



2012 Air Quality Updating and Screening Assessment for Basingstoke and Deane Borough Council

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

May 2012

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. This report is Basingstoke and Deane Borough Council's air quality Updating and Screening Assessment report for calendar year 2011.

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

No automatic air pollution monitoring is carried out by Basingstoke and Deane Borough Council. Indicative monitoring of nitrogen dioxide (NO₂) is 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⁻³ in 2011. Annual mean concentrations of this pollutant (which in previous years has been a matter of concern particularly around the Winton Square/Winchester Street junction) have decreased slightly since 2010. No Detailed Assessments are required on the basis of the 2011 diffusion tube monitoring dataset.

The following new developments have been granted approval:

- An extension to the Mortimer sand and gravel quarry.
- A gin distillation process at Laverstoke.
- Conversion of the upper floor of a retail unit at 35 Winchester Street to residential use.

In each case, Air Quality Assessments have been carried out, and on the basis of these it is concluded that no Detailed Assessments are required for these developments.

A materials recycling plant has been proposed at Kingsclere (although it has not yet been approved). If this goes ahead, additional diffusion tube monitoring sites may be required in the village of Headley, to confirm that there are no impacts on NO₂ due to the increased traffic (particularly HGVs) through the village.

A new biomass-fuelled power generation plant has been 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 has been 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. There have also been odour complaints about the plant.

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Emissions tests were carried out in April: total NO_x 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 NO₂ objectives. Therefore it has been recommended that a Detailed Assessment be carried out with respect to NO₂.

It is also recommended that a small number of diffusion tube monitoring sites be set up at the predicted point of maximum impact (120 m to the north east of the site) and nearest residential receptors (the latter are 240 m downwind of the plant with respect to the prevailing wind direction). The old Lamb's Row site could usefully be re-instated.

Basingstoke and Deane Borough Council have highlighted the increased use of wood burning stoves in the Borough. However, on the basis of local knowledge, they consider it highly unlikely that any areas exist in the Borough where the density of solid fuel use is sufficient to trigger a Detailed Assessment.

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1 Introduction

1.1 Description of Local Authority Area

The Borough of Basingstoke and Deane covers over 630 km² of Hampshire, in South-East England; around 90% of this area 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 principal 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. Also, the 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.

The second largest town is Tadley, which includes Pamber Heath and Baughurst. However, the Borough is otherwise characterised by its numerous small villages, such as Deane, Bramley and Overton. 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.

Although the Borough is predominantly rural, there are a number of Part A (Environment Agency regulated) industrial installations, including a waste to energy plant at Chineham, a paper mill at Overton and a petrochemical process in Alton. In addition there are numerous Part B (Local Authority regulated) processes including cement batching, petrol stations, a crematorium, vehicle paint spraying and dry cleaners.

1.2 Purpose of Report

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

The objective of this Updating and Screening Assessment (USA) is to identify any matters that have changed which may lead to risk of an air quality objective being exceeded. A checklist approach and screening tools are used to identify significant new sources or changes and whether there is a need for a Detailed Assessment. The USA report should provide an update of any outstanding information requested previously in Review and Assessment reports.

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 $\mu\text{g m}^{-3}$ (or milligrammes per cubic metre, mg m^{-3} for carbon monoxide) with the number of exceedances in each year that are permitted (where applicable).

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

1.4 Summary of Previous Review and Assessments

Basingstoke and Deane Borough Council have made a number of Air Quality Review and Assessment reports available on their website, at <http://www.basingstoke.gov.uk/browse/environment-and-planning/pollution/air-quality/Air+Quality+Reports.htm>. The earliest is their Stage 3 Review and Assessment, published in 2000. The conclusions and implications of all completed Air Quality Review and Assessment reports to date are summarised 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 exceedances 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 exceedance of the annual mean objective for nitrogen dioxide (NO₂) was identified at the Winchester Street junction with Winton Square. A Detailed Assessment was therefore deemed to be required, considering concentrations of NO₂ at locations of relevant exposure in the vicinity of the junction. Concern centred around a flat above a restaurant in this area. As a precursor to this assessment, additional diffusion tube monitoring was undertaken at four locations from May 2004.

Detailed Assessment, 2005

The 2005 Detailed Assessment, relating to NO₂ around the Winchester Street junction with Winton Square, established that the flat above the restaurant was not inhabited but was used as a staff rest area. This did not constitute relevant public exposure, so 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 exceedances of the Air Quality Strategy annual mean objective for NO₂ from the additional monitoring implemented in December 2005. It was concluded that there was potential exposure to this exceedance at the location considered in the 2005 Detailed Assessment, but as the flat was still only used as a staff rest area this did not constitute relevant public exposure. No significant changes likely to affect emissions of carbon monoxide, benzene, 1,3-butadiene, lead, sulphur dioxide or PM₁₀ were noted, and it was therefore concluded that exceedances of the Air Quality Strategy objectives for these pollutants were not likely and there was no requirement for a Detailed Assessment.

Progress Report, 2007

In July 2007 Basingstoke and Deane Borough Council produced a Progress Report considering NO₂ monitoring data from 22 sites, concluding that there were no likely exceedances at locations of relevant exposure in the Borough.

Progress report, 2008

The final Stage 3 Progress Report, published in April 2008, concluded from NO₂ monitoring at 20 sites that there were no likely exceedances 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 Borough recorded annual mean NO₂ 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 exceedances at locations of relevant exposure at The Old Plough on Newbury Road near Headley. Concentrations of NO₂ at the roadside façade of the building were estimated to be 45 µg m⁻³. Since The Old Plough is a residential property, it was therefore recommended that Basingstoke and Deane Borough Council proceed to a Detailed Assessment of NO₂ 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.

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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 NO₂ significantly below the AQS annual mean objective limit at locations of relevant exposure. Although kerbside monitoring at The Old Plough indicated NO₂ 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 NO₂ in the area. It was however recommended that Basingstoke and Deane Borough Council should continue, and possibly expand, monitoring of NO₂ at locations of relevant exposure in the area.

Progress Report, 2010 & 2011.

No Progress Report was submitted in 2010. The 2011 Progress Report covered both 2009 and 2010 by agreement with Defra. Diffusion tube monitoring data suggested that new exceedances of the AQS objective for NO₂ had occurred at two sites. These were: a roadside site at Forge Farm on Newbury Road, and a kerbside site on the Winton Square/Winchester Street junction. It was concluded that neither of these locations had associated relevant exposure. However, it was recommended that additional monitoring at these locations should be undertaken to confirm the accuracy of this conclusion.

2 New Monitoring Data

2.1 Summary of Monitoring Undertaken

2.1.1 Automatic Monitoring Sites

Basingstoke and Deane Borough Council did not undertake any automatic air pollution monitoring during 2011.

2.1.2 Non-Automatic Monitoring Sites

Basingstoke and Deane Borough Council carried out indicative monitoring of NO₂ using diffusion tubes, at 20 sites in 2011, including one site at which tubes were exposed in triplicate. This reflects the fact that NO₂ from road transport emissions is the pollutant of most concern in the Borough. Details of these diffusion tube sites are shown in Table 2-1. (Sites 24, 25 and 26 are triplicate tubes at one single location).

Diffusion tubes were supplied and analysed by Gradko International Ltd. The tubes were prepared using a 20% solution of TEA in water. When preparing and analysing diffusion tubes, Gradko International Ltd follows the methods set out in the Defra Practical Guidance available at <http://laqm.defra.gov.uk/diffusion-tubes/practical-guidance.html> . Gradko International Ltd has UKAS accreditation for this method.

Details of Gradko's performance in the Workplace Analysis Scheme for Proficiency (in relation to analysis of NO₂ diffusion tubes) are provided in Appendix A.

Basingstoke and Deane Borough Council do not currently operate any automatic NO₂ monitoring sites, so it has not been possible for them to carry out their own co-location study to quantify the accuracy of the diffusion tubes and calculate a bias adjustment factor. Instead, a combined or national bias adjustment factor has been used. These are calculated from the results of co-location studies reported by Local Authorities throughout the UK, and are available from <http://laqm.defra.gov.uk/bias-adjustment-factors/national-bias.html> . The 2011 national bias adjustment factor given for tubes prepared by Gradko International Ltd using the 20% TEA/water method, and analysed by the same laboratory, was 0.89 at the time of writing.

