



# 2013 Air Quality Progress Report for Basingstoke and Deane Borough Council

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

April 2013

**Basingstoke and Deane Borough Council**

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## Executive Summary

Under the Environment Act 1995, Local Authorities are required to undertake regular review and assessments of air quality. Local Authorities have recently begun the fourth round of the review and assessment process. Each round is comprised of two steps. The first step is an Updating and Screening Assessment. Where a significant risk of exceedance of one or more of the UK objectives was identified it was necessary for the Local Authority to proceed to a Detailed Assessment. Where a Local Authority did not need to undertake a Detailed Assessment, a shorter Progress Report is required instead.

Basingstoke and Deane Borough Council last conducted an Updating and Screening Assessment (USA) in 2012, which looked at measurements of NO<sub>2</sub> taken from diffusion tube sites throughout the borough. This report noted no exceedances of the AQS objectives in the Borough.

Concentrations of NO<sub>2</sub> measured throughout the borough have been relatively stable for a number of years, although measurements from many sites show a slight decreasing trend. Exceedances in the Winton Square area have been noted from data collected during 2012. This data suggests that exceedances of the AQS objective for NO<sub>2</sub> have occurred at three sites, 9, 10 and 20. However, the exceedances are not representative of relevant exposure and a Detailed Assessment is not required.

A biomass facility previously identified as being a potential source of exceedance of the annual mean NO<sub>2</sub> objective has been the subject of diffusion tube monitoring (sites 27, 28, 29) which is continuing to support a forthcoming Detailed Assessment.

Data from 2012 indicates that Basingstoke and Deane Borough Council do not therefore need to conduct any further Detailed Assessments of Air Quality in the borough at this juncture. A Progress Report should therefore be completed in 2014, utilising data recorded in 2013, as per the recommendations of LAQM guidance.

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## Appendices

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# 1 Introduction

## 1.1 Description of Local Authority Area

The borough of Basingstoke and Deane covers over 630 km<sup>2</sup> of Hampshire, in South-East England, around 90% of which is rural. The borough has a residential population of over 160,000, around half of whom live in the town of Basingstoke. Over the last 70 years Basingstoke has grown from a small market town with a population of around 14,000, to be the borough's principle settlement, with a population of nearly 83,000.

The strategic location of Basingstoke on national road and rail transport networks has contributed a great deal to its success as a centre of employment in the area. In addition to which, the relative proximity of major transport hubs in London, Southampton and Portsmouth has aided the town's commercial success. Strategic transport routes in the borough include the M3, and nearby rail line, linking Basingstoke to London and Southampton, and the A303, A339 and A33 linking Basingstoke to Andover, Newbury and Reading respectively.

Other notable conurbations in the borough include Bramley, Tadley, Kingsclere, Overton, Oakley, and Whitchurch. However, the borough is otherwise characterised by its numerous small hamlets and villages, such as the hamlet of Deane. These lie mostly to the west of Basingstoke, particularly on the periphery of the North Wessex Downs Area of Outstanding Natural Beauty, a large part of which lies in the western part of the borough.

## 1.2 Purpose of Progress Report

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

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

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

### 1.3 Air Quality Objectives

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

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

Pollutant	Air Quality Objective		Date to be achieved by
	Concentration	Measured as	
Benzene	16.25 $\mu\text{g}/\text{m}^3$	Running annual mean	31.12.2003
	5.00 $\mu\text{g}/\text{m}^3$	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 $\text{mg}/\text{m}^3$	Running 8-hour mean	31.12.2003
Lead	0.50 $\mu\text{g}/\text{m}^3$	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
Particulate Matter (PM <sub>10</sub> ) (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**

Basingstoke and Deane Borough Council have made a number of Air Quality Review and Assessment reports available on their website, the earliest being the Stage 3 Review and Assessment published in 2000. The conclusions and implications of all completed Air Quality Review and Assessment reports to date are outlined below.

### **1.4.1 First Round of Review and Assessment**

Basingstoke and Deane Borough Council completed all stages of the first round of Review and Assessment by 2000, concluding that the Air Quality Strategy objectives were likely to be met for all pollutants by the required dates.

### **1.4.2 Second Round of Review and Assessment**

Air Quality Updating and Screening Assessment (USA), 2003

The assessment carried out by Basingstoke and Deane Borough Council in 2003 concluded that, since no exceedences of the Air Quality Strategy objectives were predicted at locations of relevant exposure in the borough, a Detailed Assessment was not required.

### **Progress Report, 2004**

By considering diffusion tube monitoring data from sites in the borough, a potential exceedence of the annual mean objective for nitrogen dioxide was identified at the Winchester Street junction with Winton Square. A Detailed Assessment was therefore deemed to be required, considering concentrations of NO<sub>2</sub> at locations of relevant exposure in the vicinity of the junction. As a precursor to this assessment, additional diffusion tube monitoring was undertaken at four locations from May 2004.

### **Detailed Assessment, 2005**

The assessment of concentrations of NO<sub>2</sub> around the Winchester Street junction with Winton Square concluded that, since the use of a flat above a restaurant in the area did not constitute relevant public exposure, an AQMA was not required. It was however recommended that additional monitoring of nitrogen dioxide be implemented in the area. Monitoring by use of diffusion tubes was subsequently implemented at seven additional sites close to Winton Square.

### **1.4.3 Third Round of Review and Assessment**

#### **Air Quality Updating and Screening Assessment (USA), 2006**

The third round Updating and Screening Assessment, completed in June 2006, identified likely exceedences of the Air Quality Strategy annual mean objective for NO<sub>2</sub> from the additional monitoring implemented in December 2005. It was concluded that there was potential exposure to this exceedence at the location noted the 2004 Progress Report, and considered in the 2005 Detailed Assessment, but it was not concluded that exposure at the site (used as a staff rest room) constituted relevant public exposure. No significant changes likely to affect emissions of carbon

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monoxide, benzene, 1,3-butadiene, lead, sulphur dioxide or PM10 were noted, and it was therefore concluded that exceedences of the Air Quality Strategy objectives for these pollutants was not likely and there was no requirement to proceed to a Detailed Assessment.

### **Progress Report, 2007**

In July 2007 Basingstoke and Deane Borough Council produced a Progress Report considering NO<sub>2</sub> monitoring data from 22 sites, concluding that there were no likely exceedences at locations of relevant exposure in the borough.

### **Progress report, 2008**

The final Stage 3 Progress Report, published in April 2008, concluded from NO<sub>2</sub> monitoring at 20 sites that there were no likely exceedences of the Air Quality Strategy objective at locations with relevant exposure. It was noted that several new housing developments were underway in the borough, but Basingstoke and Deane Borough Council were not required to conduct a Detail Assessment for any of the pollutants covered by the Air Quality Strategy.

#### **1.4.4 Fourth round of Review and Assessment**

##### **Air Quality Updating and Screening Assessment (USA), 2008**

Monitoring data from eight diffusion tube sites in the district recorded annual mean NO<sub>2</sub> concentrations exceeding the Air Quality Strategy objective. Seven of these sites are located in the vicinity of Winton Square, and had therefore been considered in the 2005 Detailed Assessment, however data from site 15 indicated possible exceedences at locations of relevant exposure at The Old Plough on Newbury Road near Headley. Concentrations of NO<sub>2</sub> at the roadside façade of the building were estimated to be 45 µg•m<sup>-3</sup>. Since The Old Plough is a residential property, it was therefore recommended that Basingstoke and Deane Borough Council proceed to a Detailed Assessment of NO<sub>2</sub> in the vicinity of site 15. It was also recommended that Basingstoke and Deane Borough Council increase the number of diffusion tube monitoring sites along Newbury Road (A339), Headley, Thatcham and deploy them at several sites in the vicinity of site 15, the Old Plough.

