN2205		17045				
BILSTON ROAD (North of Junction Bilston Rd E/Ettingshall Rd/Dixon St)	TCN2205		20054				
STEELHOUSE LANE (West of Junction at Bilston Rd N/Sharrocks St/Bilston Rd S)	TCN2206	5167					
BILSTON ROAD (South of Junction Steelhouse Lane/Bilston Rd N/Sharrocks St)	TCN2206	17721					
BILSTON ROAD (North of Junction Sharrocks St/Bilston Rd S/Steelhouse Lane)	TCN2206	22170					
VICTORIA STREET (North of Junction at Cleveland St/Worcester St/Salop St)	TCN2208			6058			
NEWHAMPTON ROAD (East of Junction at Tettenhall Rd N/Tettenhall Rd S)	TCN2214	7285		7404			
TETTENHALL ROAD (South of Junction at Tettenhall Rd N/Newhampton Rd)	TCN2214	17078		17573			
TETTENHALL ROAD (North of Juction at Newhampton Rd/Tettenhall Rd S)	TCN2214	22683		23075			
HENWOOD ROAD (South of Junction at The Rock/Lower St/Tettenhall Rd)	TCN2215	11006					
LOWER STREET (North of Junction at Tettenhall Rd/Henwood Rd/The Rock)	TCN2215	14375					
THE ROCK (West of Junction at Lower St/Tettenhall Rd/Henwood Rd)	TCN2215	21174					
TETTENHALL ROAD (East of Junction at Henwood Rd/The Rock/Lower St)	TCN2215	23460					
WERGS ROAD (West of Junction at Stockwell Rd/The Rock/Upper Green)	TCN2216						
THE ROCK (Esdt of Junction at Upper Green/Wergs Rd/Stockwell Rd)	TCN2216						
CHURCH HILL (South of Junction at Penn Rd W/Penn Rd E)	TCN2217	5717					

Description	Ref	2010 AADT	2011 AADT	2012 AADT	2013 AADT	2014 AADT	% change from 2010
PENN ROAD (East of Junction at Church Hill/Penn Rd W)	TCN2217	23557					
PENN ROAD (West of Junction at Penn Rod E/Church Hill	TCN2217	24138					
COALWAY ROAD (West of Junction at Penn Rd N/Goldthorn Hill/Penn Rd S)	TCN2218	9623					
GOLDTHORN HILL (East of Junction at Penn Rd S/Coalway Rd/Penn Rd N)	TCN2218	11410					
PENN ROAD (North of Junction at Goldthorn Hill/ Penn Rd S/Coalway Rd)	TCN2218	21100					
PENN ROAD (South of Junction at Coalway Rd/Penn Rd N/Goldthorn Hill)	TCN2218	22763					
ROOKERY LANE (East of Junction at Penn Rd S/Stubbs Rd/Penn Rd N)	TCN2219	8005					
STUBBS ROAD (West of Junction at Penn Rd N/Rookery Lane/Penn Rd S)	TCN2219	10289					
PENN ROAD (North of Junction at Rookery Lane/Penn Rd S/Stubbs Rd)	TCN2219	23021					
PENN ROAD (South of Junction at Stubbs Rd/Penn Rd N/Rookery Lane)	TCN2219	24366					
LEA ROAD (West of Junction at Penn Rd N/Penn Rd S)	TCN2220		11775				
PENN ROAD (South of Junction at Lea Rd/Penn Rd N)	TCN2220		24168				
PENN ROAD (North of Junction at Penn Rd S/Lea Rd)	TCN2220		33121				
NEWHAMPTON ROAD (West of Junction at Waterloo Rd N/Waterloo Rd S)	TCN2223	13837					
WATERLOO ROAD (North of Junction at Waterloo Rd S/Newhampton Rd)	TCN2223	21474					
WATERLOO ROAD (South of Junction at Newhampton Rd/Waterloo Rd N)	TCN2223	27925					
OXLEY MOOR ROAD (West of Junction at Stafford Rd N/Stafford Rd S)	TCN2227			15629			
STAFFORD ROAD (South of of Junction at Oxley Moor Rd/Stafford Rd N)	TCN2227			31811			
STAFFORD ROAD (North of Junction at Stafford Rd S/Oxley Moor Rd)	TCN2227			33211			
BEE LANE (East of Junction at Stafford Rd S/Wobason Rd/Stafford Rd N)	TCN2229		7396				
WOBASTON ROAD (West of Junction at Staffprd Rd N/Bee Lane/Stafford Rd S)	TCN2229		22319				
STAFFORD ROAD (South of Junction at Wobaston Rd/Stafford Rd N/Bee Lane)	TCN2229		27044				
STAFFORD ROAD (North of Junction at Bee Lane/Stafford Rd S/Wobaston Rd)	TCN2229		35116				
MOSELEY RD (South of Junction Willenhall Rd W/Neachells Ln/Willenhall RdE)	TCN2230	15967					
NEACHELLS LANE (North of JunctionWillenhall Rd E/ Moseley Rd/Willenhall Rd W)	TCN2230	24078					
WILLENHALL ROAD (East of Junction Moseley Rd/Willenhall Rd W/Neachells Lane)	TCN2230	31405					
WILLENHALL ROAD (West of Junction Neachells Ln N/Willenhall Rd E/Moseley Rd)	TCN2230	32159					
STOWHEATH LANE (South of Junction at Willenhall Rd W/Deans Rd/Willenhall Rd E)	TCN2231	11332					

Description	Ref	2010 AADT	2011 AADT	2012 AADT	2013 AADT	2014 AADT	% change from 2010
DEANS ROAD (North of Junction at Willenhall Rd E/Stowheath Ln/Willenhall Rd W)	TCN2231	11492					
WILLENHALL ROAD (West of Junction at Deans Rd/Willenhall Rd E/Stowheath Ln)	TCN2231	20970					
WILLENHALL ROAD (East of Junction at Stowheath Ln/Willenhall Rd W/Deans Rd)	TCN2231	32337					
WOLVERHAMPTON ROAD EAST (South of Junction at Goldthorn Hill/ Dudley Rd/Parkfield Rd)	TCN2240	14031					
DUDLEY ROAD (North of Junction at Parkfield Rd/W'ton Rd E/Goldthorn Hill)	TCN2240	14884					
PARKFIELD ROAD (East of Junction at W'ton Rd E/Goldthorn Hill/Dudley Rd)	TCN2240	19456					
GOLDTHORN HILL (West of Junction at Dudley Rd/Parkfield Rd/W'ton Rd E)	TCN2240	19533					
CANNOCK ROAD (East of Junction at Stafford St N/Stafford St S)	TCN2247	20625					
STAFFORD STREET (North of Junction at Cannock Rd/Stafford St S)	TCN2247	28645					
STAFFORD STREET (South of Junction at Stafford St N/Cannock Rd)	TCN2247	39694					
SHAW ROAD (East of Junction at B'ham New Rd S/Shaw Rd W/B'ham New Rd N)	TCN2255		14347				
SHAW ROAD (West of Junction at B'han New Rd N/Shaw Rd E/B'ham New Rd S)	TCN2255		15594				
BIRMINGHAM NEW ROAD (South of Junction Shaw Rd W/B'ham New Rd N/Shaw Rd E)	TCN2255		31378				
BIRMINGHAM NEW ROAD (North of Junction Shaw Rd E/B'ham New Rd S/Shaw Rd W)	TCN2255		32401				
SHAW ROAD (West of Junction Ettingshall Rd/Shaw Rd E/Upper Ettingshall Rd)	TCN2256		13159				
SHAW ROAD (East of Junction Upper Ettingshall Rd/Shaw Rd W/Ettingshall Rd)	TCN2256		13708				
ETTINGSHALL ROAD (North of Junction at Millfields Rd/ Manor Rd/Parkfield Rd)	TCN2259		9716		9335		
MANOR ROAD South of Junction at Parkfield Rd/Ettingshall Rd/Millfields Rd)	TCN2259		10201		9686		
PARKFIELD ROAD (West of Junction at Ettingshall Rd N/Millfields Rd/Manor Rd)	TCN2259		19681		20009		
MILLFIELDS ROAD (East of Junction at Manor Rd/Parkfield Rd/Ettingshall Rd)	TCN2259		21102		20776		
ROOKERY ROAD (South of Junction B'ham New Rd W/Spring Rd/B'ham New Rd E)	TCN2261			5855			
SPRING ROAD (North of Junction B'ham New Rd E/Rookery Rd/B'ham New Rd W)	TCN2261			8288			
BIRMINGHAM NEW ROAD (West of Junction at Spring Rd/B'ham New Rd E/Rookery Rd)	TCN2261			26461			
BIRMINGHAM NEW ROAD (East of Junction at Rookery Rd/B'ham New Rd W/Spring Rd)	TCN2261			29229			
CHURCH STREET (North of Junction at W'ton Rd East/W'ton Rd West)	TCN2264		8091				
WOLVERHAMPTON ROAD EAST (East of Junction at W'ton Rd West/Church Street)	TCN2264		12382				
WOLVERHAMPTON ROAD WEST (West of Junction at Church Street/W'ton Rd East)	TCN2264		14468				
NEACHELLS LANE (East of Junction at High St/Lichfield Rd)	TCN2266				11325		

Description	Ref	2010 AADT	2011 AADT	2012 AADT	2013 AADT	2014 AADT	% change from 2010
LICHFIELD ROAD (North of Junction at Neachells Lane/High St)	TCN2266				12451		
LICHFIELD ROAD (West of Junction at Hyde Rd/Lichfield Rd E/Lakefield Rd)	TCN2268	8276					
LICHFIELD ROAD (East of Junction at Lakefield Rd/Lichfield Rd W/Hyde Rd)	TCN2268	19590					
LAKEFIELD ROAD (South of Junction at Lichfield Rd W/Hyde Rd/Lichfield Rd E)	TCN2268	19915					
MARCH END ROAD (West of Junction at Lichfield Rd/Wednesfield Way)	TCN2273	7368					
WEDNESFIELD WAY (South of Junction at March End Rd/Lakefield Rd)	TCN2273	18166					
LAKEFIELD ROAD (North of Junction at Wednesfield Way/March End Rd)	TCN2273	19297					
PEAR TREE LANE (North of Junction at Blackhalve Ln E/Long Knowle Ln/Blackhalve Ln W)	TCN2275						
BLACKHALVE LANE (East of Junction at Long Knowle Ln/Blackhalve Ln W/Pear Tree Ln)	TCN2275						
LONG KNOWLE LANE (South of Junction at Blackhalve Ln W/Pear Tree Ln/Blackhalve Ln E)	TCN2275						
BLACKHALVE LANE (West of Junction at Pear Tree Ln/Blackhalve Ln E/Long Knowle Ln)	TCN2275						
MOSELEY ROAD (North of Junction at Moseley Rd S/Prouds Lane)	TCN2277		10400				
PROUDS LANE (West of Junction at Moseley Rd N/Moseley Rd S)	TCN2277		12026				
MOSELEY ROAD (South of Junction at Prouds Lane/Moseley Rd N)	TCN2277		12356				
WINDMILL LANE (North of Junction at Castecroft Lane/Windmill Lane N)	TCN2285		9999				
WINDMILL LANE (North of Junction at Windmill Lane S/Castlecroft Lane)	TCN2285		14590				
ALDERSLEY ROAD East of Junction at Lower St S/Church Walk/Lower St N)	TCN2287	5185					
LOWER STREET (North of Junction at Aldersley Rd/Lower St S/Church Walk)	TCN2287	9292					
LOWER STREET (South of Junction at Church Walk/Lower St S/Aldersley Rd)	TCN2287	13595					
GARRICK STREET (South of Junction at Bilston St W/Market St/Bilston St E)	TCN2292			6395			
BILSTON STREET (East of Junction at Garrick St/Bilston St W/Market St)	TCN2292			6649			
DUDLEY ROAD (South of Dudley Rd N/Grove St)	TCN2326	16287					
DUDLEY ROAD (North of Junction at Grove St/Dudley Rd S)	TCN2326	18751					
GROVE STREET (East of Junction at Dudley Rd S/Dudley Rd N)	TCN2326	18945					
GROVE STREET (West of Junction Birmingham Rd N/Birmingham Rd S)	TCN2327	10445					
BIRMINGHAM ROAD (North of Junction at Birmingham Rd S/Grove St)	TCN2327	20145					
BIRMINGHAM ROAD (South of Junction at Grove St/Birmingham Rd N)	TCN2327	30510					
ALDERSLEY ROAD (South of Junction at Green Lane/Aldersley Rd N)	TCN3043	9433					

Description	Ref	2010 AADT	2011 AADT	2012 AADT	2013 AADT	2014 AADT	% change from 2010
ALDERSLEY ROAD (North of Junction at Aldersley Rd S/Green Lane)	TCN3043	10060					
TUDOR ROAD (West of the Junction at Bushbury Rd/Church Street)	TCR1296		6772				
CHURCH STREET (South of Junction at Tudor Rd/Bushbury Rd)	TCR1296		7875				
BUSHBURY ROAD (North of Junction at Church St/Tudor Rd)	TCR1296		13483				
BIRCHES BARN ROAD (North of Junction at Birches Barn Rd S/St Phillips Ave)	TCR1454		12781				
BIRCHES BARN ROAD (South of Junction at St Philips Ave/Birches Barn Rd N)	TCR1454		15086				
TETTENHALL ROAD (East of Junction at Haden Hill/Tettenhall Rd W)	TCR1670		16943		17469		
TETTENHALL ROAD (West of Junction at Tettenhall Rd E/Haden Hill)	TCR1670		16946		17582		
TETTENHALL ROAD (East of Junction at Larches Lane/Tettenhall Rd W/Lower Vauxhall)	TCR1671				17909		
TETTENHALL ROAD (West of Junction at Lower Vauxhall/Tettenhall Rd E/Larches Lane)	TCR1671				19577		
GREENFIELD LANE (East of Junction at Stafford Rd S/Ind Est/Stafford Rd N)	TCR1681					6463	
STAFFORD ROAD (South of Junction at Ind Est/Stafford Rd S/Greenfield Lane)	TCR1681					34640	
STAFFORD ROAD (North of Greenfield Lane/Stafford Rd S/Industrial Estate)	TCR1681					36560	
WEDNESFIELD WAY (West of Junction at Backhouse Lane/Wednesfield Way E)	TCR17028		18910				
WEDNESFIELD WAY (East of Junction at Wednesfield Way W/Backhouse Lane)	TCR17028		19585				
RICHMOND ROAD (North of Junction at Richmond Rd S/York Avenue)	TCR17056			5925			
DUDLEY ROAD (South of Junction at Ranelagh Rd/Dudley Rd N)	TCR17071						
DUDLEY ROAD (North of Junction at Dudley Rd S/Ranelagh Rd)	TCR17071						
DUDLEY ROAD (South of Junction at Hawthorne Rd/Dudley Rd N)	TCR17074						
DUDLEY ROAD (North of Junction at Dudley Rd S/Hawthorne Rd)	TCR17074						
DUDLEY ROAD (North of Junction at Dudley Rd S/Wanderers Ave)	TCR17107						
DUDLEY ROAD (South of Junction at Wanderers Ave/Dudley Rd N)	TCR17107						
WERGS ROAD SOUTH (East of Junction at Wergs Rd North W/Danescourt Rd)	TCR17109						
WERGS ROAD NORTH (West of Junction at Danescourt Rd/Wergs Rd South E)	TCR17109						
LOWER STREET (South of Junction at Lothians Rd/Codsall Rd/Sandy Ln)	TCR17110						
CODSALL ROAD (North of Junction at Sandy In/Lower St/Lothians Rd)	TCR17110						
BIRMINGHAN NEW ROAD (South of Junction at Meadow Ln/B'ham New Rd N/Black Country Route)	TCR17116						
BUSHBURY LANE (South of Junction at Legs Lane/Underhill Lane)	TCR17117						

