



2010 Air Quality Progress Report for *Dudley MBC*

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

April 2010

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Executive Summary

This combined Air Quality and Air Quality Action Plan (AQAP) Progress Report summarises the results of air quality monitoring across the borough and progress with the Brierley Hill AQAP during the 2009 calendar year.

The Council has a statutory duty under the provisions of the Environment Act 1995 to review and assess air quality in their area.

This report reviews the most recent results of the borough wide air pollution monitoring programme which has focused on the pollutants nitrogen dioxide (NO₂), fine particles (PM₁₀) and ozone. Previous monitoring indicated that levels of sulphur dioxide, carbon monoxide, lead, butadiene and benzene easily met current National Air Quality Objectives and no further monitoring of these pollutants was carried out during 2009. The Council has monitored ozone on a voluntary basis but this activity ceased at the end of the year.

New NO₂ monitoring data has broadly confirmed the conclusions of earlier review & assessment reports and ongoing exceedences of the air quality objective were confirmed numerous areas, thereby justifying The Council's decision to declare a borough wide air quality management area (AQMA) in 2007.

The latest results have not identified any requirement to modify the AQMA boundary or to proceed to any further Detailed Assessment of air quality.

Several new or previously unidentified local developments which may impact on air quality in the local authority area have been identified and these will be taken into consideration in the next Updating and Screening Assessment scheduled for 2012.

There has been steady progress with the implementation of the AQAP for the former Brierley Hill AQMA and the majority of improvements to the local road network are now complete. Air quality monitoring in the Brierley Hill area has shown a 16% reduction in NO₂ levels over the lifetime of the current Local Transport Plan. No exceedences of the annual mean objective for NO₂ in areas with relevant exposure were recorded within the original Brierley Hill AQMA during the 2009 calendar year. The LTP indicator of achieving a 1% NO₂ reduction in areas where the AQO is exceeded across the wider West Midlands conurbation is currently on target.

Dudley MBC has now drafted a new borough wide AQAP and proposes to progress formal adoption of this document during 2010. Following this, Dudley MBC proposes to develop an overarching air quality strategy document which links elements of The Council's action plan and carbon management programme.

Further monitoring of air quality will be carried out during 2010 to quantify improvements arising from the new action plan and subsequent progress will be reported in April 2011.

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1 Introduction

1.1 Description of Local Authority Area

Dudley Metropolitan Borough is located centrally in the UK and is surrounded by five other local authorities, namely Sandwell Metropolitan Borough Council (MBC) to the west, Wolverhampton City Council to the north and north west, South Staffordshire Council to the east, Bromsgrove District Council to the south and Birmingham City Council to the south east.

The borough is located within the West Midlands (WM) conurbation, being densely populated with areas of concentrated industry. The six other authorities which comprise the Metropolitan Area include the cities of Birmingham, Coventry and Wolverhampton and the boroughs of Sandwell, Solihull and Walsall. Historically, Dudley MBC has worked closely with the six other WM Authorities in tackling regional air pollution issues as part of the joint WM air quality group (WMAQG).

Dudley Borough covers 9,821 hectares and has a population of approximately 310,000. Along with Walsall, Wolverhampton and Sandwell, Dudley forms part of the Black Country. This is an amalgamation of villages and towns located along the western side of the conurbation which developed during the industrial revolution to create a continuous urban area; typical examples in Dudley include the towns of Halesowen, Stourbridge and Brierley Hill.

The main sources of air pollution in the borough include transportation, emissions from the commercial and domestic sector and local industry.

There are currently over 130 industrial processes operating within Dudley that are regulated under the Environmental Permitting Regulations. These include:

- Twelve Part A1 Processes regulated by the Environment Agency including waste management, combustion, metal processing, chemical processing and carbon regeneration activities, and:
- Six Part A2 Processes comprising 3 manufacturers of ceramic products, 2 ferrous foundries, 1 non-ferrous foundry and over 120 Part B Processes. These categories are currently regulated by Dudley MBC (DMBC).

Further information on the nature and location of processes regulated by DMBC can be obtained via the following link:

<http://gismo.dudley.gov.uk/public/envProt/Permits/Default.asp>

1.2 Purpose of Progress Report

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

They are not intended to be as detailed as USA Reports, or to require as much effort. However, if the Progress Report identifies the risk of exceedence of an Air Quality Objective (AQO), 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 AQOs applicable to LAQM in England are set out in the Air Quality (England) Regulations 2000 (SI 928) and the Air Quality (England) (Amendment) Regulations 2002 (SI 3043). They are shown in Table 1.1. This table shows the objectives in units of microgrammes per cubic metre $\mu\text{g}/\text{m}^3$ (for carbon monoxide the units used are milligrammes per cubic metre, mg/m^3). Table 1 includes the number of permitted exceedences in any given year (where applicable).

Table 1 Air Quality Objectives

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

A further AQO relating to ozone is also included in these regulations; however, this is considered as a long range, transboundary pollutant, therefore responsibility is administered at central government rather than local authority level. DMBC has historically undertaken some monitoring of ozone on a voluntary basis (See 2.25).

1.4 Summary of Previous Review and Assessments

The latest technical and policy guidance documents LAQM.TG (09) and LAQM.PG(09), issued in February 2009 by the Department of the Environment, Food and Rural Affairs (DEFRA), set out timescales for submission of the air quality documents required under the LAQM regime [1,2].

The Review & Assessment programme is set out in 3 year cycles and commenced in 2000. DMBC has published a number of documents as part of its ongoing statutory LAQM obligations (Table 2) and previous Review & Assessment reports can be downloaded from DMBC website via the following link:

<http://www.dudley.gov.uk/environment--planning/pollution-control/air-quality>

Table 2 Previously Published LAQM Reports

Dudley LAQM Key Documents			
Year	Title	Submission Date	LAQM Details
2003	Updating & Screening Assessment	Apr-2003	Round 2
2004	Detailed Assessment (DA)	Apr-2004	Round 2
2005	Annual Progress Report (APR)	Apr-2005	Round 2
2006	Updating and Screening Assessment	May-2006	Round 3
2007	Detailed Assessment	Jun-2007	Round 3
2008	Annual Progress Report	May-2008	Round 3
2009	Updating & Screening Assessment	Jul-2009	Round 4
2010	Air Quality Action Plan- Consultation Draft	Feb-2010	-
2010	Further Assessment of Air Quality	Feb-2010	-
2010	Detailed Assessment of PM ₁₀ Emissions From Three Wood Burning Installations	Apr-2010	Round 4

During the previous rounds of Review & Assessment, DMBC declared its first AQMA in 2003 following confirmation of exceedences of the annual mean nitrogen dioxide (NO₂) AQO in the Brierley Hill area. NO₂ is one of the oxides of nitrogen (NO_x) identified as having an adverse affect on health by the World Health Organisation (WHO). Oxides of nitrogen can be generated by any combustion process including electricity generation, commercial and domestic heating or by the internal combustion engine, typically associated with motor vehicles.

Following identification of non compliance areas in Brierley Hill, an air quality action plan (AQAP) was published in 2004 which contained a number of key measures to improve air quality. These included the construction of a new parallel route and implementation of local travel plans as part of the Brierley Hill Sustainable Access Network (BHSAN). The parallel route was substantially completed in October 2008 and monitoring of air quality and other proxy indicators continues within the Brierley Hill area to establish the extent of any further remedial action required. An update on the implementation of the Brierley Hill AQAP is provided in Section 9 of this report.

Following the 2004 Detailed Assessment, DMBC declared a second AQMA in Sedgley in May 2005 and a further six areas of exceedence of the annual mean NO₂ AQO were identified in the 2006 USA including Netherton, Cradley, Halesowen, Wordsley, Pensnett, Quarry Bank and Lye.

The 2007 Detailed Assessment confirmed additional new exceedences in Halesowen and Lower Gornal. At this stage, DMBC proposed the creation of a new borough wide AQMA to include the amalgamation of the two existing AQMAs in Brierley Hill and Sedgley. These proposals were subject to consultation with the general public, external stakeholders and via DMBC's local area committee meetings. DEFRA also endorsed these proposals in their feedback on the 2007 Detailed Assessment Report.

The Dudley Borough AQMA was declared in December 2007 with respect to exceedences of both the annual mean and short term NO₂ AQOs. The declaration revoked the former AQMAs in Brierley and Sedgley, thereby enabling DMBC to adopt a more consolidated approach towards the action planning process.

A Further Assessment of Air Quality [3] has now been completed and was submitted to DEFRA in February 2010. This document contains the technical evidence to support the declaration of the AQMA and identifies 15 areas of the borough where exceedences of the annual mean NO₂ objective have been positively identified. These locations included those identified prior to the borough AQMA declaration and several identified in the subsequent 2008 APR and 2009 USA [4,5]. Further information is provided in Table 3 and Figure 1, which shows the geographic setting of these locations in relation to the borough AQMA boundary.

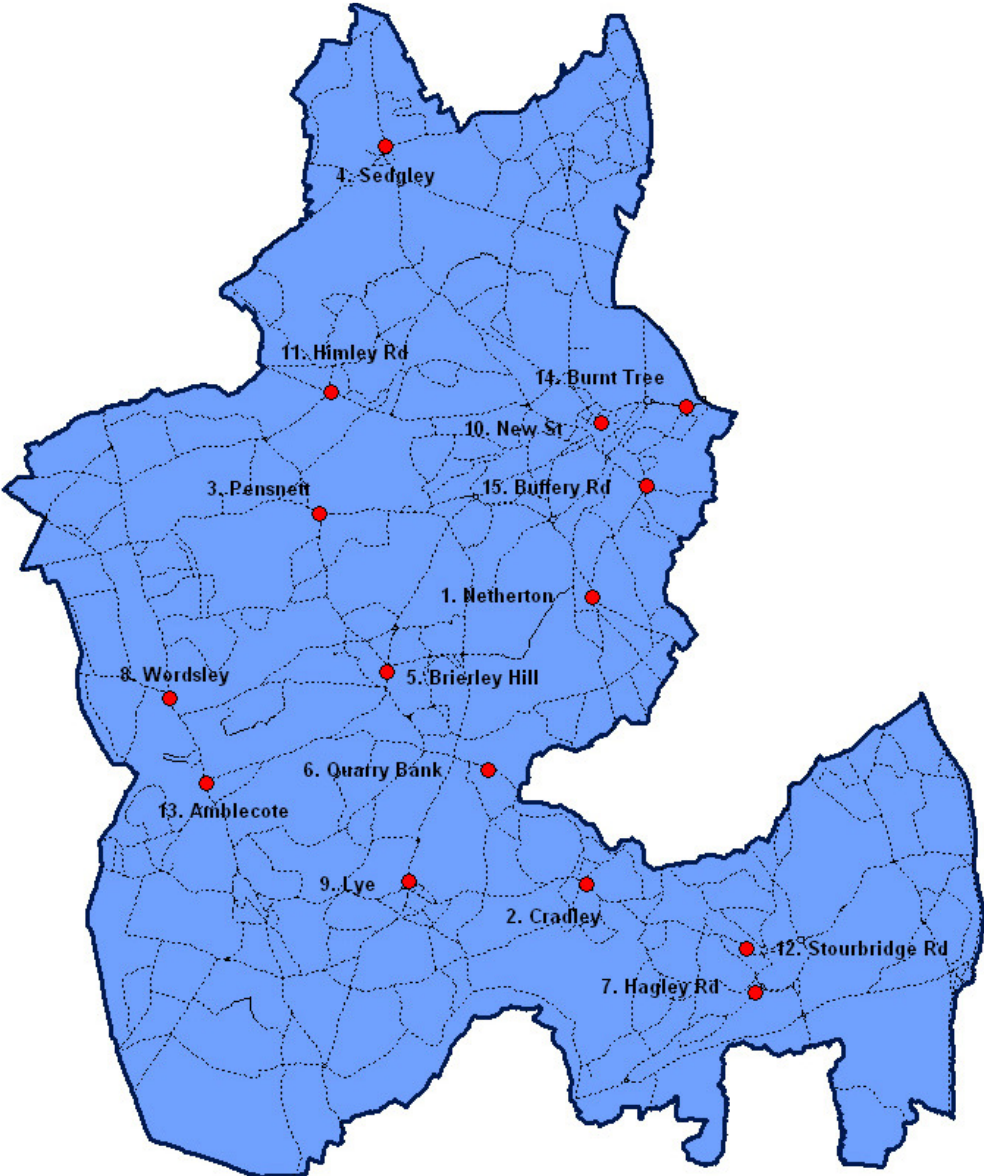
Table 3 Locations Where the Annual Mean AQO for NO₂ Is Currently Being Exceeded

DMBC NO ₂ Exceedence Areas	
Area	Description
1	Netherton
2	Cradley
3	Pensnett
4	Sedgley
5	Brierley Hill
6	Quarry Bank
7	Hagley Road, Halesowen
8	Wordsley
9	Lye
10	New Street, Dudley
11	Himley Road, Lower Gornal
12	Stourbridge Road, Halesowen
13	Amblecote
14	Birmingham Road near to Burnt Tree Island
15	Buffery Road

Levels of greater than 60µg/m³ NO₂ have been recorded at two of the exceedence locations, Areas 1 and 8. LAQM.TG(09) and LAQM.PG(09) suggest that NO₂ concentrations above this level may give rise to additional exceedences of the short term AQO, creating additional risks for receptors that might be exposed for periods of one hour or more (e.g. people shopping in a busy street or sitting at a pavement café). The AQMA declaration therefore included exceedences of both NO₂ AQOs as a precautionary measure until further work could be undertaken to investigate possible exceedences of the short term AQO. However, dispersion modelling undertaken as part of the 2010 Further Assessment of air quality was unable to confirm whether exceedences of the short term objective are likely at these locations and further monitoring of NO₂ using automated detectors will now be required. In addition to completing this work, Dudley MBC has also submitted a Detailed Assessment of fine particulate (PM₁₀) emissions from a number of biomass boilers identified in the 2009 USA.

Dudley MBC has now prepared a draft AQAP to address these air quality issues and this was submitted to DEFRA in February 2010 for further comment [6]. Following initial appraisal of the draft action plan, consultation with a wide range of stakeholders will be undertaken during the second quarter of 2010.

Figure 1 Dudley Borough AQMA



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2 New Monitoring Data

2.1 Summary of Monitoring Undertaken

2.1.1 Automatic Monitoring Sites

During the 2009 calendar year, there were four automatic monitoring sites in Dudley Borough (Table 4, Figure 2). These were used for monitoring a range of pollutants including nitric oxide, nitrogen dioxide and total oxides of nitrogen (NO/NO₂/NO_x), fine particulates (PM₁₀) and ozone (O₃):

- **Central Dudley, Ednam Road, monitoring NO/NO₂/NO_x, O₃ and PM₁₀.** Classified as an urban background site, this is The Council's most long running station and has been established at its current location since 1999. Subsequent failure of the O₃ instrument during the first quarter of 2010 meant that monitoring of O₃ at this site was effectively terminated at the end of the 2009. DMBC will not be replacing this instrument due to financial considerations.
- **Illey, monitoring NO/NO₂/NO_x and PM₁₀.** The equipment was housed in a mobile groundhog trailer and was formerly used in a number of shorter term projects at locations in Cradley, Brierley Hill and Dudley. Monitoring had been carried out at this location, classified as rural background, since 2007, and the data was primarily used in dispersion modelling applications. The station was decommissioned at the end of the 2009 calendar year because DMBC had insufficient funds to justify monitoring at a rural background location.
- **Colley Gate, Cradley, monitoring NO/NO₂/NO_x and PM₁₀.** This roadside monitoring station has been operational since 2006 and monitors roadside pollution levels in one of the areas where the annual mean NO₂ objective has been exceeded.
- **High Street, Brierley Hill Rose (a roadside site) monitoring NO/NO₂/NO_x and PM₁₀.** This station has been operational since 2008 and has been installed to assist in the quantification of air quality improvements in the former Brierley Hill AQMA as a result of executing the AQAP. The mobile groundhog trailer had formerly been located a short distance away, in Level Street car park, between 2002 and 2006.

