



2010 Air Quality Progress Report for *Mid Sussex District Council*

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

Date (May, 2010)



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Executive Summary

Monitoring data for January to December 2009 has been used to assess compliance with the national air quality objectives since the Updating & Screening Assessment undertaken in 2009.

The following conclusions have been reached for each of the pollutants:

Nitrogen dioxide:

The 2009 annual means were below the NO₂ objective at most monitoring sites. However, the objective was exceeded at a number of locations. Some of these were sites with relevant exposure i.e. residential premises within 15m of a monitoring site, or places where the public may be regularly exposed.

Consequently a Detailed Assessment is required for these locations in the Hassocks area which could lead to the declaration of an Air quality Management area (AQMA) and subsequently an Action Plan detailing how the detected NO₂ levels will be reduced.

The Detailed Assessment is due to be completed in June of this year.

Particulate matter (PM₁₀)

No further action required.

Sulphur dioxide

No further action required.

Benzene:

No further action required.

Carbon monoxide:

No further action required.

1,3-Butadiene:

No further action required.

Lead:

No further action required.

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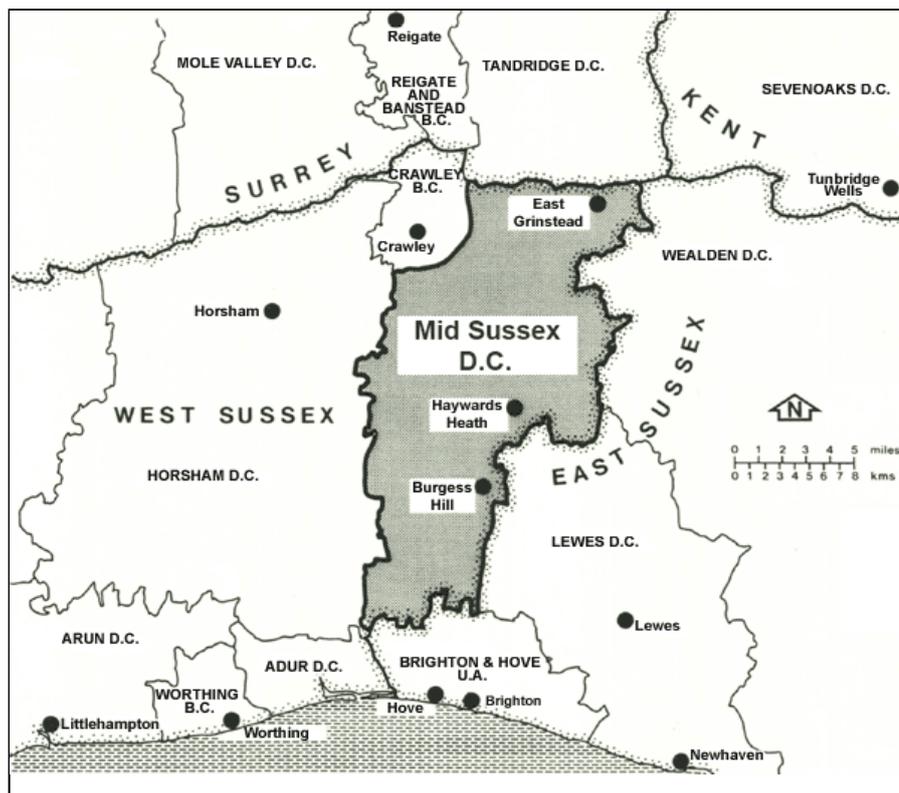
1 Introduction

1.1 Description of Local Authority Area

Mid Sussex District Council is located within the County of West Sussex. More than half the area is designated as an Area of Outstanding Natural Beauty and areas to the south of the district are part of the South Downs National Park (designated in 2009). It lies on the eastern edge of the county and shares boundaries with East Sussex to the east, Surrey to the north and Brighton and Hove to the south.

Mid Sussex covers an area of some 33,400 hectares (approximately 128 square miles) and includes the three main towns of East Grinstead, Burgess Hill and Haywards Heath in a predominantly rural area in which there are some 25 villages and many small hamlets.

The District has a population of approximately 128,000. Sixty percent of the population live in the three main towns. It is well served by transport links to London, Gatwick Airport, the coast and Europe.



1.2 Purpose of Progress Report

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

They are not intended to be as detailed as the Updating and Screening Assessment Reports.

1.3 Air Quality Objectives

The air quality objectives applicable to Local Air Quality Management (LAQM) in **England** are set out in the Air Quality (England) Regulations 2000 (SI 928), and the Air Quality (England) (Amendment) Regulations 2002 (SI 3043). They are shown in Table 1.1. 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 1.1. includes the number of permitted exceedences in any given year (where applicable).

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

Pollutant	Concentration	Measured as	Date to be achieved by
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

1.4 Summary of Previous Review and Assessments

Under the Environment Act 1995, local authorities are required to Review and Assess air quality on a regular basis. A *review* of air quality means a consideration of the levels of pollutants in the air for which objectives are prescribed in Regulations¹, and estimations of future levels. An *assessment* of air quality is the consideration of whether estimated levels for the relevant future period are likely to exceed the levels set in the objectives.

The first review and assessment round for Mid Sussex District Council was completed in June 2000 and concluded that the national air quality objectives were not likely to be exceeded at any locations in the District. The second round of review and assessment was completed in April 2006 and concluded again that the national air quality objectives were not likely to be exceeded at any locations in the District.

The Air Quality Progress Report for 2008 identified the measured and predicted results for both the annual mean, and the number of exceedences of the hourly levels over 12 months, would be met for 10 of the sites being monitored for nitrogen dioxide.

The measured levels at the Stonepound crossroads area, Hassocks indicated the annual mean air quality objective for nitrogen dioxide was likely to be exceeded. Additional monitoring of the area was, therefore, to be undertaken to determine if the authority will need to declare an Air Quality Management Area (AQMA).

The Updating & Screening Assessment 2009 confirmed that there were exceedences for the annual mean air quality objective for nitrogen dioxide at 2 sites in the Stonepound crossroads area of Hassocks (Site ID's MSAQ10 & MSAQ11) and there were potential exceedences of the annual mean air quality objective identified at 3 sites in the Stonepound crossroads area of Hassocks (Site ID's MSAQ12 MSAQ13 & MSAQ14).

One of these sites has relevant exposure (Site ID MSAQ13).

A Detailed Assessment is, therefore, required for the Stonepound crossroads area of Hassocks.

This will be completed in June 2010.

A summary of previous reports are contained in Table 1.2

Table 1.2 Summary of Previous Air Quality Review and Assessments

Previous Review /Assessment	Date	Exceedences	AQMA's Declared	Outcome
Stage 1 Review & Assessment Report	Dec 1998	None	None	
Stage 2 Review & Assessment Report	June 2000	None	None	
Updating & Screening Assessment 2003 *	April 2003	None	None	
Air Quality Progress Report 2004 *	April 2004	None	None	
Air Quality Progress Report 2005 *	April 2005	None	None	
Updating & Screening Assessment 2006 *	April 2006	None	None	
Air Quality Progress Report 2007 *	April 2007	None	None	
Air Quality Progress Report 2008 *	April 2008	NO ₂ at 2 sites	None	Detailed Assessment Required for NO ₂
Updating & Screening Assessment 2009 *	May 2009	NO ₂ at 2 sites	None	Detailed Assessment Required for NO ₂

* Copies of these reports are available on the Council's website at:-
<http://www.midsussex.gov.uk/page.cfm?pageID=2231>

2 New Monitoring Data

2.1 Summary of Monitoring Undertaken

2.1.1 Automatic Monitoring Sites

Monitoring of air quality across Sussex.

