Hertsmere Borough Council

2017 Air Quality Annual Status Report (ASR)

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

Sept 2020 **(Version 2)**

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Executive Summary: Air Quality in Our Area

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 , Wales and Northern Ireland 2007 and the relevant Policy and Technical Guidance documents.

This document is Hertsmere Borough Council's Annual Status Report 2017(ASR). It presents the Council's monitoring results for the year 2016, together with sources of air pollution in the area. The Annual Status Report identifies those changes since the last assessment, which could lead to exceedances of the Government's air quality objectives.

At the request of Defra, distance calculations have been undertaken in this ASR 2017 report, whereas in previous years there have been no distance calculations. It is important to note this when comparing results between years, as the results for 2016 may appear to be lower.

This Annual Status Report confirms that concentrations of nitrogen dioxide within Hertsmere, after distance correction, continue to exceed the annual mean objective at four locations both within and outside declared and proposed Air Quality Management Areas (AQMAs) and remain below the objectives elsewhere.

The four locations exceeding the annual mean objective for nitrogen dioxide are:

- **Tube HM49 Elstree Cross Roads – exceedance result just outside AQMA 5.**
- **Tube HM61 Blanche Lane, South Mimms – exceedance result within AQMA 3.**
- **Triplicate tubes HM99/100/101 84 Bushey High Road – exceeding but not within an AQMA.**
- **Tube HM143 12 Watling Street, Radlett – exceedance result just outside a proposed AQMA 7.**

Hertsmere Borough Council has declared six AQMAs and are proposing to declare a further two AQMAs. Three of the existing AQMAs are to be changed.

The two proposed AQMAs are Watling Street, Radlett AQMA 7 and Shenley Road, Borehamwood AQMA 8.

The distance corrected results for the proposed AQMA 7 indicate that nitrogen dioxide levels within the AQMA are below the annual mean objective, with only one exceedance just outside the AQMA.

The distance corrected results for the proposed AQMA 8 indicate no exceedances of the annual mean objective for nitrogen dioxide within the AQMA.

For AQMAs 1, 2, 4, 5 and 6 all distance corrected results were below the annual mean objective for nitrogen dioxide and for AQMA 3 there was one exceedance above the annual mean objective for nitrogen dioxide.

The 2018 ASR will undertake a review of both existing and proposed AQMAs and will consider the possibility of revoking some AQMAs. We will seek further advice from DEFRA following the submission of this report. The possible revoking of some AQMAs may require a further years' worth of data to confirm that the objective is not being exceeded as set out in the Technical Guidance (16).

The current Air Quality Action Plan dated 2010 will need to be reviewed due to the proposed AQMAs 7 and 8 and the possible changes to three of the existing AQMAs.

Hertsmere Borough Council concludes that concentrations for PM_{10} remain below the relevant objectives in 2016 at both monitoring locations.

Air Quality in Hertsmere

Air pollution is associated with a number of adverse health impacts. It is recognised as a contributing factor in the onset of heart disease and cancer. Additionally, air pollution particularly affects the most vulnerable in society: children and older people, and those with heart and lung conditions. There is also often a strong correlation with equalities issues, because areas with poor air quality are also often the less affluent areas[1, 2].

The annual health cost to society of the impacts of particulate matter alone in the UK is estimated to be around £16 billion[3].

Hertsmere is located in South East England, within the County of Hertfordshire. To the south lie the London Boroughs of Harrow and Barnet, to the east the London Borough of Enfield, to the northeast Welwyn Hatfield District, to the north St Albans District and to the west Watford District and Three Rivers District. The M25, M1 and A1 either border or run through the Hertsmere District. The main air quality issues in Hertsmere are related to emissions from traffic particularly within the towns of Potters Bar and Borehamwood, within the villages of Radlett and Elstree and close to major roads of the M25 and M1.

There are currently six AQMAs all declared for nitrogen dioxide of varying size. Two are declared in the town of Potters Bar - one in the High Street and one on the periphery close to the M25. There is one AQMA within the village of Elstree and one AQMA in proximity of junction 1 of the M1 and two AQMAs in the proximity of junction 23 of the M25. There are two proposed AQMAs, one in the village of Radlett, Watling Street and one along the Shenley Road in Borehamwood. See https://uk-air.defra.gov.uk/aqma/list for further information on the six declared AQMAs.

Hertsmere Borough Council is actively working to improve air quality in its area through implementation of the Air Quality Action Plan, last reviewed in 2010, the Air Quality Strategic Plan for Hertfordshire, as well as the Hertfordshire Local Transport Plan (Hertfordshire County Council 2011) developed in partnership with Transport, Planning and Public Health colleagues.

[1] Environmental equity, air quality, socioeconomic status and respiratory health, 2010
[2] Air quality and social deprivation in the UK: an environmental inequalities analysis, 2006
[3] Defra. Abatement cost guidance for valuing changes in air quality, May 2013

Hertsmere Borough Council belongs to the Herts and Beds Air Quality Group, this group includes other local authorities in Hertfordshire and Bedfordshire. The group meet and discuss air quality and allows continuity in the Counties in close connection with the County Councils.

Actions to Improve Air Quality

Hertsmere Borough Council has taken forward a number of measures in pursuit of improving local air quality. Work is continuing on a number of actions, including a variety of measures to improve the borough's air quality through improved traffic management, promotion of low emission transport and travel alternatives, promotion of air quality to schools and local residents and air quality monitoring.

Hertsmere intends to implement further measures to improve air quality within the borough in the future. These include further actions to promote travel alternatives, further actions to manage traffic, public information measures and promoting air quality to schools.

A measure last included in the 2016 ASR and the Action Plan, exposure of sensitive groups, has been removed due to lack of data at this detailed level.

Hertsmere applied for grant funding from Defra in 2016 to install electric car charging points in Hertsmere's car parks, start up an electric car club and promote air quality through schools and to fund an air quality champion. Hertsmere Borough Council were unsuccessful in obtaining the funding from DEFRA. Hertsmere Air Quality Action Plan 2010 can be found on our website.
www.hertsmere.gov.uk/environmentalhealth/airpollution

Local Priorities and Challenges

Hertsmere Borough Council's priorities for the coming year are to continue to work on measures outlined in the Council's Air Quality Action Plan, as well as to continue monitoring and reporting through the LAQM. The challenges are funding and resources.

How to Get Involved

Members of the public can help improve air quality in Hertsmere by reducing travel where possible and travelling using sustainable transport options such as walking, cycling and using public transport. Further information regarding Hertsmere's air quality and past reports can be found on our website. **www.hertsmere.gov.uk**

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1 Local Air Quality Management

This report provides an overview of air quality in Hertsmere Borough Council during 2016. It fulfils the requirements of Local Air Quality Management (LAQM) as set out in Part IV of the Environment Act (1995) 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 an exceedance is considered likely the local authority must 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. This Annual Status Report (ASR) is an annual requirement showing the strategies employed by Hertsmere to improve air quality and any progress that has been made.

The statutory air quality objectives applicable to LAQM in England can be found in Table E.1 in Appendix E.

2 Actions to Improve Air Quality

2.1 Air Quality Management Areas

Air Quality Management Areas (AQMAs) are declared when there is an exceedance or likely exceedance of an air quality objective. After declaration, the authority must prepare an Air Quality Action Plan (AQAP) within 12-18 months setting out measures it intends to put in place in pursuit of the objectives.

A summary of Hertsmere Borough Council's declared, altered and proposed AQMAs can be found in Figures 2.1 to 3.1. Please note that AQMAs 7 and 8 are only at this present time proposed and are not on the Defra website. AQMAs 4, 5 and 6 are to be changed.

Further information relating to the six declared AQMAs; including maps of AQMA boundaries are available online at http://uk-air.defra.gov.uk/aqma/list

