2011 Detailed Assessment Report for *Mid Sussex District Council*

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

Date: May 2011

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1 Executive Summary

Part IV of the Environment Act 1995 requires that local authorities regularly review and assess the current and likely future air quality in their areas against objectives in the National Air Quality Strategy. Where those objectives are unlikely to be met, the local authority is required to designate an Air Quality Management Area (AQMA) at the relevant location/s. The local authority must then prepare an action plan setting out measures it intends to take in pursuit of the air quality objectives within the area covered by the AQMA.

A review and assessment is the initial step in the formal Local Air Quality Management (LAQM) process. The structure of the reviews and assessment are set out in the guidance made under the act.

The LAQM process adopts a staged approach to air quality review and assessment.

Stage one is an **Updating and Screening Assessment (USA)** for identifying aspects that have changed since previous rounds of review and assessment. The USA involves a basic screening assessment of whether there is a significant risk of an air quality objective not being achieved by a specified date within the District.

Stage two is a **Detailed Assessment** of those pollutants and specific locations that have been identified as requiring further work.

The Mid Sussex USA Report 2009 concluded that it was necessary to proceed with a Detailed Assessment of Nitrogen Dioxide (NO_2) at the following location.

- Stonepound crossroads, Hassocks

This report summarises the Detailed Assessment of air quality at the above location in Mid Sussex during 2009 and 2010.

The Detailed Assessment for Mid Sussex concludes the following:

- Current exceedances of the relevant air quality objectives for NO_2 have been identified at Stonepound crossroads, Hassocks and are unlikely to be met.

- An Air Quality Management Area (AQMA) be declared for the Stonepound crossroads area, Hassocks. This recommendation is made in accordance with section 83(1) of the Environment Act 1995.

The full conclusions and recommendations of the Detailed Assessment are contained in Section 6 of this report.

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1 Introduction

1.1 Purpose of Report

This report has been produced by the Environmental Protection Team of Mid Sussex District Council. The work has been carried out in accordance with the Council's LAQM obligations under the Environment Act 1995.

1.2 Introduction to Local Air Quality Management

Part IV of the Environment Act 1995 requires that local authorities regularly review and assess the current and likely future air quality in their areas against objectives in the National Air Quality Strategy.
Where those objectives are unlikely to be met, the local authority is required to designate an Air Quality Management Area (AQMA) at the relevant location/s.
The local authority must then prepare an Action Plan setting out measures it intends to take in pursuit of the air quality objectives within the area covered by the AQMA.

A review and assessment is the initial step in the formal Local Air Quality Management (LAQM) process. The structure of the reviews and assessment are set out in the guidance made under the act.

The LAQM process adopts a staged approach to air quality review and assessment.

Stage one is an **Updating and Screening Assessment (USA)** for identifying aspects that have changed since previous rounds of review and assessment. The USA involves a basic screening assessment of whether there is a significant risk of an air quality objective not being achieved by a specified date within the district.

Stage two, is a **Detailed Assessment** of those pollutants and specific locations that have been identified as requiring further work. The Detailed Assessment should conclude whether or not Air Quality Objectives are unlikely to be met and hence whether an AQMA should be declared.

1.3 Recommendations of the Updating and Screening Assessment (USA) Report

The Mid Sussex District Council USA report was completed in 2009. This report concluded that it was necessary to proceed with a detailed assessment for NO_2 at Stonepound crossroads, Hassocks.

This location was identified as potential NO_2 concentrations greater than the air quality objective (more than 40μg/m^3 as an annual mean) had been recorded. Concern regarding air quality was initially identified as a result of previous air quality monitoring. The main source of NO_2 at this location is from road transport.

1.3 Health Effects of Nitrogen Dioxide (NO_2)

NO_2 is a gas produced by the reaction of nitrogen and oxygen during the combustion process. This happens in two stages: first one atom of each of the gases combine to form nitric oxide (NO). This compound then reacts, over time, with ozone (in the spring and summer), and oxygen (on cold winter days) to produce nitrogen dioxide. These oxides of nitrogen are collectively known as NO_X.

Once formed, NO_2 takes part in chemical reactions in the air, changing into nitric acid and nitrates. Nitrates may also remain in the air as very small particles contributing to PM_{10} (Particulate Matter of less than 10 micrometres (10μm) in diameter).