Mid Sussex District Council are members of the Sussex Air Quality Partnership (Sussex Air) which benefits from the co-ordinated monitoring of air pollutants across the region. The Sussex Air Quality Monitoring Network is managed and co-ordinated by King's College London ERG, on behalf of Sussex-air. Refer to www.sussex-air.net. Mid Sussex have no automatic monitoring sites at present.

Table 2.1 Sussex air quality monitoring stations and pollutants monitored in 2009

Authority	Location	Pollutant
Adur	Shoreham High St	NO _x
Brighton & Hove C.C. Roadside	Pavilion Gate House	NO _x
Brighton & Hove C.C. Roadside	Hove Town Hall	NO _x
Brighton & Hove C.C. Background	Foredown Tower	O ₃
Brighton & Hove C.C. Mobile	Variable	NO _x , PM ₁₀
Chichester D.C.	A27 Ring Road	PM ₁₀ , NO _x
Chichester D.C.	Lodsworth	O ₃
Chichester D.C.	Orchard Street	NO _x
Crawley B.C.	East Gatwick	NO _x
Eastbourne B.C.	Willingdon Trees	PM ₁₀ , NO _x , PM _{2.5}
Eastbourne B.C.	Devonshire Park	PM ₁₀ , NO _x , O ₃
Hastings B.C. Roadside	Bulverhythe	PM ₁₀ , NO _x
Hastings B.C.	Freshfields	PM ₁₀ , NO _x
Horsham D.C.	Horsham centre	PM ₁₀ , NO _x
Lewes D.C. Urban Roadside	Telscombe Cliffs	PM ₁₀ , NO _x , O ₃
Lewes D.C. Roadside	Town Centre	PM ₁₀ , NO _x
Rother D.C.	Rye Harbour	O ₃
Rother D.C.	Bexhill (A259)	NO _x , PM ₁₀
Horsham D.C. - AURN	Storrington	PM ₁₀ , NO _x

Authority	Location	Pollutant
Worthing B.C.	High St, Worthing	NO _x
Wealden D.C.	Isfield	O ₃
Sussex County Lab.	Mobile unit	PM ₁₀ , NO _x , O ₃
DEFRA - AURN	Preston Park, Brighton	NO _x , PM ₁₀
DEFRA - AURN	Lullington Heath, Wealden	NO _x , O ₃ , SO ₂

Key:

- NO_x - oxides of nitrogen (includes NO₂ nitrogen dioxide)
O₃ - ozone
PM₁₀ - particles less than 10 microns
SO₂ - sulphur dioxide

2.1.2 Non-Automatic Monitoring

Across the District there are 19 locations where nitrogen dioxide diffusion tubes are located.

See Figure 2.1 and Table 2.2 for the location of these monitoring sites.

The Air Quality Progress Report 2008 indicated the Stonepound crossroads, Hassocks location as an area at risk of exceeding the annual mean air quality objective for nitrogen dioxide and consequently 8 additional monitoring sites were added to the network in July 2008.

Results at Stonepound for 2009 indicate there are 5 sites which **exceed** the annual mean air quality objective, 4 of which have relevant exposure.

