



Hertsmere Borough Council

Updating Screening and Assessment

2012

Bureau Veritas Air Quality



Move Forward with Confidence



Document Control Sheet

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Executive Summary

Part IV of the Environment Act 1995 places a statutory duty on local authorities to review and assess the air quality within their area and take account of Government Guidance when undertaking such work. This Updating and Screening Assessment is a requirement of the Fifth Round of Review and Assessment and is a requirement for all local authorities. The report has been undertaken in accordance with the Technical Guidance LAQM.TG (09) and associated tools (as updated in 2010).

This Updating and Screening Assessment considers all new monitoring data and assesses the data against the Air Quality Strategy objectives. It also considers any changes that may have an impact on air quality.

Hertsmere Borough Council have carried out all past rounds of Review and Assessment. They have declared six Air Quality Management Areas (AQMAs) in their Borough and amendments to these along with other recommendations were discussed in the 2010 Detailed Assessment.

Recommended actions related to the findings of monitoring data collected in 2011 are presented below:

- Carry out a Detailed Assessment in the area around HM039 on Shenley Road, Borehamwood;
- Carry out a Detailed Assessment in the area around HM099, HM100, HM101 and HM117, HM118, HM119 on Bushey High Street;
- Relocate the monitoring at Hartspring Lane to a location of relevant exposure;
- Carry out the actions proposed in the 2010 Detailed Assessment –
 - o Extend AQMA6, High Street/Potters Bar Bus Garage;
 - o Extend AQMA5, Elstree Crossroads;
 - o Extend AQMA4, Hartspring Lane, Bushey;
 - o Declare a new AQMA in Radlett.
- Declare an AQMA at The Broadway, Potters Bar.

Recommended actions related to the assessment of sources within the Borough are summarised below:

Hertsmere Borough Council

- Shenley Road, Borehamwood has been identified as a narrow and congested street requiring a Detailed Assessment. This will be carried out in relation to the Detailed Assessment around HM039 as mentioned above.
- Two new busy junctions have been identified close to the area recommended to be declared as an AQMA in Radlett. These should be included in the Further Assessment of the area to determine the full extent of the AQMA.
- Monitoring should be carried out at the junction of Allum Lane and Elstree Hill North as DMRB predictions highlighted a potential area of exceedence of the annual mean NO₂ objective. If monitoring at the façade highlights exceedences of the AQS objectives, a Detailed Assessment should be carried out.
- The biomass boiler in Borehamwood should be assessed in the next round of review and assessment when more details are known.

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1 Introduction

1.1 Description of Local Authority Area

The area of Hertsmere Borough Council is in the south of Hertfordshire and combines attractive countryside with thriving towns and villages. The London Borough of Barnet, The London Borough of Harrow, The London Borough of Enfield, St Albans City and District Council, Welwyn Hatfield Borough Council, Watford Borough Council and Three Rivers District Council border it. Hertsmere covers an area of 39 square miles; the 100,000 people who live in Hertsmere are concentrated in the Borough's four main towns of Borehamwood, Bushey, Potters Bar and Radlett. Hertsmere boasts expansive beautiful green belt countryside dotted with attractive villages and wide tracts of unspoilt agricultural landscape.

At present Hertsmere Borough Council has six declared Air Quality Management Areas (AQMAs); four of which are motorway related and two of which are related to local traffic. The M1, M25 and A1(M) surround Hertsmere, as a result most of Hertsmere's poor air quality is related to traffic emissions.

1.2 Purpose of Report

This report fulfils the requirements of the Local Air Quality Management (LAQM) process as set out in Part IV of the Environment Act (1995), the Air Quality Strategy (AQS) 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 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

(DA). 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. This table shows the objectives in units of microgrammes per cubic metre $\mu\text{g}/\text{m}^3$ (milligrammes per cubic metre, mg/m^3 for carbon monoxide) with the number of exceedences in each year that are permitted (where applicable).

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

1.4 Summary of Previous Review and Assessments

Hertsmere Borough Council has completed all rounds of the review and assessment procedure and has now entered the fifth round of reports.

Table 2 - Previous Reports

Year	Round	Report	Outcome
2006	3	Updating and Screening Assessment	No further actions
2007	3	Detailed Assessment	AQMA to be declared at The Broadway, Potters Bar for NO ₂ . This was picked up from a previous report.
2008	3	Progress Report	Joint 2007 and 2008. Catch up on late reports.
2009	4	Updating and Screening Assessment	Recommended that Detailed Assessment for NO ₂ be carried out to determine extension of Elstree Crossroads and Hartspring Lane AQMA's. Also Detailed Assessment at High Street/Southgate Road, Potters Bar; Watling Street/Aldenham Road, Radlett and Watling Street/Park Road, Radlett.
2009	4	Revised Action Plan	Some points concluded, some dropped.
2010	4	Detailed Assessment	Report carried out.
2010	4	2009 Progress Report	Completed – conclusions below
2011	4	2010 Progress Report	Completed – conclusions below

The first report in the fourth round was the Council's Updating and Screening Assessment of May 2009; it concluded that exceedences of annual mean nitrogen dioxide (NO₂) continue to occur in the Hertsmere's six AQMA's (Figure's 1 to 6) and in the emerging AQMA at The Broadway, Potters Bar. Actions arising from the 2009 USA were implemented during 2009 and are discussed in the 2010 Progress Report.

The 2010 Detailed Assessment conclusions and recommendations were:

- The AQMA at High Street/Potters Bar Bus Garage should be amended as exceedences of the annual mean NO₂ objective are only being found adjacent to the existing AQMA and not within in. Further monitoring is needed at 169-183 High Street, Potters Bar. It was also recommended that investigation was

undertaken to find out whether there were any relevant receptors at the Hall and Police Station near the High Street/Hatfield Road Junction.

- Monitoring at the High Street/Southgate Road junction, Potters Bar should be continued;
- The AQMA at Elstree Crossroads should be expanded as the modelling predicted widespread exceedances of the annual mean NO₂ objective outside the AQMA. Monitoring at 1-3 Elstree Hill North should be undertaken to assess compliance with annual mean objective;
- An AQMA should be declared at Watling Street/Park Road junction, Radlett and along Watling Street towards the Aldenham Road junction because of the exceedances predicted.
- The AQMA related to the M1 at Hartspring Lane, Bushey should be expanded as the modelling predicted exceedances of the annual mean NO₂ objective.

The 2010 Progress Report then generated the following actions;

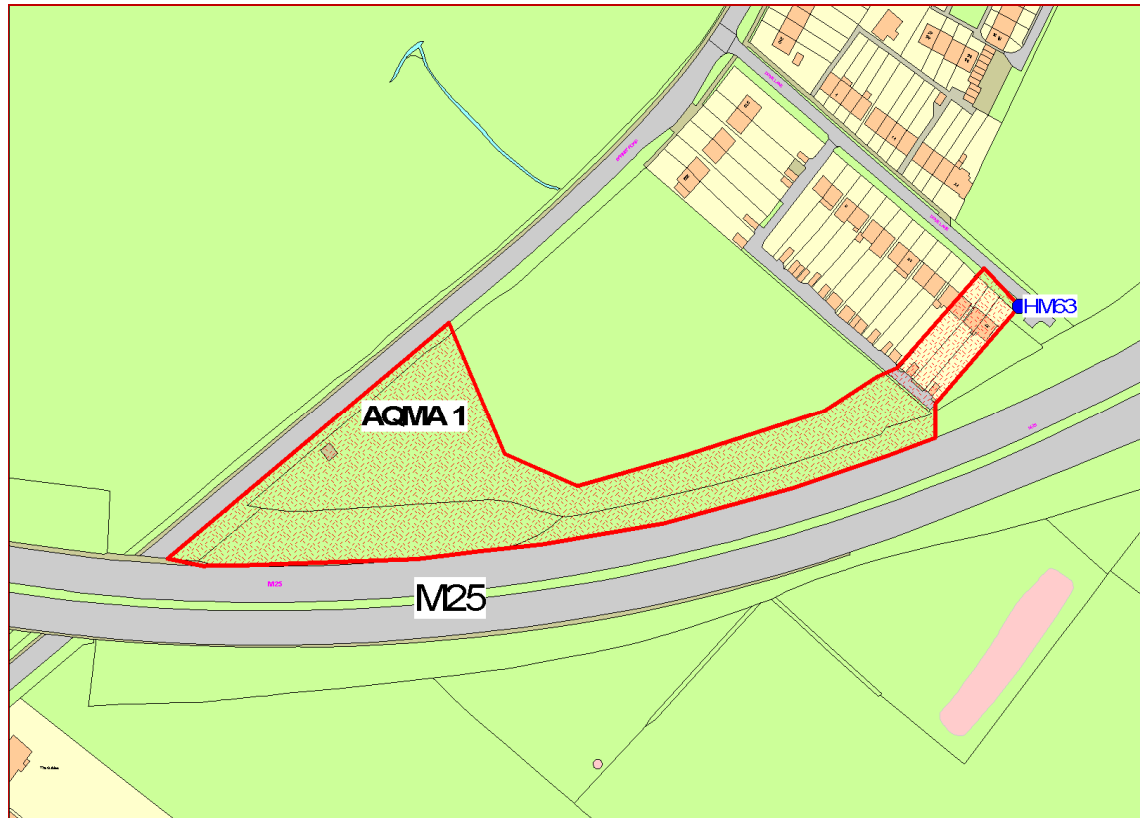
- Continue additional monitoring of NO₂ at relevant receptor locations at High Street Bushey and Watling Street/Aldenham Road junction, Radlett; and
- Implement the conclusions of the 2010 Detailed Assessment as discussed above.