NO_2 is an irritant gas, which can damage cell membranes and proteins.
High concentrations can produce airway inflammation (experienced as coughing, chest tightness and difficulty breathing). Very high concentrations may cause severe lung damage (severe difficulty breathing) or death. It may lead to narrowing of lung airways, particularly among people with pre-existing asthma. After exposure to NO_2 concentrations of 200 - 400 ppb for one hour, asthma sufferers' airways may become more sensitive to other irritants found in the air we breathe. This outdoor air concentration is only found occasionally in the United Kingdom.

1.5 Air Quality Objectives

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

2. Detailed Assessment Monitoring Scope and Methodology

A detailed assessment should conclude by identifying whether an Air Quality Management Area (AQMA) should be designated within the area. Under section 83(1) of the Environment Act 1995, local authorities have a duty to declare an AQMA in those areas where the air quality objectives are unlikely to be met.

The detailed assessment should be based on new, appropriate, air quality monitoring (or modelling) data, which has been validated and ratified. The assessment should indicate the spatial extent of the air quality objective exceedances and indicate a tentative AQMA boundary. This boundary should be set in areas where people might reasonably be exposed.

In summary, the approach undertaken for the Detailed Assessment was:

- Retention of existing diffusion tube monitoring sites for long-term trend analysis.
- Siting of new diffusion tube monitoring sites in 2008 to provide a greater spatial spread of monitoring data and establish the likely extent of potential air quality objective exceedances.

2.1 Previous Air Quality Monitoring in Mid Sussex

Monitoring within Mid Sussex is limited to passive diffusion tube monitoring for NO_2. There are currently 19 sites across the district ten of which are located at Stonepound Crossroads, Hassocks.
The Air Quality Progress Report 2008 indicated the area as at risk of exceeding the annual mean and eight additional monitoring sites were added to the existing two sites in 2008.

2.2 Air Quality Monitoring for Detailed Assessment

For the purposes of the detailed assessment existing diffusion tube monitoring sites were retained with eight new monitoring locations being added (a total of ten sites) in July 2008.

The additional diffusion tube monitoring sites were chosen to help provide information on the possible spatial extent of air quality objective exceedances at sensitive receptors.

When identifying new locations for additional diffusion tubes regard was had to guidance detailed in the Diffusion Tubes for Ambient NO_2 Monitoring: Practical Guidance (AEA Technology, 2008).

The additional diffusion tubes were sited at potential hot-spot locations, subject to practical constraints, e.g. available street furniture, away from sources of combustion and overhanging vegetation.

Technical Guidance LAQM.TG(09) stipulates that diffusion tube monitoring should be carried out for a period of 12 months in order for it to be comparable against the Air Quality Standard (AQS) objective for the annual mean. If this is not possible a shorter diffusion tube survey should be carried out for a minimum of six months (at least 3 winter months and 3 summer months consecutively).

To overcome this TG(09) describes a method that can be used to estimate annual means from short-term monitoring surveys. The methodology used is described in further detail at A*ppendix 1.*

For the diffusion tube data bias adjustment factors were applied to the data to correct annual average NO_2 levels. These were provided by reference to

(http://www.uwe.ac.uk/aqm/review/R&Asupport/diffusiontube050509.xls
for results obtained from January to December 2008.

(http://www.uwe.ac.uk/aqm/review/R&Asupport/diffusiontube310310.xls)
for results obtained from January to December 2009.

http://laqm.defra.gov.uk/bias-adjustment-factors/national-bias.html
for results obtained from January to December 2010.

The laboratory supplying the diffusion tubes was Bristol City Scientific Services.

For 2008, 2009 and 2010 the applied bias adjustment factors were 0.87, 0.84 and 0.85 respectively.

3 Detailed Assessment Monitoring Results and Analysis

Air quality data collected for the detailed assessment has been limited to a diffusion tube study to predict the concentrations at a number of sensitive receptor locations.

Table 3.2: Monitored data for 2008, 2009 and 2010

In August 2003 monitoring at Stonepound crossroads comprised trilocated diffusion tubes mounted on the south - east corner of the crossroads (Stonepound 1 MSAQ10). At this location residential premises were within 10 m of the kerb of Brighton Road (southbound) and 5 m of the kerb of Keymer Road (eastbound).

In July 2004 an additional trilocated diffusion tube location (Stonepound 2 MSAQ11) was added.
In 2008, due to recorded exceedances of the annual mean for NO_2 at these two sites the number of monitoring sites was increased to ten0.