Figure 2.1 Map of of Non-Automatic Monitoring Sites

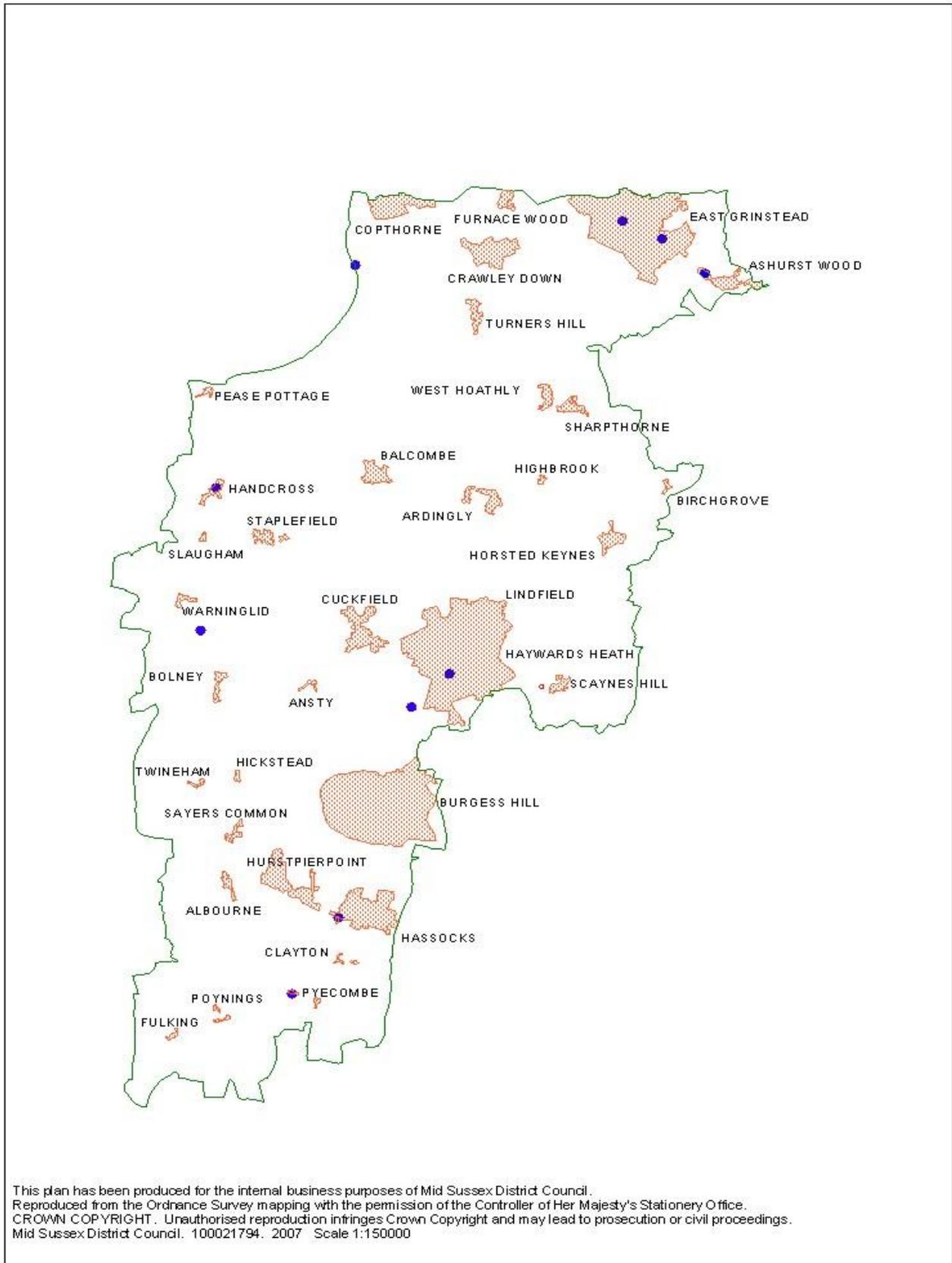


Table 2.2 Details of Non-Automatic Monitoring Sites

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)
South Road Haywards Heath	Roadside	X 533342 Y 123588	NO ₂	N	Y (0m)	2.5m
Partly constructed Haywards Heath Relief Road	Roadside	X 532184 Y 122459	NO ₂	N	N	N/A
London Road East Grinstead	Kerbside	X 538690 Y 138757	NO ₂	N	N	0.5m
Court Close East Grinstead	Suburban	X 539919 Y 138162	NO ₂	N	Y (14m)	0.5m
Lewes Road East Grinstead	Suburban	X 541243 Y 136998	NO ₂	N	N	1.5m
Smugglers End Handcross	Roadside	X 526134 Y 129828	NO ₂	N	Y (0m)	N/A
Crabbet Park Worth	Suburban	X 530440 Y 137280	NO ₂	N	Y (0m)	N/A
Pyecombe Street Pyecombe	Roadside	X 528477 Y 112870	NO ₂	N	Y (12m)	1m
Water Tower Colwood Lane Warninglid	Rural	X 525658 Y 125037	NO ₂	N	N	N/A
Stonepound 1 Keymer Road Hassocks	Roadside	X 529911 Y 115489	NO ₂	N	Y (6.7m)	1.5m
Stonepound 2 Keymer Road Hassocks	Roadside	X 529924 Y 115482	NO ₂	N	Y (0m)	3.1m
Bus Stop Keymer Road Hassocks	Kerbside	X 530006 Y 115484	NO ₂	N	N	1.1m
Lamp Post Keymer Road Hassocks	Kerbside	X 530044 Y 115472	NO ₂	N	Y (10.3m)	0.85m
Façade of residential premises Brighton Road Hassocks	Roadside	X 529916 Y 115442	NO ₂	N	Y (0m)	11.5m
Lamp Post Brighton Road Hassocks	Kerbside	X 529984 Y 115344	NO ₂	N	Y (10m)	1.25m
Bus Stop Brighton Road Hassocks	Kerbside	X 529907 Y 115445	NO ₂	N	Y (9.8m)	1.98m

Lamp Post Hurst Road Hassocks	Roadside	X 529804 Y 115549	NO ₂	N	Y (13m)	1.3m
Bus Stop London Road Hassocks	Kerbside	X 529911 Y 115598	NO ₂	N	N	1.7m
Traffic Light Sign London Road Hassocks	Kerbside	X 529932 Y 115603	NO ₂	N	Y (7m)	1.6m

2.2 Comparison of Monitoring Results with Air Quality Objectives

2.2.1 Nitrogen Dioxide

Nitrogen dioxide is a respiratory irritant associated with both acute (short-term) and chronic (long-term) effects on human health, particularly in people with asthma. Nitrogen dioxide (NO₂) and nitric oxide (NO) are both oxides of nitrogen, and are collectively referred to as nitrogen oxides (NO_x). All combustion processes produce NO_x emissions, largely in the form of nitric oxide which is then converted to nitrogen dioxide mainly as a result of reaction with ozone in the atmosphere.

The principal source of nitrogen oxides emissions in the UK is road transport. Major roads carrying large volumes of high-speed traffic are a predominant source, as are conurbations and city centres with congested traffic. Other significant sources of nitrogen oxides emissions include the electricity supply industry. Industrial sources only make a small contribution to annual mean nitrogen dioxide levels.

Automatic Monitoring Data

Mid Sussex has no automatic monitoring sites.

Non - Automatic Monitoring Data

Mid Sussex District Council operate a number of diffusion tube sampling sites. The results of sampling are contained in Table 2.2a. All data have been ratified (Appendix 1), and extrapolated to cover a calendar year where necessary, as stipulated in the technical guidance TG(09).

The 2009 annual means were below the NO₂ objective at most monitoring sites. However, the objective was exceeded at the following locations:

- London Road East Grinstead - no action required as no relevant exposure (Site reference: MSAQ3)
- Lewes Road East Grinstead - no action required as no relevant exposure (Site reference: MSAQ5)

- Stonepound 1, Keymer Road, Hassocks* - A Detailed Assessment is ongoing (Site reference: MSAQ10)
- Stonepound 2, Keymer Road, Hassocks* - A Detailed Assessment is ongoing (Site reference: MSAQ11)
- Bus Stop, Keymer Road, Hassocks - no action required as no relevant exposure (Site reference: MSAQ12)
- Lamp post, Keymer Road, Hassocks* - A Detailed Assessment is ongoing (Site reference: MSAQ13)
- Bus Stop, London Road Hassocks - no action required as no relevant exposure (Site reference: MSAQ14)
- Traffic Light sign, London Road, Hassocks* - A Detailed Assessment is ongoing (Site reference: MSAQ15)

* These are sites with relevant exposure i.e. residential premises within 15 m of a monitoring site, or places where the public may be regularly exposed.

Diffusion Tube Monitoring Data

Table 2.2a Annual mean concentrations of Nitrogen Dioxide measured using diffusion tubes January to December 2009

Site ID	Location	Within AQMA?	Data Capture 2009 %	Annual mean concentrations 2009 ($\mu\text{g}/\text{m}^3$)	Annual mean concentrations 2009 ($\mu\text{g}/\text{m}^3$) Adjusted for bias (0.84) ⁽¹⁾	Notes
MSAQ1	South Road Haywards Heath	N	100	31.8	26.7	Relevant exposure
MSAQ2	Partly constructed Haywards Heath Relief Road	N	91.7	17.8	15.0	Not relevant exposure.
MSAQ3	London Road East Grinstead	N	100	53.0	44.5	Not relevant exposure. Estimated Concentration at nearest receptor $25.0(\mu\text{g}/\text{m}^3)$ ⁽⁴⁾
MSAQ4	Court Close East Grinstead	N	100	27.0	22.7	Relevant exposure
MSAQ5	Lewes Road East Grinstead	N	100	48.5	40.7	Not relevant exposure Concentration at nearest receptor $25.8(\mu\text{g}/\text{m}^3)$ ⁽⁴⁾
MSAQ6	Smugglers End Handcross	N	100	38.3	32.1	Relevant exposure
MSAQ7	Crabbet Park Worth	N	100	35.8	30.1	Relevant exposure
MSAQ8	Pyecombe Street Pyecombe	N	100	40.4	33.9	Relevant exposure
MSAQ9	Water Tower Colwood Lane	N	91.7	14.0	11.7	Not relevant exposure.

