Air Quality CONSULTANTS

2015 Air Quality Updating and Screening Assessment:

Hertsmere Borough Council

October 2015

Experts in air quality management & assessment

Document Control

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Job Number	J2285

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Document Status and Review Schedule

Report No.	Date	Status	Reviewed by
J2285 /1/F1	12 October 2015	Final Report	Penny Wilson (Principal Consultant)

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Executive Summary

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.

This document is Hertsmere Borough Council's fifth Updating and Screening Assessment. Results from monitoring by the Council are presented and sources of air pollution are identified. The USA determines those changes since the last assessment, which could lead to the risk of an air quality objective being exceeded.

A new major road scheme has been implemented since the last round of review and assessment as part of the managed motorway scheme between junctions 23 and 24 of the M25. The air quality impacts of this scheme are currently under review. The Updating and Screening Assessment has not identified any other significant changes in emissions sources within the Hertsmere area. There have been no new relevant industrial installations and no new significant commercial, domestic or fugitive sources of emissions.

Annual mean NO_2 concentrations are likely to have been above the air quality objective at a number of locations with relevant exposure near to diffusion tube sites in 2014, some at locations outside existing AQMAs. All other pollutants in the borough are meeting the objective levels.

Proposed actions are:

- The monitoring locations adjacent to, but outside of, AQMA 6 (HM64, HM65, HM66 and HM114) should be reviewed;
- Hertsmere Borough Council should review the existing boundary of the AQMA 4, adjacent to the M1, and AQMA 5 at Elstree Junction;
- At the Broadway, Potters Bar at junction of Mutton Lane and Darkes Lane, it is recommended that the monitoring sites are repositioned to a location representative of relevant exposure and the data reviewed within the Review and Assessment process;
- It is recommended that the new AQMAs identified in previous review and assessment reports should be declared along Watling Road, between, and to include,the junctions of Park Road and Watling Street and that of Aldenham Road, Shenley Hill and Watling Street; and
- Following the 2015 Detailed Assessment, it is recommended that a new AQMA should be declared along Shenley Road. The Council should also expand the existing diffusion tube network around Shenley Road and Bushey High Street where possible.

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1. Introduction

1.1 Description of Local Authority Area

The Borough of Hertsmere is located in the south of Hertfordshire, covering 39 square miles, bordering Greater London to the south, St Albans District to the north, Welwyn Hatfield Borough to the East and Watford Borough and Three Rivers District to the West. The borough is largely rural in character with the population concentrated in the four main towns of Borehamwood, Bushey, Potters Bar and Radlett.

The Borough has within its boundaries a number of major roads, namely the M1, M25 and A1(M), which alongside other busy roads represent the major source of nitrogen dioxide in the area. Hertsmere Borough Council has declared six Air Quality Management Areas (AQMAs) for exceedences of the annual mean objective for nitrogen dioxide. Four of these AQMAs relate to motorway road traffic sources and the remaining two relate to local road traffic.

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 exceedences are considered likely, the local authority must then declare an Air Quality Management Area (AQMA) and prepare an Air Quality Action Plan (AQAP) setting out the measures it intends to put in place in pursuit of the objectives.

The objective of this Updating and Screening Assessment 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 micrograms per cubic metre $\mu g/m^3$ (milligrams per cubic metre, mg/m^3 for carbon monoxide) with the number of exceedences in each year that are permitted (where applicable).

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

Pollutant	Air Quality Objective		Date to be achieved by
	Concentration	Measured as	
Benzene	16.25 $\mu g/m^3$	Running annual mean	31.12.2003
	5.00 $\mu g/m^3$	Running annual mean	31.12.2010
1,3-Butadiene	2.25 $\mu g/m^3$	Running annual mean	31.12.2003
Carbon monoxide	10.0 mg/m^3	Running 8-hour mean	31.12.2003
Lead	0.5 $\mu g/m^3$	Annual mean	31.12.2004
	0.25 $\mu g/m^3$	Annual mean	31.12.2008
Nitrogen dioxide	200 $\mu g/m^3$ not to be exceeded more than 18 times a year	1-hour mean	31.12.2005
	40 $\mu g/m^3$	Annual mean	31.12.2005
Particles (PM_{10}) (gravimetric)	50 $\mu g/m^3$, not to be exceeded more than 35 times a year	24-hour mean	31.12.2004
	40 $\mu g/m^3$	Annual mean	31.12.2004
Sulphur dioxide	350 $\mu g/m^3$, not to be exceeded more than 24 times a year	1-hour mean	31.12.2004
	125 $\mu g/m^3$, not to be exceeded more than 3 times a year	24-hour mean	31.12.2004
	266 $\mu g/m^3$, not to be exceeded more than 35 times a year	15-minute mean	31.12.2005

1.4 Summary of Previous Review and Assessments

A summary of previous rounds of review and assessment completed by Hertsmere Borough Council are show in Table 1.2. The existing AQMAs in Hertsmere are shown in Figure 1.1 to Figure 1.6 below.

Table 1.2: Previous rounds of review and assessment.

Year	Report	Outcome
2006	Updating and Screening Assessment	No further actions.
2007	Detailed Assessment	AQMA to be declared at The Broadway, Potters Bar for NO_2.
2008	Progress Report	Joint 2007 and 2008. No Detailed Assessment required.
2009	Updating and Screening Assessment	Recommended that a 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.
	Revised Action Plan	Some points concluded and some points dropped.
2010	Detailed Assessment	Consider possible extension of Elstree Crossroads AQMA after undertaking additional monitoring. Amend the AQMA at High Street near the bus station and the junction of the High Street with The Causeway, Potters Bar. Continue monitoring at junction of Barnet Road /Southgate Road /High Street, Potters Bar. Consider declaring an AQMA in Radlett to include the junctions of Watling Street/ Aldenham Road and Watling Street/ Park Road. Consider expanding the AQMA at Hartspring Lane, Bushey.
	Progress Report	Continue additional monitoring of NO_2 at relevant receptor locations at High Street Bushey and Watling Street/Aldenham Road junction Radlett. Implement the outcomes of the 2010 Detailed Assessment.
2011	Progress Report	Review the necessity to declare an AQMA at the Broadway, Potters Bar following the recommendations of the 2007 Detailed Assessment. Implement the outcomes of the 2010 Detailed Assessment. Consider the need for a Detailed Assessment for NO_2 at Shenley Road, Borehamwood in the 2012 Updating and Screening Assessment.
2012	Updating and Screening Assessment	Carry out a Detailed Assessment for NO_2 at Shenley Road, Borehamwood. Carry out a Detailed Assessment for NO_2 at Bushey High Street. Relocate the monitoring at Hartspring Lane. Implement the outcomes of the 2010 Detailed Assessment. Declare an AQMA at The Broadway Potters Bar.
2013	Progress Report	Carry out a Detailed Assessment for NO_2 at HM39 Shenley Road, Borehamwood, HM99/100/101 84 High Street 1/2/3, Bushey and HM117/118/118 44 High Street

Year	Report	Outcome
		1/2/3, Bushey. Declare AQMA's at The Broadway, Potters Bar and Park Road/Watling Street Junction, Radlett. Amend AQMA 6 High Street, Potters Bar to a more relevant location; amend and expand AQMA 5 at Elstree Crossroads.
2014	Progress Report	Re-iterated the need to carry out a Detailed Assessment for NO_2 along Shenley Road, Borehamwood (around site HM39) and along High Street, Bushey (around sites HM99/100/101 and HM117/118/118). Furthermore, the following actions remain outstanding: • Declare AQMA's at The Broadway, Potters Bar (HM62 and HM82/83/84 will be contained in this AQMA) and Park Road/Watling Street Junction, Radlett (HM71/72/73 will be contained in this AQMA); • Amend AQMA 6 High Street, Potters Bar to a more relevant location; • Amend and expand AQMA 5 at Elstree Crossroads so the new AMQA reaches HM48, HM49 and HM52.
2015	Detailed Assessment	The areas around Shenley Road (including diffusion tube site HM039) and Bushey High Street (including diffusion tubes HM99/100/101 and HM117/118/119) were examined in a Detailed Assessment. It was recommended that an AQMA should not be declared along Bushey High Street but should be declared along Shenley Road. It was also recommended that monitoring at existing sites should continue and that the existing network could be expanded at these two locations.

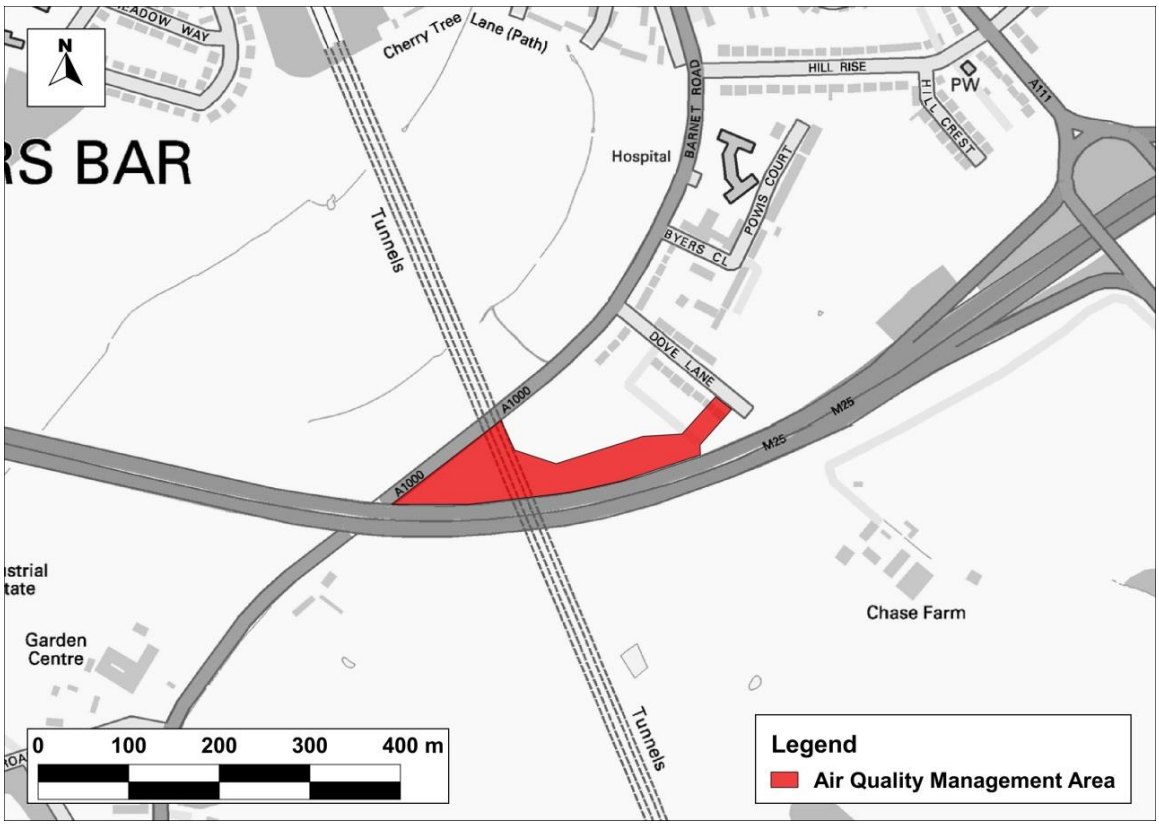

Figure 1.1: **Hertsmere AQMA 1 – An area comprised of the properties at 23 –27 Dove Lane and the caravan site Brookes Place off the A1000 Barnet Road, near the M25.**

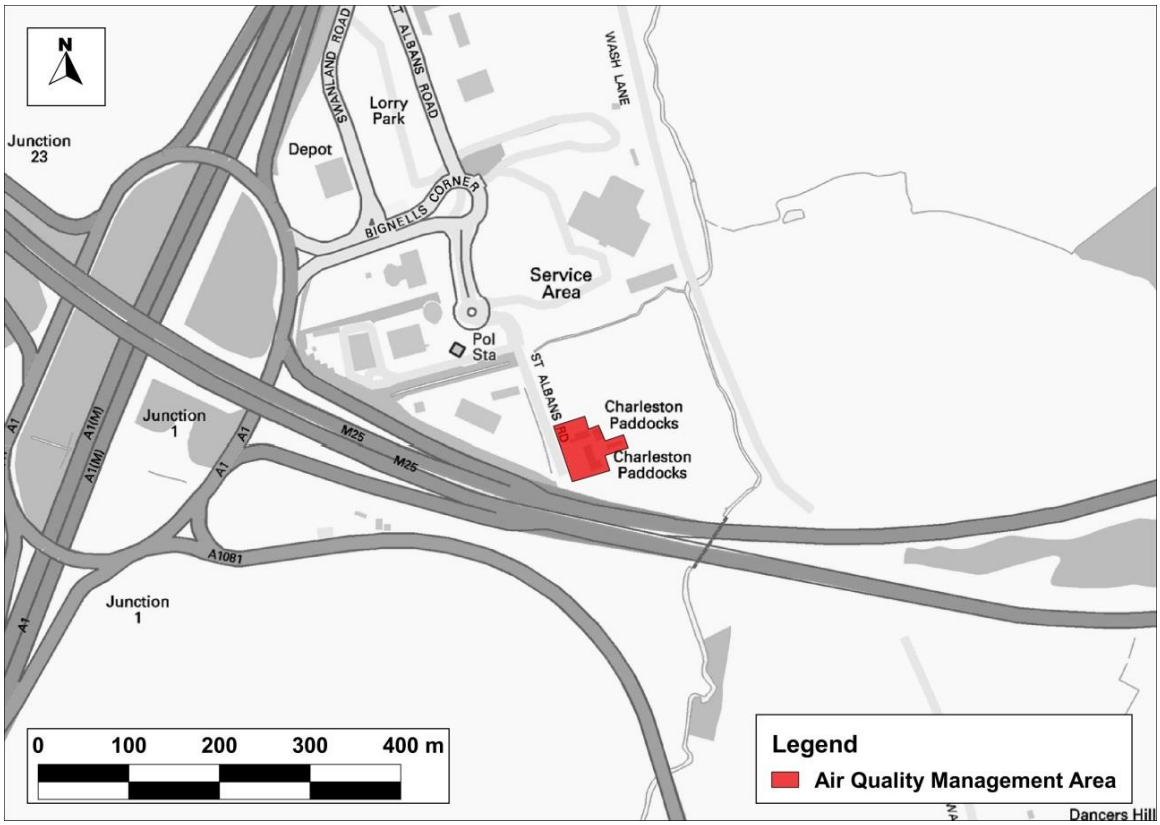

Figure 1.2: **Hertsmere AQMA 2 – An area comprised of a property known as Charleston Paddocks, St Albans Road, South Mimms, Potters Bar, near the M25.**