The outcomes of the Progress Report 2011 were:

- Twenty-two sites exceeded the annual mean NO₂ objective in 2010. Six were within current AQMAs, 2 were at The Broadway, Potters Bar, as identified in the 2007 Detailed Assessment. The majority of remaining sites were in the area covered in the 2010 Detailed Assessment.
- The final exceedance sites were on Bushey High Street and Shenley Road, Borehamwood. The Bushey High Street site does not have any relevant exposure. The Shenley Road site does have relevant exposure and will be considered in this report to determine the need for Detailed Assessment.
- It will be necessary to review the need to declare an AQMA at the Broadway, Potters Bar following the recommendations of the 2007 Detailed Assessment.
- The actions from the 2010 Detailed Assessment should be carried out. This includes changes to the AQMA6 at High Street/Potters Bar Bus Garage, AQMA5 at Elstree Crossroads and AQMA4 at Hartspring Lane, Bushey. The

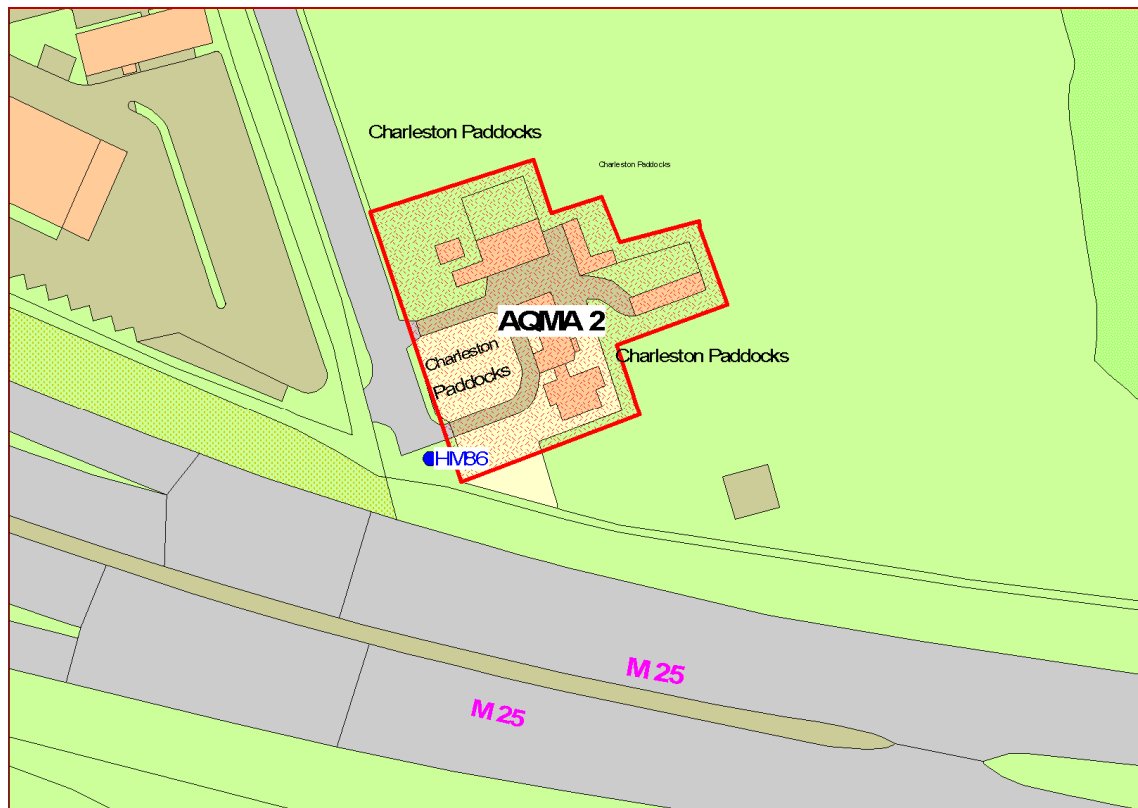
recommendations also include declaring a new AQMA on Watling Street, Radlett between the Park Road and Aldenham Road junctions.

Figure 1 - Hertsmere AQMA 1



An area comprising the domestic properties 23 –27 Dove Lane and the caravan site off the A1000 Barnet Road, near the M25.

Figure 2 - Hertsmere AQMA 2



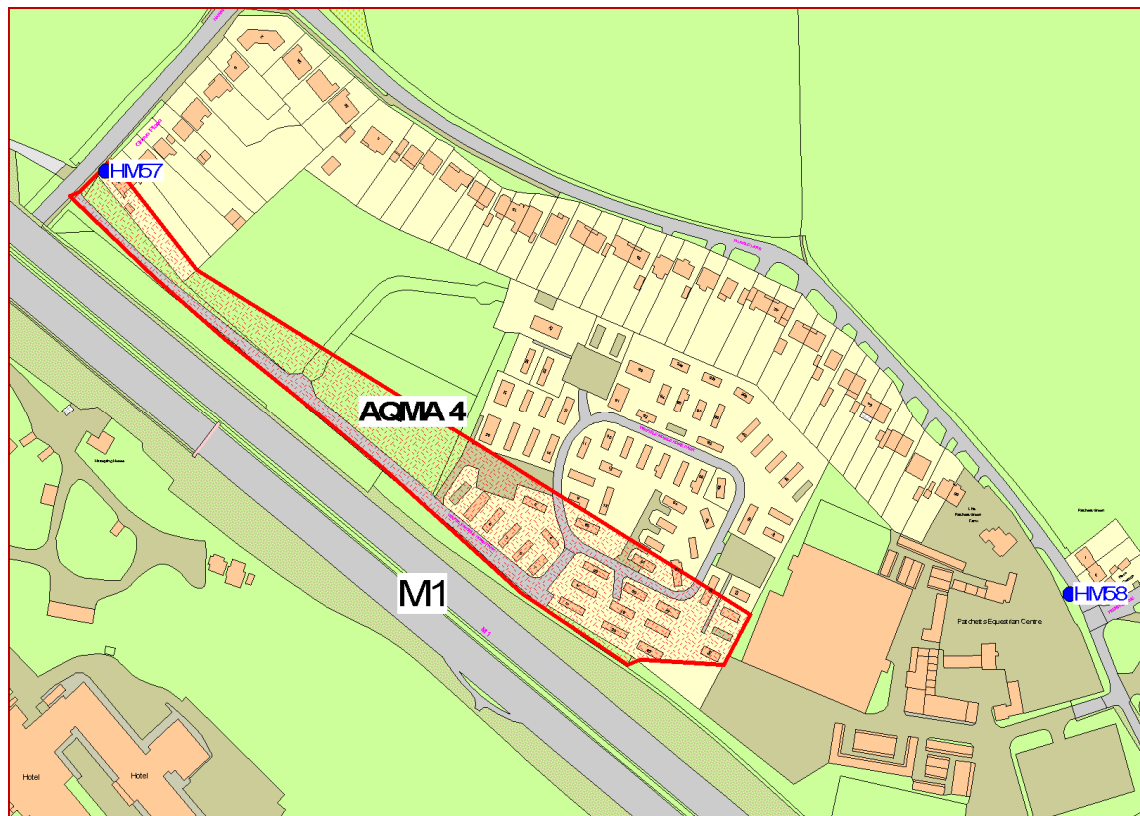
An area comprising the domestic property known as Charleston Paddocks, St Albans Road, South Mimms, Potters Bar, near the M25.

Figure 3 - Hertsmere AQMA 3



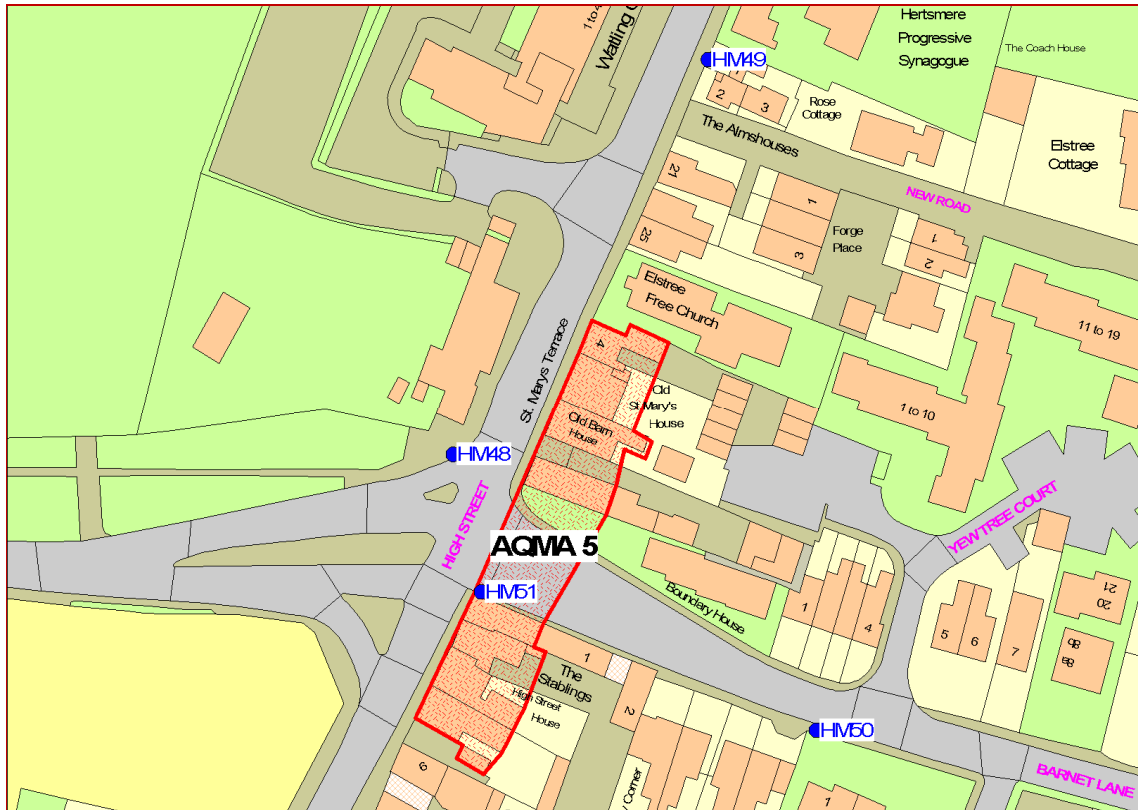
An area comprising properties 31 – 39 Blanche Lane South Mimms near the M25.