Full details of current stations can be obtained from The Council website via the following link:

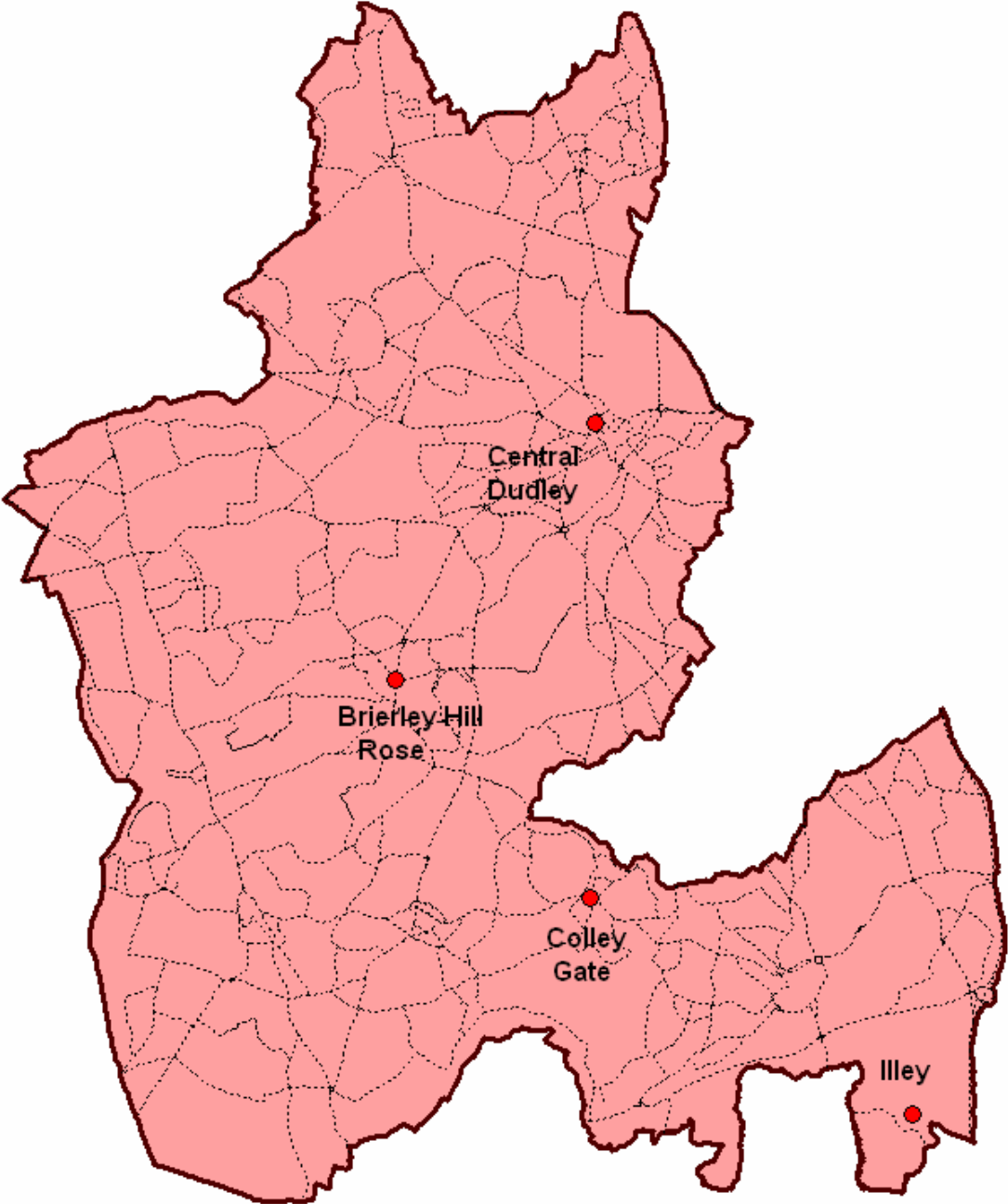
<http://www.dudley.gov.uk/environment--planning/pollution-control/air-quality/monitoring-of-air-quality>

The latest pollution data can also be accessed via WMAIR, a website which has been set up in joint collaboration with The Councils of Birmingham, Coventry, Sandwell, Solihull, Walsall and Wolverhampton to display up to date air quality information from across the West Midlands area:

<http://www.wmair.org/>

Measurement of NO, NO₂ and NO_x was performed at all stations using API chemiluminescent monitors and PM₁₀ was measured using tapered elemental oscillating microbalances (or TEOMs) corrected using the King's College Volatile Correction Model (VCM). All monitoring equipment was held within air conditioned enclosures and operated using local procedures based on national guidance protocols. Full QA/QC procedures are provided in Appendix A.

Figure 2 Map of Automatic Monitoring Sites



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Table 4 Details of Automatic Monitoring Sites

Dudley MBC Current Instrumental Monitoring Stations									
Site Name	Site Type	OS Grid Ref		Pollutants Monitored	Monitoring Technique	In AQMA ?	Relevant Exposure? (Y/N with distance (m) to relevant exposure)	Distance to kerb of nearest road (N/A if not applicable)	Does this location represent worst-case exposure?
Central Dudley	Urban background	394291	290460	NO ₂	Chemiluminescent	Y	No	N/A	N/A
Central Dudley	Urban background	394291	290460	PM ₁₀	TEOM _(VCM)	Y	No	N/A	N/A
Illey	Rural background	398191	281977	NO ₂	Chemiluminescent	Y	57 m	N/A	N/A
Illey	Rural background	398191	281977	PM ₁₀	TEOM _(VCM)	Y	57 m	N/A	N/A
Colley Gate	Roadside	394243	284626	NO ₂	Chemiluminescent	Y	21m	3.5	No
Colley Gate	Roadside	394243	284626	PM ₁₀	TEOM _(VCM)	Y	21m	3.5	No
Brierley Hill Rose	Roadside	391861	287296	NO ₂	Chemiluminescent	Y	28m	3.5	No
Brierley Hill Rose	Roadside	391861	287296	PM ₁₀	TEOM _(VCM)	Y	28m	3.5	No

Notes

- 1 Relevant exposure includes residential properties, schools, hospitals, care homes etc. Further guidance is provided in LAQM.TG (09) Box 1.4
- 2 AQMA has been declared on the basis of both the annual and 1-hour mean objectives for NO₂ only

2.1.2 Non-Automatic Monitoring

Dudley MBC continues to supplement monitoring carried out at the automated sites with a network of diffusion tubes located at over 150 strategic points across the borough. Currently, monitoring at these sites is carried out for NO₂ only. A full description of current monitoring sites is given in Table 5.

It should be noted that a number of sites, indicated in red, were discontinued by the end of the 2009 calendar year to enable monitoring at new sites identified in the 2009 USA. The new sites will be covered in the 2011 Progress Report.

DMBC has additionally developed the corporate website to provide an interactive diffusion tube map which gives further information on the geographic location of the diffusion tubes. Historic measurement data can also be downloaded from this site including data from discontinued and current diffusion tube surveys. Please follow the link given below:

<http://gismo.dudley.gov.uk/public/envprot/no2/default.asp>

Full details regarding QA/QC procedures are provided in Appendix A.

Table 5 Details of Non- Automatic Monitoring Sites

Dudley MBC Diffusion Tube Sites									
Site Ref	Site Name	Site Type	OS Grid Ref		Pollutants Monitored	In AQMA?	Relevant Exposure? (Y/N with distance (m) to relevant exposure)	Distance to kerb of nearest road (N/A if not applicable)	Worst-case Location?
20	Castle Street Coseley	R	394117	293687	NO ₂	Y	Y (8m)	1.3	Yes
17b	Evergreen Close, Coseley	UB	393909	293821	NO ₂	Y	Y (8m)	N/A	
13	Padarn Close Coseley	S	391105	293975	NO ₂	Y	Y (3m)	N/A	
32	Dudley Street, Sedgley	R	391853	293650	NO ₂	Y	Y (4m)	2.6	
32a	Dudley Street, Sedgley	R	391826	293685	NO ₂	Y	No	2.1	No
32b	Dudley Street, Sedgley	R	391875	293659	NO ₂	Y	No	2.7	
32e	High Street, Sedgley	R	391823	293788	NO ₂	Y	Y(0m)	2.9	
32f	High Street, Sedgley	R	391825	293830	NO ₂	Y	Y(10m)	1.2	
32r	Bilston Street, Sedgley	R	391867	293840	NO ₂	Y	Y (0m)	4.1	
54	Himley Rd Gornal Wood	R	391159	290740	NO ₂	Y	Y(0m)	2.4	
54ax	The Spinney, Gornal Wood	S	391165	290665	NO ₂	Y	Y(7m)	N/A	
54b	Cinder Road Gornal Wood	R	391103	290711	NO ₂	Y	Y(10m)	2.2	
56	Louise Street, Lower Gornal	R	391183	291078	NO ₂	Y	Y(48m)	1.5	
35x	Prospect Row, Dudley	UB	394693	289709	NO ₂	Y	No	N/A	
36	Blowers Green Road, Dudley	UB	393981	289733	NO ₂	Y	No	N/A	
10-10b	Central Dudley AQMS	UB	394294	290459	NO ₂	Y	Y(75m)	30	
5mx	High Street, Dudley	UC	394469	290264	NO ₂	Y	No	22	
5my	High Street, Dudley	UC	394556	290344	NO ₂	Y	No	5.5	
5r	New Street, Dudley	UC	394433	290433	NO ₂	Y	No	1.7	

Table 5 Details of Non- Automatic Monitoring Sites

Dudley MBC Diffusion Tube Sites									
Site Ref	Site Name	Site Type	OS Grid Ref		Pollutants Monitored	In AQMA?	Relevant Exposure? (Y/N with distance (m) to relevant exposure)	Distance to kerb of nearest road (N/A if not applicable)	Worst-case Location?
5s	New Street, Dudley	UC	394458	290409	NO ₂	Y	Y(10m)	1.6	
5t	New Street, Dudley	UC	394483	290404	NO ₂	Y	Y(0.5m)	0.8	
5w	New Street, Dudley	UC	394530	290358	NO ₂	Y	Y(0.5m)	1.7	Yes
KA	Birmingham New Road, Dudley	R	394340	292128	NO ₂	Y	No	7.2	Yes
61	High Street, Dudley	R	394080	290001	NO ₂	Y	Y(35m)	2.5	Yes
61b	High Street, Dudley	UC	394319	290164	NO ₂	Y	Y(20m)	1	Yes
61d	Wolverhampton Street, Dudley	UC	394328	290268	NO ₂	Y	No	1.8	Yes
61g	Priory Street, Dudley	UC	394308	290313	NO ₂	Y	Y(1m)	2.5	Yes
62	Birmingham Road, Dudley	R	395762	290575	NO ₂	Y	Y(10m)	14	
62a	Birmingham Road, Dudley	R	395831	290595	NO ₂	Y	Y(0m)	13	
62b	Birmingham Road, Dudley	R	395597	290560	NO ₂	Y	Y (0m)	6.5	Yes
24	King Charles Road, Halesowen	S	398864	283989	NO ₂	Y	Y (0m)	11	
24a	Long Lane, Halesowen	R	397836	285837	NO ₂	Y	Y (0m)	2.6	Yes
24c	Long Lane, Halesowen	R	397639	286104	NO ₂	Y	Y(0m)	2.4	
24d	Long Lane, Halesowen	R	397796	285859	NO ₂	Y	Y(0m)	2.4	
25a-c	Illey AQMS . Illey	B	398192	281981	NO ₂	Y	Y(60m)	N/A	
19b	Wesson Gardens, Halesowen	R	396476	283356	NO ₂	Y	Y(0m)	8.9	
19c	Wesson Gardens, Halesowen	R	396504	283331	NO ₂	Y	Y(0m)	8	
19d	Hagley Road Halesowen	R	396492	283262	NO ₂	Y	Y(0m)	2.9	
19e	Hagley Road Halesowen	R	396462	283211	NO ₂	Y	Y(0m)	2.8	Yes
19f	Hagley Road Halesowen	R	396484	283238	NO ₂	Y	Y(0m)	2.4	
15	Stourbridge Road, Halesowen	R	396353	283768	NO ₂	Y	Y(0m)	3	Yes

Table 5 Details of Non- Automatic Monitoring Sites

Dudley MBC Diffusion Tube Sites									
Site Ref	Site Name	Site Type	OS Grid Ref		Pollutants Monitored	In AQMA?	Relevant Exposure? (Y/N with distance (m) to relevant exposure)	Distance to kerb of nearest road (N/A if not applicable)	Worst-case Location?
15a	Stourbridge Road, Halesowen	R	396392	283752	NO ₂	Y	Y(0m)	2.4	
15b	Stourbridge Road, Halesowen	R	396040	283927	NO ₂	Y	Y(35m)	1.5	No
3	Drews Holloway, Halesowen	S	394678	284294	NO ₂	Y	Y(0m)	40	
3k	Drews Holloway, Halesowen	S	394699	284291	NO ₂	Y	Y(0m)	47	
3a	Drews Holloway, Halesowen	R	394550	284373	NO ₂	Y	Y(0m)	4.3	
3b	Windmill Hill, Halesowen	R	394495	284412	NO ₂	Y	Y(0m)	4.8	Probably
3c	Windmill Hill, Halesowen	R	394506	284423	NO ₂	Y	Y(0m)	4	
3d	Windmill Hill, Halesowen	R	394423	284504	NO ₂	Y	Y(0m)	3.9	
3e	Windmill Hill, Halesowen	R	394384	284543	NO ₂	Y	Y(0m)	2.7	
3g	Windmill Hill, Halesowen	R	394348	284571	NO ₂	Y	Y(0m)	0.9	Probably
3gx	Windmill Hill, Halesowen	R	394321	284596	NO ₂	Y	Y(0m)	2.1	
3r-t	Colley Gate AQMS, Halesowen	R	394236	284627	NO ₂	Y	No	3.5	
18	Hawthorne Road, Hayley Green	S	395135	282662	NO ₂	Y	Y(0m)	16	
11	High St, Lye	R	392172	284482	NO ₂	Y	Y(5m)	2.3	Yes
11b	High St, Lye	R	392248	284426	NO ₂	Y	Y(0m)	1.4	
11c	High St, Lye	R	392297	284409	NO ₂	Y	Y(0m)	2.4	
50aX	Dudley Road, Lye	R	392133	284610	NO ₂	Y	Y(0m)	3.2	Yes
50d	Pedmore Road, Lye	R	392087	284310	NO ₂	Y	Y(0m)	4	
50x	Pedmore Road, Lye	R	392042	284251	NO ₂	Y	Y(0m)	10.8	
50e	Pedmore Road, Lye	R	392005	284144	NO ₂	Y	Y(0m)	2.8	
50j	Pedmore Road, Lye	R	392041	284221	NO ₂	Y	Y(6m)	2.8	
50z	Shepherds Brook playing field, Lye	UB	391627	284222	NO ₂	Y	No	N/A	

Table 5 Details of Non- Automatic Monitoring Sites

Dudley MBC Diffusion Tube Sites									
Site Ref	Site Name	Site Type	OS Grid Ref		Pollutants Monitored	In AQMA?	Relevant Exposure? (Y/N with distance (m) to relevant exposure)	Distance to kerb of nearest road (N/A if not applicable)	Worst-case Location?
51	Morvale Gardens, Lye	UB	392155	284349	NO ₂	Y	Y(0m)	18	
4	Junction Road, Stourbridge	UB	390718	X Y	NO ₂	Y	Y(0m)	16	
21c	Clent View, Stourbridge	S	388457	282895	NO ₂	Y	Y(8m)	1.3	
21b	Heath Lane, Stourbridge	R	390535	283273	NO ₂	Y	No	2	
2	Penrith Close, Amblecote	S	390932	285887	NO ₂	Y	Y(0m)	N/A	
52	High Street, Amblecote	R	389913	285055	NO ₂	Y	Y(0m)	4.8	
52a	High Street, Amblecote	R	389945	284995	NO ₂	Y	Y(9m)	3.3	?
53	High Street, Amblecote	R	389593	285840	NO ₂	Y	Y(0m)	1.9	Yes
16b	High Street, Stourbridge	R	390141	284350	NO ₂	Y	Y(0m)	1.3	Yes
16c	High Street, Stourbridge	R	390275	284286	NO ₂	Y	Y(0m)	3.3	
34a/ax	High Street, Wordsley	R	389135	286893	NO ₂	Y	Y (0.5)	3.2	
34ay	High Street, Wordsley	R	389133	286910	NO ₂	Y	Y (0)	1.6	No
34c	off High Street, Wordsley	UB	389105	286877	NO ₂	Y	Y(8m)	N/A	
34d	High Street, Wordsley	R	389181	286772	NO ₂	Y	Y (25m)	2.6	
34fx	High Street, Wordsley	R	389245	286666	NO ₂	Y	Y(2m)	3	
22	Vernier Avenue, Kingswinford	UB	390016	288426	NO ₂	Y	Y (0m)	N/A	
31g	Moss Grove, Kingswinford	R	388615	288958	NO ₂	Y	Y(0m)	5.7	
31bx	Barnett Lane, Kingswinford	S	388616	288054	NO ₂	Y	No	1.4	
31m	Market Street, Kingswinford	R	388796	288735	NO ₂	Y	Y9(m)	2.9	Yes
29	Commonside, Pensnett	UB	391075	288467	NO ₂	Y	Y (0m)	25	
33	High Street, Pensnett	R	390989	289254	NO ₂	Y	Y (0m)	6.5	
33b&c	High Street, Pensnett	R	391077	289235	NO ₂	Y	Y (0m)	6.8	