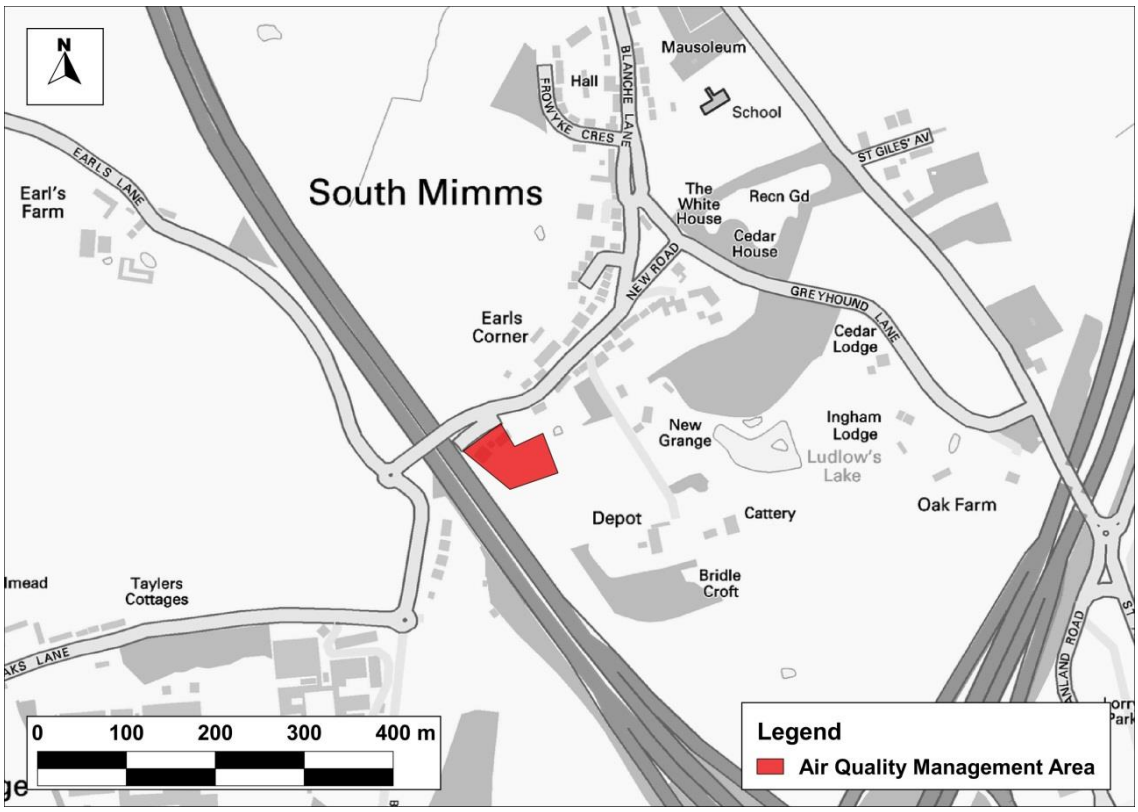

Figure 1.3: Hertsmere AQMA 3 – An area comprised of properties 31 – 39 Blanche Lane South Mimms near the M25.

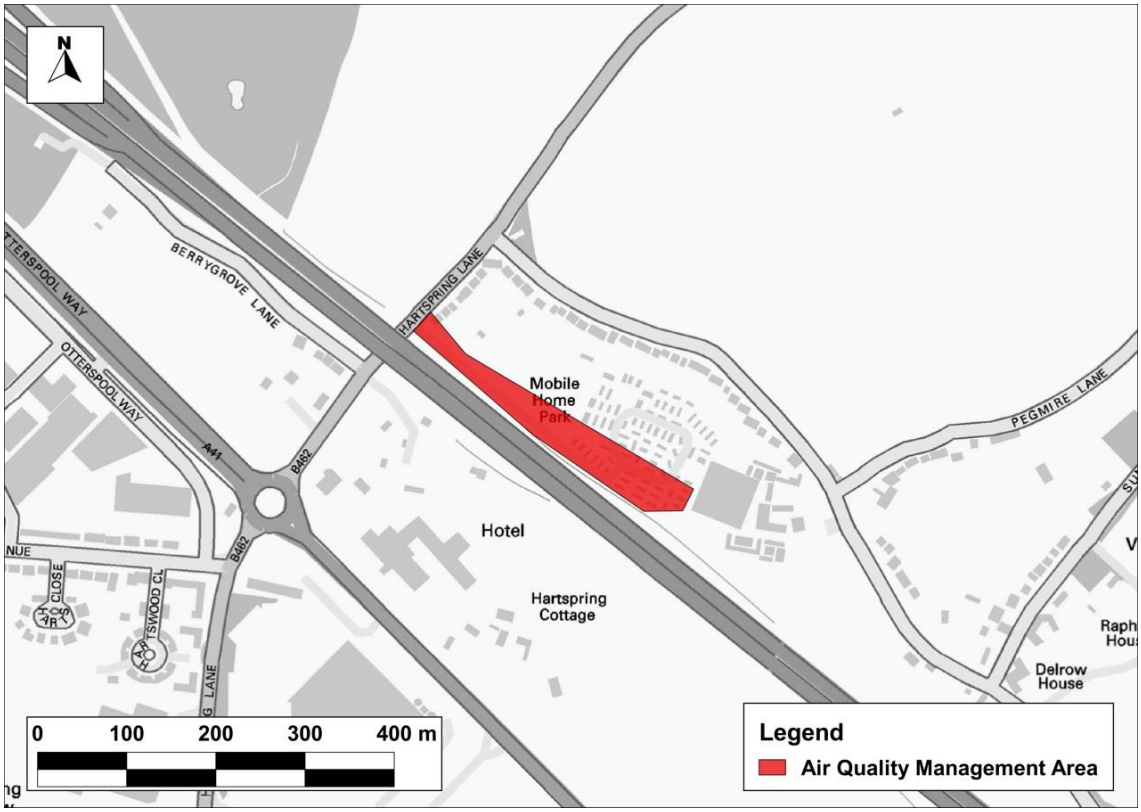

Figure 1.4: Hertsmere AQMA 4 – An area comprised of the domestic properties 12 Grove Place, Hartspring Lane and caravans numbered 1–4, 7–8, 55–58 and 60 within Winfield Caravan site, Hartspring Lane, near the M1 at Bushey.

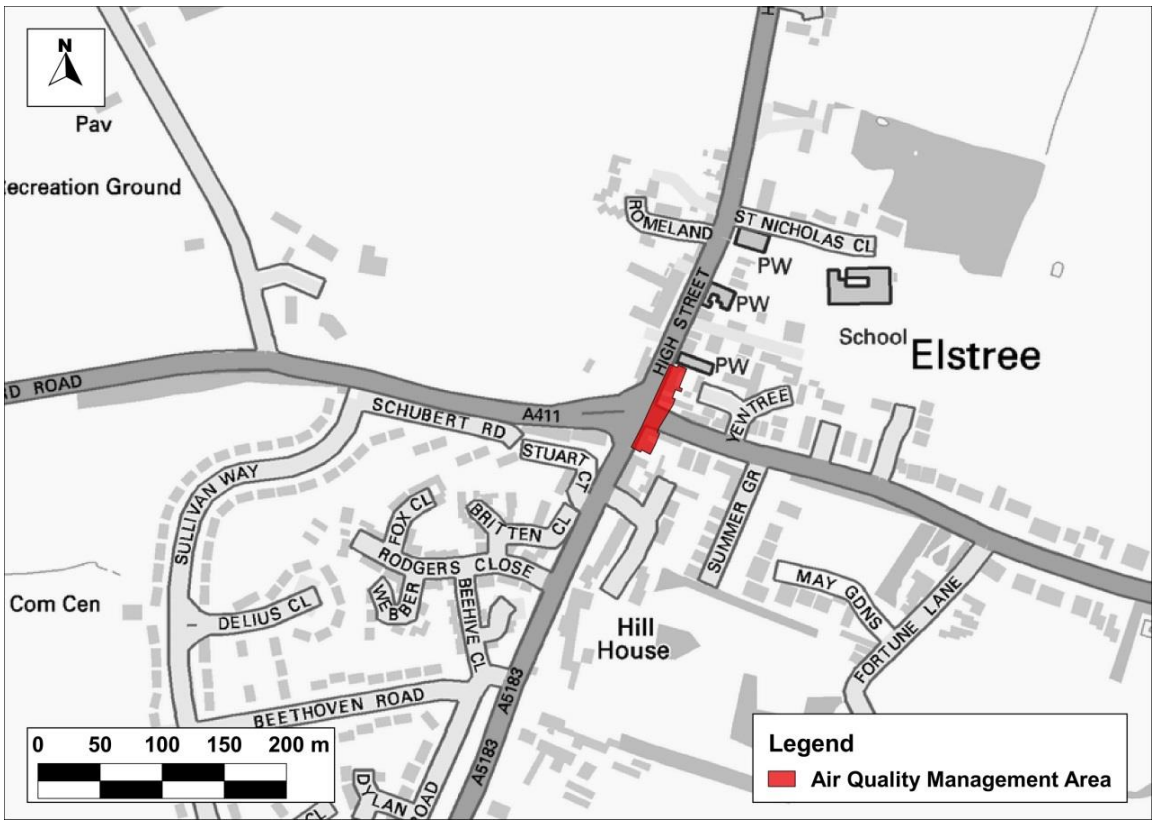

Figure 1.5: **Hertsmere AQMA 5 – An area comprised of eight properties on the east side of the A5183 High Street, Elstree around the junction with the A411 Barnet Lane.**

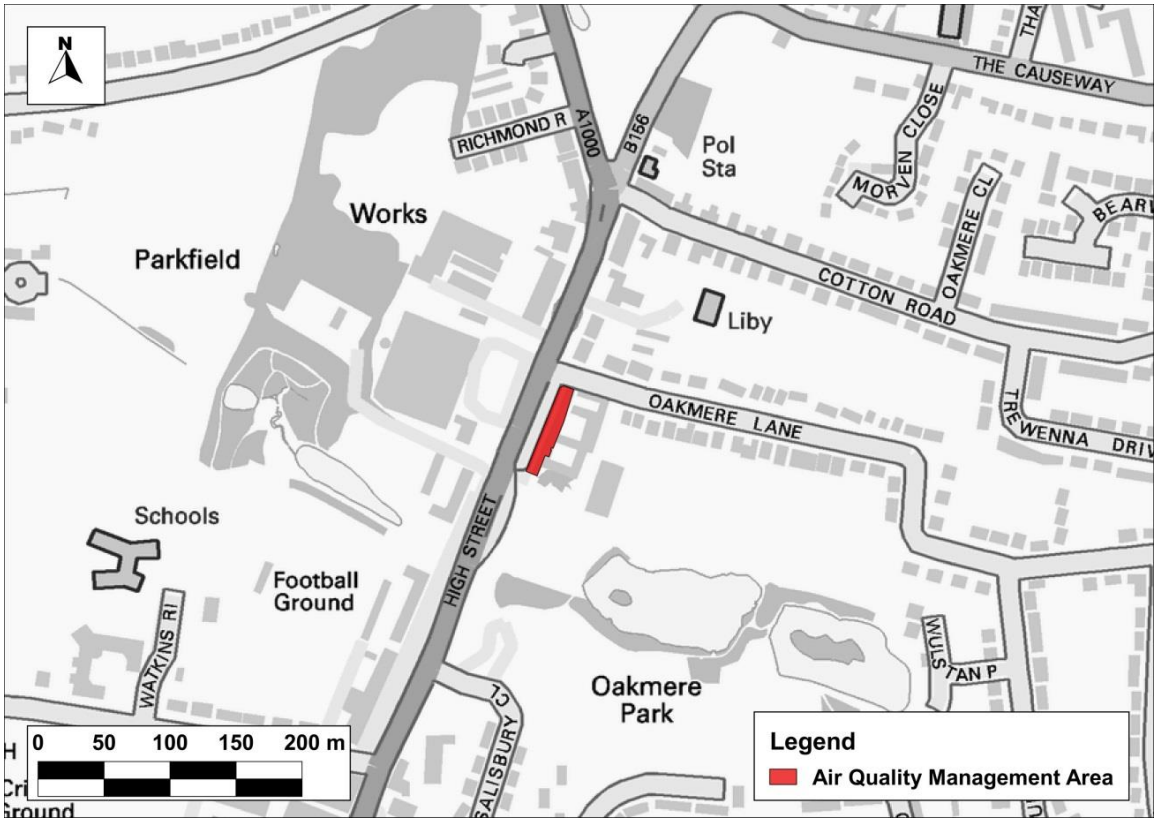

Figure 1.6: **Hertsmere AQMA 6 – An area comprised of properties at 133 to 167 High Street on the east side of the High Street opposite the bus station Potters Bar.**

2. New Monitoring Data

2.1 Summary of Monitoring Undertaken

Automatic Monitoring Sites

Hertsmere Borough Council currently operates two automatic continuous monitors within the area, both of which measure concentrations of nitrogen dioxide and particulate matter (PM_{10} and $PM_{2.5}$). The urban background continuous monitor situated in Hertswood Upper School in Borehamwood has been operated for a number of years, apart from a period of closure between March 2011 and November 2013. A new roadside continuous monitor was opened in September 2014 at the junction of Manor Way and Elstree Way.

The locations of the continuous monitors are shown in Figure 2.1 and details of the sites are given in Table 2.1. Details of the QA/QC procedures carried out on the automatic monitoring stations are presented in Appendix A1.