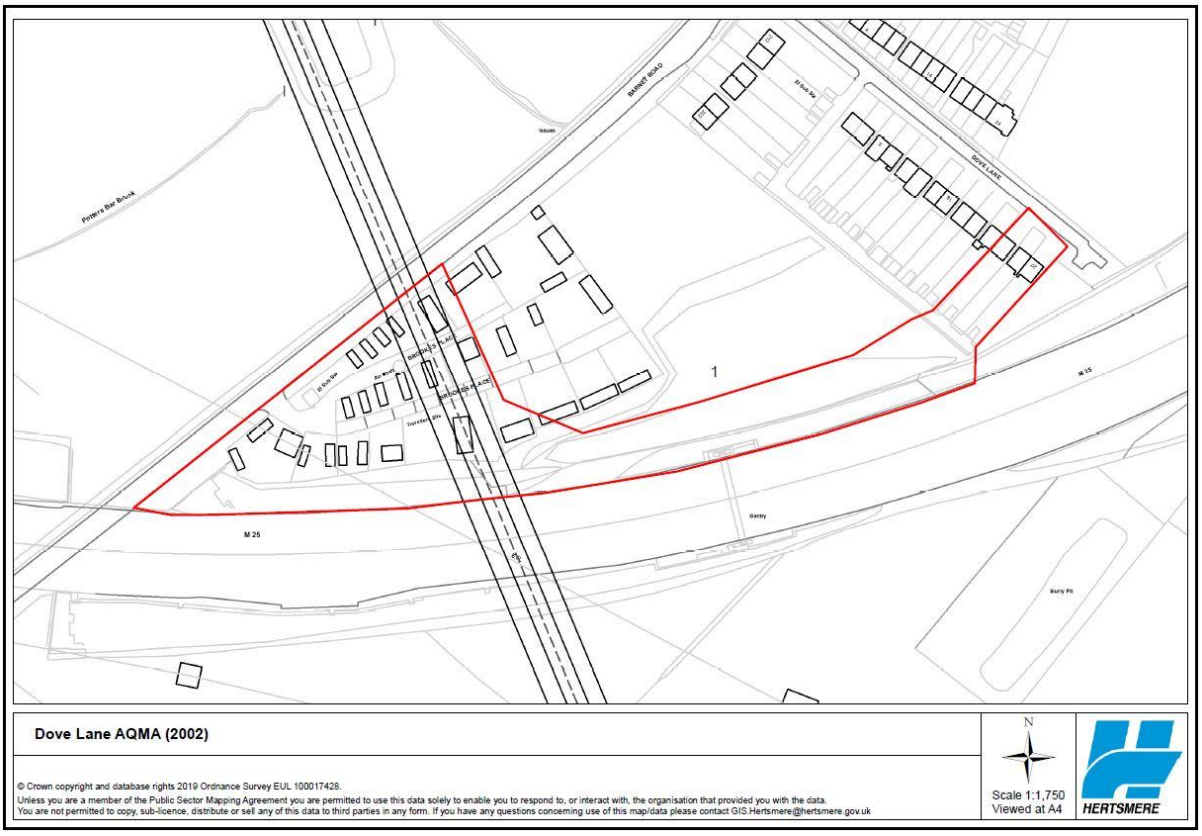

Figure 2.1: Hertsmere AQMA No.1 Dove Lane and Brookes Place

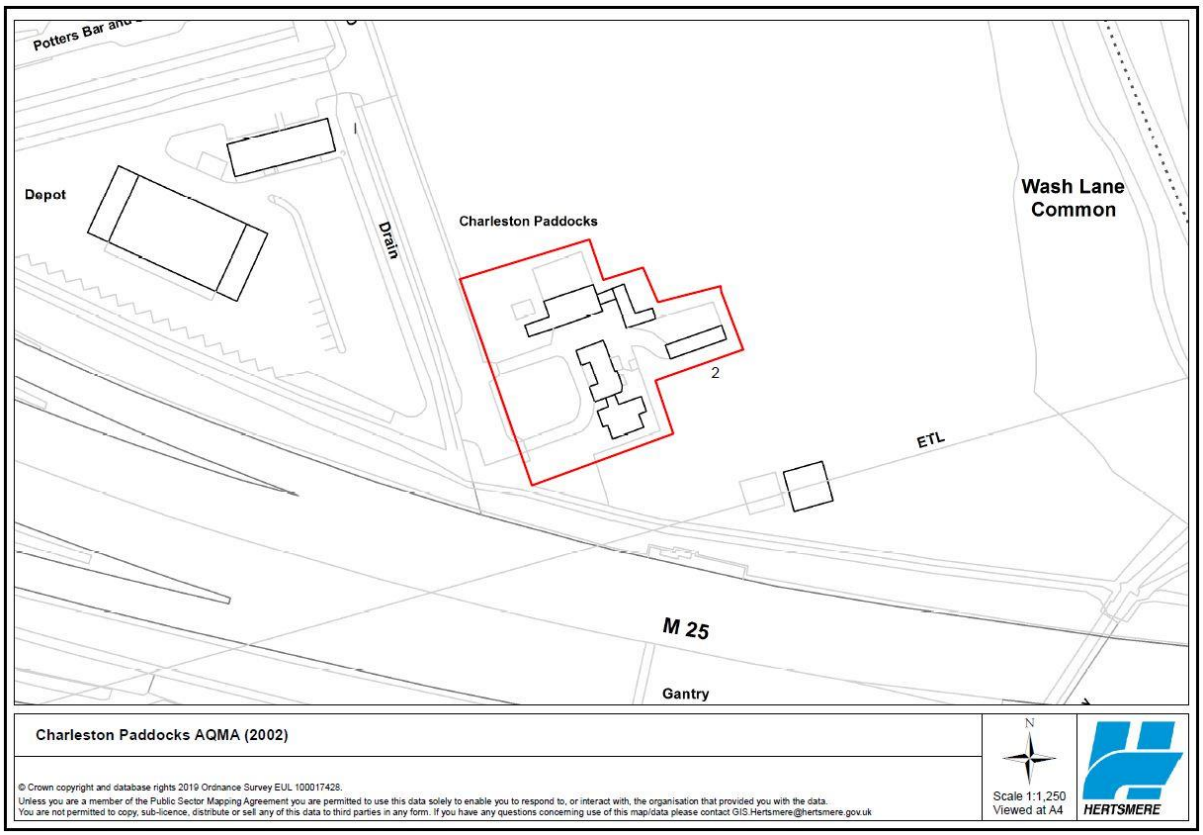

Figure 2.2: Hertsmere AQMA No. 2 Charleston Paddocks St Albans

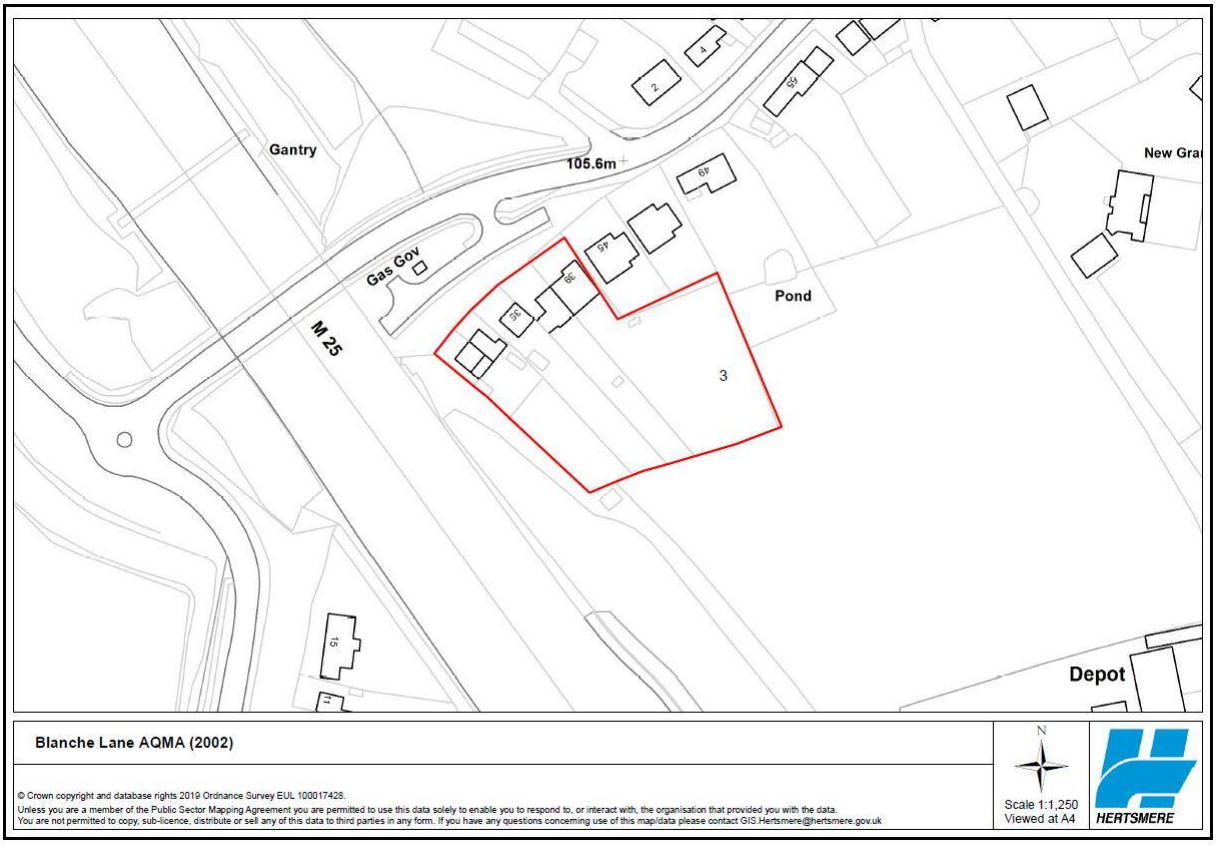

Figure 2.3: Hertsmere AQMA No 3 Blanche Lane

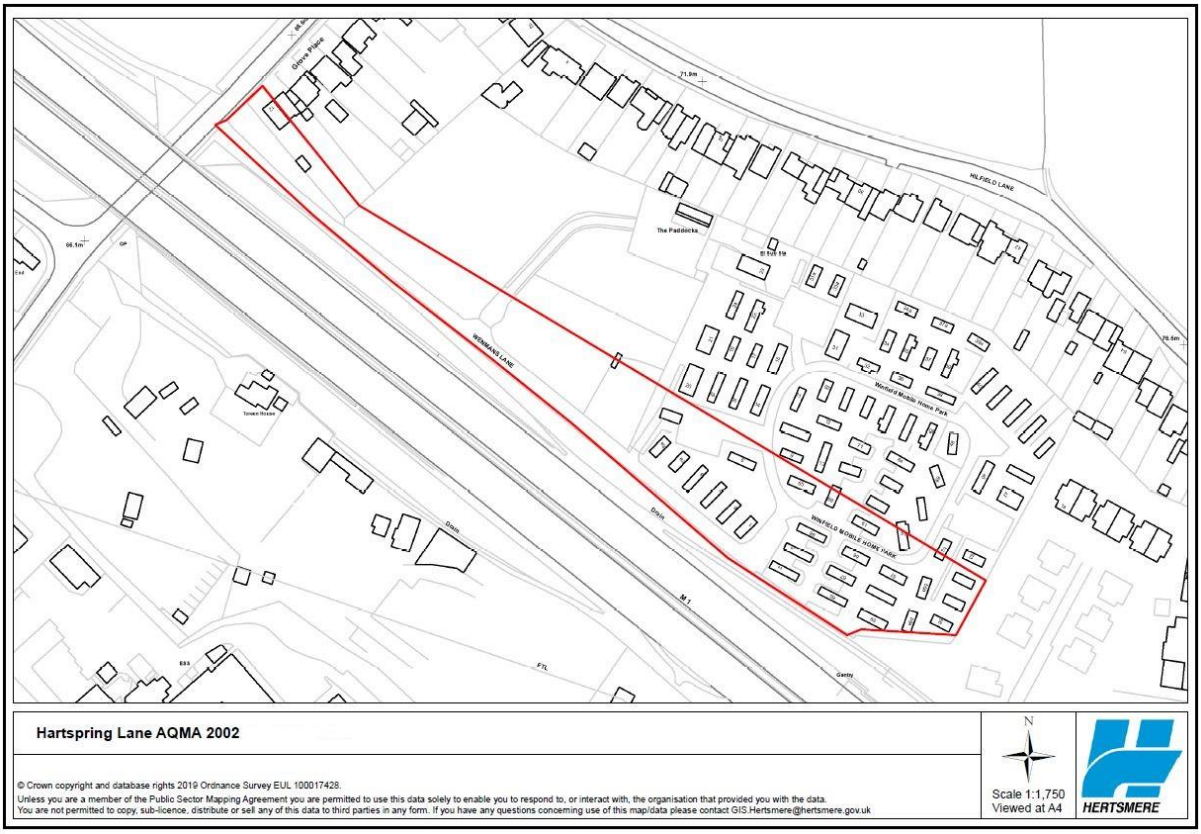

Figure 2.4: Hertsmere AQMA No 4 Hartspring Lane

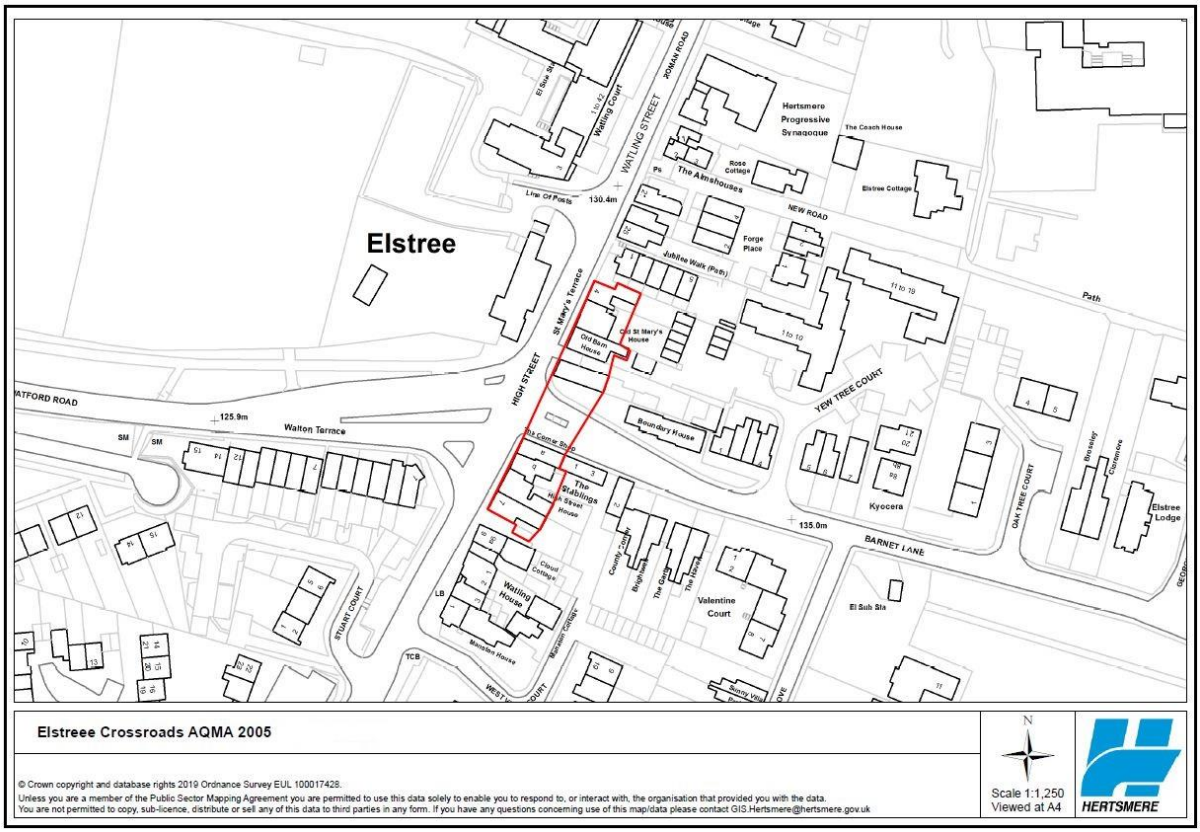