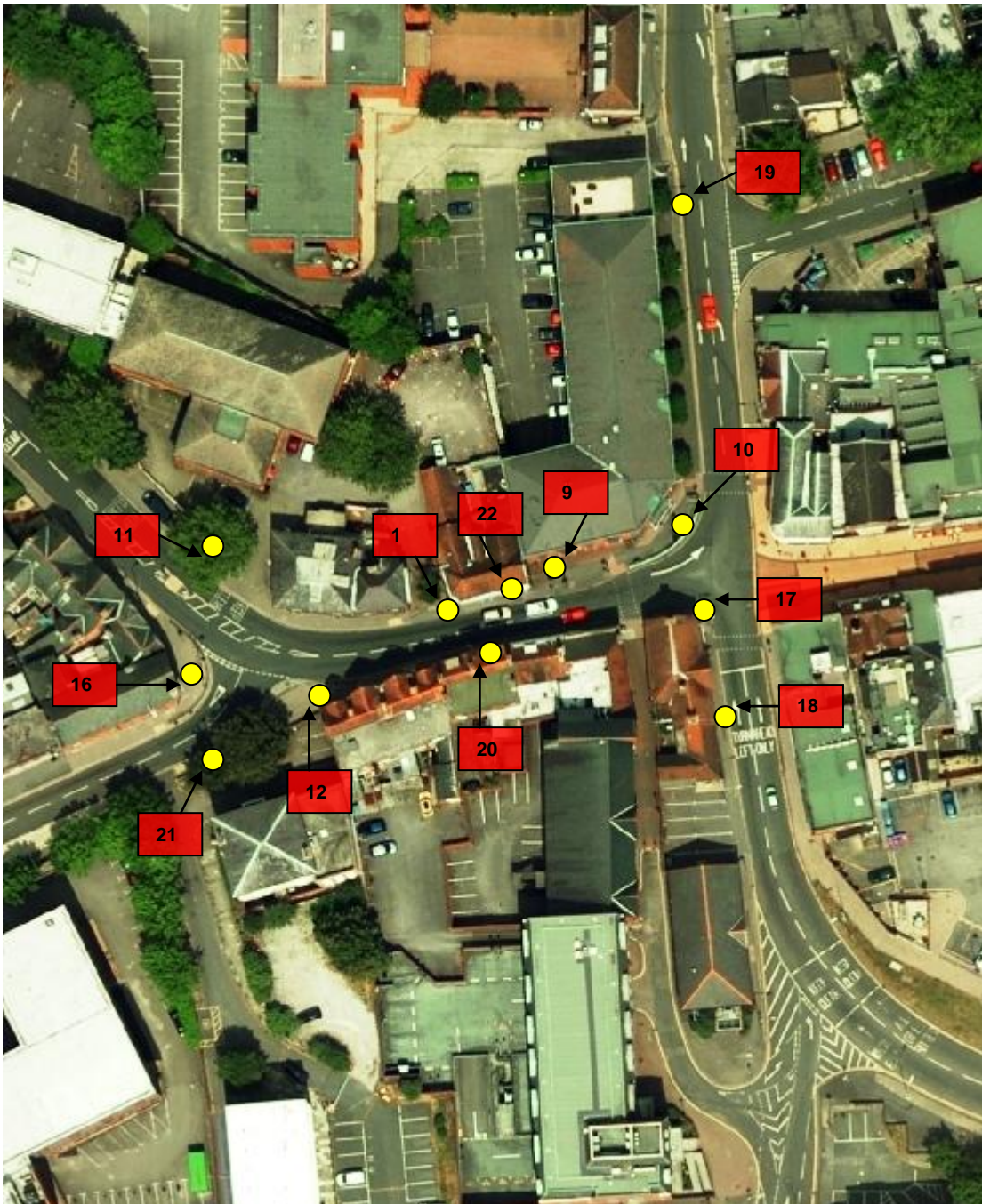


Figure 2-1 Locations of Non-Automatic Monitoring Sites Around the Winton Square/Winchester Street junction (supplied by Basingstoke and Deane BC)

Table 2-1 Details of Non-Automatic Monitoring Sites

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 1, Winton Square, Basingstoke	Roadside	463600	151800	NO ₂	N	N	N	1.7	Y
Site 2, front façade 279 Winchester Road, Basingstoke	Roadside	462300	150700	NO ₂	N	N	N	2.3	Y
Site 3, 17 Winchester Road Basingstoke	Roadside	463499	151805	NO ₂	N	N	N	5	N
Site 4, Stocker Cl., Basingstoke	Urban Background	463500	150700	NO ₂	N	N	N	1.6	N
Site 5, Front façade, 38 Swan St, Kingsclere.	Roadside	452380	158451	NO ₂	N	N	Y	4	N
Site 7, bus stop by "The Guru", Newbury Rd, Hedley.	Urban Background	451783	16234	NO ₂	N	N	Y	1.2	N
Site 9, traffic lights at Winton Sq.	Roadside	463640	151857	NO ₂	N	N	N	1.4	Y
Site 10, Corner of New St./Winton Square jnctn.	Roadside	463586	151862	NO ₂	N	N	N	1.1	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 11, Corner of Winton Square/Sarum Hill jctn	Roadside	463586	151862	NO ₂	N	N	N	1.6	Y
Site 12, 4 Winton Square	Kerbside	463607	151840	NO ₂	N	N	N	0.9	Y
Site 13, Adjacent 52 New Road, B'Stoke	Roadside	463982	152014	NO ₂	N	N	Y	4.8	Y
Site 14, 8 Winton Square, Basingstoke	Roadside	463571	151852	NO ₂	N	N	N	3	N
Site 16, junct. Winton Square/Winchester R'd.	Roadside	463587	151845	NO ₂	N	N	N	1.1	Y
Site 17, o/s 37 Winchester St.	Kerbside	463662	151852	NO ₂	N	N	N	0.4	Y
Site 18, adjacent 37 Winchester St.	Roadside	463664	151836	NO ₂	N	N	N	1.7	Y
Site 19, Adjacent Copenhagen Hse, New St.	Kerbside	463658	151912	NO ₂	N	N	N	0.5	Y
Site 20, o/s 45 Winchester St.	Kerbside	463625	151846	NO ₂	N	N	N	0.5	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 21, Winchester R'd/Winton Square junct.	Kerbside	463586	151830	NO ₂	N	N	N	0.6	Y
Site 22, façade of Agra Balti, 34 Winchester Rd	Roadside	463636	151856	NO ₂	N	N	N	1.3	Y
Site 24, IT services, front façade, the Old Plough, Newbury Road, Headley.	Roadside	451367	162731	NO ₂	N	N	Y	5.5	Y
Site 25, IT services, front façade, the Old Plough, Newbury Road, Headley.	Roadside	451367	162731	NO ₂	N	N	Y	5.5	Y
Site 26, IT services, front façade, the Old Plough, Newbury Road, Headley.	Roadside	451367	162731	NO ₂	N	N	Y	5.5	Y

2.2 Comparison of Monitoring Results with AQ Objectives

2.2.1 Nitrogen Dioxide

Automatic Monitoring Data

No automatic monitoring of nitrogen dioxide (NO₂) was carried out in 2011 by Basingstoke and Deane Borough Council.

Diffusion Tube Monitoring Data

NO₂ is monitored at 20 sites using diffusion tubes. The results of Basingstoke and Deane Borough Council's diffusion tube monitoring of NO₂ in 2011 are given in Table 2-2. A bias adjustment factor of 0.89 has been applied, as explained in section 2.1.2.

No diffusion tubes were exposed in Jan 2011, hence data capture at most sites in 2011 was 11 months (92%). Sites 4 and 11 had two further months of data missing, so these two sites had 75% data capture.

Monitoring at sites 2, 3, 5 and 14 started up in July 2011, thus achieving data capture of only 50%. The six-month means for these four sites have therefore been "annualised" according to the procedure given in Box 3.2 of the Technical Guidance LAQM.TG(09). The three nearest AURN sites have been used for this purpose: Harwell (a rural site in south Oxfordshire), Reading New Town (an urban background site in the nearby town of Reading in the neighbouring county of Berkshire) and Portsmouth (an urban background site in the city of Portsmouth, Hampshire). The mean ratio of the annual mean (1st Jan – 31st Dec 2011) to the period mean (1st Jul – 31st Dec) for these three sites was 1.105. This value was therefore used as the annualisation factor for the four sites above.

Diffusion tubes were exposed in triplicate at one location – the Old Plough, Newbury road, Hedley (sites 24, 25 and 26). This has allowed the precision of the diffusion tubes to be estimated. The coefficient of variation (i.e. the standard deviation as a percentage of the mean) of the three measurements ranged from 1% to 8% during 2011. The mean coefficient of variation of triplicate tube results was 4%.

After application of the bias adjustment factor, no diffusion tube monitoring sites in Basingstoke and Deane Borough has annual mean NO₂ concentrations that exceeded the AQS objective of 40 µg m⁻³. 2011 is the first year since 2003 that no sites have recorded an exceedance of this objective.

Because the number of diffusion tube sites is large, this report does not attempt show trends in NO₂ at every site. Instead, a time series graph is shown only for a specific set of sites, i.e. those which:

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- Have five years of data
- Have exceeded the AQS objective for annual mean NO₂ at least once in the past five years.

These are all sites in the vicinity of the Winchester Street/Winton Square junction. The graph is shown in Figure 2.2.

Figure 2.2 indicates that concentrations of NO₂ at these sites have decreased in 2010 and 2011 compared to 2009 and earlier years. It is too soon to say whether this is the beginning of a decreasing trend in NO₂ around this junction, so monitoring should continue.