Figure 4 - Hertsmere AQMA 4



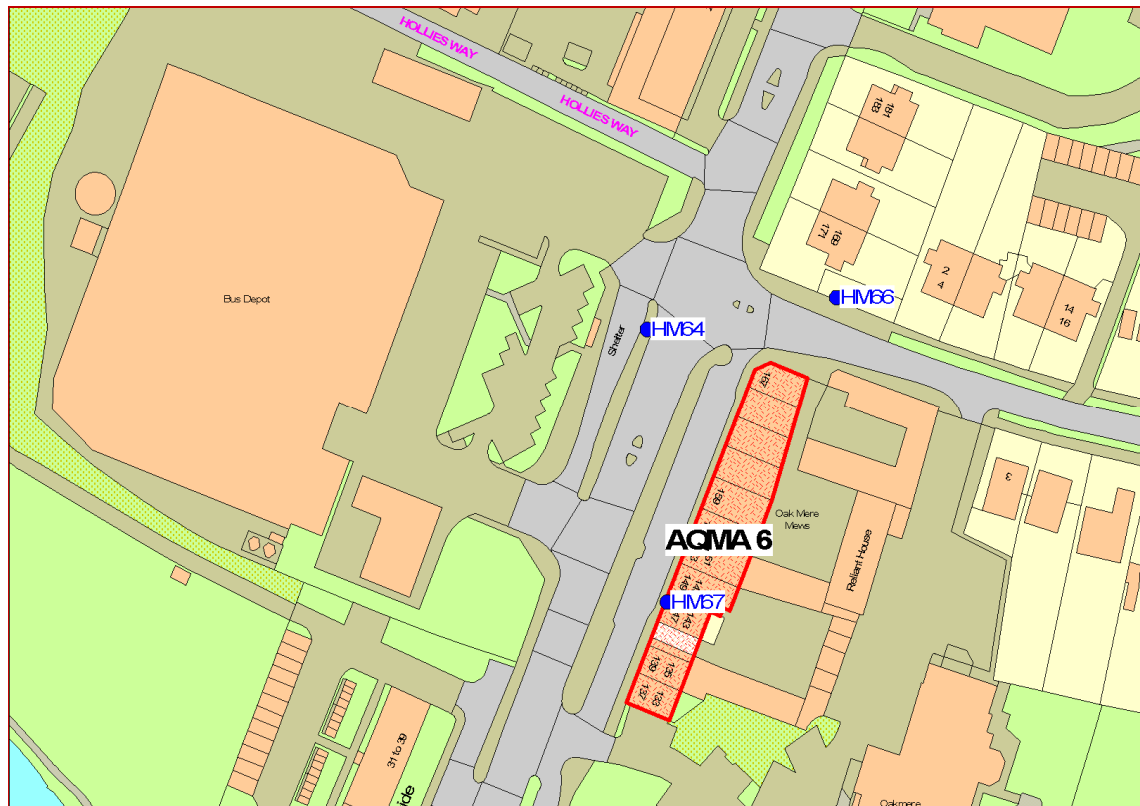
An area comprising the domestic properties 12 Grove Place, Hartspring Lane, Aldenham and caravans numbered 1, 2, 3, 4, 7, 8, 55, 56, 57, 58 and 60 within Winfield Caravan site, Hartspring Lane, near the M1 at Bushey.

Figure 5 - Hertsmere AQMA 5



An area comprising domestic dwellings within eight properties on the east side of the A5183 High Street, Elstree either side of the junction with the A411 Barnet Lane.

Figure 6 - Hertsmere AQMA 6



An area comprising domestic dwellings within properties between numbers 133 to 167 High Street on the east side of the High Street opposite the bus garage Potters Bar.

2 New Monitoring Data

2.1 Summary of Monitoring Undertaken

2.1.1 Automatic Monitoring Sites

During 2011 Hertsmere Borough Council had one urban background continuous monitor located in Hertswood Upper School, Thrift Farm Lane, Borehamwood. There has been continuous monitoring of nitrogen dioxide, PM₁₀ and ozone concentrations at the Hertswood site since 2006. Previously, from 2001, the continuous monitoring station was based at Furzehill School, Furzehill Road, Borehamwood. A NO_x chemiluminescent analyser and a TEOM PM₁₀ monitor were used.

The site was closed in March 2011 due to budget constraints.

Prior to the closure Hertsmere Borough Council carried out fortnightly routine calibrations, the results were sent to King's College, London. A six monthly audit was carried out by the National Physics Laboratories. The station was included in the Herts and Beds Air Pollution Monitoring Network, which is operated by Air Quality Data Management. All data are checked and ratified by the operator prior to release. Hertsmere Borough Council had the station serviced by contractors Supporting U.

Figure 7 - Location of Borehamwood Continuous Monitoring Station

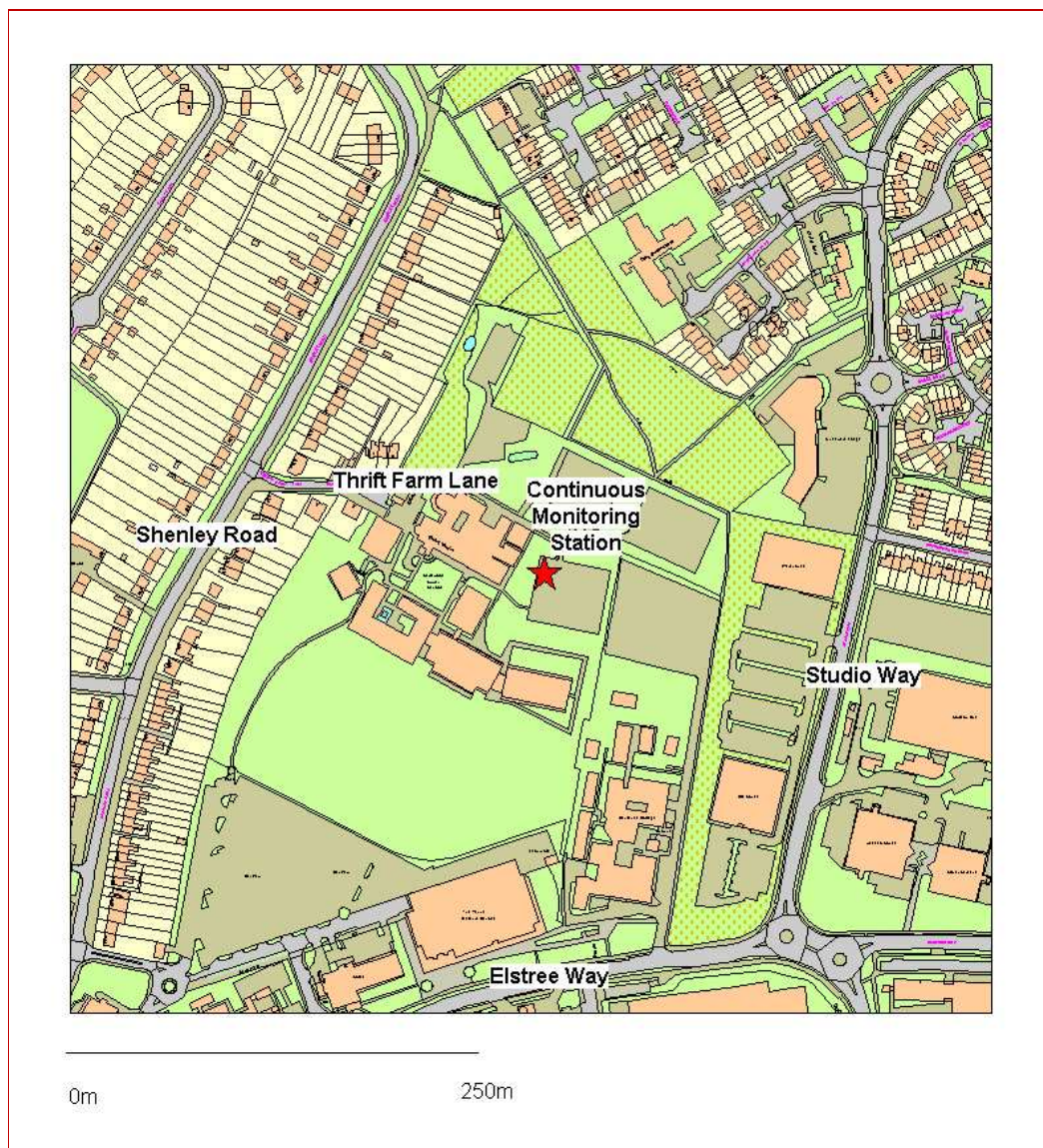


Table 3 - Details of Automatic Monitoring Sites

Site Name	Site Type	X OS GridRef	Y OS Grid Ref	Pollutants Monitored	In AQMA?	Monitoring Technique	Relevant Exposure?	Distance to kerb of nearest road	Does this location represent worst-case exposure?
Hertswood School, Borehamwood	Urban background	520147	197357	PM ₁₀ NOx, NO ₂ Ozone	N	TEOM, chemiluminescent	Y – 0m	N/A	N

2.1.2 Non-Automatic Monitoring Sites

During 2011, Hertsmere Borough Council undertook passive monitoring for NO₂ across the Borough using 66 diffusion tubes. There are three duplicate sites and twelve triplicate sites across the Borough.