Figure 2.5: Hertsmere AQMA 5 Elstree Crossroads

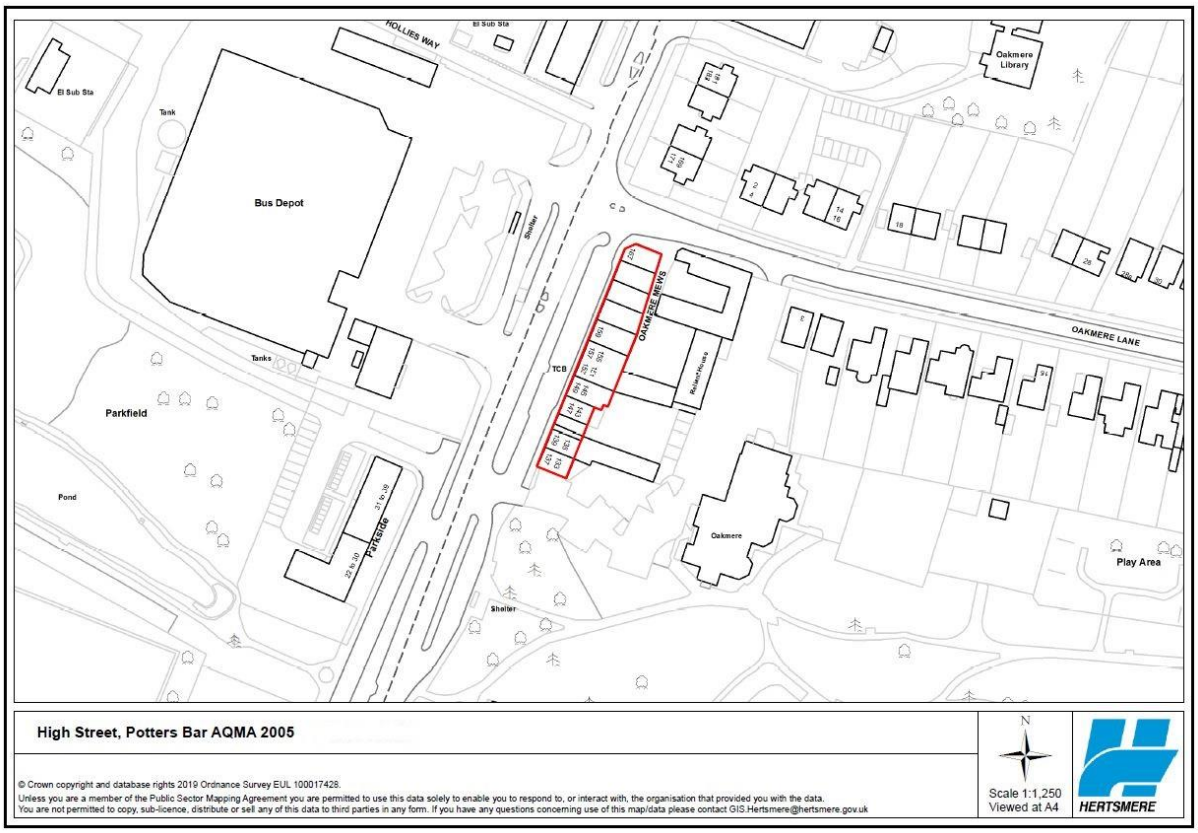

Figure 2.6: Hertsmere AQMA 6 High Street Potters Bar

At the present time, Hertsmere Borough Council are proposing to declare two new AQMAs. Watling Street Radlett AQMA 7 and Shenley Road, Borehamwood AQMA 8. Hertsmere are also proposing to make changes to AQMA 4 Hartspring Lane, AQMA 5 Elstree Crossroads and AQMA 6 High Street Potters Bar. See maps below of the proposals.