Table 2-2 Results of Nitrogen Dioxide Diffusion Tubes in 2011

Site ID	Location	Site Type	Within AQMA?	Triplicate or Collocated Tube	Data Capture 2011 (Number of Months)	Data with less than 9 months has been annualised (Y/N)	Confirm if data has been distance corrected (Y/N)	Annual mean concentration (Bias Adjustment factor = 0.89)
								2011 ($\mu\text{g}/\text{m}^3$)
1	Winton Square, Basingstoke	Roadside	N	N	11	-	N	26.3
2	Front façade 279 Winchester Road, Basingstoke	Roadside	N	N	6	Y	N	29.2
3	17 Winchester Road Basingstoke	Roadside	N	N	6	Y	N	21.9
4	Stocker Cl., Basingstoke	Urban Background	N	N	9	-	N	14.1
5	Front façade, 38 Swan St, Kingsclere.	Roadside	N	N	6	Y	N	19.0
7	Bus stop by "The Guru", Newbury Rd, Hedley.	Urban Background	N	N	11	-	N	33.3
9	Traffic lights at Winton Sq.	Roadside	N	N	11	-	N	35.0
10	Corner of New St./Winton Square jctn.	Roadside	N	N	11	-	N	34.7
11	Corner of Winton Square/Sarum Hill jctn	Roadside	N	N	9	-	N	24.1
12	4 Winton Square	Kerbside	N	N	11	-	N	35.1
13	Adjacent 52 New Road, B'Stoke	Roadside	N	N	11	-	N	31.1

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Site ID	Location	Site Type	Within AQMA?	Triplicate or Collocated Tube	Data Capture 2011 (Number of Months)	Data with less than 9 months has been annualised (Y/N)	Confirm if data has been distance corrected (Y/N)	Annual mean concentration (Bias Adjustment factor = 0.89)
								2011 ($\mu\text{g}/\text{m}^3$)
14	8 Winton Square, Basingstoke	Roadside	N	N	6	Y	N	33.3
16	Jcn Winton Square/Winchester R'd.	Roadside	N	N	11	-	N	31.8
17	O/s 37 Winchester St.	Kerbside	N	N	11	-	N	34.4
18	Adjacent 37 Winchester St.	Roadside	N	N	11	-	N	33.1
19	Adjacent Copenhagen Hse, New St.	Kerbside	N	N	11	-	N	32.1
20	o/s 45 Winchester St.	Kerbside	N	N	11	-	N	38.6
21	Winchester R'd/Winton Square jntcn	Kerbside	N	N	11	-	N	30.1
22	Façade of Agra Balti, 34 Winchester Rd	Roadside	N	N	10	-	N	35.7
24	IT services, front façade, the Old Plough, Newbury Road, Hedley.	Roadside	N	Triplicate	11	-	N	33.0
25	IT services, front façade, the Old Plough, Newbury Road, Hedley.	Roadside	N	Triplicate	11	-	N	34.1
26	IT services, front façade, the Old Plough, Newbury Road, Hedley.	Roadside	N	Triplicate	11	-	N	32.9

Table 2.6 Results of Nitrogen Dioxide Diffusion Tubes (2007 to 2011)

Site ID	Site Type	Within AQMA?	Annual mean concentration (adjusted for bias) $\mu\text{g}/\text{m}^3$				
			2007* (Bias Adjustment Factor = 0.92)	2008 (Bias Adjustment Factor = 0.82)	2009 (Bias Adjustment Factor = 0.82)	2010 (Bias Adjustment Factor = 0.84)	2011 (Bias Adjustment Factor = 0.89)
1	Roadside	N	36	30.4	31.8	29.9	26.3
2	Roadside	N	39	37.3	37.3	37.4	29.2
3	Roadside	N	- *	-	-	-	21.9
4	Urban Background	N	20	20.4	19.8	20.1	14.1
5	Roadside	N	- *	-	-	-	19.0
6	-	N	17	-	-	-	
7	Urban Background	N	- *	15.5	24.7	37.0	33.3
9	Roadside	N	48	41.8	43.2	41.7	35.0
10	Roadside	N	41	42.8	44.4	41.6	34.7
11	Roadside	N	29	31.5	30.6	30.2	24.1
12	Kerbside	N	42	42.9	42.9	40.6	35.1
13	Roadside	N	35	34.7	38.4	36.4	31.1
14	Roadside	N	-	-	-	-	33.3
16	Roadside	N	40	38.3	38.7	36.2	31.8
17	Kerbside	N	40	47.6	43.0	39.0	34.4
18	Roadside	N	47	43.2	43.3	42.1	33.1
19	Kerbside	N	37	39.5	38.2	36.2	32.1
20	Kerbside	N	47	52.1	50.8	46.5	38.6
21	Kerbside	N	37	37.8	39.7	40.1	30.1
22	Roadside	N	44	42.3	45.0	42.6	35.7
24	Roadside	N	-	-	22.1	34.2	33.0
25	Roadside	N	-	-	24.1	34.1	34.1
26	Roadside	N	-	-	22.1	34.6	32.9

*Sites 3, 5 and 7 have been relocated between 2007 and 2011, so the 2007 results for the old locations are not shown here.

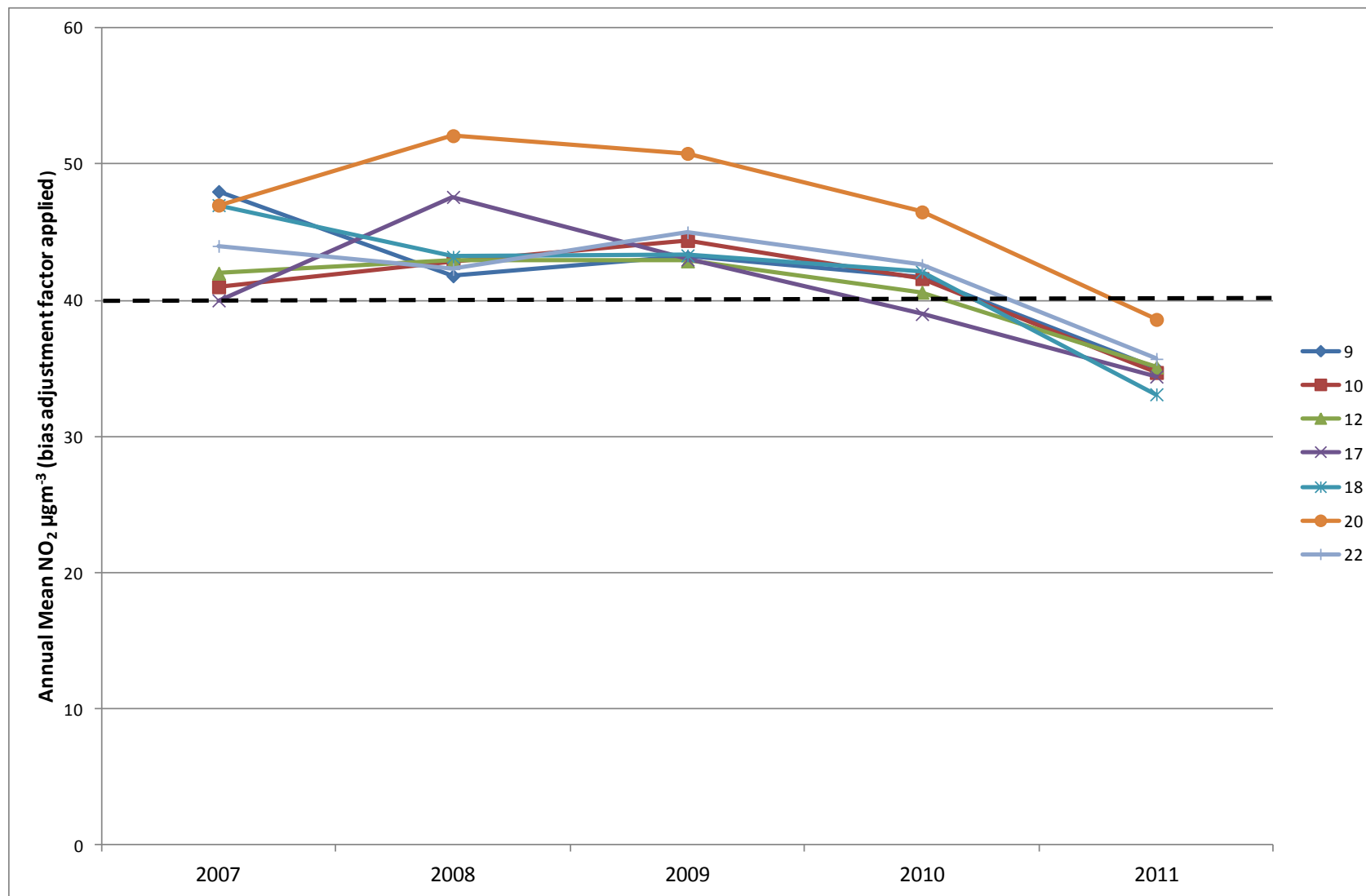


Figure 2-2 Trends in Annual Mean Nitrogen Dioxide Concentrations measured at Long-running Diffusion Tube Monitoring Sites around the Winton Square/Winchester Street junction.