As a result of these recommendations, Basingstoke and Deane Borough Council undertook a Detailed Assessment of Air Quality in the locale of The Old Plough, located alongside the A339 near the junction with Ashford Hill Road, in accordance with the requirements of the Environment Act 1995.

##### **Detailed Assessment of Air Quality, 2010**

Monitoring data from diffusion tube sites for 2008 to 2010 were considered in this assessment. Data from new monitoring locations at Beech House and The Old Plough indicated concentrations of NO<sub>2</sub> significantly below the AQS annual mean objective limit at locations of relevant exposure. Although kerbside monitoring at The Old Plough indicated NO<sub>2</sub> concentrations above the objective limit, the sites were found to have no relevant exposure and it was therefore concluded that there was no need to declare an AQMA for NO<sub>2</sub> in the area. It was however recommended that

Basingstoke and Deane Borough Council should continue, and possibly expand, monitoring of NO<sub>2</sub> at locations of relevant exposure in the area.

### 1.4.5 Fifth round of Review and Assessment

#### Updating and screening assessment, 2012

This Updating and Screening Assessment began the fifth round of Review and Assessment carried out by the Borough. Previous rounds had not identified the need for any Air Quality Management Areas in the Borough of Basingstoke and Deane.

Indicative monitoring of NO<sub>2</sub> was carried out using diffusion tubes at 20 locations. After application of the appropriate bias adjustment factor, no diffusion tube sites recorded annual mean concentrations in excess of the Air Quality Strategy objective of 40 µg m<sup>-3</sup> in 2011. Annual mean concentrations (which in previous years had been a matter of concern particularly around the Winton Square/Winchester Street junction) decreased slightly since 2010. No Detailed Assessments were required on the basis of the 2011 diffusion tube monitoring dataset.

A new biomass-fuelled power generation plant was identified as being constructed in Basingstoke. This was originally intended to operate as a Part A process, burning waste wood and meeting the provisions of the Waste Incineration Directive. However, it was unable to meet the conditions of this Directive and therefore burns virgin wood rather than waste, operating without an Environmental Permit, as an exempt process. It was briefly started up in January 2012 and closed down (temporarily) a month later due to problems in meeting its conditions of operation regarding noise.

Emissions tests were carried out in April: total NO<sub>x</sub> emission rates were found to be higher than those originally predicted before the plant's construction. On the basis of calculations carried out using the Biomass Combustion calculation tool, the plant's emissions may contribute to an exceedance of the hourly mean and annual mean NO<sub>2</sub> objectives. Therefore it has been recommended that a Detailed Assessment be carried out with respect to NO<sub>2</sub>. The Council began monitoring at the closest points of relevant exposure in 2012 and results of this survey will be reported in a Detailed Assessment.

## **2 New Monitoring Data**

This Progress Report utilises data collected from non-automatic monitoring sites in 2012, supplied by Basingstoke and Deane Borough Council, and automatic monitoring data from the AURN.

### **2.1 Summary of Monitoring Undertaken**

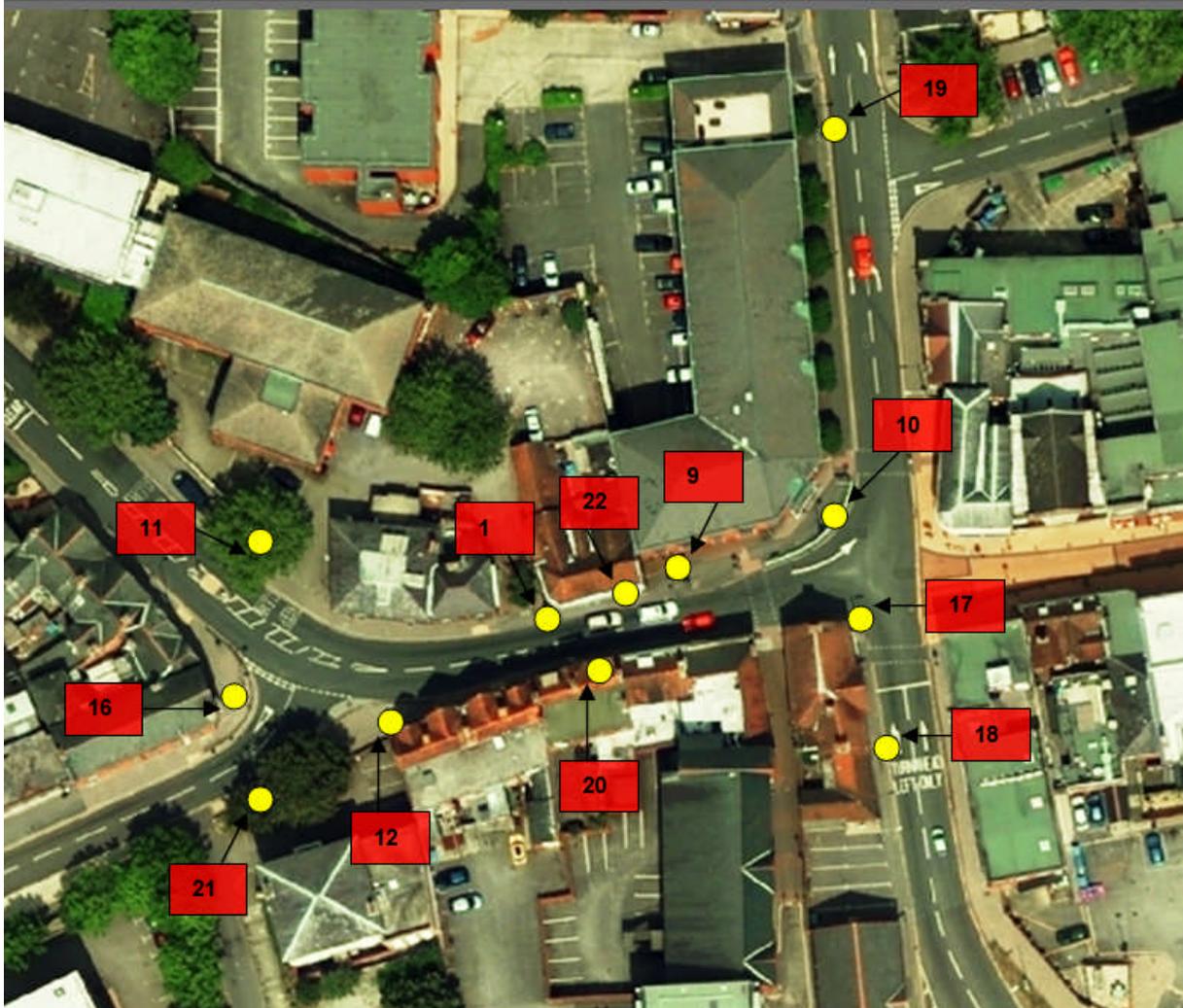
#### **2.1.1 Automatic Monitoring Sites**

Basingstoke and Deane Borough Council do not operate automatic monitoring of any kind within the borough. The closest AURN site to the borough, with reasonably continuous NO<sub>2</sub> data for 2012, is located at the Harwell business park. The Urban Background site at Reading New Town is also part of the AURN network and this in combination with the Harwell site has been used where annualisation of data is necessary.