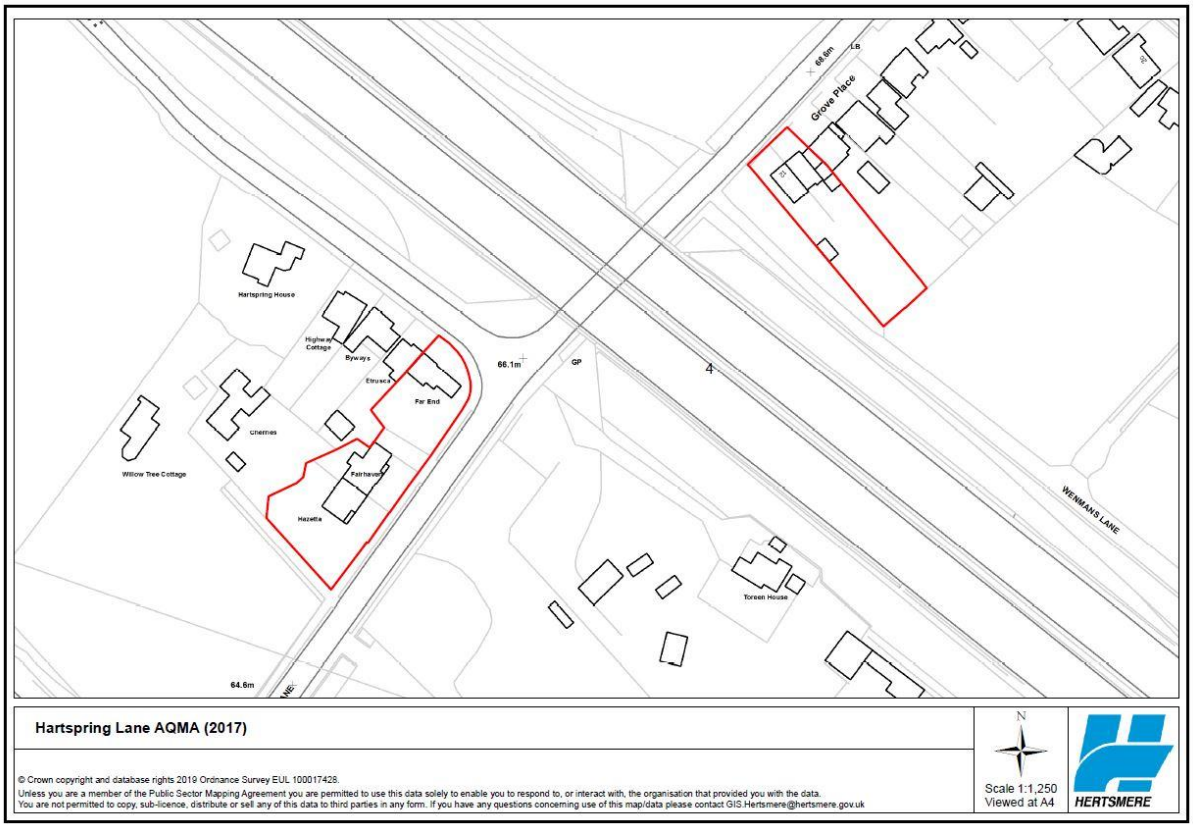

Figure 2.7: Hertsmere AQMA No. 4 Hartspring Lane Altered

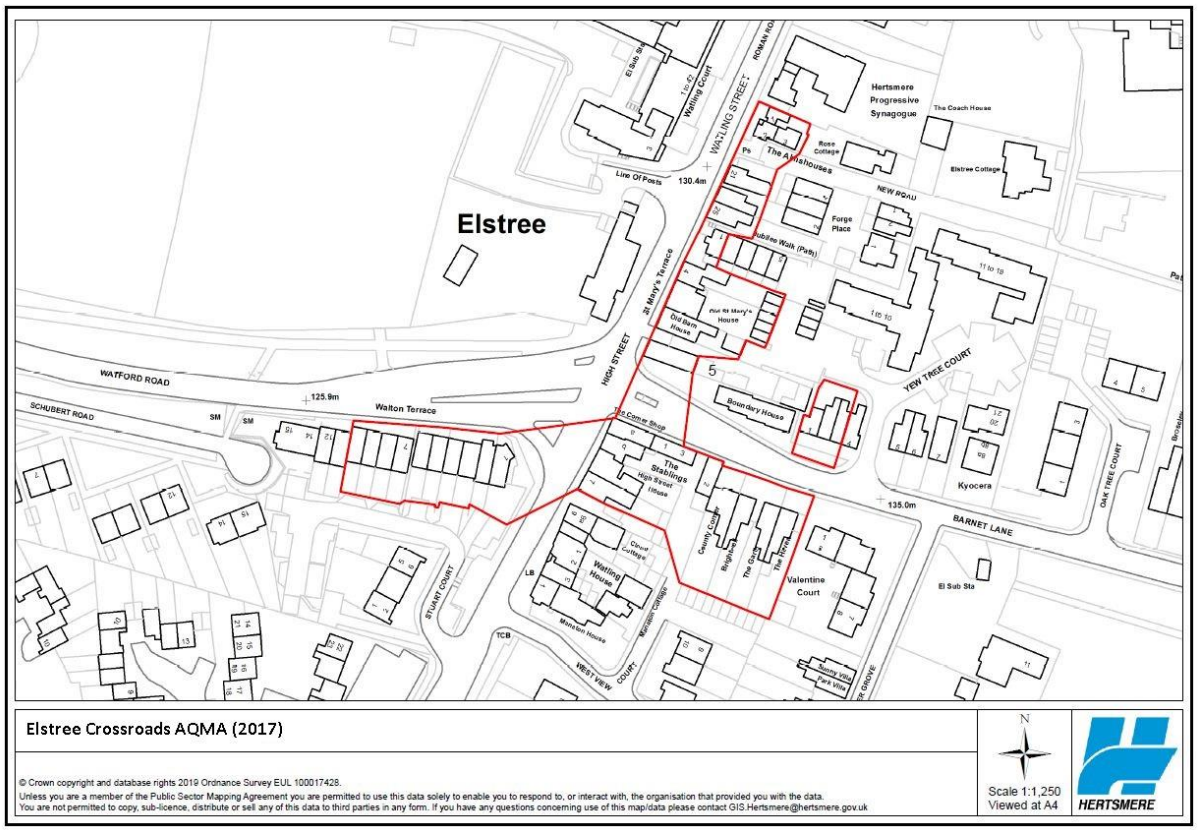

Figure 2.8: Hertsmere AQMA No. 5 Elstree Crossroads Altered

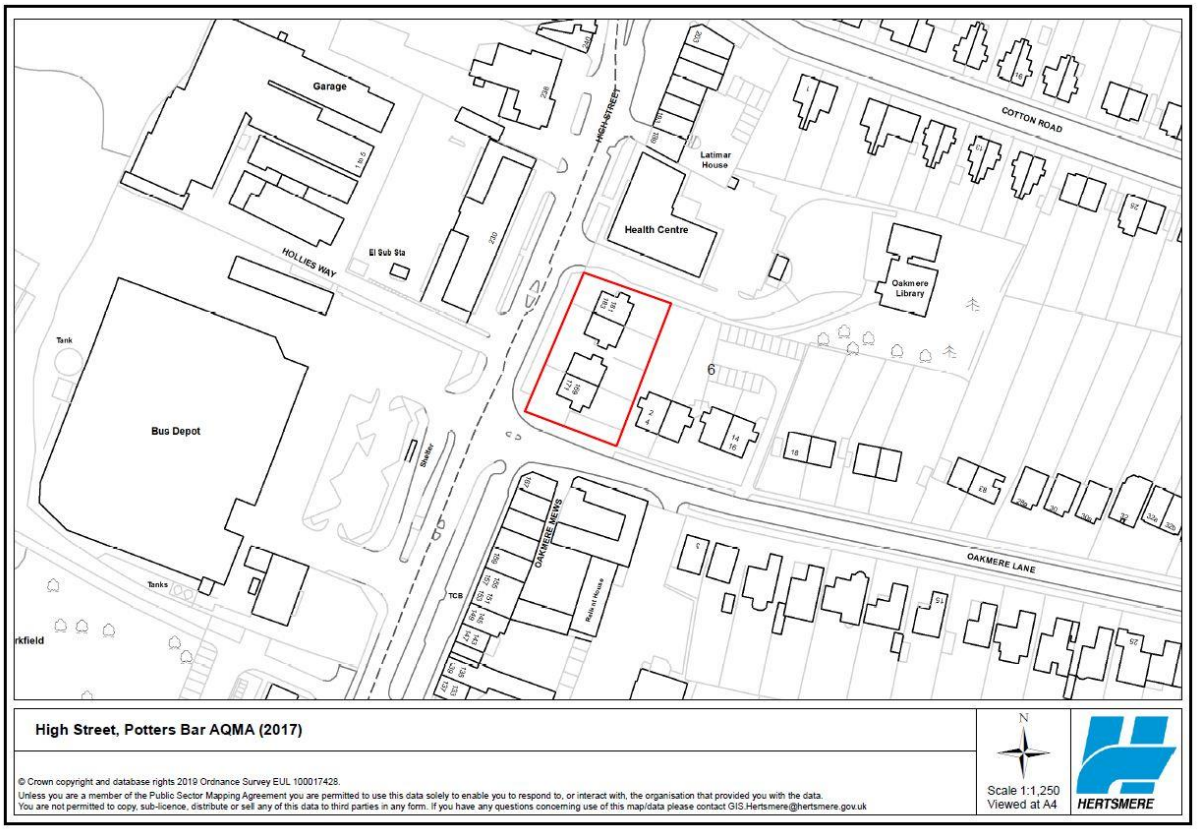

Figure 2.9 Hertsmere AQMA No 6 High Street Potters Bar Altered

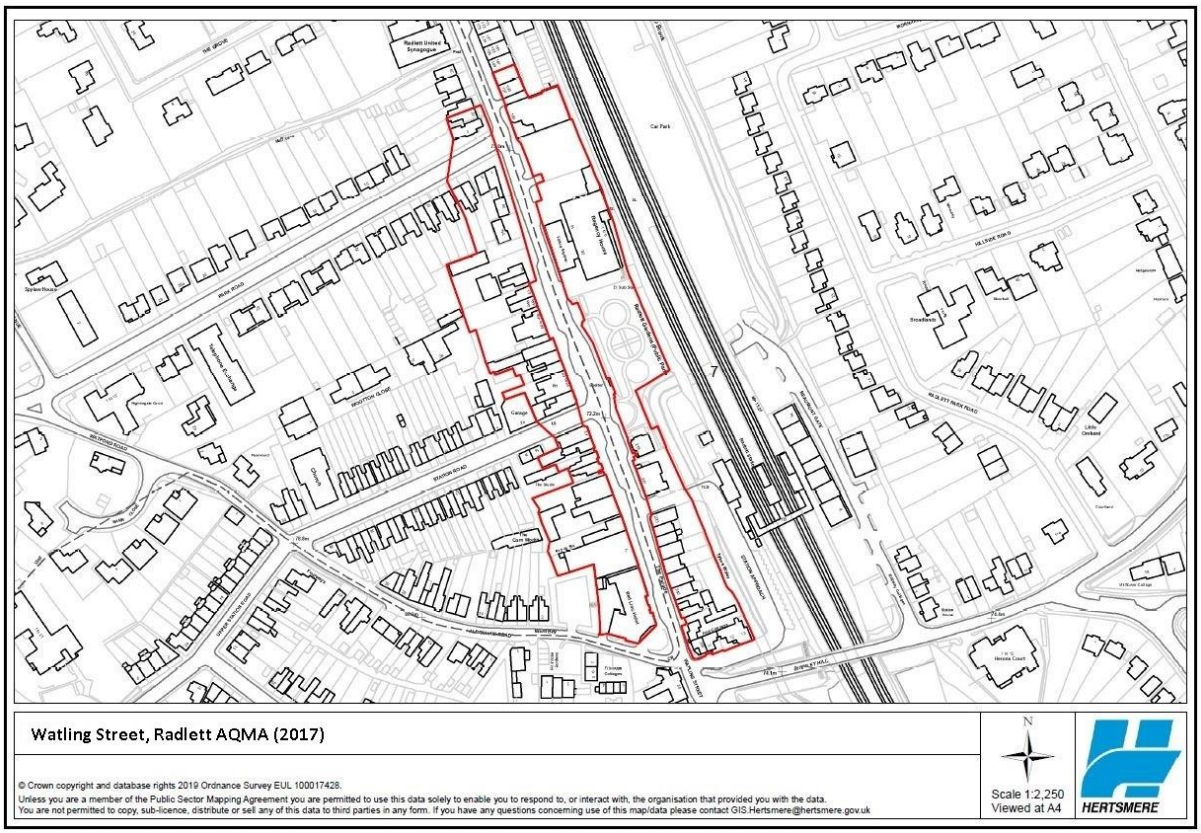

Figure 3.0 Hertsmere AQMA No 7 Watling Street Radlett Proposed

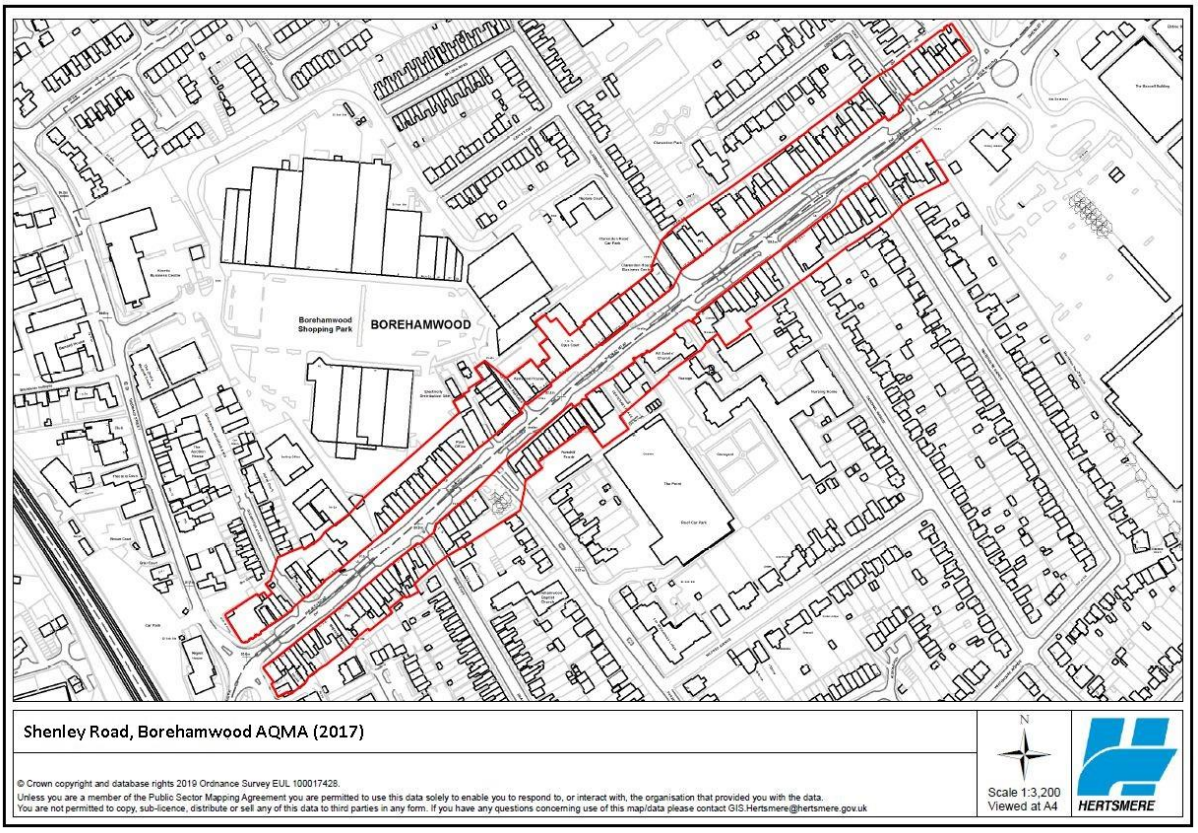

Figure 3.1: Hertsmere AQMA 8 Shenley Road, Borehamwood Proposed

Table 2.1 Declared Air Quality Management Areas

AQMA Name	Date of Declaration	Pollutants	City /Town	Description	Is Air Quality in the AQMA influenced by roads controlled by Highways England	Level of Exceedance (maximum monitored/modelled concentration at a location of relevant exposure)		Action Plan
						At Declaration	Now	
Hertsmere AQMA 1	2003	NO2 Annual Mean	Dove Lane Potters Bar	Domestic properties 23 - 27 Dove Lane and caravan site off A1000 Barnet Road	YES	46 ugm/3	33.8 ugm/3	All actions 2010
Hertsmere AQMQ 2	2003	NO2 Annual Mean	St Albans Road South Mimms	One domestic property known as Charleston Paddocks, St Albans Road	YES	48 ugm/3	31.5 ugm/3	All actions 2010
Hertsmere AQMA 3	2003	NO2 Annual Mean	Blanche Lane South Mimms	Domestic properties 31 - 39 Blanche Lane South Mimms	YES	80 ugm/3	40.3 ugm/3	All actions 2010