Diffusion tubes at three locations in the Borough have been closed in 2011. These are:

- HM051 – Elstree Crossroads 4 – removed duplicate tube;
- HM046 and HM047 – AQMS closed so co-located triplicate tubes no longer needed; and
- HM077 and HM078 – The Broadway, Potters Bar 2

Results from these tubes have been annualised and reported in the results sections.

The diffusion tubes are supplied and analysed by Gradko utilising 20% Triethanolamine (TEA) in water preparation method. Gradko participate in the Workplace Analysis Scheme for Proficiency (WASP) for NO₂ diffusion tube analysis and the Annual Field Inter-Comparison Exercise. The lab follows the procedures set out by the Harmonisation Practical Guidance.

Hertsmere, prior to the closure of Borehamwood continuous monitor had a co-location study in place. Due to the closure of the automatic monitoring site the local bias adjustment factor for 2011 cannot be calculated. Therefore the bias adjustment factor for 2011 has been taken from the LAQM national bias adjustment spreadsheet¹ for this laboratory and methodology. This was calculated as 0.89 (update March 2012) based on 26 studies.

¹ <http://laqm.defra.gov.uk/bias-adjustment-factors/bias-adjustment.html>

Figure 8 - Map of Non-Automatic Monitoring Sites

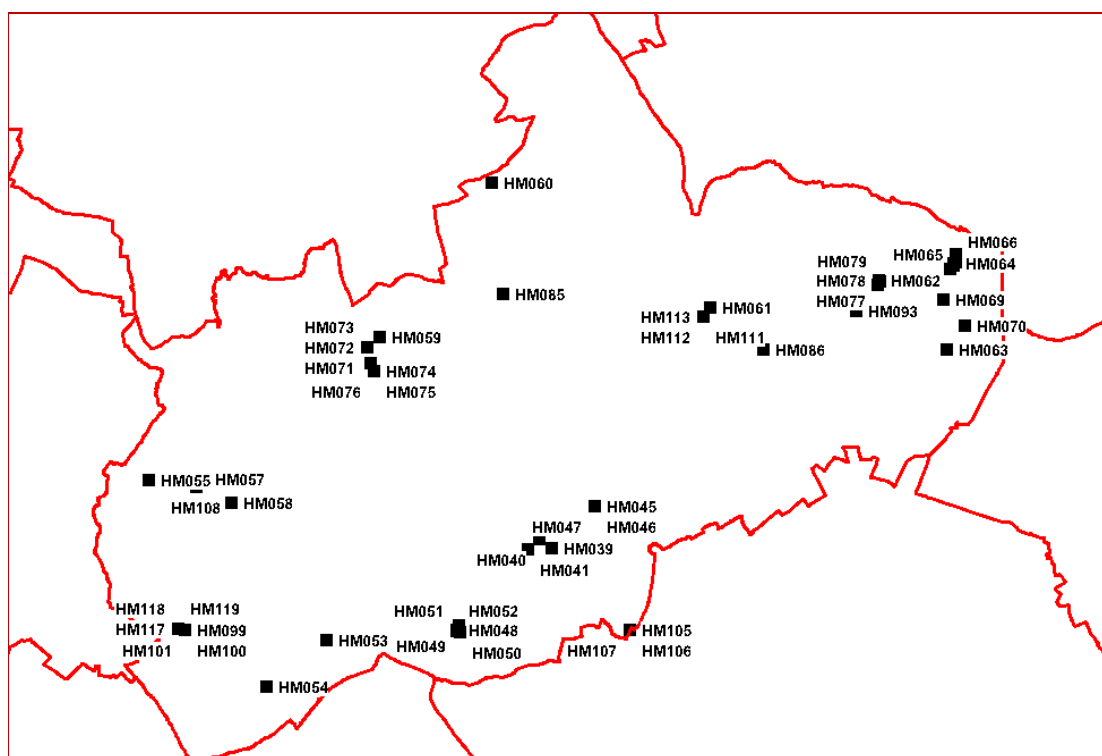


Table 4 - Details of Non-Automatic Monitoring Sites

Site Code	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In AQMA?	Relevant Exposure? (Y/N with distance (m) to relevant exposure)	Distance to kerb of nearest road(N/A if not applicable)	Does this location represent worst-case exposure?
HM039	Shenley Road	K	519406	196645	NO ₂	N	Y - 9.7m	<1m	Y
HM040	Essex Road, Borehamwood	K	519200	196800	NO ₂	N	N	<1m	Y
HM041	Boulevard, Borehamwood	K	519021	196619	NO ₂	N	Y - 6.0m	<1m	Y
HM045	AQMS 1	B	520147	197357	NO ₂	N	Y - 17.7m	N/A	N
HM046	AQMS 2	B	520147	197357	NO ₂	N	Y - 17.7m	N/A	N
HM047	AQMS 3	B	520147	197357	NO ₂	N	Y - 17.7m	N/A	N
HM048	Elstree Crossroads 1	K	517798	195272	NO ₂	N	N	<1m	Y
HM049	Elstree Crossroads 2	K	517843	195338	NO ₂	N	Y - 4.0m	<1m	Y
HM050	Elstree Crossroads 3	K	517862	195226	NO ₂	N	Y - 6.5m	<1m	Y
HM051	Elstree Crossroads 4	K	517803	195249	NO ₂	Y	Y - 0.0m	<1m	Y
HM052	Elstree Crossroads 5	K	517803	195249	NO ₂	Y	Y - 0.0m	<1m	Y
HM053	Caldecote Lane, Bushey Heath	B	515600	195100	NO ₂	N	Y - 2.9m	N/A	Y
HM054	High Road, Bushey	K	514600	194300	NO ₂	N	Y - 15.9m	<1m	Y
HM055	Highwood Avenue, Bushey Garages	B	512600	197800	NO ₂	N	Y - 36.7m	N/A	N
HM057	Hartspring Lane, Bushey	K	513516	197818	NO ₂	Y	Y - 10.0m	<1m	Y

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Site Code	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In AQMA?	Relevant Exposure? (Y/N with distance (m) to relevant exposure)	Distance to kerb of nearest road(N/A if not applicable)	Does this location represent worst-case exposure?
HM058	Pegmire Lane, Aldenham	K	514000	197400	NO ₂	N	N	<1m	Y
HM059	Aldenham Grove, Radlett	K	516500	200200	NO ₂	N	Y - 8.0m	<1m	Y
HM060	Bell Lane, London Colney	K	518400	202800	NO ₂	N	Y - 6.0m	<1m	Y
HM061	Blanche Lane, South Mimms	K	522100	200700	NO ₂	Y	Y - 32.0m	<1m	Y
HM062	The Broadway Potters Bar 1	K	524945	201163	NO ₂	N	Y - 7.0m	<1m	Y
HM063	Dove Lane, Potters Bar	K	526100	200000	NO ₂	Y	Y - 12.9m	<1m	Y
HM064	Bus Garage 1, Potters Bar	K	526207	201452	NO ₂	N	N	<1m	Y
HM065	Hatfield Road, Potters Bar	K	526252	201597	NO ₂	N	Y - 5.0m	<1m	Y
HM066	Bus Garage 2, Potters Bar	K	526245	201458	NO ₂	N	Y - 8.4m	<1m	Y
HM067	Bus Garage 3, Potters Bar	K	526211	201400	NO ₂	Y	Y - 0.5m	<1m	Y
HM068	Bus Garage 4, Potters Bar	K	526211	201400	NO ₂	Y	Y - 0.5m	<1m	Y
HM069	Southgate Road, Potters Bar	K	526033	200838	NO ₂	N	Y - 14.0m	<1m	Y
HM070	Park Avenue, Potters Bar	K	526400	200400	NO ₂	N	Y - 7.8m	<1m	Y
HM071	Park Road 1, Radlett	R	516295	200035	NO ₂	N	Y - 4.0m	1m	Y
HM072	Park Road 2, Radlett	R	516295	200035	NO ₂	N	Y - 4.0m	1m	Y
HM073	Park Road 3,	R	516295	200035	NO ₂	N	Y - 4.0m	1m	Y

Hertsmere Borough Council

Site Code	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In AQMA?	Relevant Exposure? (Y/N with distance (m) to relevant exposure)	Distance to kerb of nearest road(N/A if not applicable)	Does this location represent worst-case exposure?
	Radlett								
HM074	301 Watling Street 1, Radlett	R	516406	199621	NO ₂	N	Y - 10.8m	3m	N
HM075	301 Watling Street 2, Radlett	R	516406	199621	NO ₂	N	Y - 10.8m	3m	N
HM076	301 Watling Street 3, Radlett	R	516406	199621	NO ₂	N	Y - 10.8m	3m	N
HM077	The Broadway Potters Bar 2	K	524945	201163	NO ₂	N	Y - 7.0m	<1m	Y
HM078	The Broadway Potters Bar 3	K	524945	201163	NO ₂	N	Y - 7.0m	<1m	Y
HM079	11 The Broadway Potters Bar 1	R	524973	201140	NO ₂	N	Y - 6.0m	4m	N
HM080	11 The Broadway Potters Bar 2	R	524973	201140	NO ₂	N	Y - 6.0m	4m	N
HM081	11 The Broadway Potters Bar 3	R	524973	201140	NO ₂	N	Y - 6.0m	4m	N
HM082	10 Baker Street Potters Bar 1	R	524922	201079	NO ₂	N	Y - 9.8m	2.8m	N
HM083	10 Baker Street Potters Bar 2	R	524922	201079	NO ₂	N	Y - 9.8m	2.8m	N
HM084	10 Baker Street Potters Bar 3	R	524922	201079	NO ₂	N	Y - 9.8m	2.8m	N