#### **2.1.2 Non-Automatic Monitoring Sites**

Basingstoke and Deane Borough Council operate non-automatic monitoring of NO<sub>2</sub> at 23 sites, 3 of which were installed in 2012.

Figure 2.1 Map of diffusion tube sites in Basingstoke around the Winton Square area



**Table 2.1 Details of Non- Automatic Monitoring Sites**

<b>Site Name</b>	<b>Site Type</b>	<b>X OS Grid Ref</b>	<b>Y OS Grid Ref</b>	<b>Pollutants Monitored</b>	<b>In AQMA?</b>	<b>Is monitoring collocated with a Continuous Analyser (Y/N)</b>	<b>Relevant Exposure? (Y/N with distance (m) to relevant exposure)</b>	<b>Distance to kerb of nearest road (N/A if not applicable)</b>	<b>Does this location represent worst-case exposure?</b>
Site 1, Winton Square, Basingstoke	Roadside	463600	151800	NO <sub>2</sub>	N	N	N - 1 (shop)	1.7	Y
Site 2, front façade 279 Winchester Road, Basingstoke	Roadside	462300	150700	NO <sub>2</sub>	N	N	Y - on façade of residential building	2.3	Y
Site 3, 17 Winchester Road Basingstoke	Roadside	463499	151805	NO <sub>2</sub>	N	N	Y - On façade	5	N
Site 4, Stocker Cl., Basingstoke	Urban Background	463500	150700	NO <sub>2</sub>	N	N	N - 11	1.6	N
Site 7, bus stop by "The Guru", Newbury Rd, Hedley.	Urban Background	451783	16234	NO <sub>2</sub>	N	N	N - 5 (currently vacant restaurant)	1.2	N
Site 9, traffic lights at Winton Sq.	Roadside	463640	151857	NO <sub>2</sub>	N	N	N - 4 (office building)	1.4	Y
Site 10, Corner of New St./Winton Square jnctn.	Roadside	463586	151862	NO <sub>2</sub>	N	N	N - 5 (office building)	1.1	Y
Site 11, Corner of Winton Square/Sarum Hill jnctn	Roadside	463586	151862	NO <sub>2</sub>	N	N	N - 12 (office building)	1.6	Y
Site 12, 4 Winton Square	Kerbside	463607	151840	NO <sub>2</sub>	N	N	N - 6 (office building)	0.9	Y

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Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In AQMA?	Is monitoring collocated with a Continuous Analyser (Y/N)	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?
Site 13, Adjacent 52 New Road, B'Stoke	Roadside	463982	152014	NO <sub>2</sub>	N	N	Y - On façade	4.8	Y
Site 16, junct. Winton Square/Winchester R'd.	Roadside	463587	151845	NO <sub>2</sub>	N	N	N - 5 (takeaway)	1.1	Y
Site 17, o/s 37 Winchester St.	Kerbside	463662	151852	NO <sub>2</sub>	N	N	N - 1 (office building)	0.4	Y
Site 18, adjacent 37 Winchester St.	Roadside	463664	151836	NO <sub>2</sub>	N	N	N - 1 (office building)	1.7	Y
Site 19, Adjacent Copenhagen Hse, New St.	Kerbside	463658	151912	NO <sub>2</sub>	N	N	N - 3 (office building)	0.5	Y
Site 20, o/s 45 Winchester St.	Kerbside	463625	151846	NO <sub>2</sub>	N	N	N - 1 (office building)	0.5	Y
Site 21, Winchester R'd/Winton Square junct.	Kerbside	463586	151830	NO <sub>2</sub>	N	N	N - 10 (office building)	0.6	Y
Site 22, façade of Agra Balti, 34 Winchester Rd	Roadside	463636	151856	NO <sub>2</sub>	N	N	N - On façade of restaurant	1.3	Y
Site 24, IT services, front façade, the Old Plough, Newbury Road, Headley	Roadside	451367	162731	NO <sub>2</sub>	N	N	Y - on façade of residential building	5.5	Y

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Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In AQMA?	Is monitoring collocated with a Continuous Analyser (Y/N)	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?
Site 25, IT services, front façade, the Old Plough, Newbury Road, Headley.	Roadside	451367	162731	NO <sub>2</sub>	N	N	Y - on façade of residential building	5.5	Y
Site 26, IT services, front façade, the Old Plough, Newbury Road, Headley.	Roadside	451367	162731	NO <sub>2</sub>	N	N	Y - on façade of residential building	5.5	Y
Site 27	Next to footpath	465569	153183	NO <sub>2</sub>	N	N	Y – 14	59	Y
Site 28	Next to footpath	465646	153223	NO <sub>2</sub>	N	N	Y – 13	29	Y
Site 29	Next to footpath	465486	153287	NO <sub>2</sub>	N	N	Y – 20	13	Y

## **2.2 Comparison of Monitoring Results with Air Quality Objectives**

### **2.2.1 Nitrogen Dioxide (NO<sub>2</sub>)**

Basingstoke and Deane Borough Council carry out extensive monitoring of NO<sub>2</sub> via use of 23 diffusion tubes located at sites throughout the borough in both rural and urban settings. The rationale for this focus on NO<sub>2</sub> stems from the high road transport emissions in the borough, due in to traffic in Basingstoke town and on the borough's numerous trunk roads such as the M3 and A34.

At the time of the last Updating and Screening assessment, it was found that in 2012 there were exceedances of the AQS objective limit for NO<sub>2</sub> at eight diffusion tube sites, of which seven were situated in the area around Winton Square, and one was located near the Old Plough on Newbury Road. Detailed Assessments undertaken of NO<sub>2</sub> at both of these locations have however concluded that there is no relevant exposure at locations where the AQS annual mean objective limit is exceeded. Currently, therefore, there are no AQMAs declared in the borough of Basingstoke and Deane.

### **2.2.2 Automatic Monitoring Data**

Basingstoke and Deane Borough Council do not operate automatic monitoring of any kind within the borough. The closest AURN site to the borough, with reasonably continuous NO<sub>2</sub> data for 2012, is located at the Harwell business park. The Urban Background site at Reading New Town is also part of the AURN network and this in combination with the Harwell site has been used where annualisation of data was necessary.

### **2.2.3 Diffusion Tube Monitoring Data**

Basingstoke and Deane Borough Council operate non-automatic monitoring of NO<sub>2</sub> at 23 sites- 3 of which were established in 2012. Site information is provided in Table 2.1 and the measurements for 2012 are shown in Table 2.2. Table 2.3 shows historical NO<sub>2</sub> data back to 2008.