Location	Monitored NO_2 2008 $\mu g/m^3$ (bias adjusted)	Monitored NO_2 2009 $\mu g/m^3$ (bias adjusted)	Monitored NO_2 2010 $\mu g/m^3$ (bias adjusted)
* Stonepound 1 Hassocks - MSAQ10	48.7	50.7	55.2
* Stonepound 2 Hassocks - MSAQ11	48.1	50.4	50.1
Bus stop, Keymer Road,Hassocks - MSAQ12	46.4 (1)	45.5	50.4
* Lamp post, Keymer Road, Hassocks - MSAQ13	43.2 (1)	44.5	45.4
Bus stop, London Road, Hassocks - MSAQ14	42.4 (1)	43.8 (2)	41.3
* Traffic light sign, London Road, Hassocks - MSAQ15	39.3 (1)	41.3	42.8
* Façade of residential property, Brighton Road,Hassocks - MSAQ16	26.5 (1)	24.5	27.2
* Lamp post, Brighton Road, Hassocks - MSAQ17	25.0 (1)	25.6	28.0
* Bus stop, Brighton Road, Hassocks - MSAQ18	32.1 (1)	35.3	38.5
Lamp post, Hurst Road, Hassocks - MSAQ19	22.3 (1)	23.2	23.9

(1) (2) Based on guidance in TG(09) - See Appendix 1
* Sites with Relevant Exposure – residential premises within 15 metres or less, or locations where the public are regularly present.

Table 3.3: Predicted NO_2 levels at the facades of residential premises

(Using the NO_2 fall off with distance calculator located at http://laqm.defra.gov.uk/tools-monitoring-data/no2-falloff.html)

Location	Predicted NO_2 2009 $\mu g/m^3$ (bias adjusted)	Predicted NO_2 2010 $\mu g/m^3$ (bias adjusted)
Façade of residential premises near Traffic Lights Keymer Road Hassocks MSAQ10	39.8	42.5
Façade of residential premises near Lamp Post Keymer Road Hassocks MSAQ13	29.2	28.7
Façade of residential premises near Traffic Lights Sign London Road Hassocks MSAQ15	30.9	31.1
Façade of residential premises near Lamp Post Brighton Road Hassocks MSAQ17	19.6	19.9
Façade of residential premises near Bus Stop Brighton Road Hassocks MSAQ18	26.2	27.3
Façade of residential premises near Lamp Post Hurst Road Hassocks MSAQ19	17.8	17.0

4 Model Verification, Adjustment and Uncertainty

Model verification is the process by which discrepancies between modelled and measured concentrations are investigated and minimised. Verification may result in the adjustment of modelled results depending upon the outcome.

Discrepancies during verification can arise for a number of different reasons including:

1. Traffic flow uncertainties, including estimations of speeds, total flows and proportions of vehicle types.
2. Estimates of background concentrations.
3. Meteorological data uncertainties.
4. Model input parameters, such as roughness, length.
5. Overall model limitations.

Traffic Flows

With respect to road transport measured Annual Average Daily Traffic (AADT) counts for 2008 were used and it was assumed these had not changed much in 2009 based on advice from West Sussex County Council (WSCC).
However, for traffic speeds, accurate data was unavailable and, therefore, was based on an estimate. Similarly only a basic breakdown of Light Duty Vehicles (LDV) / Heavy Duty Vehicles (HDV) classes was used in the DMRB model. These were based on a 'guesstimate' which WSCC confirmed were reasonable. Therefore, it was reasonable to suggest that there may be some uncertainty, where more basic model input parameters were used.

Estimate of Background Concentrations

For background concentrations used, the mapped estimated background air pollution information for 2009 based on concentrations at a 1km x 1km grid resolution were used.

Meteorological data and input parameters

Unlike the DMRB model more sophisticated modelling programmes are able to take account of factors such as changing meteorological conditions or the local topography (roughness) which can significantly affect the distribution and dispersion of pollutants.

It was intended to undertake modelling using version 1.03c (July 2007) of the Design Manual for Roads and Bridges (DMRB) model spreadsheet.
In line with guidance in TG(09) verification and adjustment of modelled results would then have been undertaken.