Table 5 Details of Non- Automatic Monitoring Sites

Dudley MBC Diffusion Tube Sites									
Site Ref	Site Name	Site Type	OS Grid Ref		Pollutants Monitored	In AQMA?	Relevant Exposure? (Y/N with distance (m) to relevant exposure)	Distance to kerb of nearest road (N/A if not applicable)	Worst-case Location?
33d	High Street, Pensnett	R	391110	289208	NO ₂	Y	Y (0m)	6.8	
33ex	Birds Meadow, Pensnett	S	391027	289410	NO ₂	Y	Y (0m)	1.9	
33f	High Street, Pensnett	R	390993	289231	NO ₂	Y	Y (0m)	4	
33g	19 Bradley Street, Pensnett	R	390986	289195	NO ₂	Y	Y (0m)	5.7	
33h	High Street, Pensnett	R	391155	289210	NO ₂	Y	Y (0m)	7.6	
33k	Tansey Green Road, Pensnett	R	390870	289328	NO ₂	Y	Y (0m)	4.2	
33p	High Street, Pensnett	R	391017	289224	NO ₂	Y	Y (0m)	3.8	Yes
37	High Street, Pensnett	R	391727	289271	NO ₂	Y	Y (0m)	3.1	
60	Belper Row, Netherton	UB	395215	287554	NO ₂	Y	Y (0m)	2	
27b	Halesowen Road, Netherton	R	394429	288239	NO ₂	Y	Y (0m)	6	
27c	Halesowen Road, Netherton	R	394439	288070	NO ₂	Y	No	1.1	
27f	Cradley Road, Netherton	R	394484	287962	NO ₂	Y	Y (0m)	2.8	
27g	Halesowen Road, Netherton	R	394417	288178	NO ₂	Y	Y (0m)	1.5	
27gX	Halesowen Road, Netherton	R	394417	288171	NO ₂	Y	Y (0m)	1.5	Yes
27j	Halesowen Road, Netherton	R	394416	288169	NO ₂	Y	Y (0m)	1.6	
27k	Halesowen Road, Netherton	R	394415	288137	NO ₂	Y	Y (3m)	2.5	
27n	Halesowen Road, Netherton	R	394435	288201	NO ₂	Y	Y (0m)	5	
27p	Halesowen Road, Netherton	R	394474	288029	NO ₂	Y	Y (0m)	2.7	
27t	Halesowen Road, Netherton	R	394466	288037	NO ₂	Y	Y (0m)	2.4	
27q	Castleton Street, Netherton	R	394411	288046	NO ₂	Y	Y (0m)	1.4	
63	Cinder Bank, Netherton	R	394182	288773	NO ₂	Y	Y (0m)	6.1	
63a	Cinder Bank, Netherton	R	394370	288372	NO ₂	Y	Y (0m)	4.7	

Table 5 Details of Non- Automatic Monitoring Sites

Dudley MBC Diffusion Tube Sites									
Site Ref	Site Name	Site Type	OS Grid Ref		Pollutants Monitored	In AQMA?	Relevant Exposure? (Y/N with distance (m) to relevant exposure)	Distance to kerb of nearest road (N/A if not applicable)	Worst-case Location?
63b	Cinder Bank, Netherton	R	394354	288360	NO ₂	Y	No	3.7	
30	High Street, Quarry Bank	R	393125	286009	NO ₂	Y	Y (0m)	2.7	
30ax	High Street, Quarry Bank	R	393093	286040	NO ₂	Y	Y (13m)	5.8	
30dx	High Street, Quarry Bank	R	393038	286060	NO ₂	Y	Y (0m)	3.4	
30eX	High Street, Quarry Bank	R	392976	286070	NO ₂	Y	Y (3m)	2.3	
30g	High Street, Quarry Bank	R	392943	286098	NO ₂	Y	Y (0m)	2.3	
30m	High Street, Quarry Bank	R	393162	285997	NO ₂	Y	Y (0m)	2.4	Yes
30t	King Street, Quarry Bank	UB	393038	285843	NO ₂	Y	Y (6m)	1.6	
14	High Street, Brierley Hill	R	391845	287081	NO ₂	Y	Y (40m)	4.8	
14a	High Street, Brierley Hill	R	391859	287232	NO ₂	Y	Y(0m)	3.1	
14b	High Street, Brierley Hill	R	391870	287149	NO ₂	Y	No	1	Yes
14d	High Street, Brierley Hill	R	391863	287101	NO ₂	Y	Y (1m)	2.1	
14r-t	Brierley Hill Rose AQMS	R	391860	287297	NO ₂	Y	Y (30m)	3.5	No
41c	John Street, Brierley Hill.	R	391631	287607	NO ₂	Y	Y (0m)	5.8	
42	Bank Street, Brierley Hill.	R	391806	287383	NO ₂	Y	Y (1.6m)	1.7	
42ax	Bank Street, Brierley Hill.	R	391696	287482	NO ₂	Y	Y (0m)	3.5	
42bx	Bank Street, Brierley Hill.	R	391630	287609	NO ₂	Y	Y (0m)	9	
43	Dudley Road, Brierley Hill.	R	391886	287554	NO ₂	Y	Y (3m)	3.7	
43a	Dudley Road, Brierley Hill.	R	391869	287397	NO ₂	Y	Y (0m)	3.4	Yes
43ax	Dudley Road, Brierley Hill.	R	391877	287482	NO ₂	Y	Y (1.7m)	3.7	
43b	Dudley Road, Brierley Hill.	R	391895	287474	NO ₂	Y	T (5.3m)	4.3	
45	Mill Street, Brierley Hill.	R	391861	286992	NO ₂	Y	Y (10m)	2	

Table 5 Details of Non- Automatic Monitoring Sites

Dudley MBC Diffusion Tube Sites									
Site Ref	Site Name	Site Type	OS Grid Ref		Pollutants Monitored	In AQMA?	Relevant Exposure? (Y/N with distance (m) to relevant exposure)	Distance to kerb of nearest road (N/A if not applicable)	Worst-case Location?
45b	Mill Street, Brierley Hill.	R	391899	286932	NO ₂	Y	No	1.8	
45c	Mill Street, Brierley Hill.	R	391890	286967	NO ₂	Y	Y	1.9	Yes
46a	Moor Street, Brierley Hill.	R	391769	287056	NO ₂	Y	Y(0m)	1.6	
47	High Street, Brierley Hill	R	391840	286954	NO ₂	Y	Y (4m)	3.8	
47b	High Street, Brierley Hill	R	391815	286923	NO ₂	Y	Y (6m)	3.5	Yes
47d	High Street, Brierley Hill	R	391815	286882	NO ₂	Y	Y (10m)	5.4	
49	Talbot Street, Brierley Hill	UB	391678	287306	NO ₂	Y	Y(2m)	1.7	
49b	Cottage Street, Brierley Hill	UB	392016	287051	NO ₂	Y	No	12	
10	Dudley AQMS	UB	394294	290459	NO ₂	Y	Y (75m)	30	
10a	Dudley AQMS	UB	394294	290459	NO ₂	Y	Y (75m)	30	
10b	Dudley AQMS	UB	394294	290459	NO ₂	Y	Y (75m)	30	
3r	Colley Gate AQMS	R	394236	284627	NO ₂	Y	No	3.5	
3s	Colley Gate AQMS	R	394236	284627	NO ₂	Y	No	3.5	
3t	Colley Gate AQMS	R	394236	284627	NO ₂	Y	No	3.5	
25a	Illey AQMS	B	398192	281981	NO ₂	Y	Y (60m)	N/A	
25b	Illey AQMS	B	398192	281981	NO ₂	Y	Y (60m)	N/A	
25c	Illey AQMS	B	398192	281981	NO ₂	Y	Y (60m)	N/A	
14r	Brierley Hill Rose AQMS	R	391860	287297	NO ₂	Y	Y (30m)	3.5	No
14s	Brierley Hill Rose AQMS	R	391860	287297	NO ₂	Y	Y (30m)	3.5	No
14t	Brierley Hill Rose AQMS	R	391860	287297	NO ₂	Y	Y (30m)	3.5	No

Notes- Sites indicated in red were discontinued by the end of the 2009 calendar year to enable monitoring at new sites identified in the 2009 USA

2.2 Comparison of Monitoring Results with Air Quality Objectives

2.2.1 Nitrogen Dioxide

Automatic Monitoring Data

During 2009, Dudley MBC undertook continuous monitoring of NO₂ levels at four separate locations: Central Dudley, Illey, Colley Gate and Brierley Hill Rose. All locations are representative of public exposure.

Results of the 2009 monitoring programme are summarised in Tables 6 and 7. These data have been ratified using LAQM.TG (09) procedures as summarised in Appendix 1. The results confirmed:

- Good data capture at all locations (>90% for the period monitored)
- An exceedence of the 40 µg/m³ annual mean NO₂ objective at Colley Gate, with similar observations recorded during 2007 and 2008
- No one 1-hour means above 200 µg/m³ were recorded at any of the automated stations, i.e. there were no exceedences of the 1-hour mean NO₂ objective.

Table 6 Results of Automatic Monitoring for NO₂: Comparison with Annual Mean Objective

NO ₂ Automated Monitoring Results							
Site ID	Location	Within AQMA?	Data Capture for monitoring period %	Data Capture for full calendar year 2009 %	Annual mean concentrations (µg/m ³)		
					2007	2008	2009
Central Dudley	7 Ednam Road, Dudley	Yes	N/A	99.4	29.8 ¹	27.9	27.2
Illey	Illey, Nr Halesowen	Yes	N/A	98.0	18.5 ²	16.7	17.0
Colley Gate	Halesowen	Yes	N/A	99.7	43.4	41.3	40.2
Brierley Hill Rose	High Street, Brierley Hill	Yes	N/A	99.6	N/A	N/A	38.1

Notes

- 1 Data capture 88.9% due to air conditioner fault June/July 2007
- 2 Data capture 76.3% because monitoring commenced March 2007

Table 7 Results of Automatic Monitoring for NO₂: Comparison with 1-hour Mean Objective

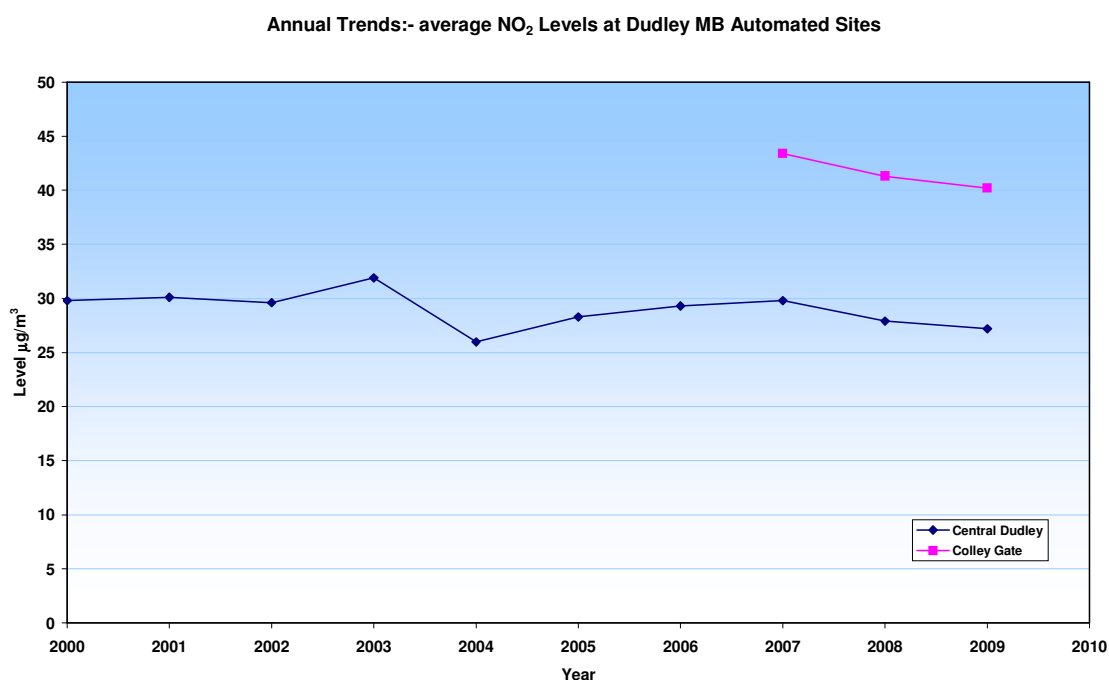
NO ₂ Automated Monitoring Results							
Site ID	Location	Within AQMA?	Data Capture for monitoring period %	Data Capture for full calendar year 2009 %	Number of Exceedences of hourly mean (200 µg/m ³)		
					2007	2008	2009
Central Dudley	7 Ednam Road, Dudley	Yes	N/A	99.41	0 (97.24)	1	0
Illey	Illey, Nr Halesowen	Yes	N/A	98.04	0 (84.36)	0	0
Colley Gate	Halesowen	Yes	N/A	99.63	0	1	0
Brierley Hill Rose	High Street, Brierley Hill	Yes	N/A	99.55	N/A	N/A	0

Notes

1 If the period of valid data was less than 90% of a full year, the 99.8th percentile of hourly means is provided in brackets.

Trend graphs for Dudley MBC’s two longest running automated monitoring sites are presented in Figure 3.

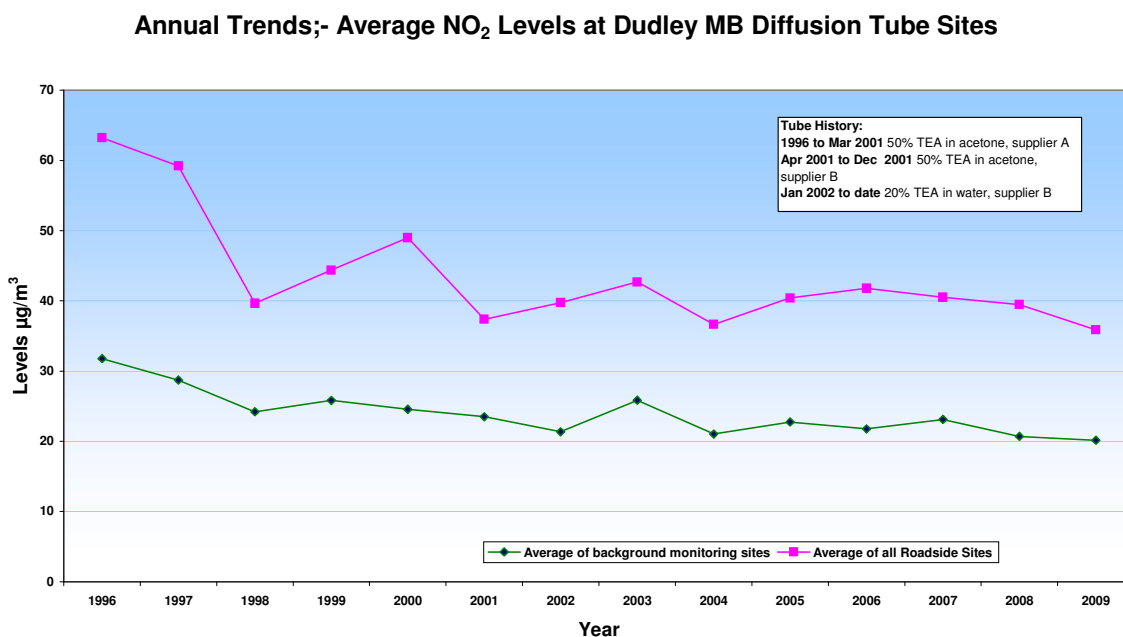
Figure 3 Trends in Annual Mean NO₂ Concentrations Measured at Automatic Monitoring Sites



Diffusion Tube Monitoring Data

Average results for nitrogen dioxide concentrations measured from diffusion tubes located across the borough are given in Figure 4. Results have been calculated from the mean concentrations measured at roadside and background locations. The results indicate a sharp initial decrease with evidence of recent stabilisation apart from the high values obtained in 2003. It should also be noted that minor changes of supplier and tube type are indicated on the graph and may also have contributed toward the general trend.

Figure 4 Trends in Annual Mean NO₂ Concentrations at Diffusion Tube Monitoring Sites



Results of the 2009 NO₂ monitoring programme are summarised in Table 8. These data have been bias adjusted using a national bias adjustment factor of 0.90 calculated using spreadsheet version 03/10 (see Appendix A) and exceedences of the annual mean objective for NO₂ are highlighted in bold type. Any sites with data capture of less than 75% have been omitted from this table. For additional information, the full 2009 diffusion tube data set is provided in Appendix B.