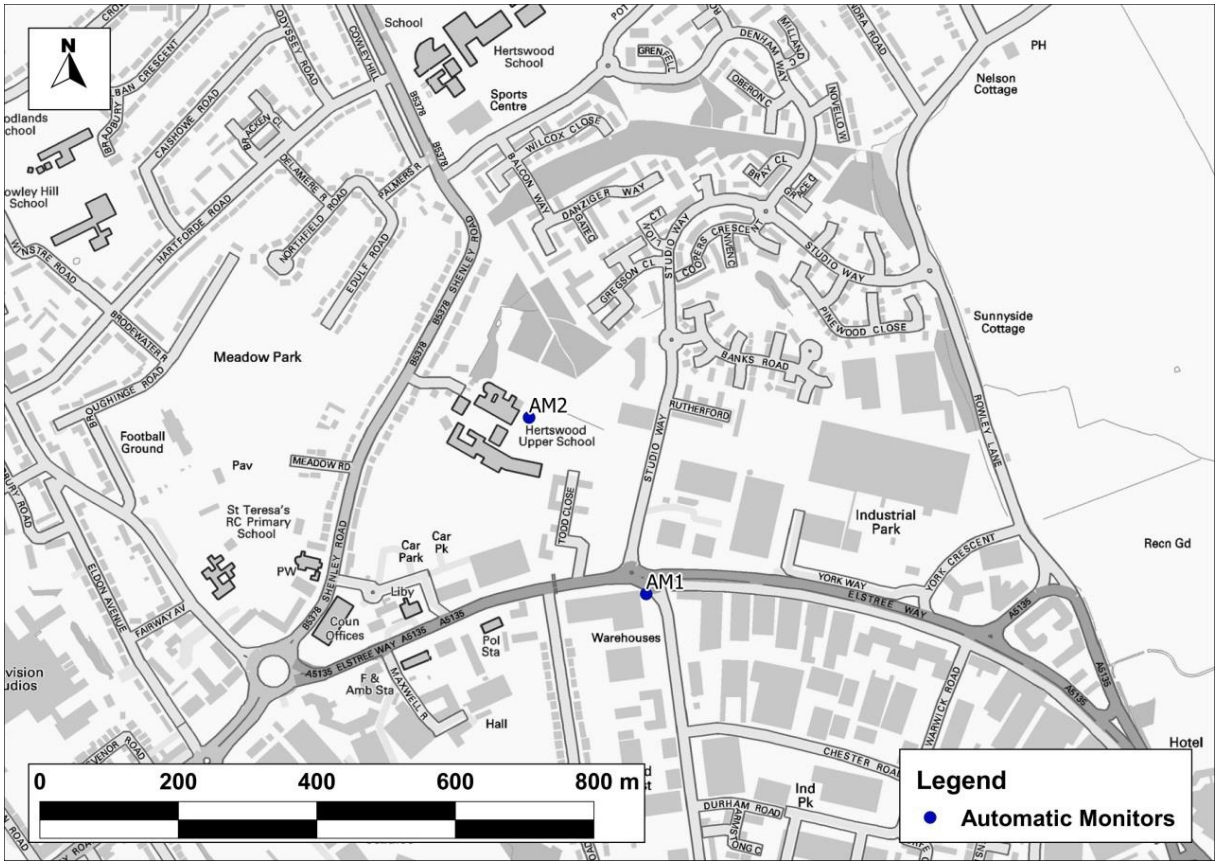

Figure 2.1: Map of Automatic Monitoring Sites

Table 2.1: Details of Automatic Monitoring Sites

Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In AQMA?	Monitoring Technique	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?
Hertsmere Borehamwood Roadside	Roadside	520317	197089	NO_2, PM_{10}, $PM_{2.5}$	N	Chemiluminescence, FDMS	N	6 m	Y
Hertsmere Borehamwood Background	Background	520156	197364	NO_2, PM_{10}, $PM_{2.5}$	N	Chemiluminescence, FDMS	N	N/A	N

Non-Automatic Monitoring Sites

Hertsmere Borough Council also monitors annual mean nitrogen dioxide concentrations using passive diffusion tubes at 44 sites across the borough. One of these sites (which is a triplicate site) is co-located with the Hertsmere Borehamwood Background automatic monitor. There have been no changes to the diffusion tube monitoring sites since the 2014 Progress Report (Hertsmere Borough Council, 2014). Table 2.2 gives details of the diffusion tube sites in the borough.