Hertsmere AQMA 4	2003	NO2 Annual Mean	Hartspring Lane Bushey	Two separate areas comprising of domestic properties 12 and 11 Grove Place Hartspring Lane and Winfield Caravan Park	YES	42 ugm/3	35.2 ugm/3	All actions 2010
Hertsmere AQMA 5	2005	NO2 Annual Mean	Elstree Crossroads Barnet Lane	Domestic properties along, Barnet Lane and High Street in the area surrounding the crossroads between these roads	NO	No figure available	38.2 ugm/3	All actions 2010
Hertsmere AQMA 6	2005	NO2 Annual Mean	High Street Potters Bar	Properties 133 -167 High Street consisting of commercial and residential	NO	No figure available	34.8 ugm/3	All actions 2010
Hertsmere AQMA 7 Proposed	Proposed 2016	NO2 Annual Mean	Radlett Watling Street	An area encompassing residential properties along both sides of Watling Street between the junctions with Park Road and	NO	44 ugm/3	36.3 ugm/3	Pending declaration

				Aldenham Road				
Hertsmere AQMA 8 Proposed	Proposed 2016	NO2 Annual Mean	Borehamwood Shenley Road	An area encompassing residential properties along both sides of Shenley Road between the crossroads of Station Road and Theobald Street and the roundabout joining Shenley Road and Eldon Avenue	NO	49 ugm/3	39.3 ugm/3	Pending declaration.