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Site Code	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In AQMA?	Relevant Exposure? (Y/N with distance (m) to relevant exposure)	Distance to kerb of nearest road(N/A if not applicable)	Does this location represent worst-case exposure?
HM085	Andrew Close, Shenley	B	518595	200936	NO ₂	N	Y - 4.1m	N/A	N
HM086	Charleston Paddocks, South Mimms	M/way	522997	199991	NO ₂	Y	N	48.2m	N
HM093	103 Baker Street, Potters Bar	R	524557	200638	NO ₂	N	Y - 15.7m	4m	N
HM099	High Street 1, Bushey	K	513210	195257	NO ₂	N	N	<1m	N
HM100	High Street 2, Bushey	K	513210	195257	NO ₂	N	N	<1m	N
HM101	High Street 3, Bushey	K	513210	195257	NO ₂	N	N	<1m	N
HM102	Aldenham Road 1, Radlett	K	516350	199762	NO ₂	N	Y - 9.00m	<1m	N
HM103	Aldenham Road 2, Radlett	K	516350	199762	NO ₂	N	Y - 9.00m	<1m	N
HM104	Aldenham Road 3, Radlett	K	516350	199762	NO ₂	N	Y - 9.00m	<1m	N
HM105	Elstree Park 1	R	520738	195272	NO ₂	N	Y - 25.5m	N/A	N
HM106	Elstree Park 2	R	520738	195272	NO ₂	N	Y - 25.5m	N/A	N
HM107	Elstree Park 3	R	520738	195272	NO ₂	N	Y - 25.5m	N/A	N
HM108	Hartspring Lane 1, Bushey	K	513397	197677	NO ₂	N	N	<1m	N
HM109	Hartspring Lane 2, Bushey	K	513397	197677	NO ₂	N	N	<1m	N

Hertsmere Borough Council

Site Code	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In AQMA?	Relevant Exposure? (Y/N with distance (m) to relevant exposure)	Distance to kerb of nearest road(N/A if not applicable)	Does this location represent worst-case exposure?
HM110	Hartspring Lane 3, Bushey	K	513397	197677	NO ₂	N	N	<1m	N
HM111	9 Blanche Lane 1, South Mimms	K	521987	200555	NO ₂	N	N	<1m	N
HM112	9 Blanche Lane 2, South Mimms	K	521987	200555	NO ₂	N	N	<1m	N
HM113	9 Blanche Lane 3, South Mimms	K	521987	200555	NO ₂	N	N	<1m	N
HM114	Parkside 1, Potters Bar	R	526161	201358	NO ₂	N	Y - 21.3m	4m	N
HM115	Parkside 2, Potters Bar	R	526161	201358	NO ₂	N	Y - 21.3m	4m	N
HM116	Parkside 3, Potters Bar	R	526161	201358	NO ₂	N	Y - 21.3m	4m	N
HM117	44 High Street 1, Bushey	K	513098	195287	NO ₂	N	N	<1m	N
HM118	44 High Street 2, Bushey	K	513098	195287	NO ₂	N	N	<1m	N
HM119	44 High Street 3, Bushey	K	513098	195287	NO ₂	N	N	<1m	N

2.2 Comparison of Monitoring Results with Air Quality Objectives

2.2.1 Nitrogen Dioxide

Automatic Monitoring Data

The automatic monitoring station located at Hertswood School, Borehamwood was closed during March 2011 due to budget cuts. The 2011 results have been annualised for the period in operation as shown in Table 5. The results have risen slightly since 2010, however with such a short period of monitoring the result should be viewed with caution. The annual mean was still below the objective level and no exceedences of the hourly mean ($200\mu\text{g}/\text{m}^3$) were recorded in 2011.

Trend analysis is not included as the site of the monitoring station changed location in 2006 from Furzehill School, Furzehill Road to the location at Hertswood School, Thrift Lane, Borehamwood. The past four years have shown a fairly consistent level of results around $25\mu\text{g}/\text{m}^3$.

Table 5 - Results of Automatic Monitoring of Nitrogen Dioxide: Comparison with Annual Mean Objective

Site ID	Location	Site Type	Within AQMA?	Valid Data Capture for period of monitoring %	Valid Data Capture 2011 %	Annual Mean Concentration $\mu\text{g}/\text{m}^3$ (% data capture for the year)			
						2008	2009	2010	2011
HM4	Hertswood School, Borehamwood	Urban Background	N	99	25	25 (84)	27 (98)	25 (97)	29 (25)

Table 6 - Results of Automatic Monitoring for Nitrogen Dioxide: Comparison with 1-hour mean Objective

Site ID	Location	Site Type	Within AQMA?	Valid Data Capture for period of monitoring %	Valid Data Capture 2011 %	Number of Exceedences of Hourly Mean ($200 \mu\text{g}/\text{m}^3$)			
						2008	2009	2010	2011
HM4	Hertswood School, Borehamwood	Urban Background	N	99	25	0	0	0	0

Diffusion Tube Monitoring Data

Monitoring across the Borough identified exceedences of the annual mean objective for NO₂ at seventeen locations during 2011. This is a reduction of five locations from 2010 results. Results from 2008 – 2011 are shown in Table 8.

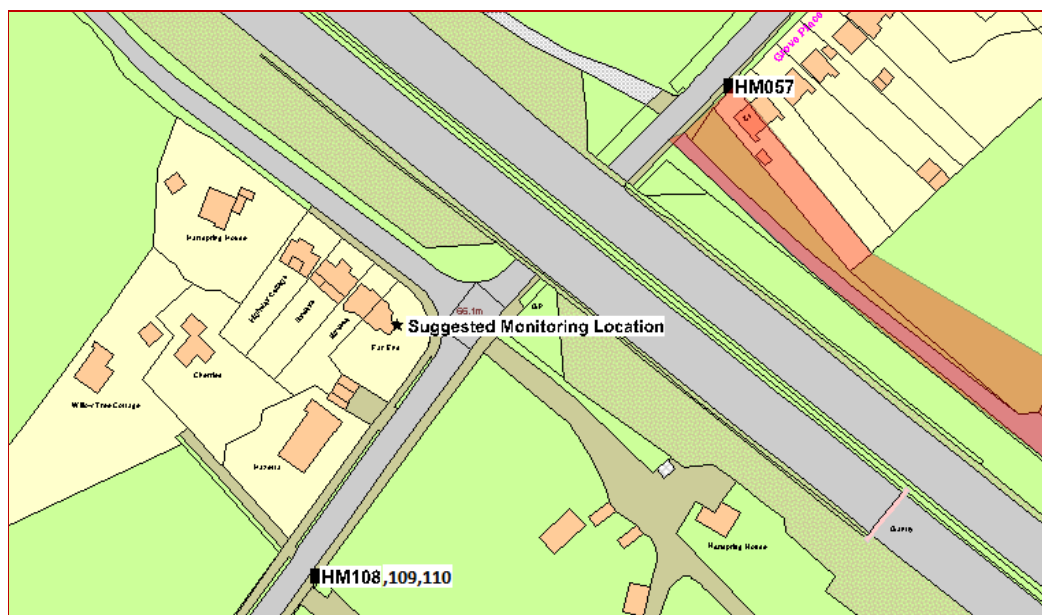
Diffusion tube monitoring in the Borough during 2011 identified thirteen locations outside of current AQMAs where the Air Quality Objectives for annual mean NO₂ were being exceeded. Three of these sites were not at sites of relevant exposure these were located at the Bus Garage, Potters Bar (HM064), Hartspring Lane (HM108,109,110) and Bushey High Street (HM099,100,101).

The site at the Bus Garage (HM064) will not need a Detailed Assessment to be carried out at this time due to lack of relevant exposure. However the conclusions of the 2010 Detailed Assessment are yet to be implemented which would increase the AQMA in this area. Those conclusions should be implemented in the area around the High Street/ Potters Bar Bus Garage.

The site at Hartspring Lane (HM108,109,110) does not need a Detailed Assessment as the tube is not at a site of relevant exposure. Also, the area was investigated in the 2010 Detailed Assessment. The recommendation of the 2010 DA to expand AQMA 4 is yet to be implemented. The Council should also consider moving this monitoring site to a point of relevant exposure closer to the M1 such as Far End House shown in Figure 9.

One site at Bushey High Street (HM099,100,101) is not a site of relevant exposure. However, as monitored levels are very close to the annual mean objective level of 40µg/m³ at the nearby monitoring point (HM117,118,119) and there are relevant receptors along this road, it is recommended that a Detailed Assessment is carried out for this area to confirm if an AQMA is required. Similarly, as an exceedence of the annual mean objective was recorded at HM039 on Shenley Road, it is recommended that a Detailed Assessment of this area is carried out.

Figure 9 - Suggested monitoring location for HM108,109,110



The majority of the remaining ten sites which were exceeding outside of the AQMAs are in the areas assessed by the 2007 and 2010 Detailed Assessments.

The monitoring at Elstree Crossroads (HM049, HM050, HM051, HM052) confirms the need to extend AQMA 5 as recommended in the 2010 Detailed Assessment.