Description	Ref	2010 AADT	2011 AADT	2012 AADT	2013 AADT	2014 AADT	% change from 2010
UNDERHILL LANE (East of Junction at Bushbury Lane/Legs Lane)	TCR17117						
LEGS LANE (North of Junction at Underhill Lane/Bushbury Lane)	TCR17117						
BILSTON ROAD (East of Junction at Bilston Rd W/Culwick St)	TCR17151	17274					
BILSTON ROAD West of Junction at Culwick St/Bilston Rd E)	TCR17151	18017					
BLACK COUNTRY ROUTE (East of Junction at Bankfield Rd/Black Country Route E)	TCR17153	7053					
BLACK COUNTRY ROUTE (West of Junction at Black Country Route E/Bankfield Rd)	TCR17153	7972					
BROAD LANE (East of Junction Star St/Broad Lane W)	TCR17160		10222				
BROAD LANE (West of Junction at Broad Lane E/Star Street)	TCR17160		10806				
TUDOR ROAD (South of Junction at Powell St/Tudor Rd N)	TCR17162		7078				
POWELL STREET (West of Junction at Tudor RdN/Tudor Rd S)	TCR17162		7874				
PENDEFORD AVENUE (South of Junction at Pendeford Ave N/Green Lane)	TCR17174			9334			
PENDEFORD AVENUE (North of Junction at Green Lane/Pendeford Ave S)	TCR17174			9546			
HICKMAN AVENUE (South of Junction at Willenhall Rd W/Griffin St/Willenhall Rd E)	TCR1824	5654					
WILLENHALL ROAD (West of Junction at Griffin St/Willenhall Rd E/Hickman Ave)	TCR1824	24326					
WILLENHALL ROAD (East of the Junction at Hickman Ave/Willenhall Rd W/Griffin St)	TCR1824	25081					
DUNSTALL ROAD (North of Junction at Dunstall Rd E/Gloucester St/Evans St)	TCR1828		6217				
EVANS STREET (West of Junction at Dunstall Rd N/Dunstall Rd E/Gloucester St)	TCR1828		7127				
DUNSTALL ROAD (East of Junction at Gloucester St/Evans St/Dunstall Rd N)	TCR1828		8578				
LOWLANDS AVENUE (East of Junction at Lower St/Maltouse Ln/Codsall Rd)	TCR1837						
LOWER STREET (South of Junction at Malthouse Ln/Codsall Rd/Lowlands Ave)	TCR1837						
CODSALL ROAD (North of Junction at Lowlands Ave/Lower St/Malthouse Ln)	TCR1837						
WERGS ROAD (West of Junction Keepers Lane/Wergs Rd E/ Woodthorne Rd)	TCR1838	13505					
WERGS ROAD (East of Junction Woodthorne Rd/Wergs Rd W/Keepers Lane)	TCR1838	13551					
MOSELEY ROAD (East of Junction at Moseley Rd W/ Hill Rd)	TCR2047		10748				
MOSELEY ROAD (West of Junction at Hill Rd/Moseley Rd E)	TCR2047		13244				
BILSTON ROAD (East of Junction at Bilston Rd W/Culwick St)	TCR217		16293				
BILSTON ROAD (West of Junction at Cullwick St/Bilston Rd E)	TCR217		17267				
PENN ROAD (South of Junction at Penn Rd N/Mount Rd	TCR2330		20662				

Description	Ref	2010 AADT	2011 AADT	2012 AADT	2013 AADT	2014 AADT	% change from 2010
PENN ROAD (North of Junction at Mount Rd/Penn Rd S)	TCR2330		21807				
ETTINGSHALL ROAD (North of Junction at George St/Ettingshall Rd S)	TCR2350		6501				
ETTINGSHALL ROAD (South of Junction at Ettingshall Rd N/George St)	TCR2350		8486				
VICTORIA STREET (South of Junction at Skinner St/ Victoria St N/Bell St)	TCR2404			6153			
LEA ROAD (North of Junction at Copthorne Rd/Lea Rd S/Jeffcock Rd)	TCR2453	10118					
LEA ROAD (South of Junction at Jeffcock Rd/Lea Rd N/Copthorne Rd)	TCR2453	12265					
SNOW HILL (South of Junction at Temple St/Snow Hill N)	TCR2457			5929			
SNOW HILL (North of Junction at Snow Hill S/Temple St)	TCR2457			6919			
OAKLANDS ROAD (West of Junction at Penn Rd N/Marston Rd/Penn Rd S)	TCR2611				6107		
MARSTON ROAD (East of Junction at Penn Rd S/Oaklands Rd/Penn Rd N)	TCR2611				14793		
PENN ROAD (South of Junction at Oaklands Rd/Penn Rd N/Marston Rd)	TCR2611				22193		
PENN ROAD (North of Junction at Marston Rd/Penn Rd S/Oaklands Rd)	TCR2611				22663		
MERRIDALE ROAD (East of Junction Merridale Gdns/Merridale Rd W/Merridale Ln)	TCR2622	15746					
MERRIDALE ROAD (West of Junction Merridale Ln/Merridale Rd E/Merridage Gdns)	TCR2622	19204					
STAFFORD ROAD (North of Junction at Springfield Ln/Stafford Rd S/Service Rd)	TCR2670	32365					
STAFFORD ROAD (South of Junction at Serice Rd/Stafford Rd N/Springfield Ln)	TCR2670	34150					
DOVEDALE ROAD (East of Junction at W'ton Rd East S/W'ton Rd East N)	TCR2706		8370				
WOLVERHAMPTON ROAD EAST (North of Junction at Dovedale Rd/Wolverhampton Rd East S)	TCR2706		14625				
WOLVERHAMPTON ROAD EAST (South of Junction at Wolverhampton Rd East N/Dovedale Rd)	TCR2706		16437				
OLD HEATH ROAD (North of Junction at Willenhall Rd E/Willenhall Rd W)	TCR2731	6163					
WILLENHALL ROAD (East of Junction at Willenhall Rd W/Old Heath Rd)	TCR2731	21837					
WILLENHALL ROAD (West of Junction at Old Heath Road/Willenhall Rd E)	TCR2731	25113					
WEDNESFIELD ROAD (East of Junction at Sun St/Wednesfield Rd W)	TCR2917				22916		
WEDNESFIELD ROAD (West of Junction at Wednesfield Rd E/Sun St)	TCR2917				24050		
WEDNESFIELD ROAD (West of Junction at Woden Rd/Wolverhampton Rd)	TCR2937	24774	26706				
WOLVERHAMPTON ROAD (East of Junction at Wednesfield Rd/Woden Rd)	TCR2937	27258	29037				
WEDNESFIELD ROAD (West of Junction at Wednesfield Rd E/Inkerman St)	TCR2939		23075				
WEDNESFIELD ROAD (East of Junction at Inkerman St/Wednesfield Rd W	TCR2939		23522				

Description	Ref	2010 AADT	2011 AADT	2012 AADT	2013 AADT	2014 AADT	% change from 2010
COALWAY ROAD (East of Junction at Coalway Rd W/Beckminster Rd)	TCR3123		10679				
COALWAY ROAD (West of Junction at Beckminster Rd/Coalway Rd E)	TCR3123		11915				
PIPERS ROW (North of Junction Bilston St E/Bilston St W)(07:00-19:00)	TCR3214A			5163			
BILSTON STREET (West of Junction at Pipers Row/Bilston St E)(07:00-19:00)	TCR3214A			11464			
BILSTON STREET (East of Junction at Bilston St E/Pipers Row)(07:00-19:00)	TCR3214A			15067			
GOLDTHORN HILL (West of Junction at Goldthorn Hill E/Goldthorn Ave)	TCR3373				10814		
GOLDTHORN HILL (East of Junction at Goldthorn Ave/Goldthorn Hill W)	TCR3373				13329		
OAKLANDS ROAD (East of Junction at Lea Road S/Owen Rd/Lea Rd N)	TCR3384		6631				
LEA ROAD (North of Junctionat at Oaklands Rd/Lea Rd S/Owen Rd)	TCR3384		9190				
LEA ROAD (South of Junction at Owen Rd/Lea Rd N/Oaklands Rd)	TCR3384		10859				
PARKFIELD ROAD (West of Junction at Myatt Ave/Parkfield Rd E/Edwards St)	TCR3388			17626			
PARKFIELD ROAD (East of Junction at Edward St/Parkfield Rd W/Myatt Avenue)	TCR3388			18452			
PARKFIELD ROAD (West of Junction at Parkfield Rd E/Martin St)	TCR3389		18482				
PARKFIELD ROAD (East of Junction at Martin St/Parkfield Rd W)	TCR3389		18482				
PLANETARY ROAD (West of Junction at Neachells Ln N/Neachells Ln S)	TCR3572				6248		
NEACHELLS LANE (North of Junction at Neachells Ln S/Planetary Rd)	TCR3572				18211		
NEACHELLS LANE (South of Junction at Planetary Rd/Neachells Ln N)	TCR3572				21886		
WOOD END ROAD (North of Junction at Wood End Rd S/Amos Ln)	TCR3581	9301					
AMOS LANE (West of Junction at Wood End Rd N/Wood End Rd S)	TCR3581	9566					
WOOD END ROAD (South of Junction at Amos Ln/Wood End Rd N)	TCR3581	18139					
LEASOWES DRIVE (South of Junction at Coalway Dr W/Coalway Dr E)	TCR3593				9343		
COALWAY DRIVE (East of Junction at Leasowes Dr/Coalway Dr W)	TCR3593				10197		
COALWAY DRIVE (West of Junction at Coalway Dv E/Leasowes Dr)	TCR3593				16116		
ASPEN WAY (East of Junction Merridale Rd S/Gamesfield Gr/Merridale Rd N)	TCR3603					9042	
MERRIDALE ROAD (North of Junction Aspen Way/Merridale Rd S/Gamesfield Gr)	TCR3603					17965	
MERRIDALE ROAD (South of Junction Gamesfield Gr/Merridale Rd N/Aspen Way)	TCR3603					20283	
DUDLEY ROAD (South of Junction at Knox Rd/Dudley Rd N)	TCR3639						
DUDLEY ROAD (North of Junction at Dudley Rd S/Knox Rd)	TCR3639						

Description	Ref	2010 AADT	2011 AADT	2012 AADT	2013 AADT	2014 AADT	% change from 2010
MORRISONS ENTRANCE (East of Junction at Blaydon Rd S/Blaydon Rd N)	TCR3646		7203				
BLAYDON ROAD (South of Junction at Blaydon Rd N/Morrisond Ent)	TCR3646		8521				
BLAYDON ROAD (North of Junction at Morrisons Ent/Blaydon Rd S)	TCR3646		10603				
LICHFIELD ROAD (South of the Junction at Moathouse Lane/Lichfield Rd N)	TCR3656		16851				
LICHFIELD ROAD (North of the Junction atLichfield Rd S/Moathouse Lane East)	TCR3656		17087				
PROUDS LANE (North of Junction at Prouds Lane S/Wassell Rd)	TCR4290		5964				
COMPTON ROAD WEST (West of Junction at Compton Park/Compton Rd/Linden Lea)	TCR4820				10754		
COMPTON ROAD (East of Junction at Linden Lea/Compton Rd W/Compton Park)	TCR4820				12299		
CULWICK STREET (East of Junction at Culwick St W/Hickman Ave)	TCR5152	5692					
DILLOWAYS LANE (South of Junction at Vaughan Rd/New St/Dilloways Ln E)	TCR5254	5334					
NEW STREET (North of Junction Dilloways Ln E/Dilloways Ln S/Vaughan Rd)	TCR5254	7587					
THE HOLLOWAY (West of Junction at Bridgnorth Rd N/Bridgnorth Rd S)	TCR571		9409				
BRIDGNORTH ROAD (South of Junction at The Holloway/Bridgnorth Rd N)	TCR571		12339				
BRIDGNORTH ROAD (North of Junction at Bridgnorth Rd S/The Holloway)	TCR571		21018				
WADDENS BROOK ROAD (East of Junction at Wednesfield Way S/Wednesfield Way N)	TCR6184	11544					
WEDNESFIELD WAY (North of Junction at Waddens Brook Rd/Wednesfield Way S)	TCR6184	18566					
WEDNESFIELD WAY (South of Junction at Wednesfied Way N/Waddensbrook Rd)	TCR6184	19536					
PINFOLD ROAD (North of Junction at Penn Lane E/Penn Lane W)	TCR6188	5986					
PENN LANE (West of Junction at Pinfold Rd/Penn Lane E)	TCR6188	20737					
PENN LANE (East of Junction at Penn Lane W/Pinfold Rd)	TCR6188	20871					
BIRMINGHAM NEW ROAD (South of Junction at Mount Rd/Birmingham New Rd N)	TCR6558				27086		
BIRMINGHAM NEW ROAD (North of Junction at Birmingham New Rd S/Mount Rd)	TCR6558				27090		
RAYNOR ROAD (South of Junction at Park Ln W/Third Ave/Park Ln E)	TCR6568		12299				
THIRD AVENUE (North of Junction at Park Ln E/Raynor Rd/Park Ln W)	TCR6568		12932				
DARLINGTON STREET (East of Juncrtion at Darlington St W/Red Lion St)	TCR6683		5147				
DARLINGTON STREET (West of Juncrtion at Red Lion St/Darlington St E)	TCR6683		7589				
COMPTON ROAD (West of Junction at Larches Lane/Compton Rd E)	TCR6710				10356		
COMPTON ROAD (East of Junction at Compton Rd W/Larches Lane)	TCR6710				11301		

Description	Ref	2010 AADT	2011 AADT	2012 AADT	2013 AADT	2014 AADT	% change from 2010
FORDHOUSE ROAD (South of Junction at Three Tuns Ln/Wood Ln/Elson Hall Ln)	TCR6923			5620			
WOOD LANE (North of Junction Elston Hall Ln/Fordhouse Rd/Three Tuns Ln)	TCR6923			5967			
ELSTON HALL LANE (East of Junction at Fordhouse Rd/Three Tuns Ln/Wood Ln)	TCR6923			10760			
THREE TUNS LANE (West of Junction at Wood Ln/Elston Hall Ln/Fordhouse Rd)	TCR6923			15662			
WELLINGTON ROAD (East of Junction at Wellington Rd W/Windsor St)	TCR7132			13621			
WELLINGTON ROAD (West of Junction at Windsor St/Wellington Rd E)	TCR7132			15107			
COALWAY ROAD (East of Junction at Windsor Ave/Coalway Rd W)	TCR7391		12541				
COALWAY ROAD (West of Junction at Coalway Rd E/Windsor Ave)	TCR7391		12680				
GOLDTHORN HILL (West of Junction at Upper Villiers St/Goldthorn Hill)	TCR773			21506			
GOLDTHORN HILL (East of Junction at Goldthorn Hill W/Upper Villiers St)	TCR773			22915			
BROAD LANE NORTH (North of Junction at Pool Hayes Ln/Broad Lane S/Stubby Ln)	TCR8218			5866			
STUBBY LANE (West of Junction Broad Lane N/Pool Hayes Ln/Broad Lane S)	TCR8218			7180			
POOL HAYES LANE (East of Junction at Broad Lane S/Stubby Ln/Broad Lane N)	TCR8218			8023			
BROAD LANE SOUTH (South of Junction at Stubby Ln/Broad Ln N/Pool Hayes Ln)	TCR8218			10553			
BRADMORE ROAD (South of Junction at Bradmore Rd N/Bantock Ave))	TCR8647		13778				
BRADMORE ROAD (North of Junction at Bantock Ave/Bradmore Rd)	TCR8647		13992				
COALWAY ROAD (East of Junction at Coalway Rd W/Church Rd)	TCR8648	11725					
COALWAY ROAD (West of Junction at Church Rd/Coalway Rd E)	TCR8648	12449					
CLARK ROAD (North of Junction at Compton Rd E/Compton Rd W)	TCR886	16830	8177				
COMPTON ROAD (East of Junction at Compton Rd W/Clark Rd)	TCR886	12591	12591				
COMPTON ROAD (West of Junction at Clark Rd/Compton Rd E)	TCR886	16830	16830				
CLARK ROAD/COMPTON ROAD	TCR886	8177					
BLACK COUNTRY ROUTE (East of Junction at Dudley St/Black Country Route W)	TCR8988	8018					
BLACK COUNTRY ROUTE (West of Junction at Black Country Rout E/Dudley St)	TCR8988	8057					
COMPTON ROAD (West of Junction at Haden Hill/Compton Rd E/Hartley St)	TCR9040	6072			9748		
COMPTON ROAD (East of Junction at Hartley St/Compton Rd W/Haden Hill)	TCR9040	5906			10230		
HARTLEY STREET (South of Junction at Compton Rd W/Haden Hill/Compton Rd E)	TCR9040	6595					
COMPTON ROAD (East of Junction at Hartley St/Compton Rd W/Haden Hill)	TCR9040A				10230		