Table 2.2 Results of NO<sub>2</sub> Diffusion Tubes 2012

Location	Within AQMA?	Triplicate or Co-located Tube	Full Calendar Year Data Capture 2012 (%) <sup>a</sup>	2012 Annual Mean Concentration (µg/m <sup>3</sup> ) - Bias Adjustment factor = 0.97 <sup>b</sup>
1. Winton Square, Basingstoke	N	N	91.7	30.1
2. Winchester Rd, Basingstoke	N	N	91.7	28.8
3. Lambs Row, Lychpit	N	N	75.0	24.6
4. Stocker Close, Basingstoke	N	N	91.7	18.0
7. Outside The Guru (restaurant)	N	N	91.7	37.1
9. Traffic Lights at Winton Square	N	N	91.7	<b>40.7</b> (35.2 with distance correction)
10. Corner of New St/Winton Square jct	N	N	91.7	<b>40.7</b> (34.1 with distance correction)
11. Corner of Winton Square/Sarum Hill jct.	N	N	66.7	22.2 (annualised)
12. Outside 4 Winton Square	N	N	91.7	39.8
13. Adjacent to 52 New Rd, Basingstoke	N	N	91.7	35.7
16. Jct. Winton Sq / Winchester Rd	N	N	75.0	33.9
17. Outside 37 Winchester St	N	N	91.7	39.5
18. Adjacent to 37 Winchester St	N	N	91.7	36.4
19. Adj. Copenhagen House. New St.	N	N	91.7	36.4
20. Outside 45 Winchester St.	N	N	83.3	<b>42.6</b> (38.6 with distance correction)

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Location	Within AQMA?	Triplicate or Co-located Tube	Full Calendar Year Data Capture 2012 (%) <sup>a</sup>	2012 Annual Mean Concentration ( $\mu\text{g}/\text{m}^3$ ) - Bias Adjustment factor = 0.97 <sup>b</sup>
21. Jct. Winton Sq / Winchester Rd	N	N	91.7	33.5
22. Façade of Agra Balti, 34 Winchester Rd	N	N	91.7	37.9
24. Front façade, The Old Plough (1)	N	N	91.7	34.5
25. Front façade, The Old Plough (2)	N	N	91.7	33.9
26. Front façade, The Old Plough (3)	N	N	75.0	33.2
27.	N	N	42.0	14.6 (annualised)
28.	N	N	58.3	17.9 (annualised)
29.	N	N	50.0	17.9 (annualised)

In bold, numerical exceedence of the NO<sub>2</sub> annual mean AQS objective of 40 $\mu\text{g}/\text{m}^3$  (note all exceeding sites are not located with relevant exposure)

<sup>a</sup> Means have been “annualised” [as in Box 3.2 of TG\(09\)](http://laqm.defra.gov.uk/technical-guidance/index.html?d=page=38)( <http://laqm.defra.gov.uk/technical-guidance/index.html?d=page=38>), where full calendar year data capture is less than 75%

<sup>b</sup> If an exceedence is measured at a monitoring site not representative of public exposure, NO<sub>2</sub> concentration at the nearest relevant exposure should be estimated based on the “[NO<sub>2</sub> fall-off with distance](http://laqm.defra.gov.uk/tools-monitoring-data/no2-falloff.html)” calculator (<http://laqm.defra.gov.uk/tools-monitoring-data/no2-falloff.html>), and results should be discussed in a specific section. The procedure is also explained [in Box 2.3 of Technical Guidance LAQM.TG\(09\)](http://laqm.defra.gov.uk/technical-guidance/index.html?d=page=30) (<http://laqm.defra.gov.uk/technical-guidance/index.html?d=page=30>).

Table 2.3 Results of NO<sub>2</sub> Diffusion Tubes (2008 to 2012)

Site ID	Within AQMA?	Annual Mean Concentration (µg/m <sup>3</sup> ) - Adjusted for Bias <sup>a</sup>				
		2008	2009 (Bias Adjustment Factor = 0.82)	2010 (Bias Adjustment Factor = 0.84)	2011 (Bias Adjustment Factor = 0.89)	2012 (Bias Adjustment Factor = 0.97)
1	N	30.4	31.8	29.9	26.3	30.1
2	N	37.3	37.3	37.4	29.2	28.8
3	N	-	-	-	21.9	24.6
4	N	20.4	19.8	20.1	14.1	18.0
7	N	15.5	24.7	37.0	33.3	37.1
9	N	41.8	43.2	41.7	35.0	<b>40.7*</b>
10	N	42.8	44.4	41.6	34.7	<b>40.7*</b>
11	N	31.5	30.6	30.2	24.1	22.2
12	N	42.9	42.9	40.6	35.1	39.8
13	N	34.7	38.4	36.4	31.1	35.7
16	N	38.3	38.7	36.2	31.8	33.9
17	N	47.6	43.0	39.0	34.4	39.5
18	N	43.2	43.3	42.1	33.1	36.4
19	N	39.5	38.2	36.2	32.1	36.4
20	N	52.1	50.8	46.5	38.6	<b>42.6*</b>
21	N	37.8	39.7	40.1	30.1	33.5
22	N	42.3	45.0	42.6	35.7	37.9
24	N	-	22.1	34.2	33.0	34.5

Site ID	Within AQMA?	Annual Mean Concentration ( $\mu\text{g}/\text{m}^3$ ) - Adjusted for Bias <sup>a</sup>				
		2008	2009 (Bias Adjustment Factor = <b>0.82</b> )	2010 (Bias Adjustment Factor = <b>0.84</b> )	2011 (Bias Adjustment Factor = <b>0.89</b> )	2012 (Bias Adjustment Factor = <b>0.97</b> )
25	N	-	24.1	34.1	34.1	33.9
26	N	-	-	-	-	33.2
27	N	-	-	-	-	14.6
28	N	-	-	-	-	17.9
29	N	-	-	-	-	17.9

Sites denoted with \* have been distance corrected- see Section below.

In bold, numerical exceedence of the NO<sub>2</sub> annual mean AQS objective of 40 $\mu\text{g}/\text{m}^3$  (note all exceeding sites are not located with relevant exposure)

<sup>a</sup> Means have been “annualised” [as in Box 3.2 of TG\(09\)](http://laqm.defra.gov.uk/technical-guidance/index.html?d=page=38) (<http://laqm.defra.gov.uk/technical-guidance/index.html?d=page=38>), where full calendar year data capture is less than 75%

## **Basingstoke and Deane Borough Council**

Exceedances of the AQS objectives have been recorded at sites 9, 10, and 20 in the area around Winton Square. However, NO<sub>2</sub> concentrations at these sites have been noted and investigated in previous assessments, and it has been concluded that there is not relevant exposure at locations of exceedance. The increase in 2012 compared with 2011 could be related to the relatively large increase in the diffusion tube bias adjustment factor, which has risen from 0.89 to 0.97 in this period. In recent years the bias adjustment factor has always been in the order of 0.8.

The annual average concentration of NO<sub>2</sub> at site 9 measured in 2012 is above the AQS objective, however there is no relevant exposure at ground level and this does not therefore require further detailed assessment.

Concentrations of NO<sub>2</sub> recorded at site 10 were above the AQS objective in 2012, however there is no relevant exposure at ground level and this does not therefore require further detailed assessment.

Concentrations of NO<sub>2</sub> recorded at site 20 were above the AQS objective in 2012, however there is no relevant exposure at ground level and this does not therefore require further detailed assessment.

Overall trends of NO<sub>2</sub> concentrations in the borough since 2008 do not show a clear increase or decrease over time. As shown in figure 2.2 below, measurements at those sites which have recorded exceedances generally show some drop in levels of NO<sub>2</sub> from 2008 to 2012, however there was an increase at most locations in 2012 compared with 2011. This may be due in part to the quite marked increase in the national bias adjustment factor for Gradko in 2012.