Table 8 Results of Nitrogen Dioxide Diffusion Tubes

Diffusion Tube Monitoring Data						
Site ID	Location	Within AQMA?	Data Capture for full calendar year 2009 ^b %	Annual mean concentrations ($\mu\text{g}/\text{m}^3$)		
				2007	2008	2009
20	Castle Street Coseley	Y	100	31.0	32.8	31.5
17b	Evergreen Close, Coseley	Y	100	22.4	23.4	22.1
13	Padarn Close Coseley	Y	-	15.0	21.6	17.8
32	Dudley Street, Sedgley	Y	100	42.0	42.7	41.9
32a	Dudley Street, Sedgley	Y	100	49.4	50.1	50.1
32b	Dudley Street, Sedgley	Y	100	45.1	41.4	42.8
32e	High Street, Sedgley	Y	100	40.8	42.5	42.6
32f	High Street, Sedgley	Y	100	42.5	45.8	44.6
32r	Bilston Street, Sedgley	Y	100	38.9	38.4	36.2
54	Himley Rd Gornal Wood	Y	100	39.5	44.1	39.7
54ax	The Spinney, Gornal Wood	Y	100	31.4	21.4	19.8
54b	Cinder Road Gornal Wood	Y	83	29.4	30.0	29.4
56	Louise Street, Lower Gornal	Y	100	32.3	34.4	31.2
35x	Prospect Row, Dudley	Y	100	26.5	24.7	24.6
36	Blowers Green Road, Dudley	Y	92	24.5	23.2	23.5
10-10b	Central Dudley AQMS	Y	100	26.6	25.1	26.7
5mx	High Street, Dudley	Y	100	32.3	36.1	36.4
5my	High Street, Dudley	Y	83	36.7	37.4	32.8
5r	New Street, Dudley	Y	83	36.9	37.8	35.8
5s	New Street, Dudley	Y	100	41.6	38.1	41.5
5t	New Street, Dudley	Y	92	37.8	38.7	39.4
5w	New Street, Dudley	Y	100	42.6	41.0	41.7
KA	Birmingham New Road, Dudley	Y	92	-	38.5	37.3
61	High Street, Dudley	Y	100	-	28.6	28.4
61b	High Street, Dudley	Y	83	-	31.6	32.2
61d	Wolverhampton Street, Dudley	Y	100	-	34.3	32.4
61g	Priory Street, Dudley	Y	83	-	31.1	31.9
62	Birmingham Road, Dudley	Y	100	-	36.0	37.1
62a	Birmingham Road, Dudley	Y	100	-	33.6	35.0
62b	Birmingham Road, Dudley	Y	100	-	42.3	42.6
24	King Charles Road, Halesowen	Y	100	23.1	19.9	19.9
24a	Long Lane, Halesowen	Y	100	41.1	39.8	37.2
24c	Long Lane, Halesowen	Y	100	41.5	37.1	39.4
24d	Long Lane, Halesowen	Y	100	36.0	33.9	34.1
25a-c	Illey AQMS . Illey	Y	100	16.9	16.0	17.0
19b	Wesson Gardens, Halesowen	Y	83	28.9	30.1	28.5
19c	Wesson Gardens, Halesowen	Y	83	23.8	-	24.7
19d	Hagley Road Halesowen	Y	100	40.6	33.2	35.7
19e	Hagley Road Halesowen	Y	92	35.1	42.0	44.1
19f	Hagley Road Halesowen	Y	100	39.8	40.0	36.6
15	Stourbridge Road, Halesowen	Y	100	43.2	45.6	41.4
15a	Stourbridge Road, Halesowen	Y	100	43.6	40.9	37.8
15b	Stourbridge Road, Halesowen	Y	100	48.1	43.4	42.4
3	Drews Holloway, Halesowen	Y	100	19.7	21.9	19.7
3k	Drews Holloway, Halesowen	Y	100	-	-	21.3
3a	Drews Holloway, Halesowen	Y	100	47.6	52.9	49.8
3b	Windmill Hill, Halesowen	Y	67	49.3	49.9	-

Table 8 Results of Nitrogen Dioxide Diffusion Tubes

Diffusion Tube Monitoring Data						
Site ID	Location	Within AQMA?	Data Capture for full calendar year 2009 ^b %	Annual mean concentrations ($\mu\text{g}/\text{m}^3$)		
				2007	2008	2009
3c	Windmill Hill, Halesowen	Y	100	40.8	43.5	39.4
3d	Windmill Hill, Halesowen	Y	100	39.1	47.3	40.8
3e	Windmill Hill, Halesowen	Y	100	43.8	42.8	43.7
3g	Windmill Hill, Halesowen	Y	92	53.8	55.5	51.2
3gx	Windmill Hill, Halesowen	Y	100	48.9	49.8	48.9
3r-t	Colley Gate AQMS, Halesowen	Y	100	41.9	44.0	40.7
18	Hawthorne Road, Hayley Green	Y	100	16.3	15.5	16.0
11	High St, Lye	Y	100	39.3	39.2	35.7
11b	High St, Lye	Y	100	37.8	37.5	35.9
11c	High St, Lye	Y	100	28.4	26.9	26.8
50aX	Dudley Road, Lye	Y	100	44.8	49.5	45.2
50d	Pedmore Road, Lye	Y	92	37.5	42.3	35.5
50x	Pedmore Road, Lye	Y	100	31.6	30.6	31.1
50e	Pedmore Road, Lye	Y	92	43.5	43.1	41.5
50j	Pedmore Road, Lye	Y	83	35.4	33.1	33.4
50z	Shepherds Brook playing field, Lye	Y	50	-	24.0	-
51	Morvale Gardens, Lye	Y	100	20.3	20.5	20.3
4	Junction Road, Stourbridge	Y	100	19.5	19.4	18.8
21c	Clent View, Stourbridge	Y	100	-	13.3	15.1
21b	Heath Lane, Stourbridge	Y	100	38.3	35.5	33.7
2	Penrith Close, Amblecote	Y	100	17.2	17.8	17.6
52	High Street, Amblecote	Y	100	37.0	37.8	36.2
52a	High Street, Amblecote	Y	100	34.5	39.7	36.0
53	High Street, Amblecote	Y	100	37.1	40.5	40.1
16b	High Street, Stourbridge	Y	100	34.1	36.0	34.7
16c	High Street, Stourbridge	Y	100	35.3	34.0	35.7
34a/ax	High Street, Wordsley	Y	100	46.2	47.9	45.1
34ay	High Street, Wordsley	Y	100	58.8	63.1	59.6
34c	off High Street, Wordsley	Y	100	18.1	16.6	17.7
34d	High Street, Wordsley	Y	100	39.6	43.9	41.7
34fx	High Street, Wordsley	Y	100	38.0	33.0	35.1
22	Vernier Avenue, Kingswinford	Y	92	14.8	16.8	17.5
31g	Moss Grove, Kingswinford	Y	100	27.1	29.5	29.0
31bx	Barnett Lane, Kingswinford	Y	75	-	26.0	-
31m	Market Street, Kingswinford	Y	100	37.6	35.6	35.6
29	Commonside, Pensnett	Y	92	20.0	23.1	21.4
33	High Street, Pensnett	Y	100	37.5	36.4	34.6
33b&c	High Street, Pensnett	Y	100	35.5	35.8	34.4
33d	High Street, Pensnett	Y	100	40.6	40.5	41.9
33ex	Birds Meadow, Pensnett	Y	83	-	22.8	21.7
33f	High Street, Pensnett	Y	100	46.3	51.3	47.4
33g	19 Bradley Street, Pensnett	Y	100	30.0	26.3	27.5
33h	High Street, Pensnett	Y	100	34.7	36.7	35.2
33k	Tansey Green Road, Pensnett	Y	100	38.7	38.5	37.6
33p	High Street, Pensnett	Y	100	52.7	54.8	53.2
37	High Street, Pensnett	Y	100	38.3	33.9	37.6
60	Belper Row, Netherton	Y	100	25.5	25.2	25.0
27b	Halesowen Road, Netherton	Y	100	36.0	38.6	36.9

Table 8 Results of Nitrogen Dioxide Diffusion Tubes

Diffusion Tube Monitoring Data						
Site ID	Location	Within AQMA?	Data Capture for full calendar year 2009 ^b %	Annual mean concentrations ($\mu\text{g}/\text{m}^3$)		
				2007	2008	2009
27c	Halesowen Road, Netherton	Y	100	35.5	35.7	38.4
27f	Cradley Road, Netherton	Y	100	39.5	37.2	37.9
27g	Halesowen Road, Netherton	Y	100	58.8	60.2	61.0
27gX	Halesowen Road, Netherton	Y	100	62.2	63.8	61.8
27j	Halesowen Road, Netherton	Y	92	59.6	59.0	52.5
27k	Halesowen Road, Netherton	Y	100	48.0	50.8	47.9
27n	Halesowen Road, Netherton	Y	100	37.0	30.4	34.6
27p	Halesowen Road, Netherton	Y	92	47.7	42.1	43.1
27t	Halesowen Road, Netherton	Y	100	-	-	42.1
27q	Castleton Street, Netherton	Y	100	30.7	31.5	28.6
63	Cinder Bank, Netherton	Y	100	-	-	34.6
63a	Cinder Bank, Netherton	Y	100	-	-	34.6
63b	Cinder Bank, Netherton	Y	100	-	-	26.4
30	High Street, Quarry Bank	Y	100	46.7	50.8	49.5
30ax	High Street, Quarry Bank	Y	100	32.7	27.9	30.9
30dx	High Street, Quarry Bank	Y	83	35.1	35.2	34.5
30eX	High Street, Quarry Bank	Y	100	48.4	45.2	49.9
30g	High Street, Quarry Bank	Y	100	40.8	42.1	41.4
30m	High Street, Quarry Bank	Y	100	46.4	51.1	46.3
30t	King Street, Quarry Bank	Y	100	24.8	24.2	22.4
14	High Street, Brierley Hill	Y	100	45.9	46.3	39.1
14a	High Street, Brierley Hill	Y	100	49.7	44.0	39.9
14b	High Street, Brierley Hill	Y	100	47.7	52.0	45.0
14d	High Street, Brierley Hill	Y	100	39.5	36.2	34.9
14r-t	Brierley Hill Rose AQMS	Y	100	-	-	35.0
41c	John Street, Brierley Hill.	Y	100	32.7	31.5	30.9
42	Bank Street, Brierley Hill.	Y	100	34.1	35.6	33.0
42ax	Bank Street, Brierley Hill.	Y	100	34.5	33.5	32.2
42bx	Bank Street, Brierley Hill.	Y	100	33.6	34.0	34.5
43	Dudley Road, Brierley Hill.	Y	100	34.5	35.8	34.9
43ax	Dudley Road, Brierley Hill.	Y	100	40.2	37.3	39.2
43b	Dudley Road, Brierley Hill.	Y	100	30.4	28.8	30.3
45	Mill Street, Brierley Hill.	Y	92	40.6	44.1	34.8
45b	Mill Street, Brierley Hill.	Y	100	44.8	40.1	32.9
45c	Mill Street, Brierley Hill.	Y	100	45.3	42.8	36.9
46a	Moor Street, Brierley Hill.	Y	83	30.6	32.7	28.2
47	High Street, Brierley Hill	Y	100	36.8	36.6	33.7
47b	High Street, Brierley Hill	Y	100	42.1	39.3	34.1
47d	High Street, Brierley Hill	Y	100	33.2	37.0	30.7
49	Talbot Street, Brierley Hill	Y	100	22.6	23.3	21.5
49b	Cottage Street, Brierley Hill	Y	100	29.6	33.5	28.3
10	Dudley AQMS	Y	100	25.1	26.0	25.6
10a	Dudley AQMS	Y	100	26.0	26.9	27.1
10b	Dudley AQMS	Y	100	27.1	28.8	27.4
3r	Colley Gate AQMS	Y	92	41.4	43.7	41.1
3s	Colley Gate AQMS	Y	100	41.0	44.5	41.1
3t	Colley Gate AQMS	Y	100	43.4	43.8	40.0
25a	Illey AQMS	Y	100	17.0	16.1	17.3

Table 8 Results of Nitrogen Dioxide Diffusion Tubes

Diffusion Tube Monitoring Data						
Site ID	Location	Within AQMA?	Data Capture for full calendar year 2009 ^b %	Annual mean concentrations ($\mu\text{g}/\text{m}^3$)		
				2007	2008	2009
25b	Illey AQMS	Y	92	16.4	16.0	17.0
25c	Illey AQMS	Y	100	17.4	16.7	17.0
14r	Brierley Hill Rose AQMS	Y	100	-	-	35.6
14s	Brierley Hill Rose AQMS	Y	100	-	-	34.5
14t	Brierley Hill Rose AQMS	Y	100	-	-	35.0

The results confirmed ongoing exceedences in several locations previously identified in earlier rounds of Review & Assessment and DMBC's including the DMBC 2009 USA and 2010 Further Assessment; both reports were based on the 2008 data set. A summary is provided in Table 9:

Table 9 Summary Table Showing 2009 NO₂ Exceedence Areas

Evaluation of DMBC 2009 NO ₂ Diffusion Tube Results			
Area	Description	NO ₂ Exceedences During 2009?	Areas of Exceedence
1	Netherton	Y	Halesowen Rd.
2	Cradley	Y	Colley Gate, Windmill Hill
3	Pensnett	Y	High St.
4	Sedgley	Y	High St., Dudley St.
5	Brierley Hill	Y	High St.
6	Quarry Bank	Y	High St.
7	Hagley Road, Halesowen	Y	Hagley Rd.
8	Wordsley	Y	High St.
9	Lye	Y	Dudley Rd., Pedmore Rd
10	New Street, Dudley	Y	New St.
11	Himley Road, Lower Gornal	N	N/A
12	Stourbridge Road, Halesowen	Y	Stourbridge Rd.
13	Amblecote	Y	High St.
14	Birmingham Road near to Burnt Tree	Y	Birmingham Rd.
15	Buffery Road	No monitoring	N/A

With the exception of Himley Rd., Lower Gornal, and Buffery Rd. Dudley, the 2009 data set confirmed exceedences of the annual mean NO₂ AQO highlighted in the 2009 USA and 2010 Further Assessment.

Brierley Hill showed only one exceedence of the NO₂ AQO following completion of the BHSAN parallel route, but there was no relevant residential exposure at this site, 14b.

No monitoring was undertaken at Buffery Road due to tube siting problems.

No new areas of exceedence of the annual mean NO₂ AQO were identified from the 2009 diffusion tube survey.

2.2.2 PM₁₀

During 2009, Dudley MBC undertook monitoring of PM₁₀ levels at three separate locations: Central Dudley, Illey and Colley Gate. All locations are representative of public exposure. Full details of QA/QC protocols and data adjustment are provided in Appendix A.

Results of the study are presented in Tables 10 and 11 and show that:

- There no exceedences of the annual mean concentration of 40 µg/m³
- There are no more than 35 24-hour exceedences of 50 µg/m³
- There are no 90th percentile of 24-hour concentrations that exceed 50 µg/m³

Table 10 Results of PM₁₀ Automatic Monitoring: Comparison with Annual Mean Objective

PM ₁₀ Monitoring Results							
Site ID	Location	Within AQMA?	Data Capture for monitoring period ^a %	Data Capture for full calendar year 2009 ^b %	2007 ¹	2008 [*]	2009 [*]
Central Dudley	7 Ednam Road, Dudley	No	100 ²	92.3	20.9	20.1	16.8 ²
Illey	Illey, Nr Halesowen	No	89.6 ^{2,4}	82.5	17.8	14.2	15.0 (24.4) ^{2,4}
Colley Gate	Halesowen	No	98.2 ²	90.4	31.2	23.8	22.9 ²
Brierley Hill Rose	High Street, Brierley Hill	No	94.7 ³	83.8	N/A	N/A	20.0 (30.9) ³

Notes

* 2008 & 2009 Particles (PM_{10 VCM}) Grav. Equiv.

¹ 2007 data is TEOM x 1.3

² The VCM contains no FDMS data for the Dudley area from 1/1/09 to 28/1/09 and includes unratified data.

³ The VCM contains no FDMS data for the Brierley Hill area from 1/1/09 to 12/2/09 and includes unratified data.

⁴ Survey ended on 26/11/10

Table 11 Results of PM₁₀ Automatic Monitoring: Comparison with 24-hour Mean Objective

PM ₁₀ Monitoring Results							
Site ID	Location	Within AQMA?	Data Capture for monitoring period ^a %	Data Capture 2009 ^b %	Number of Exceedences of daily mean objective (50 µg/m ³) [*]		
					2007 ¹	2008 ¹	2009 ^{**}
Central Dudley	7 Ednam Road, Dudley	No	100 ²	92.3	7 (33.9)	13	5 ²
Illey	Illey, Nr Halesowen	No	89.6 ^{2,4}	82.5	4 (28.3)	5	3 ^{2,4}
Colley Gate	Halesowen	No	98.2 ²	90.4	28.0	16	6 ²
Brierley Hill Rose	High Street, Brierley Hill	No	94.7 ³	83.8	N/A	N/A	7 ³

Notes

* If data capture < 90%, the 90th percentile of the daily mean is given in brackets

** 2008 & 2009 Particles (PM10 Vcm) Grav. Equiv.

1 2007 data is TEOM x 1.3

2 The VCM contains no FDMS data for the Dudley area from 1/1/09 to 28/1/09 and includes unratified data.

3 The VCM contains no FDMS data for the Brierley Hill area from 1/1/09 to 12/2/09 and includes unratified data.

4 Survey ended on 26/11/10

2.2.3 Sulphur Dioxide

Dudley MBC did not undertake any monitoring of sulphur dioxide during the 2009 calendar year.

2.2.4 Benzene

Dudley MBC did not undertake any monitoring of benzene during the 2009 calendar year.

2.2.5 Other Pollutants Monitored: Ozone

For the purposes of LAQM, ozone (O₃) is not included in the Air Quality Strategy regulations [7]. This is due to the nature of O₃ formation and its persistence. O₃ can take several days to form and once produced can then persist for several days, and over this period O₃ and its precursors may have travelled large distances. This means that ozone formation resulting from activities in one country will influence O₃ concentrations in other countries, and this makes O₃ pollution a transboundary problem.