Description	Ref	2010 AADT	2011 AADT	2012 AADT	2013 AADT	2014 AADT	% change from 2010
COMPTON ROAD (West of Junction at Haden Hill/Compton Rd E/Hartley St)	TCR9040A				10810		
BUSHBURY LANE (North of Junction at Bushbury Lane S/Moreton Rd)	TCR9106	9446	10308				
BUSHBURY LANE (South of Junction at Moreton Rd/Bushbury Ln N)	TCR9106	9550	10603				
BIRCHES BARN ROAD (West of Junction at Hughes Ave/Birches Barn Rd E)	TCR9233			10599			
BIRCHES BARN ROAD (East of Junction at Birches Barn Rd W/Hughes Ave)	TCR9233			11658			
BIRCHES BARN ROAD (West of Junction at Birches Barn Rd E/Church Walk)	TCR9233A			11803			
BIRCHES BARN ROAD (West of Junction at Church Walk/Birches Barn RD W)	TCR9233A			11923			
BRIERLEY LANE (East ofJunction at Batman's Hill Rd/Brierley Lane W)	TCR9330		5298				
BATMAN'S HILL ROAD (South of Junction at Brierley Lane W/ Brierley Lane E)	TCR9330		5941				
BRIERLEY LANE (West of Junction at Brierley Ln E/Batmans Hill Rd)	TCR9330		7522				
YEW TREE LANE (North of Junction at School Rd/Mill Lane)	TCR9331		8078				
WARSTONES DRIVE (East of Junction at Claverley Drive/Warstones Drive W)	TCR9346	7657					
WARSTONES DRIVE (West of Junction at Warstones Dr E/Claverley Drive)	TCR9346	8062					
LINTHOUSE LANE (East of Junction at Linthouse Lane W/Kitchen Lane)	TCR9454		11135				
LINTHOUSE LANE (West of Junction at Kitchen Lane/Linthouse Lane E)	TCR9454		11330				
MILLFIELDS ROAD (West of Junction at Millfields Rd E/Village Way)	TCR9456	23711					
MILLFIELDS ROAD (East of Junction at Village Way/Millfields Rd W)	TCR9456	24147					
BRIERLEY LANE (West of Junction at Westley St/Brierley Lane)	TCR9462			5398			
BRIERLEY LANE (East of Junction at Brierley Lane W/Wesley St)	TCR9462			5663			
CULLWICK STREET (West of Junction at Stowheath Lane N/Stowheath Lane S)	TCR9768			5446			
STOWHEATH LANE (South of Junction at Cullwick St/Stowheath Lane N)	TCR9768			10758			
STOWHEATH LANE (North of Junction at Stowhealth Lane S/Cullwick St)	TCR9768			12284			
OXFORD STREET (East of Junction Vulcan Rd/Loxdale St)	TNC2200		24170				
Mean							-1.6

Table B2.2. Road with a proportion of buses and/or HGV's > 20% 2012-2014

Description	Ref	Date	12hr Total	LGV Total	HGV Total	% HGV
HIGH STREET (South of Junction at Lichfield Rd/Neachells Lane)	TCN2266	02/12/2013	1088	30	518	48
CLEVELAND STREET (East of Junction at Worcester St/Salop St/Victoria St)	TCN2208	17/07/2012	1272	9	509	40
VICTORIA STREET (North of Junction at Bell St/Victoria St S/Skinner St)	TCR2404	10/07/2012	959	12	329	34
WOODHOUSE ROAD - South of Kingsley Avenue	CAR27229A	12/07/2012	1507	1161	346	23
WOODHOUSE ROAD - South of Kingsley Avenue	CAR27229	04/07/2012	1511	1170	341	23
PENN ROAD - East of Church Hill	CAR27350 CAR27205	13/10/2014 24/10/2014	16463	12519	3611	22
FINCHFIELD LANE - South of Woodland Road	CAR27223	12/06/2012	5753	4570	1183	21
MACROME ROAD - South of Lawnswood Avenue	CAR27220	08/05/2012	770	619	151	20

Appendix C: Biomass Combustion Plants

ACT Office Furniture - Talbott T500	PM_{10}	$PM_{2.5}$	Annual mean NO_2	Hourly mean NO_2
Net thermal input kW	150	150	150	150
Stack height	10.5	10.5	10.5	10.5
Stack diameter	0.15	0.15	0.15	0.15
Building height	9.5	9.5	9.5	9.5
Effective stack height	1.6	1.6	1.6	1.6
Emission factor g/GJ	240	240	90	90
Emission rate, g/s	0.036	0.036	0.014	0.014
Background concentration,ug/m3	21.3902	13.6172	26.6396	26.6396
Background adjusted emission rate, g/s	0.0034	0.0032	0.001	0.004
Threshold emission rate g/s	0.0079	0.0243	0.0286	0.0226
Nomogram target emission (actual stack height)	0.0045	0.0045	0.014	0.06
Detailed assessment required	No	No	No	No

ASAN All Saints Rd - Talbott C4	PM_{10}	$PM_{2.5}$	Annual mean NO_2	Hourly mean NO_2
Net thermal input kW	400	400	400	400
Stack height	9	9	9	9
Stack diameter	0.25	0.25	0.25	0.25
Building height	9	9	9	9
Effective stack height	0	0	0	0
Emission factor g/GJ	240	240	90	90
Emission rate, g/s	0.096	0.096	0.036	0.036
Background concentration,ug/m3	17.2059	11.7386	25.0327	28.3895
Background adjusted emission rate, g/s	0.0065	0.0072	0.002	0.010
Threshold emission rate g/s	0.0119	0.0310	0.035	0.0385
Nomogram target emission (actual stack height)	0.0045	0.0045	0.014	0.06
Detailed assessment required	No	No	No	No

Goodridge Talbott - T300	PM_{10}	$PM_{2.5}$	Annual mean NO_2	Hourly mean NO_2
Net thermal input kW	100	100	100	100
Stack height	8.5	8.5	8.5	8.5
Stack diameter	0.15	0.15	0.15	0.15
Building height	7.5	7.5	7.5	7.5
Effective stack height	1.6	1.6	1.6	1.6
Emission factor g/GJ	240	240	90	90
Emission rate, g/s	0.024	0.024	0.009	0.009
Background concentration,ug/m3	19.5785	12.2820	21.3694	21.3694
Background adjusted emission rate, g/s	0.0019	0.0019	0.000	0.002
Threshold emission rate g/s	0.013	0.013	0.003	0.01
Nomogram target emission (actual stack height)	0.0034	0.0034	0.01	0.04
Detailed assessment required	No	No	No	No

Heath Town Flats - Fröling Lambdamat 1000	PM_{10}	$PM_{2.5}$	Annual mean NO_2	Hourly mean NO_2
Net thermal input kW	1271	1271	1271	1271
Stack height	67	67	67	67
Stack diameter	0.533	0.533	0.533	0.533
Building height	65	65	65	65
Effective stack height	3.2	3.2	3.2	3.2
Emission factor g/GJ (From LAQM TG(09))	76	76	150	150
Emission rate, g/s (E) (Unit converstion tool)	0.097	0.097	0.191	0.191
Background concentration,ug/m3 (G)	17.25898	11.67785	26.02187	26.02187
Background adjusted emission rate, g/s (E_A)	0.0066	0.0073	0.0136	0.0515
Target emission rate g/s from biomass calculator tool	0.0296	0.0800	0.084	0.0764
Detailed assessment required	No	No	No	No

Midland Joinery - Talbott T3A	PM_{10}	$PM_{2.5}$	Annual mean NO_2	Hourly mean NO_2
Net thermal input kW	100	100	100	100
Stack height	12	12	12	12
Stack diameter	0.15	0.15	0.15	0.15
Building height	8	8	8	8
Effective stack height	6.4	6.4	6.4	6.4
Emission factor g/GJ	240	240	240	90
Emission rate, g/s	0.024	0.024	0.024	0.009
Background concentration,ug/m3	21.56661	13.83902	26.20993	26.20993
Background adjusted emission rate, g/s	0.0023	0.0022	0.002	0.002
Threshold emission rate g/s	0.0222	0.0698	0.0862	0.0853
Nomogram target emission (actual stack height)	0.006	0.006	0.018	0.07
Detailed assessment required	No	No	No	No

Pendeford Farm - Biolyt 50 pellet boiler x2	PM_{10}	$PM_{2.5}$	Annual mean NO_2	Hourly mean NO_2
Net thermal input kW	100	100	100	100
Stack height	11	11	11	11
Stack diameter	0.15	0.15	0.15	0.15
Building height	10	10	10	10
Effective stack height	1.6	1.6	1.6	1.6
Emission factor g/GJ	66	66	150	150
Emission rate, g/s	0.007	0.007	0.015	0.015
Background concentration,ug/m3	17.99814	17.99814	18.15526	11.56019
Background adjusted emission rate, g/s	0.0005	0.0009	0.001	0.003
Threshold emission rate g/s	0.0104	0.0287	0.0467	0.0252
Nomogram target emission (actual stack height)	0.005	0.005	0.015	0.061
Detailed assessment required	No	No	No	No

Swift Furniture - Talbott T500	PM_{10}	$PM_{2.5}$	Annual mean NO_2	Hourly mean NO_2
Net thermal input kW	150	150	150	150
Stack height	10.5	10.5	10.5	10.5
Stack diameter	0.15	0.15	0.15	0.15
Building height	8.5	8.5	8.5	8.5
Effective stack height	3.2	3.2	3.2	3.2
Emission factor g/GJ	240	240	90	90
Emission rate, g/s	0.036	0.036	0.014	0.014
Background concentration,ug/m3	21.82321	13.90337	28.38951	28.38951
Background adjusted emission rate, g/s	0.0035	0.0032	0.001	0.004
Threshold emission rate g/s	0.0117	0.0380	0.0397	0.0385
Nomogram target emission (actual stack height)	0.0045	0.0045	0.014	0.06
Detailed assessment required	No	No	No	No

The Willows Energy Centre – KWB TDS Powerfire 150	PM_{10}	$PM_{2.5}$	Annual mean NO_2	Hourly mean NO_2
Net thermal input kW	166	166	166	166
Stack height	7.4	7.4	7.4	7.4
Stack diameter	0.3	0.3	0.3	0.3
Building height	6.5	6.5	6.5	6.5
Effective stack height	1.44	1.44	1.44	1.44
Emission factor g/GJ	66	66	150	150
Emission rate, g/s	0.011	0.011	0.025	0.025
Background concentration,ug/m3	20.00000	20.00000	20.00000	11.56019
Background adjusted emission rate, g/s	0.0009	0.0022	0.001	0.006
Threshold emission rate g/s	0.0093	0.0111	0.0446	0.0299
Nomogram target emission (actual stack height)	0.0025	0.0025	0.0075	0.0075
Detailed assessment required	No	No	No	No

Appendix D: DMRB Calculations

D1.0. Input Data

Table D1.1. Background concentrations

Location/ Receptor	Grid Ref	Background Concentrations			
		Year	NO_x	NO_2	PM_{10}
Coalway Road	389929 296813	2014	22.85956	16.39772	15.06909
Linthouse Lane	394955 301609	2014	30.23935	20.89744	16.82656
Penn Road	389480 295790 (Eastbound) 389731 295917 (Westbound)	2014	21.8869	15.77526	15.04384

Table D1.2. Road traffic data

Location/ Receptor	Link number	Distance from link centre to receptor (m)	Traffic flow & speed		Traffic composition		
			AADT (combined veh/day)	Annual average speed (km/h)	Road type (A,B,C,D)	Total % LDV (<3.5t GVW)	Total % HDV (>3.5t GVW)
Coalway Road	1	8.7	10,846	40	B	97	3
Linthouse Road	1	16.5	12,907	30	B	97	3
Penn Road	1 Eastbound	10.0	10,413	50	A	67	33
	2 Westbound	20.6	10,748	50	A	89	11

D2.0 Model Verification

D2.1. Results

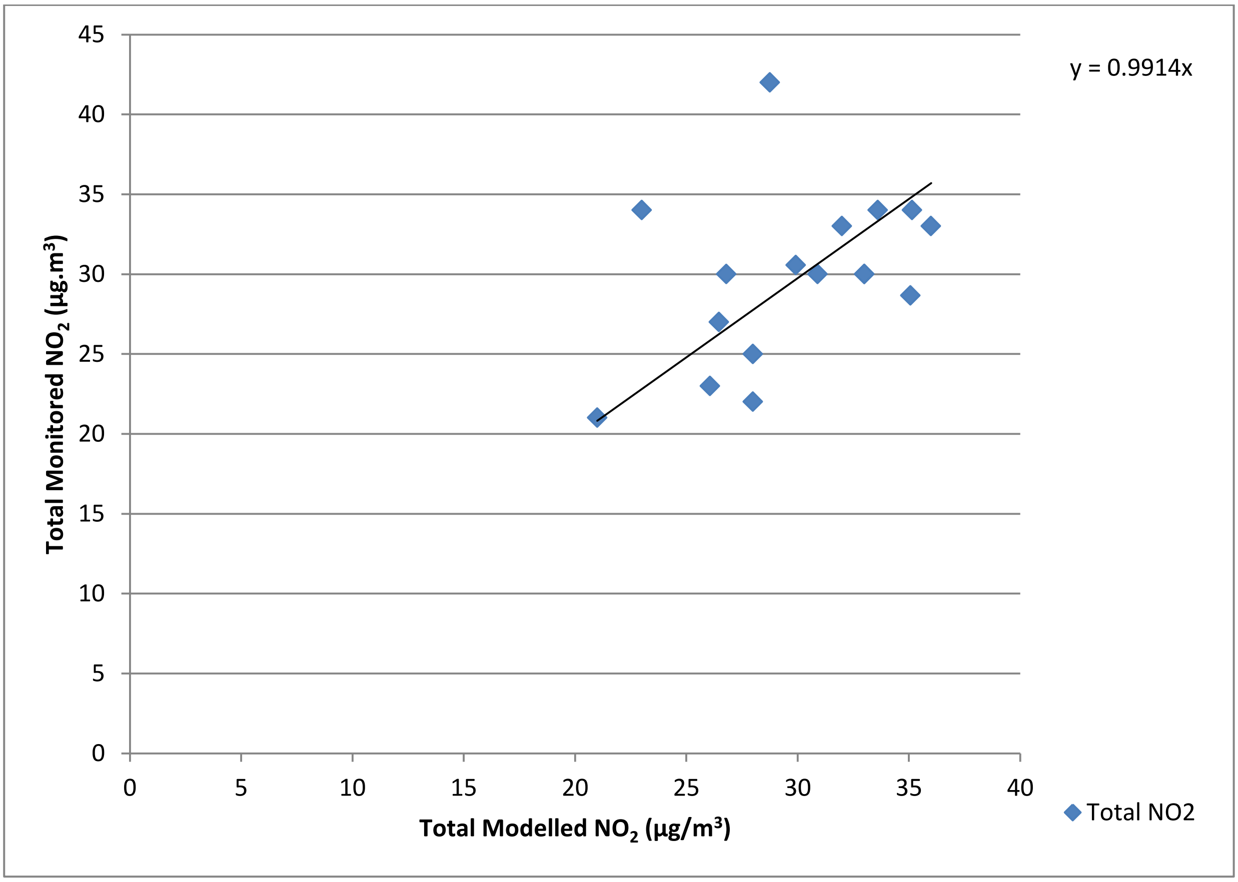
Table D2.1. Comparison of modelled and monitored NO_2 concentrations

Site ID	Monitor type	Site type	Site description	Background NO_2	Monitored total NO_2	Modelled total NO_2	% Difference
A4	CM	R	Urban A Road	22	31	30	-2
A5	CM	R	Urban A Road	26	29	35	22
BIL	DT	R	Urban A Road	28	33	32	-3
BRI	DT	R	Urban A Road	17	21	21	0
CAN	DT	R	Urban A Road	24	27	26	-2
CC7	DT	R	Urban A Road	32	30	33	10
CLE	DT	R	Urban A Road	32	30	33	10
DUD	DT	R	Urban A Road	25	25	28	12
HOR	DT	R	Urban A Road	32	34	35	3
OXF	DT	R	Urban A Road	28	30	31	3
PAR	DT	R	Urban A Road	23	30	27	-11
PEN	DT	R	Urban A Road	19	23	26	13
TET	DT	R	Urban A Road	19	34	23	-32
WAT	DT	R	Urban A Road	32	33	36	9
WIL	DT	R	Urban A Road	26	34	34	-1
WIL1	DT	R	Urban A Road	26	22	28	27

Table D2.2. Summary table

% Difference between modelled and monitored concentrations	Number of sites
Within +10% Within - 10% **Within +-10%**	6 4 **10**
Within +10% to 25% Within - 10% to 25% **Within +-10% to 25%**	3 1 **4**
Over +25% Under - 25% **Outside +-25%**	1 1 **3**
Greater +-25% **Within +-25%**	**2** **14**

Figure D2.1. Modelled total NO_2 versus monitored total NO_2 concentrations



The DMRB model has been used to predict the concentrations at the available monitoring sites, including both continuous monitoring and diffusion tube sites. The model is performing well at most locations; the difference between the modelled and monitored concentrations at 14 of the available sites is within 25%. However, there are 2 sites where the difference between the measured and modelled results is more than 25%.

At the TET site the model is under predicting, this site is on a busy road with houses at the back of the pavement on which the diffusion tube is attached. There is also on street parking along the road directly in front of the monitoring site which serves a number of shops in the vicinity. The combination of buildings close to the road hampering dispersion, and the added congestion caused by the on street parking is likely to be causing the model to under read at this location.