	Warninglid					
MSAQ10	Stonepound 1 Keymer Road Hassocks ⁽²⁾	N	100	60.4	50.7	Relevant exposure Trilocated tubes
MSAQ11	Stonepound 2 Keymer Road Hassocks ⁽²⁾	N	100	60.0	50.4	Relevant exposure Trilocated tubes
MSAQ12	Bus Stop Keymer Road Hassocks	N	75	58.8	45.5 ⁽³⁾	Not relevant exposure. Concentration at nearest receptor 30($\mu\text{g}/\text{m}^3$) ⁽⁴⁾
MSAQ13	Lamp Post Keymer Road Hassocks	N	100	53.0	44.5	Relevant exposure
MSAQ14	Bus Stop London Road Hassocks	N	100	52.2	43.8	Not relevant exposure. Concentration at nearest receptor 24.9($\mu\text{g}/\text{m}^3$) ⁽⁴⁾
MSAQ15	Traffic Light Sign London Road Hassocks	N	100	49.1	41.3	Relevant exposure
MSAQ16	Façade of residential premises Brighton Road Hassocks	N	100	29.2	24.5	Relevant exposure
MSAQ17	Lamp Post Brighton Road Hassocks	N	100	30.5	25.6	Relevant exposure
MSAQ18	Bus Stop Brighton Road Hassocks	N	83.3	42.1	35.3	Relevant exposure
MSAQ19	Lamp Post Hurst Road Hassocks	N	91.7	27.6	23.2	Relevant exposure

⁽¹⁾ Bias adjustment factor taken from the Review and Assessment website
(<http://www.uwe.ac.uk/aqm/review/R&Asupport/diffusiontube310310.xls>)

⁽²⁾ Trilocated diffusion tubes

⁽³⁾ Only nine months of data was available due to theft.

The estimated annual mean was obtained using the method in Box 3.2 of the Local Air Quality Management Technical Guidance TG(09). See Appendix C.

⁽⁴⁾ Concentration at nearest receptor calculated using the spreadsheet available at :-
(<http://www.airquality.co.uk/laqm/tools/NO2withDistancefromRoadsCalculatorIssue2.xls>)

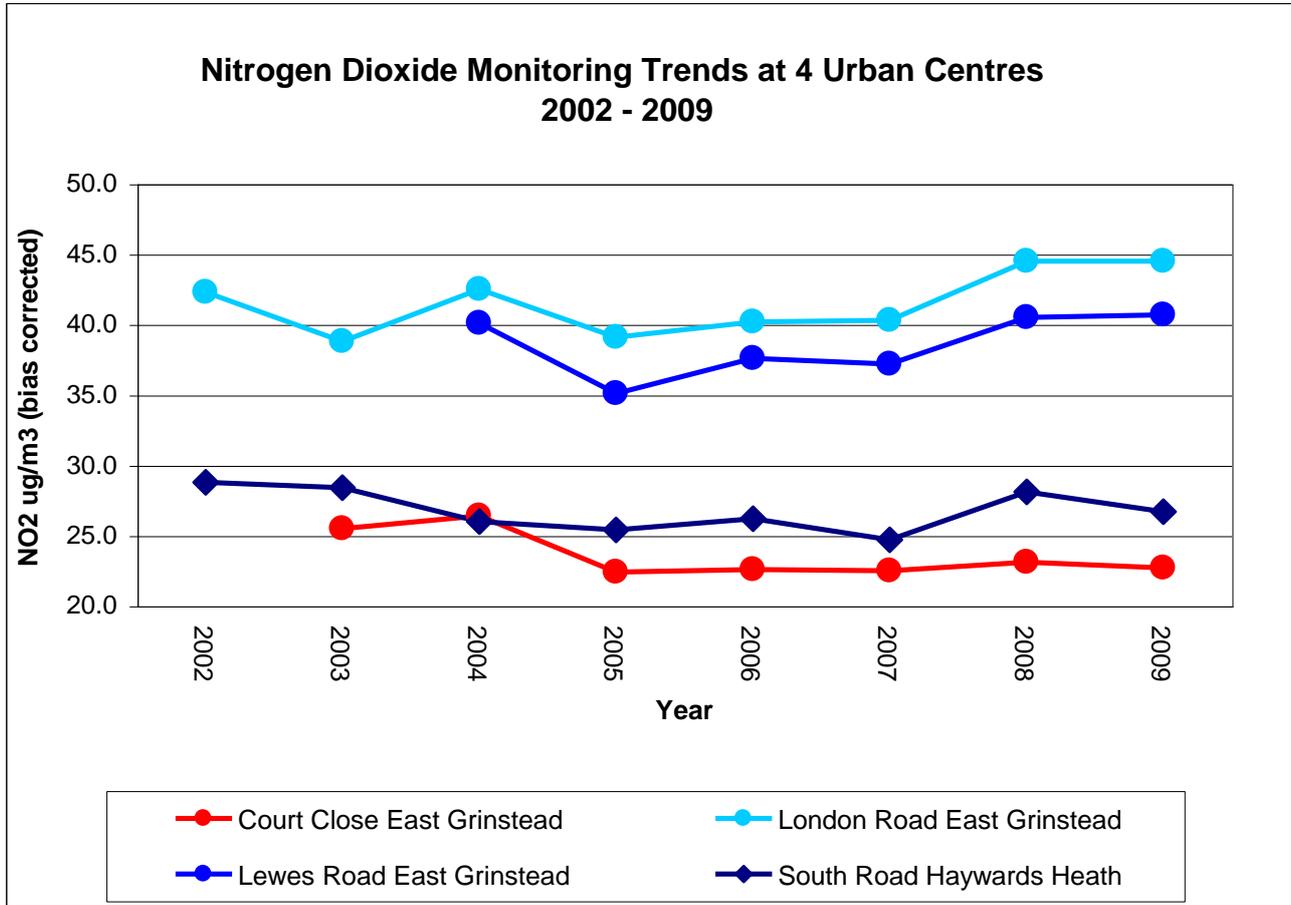
Table 2.2b Annual mean concentrations (bias corrected) 2002 to 2009 of Nitrogen Dioxide diffusion tube measurements

Site ID	Location	Within AQMA?	Annual mean concentrations ($\mu\text{g}/\text{m}^3$) Adjusted for bias							
			2002 (1.16 bias)	2003 (0.87 bias)	2004 (0.95 bias)	2005 (0.95 bias)	2006 (0.90 ias)	2007 (0.77 bias)	2008 (0.87 bias)	2009 (0.84 bias)
MSAQ1	South Road Haywards Heath	N	28.8	28.4	26.0	25.4	26.2	24.7	28.1	26.7
MSAQ2	Partly constructed Haywards Heath Relief Road	N	N/A	N/A	N/A	N/A	14.5	14.5	14.7	15.0
MSAQ3	London Road East Grinstead	N	42.3	38.8	42.5	39.1	40.2	40.3	44.5	44.5
MSAQ4	Court Close East Grinstead	N	31.8	25.5	26.4	22.4	22.6	22.5	23.1	22.7
MSAQ5	Lewes Road East Grinstead	N	41.4	37.7	40.1	35.1	37.6	37.2	40.5	40.7
MSAQ6	Smugglers End Handcross	N	34.0	27.1	30.7	27.6	28.5	28.9	32.3	32.1
MSAQ7	Crabbet Park Worth	N	33.4	28.5	30.0	27.0	30.4	29.2	32.5	30.1
MSAQ8	Pyecombe Street Pyecombe	N	31.9	29.1	31.0	25.0	29.0	27.6	33.5	33.9
MSAQ9	Water Tower Colwood Lane Warminglid	N	12.1	12.6	12.5	11.8	11.4	11.2	11.3	11.7
MSAQ10	Stonepound 1 Keymer Road Hassocks	N	43.3	42.8	40.1	36.3	41.0	40.9	48.7	50.7
MSAQ11	Stonepound 2 Keymer Road Hassocks	N	N/A	N/A	N/A	39.4	44.7	44.1	48.1	50.4
MSAQ12	Bus Stop Keymer Road Hassocks	N	N/A	N/A	N/A	N/A	N/A	N/A	46.4*	45.5
MSAQ13	Lamp Post Keymer Road Hassocks	N	N/A	N/A	N/A	N/A	N/A	N/A	43.2*	44.5
MSAQ14	Bus Stop London Road Hassocks	N	N/A	N/A	N/A	N/A	N/A	N/A	42.4*	43.8
MSAQ15	Traffic Light Sign London Road Hassocks	N	N/A	N/A	N/A	N/A	N/A	N/A	39.3*	41.3
MSAQ16	Façade of residential premises Brighton Road Hassocks	N	N/A	N/A	N/A	N/A	N/A	N/A	26.5*	24.5
MSAQ17	Lamp Post Brighton Road Hassocks	N	N/A	N/A	N/A	N/A	N/A	N/A	25.0*	25.6
MSAQ18	Bus Stop Brighton Road Hassocks	N	N/A	N/A	N/A	N/A	N/A	N/A	32.1*	35.3
MSAQ19	Lamp Post Hurst Road Hassocks	N	N/A	N/A	N/A	N/A	N/A	N/A	22.3*	23.2