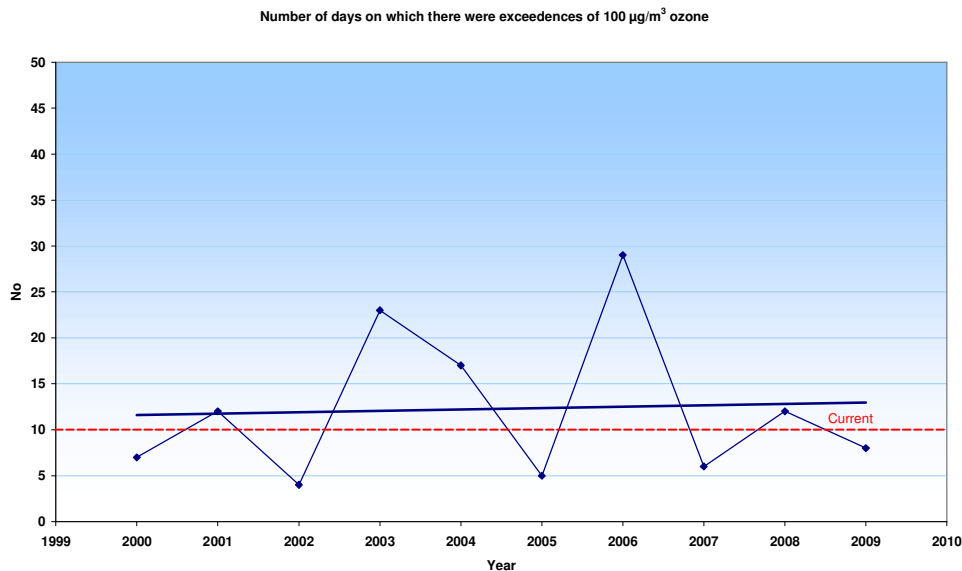
Therefore, action on regional and global scales will be most effective in tackling this problem and this objective is not included in Regulations for the purposes of LAQM.

Under DMBC's general review of air quality, ground level O₃ concentrations have been historically measured at the Central Dudley automatic monitoring station by an ultra violet absorption analyser, which provides data every 15-minutes. From this, 8 hour rolling averages are calculated which relate directly with the National Objective for December 2005 of 100 µg/m³ (50ppb) as the daily maximum of 8 hour rolling means.

Data collected during the last nine years is summarised in Table 10. It should be noted that figures recorded during 2007 were subject to an overall level of data capture of 79.2% due to technical difficulties experienced during June, November and December.

There has been a notable upward trend since 2000 in the number of days exceedence of 100 µg/m³; the 10 day objective was exceeded in 2001, 2003, 2004, 2006 and 2008 (Figure 5).

Figure 5 Trends in Ozone Concentration Measured at Central Dudley



Increasing O₃ trends have been recorded both locally throughout the WM conurbation and nationally and are linked to a number of factors including changes in climate and vehicle emission technology.

DMBC made a strategic decision to discontinue monitoring of O₃ at the end of the 2009 calendar year due to failure of the analyser and subsequent remediation costs.

2.2.6 Summary of Compliance with AQS Objectives

DMBC has examined the results from monitoring in the borough. Concentrations outside of the AQMA are all below the objectives at relevant locations, therefore there is no need to proceed to a Detailed Assessment.

Table 12 Summary of Ozone Concentrations in Central Dudley

Dudley MBC Ozone Monitoring Data										
Parameter	Year									
	2000	2001	2002	2003	2004	2005	2006	2007*	2008	2009
Max 8 hour running mean µg/m³	133.5	197.4	118.1	160.6	154.9	115.3	199.5	128.0	154.6	153.5
Date of Max 8 hour running mean	02/06/00	02/06/01	02/06/02	09/08/03	08/08/04	27/05/05	19/07/06	15/04/07	11/05/08	02/07/09
11th highest 8 hour running mean	123.3	140.8	109.6	153.3	141.5	106.6	171.4	107.8	118.7	123.4
Date of 11th highest 8 hour running mean	17/06/00	26/06/02	02/06/02	15/07/03	08/06/04	27/05/05	02/07/06	09/06/07	08/05/08	01/07/09
Number of 8 Hour running means greater than 100 µg/m³	74	89	24	131	109	18	274	32	64	43
Number of days on which there were exceedences of 100 µg/m³	7	12	4	23	17	5	29	6	12	8

*NB Partial data set included for information only. Overall data capture rate for 2007=79.2%

3 New Local Developments

3.1 Road Traffic Sources

DMBC has carried out an evaluation of the following road traffic pollution sources:

- Narrow congested streets with residential properties close to the kerb
- Busy streets where people may spend one hour or more close to traffic
- Roads with a high flow of buses and/or HGVs
- Junctions
- New roads constructed or proposed
- Roads with significantly changed traffic flows
- Bus or coach stations

The Council can confirm that there have been no significant developments in any of these areas since the completion of the last USA.

3.2 Other Transport Sources

DMBC has carried out an evaluation of the following other transport pollution sources:

- Airports.
- Locations where diesel or steam trains are regularly stationary for periods of 15 minutes or more, with potential for relevant exposure within 15m
- Locations with a large number of movements of diesel locomotives, and potential long-term relevant exposure within 30m
- Ports for shipping.

The Council can confirm that there have been no significant developments in any of these areas since the completion of the last USA.

3.3 Industrial Sources

DMBC has carried out an evaluation of the following industrial pollution sources and can confirm that there have been no significant developments in any of these areas since the completion of the last USA:

- **Industrial installations:** existing installations where emissions have increased substantially or new relevant exposure has been introduced.
- Major fuel storage depots storing petrol
- Petrol stations
- Poultry farms

However, industrial sources have been identified which fall into several other categories. These are identified as follows:

New or Proposed Installations Where an Air Quality Assessment Has Been Carried Out

- Recycled Carbon Fibre Limited, Units 11 & 21, Cannon Park Industrial Estate, West Midlands, WV14 8XQ.

This is a Part A1 process regulated by the Environment Agency, ref EA/EPR/NP3937GF/A001. The associated air quality assessment did not indicate any significant air quality impacts on local residential receptors.

New Or Significantly Changed Installations With No Previous Air Quality Assessment.

- Caparo Aluminium Technologies Ltd., Sunrise Business Park, High St., Wollaston DY8 4ZZ.

This is a Part A2 Process (SG4, Non ferrous foundry) regulated by DMBC (Ref A2/12)

3.4 Commercial and Domestic Sources

DMBC has carried out an evaluation of the following commercial and domestic sources to evaluate any significant changes since submission of the 2009 USA:

- Biomass combustion plant – individual installations
- Areas where the combined impact of several biomass combustion sources may be relevant
- Areas where domestic solid fuel burning may be relevant

A number of new biomass installations have been identified since the completion of the last USA and these will need to be considered as part of the next USA in 2012:

- Dawley Brook School
- Hawbush Primary School
- PM Products
- T&E Displays
- Ultra Furnishings

A system of logging the installation of new domestic wood burning and biomass boilers is currently under development and this will enable a detailed spatial analysis of combined effects to be carried out as part of the next Progress Report.

Details of smoke complaints are analysed spatially using DMBC's geographic information systems (GIS) and have not identified any specific areas of concern arising since completion of the 2009 USA.

3.5 New Developments with Fugitive or Uncontrolled Sources

DMBC has carried out an evaluation of the following fugitive or uncontrolled pollution sources:

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

The Council can confirm that there have been no significant developments in any of these areas since the completion of the last USA.

The results of the assessment of new development by DMBC is therefore summarised as follows:

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

- Caparo Aluminium Technologies Ltd., Sunrise Business Park, High St., Wollaston DY8 4ZZ.
- Biomass installations at two schools and three industrial premises

These processes will be taken into consideration in the next USA scheduled for 2012.

4 Local / Regional Air Quality Strategy

LAQM.TG (09) strongly recommends that Local Authorities which do not have AQMAs but do have areas close to the exceedence levels should consider drawing up a local air quality strategy. Therefore, there is a clear need to address air quality considerations in the wider context.

Although Dudley MBC has not previously published a Local Air Quality strategy, it recognises that LAQM is a rapidly developing area. Management of local air quality issues has naturally evolved in parallel with understanding of local air quality problems, and this has been made possible by investment in improved modelling and monitoring technology. Systems for integrating air quality issues into the planning and development control process and WM LTP2 are now being established and this further re-enforces the need for producing a formal Air Quality Strategy for Dudley.

It is therefore envisaged that a Local Air Quality Strategy will be published following adoption of the borough wide action plan which clearly states Dudley MBC's position on air quality issues. The strategy will outline The Council's aims and objectives in improving local air quality and the policies which will be needed to deliver these improvements and their integration into the various planning functions, including land-use (development planning and control), transport, economic, environmental and sustainable development (including climate change). The strategy will be updated on a regular basis to reflect changes in local and national policy, e.g. revisions to NAQS, national air quality objectives etc. A target completion date of April 2012 has been provisionally assigned for adoption of this document.

5 Planning Applications

Planning applications with potential air quality impacts are presently screened in accordance with Section 6.2 of this document. A summary of approved applications which were reviewed for potential air quality impacts during the 2009 calendar year is provided in Table 13. Further information on each application is available via DMBC online planning and building control. This can be accessed via the following link:

<http://www2.dudley.gov.uk/swiftlg/apas/run/wphappcriteria.display?paSearchKey=316571>

Table 13 New Developments With Potential AQ Impacts

Summary of Planning Applications Screened During 2009 with potential AQ impacts					
Location	Type of Development	Ref	Type	Decision	Comments
72 apartment retirement village	Road St, Old Meeting Rd & Whitehouse St Coseley	P08/1910	Full	Approved	No adverse comments with respect to AQ
Mosque/community building	High Street, Lye	P08/1911	Full	Approved	No adverse comments with respect to AQ
New academic accommodation	Lower High Street, Stourbridge	P09/0076	Outline	Approved	No adverse comments with respect to AQ
66 residential dwellings	Mucklow Hill, Halesowen	P09/0333	Reserved matters	Approved	No adverse comments with respect to AQ
New food store with parking	Peartree Lane, Netherton	P09/0376	Full	Approved	No adverse comments with respect to AQ
Construction of new school	Stockwell Avenue, Quarry Bank	P09/0506	Full	Approved	No adverse comments with respect to AQ
Change of use-office space to 3 apartments	High Street, Brierley Hill	P09/0644	Full	Approved	No adverse comments with respect to AQ
Change of use from offices to 4 flats	Wolverhampton Street, Dudley	P09/0338	Full	Approved	No adverse comments with respect to AQ
Change of use of retail shop to community centre	Birmingham Street, Dudley	P09/0873	Full	Approved	No adverse comments with respect to AQ
Erection of 100 dwellings	Birmingham New Road And Priors Road, Dudley	P09/0878	Outline	Approved	No adverse comments with respect to AQ

Table 13 New Developments With Potential AQ Impacts

Summary of Planning Applications Screened During 2009 with potential AQ impacts					
Location	Type of Development	Ref	Type	Decision	Comments
Demolition & erection of new school	High Street, Quarry Bank	P09/0933	Full	Approved	Travel plan submitted. No adverse comments with respect to AQ
Change of use from pub to residential dwelling	Pensnett Road, Brockmoor	P09/0959	Full	Approved	No adverse comments with respect to AQ
Redevelopment of existing bus station	Foster Street East, Stourbridge	P09/1008	Full	Approved	The redevelopment will not lead to any significant change in daily movements of buses at the bus station
Conversion of five former hospital buildings into 34 apartments	Stream Road, Wordsley	P09/1032	Full	Approved	No adverse comments with respect to AQ
Creation of bedsit accomodation	New Street, Dudley Resubmission of P09/0645	P09/1255	Full	Approved	No adverse comments with respect to AQ
Change of use from offices to restaurant and flat	New Street, Dudley	P09/1275	Full	Approved	No adverse comments with respect to AQ

6 Air Quality Planning Policies

6.1 Regional Planning Policy

The Black Country Joint Core Strategy is a spatial planning document, currently under development, that conforms to the general principles set out in the RSS and progresses work already undertaken as part of the Black Country Study. The document outlines the spatial vision, objectives and strategy for future development in the Black Country until 2026 and deals with land use and environmental, economic and social issues. Once adopted, the Core Strategy will also form part of the Development Plan Frameworks being adopted by each of the Black Country Local Authorities.

ENV8: Air Quality is one of the core policies within the strategy and describes how air quality improvements will be carried out across the region. The policy states that:

New residential or other sensitive development, such as schools, hospitals and care facilities, should, wherever possible, be located where air quality meets national AQOs.

Where development is proposed in areas where air quality does not meet (or is unlikely to meet) AQOs 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 AQOs, 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.

The inclusion of this policy is justified as follows:

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.

All the Black Country local authorities have declared their areas as air quality management areas to address the government’s national AQOs 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 AQOs.

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 (EP) Officer on a case by case basis.

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.*

Delivery of Policy ENV8 will be carried out via the planning application process. The following indicator and target have been assigned to enable implementation of the policy to be effectively monitored:

- *LOIENV8- proportion of planning permissions granted in accordance with air quality sections recommendations.*
- *Target-100%*

Each of the Black Country Local Authorities will monitor the implementation of Policy ENV8 at local level and report progress on an annual basis.

6.2 Local Planning Policy

Local planning decisions have significant potential to affect local air quality in many ways including:

- Location and design of industrial emissions sources
- Location of receptors
- Creation of traffic flow impacts

The increasing importance of this field within LAQM is recognised within PPS 23 Annexe 1 and best practice guidance published by Environmental Protection UK (EPUK) [8].

DMBC has developed a guidance document for officers interpreting potential air quality impacts of new development and this has been adopted as a Development Control Guidance Note [9]. This can be downloaded via the following web page:

<http://www.dudley.gov.uk/environment--planning/pollution-control/air-quality/development-control-and-air-quality>

The purpose of this policy is to provide information for officers of DMBC to assist in preparing comments on planning application consultations with respect to air quality issues.

It is DMBC's intention to expand this document as stated in the new borough wide action plan which is currently under consultation. With the use of this guidance a coordinated approach to air quality can be achieved for all planning applications and by implementing this guidance officers will be able to help control exposure to poor air quality and so minimise the adverse affect of air quality on health & the environment.

Development of the development control guidance note and additional supplementary planning guidance on air quality have been identified as key actions within the new AQAP and both topics are addressed via action DAQAP4: Land Use Planning Initiatives.

7 Local Transport Plans and Strategies

7.1 West Midlands Local Transport Strategy

The second generation West Midlands Local Transport Plan, WMLTP2, sets out a strategy, objectives, targets and an investment programme focused on the *Transport Shared Priority*. This is one of seven shared priorities agreed between national and local government, designed to improve public services. The four themes of the Transport Shared Priority include:

- Tackling Congestion
- Delivering Improved Accessibility
- Improving Road Safety
- Producing Better Air Quality

The WMLTP2 strategy for improving air quality includes:

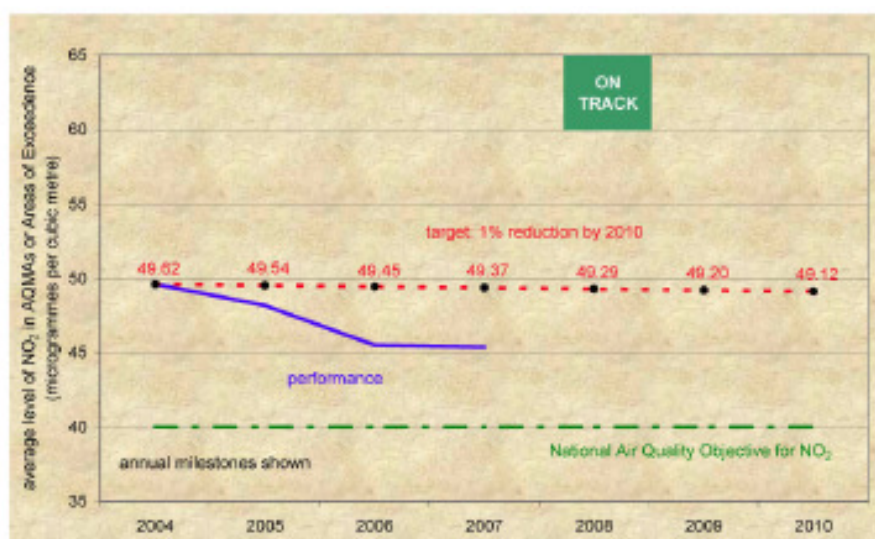
- Working with the Highways Agency to deal with the substantial emissions from motorway traffic
- Detailed initiatives to tackle local hotspots through engineering and traffic management
- Broader policies to encourage forms of transport that have less impact on air quality, such as alternatively fuelled vehicles
- Provision of mandatory Indicator Target LTP8 for reducing the average NO₂ level by 1% between 2004/05 and 2010/11 in areas where NO₂ exceeds the national AQO. This target was justified against regional monitoring data that saw concentrations of NO₂ generally rise between 2000 and 2003. Given the general rising trend, it was considered a challenging target to implement a 1% NO₂ reduction in these areas by 2011

The most recent WMLTP2 delivery report covered the period 2006 to 2008 and can be downloaded via the following link:

<http://www.westmidlandsltp.gov.uk/progress-reports/ltp2-delivery-report-2006-2008/>

This report concluded that performance in meeting Target LTP8 is currently 'on track' and showing a very encouraging downward trend across the West Midlands as indicated in Figure 6. Latest data from the Dudley area is provided in Section 9 of this report.