Conversely the model is over predicting at the WIL1 site. This site is located on the A454 Willenhall Road which has a wide open aspect with good dispersion. The diffusion tube is mounted on the building façade 20 metres back from the kerbside. The buildings on the other side of the road are 30 metres from the kerb. In addition the site is located in a 1km grid square with a relatively high background concentration of 26µg/m^3. The combination of good dispersion, increased distance from the road and high background concentration is causing the model to over predict at this location.

There are specific reasons for the discrepancies between the modelled and monitored results at these 2 locations. As the model is performing well at all other locations and the equation for the regression line is very close to 1 (y=0.991), further correction to the modelled data is not considered necessary, and may result in greater discrepancies between the modelled and monitored data at other locations.

The verification exercise has highlighted the limitations of the model were extreme situations are encountered, for example where dispersion is poor, where the distance from the kerbside is large and where background concentrations are particularly high or low. These circumstances do not apply to the locations where the DMRB model has been used in sections 3.3 and 3.6.

CITY OF WOLVERHAMPTON COUNCIL

2016 Air Quality Annual Status Report (ASR)

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

Date: November 2016

Local Authority Officer	Dean Gooch
Department	Environmental Protection
Address	City of Wolverhampton Council Environmental Protection Civic Centre St Peter's Square Wolverhampton WV1 1RP
Telephone	01902 551155
E-mail	environmentalhealth@wolverhampton.gov.uk
Report Reference number	ASR2016
Date	November 2016

Executive Summary: Air Quality in Our Area

This report has been produced as part of the on-going process of the review and assessment of air quality within the city of Wolverhampton.
The council has introduced a range of measures intended to improve air quality within the city. Two key initiatives, the Interchange project and the City Centre Scheme, have dramatically improved air quality within the city centre. Together they have resulted in a 24% reduction in nitrogen dioxide (NO_2) levels over the last 6 years.

A comprehensive review of all monitoring data collected over the last 12 months has been carried out, and has shown that air quality continues to improve across the whole of the city. In 2015 NO_2 levels dropped by 2% compared with 2014 levels and there were no exceedances of the annual mean air quality objective at locations where there is relevant exposure.

The council has a number of initiatives in place which are due to be completed over the next 2 years, and which will further reduce vehicle emissions within the city centre. The council will continue monitoring pollution levels to determine the effectiveness of these initiatives.

The main priority of the council over the next 12 months is to assess $PM_{2.5}$ levels and determine their impact on public health. In order to progress this initiative, the council has purchased 4 $PM_{2.5}$ monitors which have been located at potential hot spots within the city centre and is working closely with Public Health colleagues.

A review of emission sources has found that there have been no new industrial processes, or any other significant sources which have been granted planning approval that could contribute to poor air quality since the previous Updating and Screening Assessment (USA) in 2015.

A detailed assessment of PM_{10} concentrations has confirmed that PM_{10} concentrations are consistently meeting the air quality objectives. The council has decided to continue to monitor the levels of this pollutant for a further twelve months prior to considering what action to take regarding the air quality management area with respect to this pollutant.

Air Quality in the City of Wolverhampton

Air pollution is associated with a number of adverse health impacts. It is recognised as a contributing factor in the onset of heart disease and cancer. Additionally, air pollution particularly affects the most vulnerable in society: children and older people, and those with heart and lung conditions. There is also often a strong correlation with equalities issues, because areas with poor air quality are also often the less affluent areas[1,2].

The annual health cost to society of the impacts of particulate matter alone in the UK is estimated to be around £16 billion[3].

The main air quality issues in Wolverhampton relate to NO_2 from road traffic. Consequently the areas most affected are close to busy roads, junctions and parts of the city centre, particularly where the traffic is congested, the roads are narrow, or there is a high proportion of heavy goods vehicles (HGV's).

Trend data over the last 15 years shows that levels of NO_2 are going down. This has led to a significant drop in the number of locations where the air quality objective for NO_2 is being exceeded. In 2015 there were no exceedances of the objective at locations where members of the public are likely to be exposed. However, there are still air quality hot spots along the A449, A454 and within the city centre itself.

In order to address and improve air quality across its area the council works closely with its partners at a local, sub regional and regional level. The council is a board member of the West Midlands Low Emissions Towns and Cities Program (WMLETCP) and is leading on the emerging Black Country Ultra Low Emission Vehicle Strategy and Implementation Plan.

During the last 12 months the seven Metropolitan Authorities (Birmingham, Coventry, Dudley, Sandwell, Solihull, Walsall and Wolverhampton), along with representatives from the three Local Enterprise Partnerships and five none-constituent Authorities have joined together to form the West Midlands Combined Authority (WMCA).

The WMCA has been established to plan and deliver a transport system across the West Midlands Metropolitan area that will boost the regional economy and improve

1 Environmental equity, air quality, socioeconomic status and respiratory health, 2010
2 Air quality and social deprivation in the UK: an environmental inequalities analysis, 2006
3 Defra. Abatement cost guidance for valuing changes in air quality, May 2013

the daily lives of residents and workers and will control many of the strategic functions across the region to ensure a common approach.

The West Midlands Integrated Transport Authority (ITA) was replaced by Transport for West Midlands (TFWM), the transport arm of the Combined Authority, in June 2016 and is continuing to develop the West Midlands Transport Emissions Framework. The Framework forms part of the West Midlands Strategic Transport Plan which has replaced the Local Transport Plan 3, and includes regional policies to accelerate the uptake of ULEV's across the private sector, fleet vehicles and taxis.

Actions to Improve Air Quality

Over the last 5 years the council has introduced a range of measures which have been effective in reducing pollution levels and enabled the council to comply with the air quality objectives; these measure fall into the following core areas:

- road improvements,
- public transport improvements,
- bus route improvements,
- traffic management,
- promoting travel alternatives,
- promoting low emission vehicles,
- air quality planning and guidance.

Over the past year the Wolverhampton City Centre Scheme, which was completed in 2015, has been particularly successful and has resulted in a 14% reduction in NO_2 in the south east part of the city centre.

In addition to this there are a further 2 major improvement schemes within the city centre which are currently on going. The railway station redevelopment and the metro extension are due to be completed over the next 24 months. They will reduce vehicle traffic within the ring road and are expected to lead to a corresponding reduction in NO_2 levels.

The council's Transport Strategy section are setting up a Statutory Quality Bus Partnership (SQP) within the next 12 months, which will ensure that all buses that enter the city centre will be required to meet EURO 6 by 2021/22.

The council has continued to work closely with its partners on the WMLETCP to develop a Low emission Vehicle Strategy for the West Midlands. This is expected to be published by the end of 2016.

Over the last 12 months the four Black Country Council's, Dudley, Walsall, Sandwell and Wolverhampton have collaborated to produce a Black Country Air Quality Supplementary Planning Document which incorporates the WMLETCP Good Practice Air Quality Planning Guide into planning policy and ensure a consistent approach to planning across the Black Country. This will be adopted as planning policy early 2017

The council's Sustainability Officer is leading on the emerging sub regional Black Country Ultra Low Emission Vehicle Strategy and Implementation Plan comprising of Dudley, Sandwell, Walsall and Wolverhampton Councils. The Implementation Plan will form part of a Black Country Transport Strategy and will help deliver a step change in the number of ULEV's in the sub-region by meeting existing demand and stimulating further demand by providing vehicle owners and operators with the confidence to invest in ULEVs. The Implementation Plan will drive each council's own capital and revenue programmes and inform funding bids to the Local Growth Fund, Combined Authority, Office for Low Emission Vehicles (OLEV), European Structural Investment Fund (ESIF), Horizon 2020 and other appropriate funds. It will also support the wider promotion of ULEVs to the public, other public sector organisations and to businesses.

Local Priorities and Challenges

In 2015 there were no areas of Wolverhampton where there is public exposure which exceeded the air quality objectives. However there are some areas of the city centre where NO_2 levels remain elevated. The council has a number of initiatives in place which will reduce vehicle emissions within the city centre and will continue to monitor pollution levels to determine the effectiveness of these initiatives.

The main priority for the council over the next 12 months is to assess $PM_{2.5}$ levels and determine their impact on public health. In order to progress this initiative the council has purchased 4 $PM_{2.5}$ monitors which have been located at potential hot spots within the city centre.

How to Get Involved

The council has a number of initiatives to encourage people to use alternative forms of transport and to think about where they need to use their car:

- Wolverhampton Car Share
- Walking strategy
- Cycle strategy

Residents can play their part in improving air quality and making Wolverhampton a better place to live, by thinking about their car use.

- Do you need to use your car for short trips to the local shops?
- Can you use the bus or train or metro?
- Can you share a lift?
- Can you walk to school?

Further information can be obtained from the council's web site: http://www.wolverhampton.gov.uk/home

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1 Local Air Quality Management

This report provides an overview of air quality in the City of Wolverhampton during 2015. It fulfils the requirements of Local Air Quality Management (LAQM) as set out in Part IV of the Environment Act (1995) 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 an exceedance is considered likely the local authority must 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. This Annual Status Report (ASR) is an annual requirement showing the strategies employed by the City of Wolverhampton Council to improve air quality and any progress that has been made.

The statutory air quality objectives applicable to LAQM in England can be found in Table E.1 in Appendix E.

2 Actions to Improve Air Quality

2.1 Air Quality Management Areas

Air Quality Management Areas (AQMAs) are declared when there is an exceedance or likely exceedance of an air quality objective. After declaration, the authority must prepare an Air Quality Action Plan (AQAP) within 12-18 months setting out measures it intends to put in place in pursuit of the objectives.

The City of Wolverhampton Council has declared the whole city an AQMA for nitrogen dioxide and PM10's. Further information on the AQMA including a map of the AQMA is available online at:

https://uk-air.defra.gov.uk/aqma/local-authorities?la_id=319

2.2 Progress and Impact of Measures to address Air Quality in Wolverhampton

The City of Wolverhampton Council has taken forward a number of measures during the current reporting year of 2015 in pursuit of improving local air quality. Details of all measures completed, in progress or planned are set out in Table 2.2. Key completed measures are:

Local Actions

- **Wolverhampton Interchange Project Phase 1 - key outcomes:**
  A new access road into the bus station off the ring road has reduced the number of buses within the city centre resulting in a 23% reduction in NO2 levels in the city centre resulting in the number of exceedance areas dropping from 19 in 2009 to 4 in 2013.

- **Wolverhampton City Centre Scheme - key outcomes:**
  Pedestrianisation and the re-routing of traffic in the Market Street area of the city centre has led to a reduction in NO2 levels of 14% in Market Street, Queen Street and Princess Street.

- **Statutory quality bus partnership (SQP) - key outcomes:**
  Sets an agreed standard for all buses to achieve EURO 6 within the city centre by 2021/22
- **Urban Traffic Control Major Scheme - Key outcomes:**
  20 traffic signals upgraded to SCOOT with bus priority.
  80 PELICAN crossings upgraded to PUFFIN crossings.
  4 nitrogen dioxide monitors have been installed at major traffic light junctions linked in to the traffic control systems.
  A journey time monitoring system comprising of 28 ANPR cameras has been installed on major access routes into the city.

Regional Actions

- **West Midlands Low Emissions Towns & Cities Program (LETCP) - key outcomes:**
  The Good Practice Planning Guide - All new developments are required to implement a range of measures to minimise road traffic emissions; including electric vehicle charging points, transport management plans, and damage cost calculations

  The Good Practice Procurement Guide -

  Low emission Zone feasibility study, conducted by AEA Technology.
- **Black Country Air Quality SPD - key outcomes:**
  Incorporates the LETCP good Practise Planning guide into planning policy and ensures a consistent approach to development control across the Black Country.
- **West Midlands Strategic Transport plan: Movement for Growth.**
  The Strategic Transport Plan was initially adopted in December 2015 by the former Integrated Transport Authority (ITA) and is now being developed and delivered by Transport for West Midlands (TfWM), the transport arm of the West Midlands Combined Authority.
  The plan sets out the long term transport strategy for the West Midlands region. Cleaner air and improving public health through better public transport

and accelerating the uptake of ultra low emission vehicles, are central to the vision statement of the plan:

"We will make great progress for a Midlands economic 'Engine for Growth', clean air, improved heath and quality of life for the people of the West Midlands."

The key policy objectives to tackle poor air quality are:

Policy 9 - To significantly improve the quality of the local environment;
Policy 10 - To help tackle climate change by ensuring a large decrease in greenhouse gases from the West Midlands Metropolitan Area's transport system; and
Policy 11 - To significantly reduce diabetes, obesity, respiratory and cardio-vascular problems through reduced transport emissions and increased active travel.

The City of Wolverhampton Council expects the following measures to be completed over the course of the next reporting year:

Local Actions

- **Midland Metro City Centre extension:**
  The Midland Metro extension will link the Metro with the main bus station and railway station to provide a fully integrated transport system. This is expected to reduce car ingress into the city centre, lowering vehicle emissions.
- **Railway station access improvements**
  The provision of a new station building and access road will reduce road traffic within the ring road along Broad Street, Fryer Street and Lichfield Street.

Regional Actions

- **WMLETCP Low Emission Strategy**

  The Low Emissions Strategy will feed into the West Midlands Transport Emissions Framework and provide a template for updating the council's action plan.

- **Black Country Air Quality SPD**

  The air quality SPD incorporates the WMLETCP Good Practice Planning guide into planning policy, accelerating the provision of a low emission vehicle infrastructure and ensuring a consistent approach across the sub region.

- **Black Country Ultra Low emission Vehicle Strategy and Implementation Plan**

  The Implementation Plan will form part of a Black Country wide Transport Strategy complementing the WMLETCP Low Emission Strategy and help deliver a step change in the number of ULEV's in the sub-region by meeting existing demand and stimulating further demand by providing vehicle owners and operators with the confidence to invest in ULEVs.

- **West Midlands Transport Emissions Framework**

  The West Midlands Transport emissions Framework is in direct response to the Defra Air Quality Action Plan which requires the implementation of Clean Air Zone. It is aligned to the Strategic Transport Plan and will provide a coordinated approach at Combined Authority level, to tackle air quality issues and improve our overall transport emissions.

  The measures to be developed in 2016/17 are:

  - Developing and adopting agreed metropolitan wide policies and targets towards the accelerated uptake and adoption of Ultra Low Emissions Vehicles and associated infrastructure including hydrogen and gas refuelling opportunities. This could be potentially supported through the Planning System;
  - Developing and adopting agreed metropolitan wide policies and actions for Low Emission Zones or Clean Air Zones - in specific and suitable locations;
  - Accelerated timescales to clean up West Midlands buses, through the ITA Bus Alliance and the West Midlands Low Emissions Bus Delivery Plan;
  - Making traffic management and regulation smarter through a West Midlands Key Route Network (KRN);
  - Developing and adopting Metropolitan policies and targets for the cleaning of public and commercial fleets;
  - Developing and adopting specific policies to encourage the wider roll out of Car Clubs and active travel measures;
  - Further development of the Metropolitan Strategic Cycle Network - linked to the ITA Cycle Charter;

- Developing targeted policies toward zero emissions taxi and private hire fleets;
- Exploring the development of Low Emission Neighbourhoods and Green Travel Districts (GTD); and
- Developing an agreed funding, development and delivery framework.

The effectiveness of these actions will be determined following a review of the monitoring data.

The council has recently purchased 4 $PM_{2.5}$ monitors to assess $PM_{2.5}$ levels across the city. Future actions will be prioritised based on the information gathered from these monitors and will target those areas where $PM_{2.5}$ levels are elevated.

Table 2.1 – Progress on Measures to Improve Air Quality

Measure No.	Measure	EU Category	EU Classification	Lead Authority	Planning Phase	Implementation Phase	Key Performance Indicator	Target Pollution Reduction in the AQMA	Progress to Date	Estimated Completion Date	Comments
1	Wolverhampton Interchange project phase 1	Transport Planning and infrastructure	Public transport improvements-interchanges stations and services	CWC		2010 -2011	None set	West Midlands Local Transport Plan 3 performance aim: "A net reduction of Nitrogen Dioxide (NO2) in those areas, as confirmed by each local authority within the West Midlands, where the annual average NO2 values are predicted to exceed 40µg/m3 between 2008 (baseline) and 2015".	Completed 2011	Completed 2011	The provision of a new access road into the bus station from the ring road, has led to a net reduction in the numbers of buses within the city centre. NO2 levels dropped by 23% following completion of the scheme. The number of monitoring sites exceeding the air quality objective reduced from 19 in 2009 to 4 in 2013.
2	Midland Metro city centre extension.	Transport Planning and infrastructure	Public transport improvements-interchanges stations and services	CWC	completed	2017/18		As per measure No 1	Submission of Noise and Air Quality assessments. Necessary approvals have been obtained. Preliminary ground works due to start September 2016	2017/18	The development of a fully integrated transport structure will provide new linkages and encourage a modal shift in transport, enhancing and improving City Centre access. By improving public transport links it is anticipated car ingress into the city centre will be reduced lowering vehicle emissions and improving air quality.