Verification involves checks that are carried out on the model performance at a local level. This basically involves the comparison of the predicted versus the measured concentrations. Where there is disparity between the predicted and measured results, the first step should always be to check the input data and model parameters in order to minimise the errors. If required, the second step would be to determine an appropriate adjustment factor that can be applied to the predicted data.

The methodology used when modelling with DMRB is described in detail at *Appendix 2* which includes a worked example for Stonepound 2 (Site MSAQ11).

Due to the relatively low average annual daily traffic counts (AADT), the low traffic speeds (the crossroads are under traffic light control), and low percentage of heavy duty vehicles (HDV's) the modelling significantly under predicted the actual recorded NO_2 levels at the crossroads (see the worked example).

The AQMA has, therefore, been designated based solely on the monitored results for 2008, 2009 and 2010.

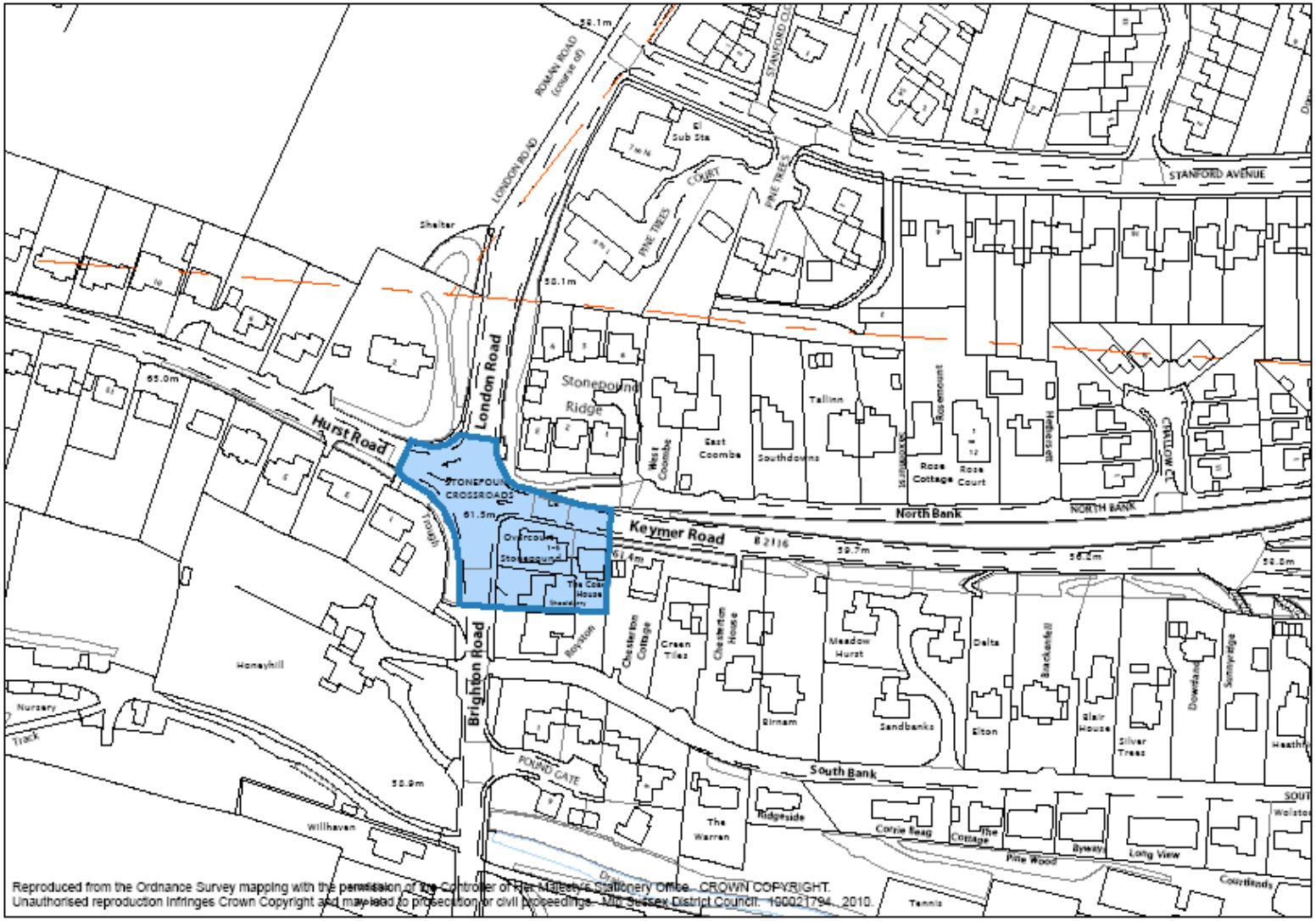
5 Areas Of Air Quality Objective Exceedances

During the modelling process it was found that modelled NO_2 concentrations predicted by the DMRB at sensitive receptors significantly under predict, and, therefore, the model was not used to predict the area of exceedances.