2.2 Progress and Impact of Measures to address Air Quality in Hertsmere

Hertsmere Borough Council has taken forward a number of measures in pursuit of improving local air quality. Details of all measures completed, in progress or planned are set out in Table 2.2. Further details on these measures can be found in the Air Quality Action Plan (AQAP) 2010 for Hertsmere Borough Council due to be reviewed in 2018.

Hertsmere Borough Council's priorities for the coming year are to continue with the measures to address air quality within the Borough that are currently underway and begin to work on additional measures in 2018.

Hertsmere Borough Council expects parts of the following measures to be completed over the course of the next reporting year.

Measure 1 Hertsmere hope to have installed a number of electric car charging points in Council car parks by 2018.

Measure 4 Hertfordshire County Council has gone out to consultation for the Local Transport Plan 4 (LTP4), which Hertsmere fully support. Also, further work with the charity Living Streets to promote other modes of transport to work and school.

Table 2.2 – Progress on Measures to Improve Air Quality

Measure No.	Measure	EU Category	EU Classification	Lead Authority	Planning Phase	Implementation Phase	Key Performance Indicator	Target Pollution Reduction in the AQMA	Progress to Date	Estimated Completion Date	Comments
1	Wherever Pollution and or traffic issues have been identified to investigate and tackle through local communities local plans / strategies	Policy Guidance and Development Control	Air Quality Planning and Policy Guidance	Hertsmere Borough Council	2017/2018	2018		Low	It has been agreed that car charging points will be placed in all of Hertsmere Council car parks	2018	Funding
2	Work ,support and discuss with Highways England , neighbouring authorities to consider traffic schemes that affect AQMAs on local roads and motorways	Traffic Management	Strategic highway improvements, Re-prioritising road space away from cars, including Access management, Selective vehicle priority, bus priority, high vehicle occupancy lane	Environmental Health, Highways England, Transport Departments	2017/2018	2018		Low	Implementation on going	2019	

Measure No.	Measure	EU Category	EU Classification	Lead Authority	Planning Phase	Implementation Phase	Key Performance Indicator	Target Pollution Reduction in the AQMA	Progress to Date	Estimated Completion Date	Comments
3	Identify major fleets in the Borough to encourage cleaner vehicle technology	Promoting low emission vehicles	Company Vehicle Procurement - Prioritising uptake of low emission vehicles	Environmental Health Transport	On-going	2019		Reduced vehicle emissions	Implementation on going	2019	
4	Support Hertfordshire County Council with its aim to encourage alternative modes of transport through various initiatives and through Travel Wise events	Promoting Travel Alternatives	School Travel Plans	Hertfordshire County Council & Environmental Health	2017-2018	2018		Low	Hertsmere have joined with Hertfordshire County Council to work with Living Streets to encourage schools to promote a walking programme. With Air Quality included	2018 - 2019	
5	Hertsmere continue to support projects Watling Chase Community Forest Natural England	Promoting Travel Alternatives	Promotion of walking	Environmental Health	On-going	2018		Low	Hertsmere has some cycle, pedestrian and horse routes open	2019	Need to investigate further to see if Hertsmere can support these projects further

Measure No.	Measure	EU Category	EU Classification	Lead Authority	Planning Phase	Implementation Phase	Key Performance Indicator	Target Pollution Reduction in the AQMA	Progress to Date	Estimated Completion Date	Comments
6	Air Quality to be taken into account when considering all planning applications particularly near and around AQMAs and adoption of air quality in specific planning guidance	Policy Guidance and Development Control	Air Quality Planning and Policy Guidance	Environmental Health and Planning	On-going	2018		Low	Dealt with in the Core Strategy Development Plan Document 2009 Planning Officers to take into consideration AQMAs	2018	
7	The Council will look for evidence that developers have taken appropriate measures to minimise pollution	Promoting Low Emission Plant	Emission control equipment for small and medium sized stationary combustion sources / replacement of combustion sources	Environmental Health, Planning and Building Control	On- going	2019		Low	Planning produce supplementary planning guides which contain guidance on odour smoke and dust	2019	Environmental Health enforces the Control of Pollution Act on construction sites.
8	The Council will offer £50 reduction for Private Hire and Hackney Carriage vehicle license fees for use of alternative fuels	Promoting Low Emission Transport	Taxi emission incentives	Environmental Health and Licensing Team Promoted at Officers Forum	On-going	2018		Low	Have had an increase from 1 vehicle to 6	2018	
9	Environmental Health will begin an on-going campaign to discourage the excessive idling of vehicle engines	Promoting Low Emission Transport	Other	Environmental Health	2017 - 2018	2018		Low	To promote during school activities with Living Streets	2019	

Measure No.	Measure	EU Category	EU Classification	Lead Authority	Planning Phase	Implementation Phase	Key Performance Indicator	Target Pollution Reduction in the AQMA	Progress to Date	Estimated Completion Date	Comments
10	Environmental Health continues to provide comprehensive control over Part B processes and industry where power exists	Environmental Permits	Measures to reduce pollution through IPPC Permits going beyond BAT	Environmental Health	On-going	2018		Low	All inspections have been carried out with a satisfactory outcome	2018	
11	Improved information and advice to residents and companies in the area about problems caused by bonfires. Encourage residents to compost waste	Public Information	Via other mechanisms	Environmental Health	On-going	2018		. Low	In the last year Hertsmere have dealt with 140 complaints regarding bonfires.	2018	
12	The Council continue to monitor air quality to the existing quality. Hertsmere now have two AQMS one at Manor Way, roadside and the other that has just been moved to Brook Road Bowling Club background	Policy Guidance and Development Control	Other policy	Environmental Health	On-going	2017		Low	Hertsmere also use diffusion tubes for data and they are reviewed every year	2018	

2.3 $PM_{2.5}$ – Local Authority Approach to Reducing Emissions and or Concentrations

As detailed in Policy Guidance LAQM.PG16 (Chapter 7), local authorities are expected to work towards reducing emissions and/or concentrations of $PM_{2.5}$ (particulate matter with an aerodynamic diameter of 2.5µgm or less). There is clear evidence that $PM_{2.5}$ has a significant impact on human health, including premature mortality, allergic reactions, and cardiovascular diseases.

Hertsmere Borough Council is part of the Herts and Beds Air Quality group that works closely with Public Health England. Public Health monitors $PM_{2.5}$ as a health outcome and funded monitors for the local authorities in the Hertforshire area. Hertsmere already monitor $PM_{2.5}$ in both Air Quality Monitoring Stations. Results from both the monitoring stations are shown in Table A.7.

In the Action Plan Hertsmere are looking to promote to the public an anti idling campaign to educate about the problems associated with idling engines.

Contained within the AQAP and the Hertfordshire Local Transport Plan (Hertfordshire County Council, 2011 aimed to be reviewed in 2017) is a variety of measures aimed at managing emissions from road traffic on local roads and motorways. Measures intended to tackle road traffic pollutant emissions (including $PM_{2.5}$ emissions) include a variety of traffic management actions (strategic highway improvements to improve traffic flow and measures intended to reduce idling) and the promotion of low emission travel alternatives(e.g cycling, walking, electric vehicles) See Table 2.2 for further information.

3 Air Quality Monitoring Data and Comparison with Air Quality Objectives and National Compliance

3.1 Summary of Monitoring Undertaken

This section sets out what monitoring has taken place and how it compares with the objectives.

3.1.1 Automatic Monitoring Sites

Hertsmere Borough Council undertook automatic (continuous) monitoring at two sites during 2016. Table A.1 in Appendix A shows the details of the sites.

National monitoring results are available at http://www.airqualityengland.co.uk

Maps showing the location of the automatic monitoring sites are provided in Appendix D, Figure A4.1. Further details on how the monitors are calibrated and how the data has been adjusted are included in Appendix C.

3.1.2 Non-Automatic Monitoring Sites

Hertsmere Borough Council undertook non-automatic (passive) monitoring of nitrogen dioxide (NO_2) at 54 sites during 2016. Nine of those 54 sites are designated as triplicate sites (the site has three diffusion tubes at the same place) Table A.2 in Appendix A shows the details of the sites.