Measure No.	Measure	EU Category	EU Classification	Lead Authority	Planning Phase	Implementation Phase	Key Performance Indicator	Target Pollution Reduction in the AQMA	Progress to Date	Estimated Completion Date	Comments
3	Railway station redevelopment	Transport Planning and infrastructure	Public transport improvements-interchanges stations and services	CWC	2016	2017/18	None set	As per measure No 1	Work started summer 2016	End 2016	The provision of a new station building and access road will reduce traffic within the ring road particularly along Broad Street, Fryer Street and Lichfield Street, thereby reducing NO2 emissions within the city centre. The effectiveness of this will be determined following a review of the monitoring data
4	Wolverhampton City Centre Scheme	Transport Planning and infrastructure	Public transport improvements-interchanges stations and services	CWC	Completed	Completed	None set	As per measure No 1	Completed	Completed	The pedestrianisation of Market Street and the re-routing of traffic along Queen St and Princess St have reduced NO2 levels in this area of the city centre by 14%.
5	Showcase route extension and improvements.	Transport Planning and Infrastructure.	Bus route improvements.	CWC & Centro.	Completed	On going	None set	As per measure No 1.	WCW has implement a programme of enhanced bus routes featuring real time information at bus stops, improved bus shelters and lighting at stops and bus priority at junctions. Electric hybrid buses were introduced on show case route 1 in 2011.	Completed.	This is part of a range of measures aimed at reducing emissions from buses and encouraging the use of public transport.
6.	Statutory quality bus partnership (SQP) covering the city centre.	Transport Planning and Infrastructure.	Bus route improvements.	CWC & Centro	Completed	On going	None set	As per measure No 1	Draft SQP currently out for consultation	SQP to be in place by end 2016	The SQP will enable better control of the quality of vehicles, emissions standards and the management of bus stops to ensure reliability and journey times within the city centre. Sets an agreed standard for all buses to achieve EURO 6 within the city centre by 2021/22

Measure No.	Measure	EU Category	EU Classification	Lead Authority	Planning Phase	Implementation Phase	Key Performance Indicator	Target Pollution Reduction in the AQMA	Progress to Date	Estimated Completion Date	Comments
7.	Increased bus lane enforcement	Transport Planning and Infrastructure	Bus route improvements	CWC	Completed	On going	None set	As per measure No 1	6 bus lane enforcement cameras have been installed on bus lanes. These became live on the 1st June 2015	On going	See point 6
8.	Urban traffic Control Major Scheme	Traffic Management	UTC, Congestion management, traffic reduction	CWC		1/9/08 – 30/9/14	None set	As per measure No 1	Approximately 20 traffic signals were upgraded to SCOOT with bus priority during 2013/14. Approximately 80 traffic PELICAN crossings have been upgraded to PUFFIN crossings over the last 5 years. 4 nitrogen dioxide monitors linked in to the traffic control system have been installed at major traffic light junctions. These monitor air pollution levels and traffic flow. A journey time monitoring system comprising of 28 ANPR cameras has been installed within the city. The traffic light signalling system has been upgraded to wireless digital communications. This has improved the control of traffic light signals and traffic flow within the city.	30/9/14	The UTC Major Scheme seeks to make more efficient use of the existing infrastructure and reduce congestion on the network of strategic routes throughout the West Midlands. It will make traffic signals more efficient, provide a common platform for bus priority measures, deliver more variable message signs, and, create a technical platform which enables intelligent transport services to be deployed. The project has been developed in partnership with the police, Highways Agency and public transport operators.

Measure No.	Measure	EU Category	EU Classification	Lead Authority	Planning Phase	Implementation Phase	Key Performance Indicator	Target Pollution Reduction in the AQMA	Progress to Date	Estimated Completion Date	Comments
9.	Wolverhampton Car Share (WCS).	Alternatives to private vehicle use	Car & lift sharing schemes	CWC	NA	On going	None set	As per measure No 1	The car share scheme was re launched in 2015 as part of the councils revised travel plan which was produced in January 2015. Wolverhampton City Council is working jointly with South Staffs Council on a car share scheme for the i54 development which includes the new Jaguar Land Rover engine plant.	On going	This forms part of the Green Travel Plan encouraging alternative means of travel. These measures are aimed at reducing the number of vehicles entering the city centre, reducing vehicle emissions.
10.	Walking Strategy	Promoting Travel Alternatives	Promotion of walking	CWC	Na	On going	None set	As per measure No 1	Active Travel Strategy to promote walking and cycling launched December 2014 in conjunction with the council's Transportation and Public Health divisions.	On going	The promotion of alternative forms of transport is intended to reduce the number of vehicles on the road improving congestion and reducing vehicle emissions
11.	Cycle Strategy	Promoting Travel Alternatives	Promotion of cycling	CWC	Na	On going	None set	As per measure No 1	Active Travel Strategy to promote walking and cycling launched December 2014 in conjunction with Transportation and Public Health. In addition the council has set up a cycle forum and cycle training in schools to promote and encourage cycling. The council has also launched a "Bike to work" scheme via the employee benefits scheme.	On going	See measure No 11
12.	Green fleet review	Vehicle Fleet Efficiency	Fleet efficiency and recognition schemes	CWC		On going	None set	As per measure No 1			

Measure No.	Measure	EU Category	EU Classification	Lead Authority	Planning Phase	Implementation Phase	Key Performance Indicator	Target Pollution Reduction in the AQMA	Progress to Date	Estimated Completion Date	Comments
13.	WCC Fleet modernisation	Vehicle Fleet Efficiency	Fleet efficiency and recognition schemes	CWC	NA	On going	None set	As per measure No 1	On going process of fleet modernisation. HGV's using Ad blue systems. Low emission vehicles have been adopted in limited numbers where appropriate. Electric vehicle trials are on-going. The Council's fleet of mowers has been upgraded with rotary mowers which are more economical and use less fuel. Heavy commercial vehicles meet EURO VI.	On going, the council intends to adopt low emission vehicle technologies where appropriate as they become available.	The adoption of low emission vehicle technology will reduce the overall emissions from the council fleet.
14.	Local sustainable transport initiatives	Promoting Low Emission Transport	Other	CWC	Na	On going	None set	As per measure No 1	£3m obtained from Local sustainable transport bid for the period 2015 to 2019, £4.6m received from the growth fund covering the period 2015 to 20. The following initiatives are on-going: promotion of sustainable transport, managing short trips, Smarter Networks, Smarter Choices, cycle to work scheme, salary sacrifice scheme to purchase bikes, cycle parking, promotion of walking, monthly payments for transport season tickets, public transport scratch cards for work related trips.	2020	Part of a range of initiatives aimed at improving fleet emissions by encouraging the take up of low emission vehicles, driver training and vehicle management.

Measure No.	Measure	EU Category	EU Classification	Lead Authority	Planning Phase	Implementation Phase	Key Performance Indicator	Target Pollution Reduction in the AQMA	Progress to Date	Estimated Completion Date	Comments
15.	West Midlands Low Emissions Towns & Cities Program (LETCP)	Policy Guidance and Development Control	Regional Groups Co-ordinating programmes to develop Area wide Strategies to reduce emissions and improve air quality	LETCP Board comprising Walsall (Chair), Birmingham, Coventry, Dudley, Sandwell, Solihull, and Wolverhampton councils		On going	None set	As per measure No 1	• Good Practice Air Quality Planning Guidance - May 2014; • Good Practice Procurement Guidance - September 2014; • West Midlands LETCP Low Emission Zones - Technical Feasibility Study Work Package 1 Scenario modelling base case; • West Midlands LETCP Low Emissions Zones - Technical Feasibility Study WP1a Scenario modelling; • West Midlands LETCP 'Economic and health impacts of air pollution' study has been completed • Draft West Midlands LETCP Low Emissions Strategy, completion is scheduled for late 2016. Publication of the Good Practice Air Quality Planning Guidance and the Good Practice Procurement Guidance. These documents have been adopted by CWC and are being implemented.	On going	The LETCP program comprises of a range of measures and guidance to drive policy and reduce emissions from road traffic across the West Midlands.

Measure No.	Measure	EU Category	EU Classification	Lead Authority	Planning Phase	Implementation Phase	Key Performance Indicator	Target Pollution Reduction in the AQMA	Progress to Date	Estimated Completion Date	Comments
16.	Black Country Ultra Low emission Vehicle Strategy and Implementation Plan	Policy Guidance and Development Control	Regional Groups Co-ordinating programmes to develop Area wide Strategies to reduce emissions and improve air quality	City of Wolverhampton Council in conjunction with Dudley MBC, Sandwell MBC and Walsall MBC.		On going	None set	As per measure No 1	A draft Low Emissions Strategy has been written and has gone out to consultation.	The strategy is to be published by the end 2016	The emerging Black Country Ultra Low Emission Vehicle Strategy and implementation plan will form part of a Black Country Transport Strategy and will help deliver a step change in the number of ULEV's in the sub-region by meeting existing demand and stimulating further demand by providing vehicle owners and operators with the confidence to invest in ULEVs. The Implementation Plan will drive each council's own capital and revenue programmes and inform funding bids to the Local Growth Fund, Combined Authority, Office for Low Emission Vehicles (OLEV), European Structural Investment Fund (ESIF), Horizon 2020 and other appropriate funds. It will also support the wider promotion of ULEVs to the public, other public sector organisations and to businesses.

Measure No.	Measure	EU Category	EU Classification	Lead Authority	Planning Phase	Implementation Phase	Key Performance Indicator	Target Pollution Reduction in the AQMA	Progress to Date	Estimated Completion Date	Comments
17.	West Midlands Transport Emissions Framework	Policy Guidance and Development Control	Regional Groups Co-ordinating programmes to develop Area wide Strategies to reduce emissions and improve air quality	Combined Authority		On going	None set	As per measure No 1	Scoping study completed – Developing a WM Transport emissions Framework	2017	The West Midlands Transport emissions Framework is in direct response to the Defra Air Quality Action Plan which requires the implementation of Clean Air Zones. It is aligned to the Strategic Transport Plan and will provide a coordinated approach at Combined Authority level, to tackle air quality issues and improve our overall transport emissions.
18.	Encouragement of city centre living	Policy Guidance and Development Control	Air Quality Planning and Policy Guidance	CWC		On going	None set	As per measure No 1	As part of its Local Development Scheme the city council has 3 Area Action Plans including the new City Centre AAP which promotes city centre living.	On going	City centre living reduces the need for car ownership and promotes the use of public transport.
19.	Black Country Air Quality SPD	Policy Guidance and Development Control	Air Quality Planning and Policy Guidance	Dudley MBC		2016/17	None set	As per measure No 1	The 4 Black Country authorities, Dudley, Sandwell, Walsall and Wolverhampton are working together to produce a Black Country supplementary planning document (SPD) to incorporate the LETCP Air Quality good Practice Guide into planning policy.	December 2016	The SPD requires new development to incorporate a range of measures to reduce emissions from road traffic. These include the provision of electric charging points, traffic management plans, and a damage cost calculator. The level of mitigation required is proportional to the size of the development.

2.3 $PM_{2.5}$ – Local Authority Approach to Reducing Emissions and or Concentrations

Policy Guidance LAQM.PG16 requires Local Authorities to work towards reducing emissions and/or concentrations of $PM_{2.5}$, (particulate matter with an aerodynamic diameter of 2.5µm or less). There is clear evidence that $PM_{2.5}$ has a significant impact on human health, including premature mortality, allergic reactions, and cardiovascular diseases, with new studies also suggesting links to much wider health issues than previously thought including conditions such as diabetes and dementia.

The City of Wolverhampton Council Public Protection team is working closely with Public Health colleagues to assess the current levels of $PM_{2.5}$ within the city and their impact on public health. The council has recently purchased 4 new particle monitors which have the capability to measure $PM_{2.5}$. These have been deployed at potential hot spots within the city to identify priority areas for the reduction of $PM_{2.5}$. Where priority areas are identified, actions aimed at reducing $PM_{2.5}$ levels in those areas will be considered and implemented.

3 Air Quality Monitoring Data and Comparison with Air Quality Objectives and National Compliance

3.1 Summary of Monitoring Undertaken

3.1.1 Automatic Monitoring Sites

This section sets out what monitoring has taken place and how it compares with objectives.

The City of Wolverhampton Council undertook automatic (continuous) monitoring at 5 sites during 2015. Table A.1 in Appendix A shows the details of the sites. NB. Local authorities do not have to report annually on the following pollutants: 1,3 butadiene, benzene, carbon monoxide and lead, unless local circumstances indicate there is a problem. National monitoring results are available at https://uk-air.defra.gov.uk/

A map showing the location of the monitoring sites is provided in Appendix D. Further details on how the monitors are calibrated and how the data has been adjusted are included in Appendix C.

3.1.2 Non-Automatic Monitoring Sites

The City of Wolverhampton Council undertook non- automatic (passive) monitoring of NO_2 at 50 sites during 2015. Table A.2 in Appendix A shows the details of the sites.

A Map showing the location of the monitoring sites is provided in Appendix D. Further details on Quality Assurance/Quality Control (QA/QC) and bias adjustment for the diffusion tubes are included in Appendix C.

3.2 Individual Pollutants

The air quality monitoring results presented in this section are, where relevant, adjusted for “annualisation” and bias. Further details on adjustments are provided in Appendix C.

3.2.1 Nitrogen Dioxide (NO_2)

Table A.3 in Appendix A compares the ratified and adjusted monitored NO_2 annual mean concentrations for the past 5 years with the air quality objective of 40µg/m^3.

For diffusion tubes, the full 2015 dataset of monthly mean values is provided in Appendix B.

Table A.4 in Appendix A compares the ratified continuous monitored NO_2 hourly mean concentrations for the past 5 years with the air quality objective of 200µg/m^3, not to be exceeded more than 18 times per year.

Four sites have exceeded the annual mean objective, however there is no relevant exposure at these locations.

There have been no exceedances of the annual mean air quality objective at locations where there is relevant exposure. As none of the annual means from the diffusion tube sites are greater than 60µg/m3, there is unlikely to be any exceedances of the 1-hour mean objective at these sites.

3.2.2 Particulate Matter (PM_{10})

Table A.5 in Appendix A compares the ratified and adjusted monitored PM_{10} annual mean concentrations for the past 5 years with the air quality objective of 40µg/m^3.

Table A.6 in Appendix A compares the ratified continuous monitored PM_{10} daily mean concentrations for the past 5 years with the air quality objective of 50µg/m^3, not to be exceeded more than 35 times per year.

During 2015 there were no exceedences of the air quality objective.

3.2.3 Particulate Matter ($PM_{2.5}$)

The council has recently purchased 4 PM2.5 monitors to be located across the city. Data from these will be presented in the next ASR.

3.2.4 Sulphur Dioxide (SO_2)

Table A.7 in Appendix A compares the ratified continuous monitored SO_2 concentrations for year 2015 with the air quality objectives for SO_2.

During 2015 there were no exceedences of the air quality objective.

Appendix A: Monitoring Results

Table A.1 – Details of Automatic Monitoring Sites

Site ID	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In AQMA?	Monitoring Technique	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Inlet Height (m)
A1	Lichfield Street	Roadside	391647	298784	NO_2, PM_{10}	Yes	Chemiluminescent, TEOM	2	2	2.5
A2	Penn Road	Roadside	390374	296775	NO_2, PM_{10}	Yes	Chemiluminescent, TEOM	N/A	6.5	2.5
A4	Stafford Road	Roadside	391261	302199	NO_2, SO_2, PM_{10}	Yes	Chemiluminescent, UV Fluorescence, TEOM	5	8.5	2.5
A5	Willenhall Road	Roadside	394754	298429	NO_2, SO_2, PM_{10}	Yes	Chemiluminescent, UV Fluorescence, TEOM	5	9.5	2.5
A9	St Peter's Square	Urban Background	390740	302692	NO_2, PM_{10}	Yes	Chemiluminescent, TEOM	N/A	30	2.5

(1) 0m if the monitoring site is at a location of exposure (e.g. installed on the façade of a residential property).

(2) N/A if not applicable.