Figure 6 WMLTP2 Air Quality Target



7.2 Dudley Transport Strategy

The Dudley Transport Strategy is the outcome of a detailed appraisal of national, regional and local transport policy including the WM Area Multi-Modal Study (WMAMMS), WMLTP2 and the Black Country Study; it was formerly adopted by DMBC in February 2008. The strategy examines existing and future network performance and transport demands and sets out a number of specific challenges that need to be addressed:

- Congestion within the borough and on the motorway network
- Unreliable, expensive and often overcrowded public transport
- Lack of a high standard urban public transport system
- Lack of good public transport travel information
- Severe congestion on the motorway system
- Future congestion and safety problems arising from car dependency
- Inefficient use of existing road space
- High costs of freight transport due to road congestion
- Inadequate facilities for cycling and walking
- Poor transport network in the west of the conurbation
- Pressure on resources to maintain and renew transport services and infrastructure
- Inadequate capital resources to deliver and sustain a modern transport system for Dudley as proposed in the Black Country Study.

The Transport Strategy focuses delivery on the four themes of the Transport Shared Priority by managing demand for travel effectively, maximising use of existing transport infrastructure, supporting economic development and regeneration by improving access to the strategic centre of Brierley Hill and other key employment areas and connectivity to regional and international gateways.

A number of specific objectives have been identified to help tackle these issues:

- Reducing traffic growth, and ultimately achieve an absolute reduction in traffic
- Increasing the number of trips in the area carried out by public transport, cycling and walking
- Reducing future levels of traffic congestion on the Principal Road Network and other key routes
- Raising awareness of the impacts of travel choices and opportunities for sustainable travel choices
- Increasing the speed and reliability of public transport on key routes
- Improving the quality, extent and security of public transport networks serving key destinations
- Increasing accessibility to jobs, main centres and hospitals
- Improving connectivity between key employment areas and the national motorway network;
- Reducing the contribution that transport makes to the region's climate change emissions and poor air quality
- Reducing the noise and visual intrusion emanating from the transport system and impacting on sensitive areas
- Continuation of safety improvements to the transport networks in the borough
- Improving the quality and security of pedestrian and cycling routes and public car parks
- Maintaining transport assets under The Council's control to a standard comparable to high performing authorities
- Reducing vehicular trips arising from new development through application of robust travel plans
- To ensure that new development contributes to mitigating the adverse impact that it may have on the transport system and supports this strategy
- Adoption of best practice in the provision of transport services and delivery of the transport strategy, including on-going communication with partners and stakeholders, and appropriate monitoring and review processes.

From a consideration of transport challenges facing the Borough, the national and regional policy steer and the future availability of resources for transport in Dudley, an integrated package of measures have been identified, many of which will have beneficial impacts on air quality. The policies and implementation measures identified within the Dudley Transport Strategy are set out in Table 13.

Table 14 Dudley Transport Strategy Policies and Objectives

Key Objectives	
Policy	Description
DTS 1	To support regeneration by maximising network capacity and the efficient use of existing infrastructure by developing and implementing improvements including: A Targeted physical improvements at congestion hotspots B Priority Investment Corridors with improved parking control and enforcement C Quick wins directed at providing rapid, mainly small scale and cost effective highway initiatives to increase network capacity at congestion hotspots across the borough
DTS 2	To continue to improve safety of the borough's transport networks by: A Continuing to investigate and analyse the causes of road traffic collisions B Continuing to implement programmes of Local Safety Schemes C Continuing to implement programmes of SRS Initiatives D Education, training and road safety awareness programmes E Working with the West Midlands Road Safety Partnership to introduce traffic enforcement and WM wide education, training and publicity
DTS 3	To increase the emphasis on promoting sustainable transport by: A Investing more heavily in developing Smarter Choices Initiatives B Accessibility Planning activities C Continuing to implement improvements to walking and cycling networks, routes and facilities
DTS 4	To continue to work closely with West Midland partners, particularly Centro and Westfield, to promote and deliver Metro between Wednesbury and Brierley Hill, or the implementation of improvements to public transport of equal quality and attractiveness to the proposed Metro extension
DTS 5	To work more closely with Centro (and bus/train operators) on developing and delivering bus and rail infrastructure and service enhancements, including: A Bus Showcase improvements, both route based and targeted investment B Development of Punctuality Improvement Partnerships. C Improved public transport interchange facilities
DTS 6	To maximise opportunities to bring in new sources of funding for transport including planning obligations, working in partnership with major developers in the area, and continuing to engage with the evolving WM Initiatives
DTS 7	To improve the transport evidence base and improve the assessment of transport investment choices through a programme of corridor transport studies/area studies focusing on the Brierley Hill Strategic Centre and key Priority Investment Corridors
DTS 8	To undertake an initial scoping study to investigate the feasibility and mechanism for bringing forward the improvements proposed in the Black Country Study and in accordance with the RSS and RTS
DTS 9	To work with WM partners to develop improved monitoring systems of key transport indicators to enable achievement of the Dudley Transport Strategy to be measured over time
DTS 10	To ensure that stakeholders are consulted and engaged in bringing forward transport strategies, policies and measures and the delivery of transport services in Dudley
DTS 11	To work with WM partners and across The Council to maximise opportunities offered by new technology in managing the highway network, delivering transport services and communicating with transport users

8 Climate Change Strategies

In delivering its services, DMBC recognises that it has a responsibility to promote sustainable development and tackle climate change for the benefit of our communities and future generations. Actions taken at the local level can make significant contributions to national and even global targets and commitments. Following the Copenhagen Climate Change Summit held in December 2009, councils across the UK have collectively reiterated their role at the forefront to reducing carbon and conserving fuel.

A Carbon Management Plan (CMP) is currently being developed as part of the Dudley Green Project. This is an overarching initiative which demonstrates DMBC's commitment to delivering measurable environmental sustainability improvements and tackling climate change within DMBC and the borough. This project has been delivered through DMBC's Sustainability Action Plan which will link into the AQAP and other council plans such as the LTP, Housing strategy and Local Development Framework

The CMP will manage carbon emissions across DMBC's operations. These operations include buildings and schools, business travel, fleet, street lighting and some out sourced services such as transporting children with special needs to and from school. Effective carbon management in these areas will also provide additional beneficial reductions in associated emissions of NO₂ both locally and nationally via reduced electricity consumption.

It is currently anticipated that consultation the draft CMP will be undertaken during 2010.

9 Implementation of Action Plans

The most recent update on progress associated with the Brierley Hill AQAP was provided in the 2009 AQAP Progress Report [10]. The report noted that:

- Many of the actions associated with the Brierley Hill Sustainable Access Network (BHSAN) been completed and the new parallel route became operational in October 2008.
- A number of additional operations including modifications to traffic signs, traffic signals and upgrade of pedestrian facilities and bus shelters in the High Street were still being progressed.
- Monitoring of air quality improvements and other proxy indicators would continue throughout 2009 to fully evaluate the effects of the BHSAN.
- The original Brierley Hill AQAP would be superseded by the borough wide AQAP. A draft version of this document was submitted to DEFRA in February 2010 and wider consultation will be progressed during 2010.

A summary of latest progress with the Brierley Hill AQAP is provided in Table 15. The table shows that by enlarge, most of the elements associated with the construction of the BHSAN are now complete. A number of further enhancements including completion of upgrades to 5 ways junction, streetscape improvements, installation of puffin crossings, finalisation of the 1 way scheme in John Street and upgrade of pedestrian facilities have been delayed as a result of funding issues. These outstanding improvements should be rolled out during 2010.

Monitoring of air quality in the Brierley Hill area has been continued to quantify any air quality benefits associated with the BHSAN project and a full year's post scheme monitoring data is now available. Figure 7 shows that over the lifetime of WMLTP2 there has been a 16% decrease in NO₂ at the LTP site in Brierley Hill compared with a 4% decrease in nearby Quarry Bank.

The latest data from other proxy indicators, e.g. traffic flows, travel modes will be reported in the 2009 Brierley Hill cordon survey. This information was not available at the time of preparing the current report but will be covered in the 2011 Progress Report.

Table 15 Brierley Hill Action Plan Progress

Summary From Action Plan							Progress Report 2010				
No	Measure	Focus	Planning Phase	Implementation Phase	Indicator	Target annual emission reduction in the AQMA	Progress to date	Progress in the last 12 months	Estimated Completion date	Comments relating to target emission reductions	
1	<p>Construction of Parallel Route</p> <p>a) Provision of signalised junctions at High Street South, Mill Street, Level Street, Dudley Road</p> <p>b) Changes to junction alignments</p> <p>c) Provision of bus priority measures</p> <p>d) Construction of new carriageway between High St., Mill St., Level Street, Dudley Rd.</p> <p>e) Improved access to rear of properties along High Street and Brier Special School</p> <p>f) Provision of formal pedestrian crossing facilities</p>	Reducing traffic flows and congestion in Brierley Hill High Street	2003 to 2007	2007 to 2010	Cordon survey data enabling detailed evaluation of the outcome of the BHSAN scheme is still being collected, e.g. traffic counts, journey time surveys. Data from the 2009 BH Cordon Survey will be presented as part of the next progress report.	WM LTP 2 has targeted a net 1% reduction at exceedence sites within the Brierley Hill AQMA (and across the wider WM conurbation) between 2006 and 2011.	Start of construction was delayed until 2007 following funding and compulsory purchase issues. The parallel route was substantially completed in October 2008.	Completion of final elements of the scheme have suffered some delays due to funding issues	Minor revisions to traffic signs and junction signals are still ongoing. Additional enhancement of pedestrian facilities and bus stops will be completed as part of additional High Street enhancement works scheduled for completion by the end of 2010.	There has been a decrease of 16% in NO ₂ at the site between Jan '06 & Dec '09 (Fig 7) of a 4% decrease at the second LTP2 site in nearby Quarry Bank. This indicates that the BHSAN scheme has had a major impact in improving air quality	

Table 15 Brierley Hill Action Plan Progress

Summary From Action Plan							Progress Report 2010				
No	Measure	Focus	Planning Phase	Implementation Phase	Indicator	Target annual emission reduction in the AQMA	Progress to date	Progress in the last 12 months	Estimated Completion date	Comments relating to target emission reductions	
2	<p>Construction of Waterfront Way Link</p> <p>a) Construction of new section of public highway between Waterfront Way and the A4036 Pedmore Road</p> <p>b) Associated junction improvements for pedestrians, cyclists and public transport</p> <p>c) Provision of new access route to Round Oak Rail</p> <p>(d) Provision of new access route to Waterfront car park</p>	Reducing traffic flows and congestion in Brierley Hill High Street	2003 to 2007	2008	See point 1	See point 1	See point 1	Scheme completed	Actual completion date: October 2008	See point 1	

Table 15 Brierley Hill Action Plan Progress

Summary From Action Plan							Progress Report 2010				
No	Measure	Focus	Planning Phase	Implementation Phase	Indicator	Target annual emission reduction in the AQMA	Progress to date	Progress in the last 12 months	Estimated Completion date	Comments relating to target emission reductions	
3	Improvement of junctions on High Street a) Five ways junction High St./Moor St/Mill St./ Cottage St. b) High St./Level St./Bank St.	Reducing traffic flows and congestion in Brierley Hill High Street	2003 to 2007	2008 to 2010	See point 1	See point 1	See point 1	Final upgrade of traffic signals at 5 ways junction has been delayed due to funding issues	Upgrade of the traffic signals at 5 ways junction (3a) should now be completed during 2010	See point 1	
4	Pensnett Rd. Area Improvements a) Brockmoor High St / John St/Bank St / Pensnett Rd junction b) Pensnett Rd / Hickman Rd junction c) Bryce Rd / Pensnett Rd junction d) John St one way scheme	Improvement of traffic flows in the wider Brierley Hill Area	2003 to 2007	2007 to 2010	See point 1	See point 1	Scheme mostly completed during 2008	Item (d) has been delayed due to traffic order issues.	Measure (d) will be completed during 2010	See point 1	

Table 15 Brierley Hill Action Plan Progress

Summary From Action Plan							Progress Report 2010				
No	Measure	Focus	Planning Phase	Implementation Phase	Indicator	Target annual emission reduction in the AQMA	Progress to date	Progress in the last 12 months	Estimated Completion date	Comments relating to target emission reductions	
5	Increased roundabout capacity at Waterfront Way / Waterfront West	See point 4	2003 to 2007	2007 to 2008	See point 1	See point 1	See point 1	Scheme completed	Actual completion date: October 2008	See point 1	
6	Parking improvements on Brierley Hill High Street	Reducing obstructions & improving traffic flows	2003 to 2007	2010	See point 1	See point 1	Not started	Not started- some delays due to funding issues	Work will be completed during 2010 as part of the High Street enhancement works	See point 1	
7	Construction of Wednesbury to Brierley Hill Midland Metro extension.	Development of a Black Countrywide Metro system is a key priority within the Black Country Transport Strategy	2003 to date	N/A	N/A	None assigned	Funding sources are still being investigated by Centro	Some work has already begun to compulsorily purchase land along the route	Scheme on hold pending resolution of funding issues. This action has been carried forward to the new Dudley Borough AQAP.	N/A	

Table 15 Brierley Hill Action Plan Progress

Summary From Action Plan							Progress Report 2010				
No	Measure	Focus	Planning Phase	Implementation Phase	Indicator	Target annual emission reduction in the AQMA	Progress to date	Progress in the last 12 months	Estimated Completion date	Comments relating to target emission reductions	
8	Bus Showcase Routes & Partnerships	Improvement of public transport offering and encouragement of modal shift	2005 to 2007	2008-2011	None set	None set	Upgrade of 311/313 Stourbridge to Walsall Service was completed in 2007. Successful trials of Selected Vehicle Detection (SVD) to decrease bus queuing at major junctions were held during 2008	Continuation of voluntary bus partnership with Centro and National Express	Runs in parallel with WMLTP2	No emission reduction targets were set within the Brierley Hill AQAP but these have been addressed during the preparation of the new Dudley Borough AQAP.	

Table 15 Brierley Hill Action Plan Progress

Summary From Action Plan							Progress Report 2010				
No	Measure	Focus	Planning Phase	Implementation Phase	Indicator	Target annual emission reduction in the AQMA	Progress to date	Progress in the last 12 months	Estimated Completion date	Comments relating to target emission reductions	
9	Improvements to bus stops	See point 8	2005 to 2007	2009-2011	None set	None set	Some work has been carried out as part of the Showcase project and voluntary bus partnership projects.		Real time displays will be rolled out to route 311 during the lifetime of LTP2	See point 8	

Table 15 Brierley Hill Action Plan Progress

Summary From Action Plan							Progress Report 2010				
No	Measure	Focus	Planning Phase	Implementation Phase	Indicator	Target annual emission reduction in the AQMA	Progress to date	Progress in the last 12 months	Estimated Completion date	Comments relating to target emission reductions	
10	Bus only access/bus priority measures	See point 8	2005 to 2007	On-going	None set	None set	New bus priority lanes have been added as part of the BHSAN project. Successful trials of Selected Vehicle Detection (SVD) to decrease bus queuing at major junctions were held during 2008	Some delays have been encountered due to funding issues	SVD will be rolled out on key bus routes and further modifications to road signs to clarify bus priority measures will be implemented during 2010.	See point 8	
11	Addition of bus/metro interchange facilities on Mill Street	See point 8	2003 to date	N/A	None set	None set	On hold pending resolution of item 7	On hold	On hold	N/A	

Table 15 Brierley Hill Action Plan Progress

Summary From Action Plan							Progress Report 2010				
No	Measure	Focus	Planning Phase	Implementation Phase	Indicator	Target annual emission reduction in the AQMA	Progress to date	Progress in the last 12 months	Estimated Completion date	Comments relating to target emission reductions	
12	Addition of cycle lanes/improved cycle parking	Encouragement of modal shift	2005 to 2007	2007-2010	None set	None set	A new cycle/ pedestrian connection has been created to connect Merry Hill to the Waterfront	Cycle lanes were not implemented as part of the BHSAN due to technical difficulties.	Not completed. Alternative proposals for a new cycle link connecting High Street with Merry Hill are contained within the draft BHAAP.	See point 8	
13	Pedestrianisation of Cottage St.	Improved facilities for walking and encouragement of modal shift	2005 to 2007	2007-2010	None set	None set	On hold	On hold	Not completed. These proposals are currently being reviewed in the present economic climate	N/A	

Table 15 Brierley Hill Action Plan Progress

Summary From Action Plan							Progress Report 2010				
No	Measure	Focus	Planning Phase	Implementation Phase	Indicator	Target annual emission reduction in the AQMA	Progress to date	Progress in the last 12 months	Estimated Completion date	Comments relating to target emission reductions	
14	Improvements to High St crossing facilities including provision of new puffin style pedestrian crossings	Improved facilities for walking and encouragement of modal shift	2003 to 2007	2008 to 2010	See point 1	See point 1	See point 1	Substantially complete	Further upgrades to puffin crossings are planned for 2010	See point 8	
15	Widening/resurfacing of pathways and pedestrian signage improvements.	Improved facilities for walking and encouragement of modal shift	2003 to 2007	2008 to 2010	See point 1	See point 1	See point 1	Substantially complete	Further pedestrian signage improvements to be completed during 2010	See point 8	
16	Improved pedestrian linkages- High St-Waterfront, High St-Merry Hill, Waterfront-Merry Hill, Mill St-Cottage St	Improved facilities for walking and encouragement of modal shift	2003 to 2007	2008 to 2010	See point 1	See point 1	See point 1	Substantially complete	Further pedestrian enhancements to be completed during 2010	See point 8	
17	Improved cyclist facilities including provision of new paths, improvements in parking and signage	Encouragement of modal shift	2005 to 2007	2007-2010	None set	None set		See point 12	See point 12	See point 8	