Maps showing the location of the monitoring sites are provided in Appendix D. Further details on Quality Assurance/Quality Control (QA/QC) bias adjustment, annualisation, distance correction and any further calculations for the diffusion tubes are included in Appendix C.

3.2 Individual Pollutants

3.2.1 Nitrogen Dioxide (NO_2)

Table A.3 in Appendix A compares the ratified and adjusted monitored NO_2 annual mean concentrations for the diffusion tubes for the past 5 years with the air quality objective of 40µg/m^3. It is important to note that when comparing results between years, distance calculations have been undertaken in this ASR 2017 report, whereas

in previous years there have been no distance calculations. Therefore, the results for 2016 may appear to be lower.

For diffusion tubes, the full 2016 dataset of monthly mean values is provided in Appendix B along with distance correction.

Nitrogen dioxide concentrations were above the annual mean air quality objective at four diffusion tube monitoring sites in 2016.

- **Tube HM49 Elstree Cross Roads – exceedance result just outside AQMA 5.**
- **Tube HM61 Blanche Lane, South Mimms – exceedance result within AQMA 3.**
- **Triplicate tubes HM99/100/101 84 Bushey High Road – exceeding but not within an AQMA.**
- **HM143 12 Watling Street, Radlett – exceedance result just outside a proposed AQMA 7.**

In conclusion, Hertsmere Borough Council recommends that AQMA 3 Blanche Lane, South Mimms remains declared.

The 2018 ASR will undertake a review of all other AQMAs, including the proposed areas and will consider the possibility of revoking some AQMAs. We will seek further advice from DEFRA following the submission of this report. The possible revoking of some AQMAS may require a further years' worth of data to confirm that the objective is not being exceeded as set out in the Technical Guidance (16).

3.2.2 Nitrogen Dioxide (NO_2)

Table A.4 in Appendix A compares the ratified continuous monitored NO_2 1-hourly mean concentrations for the past 5 years with the air quality objective of 200µg/m^3, not to be exceeded more than 18 times per year.

The results indicated that there were two exceedances of the 1-hour mean NO_2 objective measured at the roadside automatic monitoring station and no exceedances at the background automatic monitoring station. However, both sites did not exceed the objective.

3.2.3 Particulate Matter (PM_{10})

Table A.5 in Appendix A compares the ratified and adjusted monitored PM_{10} annual mean concentrations for the past 5 years with the air quality objective of 40µg/m^3.

Table A.6 in Appendix A compares the ratified continuous monitored PM_{10} daily mean concentrations for the past 5 years with the air quality objective of 50µg/m^3, not to be exceeded more than 35 times per year.

These tables show that there were no measured exceedences of the annual mean PM_{10} objective at both monitoring stations. However, there were five exceedances of the 24-hour mean PM_{10} objective at the roadside automatic monitoring station and one exceedance at the background automatic monitoring station. But both sites did not exceed the objective of 50µg/m^3 more than 35 times per year. As such, no AQMAs are recommended as a result of measured PM_{10} concentrations.

3.2.4 Particulate Matter ($PM_{2.5}$)

Table A.7 in Appendix A presents the ratified and adjusted monitored $PM_{2.5}$ annual mean concentrations for the past 5 years.

Hertsmere Borough Council will continue to monitor for $PM_{2.5}$ at both the roadside and background automatic monitoring stations.

Appendices

Appendix A: Monitoring Results

Table A.1 Details of Automatic Monitoring Sites

Table A.2 Details of Non Automatic Monitoring Sites

Table A.3 Annual Mean $N0_2$ Monitoring Results

Table A.4 1-Hour Mean NO_2 Monitoring Results

Table A.5 Annual Mean PM_{10} Monitoring Results

Table A.6 24- Hour Mean PM_{10} Monitoring Results

Table A.7 $PM_{2.5}$ Monitoring Results

Appendix B: Full Monthly Diffusion Tube Results for 2016

Appendix C: Supporting Technical Information / Air Quality Monitoring Data QA/QC

Appendix D: Maps of Monitoring Locations

Appendix E: Summary of Air Quality Objectives in England

Appendix A: Monitoring Results

Table A.1 – Details of Automatic Monitoring Sites

Site ID	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In AQMA ?	Monitoring Technique	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Inlet Height (m)
H1	Hertsmere Borehamwood Manor Way	Roadside	520290	197087	NO_2; PM_{10}; $PM_{2.5}$	N	Chemiluminescent; FDMS	10.9	6	2.5
H2	Hertsmere Borehamwood Hertswood School	Urban background	520156	197364	NO_2; PM_{10} $PM_{2.5}$	N	Chemiluminescent FDMS	40	N/A	4.0

(1) 0m if the monitoring site is at a location of exposure (e.g. installed on the façade of a residential property).

(2) N/A if not applicable.

Table A.2 – Details of Non-Automatic Monitoring Sites

Site ID	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In aqma	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Tube collocated with a Continuous Analyser?	Height (m)
HM39	117 Shenley Road, Borehamwood	Urban Traffic	519418	196681	NO_2	YES (3)	7	1.3	NO	2.1
HM40	17 Essex Road Borehamwood	Urban Backgrd	519281	196779	NO_2	NO	5.3	2.1	NO	2.1
HM41	39 Theobald Street Borehamwood	Urban Traffic	519022	196612	NO_2	NO	6.4	1.9	NO	2.3
HM45/46/47	Hertsmere Background AQMS	Urban Backgrd	520156	197364	NO_2	NO	86	108	YES	3
HM48	Elstree Cross Rd 1 Nursery High St	Urban Traffic	517846	195346	NO_2	NO	4.4	1.9	NO	2
HM49	Elstree Cross Rd 2 Barnet Lane	Urban Traffic	517861	195225	NO_2	NO	5.9	1.1	NO	2
HM50	Elstree Cross Rd 3 High Street	Urban Traffic	517801	195248	NO_2	YES	9.5	1.2	NO	2

Site ID	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In aqma	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Tube collocated with a Continuous Analyser?	Height (m)
HM52	Elstree Cross Rd 5 Walton Terrace	Urban Traffic	517744	195246	NO_2	YES (3)	1.8	1.8	NO	2
HM53	Caldecote Lane Bushey Heath	Urban Backgrd	515581	195094	NO_2	NO	0.2	0	NO	2.1
HM54	19 High Road Bushey	Urban Traffic	514596	194396	NO_2	NO	4.5	0.5	NO	2.1
HM55	Highwood Ave garages, Bushey	Urban Backgrd	512770	197834	NO_2	NO	29	0	NO	2
HM57	Hartspring Lane 11 Grove Place Bushey	Urban Traffic	513517	197818	NO_2	YES	9.2	1.8	NO	2
HM58	Pegmire Lane Bushey	Urban Traffic	513966	197615	NO_2	NO	2.5	0.5	NO	2
HM59	7 Aldenham Grove Radlett	Urban Backgrd	516570	200159	NO_2	NO	6.8	0	NO	2
HM60	Bell Lane (1 Council Cottages)	Urban Traffic	518586	202939	NO_2	NO	13.6	8.8	NO	1.9

Site ID	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In aqma	Distance to Relevant Exposure (m) [1]	Distance to kerb of nearest road (m) [2]	Tube collocated with a Continuous Analyser?	Height (m)
HM61	31 Blanche Lane South Mimms	Motorway	522037	200670	NO_2	YES	14.6	14.6	NO	1.9
HM62	24 The Broadway Potters Bar	Urban Traffic	524943	201153	NO_2	NO	12.5	3.1	NO	1.9
HM63	27 Dove Lane Potters Bar	Motorway	526079	200026	NO_2	NO	19.2	29.1	NO	2
HM64	Bus Garage 1 (outside Holly House)	Urban Traffic	526208	201454	NO_2	NO	23.3	2.1	NO	2
HM65	Hatfield Rd Potters Bar High Street	Urban Traffic	526252	201597	NO_2	NO	7.7	2.8	NO	2.1
HM66	Bus Garage 2 Potters Bar Oakmere Rd	Urban Traffic	526245	201458	NO_2	NO	5.9	3	NO	2.1
HM67	Bus Garage 3 Potters Bar 147 High St	Urban Traffic	526211	201402	NO_2	YES	0.5	11.3	NO	2
HM69	Southgate Road Potters Bar	Urban Traffic	526034	200832	NO_2	NO	15	3.1	NO	2

Site ID	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In aqma	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Tube collocated with a Continuous Analyser?	Height (m)
HM70	9 Park Ave Potters Bar	Urban Traffic	526402	200457	NO_2	NO	9.2	1.5	NO	2
HM71	2 Park Rd 1 Radlett	Urban Traffic	516291	200035	NO_2	YES (3)	4.3	1.5	NO	2.1
HM74/75/76	301 Watling St Radlett	Urban Traffic	516456	199624	NO_2	NO	9.2	6.6	NO	2
HM79/80/81	7 The Broadway Potters Bar	Urban Traffic	524988	201118	NO_2	NO	12.2	1.7	NO	2
HM82/83/84	10 Baker St	Urban Traffic	524922	201088	NO_2	NO	9.6	0.6	NO	2
HM85	16 Andrew Close Shenley	Urban Backgrd	518592	200948	NO_2	NO	2.3	0	NO	2.1
HM86	Charleston Paddocks South Mimms	Motorway	522970	199959	NO_2	YES	32.8	10.5	NO	1.8
HM93	103 Baker Street Potters Bar	Urban Traffic	524573	200633	NO_2	NO	12.9	1.4	NO	2.2