Table A.2 – Details of Non-Automatic Monitoring Sites

Site ID	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In AQMA ?	Distance to Relevant Exposure (m) [1]	Distance to kerb of nearest road (m) [2]	Tube collocated with a Continuous Analyser?	Height (m)
BIL1	Roadside ISA	395057	296541	NO_2	Y	0	4m		3m
BIL2	Roadside ISA	395085	296475	NO_2	Y	0.5	4.5m		3m
BIL3	Roadside ISA	395102	296495	NO_2	Y	N/A	10m		3m
BIL4	Roadside ISA	395117	296454	NO_2	Y	0	2.5m		3m
LIC1	Roadside ISA	391698	298776	NO_2	Y	N/A	3.5m		3m
LIC2	Roadside ISA	391508	298744	NO_2	Y	0	3m		3m
LIC3	Roadside ISA	391620	298772	NO_2	Y	N/A	6m		3m
LIC4,5,6	Roadside ISA	391643	298786	NO_2	Y	1.5	1.5m	Y	3m
LIC7	Roadside ISA	391663	298764	NO_2	Y	N/A	4m		3m
LIC8	Roadside ISA	391454	298733	NO_2	Y	N/A	3m		3m
LIC9	Roadside ISA	391706	298757	NO_2	Y	N/A	3m		3m
PIP1	Roadside ISA	391768	298662	NO_2	Y	N/A	2m		3m
PRI1	Roadside ISA	391548	298940	NO_2	Y	N/A	3m		3m
PRI2	Roadside ISA	391566	298795	NO_2	Y	0	3m		3m
PRI4	Roadside ISA	391581	298686	NO_2	Y	N/A	5m		3m
QUE1	Roadside ISA	391607	298652	NO_2	Y	0	2.5m		3m
QUE2	Roadside ISA	391622	298639	NO_2	Y	N/A	4.5m		3m
QUE3	Roadside ISA	391673	298668	NO_2	Y	0	2.5m		3m
QUE4	Roadside ISA	391707	298660	NO_2	Y	N/A	4.5m		3m

Site ID	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In AQMA ?	Distance to Relevant Exposure (m) [1]	Distance to kerb of nearest road (m) [2]	Tube collocated with a Continuous Analyser?	Height (m)
STA1	Roadside ISA	391377	299818	NO_2	Y	2	2m		3m
STA5,6,7	Roadside ISA	391261	302199	NO_2	Y	6.5	8.5m	Y	3m
STA9	Roadside ISA	391540	303373	NO_2	Y	8	3.5m		3m
STA9A	Roadside ISA	391536	303348	NO_2	Y	0	7m		3m
WIL1	Roadside ISA	394187	298451	NO_2	Y	14.5	14.5m		3m
WIL2	Roadside ISA	394712	298428	NO_2	Y	0	6.5m		3m
BRI	Roadside	388182	298782	NO_2	Y	0	11m		3m
BRO	Roadside	391676	298865	NO_2	Y	5	5.5m		3m
CAN	Roadside	393008	300867	NO_2	Y	7.5	6.5m		3m
CLE	Roadside	391485	298348	NO_2	Y	N/A	5m		3m
CUL	Roadside	393365	297369	NO_2	Y	0	2.5m		3m
DUD	Roadside	391530	297308	NO_2	Y	1	3.5m		3m
HOR	Roadside	392115	298608	NO_2	Y	0.5	2.7m		3m
NEA	Roadside	394717	299894	NO_2	Y	4.5	2m		3m
OXF	Roadside	395384	296293	NO_2	Y	0	3.2m		3m
PAR	Roadside	392306	296547	NO_2	Y	10.3	2.7m		3m
TET	Roadside	389297	299886	NO_2	Y	3.2m	3.2m		3m
TRI	Roadside	395540	296479	NO_2	Y	-1	11m		3m
WAT	Roadside	391134	298877	NO_2	Y	N/A	3m		3m
WOL	Roadside	394031	297172	NO_2	Y	4	2m		3m
PRO	Intermediate	394633	296089	NO_2	Y	N/A	28m		3m

Site ID	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In AQMA ?	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Tube collocated with a Continuous Analyser?	Height (m)
COL	Background	395855	300586	NO_2	Y	N/A	48m		3m
MAR	Background	390705	302736	NO_2	Y	N/A	165m		3m
WAR	Background	389067	296785	NO_2	Y	N/A	50m		3m
WRE	Background	392090	296095	NO_2	Y	N/A	50m		3m
CC1	Roadside	391379	298687	NO_2	Y	N/A	5.9m		3m
CC2	Roadside	391309	298554	NO_2	Y	0	2.8m		3m
CC3	Roadside	391467	298374	NO_2	Y	N/A	5.8m		3m
CC5	Roadside	391538	298327	NO_2	Y	N/A	9.5m		3m
CC7	Roadside	391597	298579	NO_2	Y	0	2.9m		3m
PEN	Roadside	390379	296752	NO_2	Y	0	11.7m		2.5m

(1) 0m if the monitoring site is at a location of exposure (e.g. installed on/adjacent to the façade of a residential property).

(2) N/A if not applicable.

Table A.3 – Annual Mean NO_2 Monitoring Results

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) [(1)]	Valid Data Capture 2015 (%) [(2)]	NO_2 Annual Mean Concentration (µg/m³) [(3)]				
					2011	2012	2013	2014	2015
A1	Roadside	Automatic		99	36	**46**	39	37	34
A2	Roadside	Automatic		98	38	**43**	**45**	**42**	**44**
A4	Roadside	Automatic		100	34	31	31	29	25
A5	Roadside	Automatic		100	38	**44**	37	28	31
A9	Urban Background	Automatic		98	N/A	32	31	27	29
BIL1	Roadside	Diffusion Tube		100	37	**42**	**43**	35	38
BIL2	Roadside	Diffusion Tube		92	32	34	33	28	28
BIL3	Roadside	Diffusion Tube		100	33	**47**	36	39	36
BIL4	Roadside	Diffusion Tube		100	33	37	33	31	29
LIC1	Roadside	Diffusion Tube		100	33	**42**	**41**	**46**	**42**
LIC2	Roadside	Diffusion Tube		92	**45**	**46**	39	38	36
LIC3	Roadside	Diffusion Tube		92	36	**47**	40	**41**	39
LIC4,5,6 [(4)]	Roadside	Diffusion Tube		92	32	40	38	38	
LIC7	Roadside	Diffusion Tube		100	33	40	37	38	36
LIC8	Roadside	Diffusion Tube		67	31	36	29	29	28
LIC9	Roadside	Diffusion Tube		100	34	**47**	**41**	**43**	**42**
PIP1	Roadside	Diffusion Tube		100	37	**46**	**41**	38	**48**
PIP2	Roadside	Diffusion Tube		NA	35	38	36	closed	closed
PRI1	Roadside	Diffusion Tube		100	39	39	36	38	35

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) [(1)]	Valid Data Capture 2015 (%) [(2)]	NO_2 Annual Mean Concentration (µg/m^3) [(3)]				
					2011	2012	2013	2014	2015
PRI2	Roadside	Diffusion Tube		100	38	**41**	36	36	35
PRI3	Roadside	Diffusion Tube		NA	32	32	32	closed	closed
PRI4	Roadside	Diffusion Tube		92	**48**	40	36	34	24
PRI5	Roadside	Diffusion Tube		NA	35	35	35	closed	closed
QUE1	Roadside	Diffusion Tube		100	36	32	30	28	24
QUE2	Roadside	Diffusion Tube		67	**41**	39	33	33	29
QUE3	Roadside	Diffusion Tube		83	**46**	36	31	28	25
QUE4	Roadside	Diffusion Tube		100	**41**	37	28	29	29
STA1	Roadside	Diffusion Tube		100	28	30	27	27	28
STA5,6,7 [(4)]	Roadside	Diffusion Tube		83	34	38	31	29	
STA9	Roadside	Diffusion Tube		83	47	**45**	30	29	28
STA9A	Roadside	Diffusion Tube		100	31	35	32	30	30
WIL1	Roadside	Diffusion Tube		100	23	27	23	22	21
WIL2	Roadside	Diffusion Tube		100	36	39	37	37	35
WIL3	Roadside	Diffusion Tube		NA	30	34	closed	closed	closed
PAR	Roadside	Diffusion Tube		100	31	36	30	30	32
BRI	Roadside	Diffusion Tube		92	21	22	20	21	19
BRO	Roadside	Diffusion Tube		100	**44**	**45**	**41**	40	38
CAN	Roadside	Diffusion Tube		92	28	30	27	27	25
CLE	Roadside	Diffusion Tube		100	31	32	26	30	26
CUL	Roadside	Diffusion Tube		100	23	26	21	21	21

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2015 (%) (2)	NO_2 Annual Mean Concentration ($\mu g/m^3$) (3)				
					2011	2012	2013	2014	2015
DUD	Roadside	Diffusion Tube		100	26	27	25	25	23
HOR	Roadside	Diffusion Tube		100	36	36	35	34	36
NEA	Roadside	Diffusion Tube		100	22	24	21	21	21
OXF	Roadside	Diffusion Tube		100	25	31	30	30	29
TET	Roadside	Diffusion Tube		100	38	39	34	34	34
WAT	Roadside	Diffusion Tube		92	30	35	34	33	32
WOL	Roadside	Diffusion Tube		100	19	20	19	17	18
PEN	Roadside	Diffusion Tube		100	N/A	N/A	N/A	23	22
PRO	Intermediate	Diffusion Tube		92	25	27	25	23	23
SPS	Intermediate	Diffusion Tube		NA	23	26	26	closed	closed
TRI	Intermediate	Diffusion Tube		100	24	25	22	23	22
COL	Background	Diffusion Tube		100	16	18	16	16	14
MAR	Background	Diffusion Tube		92	13	18	15	14	14
WAR	Background	Diffusion Tube		100	14	15	13	13	12
WRE	Background	Diffusion Tube		100	15	17	16	16	14
CC1	Roadside	Diffusion Tube		100	N/A	N/A	29	31	29
CC2	Roadside	Diffusion Tube		100	N/A	N/A	27	27	27
CC3	Roadside	Diffusion Tube		92	N/A	N/A	29	31	26
CC4	Roadside	Diffusion Tube		NA	N/A	N/A	29	closed	closed
CC5	Roadside	Diffusion Tube		100	N/A	N/A	28	28	27
CC6	Roadside	Diffusion Tube		NA	N/A	N/A	31	closed	closed

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2015 (%) (2)	NO_2 Annual Mean Concentration ($\mu g/m^3$) (3)				
					2011	2012	2013	2014	2015
CC7	Roadside	Diffusion Tube		92	N/A	N/A	31	30	28
Lichfield St, Bilston	Intensive survey area	Diffusion Tube		98	34	39	36	33	32
Lichfield St, East of Princess Sq	Intensive survey area	Diffusion Tube		90	34	**43**	39	**41**	39
Lichfield St, West of Princess Sq	Intensive survey area	Diffusion Tube		96	37	**41**	34	34	33
Princess St/Stafford St	Intensive survey area	Diffusion Tube		97	38	37	35	36	31
Queen St	Intensive survey area	Diffusion Tube		88	**41**	35	31	30	27
Stafford Rd	Intensive survey area	Diffusion Tube		92	31	36	30	29	29
Willenhall Rd	Intensive survey area	Diffusion Tube		100	30	34	29	29	27
Other Roadside sites	Intensive survey area	Diffusion Tube		98	29	31	26	28	28
Intermediate sites	Intensive survey area	Diffusion Tube		96	24	26	24	23	22
Background sites	Intensive survey area	Diffusion Tube		98	15	16	15	15	13

Notes: Exceedances of the NO_2 annual mean objective of $40\mu g/m^3$ are shown in **bold**.

NO_2 annual means exceeding $60\mu g/m^3$, indicating a potential exceedance of the NO_2 1-hour mean objective are shown in **bold and underlined.**

(1) data capture for the monitoring period, in cases where monitoring was only carried out for part of the year.

(2) data capture for the full calendar year (e.g. if monitoring was carried out for 6 months, the maximum data capture for the full calendar year is 50%).

(3) Means for diffusion tubes have been corrected for bias. All means have been "annualised" as per Technical Guidance LAQM.TG16 if valid data capture for the full calendar year is less than 75%. See Appendix C for details.

Table A.4 – 1-Hour Mean NO_2 Monitoring Results

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2015 (%) (2)	NO_2 1-Hour Means > 200µg/m^3 (3)				
					2011	2012	2013	2014	2015
A1	Roadside	Automatic		99	1	1	0	0	0
A2	Roadside	Automatic		98	0	1	0	0	0
A4	Roadside	Automatic		100	0	0	0	0	0
A5	Roadside	Automatic		100	0	5	1	1	0
A9	Urban Background	Automatic		98	N/A	0	0	0	0

Notes: Exceedances of the NO_2 1-hour mean objective (200µg/m^3 not to be exceeded more than 18 times/year) are shown in **bold.**

(1) data capture for the monitoring period, in cases where monitoring was only carried out for part of the year.

(2) data capture for the full calendar year (e.g. if monitoring was carried out for 6 months, the maximum data capture for the full calendar year is 50%).

(3) If the period of valid data is less than 85%, the 99.8th percentile of 1-hour means is provided in brackets.

Table A.5 – Annual Mean PM_{10} Monitoring Results

Site ID	Site Type	Valid Data Capture for Monitoring Period (%) [(1)]	Valid Data Capture 2015 (%) [(2)]	PM_{10} Annual Mean Concentration ($\mu g/m^3$) [(3)]				
				2011	2012	2013	2014	2015
A1	Roadside		99	23	20	21	20	19
A2	Roadside		98	25	22	23	21	19
A4	Roadside		100	23	19	19	18	17
A5	Roadside		100	23	21	22	20	20
A9	Urban Background		98	N/A	21	20	20	18

Notes: Exceedances of the PM_{10} annual mean objective of $40\mu g/m^3$ are shown in **bold.**

(1) data capture for the monitoring period, in cases where monitoring was only carried out for part of the year.

(2) data capture for the full calendar year (e.g. if monitoring was carried out for 6 months, the maximum data capture for the full calendar year is 50%).

(3) All means have been "annualised" as per Technical Guidance LAQM.TG16, valid data capture for the full calendar year is less than 75%. See Appendix C for details.

Table A.6 – 24-Hour Mean PM_{10} Monitoring Results

Site ID	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2015 (%) (2)	PM_{10} 24-Hour Means > 50µg/m^3 (3)				
				2011	2012	2013	2014	2015
A1	Roadside		99	16	7	8	10	5
A2	Roadside		98	15	8	10(38)	8	3
A4	Roadside		100	7	9	6	5(30)	2
A5	Roadside		100	11	11	5	6	4
A9	Urban Background		98	N/A	6	6	11	6

Notes: Exceedances of the PM_{10} 24-hour mean objective (50µg/m^3 not to be exceeded more than 35 times/year) are shown in **bold.**

(1) data capture for the monitoring period, in cases where monitoring was only carried out for part of the year.

(2) data capture for the full calendar year (e.g. if monitoring was carried out for 6 months, the maximum data capture for the full calendar year is 50%).

(3) If the period of valid data is less than 85%, the 90.4th percentile of 24-hour means is provided in brackets.

Table A.7 – SO_2 Monitoring Results

Site ID	Site Type	Valid Data Capture for monitoring Period (%) (1)	Valid Data Capture 2014 (%) (2)	Number of Exceedances (percentile in bracket) (3)		
				15-minute Objective (266 µg/m^3)	1-hour Objective (350 µg/m^3)	24-hour Objective (125 µg/m^3)
A4	Roadside		100	0	0	0
A5	Roadside		100	0	0	0

Notes: Exceedances of the SO_2 objectives are shown in **bold** (15-min mean = 35 allowed a year, 1-hour mean = 24 allowed a year, 24-hour mean = 3 allowed a year)

(1) Data capture for the monitoring period, in cases where monitoring was only carried out for part of the year.

(2) Data capture for the full calendar year (e.g. if monitoring was carried out for 6 months, the maximum data capture for the full calendar year is 50%)

(3) If the period of valid data is less than 85%, the relevant percentiles are provided in brackets.