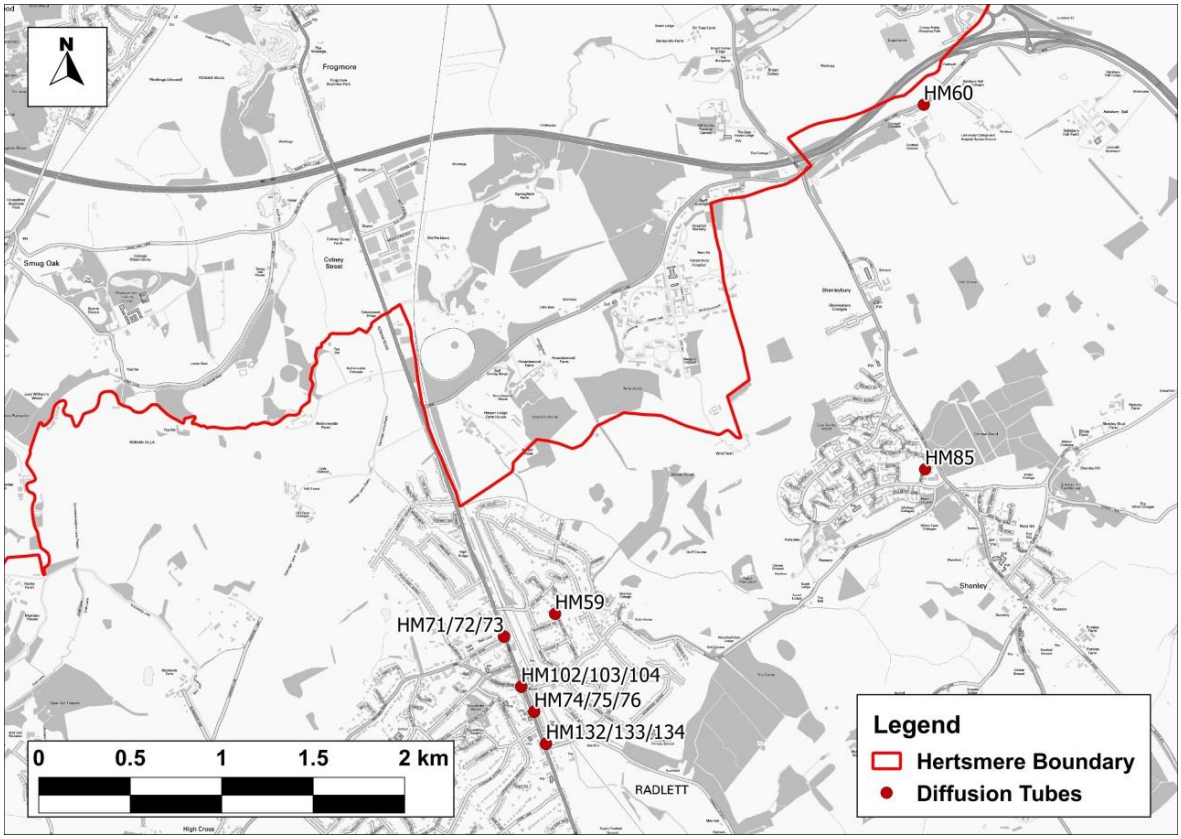

Figure 2.2: Non-Automatic Monitoring Sites in North Hertsmere

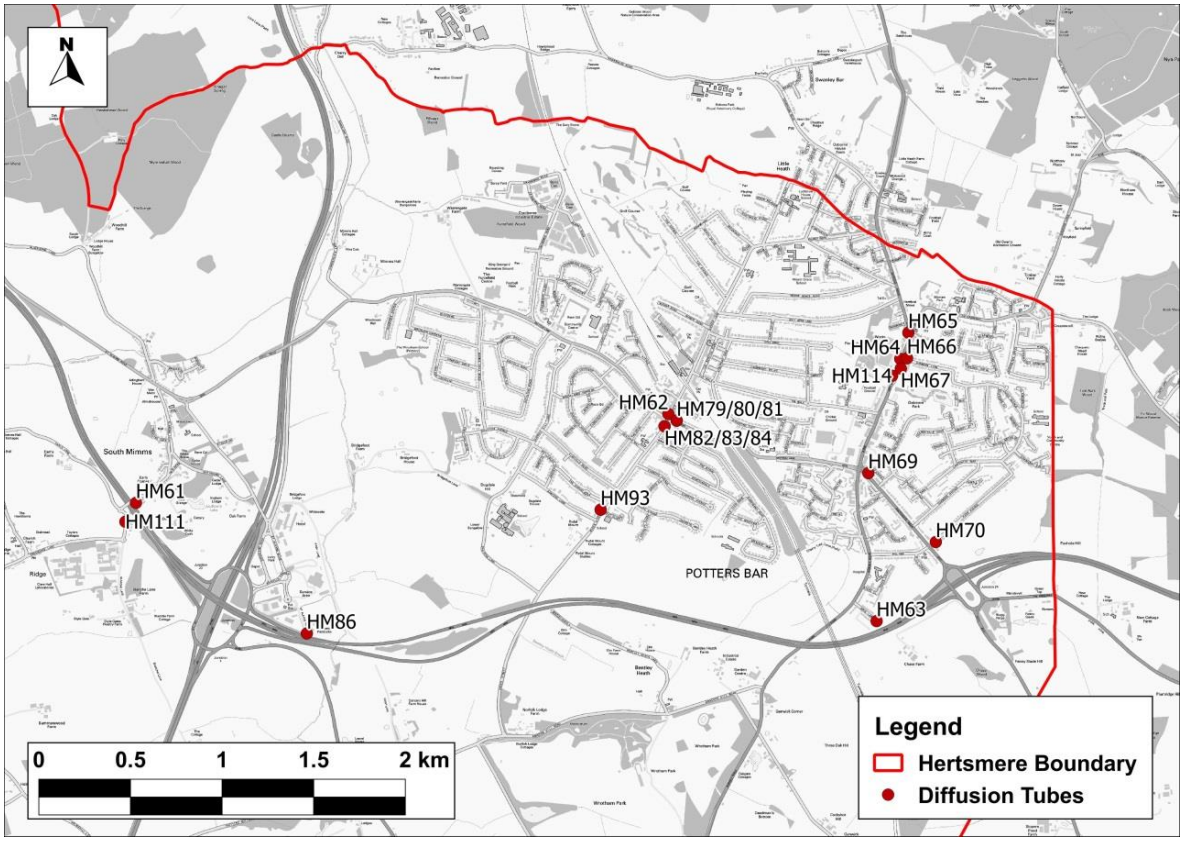

Figure 2.3: Non-Automatic Monitoring Sites in North East Hertsmere

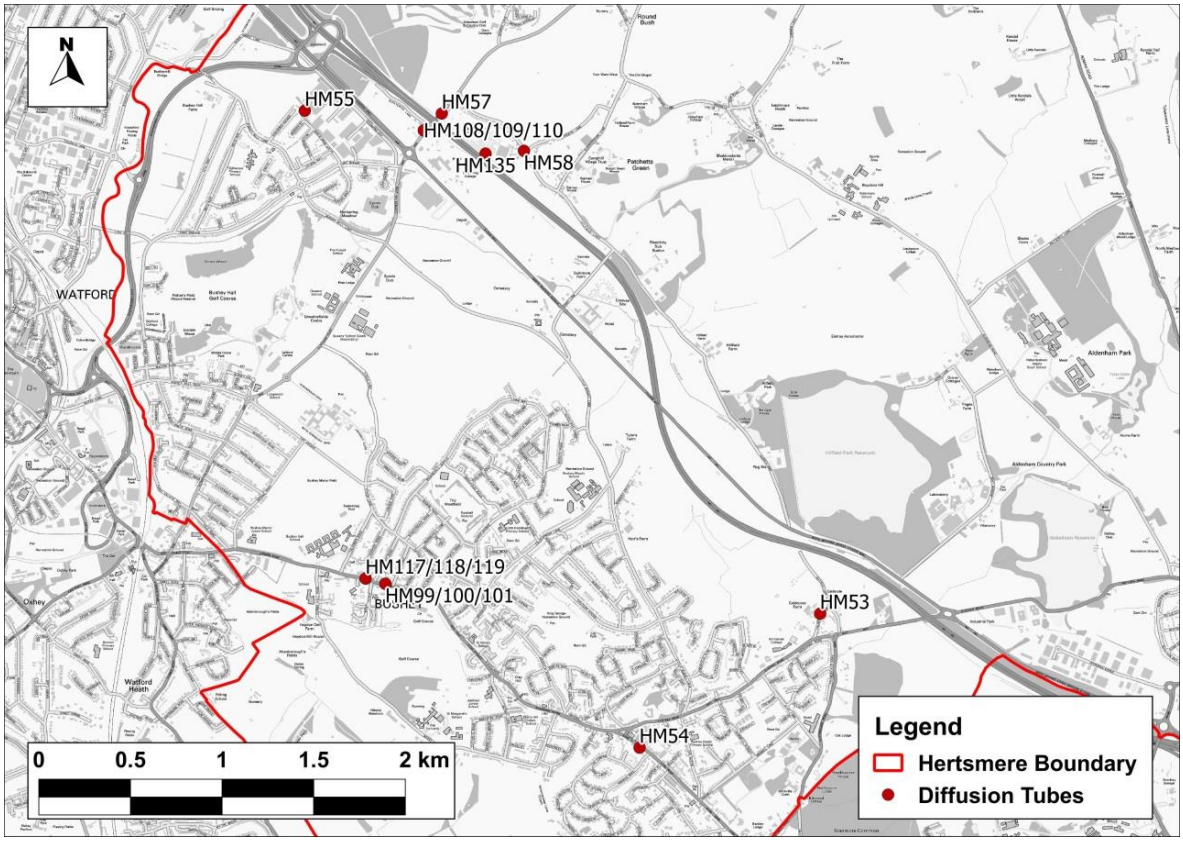

Figure 2.4: Non-Automatic Monitoring Sites in West Hertsmere

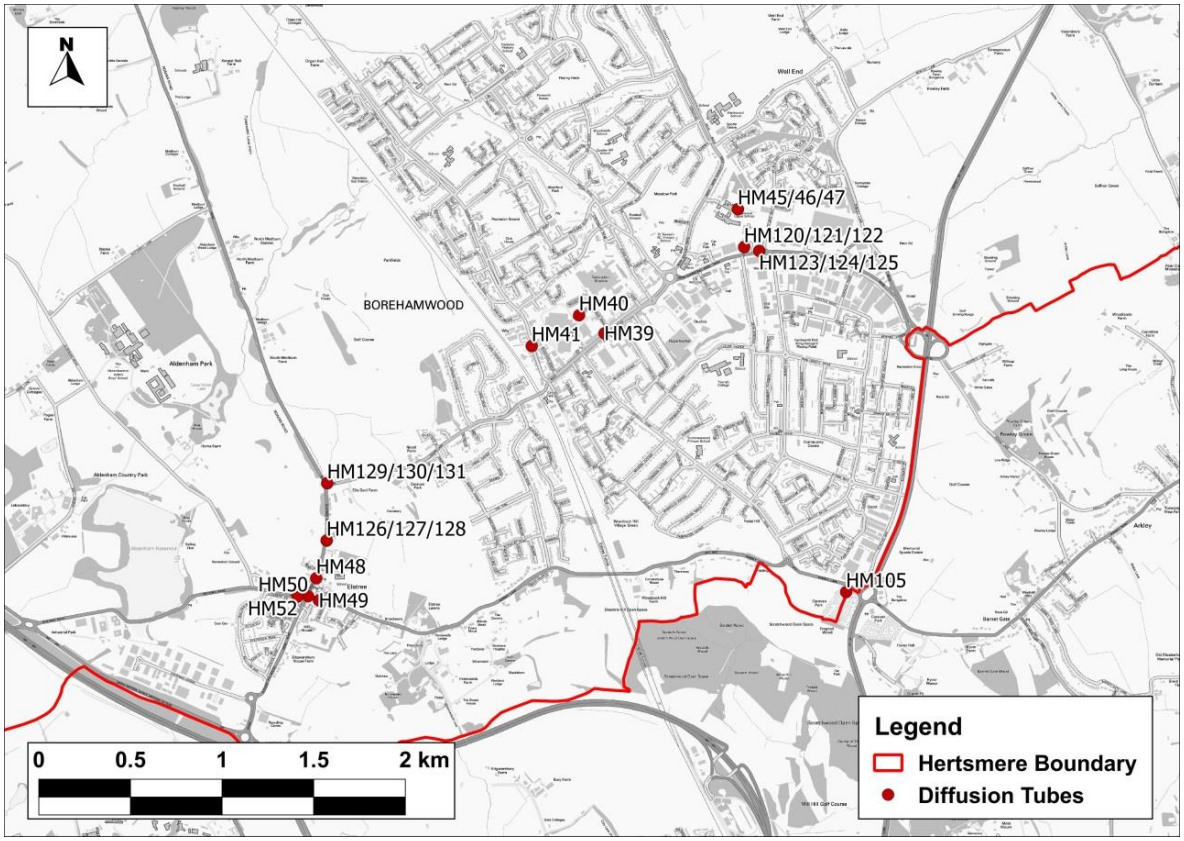

Figure 2.5: Non-Automatic Monitoring Sites in South Hertsmere

Table 2.2: Details of Non-Automatic Monitoring Sites

Site ID	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In AQMA?	Co-located 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?
HM39	Roadside	519418	196681	NO_2	N	N	Y (7m)	1.3m	Y
HM40	Roadside	519281	196779	NO_2	N	N	Y (5.3m)	2.1m	Y
HM41	Roadside	519022	196612	NO_2	N	N	Y (6.4m)	1.9m	Y
HM45	Urban Background	520147	197357	NO_2	N	Y	N/A	N/A	N
HM46	Urban Background	520147	197357	NO_2	N	Y	N/A	N/A	N
HM47	Urban Background	520147	197357	NO_2	N	Y	N/A	N/A	N
HM48	Roadside	517846	195346	NO_2	N	N	Y (4.4m)	1.9m	Y
HM49	Roadside	517861	195226	NO_2	N	N	Y (5.9m)	1.1m	Y
HM50	Roadside	517802	195249	NO_2	Y	N	Y (9.5m)	1.2m	Y
HM52	Roadside	517744	195247	NO_2	N	N	Y (1.8m)	1.8m	Y
HM53	Urban Background	515581	195094	NO_2	N	N	Y (0.2m)	N/A	Y
HM54	Kerbside	514596	194364	NO_2	N	N	Y (4.5m)	0.5m	Y
HM55	Urban Background	512770	197834	NO_2	N	N	N/A	N/A	N
HM57	Roadside	513517	197819	NO_2	Y	N	Y (9.2m)	1.8m	Y
HM58	Kerbside	513966	197615	NO_2	N	N	Y (2.5m)	0.5m	Y
HM59	Kerbside	516570	200159	NO_2	N	N	Y (6.8m)	N/A	Y
HM60	Roadside	518586	202939	NO_2	N	N	Y (13.6m)	8.8m	Y

Site ID	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In AQMA?	Co-located 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?
HM61	Motorway	522038	200670	NO_2	Y	N	Y (14.6m)	14.6m	Y
HM62	Roadside	524943	201154	NO_2	N	N	Y (12.5m)	3.1m	Y
HM63	Motorway	526079	200026	NO_2	Y	N	Y (19.2m)	29.1m	Y
HM64	Roadside	526208	201454	NO_2	N	N	Y (23.3m)	2.1m	Y
HM65	Roadside	526252	201597	NO_2	N	N	Y (7.7m)	2.8m	Y
HM66	Roadside	526245	201458	NO_2	N	N	Y (5.9m)	3m	Y
HM67	Roadside	526211	201402	NO_2	Y	N	Y (0.5m)	11.3m	Y
HM69	Roadside	526034	200832	NO_2	N	N	Y (15m)	3.1m	Y
HM70	Roadside	526402	200457	NO_2	N	N	Y (9.2m)	1.5m	Y
HM71	Roadside	516291	200035	NO_2	N	N	Y (4.3m)	1.5m	Y
HM72	Roadside	516291	200035	NO_2	N	N	Y (4.3m)	1.5m	Y
HM73	Roadside	516291	200034	NO_2	N	N	Y (4.3m)	1.5m	Y
HM74	Roadside	516456	199624	NO_2	N	N	Y (9.2m)	6.6m	Y
HM75	Roadside	516456	199624	NO_2	N	N	Y (9.2m)	6.6m	Y
HM76	Roadside	516456	199624	NO_2	N	N	Y (9.2m)	6.6m	Y
HM79	Roadside	524988	201118	NO_2	N	N	Y (12.2m)	1.7m	Y
HM80	Roadside	524988	201118	NO_2	N	N	Y (12.2m)	1.7m	Y
HM81	Roadside	524988	201118	NO_2	N	N	Y (12.2m)	1.7m	Y
HM82	Kerbside	524922	201088	NO_2	N	N	Y (9.6m)	0.6m	Y
HM83	Kerbside	524922	201088	NO_2	N	N	Y (9.6m)	0.6m	Y

Site ID	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In AQMA?	Co-located 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?
HM84	Kerbside	524922	201088	NO_2	N	N	Y (9.6m)	0.6m	Y
HM85	Urban Background	518592	200948	NO_2	N	N	Y (2.3m)	2.1m	Y
HM86	Motorway	522970	199959	NO_2	Y	N	Y (40.1m)	10.1m	Y
HM93	Roadside	524573	200633	NO_2	N	N	Y (12.9m)	1.4m	Y
HM99	Roadside	513209	195257	NO_2	N	N	Y (1.9m)	2.4m	Y
HM100	Roadside	513209	195257	NO_2	N	N	Y (1.9m)	2.4m	Y
HM101	Roadside	513209	195257	NO_2	N	N	Y (1.9m)	2.4m	Y
HM102	Kerbside	516385	199761	NO_2	N	N	Y (4m)	0.5m	Y
HM103	Kerbside	516385	199761	NO_2	N	N	Y (4m)	0.5m	Y
HM104	Kerbside	516385	199761	NO_2	N	N	Y (4m)	0.5m	Y
HM105	Roadside	520738	195271	NO_2	N	N	Y (10.7m)	36.1m	Y
HM108	Kerbside	513419	197727	NO_2	N	N	Y (11.1m)	0.5m	Y
HM109	Kerbside	513419	197727	NO_2	N	N	Y (11.1m)	0.5m	Y
HM110	Kerbside	513419	197727	NO_2	N	N	Y (11.1m)	0.5m	Y
HM111	Roadside	521980	200567	NO_2	N	N	Y (21.1m)	1.2m	Y
HM114	Roadside	526164	201363	NO_2	N	N	Y (16.3m)	9.5m	Y
HM117	Roadside	513101	195286	NO_2	N	N	Y (4.3m)	2.3m	Y
HM118	Roadside	513101	195286	NO_2	N	N	Y (4.3m)	2.3m	Y
HM119	Roadside	513101	195286	NO_2	N	N	Y (4.3m)	2.3m	Y
HM120	Roadside	520181	197150	NO_2	N	N	Y (33.1m)	36.4m	Y

Site ID	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In AQMA?	Co-located 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?
HM121	Roadside	520181	197150	NO_2	N	N	Y (33.1m)	36.4m	Y
HM122	Roadside	520181	197150	NO_2	N	N	Y (33.1m)	36.4m	Y
HM123	Roadside	520263	197130	NO_2	N	N	Y (34.5m)	3.6m	Y
HM124	Roadside	520263	197130	NO_2	N	N	Y (34.5m)	3.6m	Y
HM125	Roadside	520263	197130	NO_2	N	N	Y (34.5m)	3.6m	Y
HM126	Roadside	517903	195552	NO_2	N	N	Y (13.8m)	2.4m	Y
HM127	Roadside	517903	195552	NO_2	N	N	Y (13.8m)	2.4m	Y
HM128	Roadside	517903	195552	NO_2	N	N	Y (13.8m)	2.4m	Y
HM129	Roadside	517907	195864	NO_2	N	N	Y (6.3m)	1.5m	Y
HM130	Roadside	517907	195864	NO_2	N	N	Y (6.3m)	1.5m	Y
HM131	Roadside	517907	195864	NO_2	N	N	Y (6.3m)	1.5m	Y
HM132	Roadside	516520	199450	NO_2	N	N	Y (13.8m)	8.3m	Y
HM133	Roadside	516520	199450	NO_2	N	N	Y (13.8m)	8.3m	Y
HM134	Roadside	516520	199450	NO_2	N	N	Y (13.8m)	8.3m	Y
HM135	Motorway	513756	197600	NO_2	N	N	Y (4.7m)	20m	Y

2.2 Comparison of Monitoring Results with AQ Objectives

Nitrogen Dioxide

Automatic Monitoring Data

The background automatic monitoring site located at Hertswood Upper School in Borehamwood measured no exceedences of the annual mean objective for the two years presented in Table 2.3. Whilst concentrations in 2010 and 2014 are very similar, it is not possible to discern any trend as concentrations for 2011 to 2013 are not available due to low data capture and site closure.

The roadside automatic monitoring station located at the junction of Manor Way and Elstree Way measured an exceedence of the annual mean objective in 2014, the first year of operation. However, data capture was very low and, as such, the annual mean concentration has been estimated from the available data following the procedure described in Appendix A1.

Measured data in relation to the 1-hour mean objective at both monitoring sites are presented in Table 2.4. No exceedences of the objective were recorded between 2010 and 2014 at either site.

Table 2.3: Results of Automatic Monitoring of Nitrogen Dioxide: Comparison with Annual Mean Objective (2010 – 2014)

Site Name	Site Type	Within AQMA?	Valid Data Capture 2014 % [a]	Annual Mean Concentration µg/m^3				
				2010	2011	2012	2013	2014
Hertsmere Borehamwood Roadside	Roadside	N	29.4	–	–	–	–	**42.7** [b]
Hertsmere Borehamwood Background	Background	N	99.9	24.9	– [c]	–	– [c]	25.2
Objective				**40**				

[a] i.e. data capture for the full calendar year (e.g. if monitoring was carried out for six months the maximum data capture for the full calendar year would be 50%.)

[b] Data has been "annualised" as in Box 3.2 of TG(09), as monitoring was not carried out for the full year (see Appendix A1).

[c] Annual mean concentrations have not been presented as data capture was less than 3 months.

Table 2.4: Results of Automatic Monitoring for Nitrogen Dioxide: Comparison with 1-hour Mean Objective (2010 – 2014)

Site ID	Site Type	Within AQMA?	Valid Data Capture 2014 % [a]	Number of Exceedences of Hourly Mean (200 µg/m^3) [b]				
				2010	2011	2012	2013	2014
Hertsmere Borehamwood Roadside	Roadside	N	29.4	–	–	–	–	1 (166)
Hertsmere Borehamwood Background	Background	N	99.9	0	0 (99)	–	0 (96)	0
Objective				**18 (200)**				

[a] i.e. data capture for the full calendar year (e.g. if monitoring was carried out for six months the maximum data capture for the full calendar year would be 50%.)

[b] If the period of valid data is less than 90%, the 99.8th percentile of hourly means is included in brackets.

Diffusion Tube Monitoring Data

The nitrogen dioxide diffusion tube data are summarised in Table 2.6. The full dataset of monthly mean values in 2014 are included in Appendix A2. There were fourteen triplicate co-location studies and 30 single diffusion tube studies undertaken in 2014. The results have been multiplied by a diffusion tube bias adjustment factor of 0.91, which was obtained from the latest version of the national database of co-location studies (spreadsheet version 06/15) for tubes prepared and analysed by Gradko International (20% TEA in water) during 2014.

Results for the last five years are presented in Table 2.7. Of the sites with five years of continuous data, there are no clear trends at any of the sites with concentrations recorded at most sites remaining stable.