2.2.2 PM₁₀

Basingstoke and Deane Borough Council did not carry out any monitoring of PM₁₀ during 2011. Previous years' assessments concluded that the AQS objectives for this pollutant were unlikely to be exceeded in the Borough.

2.2.3 Sulphur Dioxide

Basingstoke and Deane Borough Council did not carry out any monitoring of sulphur dioxide during 2011. Previous years' assessments concluded that the AQS objectives for this pollutant were unlikely to be exceeded in the Borough.

2.2.4 Benzene

Basingstoke and Deane Borough Council did not carry out any monitoring of benzene during 2011. Previous years' assessments concluded that the AQS objectives for this pollutant were unlikely to be exceeded in the Borough.

2.2.5 Other pollutants monitored

Basingstoke and Deane Borough Council did not carry out monitoring of any other pollutants covered by the Review and Assessment process (including carbon monoxide, 1,3-butadiene or lead) during 2011. Previous years' assessments concluded that the AQS objectives for these pollutants were unlikely to be exceeded in the Borough.

2.2.6 Summary of Compliance with AQS Objectives

Basingstoke and Deane Borough Council has examined the results from diffusion tube monitoring of NO₂ in the Borough. Concentrations are all below the objectives, therefore there is no need to proceed to a Detailed Assessment.

3 Road Traffic Sources

3.1 Narrow Congested Streets with Residential Properties Close to the Kerb

Basingstoke and Deane Borough Council confirms that there are no new/newly identified congested streets with a flow above 5,000 vehicles per day and residential properties close to the kerb, that have not been adequately considered in previous rounds of Review and Assessment.

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

3.2.1 New Residential Development at 35 Winchester Street

A new development is proposed at 35 Winchester Street, close to the junction with Winton Square where exceedances of the AQS objective for annual mean NO₂ concentration have been reported in previous years. The development entails the conversion of offices above a shop, to residential accommodation. A second storey will be added to the building.

The development is small and its contribution to air pollution in the area is expected to be negligible. Instead, concern centres on the pollution to which the residents of the building will be exposed. The development will be close to diffusion tube sites 17 and 18, located at 37 Winchester Street. Annual mean NO₂ concentrations greater than the AQS objective of 40 µg m⁻³ have been measured in the past, in this vicinity. The new development therefore constitutes new relevant public exposure.

An Air Quality Assessment (1) was carried out by Air Quality Consultants Ltd on behalf of Basingstoke and Deane Borough Council. This concluded that the annual mean concentration at the building façade at ground level was likely to marginally exceed the AQS objective. However, since the ground floor would remain in non-residential use, there would be no relevant public exposure at ground floor level. At the first and second floor levels (where there will be relevant exposure), the annual mean concentration was predicted to be within the objective.

3.2.2 Wood Lane near M3

A new location with relevant exposure has been identified by Basingstoke and Deane Borough Council. The garage of an existing house at Wood Lane near Hook has been converted to living accommodation. This new dwelling, at OS grid reference 470395 152454, is 25 m from the edge of the carriageway.

The DMRB model was used to assess whether an exceedence of any AQS objectives for NO₂ or PM₁₀ was likely, using the following data:

- Annual Average Daily Traffic flow (AADT) for year 2010 on the section of the M3 between junctions 5 and 6 was 104,110.
- Traffic flow comprised approximately 6% HDV and 94% cars and LDV.
- Traffic speed is 112 kph (70 mph).
- The modelled annual mean background concentration of NO₂ in grid square centred on 470500 152500 was 20.8 µg m⁻³ in 2010
- The modelled annual mean background concentration of PM₁₀ in same grid square was 17.1 µg m⁻³ in 2010.
- The minimum distance from the house (at its nearest point) to the edge of carriageway is 25 m.

The annual mean concentration of NO₂ at the receptor was calculated as 30.3 µg m⁻³ and the annual mean concentration of PM₁₀ at the receptor was calculated as 21.5 µg m⁻³ with 5 days > 50 µg m⁻³. (The calculations were checked with a range of relevant speeds and none produced exceedences of the objectives). Background concentrations and traffic data for 2010 were assumed to be representative of 2011.

Therefore, the relevant AQS objectives are unlikely to be exceeded at this house and there is no need for a Detailed Assessment.

Basingstoke and Deane Borough Council has assessed new/newly identified busy streets where people may spend 1 hour or more close to traffic, that were not assessed in previous rounds of Review and Assessment, and concluded that it will not be necessary to proceed to a Detailed Assessment.

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

Basingstoke and Deane Borough Council confirms that there are no new/newly identified roads with high flows of buses/HGVs.

3.4 Junctions

Basingstoke and Deane Borough Council confirms that there are no new/newly identified busy junctions/busy roads.

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

Basingstoke and Deane Borough Council confirms that there are no new/proposed roads.

3.6 Roads with Significantly Changed Traffic Flows

Basingstoke and Deane Borough Council confirms that there are no new/newly identified roads with significantly changed traffic flows.

3.7 Bus and Coach Stations

Basingstoke and Deane Borough Council confirms that there are no relevant bus stations in the Local Authority area.

4 Other Transport Sources

4.1 Airports

As previously reported, there are no airports in the Borough meeting the specified criteria.

Basingstoke and Deane Borough Council confirms that there are no airports meeting the specified criteria in the Local Authority area.

4.2 Railways (Diesel and Steam Trains)

4.2.1 Stationary Trains

Basingstoke and Deane Borough Council confirms that there are no locations where diesel or steam trains are regularly stationary for periods of 15 minutes or more, with potential for relevant exposure within 15m.

4.2.2 Moving Trains

Basingstoke and Deane Borough Council confirms that there are no locations with a large number of movements of diesel locomotives, and potential long-term relevant exposure within 30m.

4.3 Ports (Shipping)

Basingstoke and Deane Borough Council confirms that there are no ports or shipping that meet the specified criteria within the Local Authority area.

5 Industrial Sources

5.1 Industrial Installations

5.1.1 New or Proposed Installations for which an Air Quality Assessment has been Carried Out

Tesco Store, Winchester Road/Harrow Way

A development is proposed by Tesco Stores Ltd on land between Winchester Road and Harrow Way, Basingstoke. ***This development has not yet been granted approval, so is included here for information only.***

The proposed development comprises a food store, of floor area 8,157 m² and with parking for 534 cars. An Air Quality Assessment was produced in 2011 by consultants Waterman Ltd (2) on behalf of Tesco: this considered both the emissions during the construction phase, and the air quality impact of the completed development. The pollutants considered were CO, NO₂, PM₁₀, benzene and 1,3-butadiene.

Effects due to dust emissions during the construction phase were predicted to be minor at worst. The completed development – including the associated increases in traffic – were predicted to be negligible. The Air Quality Assessment concluded “*the Development is not predicted to lead to the designation of an AQMA*”.

Materials Recycling Centre, Kingsclere

Construction of a materials recycling centre is proposed at Kingsclere Quarry, Wolverton, RG26 5SX. The site’s OS grid reference is 455974 157521. It is on the A339. ***This facility has not yet had planning approval granted, so has been included for information only.***

An Air Quality Assessment has been carried out by the John Stacey Group (3). This considered a variety of impacts including air quality. The impact of the development on local air quality was judged to be “slight”.

The AQA addressed the various impacts of the increased traffic on the A339, particularly HGVs, which the development would generate. The impacts on air quality were considered to be “slight”, and would not lead to the declaration of an AQMA. However, this concentrated mostly on the immediate vicinity of the proposed development. The additional traffic would also pass through the village of Headley approximately 6 km to the north west of the site. This village has been the subject of a Detailed Assessment for NO₂ in 2010, and Basingstoke and Deane Borough

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Council have expressed concerns about the possible impacts on air quality in the village if the development goes ahead. If approval is granted, diffusion tube monitoring of NO₂ at relevant locations in Headley should continue and possibly be expanded.

Bombay Spirits Company Ltd Gin Distillery, Laverstoke Mill, London Road.

An application has been submitted for a gin distillation process at Laverstoke. This will entail two 3.43MW thermal input boilers burning natural gas as their main fuel, with ultra-low sulphur light fuel oil as their standby fuel. Stack height is to be 18m based on a D1 stack height assessment. Dispersion modelling has been used to demonstrate that no exceedances of any AQS objectives are expected. A Detailed Assessment is therefore not required.

Basingstoke and Deane Borough Council has assessed new/proposed industrial installations, and concluded that it will not be necessary to proceed to a Detailed Assessment.