The measured levels of NO_2 from 2008, 2009 and 2010 (bias corrected) were used to designate the area of air quality exceedances.

The designated AQMA is shown in figure 5.1.
The boundary was determined by measured NO_2 levels, predicted NO_2 levels at the façades of residential premises (using the NO_2 distance from road calculator), and practical considerations in defining the area.

Figure 5.1:
Stonepound, Hassocks – Proposed AQMA



6 Conclusion and Recommendations

Mid Sussex District Council concludes the following from its detailed assessment of NO_2 air quality in Stonepound, Hassocks

- Current and likely future exceedances of the relevant air quality objective for NO_2 (annual mean) have been identified at Stonepound, Hassocks.

- Relevant air quality objectives include objectives set out in the Air Quality Standards Regulations 2007, which are made under the Environment Act 1995.

As a result of the above conclusions, and in accordance with the Council's statutory obligations under Local Air Quality Management (LAQM), the following recommendations are made.

1. **An Air Quality Management Area (AQMA) should be declared at Stonepound, Hassocks in respect of NO_2 because the air quality objectives are unlikely to be met.**

2. **An AQMA should be designated within the relevant area under section 83(1) of the Environment Act 1995, by means of an official order.**

3. **As a member of the Sussex Air Quality Partnership Mid Sussex will request that Urban ADMS modelling be undertaken to adjust the boundary of the currently defined AQMA (figure 5.1), if necessary.**

4. **A provisional air quality action plan shall be completed within 18 months of the designation of an AQMA.**

7 Consultation

The external consultation requirements of Detailed Assessment reports are set out in Schedule 11 of the Environment Act 1995 and for Mid Sussex are as detailed below.

External Consultees

1. Department of the environment, food and rural affairs (defra)
2. West Sussex County Council (Highways Authority)
3. All neighbouring local authorities
4. Environment Agency

Additional, non-statutory consultees

1. Chief Executive
2. Planning and Development Control

8 References

1. Design Manual for Roads and Bridges, Volume II Environmental Assessment, Section 3 Environmental Assessment Techniques. The Highways Agency (2007)

2. Deriving NO_2 from NO_X for Air Quality Assessments of Roads – Updated to 2006. Air Quality Consultants Ltd (2007).

3. Diffusion Tubes for Ambient NO_2 Monitoring: Practical Guidance (AEA Technology, 2008).

4. Part IV of the Environment Act 1995 Local Air Quality Management, Technical Guidance LAQM. TG(09). Department for Environment Food and Rural Affairs (2009).

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

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

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

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

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

Appendix 1

Approach to the estimation of annual mean nitrogen dioxide concentrations from short-term monitoring data (As detailed in TG(09) Box 3.2/3 - 4)

Annualisation of monitoring results

NO_2 results at Bus Stop Keymer Road Hassocks 2009

The NO_2 annual mean from three 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.

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

NO_2 results at Stonepound crossroads area Hassocks 2008

The NO_2 annual mean from three 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.

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 NO_2 July to Dec 2008 = (A)**	**Bias Corrected = (A)*0.87 = (B)**	**Best Estimate =(B)*1.025(R_a)**
Bus Stop Keymer Road Hassocks - MSAQ12	52.0	45.2	**46.4**
Lamp post Keymer Road Hassocks - MSAQ13	48.4	42.1	**43.2**
Bus Stop London Road Hassocks - MSAQ14	47.6	41.4	**42.4**
Traffic Light Sign London Road Hassocks - MSAQ15	44.1	38.4	39.3
Façade of residential premises Brighton Road Hassocks - MSAQ16	29.7	25.8	26.5
Lamp Post Brighton Road Hassocks - MSAQ17	28.0	24.4	25.0
Bus Stop Brighton Road Hassocks. - MSAQ18	36.0	31.3	32.1
Lamp Post Hurst Road Hassocks MSAQ19	25.0	21.8	22.3

Appendix 2

Detailed Assessment Modelling Data

The DMRB model was used to carry out a screening assessment of NO_2 concentrations at one relevant location (see worked example below).