Exceedences of the annual mean objective of 40 µg/m^3 were measured at 19 of the monitoring sites during 2014. Of these sites, 14 lie outside existing AQMAs. These have been considered in detail below. Within AQMA 4 and 5, exceedences were measured at locations representative of relevant exposure. No exceedences of the objective were measured in AQMA 6, which is discussed below.

The areas around Shenley Road (including diffusion tube site HM039) and Bushey High Street (including diffusion tubes HM99/100/101 and HM117/118/119) were previously identified as requiring a Detailed Assessment. A Detailed Assessment at these sites was recently undertaken (Air Quality Consultants, 2015), where it was recommended that an AQMA should not be declared along Bushey High Street but should be declared along Shenley Road. It was recommended that monitoring at existing sites should continue and that the existing network could be expanded at these two locations.

As none of the remaining sites represent locations of relevant exposure, the concentration at the nearest relevant receptors to these sites has been estimated using the falloff from roads calculator. The results are presented in Table 2.5.

Table 2.5: Fall-off with Distance Calculator Results

Site	Distance from kerb to site (m)	Distance from kerb to receptor (m)	Local annual mean background NO_2 concentration (µg/m^3)	Measured annual mean background NO_2 concentration (µg/m^3) at site	Predicted annual mean NO_2 concentration (µg/m^3) at receptor
Junction of Elstree Hill and A411 (near to existing AQMA 5)					
HM48	1.9	6.3	25.2	**48.2**	**41.8**
HM49	1.1	7.0	25.2	**56.1**	**44.3**
HM52	1.8	3.6	25.2	**44.2**	**41.2**
Junction of Mutton Lane and Darkes Lane (previously identified AQMA)					
HM62	3.1	15.6	25.2	**40.9**	34.3

High Street, Potters Bar (near to existing AQMA 6)					
HM64	2.1	25.4	25.2	**47.2**	34.2
HM65	2.8	10.5	25.2	**44.9**	38.3
Junction of Southgate Road, Mutton Lane and the A1000 (no nearby existing AQMA)					
HM69	3.1	18.1	25.2	**48.2**	37.6
Watling Street, junctions with Park Road and Aldenham Road (no nearby existing AQMA)					
HM71/72/73	1.5	5.8	25.2	**47.5**	**40.9**
HM102/103/104	0.5	4.5	25.2	**52.4**	**41.8**
Hartspring Lane (near to existing AQMA 4)					
HM108/109/110	0.5	12.2	25.2	**64.5**	**42.3**
Elstree Way, junction with Studio Way (no nearby existing AQMA)					
HM123/124/125	3.6	38.1	25.2	**47.1**	33.1

Elstree Junction (AQMA 5) – HM48, HM49 and HM52

The HM48, HM49 and HM52 diffusion tube sites are close to the existing AQMA 5, located at the Elstree Crossroads junction. Measured concentrations at these sites continue to exceed the objective and the fall-off with distance calculator predicts exceedences at nearby locations of relevant exposure around all three sites for 2014. As such, the existing AQMA 5 at this location should be extended to include nearby receptors and the HM48, HM49 and HM52 diffusion tube sites. Hertsmere Borough Council plans to extend this AQMA, in accordance with the conclusions of the 2010 Detailed Assessment (Hertsmere Borough Council, 2010).

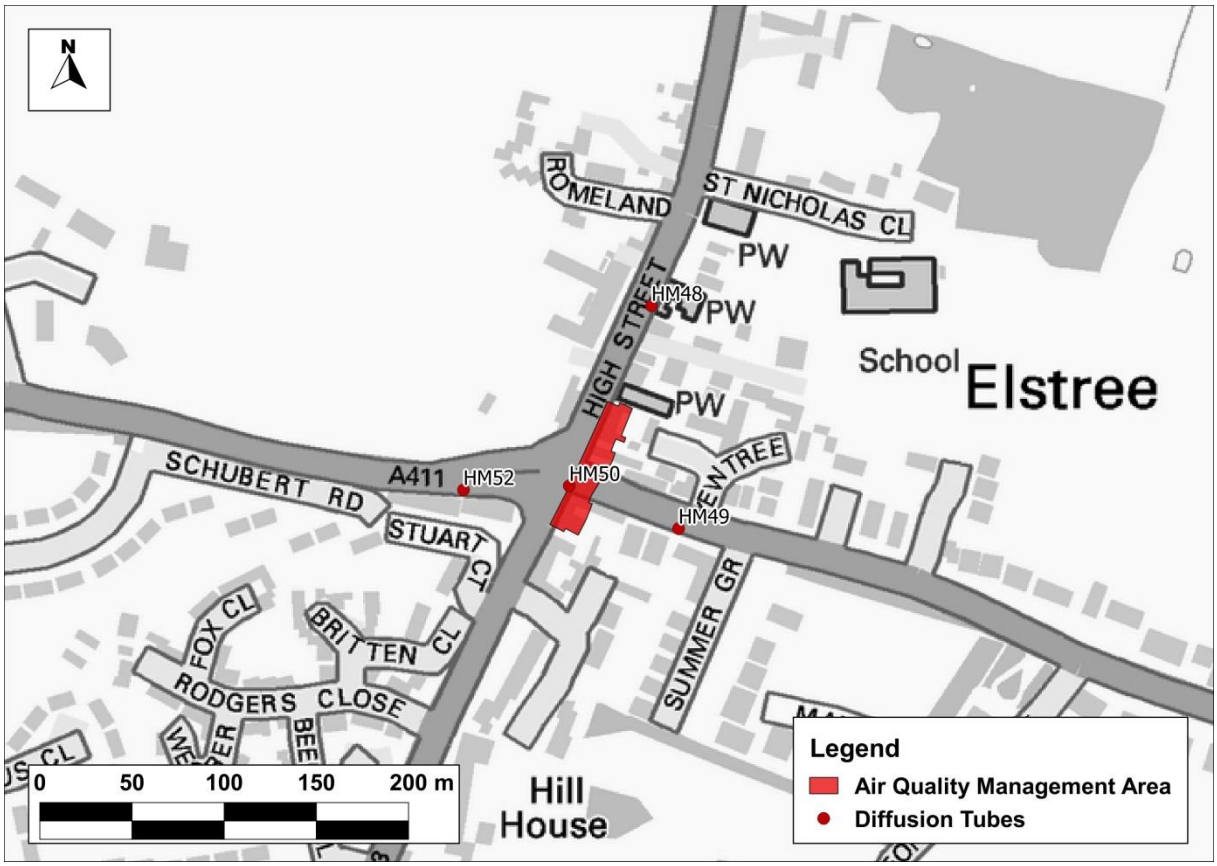

Figure 2.6: Diffusion Tube Monitors in the Area around AQMA 5

The Broadway, Potters Bar at Junction of Mutton Lane and Darkes Lane (previously identified AQMA) – HM62, HM79/80/81 and HM82/83/84

Whilst the latest concentrations at the HM62 diffusion tube site continue to exceed the objective, the fall-off with distance calculations indicate that the objective would not be exceeded at the nearest residential receptor. In addition, the nearby HM79/80/81 and HM82/83/84 diffusion tube sites have remained below the objective. Hertsmere Borough Council previously identified the need to declare this area an AQMA (Hertsmere Borough Council, 2007). However, 2014 monitoring data indicates that an AQMA may no longer be necessary. It is therefore proposed that the monitoring site be repositioned to a location representative of relevant exposure and the data reviewed within the review and assessment process.

High Street, Potters Bar (AQMA 6) – HM64 and HM65

The existing AQMA 6, situated adjacent to the bus station on High Street, Potters bar covers a row of domestic dwellings alongside the road. Monitoring within the AQMA in 2013 and 2014, at the HM67 diffusion tube site, which represents relevant exposure, indicates that the objective is not exceeded within the AQMA. Of the four nearby monitoring sites that lie outside the AQMA, exceedences of the objective have been measured at HM64 and at HM65 further to the north. Results for these two sites in 2014 from the fall-off with distance calculator do, however, predict that the objective will be met at

the nearest receptors with relevant exposure. As such, it is recommended that monitoring should continue and that, if the objective continues to be met at nearby locations of relevant exposure, consideration should be given to revoking AQMA 6.

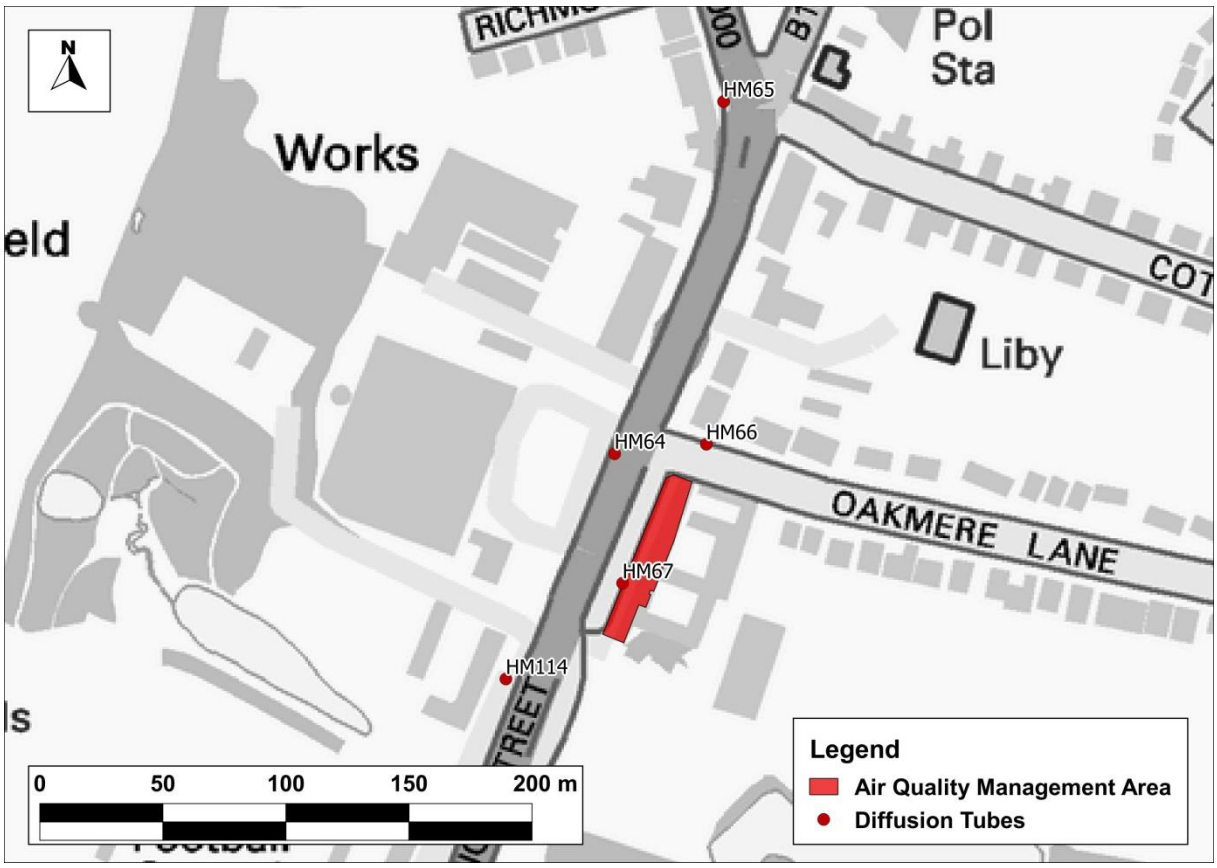

Figure 2.7: Diffusion Tube Monitors in the Area around AQMA 6

Junction of Southgate Road, Mutton Lane and the A1000 (no existing AQMA) – HM69

The HM69 diffusion tube at the junction of Southgate Road, Mutton Lane A111, Barnet Road and High Street continues to exceed the annual mean objective. Results from the fall-off with distance calculator indicate that the annual mean objective was met in 2014 at the nearest site of relevant exposure. As such, it is recommended that monitoring should continue at this site.

Watling Street, junctions with Park Road and Aldenham Road (no existing AQMA) – HM71/72/73 and HM102/103/104

Diffusion tube monitoring site HM102/103/104 at the junction of Aldenham Road, Shenley Hill and Watling Street was relocated at the beginning of 2013, moving it closer to Watling Street. Since that time exceedences of the objective have been recorded. Concentrations recorded at the HM71/72/73 site have consistently exceeded the objective over the past five years. It was recommended in the 2010 Detailed Assessment that an AQMA should be declared around the junction of Park Road and Watling Street (to include the HM71/72/73 site) and around the junction of Aldenham Road, Shenley

Hill and Watling Street (which from 2013 included the HM102/103/104 site). Ongoing monitoring at these diffusion tube sites support this action, and results from the fall-off with distance calculator indicate exceedences of the objective at the nearest receptors at both these sites. As such, it is recommended that the new AQMA should be declared, based on the modelling undertaken in the 2010 Detailed Assessment (Hertsmere Borough Council, 2010). Hertsmere Borough Council intends to declare a new AQMA which incorporates the section of Watling Street between Park Road and Aldenham Road and sections around the junctions with those streets.

Hartspring Lane (AQMA 4) – HM108/109/110

Monitoring data from the triplicate site HM108/109/110, which lies near to AQMA 4, has consistently exceeded the annual mean objective for the past five years. The site was moved to another location along Hartspring Lane at the beginning of 2013, after which recorded concentrations have significantly increased. The annual mean concentrations in 2013 and 2014 have exceeded 60 µg/m^3, indicating that the 1-hour mean NO_2 objective may also be exceeded at this location. However, the immediate area around the site does not represent relevant exposure for the 1-hour mean objective. The fall-off with distance calculator indicates that exceedences of the annual mean objective are, however, likely at nearby sites of relevant exposure. Concentrations measured at HM57, which lies within the AQMA adjacent to Hartspring Lane, continue to exceed the objective whilst those at HM135 (also within the AQMA) remain below the objective. It is recommended that Hertsmere Borough Council reviews the AQMA 4 boundary and monitoring locations. The revised AQMA should include sensitive receptors along Hartspring Lane (both north and south of the M1).

Elstree Way, junction with Studio Way (no existing AQMA)

Monitoring at the diffusion tube site HM123/124/125 commenced in January 2013 and annual mean concentrations in both 2013 and 2014 have exceeded the objective. However, the site does not represent relevant exposure and the concentration at the nearest receptor, using the fall-off with distance calculator, is predicted to be below the objective.