5.1.2 Existing Installations where Emissions have Increased Substantially or New Relevant Exposure has been Introduced

There is one existing installation where emissions may increase substantially, and that is the southern extension to Mortimer Quarry. However, this source is dealt with as a “Fugitive or Uncontrolled Source” in section 7.

Basingstoke and Deane Borough Council confirms that there are no industrial installations with substantially increased emissions or new relevant exposure in their vicinity within its area or nearby in a neighbouring authority.

5.1.3 New or Significantly Changed Installations with No Previous Air Quality Assessment

Basingstoke and Deane Borough Council 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.

5.2 Major Fuel (Petrol) Storage Depots

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

5.3 Petrol Stations

Basingstoke and Deane Borough Council confirms that there are no petrol stations meeting the specified criteria.

5.4 Poultry Farms

Basingstoke and Deane Borough Council confirms that there are no poultry farms meeting the specified criteria.

6 Commercial and Domestic Sources

6.1 Biomass Combustion – Individual Installations

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 (4).

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 procedures in section 5.76-5.86 of the Technical Guidance LAQM.TG(09), (including the biomass calculator tool, downloadable from <http://laqm.defra.gov.uk/review-and-assessment/tools/emissions.html#biomass> , which reproduces the nomograms in Figure 5.19, 5.20 and 5.21 of the Technical Guidance) have been used to assess whether a Detailed Assessment is required for this plant. The following input data have been used:

- The stack is located at grid reference 465353 153042.
- The modelled annual mean background concentration of PM₁₀ in the grid square in which the plant is 16.33 µg m⁻³.
- The **measured** background NO₂ concentration in the vicinity of the plant has been taken as 21.4 µg m⁻³. This is the mean of the three most recent annual mean values measured at the former Lamb’s Row diffusion tube monitoring site (20.1 µg m⁻³ in 2008, 22.1 µg m⁻³ in 2009 and 21.9 µg m⁻³ in 2010 – all bias adjusted). This value is slightly lower than the mapped 2010 background concentration of 23.99 µg m⁻³.
- The stack height is 13.5 m, and stack diameter is 1.0 m.
- The height of the main building on which the stack sits is 7.8 m.

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- There are two “buildings” within a radius of 5x the stack height: a building of height 4 m, and a block of trees, of height 6 m. This was treated as a building for the purposes of the consultant’s modelling study, so the same approach has been used here.

Using the biomass combustion calculator, “target” emission rates were calculated for NO₂ and for PM₁₀, on the basis of the stack and building dimensions above, and the background concentrations. If the emission rate is below these targets, exceedance of objectives is unlikely. These target emission rates were as follows:

- 0.254 g/s for PM₁₀
- 0.905 g/s for NO_x with respect to the annual mean objective.
- 0.771 g/s for NO_x with respect to the hourly mean objective.

The measured emission rate of particulate matter, based on emissions tests carried out by consultants Catalyst Environmental on 13th Apr 2012 (5) was 0.021 g/s. This is below the previous maximum predicted long-term emission rate of 0.0423 gs⁻¹ for particulate matter. It is also well below the calculated “target” emission rate of 0.254 g/s for PM₁₀. Therefore an exceedance for PM₁₀ is unlikely and no Detailed Assessment required.

The measured emission rate of total NO_x expressed as NO₂, also based on emissions tests carried out by consultants Catalyst Environmental (5) on 13th Apr 2012 was 1.049 g/s. This is higher than the maximum predicted long-term emission rate for NO_x of 0.846 gs⁻¹ and higher than the calculated target emission thresholds for total NO_x. Therefore, the calculations predict that an exceedance of annual and hourly mean NO₂ objectives is possible in the vicinity of the plant.

The above calculations indicate that a Detailed Assessment is not required for PM₁₀, but is required for both annual mean NO₂, and hourly mean NO₂. In view of this, and because the plant is not operating according to the conditions envisaged at the planning stage, does not have an Environmental Permit, and there have been odour complaints, there is a case for proceeding to a Detailed Assessment.

In addition, it is recommended to commence diffusion tube monitoring at the modelled point of maximum impact on annual mean NO₂ concentrations and at the nearest relevant receptors. This will not detect short-term air quality problems, but will enable the Council to establish whether there is an exceedance of the annual mean objective. It may be useful to re-establish the old Lamb’s Row site.

Basingstoke and Deane Borough Council has assessed a biomass combustion plant, and concluded that **it is necessary to proceed to a Detailed Assessment for NO₂.**

6.2 Biomass Combustion – Combined Impacts

The biomass combustion plant at Armstrong Road is not in a residential area or close to other biomass combustion plant. Therefore it is not considered necessary to proceed to a Detailed Assessment for combined impacts of several biomass combustion plant.

Basingstoke and Deane Borough Council has assessed the biomass combustion plant, and concluded that it will not be necessary to proceed to a Detailed Assessment on the basis of combined impact with other biomass combustion sources.

6.3 Domestic Solid-Fuel Burning

Previous assessments have not found any areas with high density of domestic solid fuel use (coal, wood, and solid smokeless fuels).

Basingstoke and Deane Borough Council have identified that there has been an increase in the use of domestic wood-burning stoves in the area. However, they have insufficient information to assess whether there are any areas with significant use.

The maximum background PM₁₀ concentration anywhere in Basingstoke and Deane Borough is 18.24 µg m⁻³. According to Figure 5.22 of the Technical Guidance, in order to trigger a Detailed Assessment, there would need to be a total annual emission of around 6500 kg of PM₁₀ from any one area 500 m x 500 m.

According to Table 5.3 of the Guidance, a household using a conventional wood-burning stove for their main source of heating would generate 25.84 kg of PM₁₀ per year. To reach the threshold of 6500 kg per year, there would need to be 251 such homes in any area 500 m x 500 m.

Basingstoke and Deane Borough Council consider it highly unlikely that there are any areas in the Borough where there is such a high density of homes using wood-burning stoves as their main heat source. Therefore it is concluded that a Detailed Assessment is not required in relation to this source.

Basingstoke and Deane Borough Council has assessed domestic solid fuel use, and concluded that it will not be necessary to proceed to a Detailed Assessment.

7 Fugitive or Uncontrolled Sources

7.1 Mortimer Sand and Gravel Quarry, Southern Extension

Planning permission has been granted (subject to legal approval) for an extension to an existing sand and gravel quarry at Mortimer, near the northern boundary of the Borough. This extension will involve extending the quarry to the south, into the area on the other side of a road currently running along the southern perimeter of the site. This will approximately double the area of the quarry.

The new boundary of the quarry would be closer to nearby homes. In particular, a residential caravan park (“Pinelands”) will be close to the western boundary and the village of Mortimer West End will be close to the eastern boundary. The latter is the more likely to experience problems because it is downwind with respect to the prevailing wind direction.

Following the procedures in the Box 5.10 of LAQM.TG(09) for PM₁₀:

- An assessment relating to air quality has been carried out. According to the Environmental Statement prepared for the development by consultants URS Scott Wilson (6) *“Potentially significant exposure to concentrations of PM₁₀ that may exceed the 24-hour objective could occur within a 50m radius of the dust generating activity”*. However, such occurrences are likely to be rare, and most of the dust likely to be generated is coarse material rather than PM₁₀. The Environmental Statement therefore concludes that there is *“little risk”* regarding exposure to exceedances of this objective, due to the distance of the properties from dust-generating activities, the use of “stand-offs” and the nature of the particulate matter.
- There is relevant public exposure “near” to the source of dust emissions. The homes at Pinelands and Mortimer West End will be within 200m.
- According to the Environmental Statement there is not a history of dust complaints associated with the quarry.
- Viewing the site online via GoogleEarth™, there did not appear to be significant amounts of dirt tracked out of the site onto the adjoining road. However, the photo (taken in 2011) appeared to have been taken following recent rain.

The Environmental Statement indicates there is unlikely to be a problem with exceedances of PM₁₀ objectives due to the extension of the Mortimer Quarry. For this reason it is not considered necessary to proceed to a Detailed Assessment at this time. However, this should be reviewed if evidence comes to light suggesting otherwise, for example if dust nuisance complaints arise from the villages mentioned above.

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Basingstoke and Deane Borough Council has identified a potential source of fugitive particulate matter emissions in the Local Authority area, but concluded it will not be necessary to proceed to a Detailed Assessment.

8 Conclusions and Proposed Actions

8.1 Conclusions from New Monitoring Data

Basingstoke and Deane Borough Council do not carry out any automatic air pollution monitoring at present. Indicative monitoring of NO₂ was carried out using diffusion tubes at 20 sites in the Borough, during 2011. Diffusion tubes were supplied and analysed by Gradko International Ltd.

The monitoring focussed on locations where there was heavy or congested traffic, in particular the area around the Winton Square/Winchester Street junction. Diffusion tube monitoring in this area, in previous years, has identified exceedances of the AQS objective of 40 µg m⁻³ for annual mean NO₂; however, these have not been in locations with relevant public exposure, so an AQMA has not, so far, been required.