* Only six months data was available as the tubes were installed in July 2008.

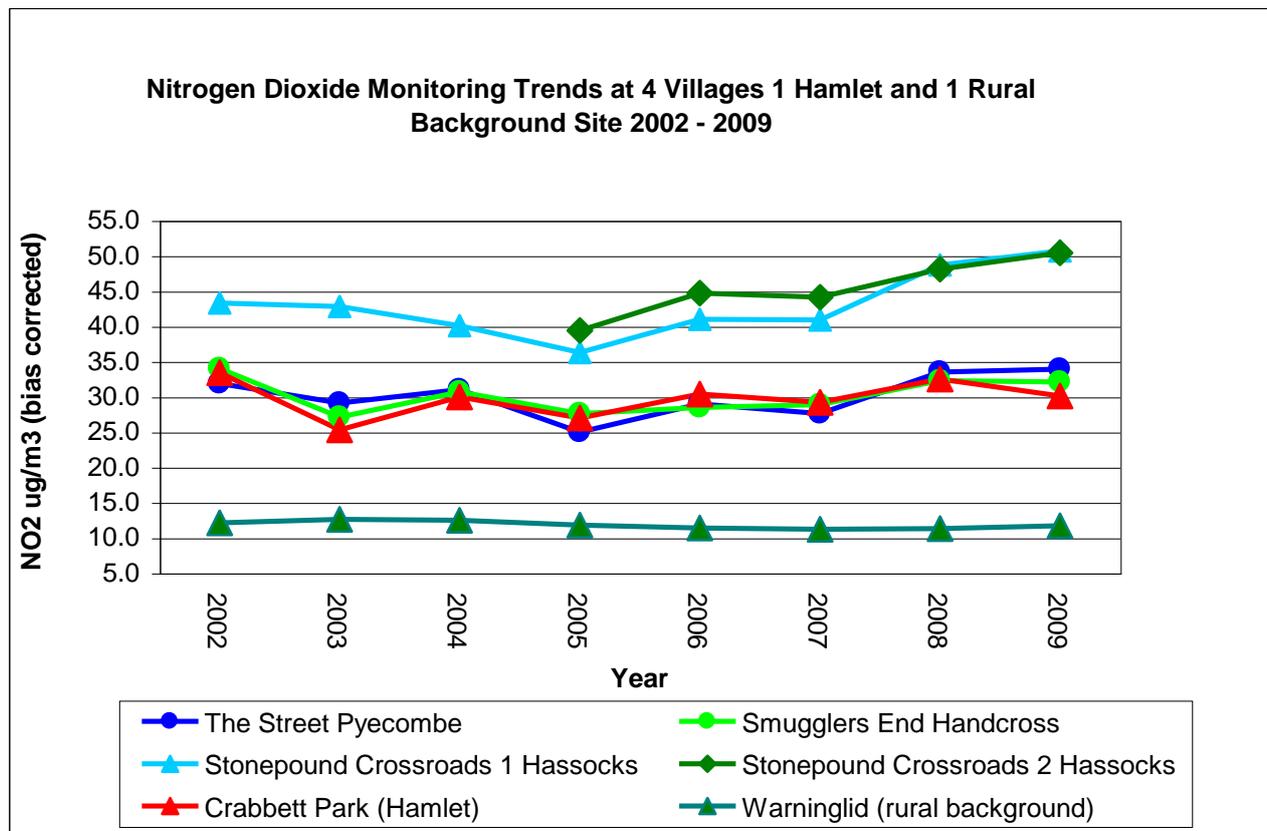
The estimated annual mean was obtained using the method in Box 3.2 of the Local Air Quality Management Technical Guidance TG(09). See Appendix C

Graph 2.2 a Annual mean concentrations (bias corrected) 2002 to 2009 of nitrogen dioxide diffusion tube measurements at 4 urban centre sites



From 2005 to 2009 there has been a gradual increase in the monitored levels of nitrogen dioxide at 3 of the 4 urban centres. As the major source of NO₂ is traffic at these locations this indicates an increase in the number of vehicles using the road/s adjacent to the monitoring sites. South Road showed a slight decline in levels in 2009.

Graph 2.2 b Annual mean concentrations (bias corrected) 2002 to 2009 of nitrogen dioxide diffusion tube measurements at 4 Villages, 1 Hamlet and 1 Rural Background site



From 2005 to 2009 there has been a gradual increase in the monitored levels of nitrogen dioxide at 4 of the sites. As the major source of NO₂ is traffic at these locations this indicates an increase in the number of vehicles using the road/s adjacent to the monitoring sites. Crabbett Park showed a slight decline and the rural background has stayed steady.

Nitrogen Dioxide Monitoring Trends at Stonepound Hassocks

Site ID	Location	Within AQMA?	Annual mean concentrations ($\mu\text{g}/\text{m}^3$) Adjusted for bias							
			2002 (1.16 bias)	2003 (0.87 bias)	2004 (0.95 bias)	2005 (0.95 bias)	2006 (0.90 bias)	2007 (0.77 bias)	2008 (0.87 bias)	2009 (0.84 bias)
MSAQ10	Stonepound 1 Keymer Road Hassocks	N	43.3	42.8	40.1	36.3	41.0	40.9	48.7	50.7
MSAQ11	Stonepound 2 Keymer Road Hassocks	N	N/A	N/A	N/A	39.4	44.7	44.1	48.1	50.4
MSAQ12	Bus Stop Keymer Road Hassocks	N	N/A	N/A	N/A	N/A	N/A	N/A	46.4*	45.5
MSAQ13	Lamp Post Keymer Road Hassocks	N	N/A	N/A	N/A	N/A	N/A	N/A	43.2*	44.5
MSAQ14	Bus Stop London Road Hassocks	N	N/A	N/A	N/A	N/A	N/A	N/A	42.4*	43.8
MSAQ15	Traffic Light Sign London Road Hassocks	N	N/A	N/A	N/A	N/A	N/A	N/A	39.3*	41.3
MSAQ16	Façade of residential premises Brighton Road Hassocks	N	N/A	N/A	N/A	N/A	N/A	N/A	26.5*	24.5
MSAQ17	Lamp Post Brighton Road Hassocks	N	N/A	N/A	N/A	N/A	N/A	N/A	25.0*	25.6
MSAQ18	Bus Stop Brighton Road Hassocks	N	N/A	N/A	N/A	N/A	N/A	N/A	32.1*	35.3
MSAQ19	Lamp Post Hurst Road Hassocks	N	N/A	N/A	N/A	N/A	N/A	N/A	22.3*	23.2

The monitored levels in bold represent sites where the Air Quality Objective has been exceeded.