Table 2.6: Results of Nitrogen Dioxide Diffusion Tube Monitoring in 2014 (exceedences of the annual mean objective shown in bold)

Site ID	Site Type	Within AQMA?	Triplicate or Co-located Tube?	Data capture 2014 (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 = 0.91) 2014 (µg/m^3)
HM39	Roadside	N	N	12	N/A	N	**51.8**
HM40	Roadside	N	N	12	N/A	N	26.1
HM41	Roadside	N	N	12	N/A	N	35.4
HM45/46/47	Urban Background	N	Triplicate and Co-located	12/12/12	N/A	N	25.2
HM48	Roadside	N	N	10	N/A	Y – see Table 2.5	**48.2**
HM49	Roadside	N	N	12	N/A	Y – see Table 2.5	**56.1**
HM50	Roadside	Y	N	11	N/A	N	**53.9**
HM52	Roadside	N	N	9	N/A	Y – see Table 2.5	**44.2**
HM53	Urban Background	N	N	12	N/A	N	21.3
HM54	Kerbside	N	N	12	N/A	N	26.9
HM55	Urban Background	N	N	12	N/A	N	23.0
HM57	Roadside	Y	N	12	N/A	N	**46.8**
HM58	Kerbside	N	N	12	N/A	N	27.4
HM59	Kerbside	N	N	12	N/A	N	17.6

Site ID	Site Type	Within AQMA?	Triplicate or Co-located Tube?	Data capture 2014 (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 = 0.91) 2014 (µg/m^3)
HM60	Roadside	N	N	12	N/A	N	30.8
HM61	Motorway	Y	N	12	N/A	N	**46.5**
HM62	Roadside	N	N	11	N/A	Y – see Table 2.5	**40.9**
HM63	Motorway	Y	N	12	N/A	N	**40.1**
HM64	Roadside	N	N	12	N/A	Y – see Table 2.5	**47.2**
HM65	Roadside	N	N	12	N/A	Y – see Table 2.5	**44.9**
HM66	Roadside	N	N	12	N/A	N	38.6
HM67	Roadside	Y	N	11	N/A	N	36.1
HM69	Roadside	N	N	12	N/A	Y – see Table 2.5	**48.2**
HM70	Roadside	N	N	12	N/A	N	34.0
HM71/72/73	Roadside	N	Triplicate	12/12/12	N/A	Y – see Table 2.5	**47.5**
HM74/75/76	Roadside	N	Triplicate	12/12/12	N/A	N	37.6
HM79/80/81	Roadside	N	Triplicate	12/12/12	N/A	N	37.4
HM82/83/84	Kerbside	N	Triplicate	12/12/12	N/A	N	35.2
HM85	Urban Background	N	N	11	N/A	N	25.8
HM86	Motorway	Y	N	12	N/A	N	**46.7**

Site ID	Site Type	Within AQMA?	Triplicate or Co-located Tube?	Data capture 2014 (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 = 0.91) 2014 (µg/m^3)
HM93	Roadside	N	N	12	N/A	N	31.7
HM99/100/101	Roadside	N	Triplicate	11/9/11	N/A	N	**43.2**
HM102/103/104	Kerbside	N	Triplicate	10/10/11	N/A	Y – see Table 2.5	**52.4**
HM105	Roadside	N	N	12	N/A	N	29.7
HM108/109/110	Kerbside	N	Triplicate	11/12/12	N/A	Y – see Table 2.5	**64.5**
HM111	Roadside	N	N	12	N/A	N	33.5
HM114	Roadside	N	N	12	N/A	N	34.5
HM117/118/119	Roadside	N	Triplicate	12/12/12	N/A	N	**44.5**
HM120/121/122	Roadside	N	Triplicate	11/12/12	N/A	N	31.6
HM123/124/125	Roadside	N	Triplicate	11/11/11	N/A	Y – see Table 2.5	**47.1**
HM126/127/128	Roadside	N	Triplicate	11/11/11	N/A	N	38.3
HM129/130/131	Roadside	N	Triplicate	12/12/12	N/A	N	37.5
HM132/133/134	Roadside	N	Triplicate	12/12/12	N/A	N	32.7
HM135	Motorway	Y	N	12	N/A	N	37.1
Objective							**40**

Table 2.7: Results of Nitrogen Dioxide Diffusion Tube Monitoring (2010 to 2014) (exceedences of the annual mean objective shown in bold)

Site ID	Site Type	Within AQMA?	Annual mean concentration (adjusted for bias) µg/m^3				
			2010 (Bias Adjustment Factor = 0.92)	2011 (Bias Adjustment Factor = 0.89)	2012 (Bias Adjustment Factor = 0.97)	2013 (Bias Adjustment Factor = 0.96)	2014 (Bias Adjustment Factor = 0.91)
HM39	Roadside	N	**57**	**47**	**55**	**52**	**51.8**
HM40	Roadside	N	28	25	29	27	26.1
HM41	Roadside	N	36	33	37	36	35.4
HM45/46/47	Urban Background	N	26	24	25	27	25.2
HM48	Roadside	N	**45**	**40**	**50**	**49**	**48.2**
HM49	Roadside	N	**48**	**52**	**59**	**59**	**56.1**
HM50	Roadside	Y	**55**	**52**	**62**	**59**	**53.9**
HM52	Roadside	N	**55**	37	40	40	**44.2**
HM53	Urban Background	N	25	21	22	22	21.3
HM54	Kerbside	N	32	28	32	31	26.9
HM55	Urban Background	N	26	21	25	24	23.0
HM57	Roadside	Y	**47**	**44**	**51**	**46**	**46.8**
HM58	Kerbside	N	29	31	29	28	27.4
HM59	Kerbside	N	21	19	23	19	17.6

Site ID	Site Type	Within AQMA?	Annual mean concentration (adjusted for bias) µg/m^3				
			2010 (Bias Adjustment Factor = 0.92)	2011 (Bias Adjustment Factor = 0.89)	2012 (Bias Adjustment Factor = 0.97)	2013 (Bias Adjustment Factor = 0.96)	2014 (Bias Adjustment Factor = 0.91)
HM60	Roadside	N	35	32	35	33	30.8
HM61	Motorway	Y	**49**	**47**	**50**	**45**	**46.5**
HM62	Roadside	N	**46**	**45**	**43**	**44**	**40.9**
HM63	Motorway	Y	**41**	**43**	**42**	36	**40.1**
HM64	Roadside	N	**49**	**52**	**56**	**48**	**47.2**
HM65	Roadside	N	**47**	**50**	**49**	**45**	**44.9**
HM66	Roadside	N	**41**	**41**	**46**	38	38.6
HM67	Roadside	Y	**43**	39	**42**	39	36.1
HM69	Roadside	N	**55**	**55**	**53**	**51**	**48.2**
HM70	Roadside	N	34	37	39	32	34.0
HM71/72/73	Roadside	N	**49**	**45**	**49**	**51**	**47.5**
HM74/75/76	Roadside	N	39	35	37	**44**	37.6
HM79/80/81	Roadside	N	**42**	33	36	38	37.4
HM82/83/84	Kerbside	N	39	38	**40**	**43**	35.2
HM85	Urban Background	N	27	24	24	26	25.8
HM86	Motorway	Y	**52**	**55**	**55**	**43**	**46.7**

Site ID	Site Type	Within AQMA?	Annual mean concentration (adjusted for bias) µg/m^3				
			2010 (Bias Adjustment Factor = 0.92)	2011 (Bias Adjustment Factor = 0.89)	2012 (Bias Adjustment Factor = 0.97)	2013 (Bias Adjustment Factor = 0.96)	2014 (Bias Adjustment Factor = 0.91)
HM93	Roadside	N	30	32	31	29	31.7
HM99/100/101	Roadside	N	**49**	**46**	**50**	**56**	**43.2**
HM102/103/104	Kerbside	N	40	37	39	**58**	**52.4**
HM105	Roadside	N	33	30	31	33	29.7
HM108/109/110	Kerbside	N	**44**	40	**47**	**69**	**64.5**
HM111	Roadside	N	35	29	30	31	33.5
HM114	Roadside	N	40	37	40	37	34.5
HM117/118/119	Roadside	N	**45**	40	**46**	**50**	**44.5**
HM120/121/122	Roadside	N	–	–	–	29	31.6
HM123/124/125	Roadside	N	–	–	–	**46**	**47.1**
HM126/127/128	Roadside	N	–	–	–	**41**	38.3
HM129/130/131	Roadside	N	–	–	–	36	37.5
HM132/133/134	Roadside	N	–	–	–	37	32.7
HM135	Motorway	Y	–	–	–	34	37.1
Objective			**40**				

PM_{10}

As shown in Table 2.8, there were no measured exceedences of the annual mean objective (40 μg/m^3) for PM_{10} at either of the automatic monitoring sites within the Borough in 2014. This result is consistent with the presented data from the Borehamwood Background monitor in previous years.

It is not possible to identify any clear trends in data for the last five years due to low data capture and site closures.

Table 2.9 shows the number of exceedences of the 24-hour mean objective for PM_{10} at these sites. No exceedences of the objective were recorded between 2010 and 2014 at either site.

Table 2.8: Results of Automatic Monitoring of PM_{10}: Comparison with Annual Mean Objective (2010 – 2014)

Site ID	Site Type	Within AQMA?	Valid Data Capture 2014 %[a]	Confirm Gravimetric Equivalent	Annual Mean Concentration µg/m^3				
					2010	2011	2012	2013	2014
Hertsmere Borehamwood Roadside	Roadside	N	27.8	Y	–	–	–	–	21.0 [b]
Hertsmere Borehamwood Background	Background	N	94.3	Y	19 [c]	10 [c]	–	– [d]	16.0
Objective					**40**				

[a] i.e. data capture for the full calendar year (e.g. if monitoring was carried out for six months the maximum data capture for the full calendar year would be 50%.)

[b] Data has been "annualised" as in Box 3.2 of TG(09), as monitoring was not carried out for the full year (see Appendix A1).

[c] Data taken from the 2012 Updating and Screening Assessment (Hertsmere Borough Council, 2012).

[d] Annual mean concentrations have not been presented as data capture was 12%.

Table 2.9: Results of Automatic Monitoring for PM_{10}: Comparison with 24-hour mean Objective (2010 – 2014)

Site ID	Site Type	Within AQMA?	Valid Data Capture 2014 %[a]	Confirm Gravimetric Equivalent	Number of Exceedences of 24-Hour Mean (50 µg/m^3)				
					2010	2011	2012	2013	2014
Hertsmere Borehamwood Roadside	Roadside	N	27.8	Y	–	–	–	–	1 (42) [b]
Hertsmere Borehamwood Background	Background	N	94.3	Y	1 (30) [c]	7 (31) [c]	–	1 (38) [d]	5
Objective					**35 (50)**				

[a] i.e. data capture for the full calendar year (e.g. if monitoring was carried out for six months the maximum data capture for the full calendar year would be 50%.)

[b] Data has been "annualised" as in Box 3.2 of TG(09), as monitoring was not carried out for the full year (see Appendix A1).

[c] Data taken from the 2012 Updating and Screening Assessment (Hertsmere Borough Council, 2012).

[d] Data capture was 12%.

Sulphur Dioxide

No monitoring of sulphur dioxide was undertaken by Hertsmere Borough Council in 2014.

Benzene

No monitoring of benzene was undertaken by Hertsmere Borough Council in 2014.

$PM_{2.5}$

Annual mean concentrations of $PM_{2.5}$ recorded at the two automatic monitors in the Borough are reported in Table 2.10. The concentrations at all sites are below the annual mean objective.

Table 2.10: Results of Automatic Monitoring of $PM_{2.5}$ in 2014

Site ID	Site Type	Within AQMA?	Valid Data Capture 2014 %	Annual Mean Concentration µg/m^3
				2014
Hertsmere Borehamwood Roadside	Roadside	N	27.3	15.3
Hertsmere Borehamwood Background	Background	N	92.8	11.4
Objective				**25**

Summary of Compliance with AQS Objectives

Hertsmere Borough Council has measured concentrations of NO_2 above the annual mean objective at a number of relevant locations outside existing AQMAs in areas previously considered in Detailed Assessments.

Hertsmere Borough Council should review and extend the existing AQMA 5 at the Elstree Junction and AQMA 4 adjacent to the M1. It is recommended that no changes are made to the existing AQMA 6 but that monitoring locations around this AQMA are reviewed. It is also recommended that the monitoring locations around The Broadway in Potters Bar are repositioned to sites of relevant exposure (HM62, HM79/80/81 and HM82/83/84).

AQMAs 1, 2 and 3 should be retained.

In addition, it is recommended that new AQMAs should be declared at:

- Watling Street, section between, and to include, the junction with Park Road and the junction with Aldenham Road and Shenley Hill; and
- Shenley Road.

The existing diffusion tube networks in the Shenley Road and Bushey High Street areas could be expanded to measure concentrations at sites of relevant exposure.

3. Road Traffic Sources

3.1 Narrow Congested Streets with Residential Properties Close to the Kerb

The criteria for assessing narrow congested streets are set out in Box 5.3, section A1 of TG(09). Narrow congested streets were considered in the previous USA and a single location, Shenley Road in Borehamwood, was identified and recommended as requiring a Detailed Assessment.

Hertsmere 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

The criteria for assessing busy streets relevant for the hourly nitrogen dioxide objective are set out in Box 5.3, section A2 of TG(09). Busy streets where people may spend 1-hour or more close to traffic were considered in the previous USA and no such location identified.

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.

The criteria for assessing roads with high flows of buses and/ or HGVs are set out in Box 5.3, section A3 of TG(09). Roads with a high flow of buses and/or HGVs were considered in previous Updating and Screening Assessments and no such locations identified.

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

3.4 Junctions

The criteria for assessing junctions are set out in Box 5.3, section A4 of TG(09). Junctions were considered in detail in previous Updating and Screening Assessments and where relevant have been included in Detailed Assessments and subsequent AQMA declarations.