After application of a bias adjustment factor of 0.89 (from the database of combined bias adjustment factors at <http://laqm.defra.gov.uk/bias-adjustment-factors/national-bias.html>), and application of an annualisation factor in the case of four sites where data capture was less than 75%, annual mean NO₂ concentration was within the AQS objective at all diffusion tube monitoring sites.

2011 was the first year since 2002 when no NO₂ diffusion tube monitoring sites in Basingstoke and Deane Borough have recorded an exceedance of the AQS annual mean objective. Data from the past five years indicate that concentrations of NO₂ around the Winton Square/Winchester Street junction have decreased slightly in 2010 and 2011. However, it is too soon to tell whether this is the beginning of a downward trend in NO₂ concentrations around this junction, and it is recommended that Basingstoke and Deane Borough Council continue monitoring at the current locations.

8.2 Conclusions from Assessment of Sources

The following new developments have been approved in the Borough:

- Planning permission has been granted (subject to legal approval) for an extension to an existing sand and gravel quarry at Mortimer. The Environmental Statement indicates there is unlikely to be a problem with exceedances of PM₁₀ objectives. Therefore, it is not considered necessary to proceed to a Detailed Assessment at this time. However, this should be reviewed if evidence comes to light suggesting otherwise.

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- A gin distillation process is proposed at Laverstoke. A dispersion modelling study demonstrated that no exceedances of any AQS objectives are expected. A Detailed Assessment is therefore not required.
- The upper floor of a retail unit at 35 Winchester Street is to be converted from offices to flats, and an additional floor is to be added. This development will be introducing new public exposure into an area where exceedances of the AQS objective for annual mean NO₂ concentration have been measured. However, an Air Quality Assessment concluded that, although the annual mean concentration at the building façade at ground level was likely to marginally exceed the AQS objective, the annual mean concentration was predicted to be within the objective at the first and second floor levels (where the relevant exposure will be). A Detailed Assessment is not required.

The following new developments have not yet been granted approval:

- The development of a Tesco store is proposed, on the land between Winchester Road and Harrow Way (Basingstoke). This has not yet been granted approval. However, an Air Quality Assessment has concluded that air quality impacts of the completed development – including the associated increases in traffic – were predicted to be negligible. A Detailed Assessment is unlikely to be required.
- A materials recycling centre is proposed at Kingsclere Quarry. This also has not yet been granted approval. An Air Quality Assessment has concluded that air quality impacts are likely to be “slight”: however, the AQA mainly concentrated on the immediate vicinity of the plant. The increased traffic, particularly HGVs, through the nearby village of Headley could have an impact on air quality. If the development goes ahead, monitoring should be continued in the village of Headley, with possibly further diffusion tube sites set up at locations with relevant public exposure.

A 750 kW biomass fuelled power generation unit has been constructed at Armstrong Road, Basingstoke. It was originally intended to operate as a Part A process, under the conditions of an Environmental Permit, burning waste wood and meeting the provisions of the Waste Incineration Directive. However, it has been 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.

Emission test data from tests carried out in April 2012 indicate emissions of NO_x are (i) above the predicted emission rates and (ii) above the “target” threshold calculated using the Biomass Combustion tool, above which the plant’s emissions may contribute to an exceedance of the annual and hourly mean NO₂ objectives. It is therefore recommended that the Council proceed to a Detailed Assessment for NO₂, also that diffusion tube monitoring sites are set up at the predicted point of maximum impact, 120 m to the north east of the plant. Also, at the nearest residential receptors

(240 m downwind of the plant with respect to the prevailing wind direction). The old Lamb's Row site could usefully be started up again.

8.3 Proposed Actions

1. Emissions data from the Armstrong Road biomass combustion plant should be obtained as soon as it is back in operation. This should be used to establish whether a modelling-based Detailed Assessment is necessary for NO₂.
2. One or more (e.g. two or three) NO₂ diffusion tube monitoring sites should be set up at the predicted point of maximum impact of the plant's NO_x emissions and nearest residential receptors. The objective would be to assess whether there is exceedance of the annual mean objective at this point.
3. If the proposed materials recycling centre at Kingsclere goes ahead, it is recommended that additional diffusion tube monitoring is carried out in the village of Headley.

9 References

1. **Air Quality Consultants.** *Air Quality Assessment: 35 Winchester Street, Basingstoke.* Bristol : Air Quality Consultants , 2012.
2. **Waterman Energy, Environment and Design Ltd.** *Air Quality Assessment: Basingstoke Tesco.* London : Waterman Ltd, 2011. EED-10005-R.1.1.4_IBM.docm.
3. **John Stacey Group.** *Kingsclere Quarry, Wolverton.* s.l. : John Stacey Group, (Year not specified).
4. **GF Environmental Ltd.** *Atmospheric Dispersion Modelling of Emissions from a Biomass Power Plant at Armstrong Road, Basingstoke, Hampshire.* s.l. : GF Environmental Ltd, May 2010.
5. **Catalyst Environmental.** *Stack Emissions Testing Report commissioned by Basingstoke Skip Hire.* Swindon : Catalyst Environmental, 2012.
6. **URS Scott Wilson.** *Mortimer Quarry extension to sand and gravel workings. Environmental Statement. Appendix G, Air Quality and Dust.* s.l. : URS Scott Wilson, 2011. D128157 .

Appendices

Appendix A: QA/QC Data

Appendix B: List of Part A Processes

Appendix C: List of Part B Processes

Appendix A: QA:QC Data

Diffusion Tube Bias Adjustment Factors

A locally-derived bias adjustment factor was not available. The NO₂ diffusion tube bias adjustment factor used in this report was taken from the database of combined bias adjustment factors (March 2012 edition), downloadable from <http://laqm.defra.gov.uk/bias-adjustment-factors/national-bias.html> .

The bias adjustment factor for tubes prepared by Gradko International, using the 20% TEA/water method, and analysed by the same laboratory, was 0.89.

QA/QC of diffusion tube monitoring

Diffusion tube precision is discussed in the main body of the report, on the basis of the triplicate tubes exposed at sites 24, 25 and 26.

The laboratory used (Gradko International) participates in the Workplace Analysis Scheme for Proficiency (WASP), an independent performance testing scheme operated by the Health and Safety Laboratory. This involves analysis of diffusion tubes “spiked” with a known amount of nitrite.

A summary of the performance of Gradko International in the WASP scheme is included in the table below, available from <http://laqm.defra.gov.uk/diffusion-tubes/qa-qc-framework.html> .

Gradko’s performance in Round 115 was relatively poor compared to previous recent rounds. Gradko were contacted about this. The laboratory manager, Linda Gates explained that the affected WASP samples for this round had been become contaminated at the time of analysis. They were analysed as a separate batch, and there was an issue with cross-contamination of sample vials. However, Gradko gave their assurance that this problem only affected the WASP samples: no customer diffusion tubes had been affected.

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Table 1: Laboratory summary performance for WASP NO₂ PT rounds 108 - 115

The following table lists those UK laboratories undertaking LAQM activities that have participated in recent HSL WASP NO₂ PT rounds and the percentage (%) of results submitted which were subsequently determined to be **satisfactory** based upon a z-score of $< \pm 2$ as defined above.

WASP Round	WASP R108	WASP R109	WASP R110	WASP R111	WASP R112	WASP R113	WASP R114	WASP R115
Round conducted in the period	Jan – March 2010	April – June 2010	June – August 2010	Oct – Dec 2010	Jan -March 2011	April - June 2011	July - Sept 2011	October - December 2011
Aberdeen Public Analysts	100 %	100 %	100 %	100 %	100 %	100 %	100 %	100 %
Bristol City Council	75 %	100 %	100 %	100 %	100 %	100 %	100 %	100 %
Cardiff Scientific Services	100 %	50 %	100 %	75 %	100 %	100 %	100 %	75 %
Edinburgh City Council	100 %	100 %	75 %	100 %	100 %	100 %	100 %	0 %
Environmental Services Group, Didcot (formerly Bureau Veritas Laboratories, Glasgow and Harwell Scientifics) [1] [2]	100 %	100 %	100 %	100 %	100 %	100 %	100 %	100 %
Exova (formerly Clyde Analytical)	100 %	50 %	50 %	100 %	100 %	100 %	0 %	75 %
Glasgow Scientific Services	50 %	100 %	100 %	100 %	100 %	100 %	100 %	100 %
Gradko International [2]	100 %	87.5 %	100 %	100 %	100 %	100 %	100 %	37.5 %
Kent Scientific Services	100 %	100 %	100 %	100 %	50 %	100 %	100 %	75 %
Kirklees MBC	100 %	100 %	100 %	0 %	100 %	0 %	0 %	50 %
Lambeth Scientific Services	50 %	100 %	100 %	100 %	50 %	25 %	100 %	25 %
Lancashire County Analysts [3]	100 %	75 %	50 %	100 %	75 %	-	-	-
Milton Keynes Council	100 %	25 %	50 %	100 %	100 %	75 %	100 %	100 %
Northampton Borough Council	100 %	100 %	100 %	100 %	100 %	100 %	100 %	100 %
Somerset Council [4]	-	-	-	-	-	-	-	100 %
South Yorkshire Council Laboratory [5]	25 %	-	-	-	-	-	-	-
South Yorkshire Air Quality Samplers [6]	-	100 %	100 %	100 %	100 %	100 %	100 %	100 %
Staffordshire County Council	100 %	100 %	50 %	100 %	100 %	100 %	100 %	100 %
Tayside (formerly Dundee CC)	100 %	100 %	100 %	100 %	100 %	100 %	100 %	100 %
Walsall MBC [7]	-	100 %	100 %	100 %	-	-	-	-
West Yorkshire Analytical Services	100 %	100 %	100 %	100 %	75 %	75 %	100 %	100 %

[1] Bureau Veritas laboratory and Harwell Scientific now part of ESG Group.