Table 15 Brierley Hill Action Plan Progress

Summary From Action Plan							Progress Report 2010				
No	Measure	Focus	Planning Phase	Implementation Phase	Indicator	Target annual emission reduction in the AQMA	Progress to date	Progress in the last 12 months	Estimated Completion date	Comments relating to target emission reductions	
18	Improved environmental and security measures including provision of high quality street furniture on Brierley Hill High Street, provision of CCTV and improved lighting	Improved facilities for walking and encouragement of modal shift	2003 to 2007	2008 to 2010	See point 1	See point 1		Some CCTV has been installed at pedestrian crossings as part of BHSAN scheme	Further urban transport control cameras will be installed during 2010.	See point 8	
19	Introduction of car parking charges at the Merry Hill and Waterfront Developments.	Encouragement of modal shift but needs to be implemented in parallel with measure 7 to achieve maximum effectiveness	2003 to date	T.B.A.	See point 1	See point 1	On hold	No further progress during 2009	The introduction of parking charges is still being considered as part of the wider <i>BHAAP</i> . New implementation date to be advised.	None set at present	

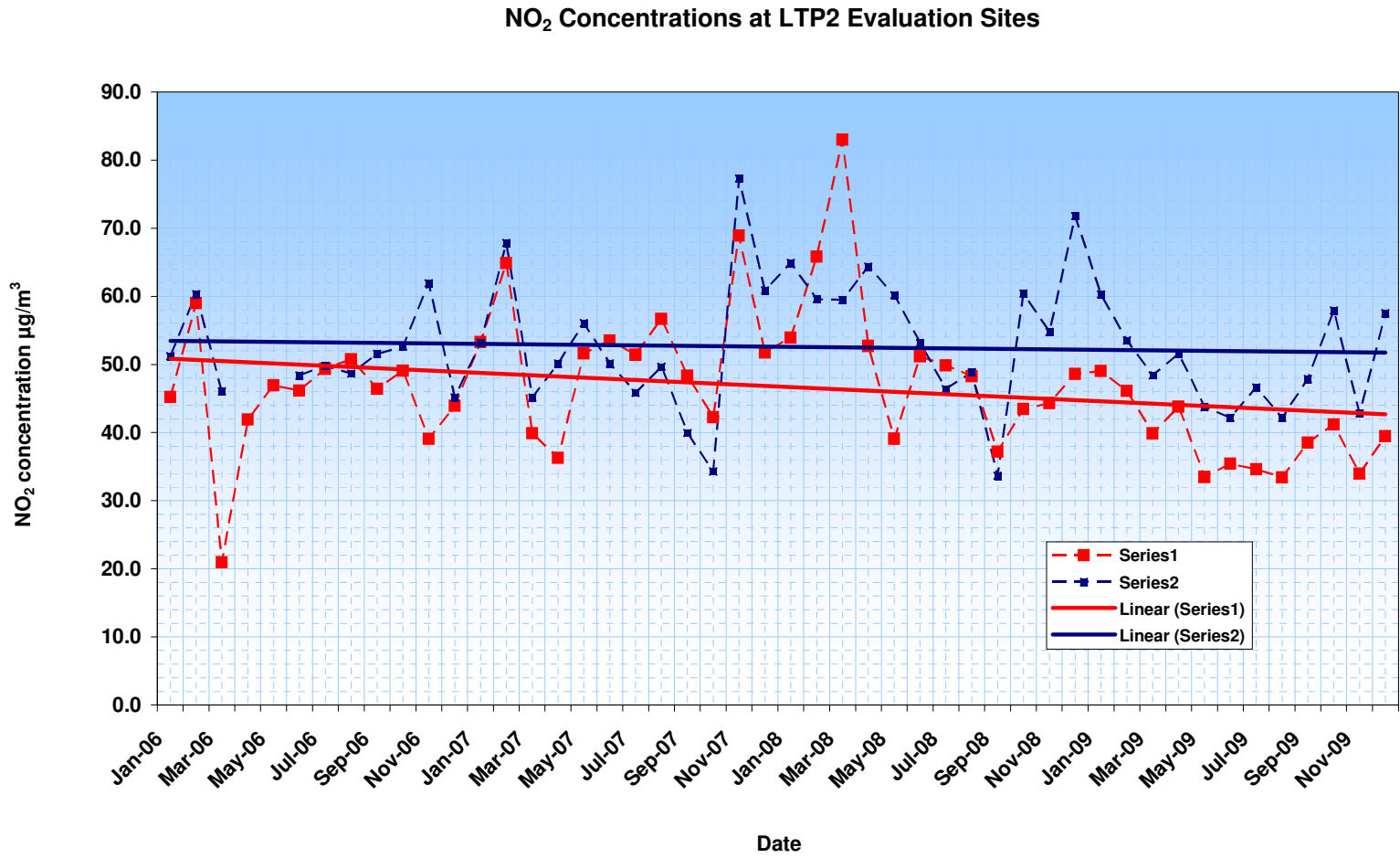
Table 15 Brierley Hill Action Plan Progress

Summary From Action Plan							Progress Report 2010				
No	Measure	Focus	Planning Phase	Implementation Phase	Indicator	Target annual emission reduction in the AQMA	Progress to date	Progress in the last 12 months	Estimated Completion date	Comments relating to target emission reductions	
20	Implementation of Travel Plans a) Voluntary	Mitigation of AQ developments of new development.		On going	None set	None set	Dudley MBC adopted its Parking Standards and Travel Plans SPD in March 2007	11 travel plans have been submitted via the planning process during 2009.	An ongoing task- It is envisaged that the publication of this document in conjunction with the declaration of a Borough wide AQMA will increase the number of travel plans which can be requested via the planning process	Further work to calculate air quality benefits associated with travel plan targets is being undertaken with EMIT.	

Table 15 Brierley Hill Action Plan Progress

Summary From Action Plan							Progress Report 2010				
No	Measure	Focus	Planning Phase	Implementation Phase	Indicator	Target annual emission reduction in the AQMA	Progress to date	Progress in the last 12 months	Estimated Completion date	Comments relating to target emission reductions	
20	b) Safer Routes To School (SRS) Travel Plans	Reducing traffic impacts from the school run, raising awareness of AQ issues within the school community	2003 to 2006	2006 to 2011	Targeted for adoption in 100% schools by 2011.	AQ benefits are as yet unquantified but see comments in final column.	A total of 93% of DMBC's 114 schools were recruited to the SRS programme by the end of 2009. 36 schools have now signed up to the Schools TravelWise website.	5 schools are now hosting diffusion tubes and an AQ awareness campaign for children has been initiated. This has involved giving talks to children and launching a new website.	April 2010	See comments for measure 20a. Further information will be fed back to schools as part of the awareness raising campaign.	

Figure 7 NO₂ Concentrations at LTP2 Sites In Brierley Hill and Quarry Bank



10 Conclusions and Proposed Actions

10.1 Conclusions from New Monitoring Data

New monitoring data has broadly confirmed the conclusions of earlier review & assessment reports, particularly the 2009 USA and 2010 Further Assessment. Exceedences of the annual mean NO₂ objective were confirmed in 13 of the fifteen areas identified in the 2010 Further Assessment, thereby justifying the borough wide AQMA declaration.

There is no requirement to modify the AQMA boundary or widen the scope to include PM₁₀ as measured levels of fine particulates were well below the PM₁₀ AQOs.

10.2 Conclusions relating to New Local Developments

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

- Caparo Aluminium Technologies Ltd., Sunrise Business Park, High St., Wollaston DY8 4ZZ.
- Biomass installations at two schools and three industrial premises

These processes will be taken into consideration in the next USA scheduled for 2012.

10.3 Other Conclusions

Implementation of the Brierley Hill AQAP has shown steady progress with many elements of the BHSAN scheme now complete. A small number of local measures will be completed during 2010 and a small number of relevant follow up measures have been incorporated into DMBC's new Borough wide action plan which is currently under consultation.

Air quality monitoring in the Brierley Hill area has shown a 16% reduction in NO₂ levels over the lifetime of the current LTP. No exceedences of the annual mean objective for NO₂ in areas with relevant exposure were recorded within the original Brierley Hill AQMA during the 2009 calendar year.

The LTP indicator of achieving a 1% NO₂ reduction in areas where the AQO is exceeded across the wider West Midlands conurbation is currently on target.

Systems for monitoring air quality impacts of new development are now well established, although a requirement for an air quality supplementary planning document has been identified. This is being addressed via the new air quality action plan.

Monitoring of ozone was terminated at the end of the 2009 calendar year and DMBC's rural air quality station located in Illey has now been discontinued.

10.4 Proposed Actions

The monitoring data has identified no further requirements to proceed to a Detailed Assessment or modify the current AQMA boundary. The 2009 data set reinforces the conclusions of the Further Assessment submitted to provide the technical evidence base to support the AQMA declaration.

Dudley MBC proposes to progress formal adoption of the draft action plan during 2010, then to finalise an overarching air quality strategy which links elements of The Council's AQAP and carbon management programme.

A number of changes to DMBC's monitoring programme were instigated at the start of the 2010 calendar year to address the requirements of the 2009 USA. Dudley proposes to continue monitoring air quality at the following levels during 2010:

- 150 diffusion tube locations
- Three automated sites including Central Dudley, Colley Gate and Brierley Hill. A fourth site in Birmingham Road near to Burnt Tree Island is currently being commissioned.
- Further work may be undertaken to investigate possible exceedences of the short term NO₂ AQO in Wordsley if appropriate funding streams can be identified.

A further progress report will be due for submission in April 2011 and will include the first year's monitoring data from the new diffusion tube sites.

11 References

1. DEFRA (2009) Local Air Quality Management Technical Guidance LAQM.TG(09)
2. DEFRA (2009) Local Air Quality Management Policy Guidance LAQM.PG(09)
3. DMBC (2010) Further Assessment of Air Quality
4. DMBC (2008) Progress Report
5. DMBC (2009) 2009 Air Quality Updating and Screening Assessment
6. DMBC (2010) Air Quality Action Plan
7. DEFRA (2009) Air Quality Strategy for England, Scotland, Wales and Northern Ireland
8. Environmental Protection UK (2010): Development Control: Planning For Air Quality- 2010 Update
9. DMBC (2008) Development Control and Air Quality Policy
10. DMBC (2009) 2009 Brierley Hill AQAP Progress Report
11. AEA (on behalf of DEFRA and the devolved administrations) (2010) "WASP – Annual Performance Criteria for NO₂ Diffusion Tubes used in Local Air Quality Management (LAQM), 2008 onwards, and Summary of Laboratory Performance in Rounds 103-107."
12. Targa, J., Loader, L., The DEFRA Working Group on Harmonisation of Diffusion Tubes (2008) "Diffusion Tubes for Ambient NO₂ Monitoring: Practical Guidance for Laboratories and Users, ED48673043 Issue 1a, Feb 2008"

Appendices

Appendix A: QA/QC Data

Appendix B: NO₂ Diffusion Tube Data Set, 2009

Appendix A: QA: QC Data

Diffusion Tube Bias Adjustment Factors

The NO₂ tubes employed by Dudley MBC are supplied and analysed by Gradko International Ltd., Winchester, Hampshire. Full details are provided in Box 1.1

Diffusion Tube Details	
Type Of Tube	Nitrogen Dioxide (NO ₂)
Type of absorbent	Triethanolamine
Method of tube preparation	20% TEA in water
Monitoring site locations	See Table 5.
Exposure dates	Tubes are exposed in accordance with the NETCEN calendar
Exposure duration	One month
Measured concentrations	See Table 8.

Box 1.1: Nitrogen Dioxide diffusion tube information

Factor from Local Co-location Studies

Data provided by Dudley MBC for use in the national survey is summarised in Box 1.2.

DMBC Co Location Study								
Site	Type	Site Type	Length of Study (months)	Diffusion Tube Mean Conc. (Dm) (µg/m ³)	Automatic Monitor Mean Conc. (Cm) (µg/m ³)	Bias (B)	Tube Precision ⁶	Bias Adjustment Factor (A) (Cm/Dm)
Cradley	20% TEA in Water	R	12	44	40	11.3	G	0.90
Dudley	20% TEA in Water	B	12	30	27	9.4	G	0.91
Illey	20% TEA in Water	Rural	12	19	17	11.2	G	0.90
Brierley Hill Rose	20% TEA in Water	R	11	42	37	13.1	G	0.88
							Mean	0.90
							National Factor	0.90

Box 1.2 Dudley MBC Co-Location Data 2009

Discussion of Choice of Factor to Use

Local Authorities are advised to report both the adjustment factor from their local study, and the national bias adjustment factor. Box 1.2 demonstrates that the Dudley MBC locally derived average value of 0.90 shows excellent correlation with the national bias adjustment factor of 0.90 calculated using spreadsheet version 03/10.

Normally, the decision of which bias adjustment factor to use will depend upon a number of issues that will need to be considered. At the end of the day it will be up to each Local Authority to take account of these factors and set out the reasons for the choice made. On this occasion, as both factors are the same, the choice is a hypothetical one. Dudley MBC, however, would normally choose to use the national factor for the following reasons:

- The survey consists of over 150 tubes exposed over a wide range of settings which differ from the co-location sites employed in Dudley. For example, none of the co-location sites assessed are on a building façade in a canyon-like street.
- The automatic analysers have been operated using local, rather than national, QA/QC procedures.
- During some years, data capture from the automatic analyser has been less than 90%; use of nationally calculated bias adjustment factors enables a consistent approach to be used from one year to the next.

PM Monitoring Adjustment

Prior to 2008, data obtained from the TEOMs was scaled a factor of 1.3 as recommended in the former technical guidance document LAQM.TG (03). Data from 01/01/2008 onwards has been corrected using DEFRA's Volatile Correction Model (VCM) web portal. This web portal is funded by DEFRA and is designed for all users of TEOM PM₁₀ measurements. It allows TEOM measurements to be corrected for the loss of volatile components of particulate matter that occur due to the high sampling temperatures employed by this instrument. The resulting corrected measurements have been demonstrated as equivalent to the gravimetric reference equivalent.

Short-term to Long-term Data adjustment

Data with <75% data capture rate were omitted from Table 8, therefore no short-term to long-term adjustments were required during the preparation of this report.

QA/QC of automatic monitoring

The chemiluminescent NO₂ analysers are housed in an air-conditioned environment and are operated according to manufacturers' instructions. Calibration of instruments is carried out once every two weeks by Dudley MBC personnel. The calibration is performed with zero air from the analyser's internal zero air generators and certificated gas cylinders supplied by Air Liquide. 15-minute averaged data is collected and scaled using the determined calibration factors. All instruments are serviced at 6-monthly intervals by engineers from Environmental Technology plc, and are covered by that firm's service contract.

QA/QC of diffusion tube monitoring

The current test laboratory, Gradko, participates in two centralised QA/QC schemes:

- The Workplace Analysis for Proficiency (WASP) scheme managed by the Health & Safety Laboratory (HSL)
- A monthly field intercomparison exercise managed by the Atomic Energy Authority (AEA)

The laboratory has demonstrated 'good' performance with regard to WASP performance criteria over the period October 2008 to October 2009 [11]. The test laboratory is also a member of the Working Group on Harmonisation of Preparation and Analysis Methods. As part of this contract, DEFRA and the Devolved Administrations commissioned a Working Group (comprising representation from DEFRA and the Devolved Administrations, laboratories, HSL, the Environment Agency, SEPA and other stakeholders) aimed at harmonising the methodology used in preparing, utilising and analysing diffusion tubes. The laboratory follows procedures set out in the Harmonisation Practical Guidance [12].