The levels recorded at Stonepound 1 since 2002 & Stonepound 2 since 2006 have shown a gradual increase. The levels at the other sites have only been monitored for 18 months and so a trend cannot yet be determined, however, results for 4 of the sites indicate the Air Quality Objective has been exceeded

Conclusion

A Detailed Assessment is required for these locations in the Hassocks area which could lead to the declaration of an Air quality Management area (AQMA) and subsequently an Action Plan detailing how the detected NO₂ levels will be reduced.

2.2.2 PM₁₀

Particulate matter is of major health concern, as it has been linked with both increased morbidity and premature mortality. There is a wide range of emission sources that contribute to PM₁₀ concentrations in the UK. These emissions can be divided into three categories :-

1. Primary particles - emissions from combustion sources including road traffic, power generation, industrial processes etc
2. Secondary particles - formed by chemical reactions in the atmosphere and comprised principally of sulphates and nitrates
3. Coarse particles - emissions from a wide range of sources including re-suspended dusts from road traffic, construction works, mineral extraction etc.

As detailed in the Progress Report 2008, Mid Sussex District Council does not have a monitoring site for PM₁₀ in the District.

However, results from the Sussex Air Network's permanent automatic monitoring sites indicate the objective for PM₁₀ has not been exceeded across Sussex and, therefore, it is unlikely that it will be exceeded in future years in Mid Sussex as no new industrial developments are currently planned in the District.

2.2.3 Sulphur Dioxide

Sulphur dioxide is an acute respiratory irritant, hence the short averaging time for its objective. The main source of sulphur dioxide in the UK is power stations. There are also significant emissions from other industrial processes.

As no new industrial sources or sources with substantially increased emissions have been identified and local knowledge indicates that there are no significant increase in domestic sources, it is concluded that the sulphur dioxide objective will not be exceeded in the Mid Sussex Area.

2.2.4 Benzene

Benzene is a known human carcinogen and also contributes to the formation of ground level ozone. The main source of benzene emissions in the UK are petrol vehicles, petrol refining, and the fuel distribution from those petrol stations without vapour recovery systems.

Results from benzene diffusion tube monitoring in Mid Sussex were considered in the Updating & Screening Assessment 2003 and the Progress Reports for 2004 and 2005 and indicated the benzene objective would not be exceeded then or in the future.

Summary of Compliance with Air Quality Standards Objectives

Mid Sussex District Council has measured concentrations of nitrogen dioxide above the annual mean objective at 4 relevant locations and **are undertaking a Detailed Assessment** for the Stonepound Crossroads area in Hassocks.

3 New Local Developments

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

3.1 Road Traffic Sources

Mid Sussex confirms that there are no new/newly identified road traffic sources in the District since the 2009 Updating and Screening Assessment.

3.2 Other Transport Sources

Mid Sussex confirms that there are no airports, ports or locations with a large number of movements of diesel locomotives or sites where diesel / steam trains are regularly stationary for 15 minutes or more with relevant exposure within 15m, in the Local Authority area.

3.3 Industrial Sources

New or proposed installations

Mid Sussex confirms that there are no new or proposed industrial installations for which an air quality assessment has been undertaken or planning approval has been granted within its area or nearby in a neighbouring authority.

Existing installations with increased emissions or new relevant exposure

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

New or significantly changed installations with no previous air quality assessment

Mid Sussex confirms that there are no new or significantly changed industrial installations with no previous air quality assessment for which planning approval has been granted within its area or nearby in a neighbouring authority.

Major fuel storage depots

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

Petrol Stations

Mid Sussex confirms there are no new petrol stations meeting the specified criteria.

Poultry Farms

Mid Sussex confirms that there are no new poultry farms meeting the specified criteria.

3.4 Commercial and Domestic Sources

Mid Sussex confirms that there are no biomass combustion plant or areas of significant domestic solid fuel burning in the Local Authority area.

3.5 New Developments with Fugitive or Uncontrolled Sources

Mid Sussex confirms that there are no new potential sources of fugitive particulate matter emissions in the Local Authority area.

4 Conclusions and Proposed Actions

4.1 Conclusions from New Monitoring Data

Exceedences of the annual nitrogen dioxide objective have been identified at :-

- London Road, East Grinstead - no action required as no relevant exposure
- Lewes Road, East Grinstead - no action required as no relevant exposure
- Stonepound 1, Keymer Road, Hassocks - action required
- Stonepound 2, Keymer Road, Hassocks – action required
- Bus Stop, Keymer Road, Hassocks - no action required as no relevant exposure
- Lamp post, Keymer Road, Hassocks – action required
- Bus Stop, London Road, Hassocks - no action required as no relevant exposure
- Traffic light sign, London Road, Hassocks – action required

4.2 Conclusions relating to New Local Developments

There are no planned new local developments that will require detailed consideration in the next Updating & Screening Assessment

4.3 Proposed Actions

A Detailed Assessment is required for the Stonepound crossroads area of Hassocks for nitrogen dioxide (NO₂).

This will be completed in June 2010.

5 References

DEFRA (2002) The Air Quality (England) (Amendment) Regulations. HMSO.

DEFRA (2003) The Air Quality Strategy for England, Scotland, Wales and Northern Ireland: Addendum. HMSO.

DETR (2000) The Air Quality (England) Regulations. HMSO.

DETR (2000) The Air Quality Strategy for England, Scotland, Wales and Northern Ireland. HMSO.

DEFRA (2009) Local Air Quality Management Policy Guidance. LAQM.PG(09)

DEFRA (2009) Local Air Quality Management Technical Guidance. LAQM.TG(09)

DEFRA (2009) Local Air Quality Management Technical Guidance, FAQs relative to USA 2009
<http://www.uwe.ac.uk/aqm/review/index.html>

APEG (1999) Source apportionment of airborne particulate matter in the United Kingdom. Report of the Airborne Particles Expert Group.

The Environment Act (1995)

The Environmental Protection Act (1990)

Appendices

Appendix A: QA/QC Data

Diffusion Tube Bias Adjustment Factors

The laboratory supplying our diffusion tubes is Bristol City Scientific Services.

The tubes are prepared using 20% triethanolamine (TEA) in water.

The bias adjustment factor of 0.84 was obtained from the Review and Assessment website

(<http://www.uwe.ac.uk/aqm/review/R&Asupport/diffusiontube310310.xls>)

QA/QC of diffusion tube monitoring



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North East Somerset,
North Somerset and
South Gloucestershire*

4th February 2010

QA/QC Information for Nitrogen Dioxide Diffusion Tubes

In response to several requests for information on our procedures and QA/QC I hope the following notes are helpful:

We follow the procedures detailed in "Diffusion Tubes for Ambient NO₂ Monitoring: Practical Guidance" published by AEA Energy & Environment in February 2008.