Hertsmere 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

The criteria for assessing new roads are set out in Box 5.3, section A5 of TG(09) and are unchanged from previous rounds of Review and Assessment. Since the last Updating and Screening Assessment, a managed motorway scheme has been recently implemented on a section of the M25 running through the Borough between Junctions 23 and 24 (South Mimms services to Potters Bar). This involved the addition of a fourth lane on each direction to allow for the dynamic distribution of traffic in times of peak flows.

It is difficult to determine the impacts of such a scheme on local air quality as during times of managed motorway flows. Traffic will, on average, be closer to sensitive receptors near to the motorway boundaries but it would be expected that congestion would be eased as a result. Hertsmere Borough Council has stated that the impact of the managed motorway scheme is currently under investigation.

There are two AQMAs declared adjacent to the M25 between Junctions 23 and 24 supported by two diffusion tube monitors, HM063 and HM086. It is recommended that monitoring at these sites should continue and a detailed assessment undertaken should concentrations increase significantly.

Hertsmere Borough Council has assessed new/proposed roads meeting the criteria in Section A.5 of Box 5.3 in TG(09), and concluded that it will not be necessary to proceed to a Detailed Assessment.

3.6 Roads with Significantly Changed Traffic Flows

The criteria for assessing roads with significantly changed traffic flows are set out in Box 5.3, section A6 of TG(09).

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

Bus and Coach Stations

The criteria for assessing roads with significantly changed traffic flows are set out in Box 5.3, section A7 of TG(09). Bus and coach stations were considered in previous Updating and Screening Assessments and no such locations identified.

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

4. Other Transport Sources

4.1 Airports

The criteria for assessing airports are set out in Box 5.4, section B1 of TG(09). Airports were considered in previous Updating and Screening Assessments and no such locations identified.

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

4.2 Railways (Diesel and Steam Trains)

Stationary Trains

The criteria for assessing stationary locomotives are set out in Box 5.4, section B2 of TG(09) (Approach 1). There are no locations in the Borough of Hertsmere where trains are stationary for 15 minutes or more, more than three times a day.

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.

Moving Trains

The criteria for assessing moving locomotives are set out in Box 5.4, section B2 of TG(09) (Approach 2). None of the major railway lines listed in Table 5.1 of the Technical Guidance LAQM.TG(09) pass through the Borough of Hertsmere.

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)

The criteria for assessing ports are set out in Box 5.4, section B3 of TG(09) and are unchanged from previous rounds of Review and Assessment. There is no shipping activity in the Borough of Hertsmere.

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

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

The criteria for assessing industrial installations are set out in Box 5.5, section C1 of TG(09). There are no new or proposed industrial installations within the Borough of Hertsmere since the last USA.

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.

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

None of the industrial installations identified in previous Updating and Screening Assessments have substantially increased emissions and no new exposure has been introduced nearby.

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.

New or Significantly Changed Installations with No Previous Air Quality Assessment

The criteria for assessing industrial installations are set out in Box 5.5, section C1 of TG(09). There are no new or significantly changed industrial installations within the Borough of Hertsmere since the last USA.

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.

5.2 Major Fuel (Petrol) Storage Depots

The criteria for assessing major fuel (petrol) storage depots are set out in Box 5.5, section C2 of TG(09). Major petrol storage depots were considered in the previous Updating and Screening Assessments and no such locations identified.

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

5.3 Petrol Stations

The criteria for assessing petrol stations are set out in Box 5.5, section C3 of TG(09). There are no petrol stations within the Borough of Hertsmere that fulfil the criteria.

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

5.4 Poultry Farms

The criteria for assessing poultry farms are set out in Box 5.5, section C4 of TG(09). No farms exceeding the relevant criteria (turkey units with greater than 100,000 birds, naturally ventilated units with greater than 200,000 birds or mechanically ventilated units with greater than 400,000) have been identified.

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

The criteria for assessing biomass combustion (individual installations) are set out in Box 5.8, section D1 of TG(09). Hertsmere Borough Council has not identified any biomass boilers between 50kW and 20MW.

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

6.2 Biomass Combustion – Combined Impacts

The criteria for assessing biomass combustion (combined impacts) are set out in Box 5.8, section D2 of TG(09).

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

6.3 Domestic Solid-Fuel Burning

The criteria for assessing domestic solid-fuel burning are set out in Box 5.8, section D2 of TG(09). Hertsmere Borough Council has not identified any areas where significant coal burning takes place.

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

7. Fugitive or Uncontrolled Sources

The criteria for assessing fugitive or uncontrolled sources are set out in Box 5.10, section E1 of TG(09). There are no quarries, landfill sites or other dusty operations in the Borough of Hertsmere that have the potential to have a significant effect on PM_{10} concentrations at residential properties that have not already been considered in previous review and assessment reports.

Hertsmere Borough Council confirms that there are no potential sources of fugitive particulate matter emissions in the Local Authority area that have not already been considered in previous review and assessment reports.

8. Conclusions and Proposed Actions

8.1 Conclusions from New Monitoring Data

Hertsmere Borough Council has examined results from monitoring in the area. Exceedences of the nitrogen dioxide annual mean objective continue to be measured at a number of locations representative of relevant exposure outside the existing AQMAs. All of these locations have been considered in previous Detailed Assessments and therefore no further Detailed Assessments are required.

There are no significant trends in the automatic monitoring data with concentrations at most sites remaining stable.

Concentrations of annual mean and 24-hour mean PM_{10} recorded at the Borehamwood Background and Roadside sites remained below the objective in 2014.

8.2 Conclusions from Assessment of Sources

A managed motorway scheme has recently been implemented on a section of the M25 running through the Borough between Junctions 23 and 24 (South Mimms services to Potters Bar). The air quality impacts arising from this change is currently under investigation and will be reviewed by Hertsmere Borough Council when the outcomes of the study are available.

The Updating and Screening Assessment has not identified any other significant changes in emissions sources within the Hertsmere area other than those covered in previous review and assessment reports.

8.3 Proposed Actions

It is proposed that monitoring should continue at all the existing sites in Hertsmere. However, the monitoring locations in the following areas should be reviewed:

- The Broadway, Potters Bar (HM62, HM79/80/81 and HM82/83/84)
- AQMA 6 (HM64, HM65, HM66 and HM114);
- Bushey High Street (HM99/100/101 and HM117/118/119) as identified in the 2015 Detailed Assessment – consideration should be given to locating a monitoring site or sites at first-floor level at position with relevant exposure; and
- Shenley Road (HM39) as identified in the 2015 Detailed Assessment – expand the diffusion tube network where possible, particularly into areas which are ‘canyon’ like. In addition, a tube should be installed on the ground floor of the south western corner of Brook Court along Brook Road and consideration given to locating a monitoring site or sites at first-floor level along Shenley Road at positions of relevant exposure.

The following existing AQMAs should be amended:

- Elstree Junction AQMA 5 – this should be extended to include nearby sensitive receptors and the HM048, HM049 and HM052 diffusion tube sites; and
- Hartspring Lane AQMA 4 – this should be amended to include nearby sensitive receptors along Hartspring Lane and the HM108/109/110 site.

The previously identified AQMAs should be declared at the following locations:

- Watling Street section between, and to include, the junction with Park Road (to include HM71/72/73) and the junction with Aldenham Road and Shenley Hill (to include HM102/103/104) following the results from modelling in the 2010 Detailed Assessment; and
- Shenley Road as identified in the 2015 Detailed Assessment – an AQMA should be declared to include the whole of Shenley Road between the roundabout with Eldon Avenue (eastern extent) and the junction with Theobald Street (western extent) to include all residential properties that front onto Shenley Road.

Changes to the LAQM process are currently being consulted on and it is therefore likely that by 2016 the LAQM process will have changed with further guidance produced for local authorities to follow. Hertsmere Borough Council will keep up to date with any changes to the LAQM process and produce a report in 2016 which complies with the guidance at that time.

9. References

Air Quality Consultants. (2015). *Detailed Assessment of Air Quality at Bushey High Street and Shenley Road for Hertsmere Borough Council.*

Hertsmere Borough Council. (2007). *Detailed Assessment for The Broadway, Potters Bar.*

Hertsmere Borough Council. (2010). *Hertsmere Borough Council LAQM Detailed Assessment 2010.*

Hertsmere Borough Council. (2012). *Hertsmere Borough Council Updating Screening and Assessment 2012.*

Hertsmere Borough Council. (2014). *Air Quality Progress Report for Hertsmere Borough Council.*

10. Appendices

A1 Appendix A: QA:QC Data

Factor from Local Co-location Studies

There was a single co-location study conducted during 2014 at the Borehamwood Background automatic monitoring site. Data from this study was used to produce a local bias adjustment factor for 2014. The weighted annual mean for the relevant period from the continuous monitor was 26.4 µg/m^3 and that from the co-located diffusion tubes was 27.0 µg/m^3. The local bias adjustment factor was therefore calculated to be 0.98.

Diffusion Tube Bias Adjustment Factors

Hertsmere Borough Council uses Gradko International for their diffusion tube analysis. These are prepared using the 20% TEA in water method. The bias adjustment factor for Gradko in 2014, obtained from the national bias adjustment spreadsheet (based on 21 studies in version 06/15) is 0.91.

Discussion of Choice of Factor to Use

In its Review and Assessment reports between 2010 and 2013, Hertsmere Borough Council has consistently adjusted its diffusion tube results using national bias-adjustment factors. Given the historical use of the national bias-adjustment factor, the fact that the national factor is based on a greater number of studies and that there is relatively good agreement between the national and local factors, it is considered appropriate to apply the national bias-adjustment factor for 2014.

PM Monitoring Adjustment

The Borehamwood Roadside and Borehamwood Background automatic monitoring sites are TEOM-FDMS monitors and thus the presented data are considered to be gravimetric equivalent and have been unadjusted.

Short-term to Long-term Data adjustment

The Hertsmere Borehamwood Roadside automatic monitoring site was established on the roadside adjacent to the roundabout with Shenley Road and Elstree Way in September 2014. As such, the available data for 2014 do not represent a full calendar year. In accordance with the guidance set out in Box 3.2 of LAQM.TG(09), the data have been adjusted to an annual mean, based on the ratio of concentrations during the short-term monitoring period (4 months; September – December 2014) to those over the 2014 calendar year at three background sites operated as part of the Automatic Urban and Rural Network (AURN) where long-term data are available.

The annual mean concentrations and the period means for each of the three monitoring sites from which adjustment factors have been calculated are presented in Table A1.1 for nitrogen dioxide and Table A1.2 for PM_{10}, along with the Overall Factors.

Table A1.1: Data used to Adjust Short-term Nitrogen Dioxide Monitoring Data at the Borehamwood Roadside site to 2014 Annual Mean (µg/m^3)

Site	Site Type	Annual Mean	Period Mean (September to December)	Ratio (Am/Pm)
Camden – Bloomsbury	Urban Background	44.6	51.0	0.87
Harrow – Stanmore	Urban Background	24.7	30.1	0.82
Kensington and Chelsea – North Kensington	Urban Background	33.0	37.7	0.87
			Average	**0.86**

Table A1.2: Data used to Adjust Short-term PM_{10} Monitoring Data at the Borehamwood Roadside site to 2014 Annual Mean (µg/m^3)

Site	Site Type	Annual Mean	Period Mean (September to December)	Ratio (Am/Pm)
Camden – Bloomsbury	Urban Background	19.5	20.8	0.94
Reading – New Town	Urban Background	14.0	14.6	0.96
Thurrock – London Road	Urban Background	19.3	20.3	0.95
			Average	**0.95**

QA/QC of automatic monitoring

Air quality measurements from automatic instruments are validated and ratified to the standards described in the Local Air Quality Management – Technical Guidance LAQM TG(09) by Air Quality Data Management (AQDM) http://www.aqdm.co.uk.

Validation

This process operates on data during the data collection stage. All data are continually screened algorithmically and manually for anomalies. There are several techniques designed to discover spurious and unusual measurements within a very large dataset. These anomalies may be due to equipment failure, human error, power failures, interference or other disturbances. Automatic screening can only safely identify spurious results that need further manual investigation.

Raw data from the gaseous instruments (e.g. NOx, O_3, SO_2 and CO) are scaled into concentrations using the latest values derived from the manual and automatic calibrations. These instruments are not absolute and suffer drifts. Both the zero baseline (background) and the sensitivity change with time. Regular calibrations with certified gas standards are used to measure the zero and sensitivity. However, these are

only valid for the moment of the calibration since the instrument will continue to drift. Raw measurements from particulate instruments (e.g. PM_{10} and $PM_{2.5}$) generally do not require scaling into concentrations. The original raw data are always preserved intact while the processed data are dynamically scaled and edited.

Ratification

This is the process that finalises the data to produce the measurements suitable for reporting. All available information is critically assessed so that the best data scaling is applied and all anomalies are appropriately edited. Generally this occurs at three, six or twelve month intervals. However, unexpected faults can be identified during the instrument routine services or independent audits which are often at 6-monthly intervals. In practice, therefore, the data can only be fully ratified in 12-month or annual periods. The data processing performed during the three and six monthly cycles helps build a reliable dataset that is finalised at the end of the year.

There is a diverse range of additional information that can be essential to the correct understanding and editing of data anomalies. These may include:

- the correct scaling of data;
- ignoring calibrations that were poor e.g. a spent zero scrubber;
- closely tracking rapid drifts or eliminating the data;
- comparing the measurements with other pollutants and nearby sites;
- corrections due to span cylinder drift;
- corrections due to flow drifts for the particulate instruments;
- corrections for ozone instrument sensitivity drifts;
- eliminating measurements for NO2 conversion inefficiencies;
- eliminating periods where calibration gas is in the ambient dataset;
- identifying periods were instruments are warming-up after a powercut;
- identification of anomalies due to mains power spikes;
- correcting problems with the date and time stamp; and
- observations made during the sites visits and services.

QA/QC of diffusion tube monitoring

Gradko maintains a UKAS accredited quality system with fully documented in house methods for all analysis procedures. The concentration of nitrogen dioxide is determined for exposed diffusion tubes using method GLM 9.

Results of tube precision for Gradko using the 20% TEA in Water method, as published on the LAQM website, indicate good precision for 2014.