Version 1.03 (January 2007) of the DMRB model spreadsheet was used.

A2.1: Input and Output Data

Background concentrations used were taken from estimated background air pollution maps for 2009 based on concentrations at a 1km x 1km grid resolution.

This data has been accessed from the following link:

http://laqm.defra.gov.uk/review-and-assessment/tools/background-maps.html

For vehicle speed there was no locally available data. The DMRB assessment procedure states that where speed data is not available or cannot be estimated the speed limit may be used as a default. This was taken into account but the speed reduced to reflect the crossroads being under traffic light control and busy peak periods from 30 mph to 15 mph (24 kmh).

Traffic flow data for 2008 were obtained from West Sussex County Council.
All traffic flow volumes are annual average daily flows (AADT).
For traffic composition no basic LDV/HDV data was available but advice from WSCC indicated the traffic composition 'guesstimate' would be correct.

The results significantly under predicted the recorded NO_2 levels at the site modelled It was concluded further DMRB modelling would not yield useful results.

DMRB modelling for site MSAQ11

DMRB: Assessment of Local Air Quality — INPUT SHEET

Step 1	Receptor name	Stonepound MSAQ11	Receptor number	1
Step 2	Year	2009		
Step 3	Number of links	2		

Step 4 — Background concentrations for 2009

CO (mg/m^3)	Benzene (µg/m^3)	1,3-butadiene (µg/m^3)	NO_x (µg/m^3)	NO_2 (µg/m^3)	PM_{10} (µg/m^3)
0	0	0	16.62	12.36	0

Step 6

Step 7

RUN COMPLETE

Step 5

Link number	Distance from link centre to receptor (m)	Traffic flow & speed		Traffic composition							
		AADT (combined, veh/day)	Annual average speed (km/h)	Road type (A,B,C,D)	Vehicles <3.5t GVW (LDV)			Vehicles>3.5t GVW (HDV)			
					% passen-ger cars	% light goods vehicles	Total % LDV	% buses and coaches	% rigid HGV	% articulated HGV	Total % HDV
1	9	10790	24	B			98				2
2	25	12613	24	A			97				3
3											
4											
5											
6											
7											
8											
9											
10											
11											
12											
13											
14											
15											

DMRB: Assessment of Local Air Quality — OUTPUT SHEET

Current receptor

Receptor Name	Stonepound MSAQ11	Receptor number	1
Assessment year	2009		

Results

Pollutant	Annual mean				For comparison with Air Quality Standards		
	Background concentration	Road traffic component	Total	Units	Metric	Value	Units
CO	0.00	0.15	0.15	mg/m^3	Annual mean *	0.15	mg/m^3
Benzene	0.00	0.16	0.16	$\mu g/m^3$	Annual mean	0.16	$\mu g/m^3$
1,3-butadiene	0.00	0.11	0.11	$\mu g/m^3$	Annual mean	0.11	$\mu g/m^3$
NO_x	16.6	18.3	34.9	$\mu g/m^3$	Not applicable		
NO_2	12.4	5.2	17.6	$\mu g/m^3$	Annual mean *	17.6	$\mu g/m^3$
PM_{10}	0.0	2.58	2.58	$\mu g/m^3$	Annual mean	2.6	$\mu g/m^3$
					Days >50$\mu g/m^3$	0	Days

* See Footnote 32 in DMRB Volume 11 Chapter 3

Contribution of each link to annual mean

Link number	CO (mg/m^3)	Benzene ($\mu g/m^3$)	1,3-butadiene ($\mu g/m^3$)	NOx ($\mu g/m^3$)	PM_{10} ($\mu g/m^3$)
1	0.08	0.09	0.05	9.16	1.34
2	0.06	0.07	0.05	9.14	1.25
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					

All receptors

Receptor number	Name	Year	Pollutant concentrations at receptor						
			CO *	Benzene	1,3-butadiene	NO_x	NO_2 *	PM_{10}	
			Annual mean mg/m	Annual mean $\mu g/m^3$	Annual mean $\mu g/m^3$	Annual mean $\mu g/m^3$	Annual mean $\mu g/m^3$	Annual mean $\mu g/m^3$	Days >50$\mu g/m^3$