Monitoring at High Street, Potters Bar (HM065) and Southgate Road/High Street Junction (HM069) confirms the need to extend AQMA 6 as recommended in the 2010 Detailed Assessment.

The 2011 Progress Report included a conclusion to review the necessity to declare and AQMA at The Broadway, Potters Bar following the recommendations in the 2007 Detailed Assessment. Based on the 2011 monitoring results it is recommended that an AQMA is declared as all the results in the area have been consistently high and within 10% of the annual mean objective for the past four years.

The 2010 Detailed Assessment recommended that an AQMA be declared on Watling Street in Radlett between the junctions with Park Road and Aldenham Road. Based on the monitoring in 2011, it is recommended that this AQMA should be declared due to the continued high levels of NO₂ in the area.

The sites in the Borough which are within 10% of the annual mean objective have also been investigated. All are either already in an AQMA or are in areas which have been modelled in the 2010 Detailed Assessment.

Analysis of UK continuous NO₂ monitoring data has shown that it is unlikely that the hourly mean NO₂ objective, of 18 hourly means over 200µg/m³, would be exceeded where the annual mean objective is below 60µg/m³². The highest value monitored in the Borough was 55.2µg/m³ therefore, the NO₂ hourly mean AQS objective is expected to be met at all relevant locations.

² Analysis of the relationship between annual mean nitrogen dioxide concentration and exceedences of the 1-hour mean AQS Objective – AEA - 2008

Table 7 - Results of Nitrogen Dioxide Diffusion Tubes in 2011

Site code	Location	Site Type	Within AQMA?	Triplicate or Collocated	Data capture 2011 (months)	Data with less than 9 months has been annualised	Annual mean concentration (bias factor = 0.89)
HM039	Shenley Road	K	N	NA	12	Y	47.3
HM040	Essex Road, Borehamwood	K	N	NA	12	Y	25.1
HM041	Boulevard, Borehamwood	K	N	NA	12	Y	33.4
HM045,046,047	AQMS 1,2,3	B	N	Triplicate & collocated	6	Y	23.6
HM048	Elstree Crossroads 1	K	N	NA	11	Y	39.9
HM049	Elstree Crossroads 2	K	N	NA	12	Y	52.2
HM050	Elstree Crossroads 3	K	N	NA	12	Y	52.3
HM051,052	Elstree Crossroads 4,5	K	N	Duplicate	6,12	Y	45.1

Hertsmere Borough Council

Site code	Location	Site Type	Within AQMA?	Triplicate or Collocated	Data capture 2011 (months)	Data with less than 9 months has been annualised	Annual mean concentration (bias factor = 0.89)
HM053	Caldecote Lane, Bushey Heath	B	N	NA	12	Y	20.7
HM054	High Road, Bushey	K	N	NA	12	Y	28.0
HM055	Highwood Avenue, Bushey Garages	B	N	NA	12	Y	20.9
HM057	Hartspring Lane, Bushey	K	Y	NA	12	Y	43.6
HM058	Pegmire Lane, Aldenham	K	N	NA	12	Y	30.6
HM059	Aldenham Grove, Radlett	K	N	NA	12	Y	19.4
HM060	Bell Lane, London Colney	K	N	NA	10	Y	31.5
HM061	Blanche Lane, South Mimms	K	Y	NA	12	Y	46.9

Hertsmere Borough Council

Site code	Location	Site Type	Within AQMA?	Triplicate or Collocated	Data capture 2011 (months)	Data with less than 9 months has been annualised	Annual mean concentration (bias factor = 0.89)
HM063	Dove Lane, Potters Bar	K	Y	NA	12	Y	43.2
HM064	Bus Garage 1, Potters Bar	K	N	NA	12	Y	51.7
HM065	Hatfield Road, Potters Bar	K	N	NA	12	Y	49.9
HM066	Bus Garage 2, Potters Bar	K	N	NA	12	Y	41.4
HM067,068	Bus Garage 3,4, Potters Bar	K	N	Duplicate	12	Y	39.4
HM069	Southgate Road, Potters Bar	K	N	NA	12	Y	54.7
HM070	Park Avenue, Potters Bar	K	N	NA	11	Y	37.2

Hertsmere Borough Council

Site code	Location	Site Type	Within AQMA?	Triplicate or Collocated	Data capture 2011 (months)	Data with less than 9 months has been annualised	Annual mean concentration (bias factor = 0.89)
HM071,072,073	Park Road 1,2,3, Radlett	R	N	Triplicate	11	Y	44.6
HM074,075,076	301 Watling Street 1,2,3, Radlett	R	N	Triplicate	11,10,11	Y	34.7
HM062,077,078	The Broadway 2,3, Potters Bar	K	N	Triplicate	12,6,6	Y	43.6
HM079,080,081	11 The Broadway 1,2,3, Potters Bar	R	N	Triplicate	12	Y	33.4
HM082,083,084	10 Baker Street 1,2,3, Potters Bar	R	N	Triplicate	12,12,11	Y	37.5
HM085	Andrew Close, Shenley	B	N	NA	11	Y	24.0
HM086	Charleston Paddocks, South Mimms	M/way	Y	NA	11	Y	55.2

Hertsmere Borough Council

Site code	Location	Site Type	Within AQMA?	Triplicate or Collocated	Data capture 2011 (months)	Data with less than 9 months has been annualised	Annual mean concentration (bias factor = 0.89)
HM093	103 Baker Street, Potters Bar	R	N	NA	12	Y	31.6
HM099,100,101	High Street 1,2,3, Bushey	K	N	Triplicate	12,12,11	Y	45.8
HM102,103,104	Aldenham Road 1,2,3, Radlett	K	N	Triplicate	4,4,1	Y	40.5
HM105,106,107	Elstree Park, 1,2,3, Borehamwood	R	N	Triplicate	12	Y	30.4
HM108,109,110	Hartspring Lane 1,2,3, Bushey	K	N	Triplicate	12	Y	40.2
HM111,112,113	9 Blanche Lane 1,2,3, South Mimms	K	N	Triplicate	12	Y	28.8
HM114,115,116	Parkside 1,2,3, Potters Bar	R	N	Triplicate	12,10,11	Y	37.1
HM117,118,119	44 High Street 1,2,3, Bushey	K	N	Triplicate	12,11,11	Y	39.9

Table 8 - Results of Nitrogen Dioxide Diffusion Tubes (2008 to 2011)

Site code	Location	Annual mean concentration 2008 Bias factor 0.9	Annual mean concentration 2009 Bias factor 0.9	Annual mean concentration 2010 bias factor 0.92	Annual mean concentration 2011 (bias factor = 0.89)
HM039	Shenley Road	52	52	57	47.3
HM040	Essex Road, Borehamwood	29	29	28	25.1
HM041	Boulevard, Borehamwood	38	36	36	33.4
HM045,046,047	AQMS 1,2,3	28	27	26/26/26	23.6
HM048	Elstree Crossroads 1	41	39	45	39.9
HM049	Elstree Crossroads 2	45	42	48	52.2
HM050	Elstree Crossroads 3	56	53	55	52.3
HM051,052	Elstree Crossroads 4,5	58	56/55	57/55	45.1

Site code	Location	Annual mean concentration 2008 Bias factor 0.9	Annual mean concentration 2009 Bias factor 0.9	Annual mean concentration 2010 bias factor 0.92	Annual mean concentration 2011 (bias factor = 0.89)
HM053	Caldecote Lane, Bushey Heath	24	24	25	20.7
HM054	High Road, Bushey	33	31	32	28.0
HM055	Highwood Avenue, Bushey Garages	24	24	26	20.9
HM057	Hartspring Lane, Bushey	46	43	47	43.6
HM058	Pegmire Lane, Aldenham	32	31	29	30.6
HM059	Aldenham Grove, Radlett	25	21	21	19.4
HM060	Bell Lane, London Colney	35	32	35	31.5

Site code	Location	Annual mean concentration 2008 Bias factor 0.9	Annual mean concentration 2009 Bias factor 0.9	Annual mean concentration 2010 bias factor 0.92	Annual mean concentration 2011 (bias factor = 0.89)
HM061	Blanche Lane, South Mimms	54	47	49	46.9
HM063	Dove Lane, Potters Bar	45	43	41	43.2
HM064	Bus Garage 1, Potters Bar	62	50	49	51.7
HM065	Hatfield Road, Potters Bar	48	47	47	49.9
HM066	Bus Garage 2, Potters Bar	45	39	41	41.4
HM067,068	Bus Garage 3,4, Potters Bar	43	40/38	43/43	39.4
HM069	Southgate Road, Potters Bar	57	47	55	54.7

Site code	Location	Annual mean concentration 2008 Bias factor 0.9	Annual mean concentration 2009 Bias factor 0.9	Annual mean concentration 2010 bias factor 0.92	Annual mean concentration 2011 (bias factor = 0.89)
HM070	Park Avenue, Potters Bar	30	36	34	37.2
HM071,072,073	Park Road 1,2,3, Radlett	50	49/45/46	50/48/49	44.6
HM074,075,076	301 Watling Street 1,2,3, Radlett	38	36/38/38	38/40/40	34.7
HM062,077,078	The Broadway 2,3, Potters Bar	48	42/45/44	46/46/47	43.6
HM079,080,081	11 The Broadway 1,2,3, Potters Bar	45	40/43/40	40/45/42	33.4
HM082,083,084	10 Baker Street 1,2,3, Potters Bar	38	40/39/35	39/39/40	37.5
HM085	Andrew Close, Shenley	25	25	27	24.0