Appendix 2: NO₂ Diffusion Tube Data Set, 2009

DMBC NO2 Diffusion Tube Data Se, 2009												
Site id	2009 Bias Adjusted NO2 Concentrations (µg/m ³)											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
20	45.4	38.2	31.2	31.8	23.6	30.1	22.0	25.7	24.3	37.8	26.9	41.7
17b	35.0	30.2	17.8	23.5	13.5	23.3	12.2	12.1	16.7	29.0	21.2	30.2
13	30.7	23.3	16.6	18.7	9.3	13.1	8.0		12.1	19.2	19.2	25.0
32	49.6	62.4	45.1	46.8	30.5	41.2	34.8	35.4	37.2	48.8	37.4	33.5
32a	71.4	55.4	52.2	55.1	44.8	47.2	36.4	39.8	44.5	55.2	53.3	46.3
32b	60.9	54.9	36.3	54.3	38.6	53.3	22.3	24.9	40.6	46.0	37.3	44.6
32e	55.3	45.8	37.6	51.1	44.6	59.1	25.1	24.5	42.4	44.6	36.8	43.8
32f	67.5	42.9	38.9	52.7	40.2	53.9	34.5	29.9	36.1	50.3	41.1	46.8
32r	44.0	48.8	37.3	39.1	33.7	37.9	22.4	22.0	34.1	42.5	31.4	41.4
54	57.8	45.9	44.6	46.7	35.4	39.8	34.2	17.6	35.7	42.8	35.1	41.0
54ax	31.0	29.8	17.0	19.5	10.8	17.7	11.8	11.1	17.4	24.6	19.3	28.1
54b	42.5	38.3	30.1	28.8		27.3	16.6	17.6	28.3		28.9	35.4
56	41.9	39.3	30.6	32.3	21.3	32.9	20.9	20.8	30.5	36.2	27.5	40.2
35x	36.8	33.1	24.2	26.1	16.9	23.6	14.2	14.6	23.0	27.5	23.9	31.4
36	39.8	28.8	22.0	22.6	14.2	18.3	13.1	0.0	17.5	29.4	23.5	28.9
10-10b	39.4	37.3	26.2	29.4	17.5	25.9	15.1	16.4	22.2	30.7	26.8	33.2
5mx	43.3	44.0	30.7	43.6	30.8	47.9	22.6	21.1	44.1	35.6	35.4	37.1
5my	51.4	43.9	34.6	36.5	21.0	29.5	18.5	18.4	29.4	44.9		
5r	45.3	48.2	35.9	44.4	27.5	40.1	22.0	23.5	32.0	39.2		
5s	53.4	48.8	35.7	52.9	34.5	41.1	32.3	30.2	35.3	48.2	39.5	45.8
5t	52.1	46.6		43.8	27.9	47.1	22.2	25.1	33.8	46.5	41.0	47.1
5w	52.2	50.6	41.2	56.4	36.7	42.2	25.5	29.1	37.6	42.3	44.2	41.9
KA	57.3	38.9	29.5		29.4	33.2	31.3	31.1	33.9	44.9	44.3	36.1
61	40.6	36.7	26.4	32.6	20.6	33.4	16.1	16.4	26.2	31.9	26.8	32.8
61b	43.9	45.0	27.7	37.5	23.5	34.2	22.6	22.2	29.5	36.4		
61d	45.2	39.2	29.8	39.7	22.2	40.5	18.3	21.2	29.0	38.9	33.4	32.0
61g	42.5	37.4	31.1	36.5	22.6	38.2	16.3	21.2	34.4	39.2		
62	44.4	49.5	46.0	39.6	29.8	43.5	25.6	24.9	35.7	36.6	30.3	39.1
62a	45.1	46.3	38.3	41.1	26.1	37.0	34.5	25.1	30.5	31.2	27.4	37.1
62b	55.7	46.2	44.5	46.8	31.1	51.6	43.7	31.0	35.1	44.1	39.0	42.1
24	30.9	28.9	19.6	22.0	12.9	16.7	9.1	11.5	16.7	23.7	19.1	27.8
24a	47.4	43.9	39.9	39.3	23.2	32.7	29.0	31.6	33.6	42.0	38.6	45.5
24c	54.6	49.4	35.5	46.1	24.0	30.7	34.7	31.6	31.1	44.7	41.7	48.2
24d	50.8	40.9	31.2	36.5	23.2	27.5	28.2	27.8	28.3	36.3	37.5	40.6
25a-c	34.8	20.8	14.2	18.6	10.0	14.5	10.0	9.5	12.4	19.6	15.7	24.1
19b	36.7	39.3	25.7	32.4	25.8	33.2	17.8	19.3	25.2	29.4		
19c	37.6	29.8	23.6	28.3	18.3	27.8	14.9	16.1	21.9	28.4		
19d	48.7	45.5	37.5	38.0	22.9	37.4	22.5	23.7	31.0	42.4	34.6	44.2
19e	59.4	39.8	36.9	51.4	28.3	47.7	0.0	49.4	37.3	45.4	41.3	48.7
19f	50.4	40.9	31.6	40.8	25.4	37.8	31.4	30.2	31.3	39.1	35.9	44.8
15	57.1	53.9	46.1	43.3	28.5	43.3	26.3	29.2	36.4	46.7	39.7	45.9
15a	55.8	45.8	32.6	43.0	27.0	41.1	20.6	23.7	33.9	48.6	33.1	48.8
15b	66.3	52.9	48.5	37.8	26.3	39.3	30.4	32.0	32.0	49.2	38.8	55.3
3	27.5	32.2	17.8	23.5	11.6	20.0	9.1	9.8	17.1	21.8	15.9	30.6
3k	37.5	31.2	17.9	23.9	13.4	19.5	10.6	10.8	16.6	24.8	18.2	31.4
3a	59.5	63.4	52.9	60.6	31.7	51.7	41.6	33.7	55.2	53.8	43.5	49.5
3b	62.7	56.6	54.0	56.7				33.7	46.0	49.4	41.8	45.9
3c	52.7	47.0	36.6	47.9	26.5	50.0	23.4	28.0	41.6	42.1	34.9	42.0
3d	59.4	45.3	37.9	53.1	27.1	33.5	36.5	31.9	36.1	44.0	38.7	46.7
3e	57.0	49.5	41.9	57.2	37.2	45.1	24.5	26.9	47.3	50.0	34.5	52.6
3g	66.1	56.5	51.6		33.3	42.9	49.1	50.3	49.3	58.0	49.4	56.7

DMBC NO2 Diffusion Tube Data Se, 2009												
Site id	2009 Bias Adjusted NO2 Concentrations ($\mu\text{g}/\text{m}^3$)											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
3gx	68.2	51.7	51.1	53.6	39.1	38.0	39.6	44.8	43.5	54.1	52.4	50.5
3r-t	54.9	51.9	43.7	43.8	31.2	35.2	29.4	31.5	40.2	45.8	39.0	41.9
18	26.8	23.2	14.7	17.2	9.2	16.2	7.4	8.0	13.1	17.5	14.5	24.5
11	47.7	41.4	33.5	47.6	24.9	35.1	27.6	24.6	31.1	39.5	28.2	46.7
11b	49.6	46.5	32.6	43.1	30.3	38.4	23.8	25.1	32.1	35.9	30.8	42.5
11c	45.3	36.6	23.6	31.6	18.1	27.4	18.6	17.0	24.2	29.2	20.2	29.4
50aX	65.1	46.2	28.7	62.4	40.8	41.9	43.6	34.8	35.1	49.1	40.1	55.2
50d	53.0	41.6	33.5		25.7	37.2	27.2	25.8	34.2	35.6	32.0	44.6
50x	41.4	41.9	27.9	39.1	22.4	24.3	20.4	21.6	26.1	29.1	40.4	38.3
50e	62.5	54.9	38.1	62.9	26.3	39.4	29.8	26.2		38.4	26.2	51.4
50j	47.3	38.8	31.5	40.1	31.9	32.7	24.5	21.8	31.4	33.8		
50z	32.4	31.0	19.3			16.3	10.4	11.6				
51	34.0	31.2	16.9	22.1	13.1	18.5	10.8	11.6	17.2	22.6	20.2	25.8
4	31.2	29.5	17.9	20.1	13.5	15.3	10.1	9.2	14.2	20.0	14.8	29.6
21c	31.6	20.3	12.1	16.4	9.2	11.1	6.5	6.4	11.2	16.3	14.8	25.2
21b	51.2	49.2	32.9	44.9	25.5	12.9	24.1	25.0	33.2	39.1	30.5	36.6
2	31.9	24.8	15.6	15.9	12.1	12.6	8.2	10.0	13.5	20.1	19.1	27.4
52	51.9	50.1	38.3	43.0	24.0	39.3	28.3	21.9	33.1	38.0	29.1	37.5
52a	54.1	46.3	33.3	38.9	25.0	32.9	29.3	27.2	28.7	37.9	36.9	41.1
53	55.2	48.4	35.7	51.1	33.0	39.0	29.6	28.5	33.1	45.0	36.2	46.8
16b	55.7	40.4	31.1	40.4	25.5	31.9	23.1	26.5	30.0	36.0	32.0	43.8
16c	48.5	39.6	34.9	40.7	26.6	33.3	30.0	28.8	31.7	38.2	36.4	40.0
34a/ax	65.6	41.1	45.6	47.2	32.7	44.3	35.3	34.1	43.0	51.8	42.4	57.9
34ay	70.8	87.3	70.5	57.1	39.2	62.2	45.6	44.3	51.2	68.1	56.9	61.6
34c	29.4	24.8	14.5	17.9	11.9	15.7	9.4	8.4	14.4	21.7	16.4	27.6
34d	53.4	42.8		41.2	29.5	48.0	37.5	32.2	34.0	52.9	37.5	50.2
34fx	56.7	37.7	26.7	48.0	23.9	37.8	24.7	23.3	26.9	36.2	33.8	45.4
22	30.5	23.5	14.3	15.9	10.0	12.2	7.3	10.8	16.4	24.6		26.4
31g	42.0	33.1	29.4	32.0	20.8	26.5	26.4	20.1	21.9	30.9	29.6	35.5
31bx	47.6	29.1	20.3	23.5	28.6		26.5	10.4	16.3	26.4		
31m	42.8	43.5	35.2	47.5	12.1	43.9	26.4	21.7	32.6	42.8	34.6	43.6
29	38.2	25.0	20.1	23.2	15.0	19.1		14.1	11.2	19.4	18.4	31.8
33	43.8	41.0	33.1	42.8	23.9	39.0	23.8	24.5	35.4	35.5	28.1	44.5
33b&c	43.8	48.9	38.3	34.4	26.4	32.9	27.0	23.4	32.6	38.2	26.7	40.4
33d	57.2	42.9	43.4	47.4	38.2	39.0	29.4	37.8	35.6	41.4	44.5	45.6
33ex	36.1	27.3	21.7	17.3	15.2	18.3	13.6		16.7	25.9	25.5	
33f	67.6	50.8	51.1	53.4	40.2	45.0	32.6	41.9	40.5	49.4	46.7	50.1
33g	37.1	38.6	30.4	27.9	20.7	26.9	16.9	18.0	25.2	27.6	25.8	34.6
33h	45.3	40.7	36.5	34.2	30.1	34.2	25.0	30.5	31.7	38.4	34.2	41.1
33k	59.3	45.3	33.4	45.4	33.2	38.1	18.9	24.3	34.7	37.6	35.2	45.8
33p	64.9	52.1	60.2	60.0	53.2	42.7	42.1	44.5	43.1	53.9	55.6	66.0
37	53.3	41.9	37.7	41.7	31.6	33.1	31.6	29.7	34.2	39.3	34.3	42.1
60	41.5	33.8	25.1	25.9	17.8	18.9	15.5	14.2	22.1	27.3	24.9	33.1
27b	46.9	41.7	37.9	38.6	31.6	35.5	32.9	27.3	36.0	38.3	33.1	42.4
27c	53.2	39.2	35.7	45.8	31.9	42.5	32.1	21.8	34.9	41.9	33.8	48.4
27f	46.5	47.9	45.9	33.3	30.7	31.5	30.2	28.2	32.7	41.4	33.8	52.5
27g	77.6	58.6	66.2	57.9	57.3	48.3	52.5	57.9	59.2	69.5	54.2	73.1
27gX	78.3	73.0	48.9	55.6	57.4	57.4	65.0	53.8	58.7	71.4	58.0	63.5
27j		30.1	61.2	49.5	51.2	45.7	47.6	52.9	50.3	69.7	61.0	58.4
27k	63.9	51.2	50.3	49.8	39.1	42.8	44.3	37.2	43.3	52.5	44.3	55.6
27n	43.7	41.0	32.8	36.8	29.2	39.2	25.2	23.8	33.9	38.1	31.4	39.8
27p	50.7	41.3	47.8	37.5	42.0	38.9	30.8		46.6	33.4	45.5	50.7
27t	43.1	43.2	47.6	34.4	41.4	31.0	24.4	40.2	47.6	36.9	53.4	43.1
27q	39.1	35.7	31.3	24.8	22.4	23.0	19.6	18.5	26.4	33.2	29.2	40.2
63	48.2	39.3	32.4	39.8	27.5	35.8	26.3	23.4	32.8	37.1	31.5	40.9

DMBC NO2 Diffusion Tube Data Se, 2009												
Site id	2009 Bias Adjusted NO2 Concentrations (µg/m ³)											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
63a	45.5	42.4	32.5	36.2	26.0	32.2	26.4	22.4	35.2	41.8	31.1	43.2
63b	40.8	31.3	26.8	27.7	18.0	23.4	18.5	12.9	23.1	30.6	26.0	37.5
30	60.3	53.5	48.4	51.6	43.7	42.1	46.6	42.1	47.8	57.9	42.8	57.5
30ax	45.4	49.0	32.6	29.7	22.2	29.2	21.9	22.3	25.4	33.8	24.9	34.5
30dx	38.1	34.5		39.8	26.5	39.1	20.2		32.5	42.4	25.8	45.7
30eX	63.2	47.8	54.0	51.6	39.9	48.5	47.5	37.3	42.6	58.6	53.1	54.3
30g	45.1	50.7	46.4	46.2	29.2	40.7	31.8	39.8	39.0	43.8	33.2	51.0
30m	52.9	49.7	54.9	53.1	41.9	41.6	33.3	39.8	43.2	45.8	42.8	56.9
30t	40.2	28.9	24.7	24.1	16.0	20.2	11.9	12.0	17.9	20.7	22.1	30.6
14	49.0	46.1	39.9	43.8	33.5	35.4	34.6	33.4	38.5	41.2	33.9	39.5
14a	46.3	49.9	35.1	43.8	34.3	38.8	33.2	32.4	38.3	41.7	38.1	46.7
14b	61.5	47.5	42.5	52.9	41.0	42.9	42.3	34.7	38.5	36.1	45.6	55.1
14d	50.1	40.5	31.0	37.7	25.8	34.0	32.4	23.3	29.0	44.3	29.5	41.6
14r-t	61.3	39.0	32.7	5.3	33.0	27.3	33.5	26.5	34.3	39.0	39.4	49.1
41c	44.5	38.1	29.7	35.0	26.0	19.5	26.0	22.3	26.6	30.9	33.0	38.9
42	44.2	39.2	31.9	36.5	25.8	28.4	25.0	18.0	29.3	36.9	30.6	49.3
42ax	44.2	43.6	38.8	32.0	26.6	25.3	29.3	24.0	27.4	34.1	30.4	31.1
42bx	45.6	45.8	31.9	39.5	26.9	38.4	31.0	20.9	29.2	38.4	28.1	38.6
43	38.8	39.9	40.1	35.0	28.6	24.1	31.3	25.5	28.7	39.9	37.4	49.6
43ax	51.7	45.6	45.9	42.5	31.1	25.6	38.8	29.8	31.0	44.4	37.4	46.9
43b	44.4	37.1	28.6	30.7	24.1	23.5	27.1	19.9	22.2	31.4	31.1	43.1
45	45.0	39.1	34.5	40.0	28.6	31.6		22.2	30.4	38.2	27.5	45.2
45b	45.1	39.9	39.7	39.2	24.7	26.0	28.8	21.5	30.0	34.9	27.4	37.0
45c	50.5	47.4	36.7	44.7	29.8	28.5	30.7	24.1	29.4	37.1	35.2	48.4
46a	42.2	35.9	28.6	35.4	23.0	25.6	20.1	14.4	25.3	31.0		
47	47.6	37.0	29.9	38.0	27.5	33.1	28.5	20.2	31.3	34.8	32.4	43.9
47b	41.8	38.8	37.2	37.4	28.9	25.9	30.2	25.2	34.5	39.0	33.7	36.8
47d	40.6	36.8	29.4	37.9	24.8	26.7	25.5	18.7	27.5	31.5	29.7	39.9
49	34.6	28.7	19.4	20.3	13.6	15.4	21.7	10.0	16.7	22.6	21.2	33.4
49b	45.0	36.1	28.3	28.5	19.0	23.1	27.1	16.5	23.0	29.8	26.5	36.2
10	36.0	36.2	26.4	28.1	15.1	26.0	12.7	16.2	21.7	30.1	25.8	32.6
10a	41.0	37.8	26.6	30.2	18.3	26.6	14.4	16.0	22.6	30.1	26.8	34.6
10b	41.3	38.0	25.7	29.9	19.0	25.2	18.1	16.9	22.3	31.9	27.7	32.3
3r	55.0	54.4	40.1	48.3	31.3	34.0	30.6	30.2		44.6	39.2	44.7
3s	57.1	52.9	44.4	41.5	28.8	37.6	29.3	33.2	40.0	46.3	40.3	42.1
3t	52.5	48.2	46.7	41.7	33.6	34.0	28.4	31.0	40.3	46.5	37.6	38.9
25a	33.2	21.6	14.8	20.3	10.0	14.9	10.8	9.4	12.1	20.2	15.8	24.4
25b	31.8	21.7		18.8	9.9	14.0	9.5	9.4	13.0	18.8	15.6	23.9
25c	39.5	19.1	13.6	16.7	10.2	14.5	9.6	9.5	12.1	19.7	15.6	24.1
14r	71.8	41.4	31.9	8.4	31.8	24.7	33.1	27.1	34.6	39.3	37.4	46.0
14s	56.8	36.0	32.9	6.3	33.8	28.7	33.8	26.6	35.5	39.2	39.6	44.6
14t	55.2	39.7	33.3	1.2	33.4	28.5	33.7	25.9	32.9	38.5	41.2	56.6

Notes

- Survey not in progress
- Data invalid – affected by spider in tube
- Missing
- Blue;-average of 2 or 3 co-located tubes
- Red italics;- data capture <75%; data omitted from Table 8*