### **Distance Correction for exceeding sites**

Although the exceeding sites are not at locations with relevant exposure, we have conducted the recommended distance correction using the Defra tool<sup>1</sup> to estimate concentrations of NO<sub>2</sub> at the nearest building facades.

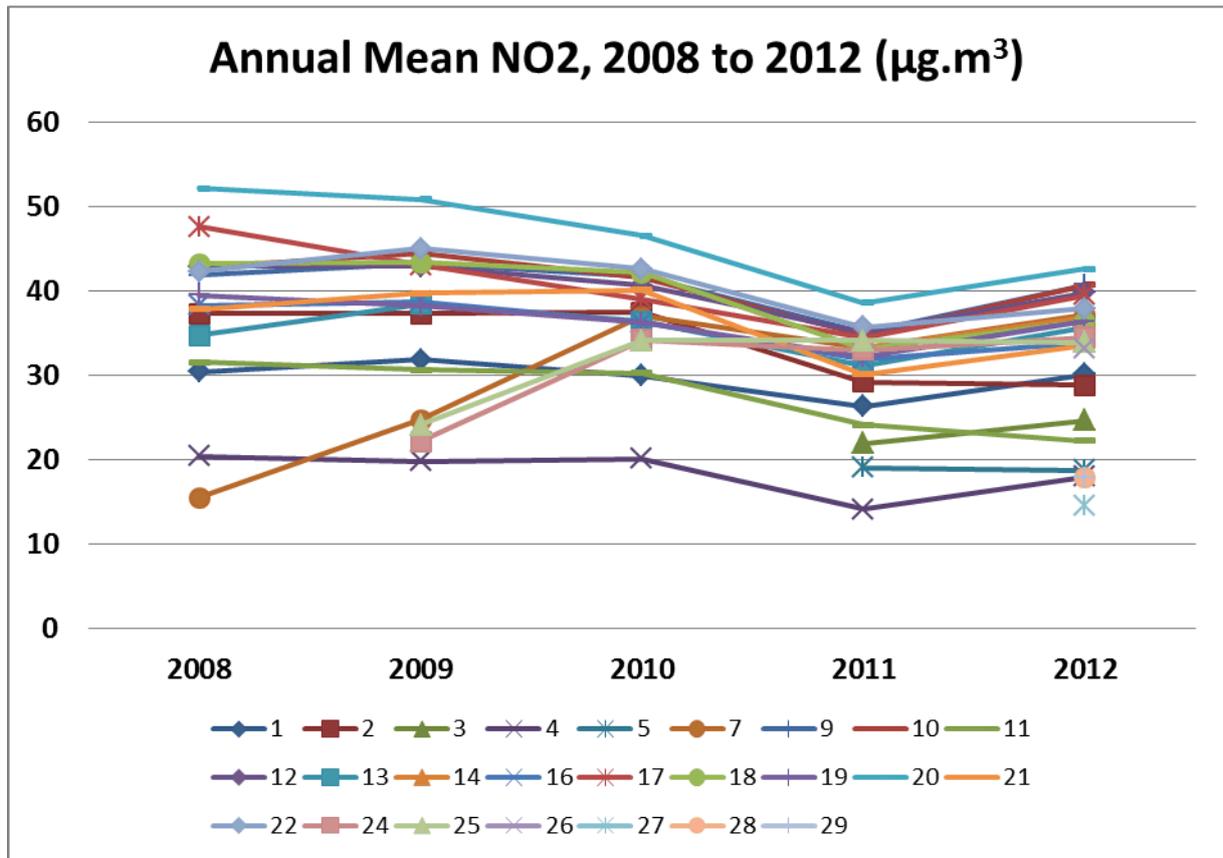
Site 9 has an adjusted annual mean NO<sub>2</sub> concentration of 35.3µg.m<sup>-3</sup>, site 10 has an adjusted value of 34.1µg.m<sup>-3</sup> and site 20 has a value of 38.6µg.m<sup>-3</sup>. Therefore, even if these sites did represent relevant exposure for the annual mean NO<sub>2</sub> objective, they would not be exceeding currently.

Full details of the distance correction are provided in Appendix B.

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<sup>1</sup> <http://laqm.defra.gov.uk/tools-monitoring-data/no2-falloff.html>

Figure 2.2 Trends in Annual Mean Nitrogen Dioxide Concentrations Measured at Diffusion Tube Monitoring Sites



**2.2.4 Particulate Matter (PM<sub>10</sub>)**

Basingstoke and Deane Borough Council have not conducted monitoring of PM10 in 2012.

**2.2.5 Sulphur Dioxide (SO<sub>2</sub>)**

Basingstoke and Deane Borough Council have not conducted monitoring of SO2 in 2012.

**2.2.6 Benzene**

Basingstoke and Deane Borough Council have not conducted monitoring of C6H6 in 2012.

**2.2.7 Other Pollutants Monitored**

Basingstoke and Deane Borough Council have not conducted monitoring of any pollutants other than NO2.

**2.2.8 Summary of Compliance with AQS Objectives**

Basingstoke and Deane Borough Council has examined the results from monitoring in the borough. Concentrations at locations of relevant exposure are all below the objectives at locations of relevant exposure, therefore there is no need to proceed to a Detailed Assessment.

## **3 New Local Developments**

### **3.1 Road Traffic Sources**

Basingstoke and Deane Borough Council have not identified any new or sufficiently changed road sources to warrant further investigation at this stage.

### **3.2 Other Transport Sources**

Basingstoke and Deane Borough Council have not identified any new or sufficiently changed other transport sources to warrant further investigation at this stage.

### **3.3 Industrial Sources**

#### **Biomass Combustion Plant, Armstrong Road**

Planning permission was granted in 2010 for a biomass combustion plant at the former SCA Building and Yard, Armstrong Road, Basingstoke (RG24 8NU). This represented a change in use of the premises from waste paper recycling, to the combustion of wood waste for the purposes of generating energy to sell to the National Grid. An Air Quality Assessment was carried out by consultants GF Environmental Ltd<sup>2</sup>.

The plant is rated at 750 KW. It is of the cement kiln type, fitted with cyclones followed by fabric filters to control particulate emissions. The original intention was that it should meet the pollutant emission limits of the Waste Incineration Directive and be operated according to the conditions of an Environmental Permit. However, in practice it could not meet the WID conditions and now burns only virgin timber. It is therefore not burning waste, and does not require an Environmental Permit, as it is exempt.

It was started up in Jan 2012, and operated intermittently throughout Jan and Feb 2012. It was temporarily shut down at the end of Feb 2012, because it was failing to meet the conditions imposed for noise control. During the time it was operating, there have been odour complaints about a smell of "smoke" or "bonfire" from the plant.

The plant has an EA permit A1 combustion plant but has now become a Small Waste Incinerator Plant. It burns "clean" waste wood. Wood exempt from WID. A permit was granted in December 2012 and the plant became operational from January 2013.

Based on the recommendations of the 2012 USA, the Council initiated diffusion tube monitoring at three sites where the GF Environmental model predicted the worst annual mean NO<sub>2</sub> impacts. Basingstoke and Deane Borough Council will report the results of the survey in a forthcoming Detailed Assessment.