Hertsmere Borough Council

Site code	Location	Annual mean concentration 2008 Bias factor 0.9	Annual mean concentration 2009 Bias factor 0.9	Annual mean concentration 2010 bias factor 0.92	Annual mean concentration 2011 (bias factor = 0.89)
HM086	Charleston Paddocks, South Mimms	55	42	52	55.2
HM093	103 Baker Street, Potters Bar	34	36	30	31.6
HM99,100,101	High Street 1,2,3, Bushey	-	48/45/47	48/49/50	45.8
HM102,103,104	Aldenham Road 1,2,3, Radlett	-	37/37/35	40/41/40	40.5
HM105,106,107	Elstree Park, 1,2,3, Borehamwood	-	31/32/31	32/34/32	30.4
HM108,109,110	Hartspring Lane 1,2,3, Bushey	-	30/33/34	44/45/44	40.2
HM111,112,113	9 Blanche Lane 1,2,3, South Mimms	-	30/27/31	35/35/34	28.8

Site code	Location	Annual mean concentration 2008 Bias factor 0.9	Annual mean concentration 2009 Bias factor 0.9	Annual mean concentration 2010 bias factor 0.92	Annual mean concentration 2011 (bias factor = 0.89)
HM114,115,116	Parkside 1,2,3, Potters Bar	-	41/43/39	40/39/44	37.1
HM117,118,119	44 High Street 1,2,3, Bushey	-	39/44/25	44/47/44	39.9

2.2.2 PM₁₀

PM₁₀ was monitored in the Borough at the continuous monitoring location until it was decommissioned in March 2011. Due to the short monitoring period the data has been annualised. However due to the lack of background PM₁₀ monitoring within the region with which this result can be annualised, the regional background trend across the year are not clear. Due to this, both the annualised and non-annualised results have been presented. As the PM₁₀ levels have not been exceeded at this site there is no need to carry out a Detailed Assessment.

Table 9 - Results of Automatic Monitoring of PM₁₀: Comparison with Annual Mean Objective

Site ID	Location	Site Type	Within AQMA?	Valid Data Capture for period of monitoring %	Valid Data Capture 2011 %	Annual Mean Concentration µg/m ³ (% data capture for the year)			
						2008	2009	2010	2011
HM4	Hertswood School, Borehamwood	Urban Background	N	99	25	17 (82)	19 (94)	19 (97)	10 (25) 16*

*Non-annualised 2011 PM₁₀ result.

Table 10 - Results of Automatic Monitoring for PM10: Comparison with 24-hour mean Objective

Location	Site Type	Within AQMA?	Valid Data Capture for period of monitoring %	Valid Data Capture 2011 %	Number of Exceedences of daily mean objectives (90th percencile of daily mean PM10 concentration if data capture <90%)			
					2008	2009	2010	2011
Hertswood School, Borehamwood	Urban Background	N	99	25	4 (30.3)	3	1 (29.7)	7 (31)

2.2.3 Sulphur Dioxide

Hertsmere Borough Council does not monitor sulphur dioxide.

2.2.4 Benzene

Hertsmere Borough Council does not monitor for Benzene.

2.2.5 Other pollutants monitored

Continuous monitoring for ozone was undertaken at the background monitoring location. However due to the closure of the continuous monitoring station in March 2011, the data for Ozone is not valid. In previous years the AQS objectives for Ozone have been exceeded.

Odour and dust complaints are handled by the Environmental Health Pollution Team as reactive complaints.

2.2.6 Summary of Compliance with Air Quality Strategy Objectives

A number of sites continue to exceed the AQS objectives for NO₂ outside of current AQMA. All of these sites excluding HM039 on Shenley Road and the two sites on Bushey High Street (HM099,100,101 and HM117,118,119) were assessed in the 2007 and 2010 Detailed Assessments. The conclusions of the 2010 Detailed Assessment will not change due to the findings in this report. Therefore the council should move forward with the following recommendations:

- Carry out a Detailed Assessment in the area around HM039 on Shenley Road;
- Carry out a Detailed Assessment in the area around HM099,100,101 and HM117,118,119 on Bushey High Street;
- Relocate the monitoring at Hartspring Lane to a location of relevant exposure;
- Carry out the actions proposed in the 2010 Detailed Assessment –
 - Extend AQMA6, High Street/Potters Bar Bus Garage;
 - Extend AQMA5, Elstree Crossroads;
 - Extend AQMA4, Hartspring Lane, Bushey;
 - Declare a new AQMA in Radlett (further information on an AQMA in Radlett in section 3).
- Declare an AQMA at The Broadway, Potters Bar following the recommendations in the 2007 Detailed Assessment.

Hertsmere Borough Council has measured concentrations of NO₂ above the annual mean objective at relevant locations outside of the AQMA, and **will need to proceed to Detailed Assessments**, for Shenley Road and High Street, Bushey.

3 Road Traffic Sources

3.1 Narrow Congested Streets with Residential Properties Close to the Kerb

Hertsmere Borough Council have identified one new narrow and congested street. This is Shenley Road in Borehamwood. Relevant exposure has been identified in this area. The monitoring in this area (HM039) has also confirmed the need to carry out a Detailed Assessment of annual mean NO₂ levels in this area.

Hertsmere Borough Council has identified congested streets with a flow above 5,000 vehicles per day and residential properties close to the kerb, new or not adequately considered in previous rounds of Review and Assessment, and **will need to proceed to a Detailed Assessment**.

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

Hertsmere Borough Council confirms that there are no new/newly identified busy streets where people may spend 1 hour or more close to traffic.

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

Hertsmere Borough Council confirms that there are no new/newly identified roads with high flows of buses/HDVs.

3.4 Junctions

Hertsmere Borough Council have identified the following busy junctions which have not been previously identified in previous assessment:

- Shenley Hill and Watling Street, Radlett;
- Theobald Street and Watling Street, Radlett; and
- Allum Lane with Watling Street and Elstree Hill North in Elstree.

The 2010 Detailed Assessment recommended that an AQMA was declared on Watling Street, Radlett between and including the Park Road and Aldenham Road junctions. The Shenley Hill/Watling Street junction is adjacent to the Aldenham Road/Watling Street junction, and the Theobald Street/Watling Street junction is slightly further to the south. As it has already been recommended that an AQMA is declared in Radlett, it is recommended that these two additional junctions should be included in the further assessment of the area undertaken to confirm the extent of the AQMA. Should the assessment indicate that exceedances are likely around these junctions, they should be included in the Radlett AQMA.

The area around the junction between Allum Lane, Watling Street and Elstree Hill North has been assessed using DMRB screening methodology. The results were verified using the nearest diffusion tube on Elstree Road (HM049), and as such, modelled results were adjusted by a factor of 2.7. The predicted concentration at the façade of the closest residential property to the junction was $54.28\mu\text{g}/\text{m}^3$. Due to this potential exceedance of the annual mean objective for NO_2 , it is recommended that monitoring be placed at property facades around this junction. Should monitored exceedances be recorded, a Detailed Assessment should be carried out. Alternatively, this junction could be included in a Further Assessment for the Elstree Crossroads AQMA (AQMA 5) with a view to including both junctions in the AQMA.

Hertsmere Borough Council has assessed new/newly identified junctions meeting the criteria in Section A.4 of Box 5.3 in TG(09), and concluded that **it will be necessary to proceed to a Detailed/ Further Assessment for NO_2 .**

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

Hertsmere Borough Council confirms that there are no new/proposed roads.

3.6 Roads with Significantly Changed Traffic Flows

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

3.7 Bus and Coach Stations

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

4 Other Transport Sources

4.1 Airports

Hertsmere Borough Council confirms that there are no new airports in the Local Authority area.

4.2 Railways (Diesel and Steam Trains)

4.2.1 Stationary Trains

Hertsmere 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

Hertsmere 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)

Hertsmere 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

During 2011 it came to the Council's attention that in there are two permits issued by the Environment Agency for synthetic bone manufacture at a bone substitute synthesis facility within the Borough. The permits are issued to Apatech Ltd Centennial Avenue, Centennial Park, Elstree, Hertfordshire WD6 3TJ. The installations include permission for emissions to air. Permit EA/PPC/GP3330LG lists the oven and disc mill as emission points to air. Permit EA/PPC/GP3330LG identifies 'drying of product' and 'milling of product' as sources of emissions to air with the emissions being ammonia and particulates respectively. All emissions to air are required to meet the insignificant criteria as assessed using the H1 assessment tool and therefore contribute less than 1% of the long term environmental standard.

Hertsmere 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

Hertsmere 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

During 2011 new Part B permits were issued by the local authority for waste oil burners in the Borough of Hertsmere. These are listed below with some details. Due

to their size and nature of operation, neither of the installations are predicted to cause a breach of any of the air quality objectives.

- Local Authority permit issued to C.A.M Unit 1A, Cranborne Road Industrial Estate, Cranborne Road, Potters Bar, Hertfordshire, EN6 3JN for a waste oil burner with a net rated thermal input of <0.4MW.
- Local Authority permit issued to, JTT Autotech Limited, Hollies Way Industrial Estate, 218 High Street, Potters Bar, Hertfordshire, EN6 5BJ for a waste oil burner with a net rated thermal input of <0.4MW.

During 2011 new permits were issued by the Environment Agency for several industrial installations in the Borough of Hertsmere. These are listed below with some details. None of the installations are predicted to cause a breach of any of the air quality objectives.

02/02/2011 – permit (EPR/FP3699LC) granted by Environment Agency for Reviva Composting Limited, Elstree Hill South, Elstree, Hertfordshire, WD6 3BL. No emissions to air, but quarterly bioaerosol monitoring is required for the first year and biannual thereafter.