Appendix B: Full Monthly Diffusion Tube Results for 2015

Table B.2 – NO_2 Monthly Diffusion Tube Results - 2015

Site ID	NO_2 Mean Concentrations (µg/m^3)													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean	
													Raw Data	Bias Adjusted (1)
BIL1	50	47	56	58	38	39	43	46	64	73	45	73	53	38
BIL2	42	39	43	42	28	30		32	45	50	34	32	38	28
BIL3	61	42	53	57	43	35	35	46	61	71	43	49	50	36
BIL4	42	41	46	45	34	27	32	37	46	56	34	38	40	29
LIC1	70	62	69	70	29	55	52	51	63	67	57	48	58	**42**
LIC2	53	49		65	47	47	41	46	52	56	43	49	50	36
LIC3	60	56	60	64		45	43	44	54	59	51	56	54	39
LIC4		57	65	68	49	45	40	45	56	62	47		53	39
LIC5	54	56	56	61	43	42	41	43	59	67	41	39	50	37
LIC6	50	39	54	60	41	42	41	45	62	68	39		49	36
LIC7	55	47	60	54	42	48	40	44	47	57	48	46	49	36
LIC8	37	36	50	42	35	34	30	35					37	27

Site ID	NO_2 Mean Concentrations (µg/m^3)													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean: Raw Data	Annual Mean: Bias Adjusted (1)
LIC9	58	67	62	65	54	50	48	52	58	66	63	57	58	**42**
PIP1	83	73	75	68	63	56	55	60	68	69	60	60	66	**48**
PRI1	50	49	49	56	35	44	41	44	52	65	46	43	48	35
PRI2	56	49	54	54	45	39	37	41	52	59	41	44	48	35
PRI4	44	32	37	36		21	23	26	33	47	32	31	33	24
QUE1	38	34	39	36	26	25	23	27	38	47	31	30	33	24
QUE2	48	36				37	31	37	46	56	39		41	30
QUE3	36	32	40		26		23	29	41	51	33	30	34	25
QUE4	33	41	45	46	36	27	32	36	49	52	38	36	39	29
STA1	41	45	44	44	28	26	31	37	37	49	37	44	38	28
STA5	46	52			39	29	38	34	41	51		47	42	31
STA6	52	45	42	45	33	26	37	39	39	51	38	44	41	30
STA7	53			45	43	35	34	39	42	50		44	43	31
STA9		45		40	29	30	31	30	41	56	39	47	39	28
STA9A	45	45.8	43	48	35	30	32	35	43	53	39	40	41	30

Site ID	NO_2 Mean Concentrations (μg/m^3)													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean	
													Raw Data	Bias Adjusted (1)
WIL1	25	35	32	37	21	20	22	26	36	35	32	26	29	21
WIL2	57	42	54	62	23	45	44	48	50	57	45	47	48	35
PAR	35	53	41	49	39	35	38	39	50	62	37	43	43	32
BRI	26	22	31	35	22	16	20	21	27	34		28	26	19
BRO	46	51	54	63	39	45	42	51	56	66	51	55	52	38
CAN	44	33		34	24	24	28	33	36	52	36	28	34	25
CLE	48	41	46	43	32	26	22	25	36	41	34	30	35	26
CUL	37	36	31	36	20	14	19	22	31	40	32	31	29	21
DUD	37	37	32	35	22	20	21	29	30	48	30	39	32	23
HOR	64	40	57	55	38	41	41	48	53	64	45	43	49	36
NEA	36	32	32	36	19	17	20	21	30	40	25	34	28	21
OXF	37	38	48	50	32	36	30	37	49	54	36	32	40	29
TET	53	55	49	52	41	40	43	42	47	49	44	46	47	34
WAT	42	44	52	47	36	35	36	42	49	58		49	45	32
WOL	30	26	29	30	18	16	12	19	26	38	27	35	25	18

Site ID	NO_2 Mean Concentrations (µg/m^3)													
													Annual Mean	
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Raw Data	Bias Adjusted (1)
PEN	41	32	33	32	27	27	28	28	33	41	22	21	30	22
PRO	41	31	40	33	24	20	21		35	42	34	29	32	23
TRI	39	25	33	37	23	18	22	24	32	40	32	32	30	22
COL	24	23	21	25	14	12	15	13	19	30	19	25	20	14
MAR	26	18	19		12	11	11	12	21	31	23	24	19	14
WAR	21	21	21	17	11	10	11	11	19	24	12	16	16	12
WRE	18	21	25	22	13	10	14	14	26	30	18	17	19	14
CC1	47	35	51	45	34	33	26	36	39	54	41	35	40	29
CC2	51	28	45	39	32	30	31	30	41	48	39	30	37	27
CC3	40	38	49		32	30	31	31	43	50	30	25	36	26
CC5	44	41	45	43	34	38	34	34	39	51	25	26	38	27
CC7	32	39	43	47	30	28	28		49	54	36	36	38	28

(1) See Appendix C for details on bias adjustment

Appendix C: Supporting Technical Information / Air Quality Monitoring Data QA/QC

C1 Diffusion Tube Bias Adjustment Factors

The council uses diffusion tubes prepared using 50% TEA in acetone which, since 1 April 2014, are supplied by ESG Didcot. Prior to this they were supplied by Gradko International Ltd.

The tubes arrive from ESG and are stored in a refrigerator prior to being labelled with a site and date code. The tubes are then exposed in accordance with the start and end dates for the national NO_2 survey. Following exposure the tubes are capped and immediately dispatched to ESG for analysis.

The bias adjustment factor for the tubes and supplier have been obtained from the LAQM tools website, Review & Assessment database, Spreadsheet Version Number: 06/16, these are detailed below.

C1.1 Factor from Local co-location Studies

Triplicate tubes are exposed at the automatic monitoring stations in order to calculate a bias correction factor. The correction factor is applied to the yearly average to enable comparison with the annual NO_2 objective. The results from the co-location studies for 2011-15 are shown in the table below.

Prior to its closure in 2007 the Wolverhampton Centre AURN station was used for the co-location study. Since 2007 co-location tubes have been placed at the Lichfield Street and Stafford Road automatic stations. The factor applied to the data set is the mean bias adjustment factor from Tables C.1 to C.5.

Table C.1 – Chemiluminescent v Diffusion Tube Values 2011 (µg/m^3)

Site	Mean	Jan	Feb	Mar	April	May	June	July	Aug	Sept	Oct	Nov	Dec	%
Diffusion Tube Values µg/m^3														
LIC4	37	50	39	39	43	30	23	35	35	32	37	48	36	100
LIC5	38	59	38	38	36	25	27	40	33	32	41	48	33	100
LIC6	40	69	37	43	40	33	27	37	33	29	40	49	38	100
Mean		49	36	42	38	37	35	38	37	39	37	44	40	
Standard deviation		5	4	3	2	2	4	2	2	2	3	1	4	
Coefficient of variation		11.1	10.5	8.0	4.0	4.3	11.3	5.8	6.1	6.2	9.0	3.3	10.1	
Data quality		Good	Good	Good	Good	Good	Good	Good	Good	Good	Good	Good	Good	
STA5	39	55	32	40	39	35	37	37	39	37	33	45	42	100
STA6	39	45	39	46	39	38	30	36	35	37	40	42	35	100
STA7	40	47	38	41	36	37	36	40	35	41	38	45	42	100
Mean		49	36	42	38	37	35	38	37	39	37	44	40	
Standard deviation		5	4	3	2	2	4	2	2	2	3	1	4	
Coefficient of variation		11.1	10.5	8.0	4.0	4.3	11.3	5.8	6.1	6.2	9.0	3.3	10.1	
Data quality		Good	Good	Good	Good	Good	Good	Good	Good	Good	Good	Good	Good	
Mean of triplicate tubes														
Lichfield St	36	44	40	44	40	29	25	31	29	27	40	48	34	100
Stafford Rd	33	42	36	44	34	25	23	34	31	31	34	36	29	100
Monthly Chemiluminescent Values														
Lichfield St	38	59	38	40	40	29	26	37	34	31	39	48	36	100
Stafford Rd	39	49	36	42	38	37	35	38	37	39	37	44	40	100
Ratios of diffusion Tube Values: Chemiluminescent values														
Lichfield St	0.94	0.74	1.06	1.11	1.01	0.97	0.97	0.82	0.84	0.86	1.02	0.99	0.96	0.74
Stafford Rd	0.85	0.86	1.00	1.03	0.90	0.68	0.66	0.92	0.84	0.79	0.93	0.83	0.72	0.86
Mean bias	0.89													

Table C.2 – Chemiluminescent v Diffusion Tube Values 2012 (µg/m^3)

Site	Mean	Jan	Feb	Mar	April	May	June	July	Aug	Sept	Oct	Nov	Dec	%
Diffusion Tube Values µg/m^3														
LIC4	45	43	50	39	40	34		29	36	37	44	38	45	92
LIC5	49	47	47	30	45	35	31	36	38		44		49	83
LIC6	48	42	53	33	42	36	35		39	38	47	41	48	92
Mean		47	44	50	34	43	35	33	32	38	37	45	39	
Standard deviation		1.8	2.6	3.1	4.2	2.5	1.1	2.8	5.0	2.0	0.8	1.9	2.3	
Coefficient of variation		3.9	5.8	6.1	12.3	5.8	3.2	8.5	15.6	5.2	2.1	4.3	6.0	
Data quality		Good	Good	Good	Good	Good	Good	Good	Good	Good	Good	Good	Good	
STA5	49	45	42	25	32	32	31	33	39	42	42	42	49	100
STA6	48	42	44	28		31	31	29	35	42	42	37	48	92
STA7	49	40	46	24	34	29	29	31	39	48	45	37	49	100
Mean		48	42	44	26	33	30	31	31	38	44	43	39	
Standard deviation		0.6	2.4	2.1	2.0	1	2	1	2	2	3	2	3	
Coefficient of variation		1.3	5.7	4.7	7.7	4.6	5.3	3.6	6.8	5.9	7.9	3.5	7.5	
Data quality		Good	Good	Good	Good	Good	Good	Good	Good	Good	Good	Good	Good	
Mean of triplicate tubes														
Lichfield St	41	47	44	50	34	43	35	33		38		45		75
Stafford Rd	38	48	42	44	26	33	35	33	34	38	37	46	40	100
Monthly Chemiluminescent Values														
Lichfield St	49	53	50	53	52	48	38	40		48		61		75
Stafford Rd	34	42	42	42	36	31	25	25	25	31	34	36	34	100
Ratios of diffusion Tube Values: Chemiluminescent values														
Lichfield St	1.20	1.13	1.13	1.07	1.52	1.12	1.10	1.23		1.27		1.35		1.13
Stafford Rd	0.88	0.87	0.99	0.96	1.42	0.93	0.71	0.76	0.73	0.80	0.92	0.79	0.86	0.87
Mean bias	1.05													

Table C.3 – Chemiluminescent v Diffusion Tube Values 2013 (µg/m^3)

Site	Mean	Jan	Feb	Mar	April	May	June	July	Aug	Sept	Oct	Nov	Dec	%
Diffusion Tube Values µg/m^3														
LIC4	40	39	50	50	48	39	37	43	42	39		57	33	92
LIC5	39	45	60	48	34	38	39	43	38	42	36	56	36	100
LIC6	40	47	49	46	44	38	38	45	38	44	40	56	33	100
Mean		44	53	48	42	38	38	44	39	42	38	56.4	34.1	
Standard deviation		3.9	6.1	2.0	6.9	0.7	0.8	1.2	2.0	2.1	3.0	0.6	1.5	
Coefficient of variation		8.9	11.6	4.2	16.5	1.8	2.0	2.7	5.1	5.1	7.9	1.1	4.5	
Data quality		Good	Good	Good	Good	Good	Good	Good	Good	Good	Good	Good	Good	
STA5	35	38	44	30	34	28	28	32	34	36	36	44	38	100
STA6	32	38	38	31	34	35	28	32	34	37	33	47		92
STA7	32	39	40	36	30	31	27	31	35	34	34	45	34	100
Mean		38	41	32	32	31	28	32	34	36	34	45	36	
Standard deviation		0.6	2.6	3.3	2.4	3.3	0.7	0.4	0.6	1.2	1.5	1.2	2.6	
Coefficient of variation		1.6	6.5	10.1	7.3	10.6	2.4	1.3	1.8	3.5	4.3	2.6	7.2	
Data quality		Good	Good	Good	Good	Good	Good	Good	Good	Good	Good	Good	Good	
Mean of triplicate tubes														
Lichfield St	**43**	44	53	48	42	38	38	44		42	38	56	34	92
Stafford Rd	**35**	38	41		32	31	28	32	34	36	34	45	36	92
Monthly Chemiluminescent Values														
Lichfield St	40	48	55	55	34	36	34	44		38	32	40	27	92
Stafford Rd	32	36	36		31	27	23	29	29	34	31	44	31	92
Ratios of diffusion Tube Values: Chemiluminescent values														
Lichfield St	0.93	1.09	1.04	1.15	0.82	0.94	0.90	1.01		0.92	0.85	0.71	0.78	
Stafford Rd	0.90	0.95	0.89		0.94	0.86	0.83	0.91	0.83	0.96	0.90	0.97	0.85	
Mean bias	**0.92**													

Table C.4 – Chemiluminescent v Diffusion Tube Values 2014 (µg/m^3)

Site	Mean	Jan	Feb	Mar	April	May	June	July	Aug	Sept	Oct	Nov	Dec	%
Diffusion Tube Values µg/m^3														
LIC4		36	NA	45	56	48	45	39	47	95	44	79		83
LIC5		41	28	44	56	51	54	50	49	94	43	62	55	100
LIC6		37	NA	53	54	56	39	46	43	90	41	76	45	92
Mean		38		47	55	52	46	45	46	93	42	72.4	50.0	
Standard deviation		2.5		5.2	1.2	4.1	7.7	5.6	2.7	2.2	1.9	9.2	7.1	
Coefficient of variation		6.5		11.0	2.2	7.9	16.8	12.5	5.8	2.4	4.4	12.7	14.3	
Data quality		Good		Good	Good	Good	Good	Good	Good	Good	Good	Good	Good	
STA5		34	31	36	41	36	25	35	36	37	44	50		92
STA6		43	33	43	45	33	32	29	38	35	40	52	60	100
STA7		35	34	38	49	36	33	28	40	39	47	53	58	100
Mean		37	33	39	45	35	30	31	38	37	44	51	59	
Standard deviation		4.5	1.8	3.7	3.7	2	4	4	2	2	3	2	1	
Coefficient of variation		12.1	5.3	9.5	8.3	4.7	14.2	13.4	5.2	5.5	7.4	2.9	1.9	
Data quality		Good	Good	Good	Good	Good	Good	Good	Good	Good	Good	Good	Good	
Mean of triplicate tubes														
Lichfield St		36		46	36	32	40	38	31	59	36	50	32	92
Stafford Rd		31	29	36	34	31	27	25	23	27	29	32	38	100
Monthly Chemiluminescent Values														
Lichfield St		38		47	55	52	46	45	46	93	42	72	50	92
Stafford Rd		37	33	39	45	35	30	31	38	37	44	51	59	100
Ratios of diffusion Tube Values: Chemiluminescent values														
Lichfield St			0.97	0.66	0.62	0.87	0.85	0.66	0.64	0.86	0.69	0.65	0.95	
Stafford Rd		0.87	0.93	0.77	0.88	0.89	0.81	0.61	0.73	0.66	0.63	0.65	0.82	
Mean bias		**0.92 (Gradko)**			**0.71 (ESG Didcot)**									

Table C.5 – Chemiluminescent v Diffusion Tube Values 2015 (μg/m^3)

Site	Mean	Jan	Feb	Mar	April	May	June	July	Aug	Sept	Oct	Nov	Dec	%
Diffusion Tube Values μg/m^3														
LIC4	53	NA	57	65	68	49	45	40	45	56	62	47	NA	83
LIC5	50	54	56	56	61	43	42	41	43	59	67	41	39	100
LIC6	50	50	39	54	60	41	48	41	45	62	68	39	NA	92
Mean		52	51	58	63	44	45	41	44	59	66	42.4	39	
Standard deviation		3.2	9.7	5.9	4.6	4.1	2.9	0.6	1.2	3.0	3.6	3.9		
Coefficient of variation		6.1	19.1	10.2	7.3	9.4	6.5	1.4	2.6	5.0	5.5	9.2		
Data quality		Good	Good	Good	Good	Good	Good	Good	Good	Good	Good	Good		
STA5	42	46	52	NA	NA	39	29	38	34	41	51	NA	47	75
STA6	41	52	45	42	45	33	26	37	39	39	51	38	44	100
STA7	43	53	NA	NA	45	43	35	34	39	42	50	NA	44	75
Mean		51	48	42	45	38	30	36	37	40	51	38	45	
Standard deviation		3.7	5.2		0.5	5	4	2	3	2	1		2	
Coefficient of variation		7.4	10.7		1.1	13.3	14.6	5.3	7.3	4.6	1.5		3.6	
Data quality		Good	Good		Good	Good	Good	Good	Good	Good	Good		Good	
Mean of triplicate tubes														
Lichfield St	50	52	51	58	63	44	45	41	44	59	66	42	39	92
Stafford Rd	42	51	48	42	45	38	30	36	37	40	51	38	45	83
Monthly Chemiluminescent Values														
Lichfield St	36	36	38	40	34	34	34	29	31	34	38	38	40	92
Stafford Rd	32	38	40	36	34	27	25	25	27	29	36	32	29	83
Ratios of diffusion Tube Values: Chemiluminescent values														
Lichfield St	0.71	0.70	0.76	0.69	0.55	0.78	0.77	0.70	0.69	0.59	0.58	0.90	1.04	
Stafford Rd	0.75	0.76	0.83	0.87	0.77	0.70	0.82	0.69	0.71	0.71	0.71	0.85	0.64	
Bias	**0.73**													

C1.2 Discussion of Choice of Factor to Use

A comparison of the relevant bias adjustment factors is shown in Table A1.2 below. The national factors have been calculated using data from a number of authorities with tubes which will have been prepared and analysed in different batches and at different times.