#### **3.3.1 Closure of Part B processes**

The following Part B processes have closed in the Borough:

<sup>2</sup> Atmospheric Dispersion Modelling of Emissions from a Biomass Power Plant at Armstrong Road, Basingstoke, Hampshire. s.l. : GF Environmental Ltd, May 2010.

- Wyndeham Printworks
- Urbis Lighting (coating process)
- De La Rue (coating process)

### **3.4 New Developments with Fugitive or Uncontrolled Sources**

Basingstoke and Deane Borough Council have not identified any new or sufficiently changed fugitive or uncontrolled sources to warrant further investigation at this stage.

Basingstoke and Deane Borough 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.

Basingstoke and Deane Borough Council confirms that all the following have been considered:

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

## 4 Planning Applications

### 4.1 Industrial installations in planning

#### Bushywarren Lane, Herriard

A planning application was granted in 2012 for construction of an anaerobic digestion installation for rotational arable crops and local food waste together with landscaping and highway improvements at Bushywarren Lane, Herriard.

A full air quality assessment was not submitted with the application though a qualitative risk assessment was included which provides emission rates for the CHP plant<sup>3</sup>. We have used the provided data to screen the boiler using the industrial emissions screening tool provided with LAQM.TG(09). The nearest residential receptors are located approximately 1km away from the development site, which has an annual NO<sub>x</sub> emissions of approximately 17 tonnes. The output of the screening assessment is provided below- it clearly shows that a detailed assessment will not be required when the plant is operational as there more than an order of magnitude of difference between the allowed and expected emission rates. That said, if residential receptors are introduced close to the site this could result in a Detailed Assessment being required.

Figure 4-1 Screening assessment of CHP plant at Bushwarren Lane

Tool for Nitrogen Dioxide from discharges < 10m high TG03 Figure Ref. 6.3		Additional Comments/Information
The emissions of NO <sub>x</sub> in tonnes per annum are calculated at your given distance from the stack that give rise to a maximum annual mean concentration less than 1µg/m <sup>3</sup>		Details of the plant are as follows
Enter required information in Yellow Cells Resulting Emission in Red Bold		Site location 465254, 146152 Background NO <sub>2</sub> for 2012 is 11.0ug/m <sup>3</sup> CHP unit gas output- 3881NM <sup>3</sup> per hour CHP Nox emission- max 500mg/NM <sup>3</sup> This equates to 535mg/sec
Distance from nearest sensitive receptor	1000 m	Which equals 17.0 tonnes per annum.
Discharge height	7.2 m	
NO <sub>2</sub> Background concentration (include roadside contribution at relevant receptors)	11 µg/m <sup>3</sup>	The allowable emission rate is 584 tonnes per annum
Maximum Emission Rate	584.39 tonnes per annum	
Note: use actual emission rates and there is no need to further scale your emission rates		
If your scaled stack emissions in tonnes per annum are less than the target above you do not need to proceed, if your scaled emissions are greater than the target refer to TG03 for further advice		

<sup>3</sup> <http://www3.hants.gov.uk/mw-attachment?location=planning%5CBDB-76332%5CPPP%2020.4.12.pdf>

**Manor Farm, Monk Sherborne, Tadley RG26 5HW**

An application has been made for a variation of condition 9 (Site Layout) and 10 (to allow crushing and screening) of planning permission BDB/75626 at Manor Farm, Monk Sherborne.

The application does not relate to any additional emissions to air and will not therefore require a Detailed Assessment should it proceed.

**Overton Road**

In addition, an application has been made<sup>4</sup> for the construction and operation of a 8 MWE Pyrolysis Advanced Conversion Technology (ACT) plant including a 2 MWE Anaerobic Digestion Plant associated office, visitor centre, with new access road and weighbridge facilities, solar panels, associated landscaping and surface water attenuation features at Overton Road, Micheldever Station. This does lie within the boundary of Basingstoke and Deane Borough Council but is included here as the council were consultees on the application.

A modelling based air quality assessment was submitted which concluded the following:

- The additional traffic associated with both the construction and operation of the proposed development is below the DMRB criteria for assessment (classified as 'neutral') and therefore the impact associated with vehicle exhaust emissions is considered to be 'insignificant'.
- The findings of the detailed dispersion modelling assessment of combustion emissions from the stacks serving the ACT and AD processes at the proposed development has found that for all pollutants the maximum predicted long-term and short term impacts on air quality and sensitive ecosystems would be classified as 'insignificant'.

**Basingstoke Campus**

Network Rail submitted planning app to develop its Basingstoke Campus site which is approximately 600m east of Basingstoke Station, on the eastern side of Basingstoke. The 34,000m<sup>3</sup> site will include a Railway Operating Centre, a Workforce Development Centre and will also include a gas fired energy centre.

An EIA was submitted with an air quality assessment section which considered operational and construction phase impacts on NO<sub>2</sub>, PM<sub>10</sub> and construction dust. Railway Operating Centre and Workforce Development Centre.

BDBC were consulted during the scoping phase and were satisfied with the methodologies employed.

The assessment concluded that the development would result in insignificant impacts arising from PM<sub>10</sub> and NO<sub>x</sub>/NO<sub>2</sub> from vehicles and on-site gas fired energy plant.

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<sup>4</sup> <http://www3.hants.gov.uk/mineralsandwaste/application-details.htm?id=15241>

## 5 Air Quality Planning Policies

The UK Air Quality Strategy identifies planning policy as a key mechanism for Local Air Quality Management. As such, Basingstoke and Deane Borough Council have identified a number of Local Air Quality Priority Areas (LAQPA), where levels of NO<sub>2</sub> are close to or above the AQS annual mean objective limit of 40 µg·m<sup>-3</sup>. Development proposals in these areas are encouraged to undertake an air quality impact assessment, considering the impact that existing air quality might have on the development as well as the impact that the development will have on air quality. As part of this, supplementary monitoring of pollutants is encouraged to ensure accuracy of the assessment.

Basingstoke and Deane Borough Council requires that air quality assessments of planned developments in the borough assess the existing air quality in the area, and predict future air quality with and without the developments' impact. Consideration must then be given to the impact of air quality on existing residents, and on residents to be introduced to the area as part of a residential development. The criteria under which an air quality impact assessment is required as part of a planning application are published by Basingstoke and Deane Borough Council on their website, and broadly include proposals which:

- generate increased congestion, affect traffic volumes, speed, or composition on local roads, or include significant new parking capacity;
- introduce new exposure to existing sources of pollution;
- include biomass or CHP plants or introduce new industrial activity; or
- could give rise to increased HGV flows and fugitive dust emissions in sensitive areas as a result of the construction process.

In cases where developments are deemed to interfere with Air Quality Strategy, and insufficient mitigation or offsetting of air quality impacts can be provided, refusal of planning permission is considered, in line with guidance published on the Basingstoke and Deane Borough Council website.

Basingstoke and Deane Borough Council Environmental Protection Team, through pro-active consultation in planning, work to ensure that the AQS objectives for NO<sub>2</sub> are not exceeded at locations of relevant exposure in the borough. In recent years particular attention has been paid to the area of Winton Square, in which high levels of NO<sub>2</sub> have been found as a result of traffic pollution. Air Quality Planning Policy in this area has helped to ensure that residents not exposed to the effects of air pollution, and prevented the need for declaration of an AQMA.