[2] Participant subscribes to two sets of test samples (2 x 4 test samples) in each WASP PT round.

[3] No longer involved in NO₂ diffusion tube measurements from R113.

[4] New participant from R115.

[5] No longer involved in NO₂ diffusion tube measurements from R109.

[6] New participant from R109.

[7] Results for WASP R107, R108 and R112 not submitted. No longer involved in NO₂ diffusion tube measurements from R113.

Appendix B: List of Part A Processes

Information supplied by Basingstoke and Deane Borough Council.

Part A Installations in Basingstoke and Deane regulated by the Environment Agency

Operator Name	Permit No.	Site Address	Type of Installation
STAR ENERGY UK ONSHORE LTD	BE9373	HUMBLY GROVE OILFIELD THE AVENUE LASHAM ALTON HAMPSHIRE GU34 5SY	petroleum processes
DE LA RUE INTERNATIONAL LTD	BJ7310	OVERTON PAPER MILL OVERTON BASINGSTOKE HAMPSHIRE RG25 3JG	combustion processes
TRINITY AEROSPACE ENGINEERING LTD	BT8716	BILTON INDUSTRIAL ESTATE 16/18 BILTON ROAD BASINGSTOKE HAMPSHIRE RG24 8LJ	inorganic chemical processes
LEVERTON CLARKE LTD	AO1942	UNIT 16 SHERRINGTON WAY LISTER ROAD INDUSTRIAL ESTATE BASINGSTOKE HAMPSHIRE RG22 4DQ	inorganic chemical processes
ONYX HAMPSHIRE LTD	BG2248	READING ROAD, CHINEHAM, BASINGSTOKE, RG24 0LL	incineration

Appendix C: List of Part B Processes

Information supplied by Basingstoke and Deane Borough Council.

Part B Installations in Basingstoke and Deane regulated by Basingstoke and Deane Borough Council

Permit Number	Installation	Installation Address	Registered Office Address	Permit Issued
LA00001	Basingstoke Crematorium	Manor Farm Stockbridge Road North Waltham Basingstoke RG25 2BA	Dignity Caring Funerals Ltd Plantsbrook House 94 The Parade Sutton Coldfield West Midlands B72 1PH	June 1998
LA00002	Waste Oil Burner	Hadleys Garage Limited Houndmills Basingstoke RG21 2YL	Hadleys Garage Limited Houndmills Basingstoke RG21 2YL	November 1991 Revoked March 2004
LA00003	Waste Oil Burner	Partek Cargotec Ltd Unit 5 Bell Road Daneshill East Trading Estate Basingstoke	Cargotec (UK) Ltd Cargotec Industrial Park Ellesmere Shropshire SY12 9JW	February 1992 Revoked April 1998
LA00004	Cement Batching	Hanson Premix Swing Swang Lane Basingstoke RG25 2BA	Hanson Quarry Products Europe The Ridge Chipping Sodbury Bristol BS37 6AY	May 1992
LA00005	Cement Batching	CEMEX (UK) Materials Ltd Swing Swang Lane Basingstoke RG21 0NR		May 1992

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Permit Number	Installation	Installation Address	Registered Office Address	Permit Issued
LA00006	Waste Oil Burner	A W Garland Ltd The Workshop Water End Hook Basingstoke RG24 0BB	AW Garland Ltd 19 Watermills Close Andover Hants SP10 2ND	December 1996 Revoked November 2001
LA00007	Waste Oil burner	St Mary Bourne Garage Ltd Breach Farm Garage Egbury Road St Mary Bourne Andover Hampshire SP11 6DQ	St Mary Bourne Garage Ltd Breach Farm Garage Egbury Road St Mary Bourne Andover Hampshire SP11 6DQ	November 1997
LA00008	Waste Oil Burner	WW Webber Ltd New Road Basingstoke RG21 1NP	WW Webber Ltd New Road Basingstoke RG21 1NP	April 1992 Revoked April 1995
LA00009	Re-spraying of Road Vehicles	Jacksons (Basingstoke) Ltd Roentgen Road Daneshill Industrial Estate Basingstoke RG24 8NT	Jacksons (Basingstoke) Ltd Roentgen Road Daneshill Industrial Estate Basingstoke RG24 8NT	January 1993 Revoked July 06
LA00010	Re-spraying of Road Vehicles	CSM (Basingstoke) Ltd T/A J Davy (Basingstoke) West Ham Basingstoke RG22 6PL	CSM (Basingstoke) Ltd T/A J Davy (Basingstoke) West Ham Basingstoke RG22 6PL	October 1993
LA00012	Coating process	Eli Lilly and Company Ltd Kingsclere Road Basingstoke RG21 6XA	Eli Lilly and Company Ltd Kingsclere Road Basingstoke RG21 6XA	February 1993 Revoked December 2002
LA00013	Re-spraying of Road Vehicles	Apollo Motor Company (Basingstoke) Ltd. Aldermaston Road South Basingstoke RG21 6YL.	Apollo Motor Group Limited New Hampshire Court St. Paul's Road Portsmouth PO5 4AQ	September 1993

Basingstoke and Deane Borough Council

Permit Number	Installation	Installation Address	Registered Office Address	Permit Issued
LA00014	Coating of Metal or Plastic	Linde Material Handling (UK) Limited Kingsclere Road Basingstoke RG21 6XJ	Linde Material Handling (UK) Limited Kingsclere Road Basingstoke RG21 6XJ	October 1993
LA00015	Re-spraying of Road Vehicles	Martins of Basingstoke London Road Hatch Basingstoke RG24 7NZ	Saftdwin Limited London Road Hatch Basingstoke RG24 7NZ	April 1995
LA00017	Print Works	Wyndeham Impact Ltd Units L1-3 Grafton Way West Ham Industrial Estate Basingstoke RG22 6HY		October 1993 Surrendered January 2012
LA00018	Re-spraying of Road Vehicles	Solus Unit 11 Whitney road Basingstoke RG24 8NS	Solus London Limited Chase Road 1-9 Port Royal London NW10 6LX	September 1998
LA00020	Waste Oil Burner	Basingstoke Skip Hire Wade Road Depot Basingstoke RG24 0PL	Basingstoke Skip Hire Wade Road Depot Basingstoke RG24 0PL	February 1994 Revoked April 1995
LA00021	Re-spraying of road vehicles	Lennox Bodycentres (Southern) Ltd Lennox Road Bilton Estate Basingstoke RG22 4AP	Lennox Bodycentres (Southern) Ltd Lennox Road Bilton Estate Basingstoke RG22 4AP	February 1994 Revoked December 2002
LA00022	Waste Oil Burner	Js Auto Services Unit C Thurston Place Cranbourne Lane Basingstoke RG21 3NU	Js Auto Services Unit C Thurston Place Cranbourne Lane Basingstoke RG21 3NU	January 1994 Revoked June 08

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Permit Number	Installation	Installation Address	Registered Office Address	Permit Issued
LA00023	Waste Oil Burner	Pack Lane Garage 148 Pack Lane Basingstoke RG22 5HR	Pack Lane Garage 148 Pack Lane Basingstoke RG22 5HR	June 1995
LA00024	Coating of Metal or Plastic	De La Rue Holographics Stroudley Road Basingstoke RG24 8FW	De La Rue International Ltd De La Rue House Jays Close Viables Basingstoke RG24 4BS	June 1997
LA00026	Unloading of Petrol	Basingstoke Service Station Grove Road Basingstoke RG23 3EE	Somerfield Stores Ltd Somerfield House Whitchurch Lane Bristol BS12 0TJ	December 1998
LA00027	Unloading of Petrol	J Sainsbury plc Wallop Drive Hatch Warren Basingstoke RG22 4TW	J Sainsbury plc Group Legal Services Stamford House Stamford Street London SE1 9LL	December 1998
LA00028	Unloading of Petrol	Morrison's Petrol Station Worting Road Basingstoke RG21 8JB	Morrison's Supermarkets plc Hilmore House Thornton Road Bradford West Yorks BD8 9AX	December 1998
LA00029	Unloading of Petrol	Shell UK Ltd 374 Worting Road Basingstoke RG22 5DZ	Shell UK Retail PO Box 403 Staines TW18 3ZB	December 1998
LA00030	Unloading of Petrol	Shell Pied Piper Winchester Road Basingstoke RG22 6HD	Shell UK Retail PO Box 403 Staines TW18 3ZB	December 1998