01/09/2011 – permit (EPR/ZP3190VN) granted by Environment Agency for M E C Grab Services Limited, The Conifers, Elton Way A41, Watford, Hertfordshire, WD25 8HD. Permitted activities include storage of certain wastes, recycling/reclamation of metals and metal compounds, recycling/reclamation of organic substances which are not used as solvents, recycling/reclamation of other inorganic compounds. A variation to this permit was issued on 21 December 2011 to allow for onsite crushing and screening. Dust emissions from fugitive and uncontrolled sources in relation to waste handling can give rise to elevated PM₁₀ concentrations, however, in accordance with Box 5.10 of TG(09), as no concerns have been raised about dust from the site, there is no need to proceed to a Detailed Assessment.

Hertsmere Borough Council confirms that there are no new or proposed industrial installations for which planning approval has been granted within its area or nearby in a neighbouring authority requiring Detailed Assessment.

5.2 Major Fuel (Petrol) Storage Depots

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

5.3 Petrol Stations

Hertsmere Borough Council confirms that there are no petrol stations meeting the specified criteria.

5.4 Poultry Farms

Hertsmere Borough Council confirms that there are no poultry farms meeting the specified criteria.

6 Commercial and Domestic Sources

6.1 Biomass Combustion – Individual Installations

Hertsmere Borough Council approved a planning application that grants permission for a straw and woodchip burning boiler to be installed. The boiler will heat the domestic house at Crossoaks Farm, Crossoaks Lane, Well End, Borehamwood, WD6 5PH. It is not currently known what the capacity of this boiler will be.

As it is not currently known what the capacity will be, it cannot be assessed at this time. This installation will be assessed when the capacity of the boiler is known. As the boiler is for a domestic property it is not expected to have an adverse effect on its surroundings.

Hertsmere Borough Council has assessed the biomass combustion plant, and concluded that it will not be necessary to proceed to a Detailed Assessment at present, but this will be reviewed when more information is available.

6.2 Biomass Combustion – Combined Impacts

Hertsmere Borough Council confirms that there are no biomass combustion plants in the Local Authority area.

6.3 Domestic Solid-Fuel Burning

Hertsmere Borough Council confirms that there are no areas of significant domestic fuel use in the Local Authority area.

7 Fugitive or Uncontrolled Sources

Hertsmere Borough Council confirms that there are no potential sources of fugitive particulate matter emissions in the Local Authority area.

8 Conclusions and Proposed Actions

8.1 Conclusions from New Monitoring Data

Monitoring across the Borough identified seventeen exceedences of the annual mean objective for NO₂ during 2011. This is a reduction of five locations from 2010 results. Results from 2008 – 2011 are shown in Table 8.

A number of amendments to current AQMAs are recommended based on the findings of 2011 monitoring data and previous Detailed Assessments. These are summarised in the proposed actions section.

8.2 Conclusions from Assessment of Sources

Pollution from traffic is the main cause of high pollution levels in the Borough. The need for two new Detailed Assessments has been identified due to roads or junctions with residential exposure and possible exceedences that have not been assessed in past air quality reporting.

No new Detailed Assessments are required for any industrial developments. The biomass installation should be considered in future reporting once further details are gathered.

A summary of proposed actions related to the assessment of sources within the Borough is provided in the proposed actions section below.

8.3 Proposed Actions

Recommended actions related to the findings of monitoring data collected in 2011 are presented below:

- Carry out a Detailed Assessment in the area around HM039 on Shenley Road, Borehamwood;
- Carry out a Detailed Assessment in the area around HM099, HM100, HM101 and HM117, HM118, HM119 on Bushey High Street;
- Relocate the monitoring at Hartspring Lane to a location of relevant exposure;

- Carry out the actions proposed in the 2010 Detailed Assessment –
 - o Extend AQMA6, High Street/Potters Bar Bus Garage;
 - o Extend AQMA5, Elstree Crossroads;
 - o Extend AQMA4, Hartspring Lane, Bushey;
 - o Declare a new AQMA in Radlett.
- Declare an AQMA at The Broadway, Potters Bar.

Recommended actions related to the assessment of sources within the Borough are summarised below:

- Shenley Road, Borehamwood has been identified as a narrow and congested street requiring a Detailed Assessment. This will be carried out in relation to the Detailed Assessment around HM039 as mentioned above.
- Two new busy junctions have been identified close to the area recommended to be declared as an AQMA in Radlett. These should be included in the Further Assessment of the area to determine the full extent of the AQMA.
- Monitoring should be carried out at the junction of Allum Lane and Elstree Hill North as DMRB predictions highlighted a potential area of exceedence of the annual mean NO₂ objective. If monitoring at the façade highlights exceedences of the AQS objectives, a Detailed Assessment should be carried out.
- The biomass boiler in Borehamwood should be assessed in the next round of review and assessment when more details are known.

9 References

Defra, 2007. The Air Quality Strategy for England, Scotland, Wales and Northern Ireland. Volume 1. Defra, London. Cm 7169.

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Appendices

Appendix A: QA/QC Data

Appendix B: DMRB Calculations

Appendix A: QA:QC Data

Diffusion Tube Bias Adjustment Factors

The bias adjustment factor for 2011 has been taken from the LAQM national bias adjustment spreadsheet³ for this laboratory methodology. This was calculated as 0.89 (update March 2012) based on 26 studies.

Discussion of Choice of Factor to Use

Hertsmere, prior to the closure of Borehamwood continuous monitor had a co-location study in place. Due to the closure of the automatic monitoring site the local bias adjustment factor for 2011 cannot be calculated. Therefore the bias adjustment factor for 2011 has been taken from the LAQM national bias adjustment spreadsheet⁴ for this laboratory methodology.

PM Monitoring Adjustment

No PM adjustment was necessary for this report. Data for PM was only available for three months of the year due to the closure of the continuous monitoring site.

Short-term to Long-term Data adjustment

Annualisation of diffusion tubes which has less than nine months of data capture was carried out. Also annualisation of the three months of continuous monitoring data was carried out.

Continuous monitoring annualisation

	Average
Mean of site to be annualised / $\mu\text{g}/\text{m}^3$	33.50
Data Capture / %	24.45
Average Annualisation Factor	0.88
Annualised Mean / $\mu\text{g}/\text{m}^3$	29.37

QA/QC of Automatic Monitoring

Prior to the closure of the automatic monitoring station, Hertsmere Borough Council carried out fortnightly routine calibrations, the results were sent to King's College, London. A six monthly audit was carried out by the National Physics Laboratories.

³ <http://laqm.defra.gov.uk/bias-adjustment-factors/bias-adjustment.html>

⁴ <http://laqm.defra.gov.uk/bias-adjustment-factors/bias-adjustment.html>

The station was included in the Herts and Beds Air Pollution Monitoring Network, which is operated by Air Quality Data Management. All data are checked and ratified by the operator prior to release. Hertsmere Borough Council had the station serviced by contractors Supporting U.

QA/QC of Diffusion Tube Monitoring

The diffusion tubes are supplied and analysed by Gradko utilising 20% Triethanolamine (TEA) in water preparation method. Gradko International Ltd currently holds UKAS accreditation and participates in the Workplace Analysis Scheme for Proficiency (WASP) for Benzene and NO₂ diffusion tube analysis and the NO₂ Annual Field Inter-Comparison Exercise. These provide strict performance criteria for participating laboratories to meet, thereby ensuring NO₂ concentrations reported are of a high calibre. The WASP calculations were reviewed in 2010-2011 such that the z-scores for laboratories rather than a value judgement were provided. The criteria against which to determine laboratory performance is the percentage of results which met a z-score $< \pm 2$ (satisfactory). Assuming there is no systematic error in analysis 19 out of 20 z-scores (95%) should meet the 'satisfactory' criterion. For the rounds which occurred during 2011 Gradko scored 100% for the first three trials; however, performance reduced during the analysis of the final round to 37.5%. The tube precision for the NO₂ Annual Field Inter-comparison at Marylebone Road was rated as 'Good'

Appendix B: DMRB Calculations

Input Data

Location/ Receptor	Grid Ref	Background Concentrations		
		Year	NO ₂	PM ₁₀
A	517883.3, 195859.8	2011	29	16

Location/ Receptor	Link number	Distance from link centre to receptor (m)	Traffic flow & speed		Traffic composition		
			AADT (combined, veh/day)	Annual average speed (km/h)	Road type (A,B,C,D)	Total % LDV (<3.5t GVW)	Total % HDV (>3.5t GVW)
A	1	12	14763	48	A	95	5
	2	28	12254	20	B	95	5

Verification

Verification was carried out based on HM049 on Elstree Road, south of the junction in question. An adjustment factor of 2.701 was derived and applied to the modelled NO_x results before putting these into the NO_x to NO₂ converter to derive total NO₂ for the junction.

Model Verification and Adjustment

Site	Background NO ₂ (µg/m ³)	Background NO _x (µg/m ³)	Monitored Total NO ₂ (µg/m ³)	Monitored Road Contribution NO _x (µg/m ³)	Modelled Road Contribution NO _x (µg/m ³)	Ratio of Monitored Road NO _x /Modelled Road NO _x	Adjustment Factor for Modelled Road Contribution	Adjusted Modelled Road Contribution NO _x (µg/m ³)	Adjusted Modelled Total NO _x (µg/m ³)	Modelled Total NO ₂ (µg/m ³)	Monitored Total NO ₂ (µg/m ³)	% Difference NO ₂ [(Modelled - Monitored)/ Monitored]
HM049	29	45	52.2	56.7	21.0	2.7	2.701	56.7	101.7	52.2	52.2	0%

Maps of Locations

Map of Junction between Allum Lane, Watling Street and Elstree Hill North