## 6 Local Transport Plans and Strategies

In 1999 Hampshire County Council and Basingstoke and Deane Borough Council, in partnership with key stakeholders in the local community, jointly prepared the Basingstoke Environmental Strategy for Transport (BEST). The document provides a framework to address the future transport needs of Basingstoke and the surrounding area in a sustainable way, taking a long-term view up to 25 years ahead. This document has been supplemented and updated through the Hampshire County Council Transport Plan (now LTP3 2011-31) including a North Hampshire Transport Strategy (NHTS). Together, these documents explain how transport and access will be improved to match today's demand for movement around the borough.

The guiding principles will co-ordinate the future development and transport policy key decisions of both Councils and guide the investment plans of our two authorities, local businesses, property developers and public transport operators.

New housing and commercial development in the borough will impose additional demands on the highway and public transport networks. As such, new developments will be required to make a contribution towards improvements. The current policy for establishing the levels of such highway (BEST or NHTS highway contributions) is the Hampshire County Council Transport Contributions Policy, which was adopted in September 2007.

On 17 November 2010 the council adopted its policy "Parking: A Strategic Approach" which sets out an overall policy for determining the future direction for car parking supply in Basingstoke. The Approach found that, following public consultation, that the quantum and mix of long and short stay parking should be broadly maintained, in recognition of its importance to the economic vitality of the town.

## 7 Climate Change Strategies

Basingstoke and Deane Borough Council's Climate Change Strategy is available to consult on the Council website<sup>5</sup>. In May 2007 the Council Leader and Chief Executive signed The Nottingham Declaration on Climate Change and acknowledged that evidence showed that climate change is occurring and that this will have far reaching effects on people, places, economy, society and the environment.

This public declaration commits the council to contribute, at a local level, to the delivery of the UK Climate Change Programme, the Kyoto Protocol and the target for carbon dioxide reduction of 12.5% reduction by 2012.

The declaration also commits the council to participate in local and regional networks, make a significant reduction of greenhouse gas emissions from its own operations, to encourage all sectors of the community to reduce their greenhouse gas emissions, assess the risks associated with a changing climate and to produce a climate change strategy for the borough.

Working closely with The Carbon Trust, Basingstoke and Deane Borough Council has produced a comprehensive Carbon Management Plan setting out how the council plans to reduce its carbon footprint. A commitment was made to a carbon reduction target of 20% by 2011 with a further additional 10% reduction by 2013.

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<sup>5</sup> <http://www.basingstoke.gov.uk/browse/environment-and-planning/sustainability/climate-change/climatechangestrategy.htm>

## **8 Conclusions and Proposed Actions**

### **8.1 Conclusions from New Monitoring Data**

Monitoring data from 2012 indicates that concentrations of NO<sub>2</sub> have exceeded the AQS objective limit at a few sites around the Winton Square area in Basingstoke. Further assessment of these locations has however indicated that no exceedances of the objectives have occurred at buildings near the monitoring sites- these buildings do not represent relevant exposure but have been assessed in this way as a conservative measure. Basingstoke and Deane Borough Council are not therefore required to take any additional actions based on these data.

### **8.2 Conclusions relating to New Local Developments**

There are no new industrial, commercial or domestic developments in Basingstoke and Deane Borough which are likely to adversely affect air quality.

### **8.3 Proposed Actions**

No exceedances of the AQS objectives have been found for monitored pollutants in the borough of Basingstoke and Deane, and there are no new developments which are considered likely to affect considerations of air quality management in the area. There is therefore no requirement for Basingstoke and Deane Borough Council to undertake any additional assessments of air quality arising from this assessment. A Detailed Assessment will be submitted in due course for the biomass facility that is undergoing monitoring at the moment.

Basingstoke and Deane Borough Council will submit a Progress Report in 2014 as per the LAQM framework requirements.

# Appendices

## Appendix A: QA:QC Data

### Diffusion Tube Bias Adjustment Factors

Diffusion tubes may systematically under or over-read NO<sub>2</sub> concentrations when compared to the reference chemiluminescence analyser. This is described as bias and can be corrected for to improve the accuracy of the diffusion tube results, using a suitable bias adjustment factor.

Basingstoke and Deane Borough Council's diffusion tubes are prepared and analysed by Gradko using the 20% TEA in water method. This laboratory takes part in the QA/QC Field Intercomparison, operated on behalf of DEFRA as part of their Support to Local Authorities for LAQM contract.

As no automatic monitoring was undertaken in the Basingstoke and Deane Borough during 2012, the bias adjustment factors used within this Progress Report were derived from the national database of collocation studies as shown in Figure A1. Results from this spreadsheet provided national bias adjustment factors of 0.97 for 2012, which has been used to adjust data throughout this report.

Figure A1 – Diffusion Tube Bias Adjustment Calculations for 2012

National Diffusion Tube Bias Adjustment Factor Spreadsheet							Spreadsheet Version Number: 03/13			
Follow the steps below <u>in the correct order</u> to show the results of <u>relevant</u> co-location studies							This spreadsheet will be updated at the end of June 2013			
Data only apply to tubes exposed monthly and are not suitable for correcting individual short-term monitoring periods							Whenever presenting adjusted data, you should state the adjustment factor used and the version of the spreadsheet			
This spreadsheet will be updated every few months; the factors may therefore be subject to change. This should not discourage their immediate use.							LAQM Helpdesk Website			
The LAQM Helpdesk is operated on behalf of Defra and the Devolved Administrations by Bureau Veritas, in conjunction with contract partners AECOM and the National Physical Laboratory.							Spreadsheet maintained by the National Physical Laboratory. Original compiled by Air Quality Consultants Ltd.			
Step 1:		Step 2:		Step 3:		Step 4:				
Select the Laboratory that Analyses Your Tubes from the Drop-Down List		Select a Preparation Method from the Drop-Down List		Select a Year from the Drop-Down List		Where there is only one study for a chosen combination, you should use the adjustment factor shown with caution. Where there is more than one study, use the overall factor <sup>2</sup> shown in blue at the foot of the final column.				
If a laboratory is not shown, we have no data for this laboratory.		If a preparation method is not shown, we have no data for this method at this laboratory.		If a year is not shown, we have no data		If you have your own co-location study then see footnote <sup>1</sup> . If uncertain what to do then contact the Local Air Quality Management Helpdesk at LAQMhelpdesk@uk.bureauveritas.com or 0800 0327953				
Analysed By <sup>1</sup>	Method	Year	Site Type	Local Authority	Length of Study (months)	Diffusion Tube Mean Conc. (Dm) (µg/m <sup>3</sup> )	Automatic Monitor Mean Conc. (Cm) (µg/m <sup>3</sup> )	Bias (B)	Tube Precision <sup>3</sup>	Bias Adjustment Factor (A) (Cm/Dm)
Gradko	20% TEA in Water	2012	R	Gateshead Council	11	32	33	-2.6%	G	1.03
Gradko	20% TEA in Water	2012	R	Dudley MBC	9	55	60	-7.5%	G	1.08
Gradko	20% TEA in Water	2012	UB	Luton Borough Council	11	38	30	23.4%	G	0.77
gradko	20% TEA in water	2012	UC	Southampton City Council	11	30	33	-8.3%	G	1.09
Gradko	20% TEA in water	2012	R	Exeter City Council	11	34	34	-0.3%	G	1.00
Gradko	20% TEA in water	2012	R	Scarborough BC	11	32	37	-11.3%	G	1.13
Gradko	20% TEA in Water	2012	KS	Maylebone Road Intercomparison	11	106	94	12.1%	G	0.89
Gradko	20% TEA in water	2012	KS	New Forest DC	10	46	40	13.4%	G	0.88
Gradko	20% TEA in water	2012	R	New Forest DC	10	33	29	11.8%	G	0.89
Gradko	20% TEA in water	2012	R	Brighton & Hove City Council	11	41	37	10.5%	G	0.91
Gradko	20% TEA in water	2012	R	City of Lincoln Council	11	53	44	18.4%	G	0.84
Gradko	20% TEA in water	2012	R	Fareham Borough Council	9	38	39	-4.1%	G	1.04
Gradko	20% TEA in water	2012	R	NOTTINGHAM CITY COUNCIL	10	44	44	-0.2%	G	1.00
Gradko	20% TEA in water	2012	R	NOTTINGHAM CITY COUNCIL	11	43	41	4.9%	G	0.95
Gradko	20% TEA in water	2012	R	NOTTINGHAM CITY COUNCIL	10	46	47	-0.3%	G	1.00
Gradko	20% TEA in water	2012	R	The Highland Council	9	24	32	-24.1%	G	1.32
Gradko	20% TEA in water	2012	R	Wiltshire Council	10	36	35	3.3%	G	0.96
Gradko	20% TEA in Water	2012	UB	LB Waltham Forest	11	33	38	-11.8%	S	1.13
<b>Overall Factor<sup>2</sup> (27 studies)</b>							<b>Use</b>		<b>0.97</b>	