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Permit Number	Installation	Installation Address	Registered Office Address	Permit Issued
LA00031	Unloading of Petrol	Kingsclere Service Station Newbury Road Kingsclere Berkshire RG15 8SP	Sailesh R Sejpal Kingsclere Service Station Newbury Road Kingsclere Berkshire RG15 8SP	July 2001
LA00032	Unloading of Petrol	Micheldever Service Station Popham Winchester SO21 3SP	BP Express Shopping Ltd Witon Gate House 500-600 Witon Gate Central Milton Keynes MK19 1ES	January 1999
LA00033	Unloading of Petrol	BP filling Station Grove Road Basingstoke RG21 3HL	BP Express Shopping Ltd Witon Gate House 500-600 Witon Gate Central Milton Keynes MK19 1ES	January 1999
LA00034	Unloading of Petrol	Esso New Road Basingstoke	Esso Petroleum Company Limited Exxonmobil House Ermyrn Way Leatherhead KT22 8UX	Revoked August 2002
LA00035	Unloading of Petrol	Tesco District shopping Centre Chineham Basingstoke RG21	Tesco Stores Ltd New Tesco House PO Box 18 Delamare Road Chushunt, Waltham Cross Hertfordshire EN8 9SL	December 1998
LA00036	Unloading of Petrol	Tadley Service Station Mulford's Hill Tadley	Esso Petroleum Company Limited Exxonmobil House Ermyrn Way, Leatherhead KT22 8UX	December 1998 Revoked July 2005
LA00037	Unloading of Petrol	Total Fina (UK) Ltd Tadley Hill Tadley Hampshire	Total Fina (UK) Ltd 40 Clarendon Road Watford, Hertfordshire WD17 1TQ	December 1998 Revoked May 2002

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Permit Number	Installation	Installation Address	Registered Office Address	Permit Issued
LA00038	Unloading of Petrol	Alan Gibson Limited London Road Riverdene Basingstoke RG21 4AE	Alan Gibson Limited London Road Basingstoke RG21 4AE	January 2002 Revoked October 2002
LA00039	Unloading of Petrol	Alan Gibson Limited London Road Old Basing Basingstoke RG24 7JD	Alan Gibson Limited London Road Basingstoke RG21 4AE	January 2002 Revoked September 06
LA00040	Unloading of Petrol	Gibbs Garage Reading Road Turgis Green Basingstoke RG27 0AG	Gibbs Group 5 Buttermarket Tharne Oxon OX9 3EW	July 2001
LA00041	Unloading of Petrol	Houndmills Service Station Aldermaston Road Houndmills Basingstoke RG21 6YL	Broadbridge Heath Motor Company Ltd T/A Viking Peugeot Aldermaston Road (S) Houndmills Basingstoke	April 1999
LA00042	Unloading of Petrol	Shell Tothill Newbury Bypass Burghclere Berkshire RG20 9BH	Shell (UK) Retail PO Box 403 Staines TW18 3ZB	May 1999
LA00043	Unloading of Petrol	Micheldever Service Station Top of the Rise Cocksford Down Nr Popham, Winchester SO21 3BE	Esso Petroleum Company Limited Exxonmobil House Ermyrn Way, Leatherhead KT22 8UX	December 1999 Revoked June 05
LA00044	Unloading of Petrol	BP Petrol Station West Ham Basingstoke RG22 6PL	CSM (Basingstoke) Ltd T/A J Davy (Basingstoke) West Ham Basingstoke RG22 6PL	December 1999

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Permit Number	Installation	Installation Address	Registered Office Address	Permit Issued
LA00045	Unloading of Petrol	Whitchurch Filling Station 9-13 Church Street Whitchurch RG28 7AR	Abdul Majid T/A Basildon Garage Reading Road Lower Basildon	November 2001
LA00046	Vehicle Re-spraying	The Headley Bodyshop Limited Harrow Garage Newbury Road Headley RG19 8LG	The Headley Bodyshop Limited Harrow Garage Newbury Road Headley Berkshire RG19 8LG	Surrendered March 2008
LA00047	Mobile Crusher	Hutchings & Carter Ltd Network Logistics Yard Avenue Road Lasham GU34 5SU	Hutchings & Carter Ltd Network Logistics Yard Avenue Road Lasham GU34 5SU	April 2003 Revoked April 2011
LA00048	Re-spraying of Road Vehicles	R & R Autos Bodyshop Ltd Montana House Lennox Rod Basingstoke RG22 4AP	R & R Autos Bodyshop Ltd Montana House Lennox Rod Basingstoke RG22 4AP	July 03
LA00049	Coating of Metal or Plastic	Urbis Lighting Ltd Hamilton Close Houndmills Basingstoke RG21 6YT	Urbis Lighting Ltd 1 Telford Road Basingstoke RG21 6YW	September 2005
LA00050	Mobile Crusher	Basingstoke Skip Hire The Council Depot Wade Road Basingstoke RG24 8PL	Basingstoke Skip Hire The Council Depot Wade Road Basingstoke RG24 8PL	May 2005 Revoked June 06

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Permit Number	Installation	Installation Address	Registered Office Address	Permit Issued
LA00051	Unloading of Petrol	Tadley Service Station Mulfords Hill Tadley RG26 3LQ	Esso Petroleum Company Limited Exxonmobil House Ermyrn Way Leatherhead KT22 8UX	October 2005
LA00052	Unloading of Petrol	Micheldever Service Station Top of the Rise Cocksford Down Nr Popham, Winchester SO21 3BE	Esso Petroleum Company Ltd Exxonmobil House Ermyrn Way Leatherhead KT22 8UX	
LA00053	Dry Cleaners	Wm Morrison Supermarkets Ltd Thornycroft Industrial Estate Worting Road Basingstoke RG21 1SD	Wm Morrison Supermarkets Ltd Hilmore House Thornton House Bradford BD8 9AX	April 2006
LA00054	Dry Cleaners	Johnsons Apparelmaster Ltd West Ham Industrial Estate Worting Road Basingstoke RG22 6NE	Johnsons Apparelmaster Ltd Mildmay Road Bootle Merseyside L20 5EW	October 2006
LA00055	Dry Cleaners	Tudor Dry Cleaning 30D Mulfords Hill Tadley RG26 3JE	Tudor Dry Cleaning 30D Mulfords Hill Tadley RG26 3JE	October 2006
LA00056	Dry Cleaners	Executive Dry Cleaners 23 High Street Overton RG25 3HB	Executive Dry Cleaners 23 High Street Overton RG25 3HB	October 2006
LA00057	Dry Cleaners	Johnsons Cleaners UK 7 Winchester Street Basingstoke RG21 7ED	Johnsons Cleaners UK Ltd Mildmay Road Bootle Merseyside L20 5EW	October 2006

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Permit Number	Installation	Installation Address	Registered Office Address	Permit Issued
LA00058	Dry Cleaners	Johnsons Cleaners UK Unit 16 Chineham shopping Centre Basingstoke	Johnsons Cleaners UK Ltd Mildmay Road Bootle Merseyside L20 5EW	October 2006
LA00059	Surface Cleaning	Vibro-Meter UK The Laurels Jays Close Viabes Industrial Estate Basingstoke RG22 4BS	Meggit (UK) Ltd Atlantic House Aviation Park West Bournemouth International Airport Christchurch Dorset BH23 6EW	February 2008 Surrendered February 2010
LA00060	Dry Cleaners	Timpson Supermarket Services Ltd, Sainsbury's, Wallop Drive, Hatch Warren, Basingstoke, Hants, RG22 4TW	Timpson House, Claverton Road, Wythenshawe, Manchester, M23 9TT	January 2009 Surrendered April 2011
LA00061	Dry Cleaners	Rhema Textile Services, Unit 1 Bessemer Park Industrial Estate, Basingstoke, Hampshire, RG21 3NB	79 Victoria Road, Ruislip Manor, Middlesex, HA4 9BH	September 2009
LA00062	Waste Oil Burner	Basingstoke Car Supercentre, Unit 2 Enterprise Centre, Moniton Trading Estate, West Ham Lane, Basingstoke, Hants, RG22 6NQ	Basingstoke Car Supercentre, Unit 2 Enterprise Centre, Moniton Trading Estate, West Ham Lane, Basingstoke, Hants, RG22 6NQ	July 2011
LA00063	Re-spraying of Road Vehicles	Apollo Motor Group (Basingstoke) Limited, Site 10 Stroudley Road, Daneshill, Basingstoke, Hants, RG24 8SW	Apollo Motor Group Limited, Murrills House, 48 East Street, Porchester, Fareham, Hants, PO16 9XS	Application duly made on 31 st Jan 2012