Gradko was assessed as part of the Workplace Analysis Scheme for Proficiency (WASP) operated by the Health and Safety Laboratory (HSL) and demonstrated satisfactory performance in the WASP Rounds 121 – 124 and AIR PT Rounds 1, 3, 4 and 6, scoring 100% across all quarters of 2014.

A2 Appendix B: Monthly Non-Automatic Data for 2014

Table A2.1: Raw Monthly Measured Concentrations from Diffusion Tube Studies

Site ID	Site Type	Nitrogen Dioxide Concentration per Month (2014) µg/m^3												
		Jan	Feb	March	April	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Average
HM39	Roadside	**76.1**	**59.2**	**58.7**	**50.7**	**50.0**	**42.7**	**42.7**	**63.8**	**57.5**	**61.3**	**50.6**	**70.0**	**56.9**
HM40	Roadside	38.6	35.7	32.6	26.3	22.1	20.9	18.6	20.0	26.7	31.1	39.4	31.8	28.7
HM41	Roadside	**42.2**	**44.1**	38.8	36.5	35.0	33.1	31.5	34.5	39.8	39.5	**52.6**	38.7	38.9
HM45	Urban Background	31.6	**40.3**	32.3	22.3	20.1	17.5	14.7	17.0	24.2	**45.7**	**44.4**	**41.1**	29.3
HM46	Urban Background	31.1	33.4	32.3	25.6	20.2	18.0	15.1	16.8	22.1	31.6	34.2	34.1	26.2
HM47	Urban Background	38.9	36.8	35.9	25.6	22.2	18.0	13.9	20.1	20.8	32.2	36.2	28.9	27.5
HM48	Roadside	**54.2**			**49.1**	**47.6**	**56.3**	**48.3**	39.1	**55.5**	**77.0**	**60.0**	**42.5**	**53.0**
HM49	Roadside	**80.6**	**63.6**	**61.4**	**68.2**	**52.0**	**46.8**	38.0	**50.7**	**52.9**	**73.6**	**88.5**	**63.7**	**61.7**
HM50	Roadside	**63.1**	**67.7**	**74.3**	**54.9**	**52.2**	**41.8**	**42.3**	–	**58.4**	**54.3**	**77.1**	**64.9**	**59.2**
HM52	Roadside	**51.2**	**47.8**	**47.4**	**50.2**	39.9	29.1	–	–	**47.4**	**54.2**	**69.8**	–	**48.6**
HM53	Urban Background	33.5	25.7	28.2	18.3	18.9	20.7	17.8	14.7	22.6	25.5	31.5	23.6	23.4
HM54	Kerbside	33.2	30.4	40.7	28.9	16.7	27.0	23.2	23.1	34.4	27.5	35.9	33.4	29.5
HM55	Urban Background	28.2	21.6	30.4	25.6	21.6	22.0	22.9	16.8	29.1	25.9	29.5	29.2	25.2
HM57	Roadside	**59.5**	**50.7**	**53.2**	**49.4**	**45.1**	**41.0**	**45.1**	**53.9**	**46.3**	**64.5**	**46.3**	**61.5**	**51.4**
HM58	Kerbside	34.8	31.3	34.5	31.3	24.1	21.4	23.3	29.9	24.8	32.0	**40.1**	33.8	30.1
HM59	Kerbside	25.0	20.9	24.6	15.6	16.8	14.9	13.3	13.7	18.6	22.4	22.9	23.7	19.4
HM60	Roadside	38.1	33.3	36.9	29.5	33.0	28.6	34.9	30.7	33.7	32.1	31.9	**43.7**	33.9

Site ID	Site Type	Nitrogen Dioxide Concentration per Month (2014) µg/m^3												
		Jan	Feb	March	April	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Average
HM61	Motorway	**80.5**	**71.1**	**55.3**	**50.8**	**50.8**	37.7	**45.4**	**58.4**	39.3	**65.4**	33.2	24.8	**51.1**
HM62	Roadside	**62.2**	**51.6**	33.8	–	**47.4**	**44.2**	37.4	20.9	**46.1**	**54.8**	**46.0**	**50.2**	**45.0**
HM63	Motorway	**60.1**	**58.3**	**48.4**	36.5	**44.7**	30.6	28.5	37.9	34.3	**49.2**	**49.9**	**50.1**	**44.0**
HM64	Roadside	**66.4**	**56.0**	**50.2**	**40.1**	28.8	**52.7**	**48.7**	**53.4**	**44.9**	**55.0**	**49.5**	**76.3**	**51.8**
HM65	Roadside	**56.6**	**58.7**	**56.8**	39.7	**45.2**	39.3	**46.1**	**42.3**	**42.6**	**55.6**	**53.8**	**55.2**	**49.3**
HM66	Roadside	**45.7**	**53.2**	**45.2**	33.0	32.0	33.9	30.3	39.8	33.0	**54.9**	**46.6**	**62.0**	**42.5**
HM67	Roadside	**42.1**	–	**49.9**	33.1	36.5	33.8	31.6	34.1	39.3	**43.5**	**46.9**	**46.1**	39.7
HM69	Roadside	**58.7**	**65.2**	**58.3**	**48.3**	**47.2**	**49.8**	**40.5**	**52.8**	**42.4**	**54.8**	**55.4**	**61.9**	**52.9**
HM70	Roadside	**52.7**	**49.3**	34.7	29.5	31.2	28.6	23.6	32.7	27.3	**49.9**	**43.8**	**45.7**	37.4
HM71	Roadside	**63.7**	**59.0**	**46.7**	**45.8**	**47.3**	**43.7**	**43.1**	**48.4**	**58.1**	**54.0**	**53.0**	**50.2**	**51.1**
HM72	Roadside	**61.4**	**62.5**	**56.0**	**43.1**	**51.0**	**43.6**	**45.5**	**49.0**	**53.0**	**59.2**	**53.9**	**53.3**	**52.6**
HM73	Roadside	**65.2**	**53.0**	**51.4**	**51.0**	**50.3**	**43.0**	**46.7**	**47.2**	**55.9**	**58.5**	**58.8**	**53.7**	**52.9**
HM74	Roadside	**44.8**	36.5	**45.9**	**45.0**	39.8	**40.7**	25.2	26.7	**42.8**	**41.7**	**62.7**	39.4	**40.9**
HM75	Roadside	**50.7**	**43.7**	**40.5**	38.3	39.9	36.4	36.0	28.2	**45.5**	**43.7**	**54.1**	**42.7**	**41.6**
HM76	Roadside	**48.8**	**47.7**	**45.0**	**45.5**	**40.6**	36.3	**41.6**	30.8	39.0	**40.8**	**44.8**	34.4	**41.3**
HM79	Roadside	**48.8**	**41.6**	**48.0**	**40.9**	37.4	38.0	37.6	35.4	32.0	37.0	35.4	**50.2**	**40.2**
HM80	Roadside	**51.9**	**50.8**	**54.1**	**45.9**	33.8	**42.4**	33.3	**45.0**	33.5	33.7	**40.3**	**41.2**	**42.2**
HM81	Roadside	**45.6**	**41.6**	**42.9**	**42.9**	35.9	37.2	36.8	39.8	38.4	38.5	**47.9**	**42.8**	**40.9**
HM82	Kerbside	**49.5**	38.4	39.6	36.4	34.0	34.3	31.1	28.7	**42.3**	**45.5**	**49.3**	39.5	39.1
HM83	Kerbside	34.3	**40.3**	**40.4**	36.4	34.4	34.1	28.1	29.1	**41.1**	**46.0**	38.4	**55.5**	38.2
HM84	Kerbside	**41.9**	38.8	**40.8**	37.1	29.7	32.7	27.5	30.3	**42.5**	**48.5**	**47.7**	**46.4**	38.7
HM85	Urban Background	37.2	30.7	32.7	21.6	19.8	19.0	–	16.6	23.6	27.4	**43.5**	40.0	28.4
HM86	Motorway	**74.4**	**56.1**	**52.1**	**41.4**	**50.3**	**40.8**	37.5	**54.0**	35.5	**59.7**	**46.6**	**66.8**	**51.3**

Site ID	Site Type	Nitrogen Dioxide Concentration per Month (2014) µg/m^3												
		Jan	Feb	March	April	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Average
HM93	Roadside	**47.7**	**50.5**	**41.9**	28.5	26.9	25.2	21.5	23.8	28.8	38.9	**41.1**	**42.6**	34.8
HM99	Roadside	**56.3**	**48.9**	**50.5**	**54.7**	**49.0**	**42.5**	–	**48.7**	26.6	**50.8**	**55.3**	**56.3**	**49.1**
HM100	Roadside	**54.2**	**52.6**	**56.8**	–	**47.3**	**42.8**	–	**48.6**	8.0	**47.5**	**47.5**	–	**45.0**
HM101	Roadside	**55.6**	**47.7**	**66.9**	**50.8**	**48.4**	**45.8**	–	**48.3**	3.6	**50.4**	**53.2**	**62.5**	**48.5**
HM102	Kerbside	–	**64.1**	**61.1**	**52.6**	**53.0**	**49.8**	**51.5**	**50.7**	**56.4**	**57.5**	**59.3**	–	**55.6**
HM103	Kerbside	–	**69.7**	**64.6**	**55.6**	**62.1**	**55.9**	**47.9**	**48.3**	**48.4**	**71.3**	**71.9**	–	**59.6**
HM104	Kerbside	–	**72.2**	**57.9**	**54.7**	**54.4**	**46.8**	**49.0**	**50.4**	**45.9**	**69.3**	**75.3**	**56.7**	**57.5**
HM105	Roadside	37.4	35.7	40.0	32.4	26.5	27.5	23.3	20.6	32.2	35.2	**45.9**	35.1	32.7
HM108	Kerbside	**84.1**	**71.2**	**79.4**	**73.8**	**56.9**	–	**71.1**	**61.0**	**67.7**	**78.5**	**67.0**	**74.6**	**71.4**
HM109	Kerbside	**73.4**	**67.1**	**71.1**	**75.6**	**56.6**	**61.2**	**60.8**	**65.6**	**80.9**	**76.1**	**59.9**	**86.5**	**69.6**
HM110	Kerbside	**91.9**	**66.3**	**68.2**	**76.8**	**66.6**	**72.5**	**65.4**	**57.8**	**74.8**	**73.3**	**71.3**	**74.0**	**71.6**
HM111	Roadside	37.3	27.1	37.9	**50.8**	31.0	28.2	28.1	20.5	32.9	32.9	**58.5**	**56.2**	36.8
HM114	Roadside	**43.1**	**40.9**	**42.9**	33.7	36.6	31.3	28.1	34.3	33.3	**43.7**	**45.4**	**41.4**	37.9
HM117	Roadside	**51.2**	**49.3**	**51.4**	**51.8**	**47.3**	**42.0**	**49.1**	**45.2**	**48.4**	**53.1**	**52.1**	**50.9**	**49.3**
HM118	Roadside	**58.0**	23.7	**51.5**	**46.6**	**41.5**	**44.2**	**48.5**	**44.4**	**52.5**	**46.9**	**54.7**	**56.4**	**47.4**
HM119	Roadside	**55.0**	38.9	**58.9**	**50.6**	**48.0**	**47.6**	**49.8**	**45.5**	**53.4**	**43.7**	**57.0**	**51.0**	**50.0**
HM120	Roadside	**50.9**	**42.2**	37.3	27.9	25.6	–	18.2	20.1	29.5	**56.6**	**49.6**	36.3	35.8
HM121	Roadside	**41.4**	**40.7**	32.7	29.6	26.4	23.9	19.9	26.5	28.7	**53.9**	**61.4**	38.9	35.3
HM122	Roadside	37.9	32.7	34.2	26.3	25.1	23.9	20.3	22.8	31.0	**57.6**	**49.0**	35.1	33.0
HM123	Roadside	**56.9**	**57.1**	**52.3**	**43.7**	**49.4**	–	**40.2**	**48.9**	**53.4**	**45.7**	**47.4**	**63.0**	**50.7**
HM124	Roadside	**55.2**	**56.7**	**47.1**	**46.7**	**52.5**	–	**43.3**	**59.1**	**53.2**	35.6	**55.7**	**54.4**	**50.9**
HM125	Roadside	**80.8**	**66.9**	**65.0**	**46.3**	**42.3**	–	**41.9**	**54.1**	**52.2**	**42.8**	**46.5**	**51.5**	**53.7**
HM126	Roadside	**46.0**	**46.5**	**41.2**	37.0	38.5	36.1	36.7	–	37.9	**47.6**	37.6	**57.4**	**42.0**
HM127	Roadside	**50.7**	40.0	**41.5**	35.8	**40.4**	36.9	37.2	–	**42.1**	**43.1**	**43.2**	**51.0**	**42.0**

Site ID	Site Type	Nitrogen Dioxide Concentration per Month (2014) µg/m^3												
		Jan	Feb	March	April	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Average
HM128	Roadside	**49.6**	**45.2**	38.9	38.6	39.7	33.4	34.6	–	37.7	**50.4**	**44.6**	**50.3**	**42.1**
HM129	Roadside	**51.3**	**46.5**	**40.3**	35.5	**42.8**	37.3	32.8	37.7	**43.2**	**44.0**	**46.2**	38.0	**41.3**
HM130	Roadside	**53.6**	**50.0**	39.0	31.5	**41.6**	37.7	31.4	36.9	37.7	**44.8**	**42.2**	**42.7**	**40.8**
HM131	Roadside	**54.4**	**42.7**	39.2	36.7	37.7	35.4	37.6	39.8	38.7	**50.1**	**48.9**	38.3	**41.6**
HM132	Roadside	**44.1**	32.4	**40.9**	32.8	34.1	32.0	34.1	26.1	37.5	35.8	**52.1**	39.7	36.8
HM133	Roadside	**41.9**	34.8	**42.5**	34.6	31.2	32.7	37.3	25.3	39.9	34.2	35.7	35.8	35.5
HM134	Roadside	**40.2**	33.5	**41.4**	38.8	32.9	26.2	34.1	23.6	37.6	35.8	**46.0**	36.6	35.6
HM135	Motorway	**51.7**	**45.1**	**42.1**	39.4	34.3	30.3	33.1	**44.2**	34.8	**48.8**	39.6	**45.7**	**40.8**