The local bias adjustment factors are derived from triplicate co-located tubes exposed alongside an automatic analyser. These tubes are from the same batch as the measurement tubes and are handled, stored and analysed in the same way.

Table C.6 National and local bias adjustment factors.

Year	National Bias Adjustment Factor	Local Bias Adjustment Factor
2001	1.45	1.01
2002	1.27	0.95
2003	1.11	0.97
2004	1.10	0.93
2005	1.10	1.00
2006	1.01	1.03
2007	0.99	0.93
2008	0.94	0.97
2009	0.97	1.08
2010	0.99	0.97
2011	0.94	0.89
2012	1.02	1.05
2013	1.01	0.92
2014	0.98 (Gradko) 0.81 (ESG)	0.92 (Gradko, January to March) 0.71 (ESG Dicot, April to December)
2015	0.79	0.73

Trend data using both correction factors is presented in Figures A1.1 and A1.2. This shows that the national correction factor artificially raises the NO_2 concentrations at the start of the period, and produces an overall downward trend of 18$\mu g/m^3$ at roadside locations and 14$\mu g/m^3$ at background locations (Figure A1.1).

The diffusion tube NO_2 concentrations corrected with the locally derived adjustment factors (Figure A1.2) give a downward trend of 8$\mu g/m^3$ at roadside locations and 7$\mu g/m^3$ at background locations. These correction factors produce trend data which is more consistent with the data from the automatic analyser which is shown for comparison.

Based on this assessment local correction factors have been used to correct the diffusion tube data.

Figure C.1 Annual mean NO_2 values using national bias adjustment factor.

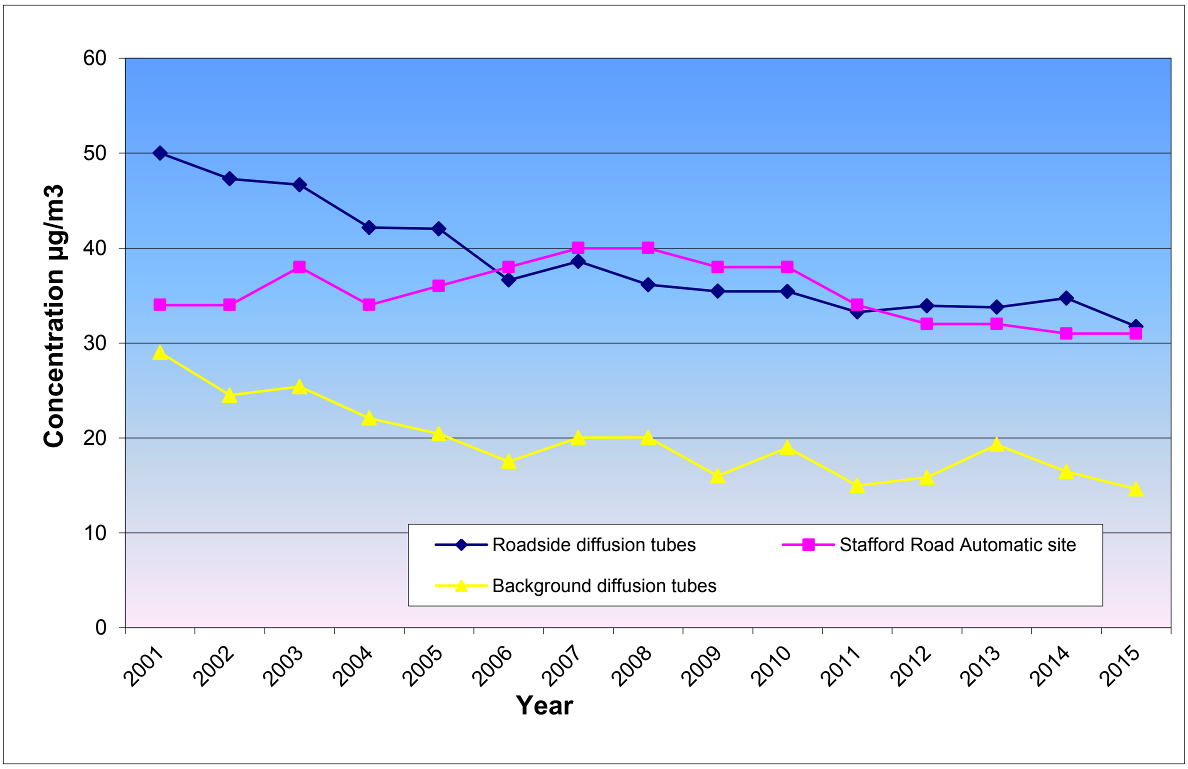
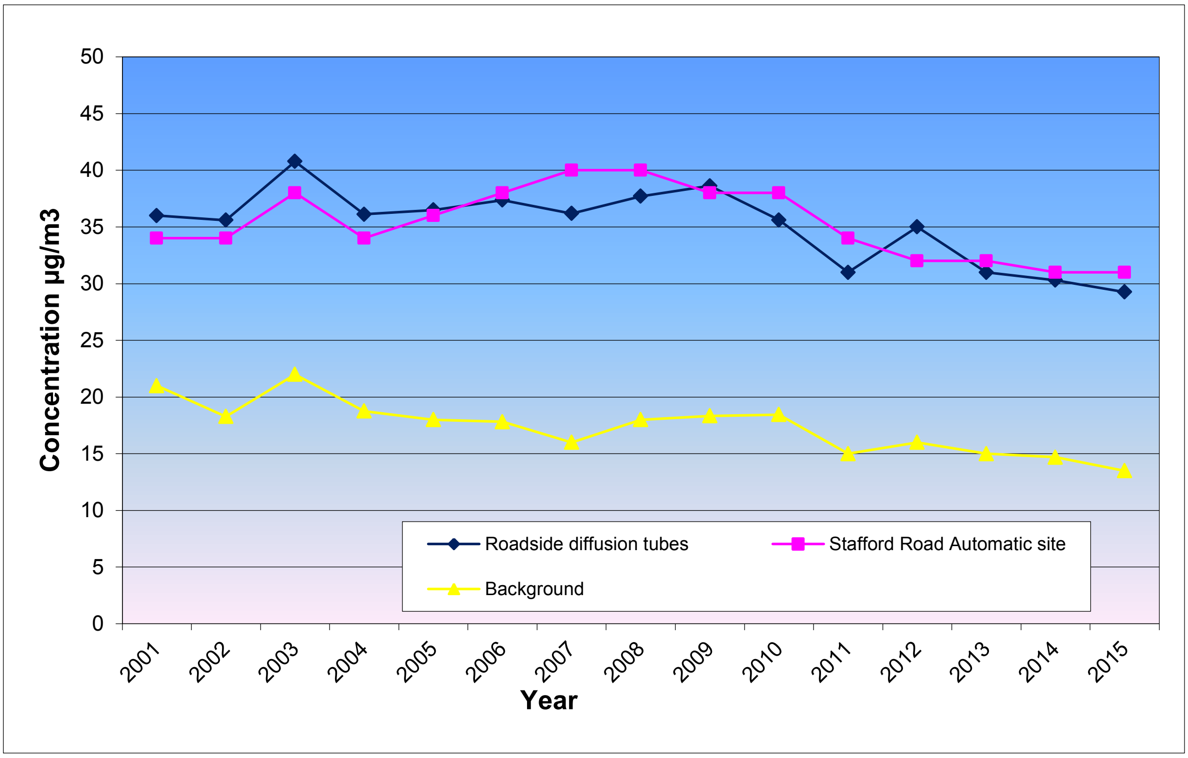


Figure C.2 Annual mean NO_2 values using local bias adjustment factor.



C1.3 PM Monitoring Adjustment

Particle monitoring is carried out using Tapered Element Oscillating Microbalance (TEOM) analysers. Since 2008 data has been corrected using the volatile correction model (VCM) in accordance with LAQM.TG16. The VCM was not available prior to 2008, therefore pre 2008 data has been corrected by applying the 1.3 correction factor to the annual mean in accordance with the previous guidance in LAQM.TG03.

C2 Short-term to Long-term Data adjustment

Data capture for LIC8 and QUE2 NO^2 diffusion tube sites was 67% during 2015. As this is below the minimum requirement of 75% for data capture, the results have been adjusted to provide an estimated annual mean concentration in accordance with the method outlined in Box 7.9 of LAQM.TG16, using data from the closest available continuous monitoring background sites. The correction factors for each site are calculated below.

Table C.7 Short-Term to Long-Term Monitoring Data Adjustment for diffusion tube site ref LIC8

Site	Site Type	Annual Mean ($\mu g/m^3$)	Period Mean ($\mu g/m^3$)	Ratio
Birmingham Acocks Green	Background urban	18.78	18.10	1.038
Birmingham Tyburn	Background urban	29.71	28.85	1.030
Walsall Woodlands	Background urban	19.14	17.62	1.086
Average				**1.051**

Table C.8 Short-Term to Long-Term Monitoring Data Adjustment for diffusion tube site ref QUE2

Site	Site Type	Annual Mean (µg/m^3)	Period Mean (µg/m^3)	Ratio
Birmingham Acocks Green	Urban Background	18.78	18.10	0.972
Birmingham Tyburn Rd	Background urban	29.71	28.85	0.960
Walsall Woodlands	Background urban	19.14	19.01	1.007
Average				**0.980**

C3 QA/QC of automatic monitors

The council follows the QA/QC procedures outlined in Chapter 7 of LAQM.TG16 in order to minimise data loss and achieve the required 90% data capture.

The chemiluminescent monitors are calibrated daily using on site calibration gases. This involves feeding zero air gas, followed by a span gas containing a known concentration of NO_2 through the analyser. A correction factor is then applied based on the analyser's response. The calibration reports are checked daily for drift and the correct application of the correction factor. Data is stored in both raw and corrected form.

A site visit is made every month to change filters and carry out a manual calibration which is checked against the automatic daily calibrations. Copies of the calibration reports, calibration gas logs and engineer's reports are retained on file.

All the sites are covered by a service contract provided by Enviro Technology Services plc (ET). The sites are serviced every 6 months by an ET service engineer in accordance with the manufacturer's instructions and warranty conditions. ET also provide a 48-hour call out response to cover breakdowns.

Raw data is examined on a daily basis to screen out erroneous and unusual measurements, having regard to the recommendations in Chapter 7 of LAQM.TG16.

C4 QA/QC of diffusion tube monitoring

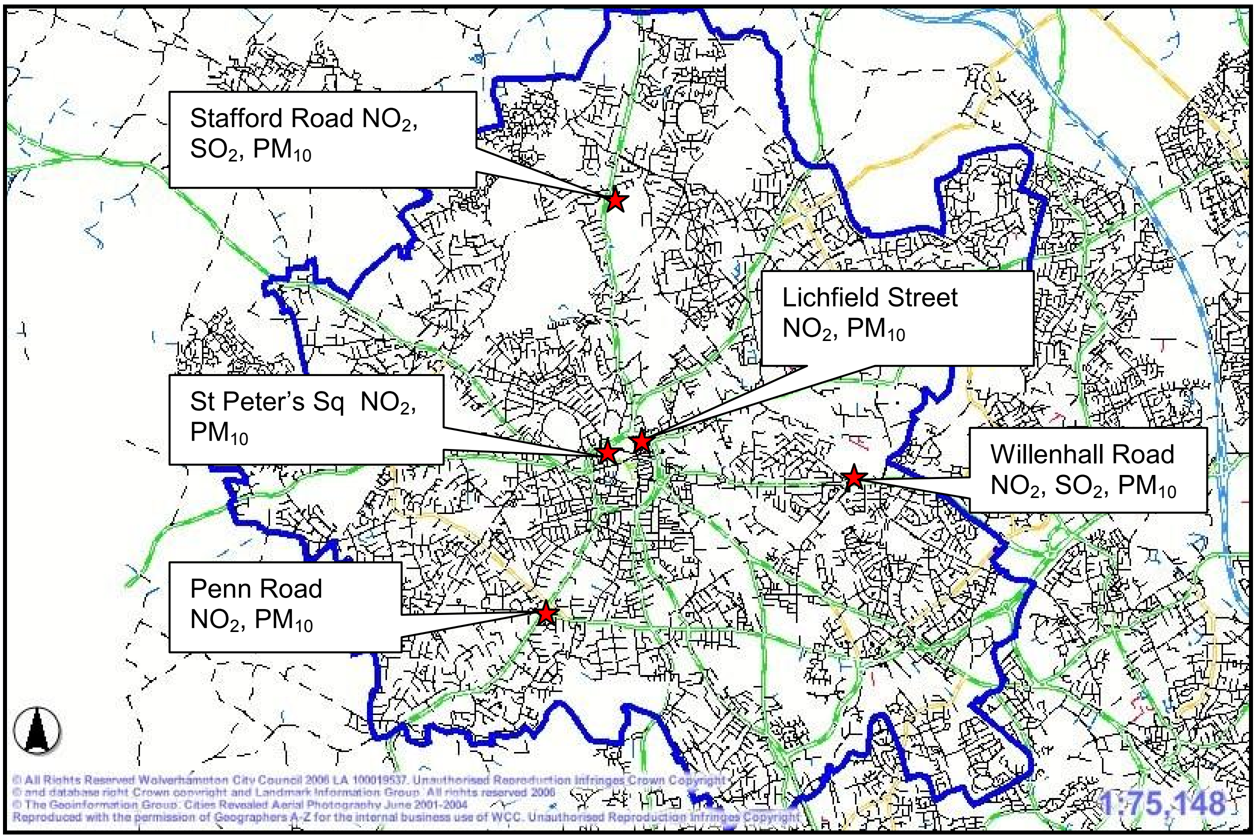
Since April 2014 the diffusion tubes used by the council have been supplied and analysed by ESD Didcot. The laboratory is UKAS accredited and takes part in the AIR NO2 Proficiency Testing Scheme (AIR-PT) which is operated by LGC Standards and supported by the Health and Safety Laboratory (HSL).

A summary of the performance of ESG Didcot in rounds AR006 to AR010 of the AIR-PT scheme covering the period January 2015 to November 2015 has been obtained from the Local Authority Air Quality Support web site. The results indicate that the laboratories analytical procedures do not have any systematic sources of bias. There are no rounds available covering December 2015

Triplicate tubes are exposed at the chemiluminescent monitoring stations in order to calculate bias correction which is applied to the yearly average to enable comparison with the annual NO_2 objective. The data from the triplicate tubes covering the period of this report show good precision.

Appendix D: Map of Monitoring Locations

Figure D.1 Location of Automatic Monitoring Sites



Appendix E: Summary of Air Quality Objectives in England

Table E.1 – Air Quality Objectives in England

Pollutant	Air Quality Objective[4]	
	Concentration	Measured as
Nitrogen Dioxide (NO_2)	200 µg/m^3 not to be exceeded more than 18 times a year	1-hour mean
	40 µg/m^3	Annual mean
Particulate Matter (PM_{10})	50 µg/m^3 not to be exceeded more than 35 times a year	24-hour mean
	40 µg/m^3	Annual mean
Sulphur Dioxide (SO_2)	350 µg/m^3 not to be exceeded more than 24 times a year	1-hour mean
	125 µg/m^3 not to be exceeded more than 3 times a year	24-hour mean
	266 µg/m^3 not to be exceeded more than 35 times a year	15-minute mean

[4] The units are in microgrammes of pollutant per cubic metre of air (µg/m^3).

Glossary of Terms

Abbreviation	Description
AQAP	Air Quality Action Plan - A detailed description of measures, outcomes, achievement dates and implementation methods, showing how the local authority intends to achieve air quality limit values’
AQMA	Air Quality Management Area – An area where air pollutant concentrations exceed/are likely to exceed the relevant air quality objectives. AQMAs are declared for specific pollutants and objectives
ASR	Air quality Annual Status Report
Defra	Department for Environment, Food and Rural Affairs
DMRB	Design Manual for Roads and Bridges – Air quality screening tool produced by Highways England
EU	European Union
FDMS	Filter Dynamics Measurement System
LAQM	Local Air Quality Management
NO_2	Nitrogen Dioxide
NO_x	Nitrogen Oxides
PM_{10}	Airborne particulate matter with an aerodynamic diameter of 10µm (micrometres or microns) or less
$PM_{2.5}$	Airborne particulate matter with an aerodynamic diameter of 2.5µm or less
QA/QC	Quality Assurance and Quality Control
SO_2	Sulphur Dioxide

References

(1) Local Air Quality Management – Technical Guidance (TG16), Department for Environment, Food and Rural Affairs 2016.

(2) 2015 Updating and Screening Assessment, Wolverhampton City Council.

(3) 2014 Progress Report, Wolverhampton City Council.

(4) LAQM Tools; Local Air Quality Management website www.airquality.co.uk