We prepare the tubes using 50µl of 20% triethanolamine (TEA) in water.

There are various parts to the QA/QC procedures:

- We run a full calibration each month and this is checked by running standards in each batch of tubes analysed. A typical batch size for us is 50 tubes – in this we run a high, medium and blank standard at the beginning of the run, a check medium standard and blank mid-run, and a high, medium and blank standard at the end of the run.
- The calibration is verified using a solution provided by AEA Energy & Environment as detailed in the "Practical Guidance".
- We participate in the WASP scheme (Workplace Analysis Scheme for Proficiency) in which we are provided with four spiked tubes every quarter. From the data it is possible to calculate a standardised result (µg NO₂ reported divided by actual spiked amount). Additionally it is possible to calculate a performance index where the aim is to reduce this to a minimum – currently a rolling performance minimum of less than or equal to 56.25 is classed as "good". I have included a summary of the data from these up to round 107 (end of 2009).
- I have also used the WASP data from rounds 102 to 107 to calculate uncertainty. The expanded uncertainty of the procedure using a coverage factor of 2 is 6.9%. It must be remembered that this is based on data for spiked tubes only so does not take into account uncertainty caused by tube preparation or exposure.
- We also participate in the field trial organised by WASP. Each month we send four tubes – three to be exposed and one blank. The data from these is compared to a reference concentration in order to obtain data including a bias factor. I have included a summary of all the data we have from 2009. The average bias correction for 2009 is currently at 0.86 but there are some concerns over what was taken as the reference value in some months. When I get the final data I will update the summary.

I hope all this is of some interest to you, but if require any further details please let me know.


S. D. Pearce
Principal Scientist



CUSTOMER SERVICE EXCELLENCE

WASP Results Lab 152 Round 97 onwards:

Round	97	98	99	100	101	102	103	104	105	106	107
Tube 1 (µg NO ₂)	0.890	1.865	2.085	1.358	0.949	1.489	1.178	1.179	1.689	1.730	2.038
Tube 2 (µg NO ₂)	1.573	1.228	2.093	1.474	2.576	1.431	0.916	1.108	1.006	1.662	2.154
Tube 3 (µg NO ₂)	1.582	1.857	0.885	1.354	1.813	2.307	0.934	1.840	1.665	1.342	2.038
Tube 4 (µg NO ₂)	0.914	1.217	0.879	1.467	0.914	1.960	1.071	1.960	0.992	1.394	2.227
Spike tube 1 (µg NO ₂)	0.890	1.830	2.150	1.360	0.920	1.370	1.220	1.220	1.680	1.840	2.030
Spike tube 2 (µg NO ₂)	1.580	1.190	2.150	1.470	1.860	1.370	0.940	1.220	0.960	1.840	2.200
Spike tube 3 (µg NO ₂)	1.580	1.830	0.840	1.360	1.860	2.280	0.940	2.020	1.680	1.420	2.030
Spike tube 4 (µg NO ₂)	0.890	1.190	0.840	1.470	0.920	2.280	1.220	2.020	0.960	1.420	2.200
Standardised result tube 1	1.000	1.019	0.970	0.999	1.032	1.087	0.966	0.966	1.005	0.940	1.004
Standardised result tube 2	0.996	1.032	0.973	1.003	1.385	1.045	0.974	0.908	1.048	0.903	0.979
Standardised result tube 3	1.001	1.015	1.054	0.996	0.975	1.012	0.994	0.911	0.991	0.945	1.004
Standardised result tube 4	1.027	1.023	1.046	0.998	0.993	0.860	0.878	0.970	1.033	0.982	1.012
Performance index	1.87	5.29	16.61	0.08	374.65	73.42	41.98	45.95	8.79	40.71	1.55
Rolling performance index (NOT best of 4 out of 5)				5.96	99.16	116.19	122.53	134.00	42.53	34.36	24.25
Rolling performance index (best 4 out of 5)				5.96	5.96	23.85	33.02	40.36	42.53	34.36	23.26
Performance classification (criteria from April 2009?)				Good	Good	Good	Good	Good	Good	Good	Good
Good =<56.25											
Acceptable =<225											
Unacceptable >225											

Field Trial Results 2009 - Lab 152

	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sept	Oct	Nov	Dec
Ref conc ($\mu\text{g}/\text{m}^3$)	114	97	112	103	105	100		115	84	115		
Mean of 3 tubes ($\mu\text{g}/\text{m}^3$)	140.00	104.27	116.93	116.53	127.90	119.77		129.07	107.53	132.30		
CoV	0.57	9.29	2.48	1.54	0.34	5.81		7.38	3.51	1.02		
Bias correction factor "A"	0.81	0.93	0.96	0.88	0.82	0.83		0.89	0.78	0.87		

Mean bias correction "A" **0.86**

Results of Bristol City Scientific Services Laboratory Precision

Checking Precision and Accuracy of Triplicate Tubes



Diffusion Tubes Measurements									
Period	Start Date dd/mm/yyyy	End Date dd/mm/yyyy	Tube 1 μgm^{-3}	Tube 2 μgm^{-3}	Tube 3 μgm^{-3}	Triplicate Mean	Standard Deviation	Coefficient of Variation (CV)	95% CI of mean
1	07/01/2009	04/02/2009	139.1	140.6	140.3	140	0.8	1	2.0
2	04/02/2009	04/03/2009	114.4	103.3	95.1	104	9.7	9	24.1
3	04/03/2009	31/03/2009	113.7	119.3	117.8	117	2.9	2	7.2
4	31/03/2009	29/04/2009	118.6	115.4	115.6	117	1.8	2	4.5
5	29/04/2009	03/06/2009	128.2	128.1	127.4	128	0.4	0	1.1
6	03/06/2009	01/07/2009	118.7	113.4	127.2	120	7.0	6	17.3
7	01/07/2009	29/07/2009							
8	29/07/2009	02/09/2009	124.6	122.6	140.0	129	9.5	7	23.7
9	02/09/2009	30/09/2009	103.4	108.4	110.8	108	3.8	4	9.4
10	07/10/2009	04/11/2009	132.2	133.7	131.0	132	1.4	1	3.4
11	04/11/2009	02/12/2009	160.9	157.5	159.1	159	1.7	1	4.2
12	02/12/2009	07/01/2010	126.1	121.4	133.4	127	6.0	5	15.0
13									

It is necessary to have results for at least two tubes in order to calculate the precision of the measurements

Automatic Method		Data Quality Check	
Period Mean	Data Capture (% DC)	Tubes Precision Check	Automatic Monitor Data
114	99.1	Good	Good
97	98.1	Good	Good
112	99.4	Good	Good
103	99.4	Good	Good
107	99.5	Good	Good
100	99.6	Good	Good
117	99.6		Good
115	99.2	Good	Good
84	95.1	Good	Good
112	99.3	Good	Good
126	99.6	Good	Good
103	99.5	Good	Good

Overall survey --> **Good precision** **Good Overall DC**

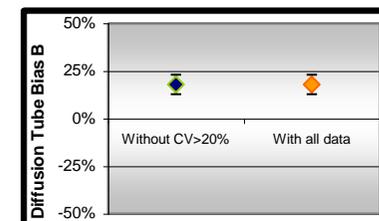
(Check average CV & DC from Accuracy calculations)