### **QA/QC of diffusion tube monitoring**

The Workplace Analysis Scheme for Proficiency (WASP) is an independent analytical performance-testing scheme, operated by the Health and Safety Laboratory (HSL). WASP formed a key part of the former UK NO<sub>2</sub> Network's QA/QC, and remains an important QA/QC exercise for laboratories supplying diffusion tubes to Local Authorities for use in the context of Local Air Quality Management (LAQM). The laboratory participants analyse four spiked tubes, and report the results to HSL. HSL assign a performance score to each laboratory's result, based on their deviation from the known mass of nitrite in the analyte.

The outcomes of these QA/QC schemes are evaluated on a regular basis against a set of pre-defined performance criteria, in the independent Workplace Analysis Scheme for Proficiency. The WASP – Annual Performance Criteria, for NO<sub>2</sub> Diffusion Tubes used in Local Air Quality Management (LAQM), indicate that Gradko demonstrated 'Good' precision in all results in 2012<sup>6</sup> (WASP rounds 116 to 118).

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<sup>6</sup> [http://laqm.defra.gov.uk/documents/LAQM-WASP-Rounds-111-118-\(September-2010--Setember-2012\)-NO2-report.pdf](http://laqm.defra.gov.uk/documents/LAQM-WASP-Rounds-111-118-(September-2010--Setember-2012)-NO2-report.pdf)

## Appendix B: QA:QC Data

This appendix presents the results of the application of the Defra “NO<sub>2</sub> with Distance from Roads” calculator at sites with a numerical exceedance of the annual mean NO<sub>2</sub> objective. Distances were measured by the Council in GIS and background value re taken from the 2012 background maps. None of the sites have relevant exposure, though in this instance we have calculated concentrations at commercial buildings as a conservative measure.

### Site 9

This calculator allows you to predict the annual mean NO<sub>2</sub> concentration for a location ("receptor") that is close to a monitoring site, but nearer or further the kerb than the monitor. The next sheet shows your results on a graph. 

**Enter data into the yellow cells**

<b>Step 1</b>	<b>How far from the KERB was your measurement made (in metres)?</b> (Note 1)	<b>1.4</b> metres
<b>Step 2</b>	<b>How far from the KERB is your receptor (in metres)?</b> (Note 1)	<b>5.4</b> metres
<b>Step 3</b>	<b>What is the local annual mean background NO<sub>2</sub> concentration (in µg/m<sup>3</sup>)?</b> (Note 2)	<b>22</b> µg/m <sup>3</sup>
<b>Step 4</b>	<b>What is your measured annual mean NO<sub>2</sub> concentration (in µg/m<sup>3</sup>)?</b> (Note 2)	<b>40.7</b> µg/m <sup>3</sup>
<b>Result</b>	<b>The predicted annual mean NO<sub>2</sub> concentration (in µg/m<sup>3</sup>) at your receptor</b> (Note 3)	<b>35.2</b> µg/m <sup>3</sup>

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

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

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

Issue 4: 25/01/11. Created by Dr Ben Mamer, Approved by Prof Duncan Laxen. Contact: benmamer@aqconsultants.co.uk

### Site 10

This calculator allows you to predict the annual mean NO<sub>2</sub> concentration for a location ("receptor") that is close to a monitoring site, but nearer or further the kerb than the monitor. The next sheet shows your results on a graph. 

**Enter data into the yellow cells**

<b>Step 1</b>	<b>How far from the KERB was your measurement made (in metres)?</b> (Note 1)	<b>1.1</b> metres
<b>Step 2</b>	<b>How far from the KERB is your receptor (in metres)?</b> (Note 1)	<b>6.1</b> metres
<b>Step 3</b>	<b>What is the local annual mean background NO<sub>2</sub> concentration (in µg/m<sup>3</sup>)?</b> (Note 2)	<b>22</b> µg/m <sup>3</sup>
<b>Step 4</b>	<b>What is your measured annual mean NO<sub>2</sub> concentration (in µg/m<sup>3</sup>)?</b> (Note 2)	<b>40.7</b> µg/m <sup>3</sup>
<b>Result</b>	<b>The predicted annual mean NO<sub>2</sub> concentration (in µg/m<sup>3</sup>) at your receptor</b> (Note 3)	<b>34.1</b> µg/m <sup>3</sup>

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

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

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

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Site 20

This calculator allows you to predict the annual mean  $\text{NO}_2$  concentration for a location ("receptor") that is close to a monitoring site, but nearer or further the kerb than the monitor. The next sheet shows your results on a graph.



Enter data into the yellow cells

<b>Step 1</b>	<b>How far from the KERB was your measurement made (in metres)?</b>	(Note 1)	<b>0.5</b>	metres
<b>Step 2</b>	<b>How far from the KERB is your receptor (in metres)?</b>	(Note 1)	<b>1.5</b>	metres
<b>Step 3</b>	<b>What is the local annual mean background <math>\text{NO}_2</math> concentration (in <math>\mu\text{g}/\text{m}^3</math>)?</b>	(Note 2)	<b>22</b>	$\mu\text{g}/\text{m}^3$
<b>Step 4</b>	<b>What is your measured annual mean <math>\text{NO}_2</math> concentration (in <math>\mu\text{g}/\text{m}^3</math>)?</b>	(Note 2)	<b>42.6</b>	$\mu\text{g}/\text{m}^3$
<b>Result</b>	<b>The predicted annual mean <math>\text{NO}_2</math> concentration (in <math>\mu\text{g}/\text{m}^3</math>) at your receptor</b>	(Note 3)	<b>38.6</b>	$\mu\text{g}/\text{m}^3$

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

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

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

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