Site Name/ ID: **Bristol - Intercomp 2009**

Precision **11 out of 11 periods have a CV smaller than 20%**

Accuracy (with 95% confidence interval)	
without periods with CV larger than 20%	
Bias calculated using 11 periods of data	
Bias factor A	0.85 (0.81 - 0.89)
Bias B	18% (13% - 23%)
Diffusion Tubes Mean:	125 μgm^{-3}
Mean CV (Precision):	3
Automatic Mean:	107 μgm^{-3}
Data Capture for periods used:	99%
Adjusted Tubes Mean:	107 (102 - 112) μgm^{-3}

Accuracy (with 95% confidence interval)	
WITH ALL DATA	
Bias calculated using 11 periods of data	
Bias factor A	0.85 (0.81 - 0.89)
Bias B	18% (13% - 23%)
Diffusion Tubes Mean:	125 μgm^{-3}
Mean CV (Precision):	3
Automatic Mean:	107 μgm^{-3}
Data Capture for periods used:	99%
Adjusted Tubes Mean:	107 (102 - 112) μgm^{-3}



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Version 03 - November 2006

Appendix B:**Monthly Average Results of Nitrogen Dioxide Diffusion Tubes January to December 2009**

Site ID	Location	Monthly Average levels of NO ₂ (µg/m ³)											
		Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
MSAQ1	South Road Haywards Heath	39.3	37.7	34.4	33.6	26.3	30.7	24.7	25.8	30.1	32.3	30.6	35.5
MSAQ2	Partly constructed Haywards Heath Relief Road	27.2	22.4	20.0	17.0	11.0	11.7		12.6	14.8	19.5	13.6	26.4
MSAQ3	London Road East Grinstead	56.7	65.6	53.4	58.0	44.4	53.0	46.5	46.2	51.8	59.5	54.7	46.2
MSAQ4	Court Close East Grinstead	35.8	35.9	30.8	25.7	16.7	23.0	18.9	26.2	26.3	27.3	24.7	32.9
MSAQ5	Lewes Road East Grinstead	51.8	57.1	47.8	49.3	45.8	44.6	40.7	41.4	61.0	51.8	46.5	43.7
MSAQ6	Smugglers End Handcross	37.8	50.0	39.3	37.1	32.9	37.6	39.9	37.7	38.7	38.5	35.7	34.0
MSAQ7	Crabbet Park Worth	41.4	45.5	36.8	36.8	27.9	31.5	33.7	35.3	37.6	33.5	37.2	32.4
MSAQ8	Pyecombe Street Pyecombe	49.9	42.1	43.8	45.2	36.1	32.2	41.6	41.5	31.6	46.9	43.2	30.2
MSAQ9	Water Tower Colwood Lane Warninglid	18.6	15.2	14.0		9.1	10.6	6.3	8.8	14.7	17.8	13.5	25.0
MSAQ10	Stonepound 1 Keymer Road Hassocks	60.0	62.2	56.6	66.2	61.6	74.8	45.1	51.7	67.7	65.9	47.6	64.8
MSAQ11	Stonepound 2 Keymer Road Hassocks	55.0	57.4	60.6	61.7	57.1	67.8	54.3	51.5	68.7	63.8	57.4	64.1
MSAQ12	Bus Stop Keymer Road Hassocks	54.9	67.6	62.5	58.9	56.1			48.3	64.6	58.0		58.2
MSAQ13	Lamp Post Keymer Road Hassocks	58.5	60.0	60.2	52.3	41.4	52.8	36.0	37.3	68.0	62.6	45.2	61.5
MSAQ14	Bus Stop London Road Hassocks	55.8	38.6	45.5	64.0	52.6	58.9	55.4	56.4	35.7	56.5	60.5	46.4
MSAQ15	Traffic Light Sign London Road Hassocks	52.2	48.1	47.7	56.6	45.9	57.9	47.8	46.5	48.6	46.2	46.7	45.4
MSAQ16	Façade of residential premises Brighton Road Hassocks	30.9	35.1	30.4	29.9	23.9	25.7	21.0	25.0	34.2	35.2	22.2	36.7
MSAQ17	Lamp Post Brighton Road Hassocks	36.9	33.5	30.7	32.1	24.6	31.8	18.6	22.9	34.1	37.7	25.0	
MSAQ18	Bus Stop Brighton Road Hassocks	41.1	53.2	49.0	41.0	37.1	44.0	37.5	46.2		31.2	40.2	
MSAQ19	Lamp Post Hurst Road Hassocks	41.2	32.9	31.5		20.3	25.9	18.7	21.4	22.1	32.9	21.2	35.8

Appendix C:

Annualisation of monitoring results

NO₂ results at Bus Stop Keymer Road Hassocks 2009

The NO₂ annual mean from 3 long term continuous monitors was obtained for 2009 from the Air Quality Archive web site :- <http://www.airquality.co.uk>

The monitors lie within a 50 mile radius of the Stonepound, Hassocks area.

The annual mean (Am) was then divided by the period mean (Pm) to obtain a Ratio.

Annual Mean obtained from Air Quality Archive Web Site			
Long Term Site	Annual Mean 2009 (Am)	Period Mean 2009 (Pm)	Ratio (Am/Pm)
Brighton Preston Park (Urban Background)	19	21	0.905
Horley (Urban Background)	26	27.3	0.952
Portsmouth (Urban Background)	22	24.2	0.909
		Average (R_a)	0.922

Short Term Site	Mean NO ₂ Jan to Dec 2009 = (A)	Bias Corrected = (A)*0.84 = (B)	Best Estimate =(B)*0.922(R _a)
Bus Stop Keymer Road Hassocks	58.8	49.4	45.5

NO₂ results at Stonepound crossroads area Hassocks 2008

The NO₂ annual mean from 3 long term continuous monitors was obtained for 2008 from the Air Quality Archive web site:- <http://www.airquality.co.uk>

The monitors lie within a 50 mile radius of the Stonepound, Hassocks area.

The annual mean (Am) was then divided by the period mean (Pm) to obtain a Ratio.

Annual Mean obtained from Air Quality Archive Web Site			
Long Term Site	Annual Mean 2008 (Am)	Period Mean 2008 (Pm)	Ratio (Am/Pm)
Brighton Preston Park (Urban Background)	20	19	1.053
Horley (Urban Background)	27	26.6	1.015
Portsmouth (Urban Background)	23	22.8	1.009
		Average (R_a)	1.025

The average of these Ratios (R_a) is then multiplied by the measured diffusion tube value to obtain the estimated annual mean.

Short Term Site	Mean NO₂ July to Dec 2008 = (A)	Bias Corrected = (A)*0.87 = (B)	Best Estimate =(B)*1.025(R_a)
Bus Stop Keymer Road Hassocks	52.0	45.2	46.4
Lamp post Keymer Road Hassocks	48.4	42.1	43.2
Bus Stop London Road Hassocks	47.6	41.4	42.4
Traffic Light Sign London Road Hassocks	44.1	38.4	39.3
Façade of residential premises Brighton Road Hassocks	29.7	25.8	26.5
Lamp Post Brighton Road Hassocks	28.0	24.4	25.0
Bus Stop Brighton Road Hassocks	36.0	31.3	32.1
Lamp Post Hurst Road Hassocks	25.0	21.8	22.3