Site ID	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In aqma	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Tube collocated with a Continuous Analyser?	Height (m)
HM99/100/101	84 High Street Bushey	Urban Traffic	513209	195257	NO_2	NO	1.9	2.4	NO	2.1
HM102	Aldenham Road Radlett Red Lion	Urban Traffic	516385	199761	NO_2	YES (3)	4	0.5	NO	1.9
HM105	Elstree Park Borehamwood	Urban Backgrd	520738	195271	NO_2	NO	10.7	36.1	NO	2
HM108/109/110	Hartspring Lane Bushey Hazetta House	Urban Traffic	513419	197727	NO_2	YES (3)	11.1	0.5	NO	1.8
HM111	9 Blanche Lane South Mimms	Urban Traffic	521980	200567	NO_2	NO	21.1	1.2	NO	1.9
HM114	Parkside Potters Bar	Urban Traffic	526164	201363	NO_2	NO	16.3	9.5	NO	1.9
HM117/118/119	44 High Street Bushey	Urban Traffic	513101	195286	NO_2	NO	4.3	2.3	NO	2
HM120/121/122	Todd Close Borehamwood	Urban Traffic	520181	197150	NO_2	NO	33.1	36.4	NO	1.9

Site ID	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In aqma	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Tube collocated with a Continuous Analyser?	Height (m)
HM123/124/125	Elstree Way Borehamwood	Urban Traffic	520263	197130	NO_2	NO	34.5	3.6	NO	1.9
HM126	63 Elstree Hill North	Urban Traffic	517903	195552	NO_2	NO	13.8	2.4	NO	2.1
HM129	Allum Lane Elstree	Urban Traffic	517907	195864	NO_2	NO	6.3	1.5	NO	2.1
HM132	Watling Mansions Radlett	Urban Traffic	516520	199450	NO_2	NO	13.8	8.3	NO	2
HM135	Winfield Park Bushey	Motorway	513755	197599	NO_2	YES (3)	4.7	20.8	NO	2
HM136	Baker Court Police Station Borehamwood	Urban Traffic	519802	197597	NO_2	NO	7.3	2	NO	1.9
HM137	Baker Court Brook Road Borehamwood	Urban Traffic	519706	197041	NO_2	NO	10.7	2.2	NO	2
HM138	209 Shenley Road Borehamwood	Urban Traffic	519644	196865	NO_2	YES (3)	3.1		NO	2

Site ID	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In aqma	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Tube collocated with a Continuous Analyser?	Height (m)
HM139	140 Shenley Road Borehamwood	Urban Traffic	519589	196794	NO_2	YES (3)	4	2	NO	1.9
HM140	Shenley Road Furzehill Road Borehamwood	Urban Traffic	519308	196574	NO_2	YES (3)	2.5	0.9	NO	1.9
HM141	42 Shenley Road Borehamwood	Urban Traffic	519233	196495	NO_2	YES (3)	4.5	0.8	NO	1.9
HM142	2a Hillfield Lane Bushey	Urban Traffic	513587	197872	NO_2	NO	13	5.7	NO	1.8
HM143	12 Watling Street Radlett	Urban Traffic	516229	200201	NO_2	NO	8.2	1.4	NO	2
HM144	Hatfield Road 2 Potters Bar	Urban Traffic	526210	201753	NO_2	NO	7.5	3.4	NO	1.9
HM145	The Causeway Potters Bar	Urban Traffic	526409	201715	NO_2	NO	17	1.4	NO	1.9

(1) 0m if the monitoring site is at a location of exposure (e.g. installed on/adjacent to the façade of a residential property).

(2) N/A if not applicable.

(3) Proposed or altered AQMA.

Table A.3 – Annual Mean NO_2 Monitoring Results

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2016 (%) (2)	NO_2 Annual Mean Concentration ($\mu g/m^3$) (3)				
					2012	2013	2014	2015	2016
Hertsmere Borehamwood Roadside	Roadside	Automatic		98	**61.0**	**48.1**	**44.1**	**43.2**	33
Hertsmere Borehamwood Background	Urban Background	Automatic		99	27.0	28.2	31.5	27.8	24
HM39	Roadside	Diffusion Tube		91.7	**55**	**52**	**51.8**	**45.7**	**49.1**
HM40	Urban Background	Diffusion Tube		100	29	27	26.1	21.6	24.9
HM41	Roadside	Diffusion Tube		75	37	36	35.4	29.8	34.5
HM45/46/47	Urban Background	Diffusion Tube		100	25	27	25.5	20.1	22.1
HM48	Roadside	Diffusion Tube		100	**50**	**49**	**48.2**	37.7	**40.4**
HM49	Roadside	Diffusion Tube		100	**59**	**59**	**56.1**	**52.2**	**56.6**
HM50	Roadside	Diffusion Tube		100	**62**	**59**	**53.9**	**53.3**	**55.3**
HM52	Roadside	Diffusion Tube		100	**40**	**40**	**44.2**	35.8	**39.6**
HM53	Urban Background	Diffusion Tube		100	22	22	21.3	18.4	21.5
HM54	Kerbside	Diffusion Tube		100	32	31	26.9	23.3	27.6
HM55	Urban Background	Diffusion Tube		91.7	25	24	23	20.8	24.3
HM57	Roadside	Diffusion Tube		100	**51**	**46**	**46.8**	**41.6**	**45.1**
HM58	Roadside	Diffusion Tube		100	29	28	27.4	24.4	26.7
HM59	Urban Background	Diffusion Tube		100	23	19	17.6	16.8	19.5

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Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2016 (%) (2)	NO_2 Annual Mean Concentration ($\mu g/m^3$) (3)				
					2012	2013	2014	2015	2016
HM60	Roadside	Diffusion Tube		100	35	33	30.5	28.9	30.8
HM61	Other	Diffusion Tube		100	**50**	**45**	**46.5**	**43.3**	**46.5**
HM62	Roadside	Diffusion Tube		100	**43**	**44**	**40.1**	34.7	**41.6**
HM63	Other	Diffusion Tube		100	**42**	36	**40.1**	34.1	**37.8**
HM64	Roadside	Diffusion Tube		100	**56**	**48**	**47.2**	**41.8**	**49**
HM65	Roadside	Diffusion Tube		100	**49**	**45**	**44.9**	38.3	**42.5**
HM66	Roadside	Diffusion Tube		100	**46**	38	38.6	34.3	**38.1**
HM67	Roadside	Diffusion Tube		100	**42**	39	36.1	30.4	34.8
HM69	Roadside	Diffusion Tube		100	**53**	**51**	**48.2**	**43.7**	**49.4**
HM70	Roadside	Diffusion Tube		100	39	32	34	30.1	33.2
HM71	Roadside	Diffusion Tube		100	**49**	**51**	**47.5**	**40.1**	**44.8**
HM74/75/76	Roadside	Diffusion Tube		91.7	37	**44**	37.6	31.6	33.3
HM79/80/81	Roadside	Diffusion Tube		83.3	36	38	37.4	32.7	34.3
HM82/83/84	Roadside	Diffusion Tube		100	**40**	**43**	35.2	29.9	34.6
HM85	Urban Background	Diffusion Tube		100	24	26	25.8	21.3	24.1
HM86	Other	Diffusion Tube		83.3	**55**	**43**	**46.7**	**41.8**	**43**
HM93	Roadside	Diffusion Tube		100	31	29	31.7	26	29.1
HM99/100/101	Roadside	Diffusion Tube		83.3	**50**	**56**	**43.2**	38.6	**44.1**
HM102	Kerbside	Diffusion Tube		100	39	**58**	**52.4**	**47.2**	**51.3**
HM105	Urban Background	Diffusion Tube		100	31	33	29.7	26.6	31.3

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Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2016 (%) (2)	NO_2 Annual Mean Concentration ($\mu g/m^3$) (3)				
					2012	2013	2014	2015	2016
HM108/109/110	Roadside	Diffusion Tube		100	**47**	**69**	**64.5**	**55.9**	**62.1**
HM111	Roadside	Diffusion Tube		100	30	31	33.5	24.3	28.1
HM114	Roadside	Diffusion Tube		100	**40**	37	34.5	30.8	35.2
HM117/118/119	Roadside	Diffusion Tube		100	**46**	**50**	**44.5**	35.6	**40.1**
HM120/121/122	Urban Background	Diffusion Tube		100		29	31.6	25.3	31.7
HM123/124/125	Roadside	Diffusion Tube		83.3		**46**	**47.1**	38.2	**42.2**
HM126	Roadside	Diffusion Tube		100		**41**	38.3	32.5	**36.8**
HM129	Roadside	Diffusion Tube		100		36	37.5	33.5	33.1
HM132	Roadside	Diffusion Tube		100		37	32.7	29	31.2
HM135	Other	Diffusion Tube		100		34	37.1	34.3	35.8
HM136	Roadside	Diffusion Tube		66.67					31
HM137	Roadside	Diffusion Tube		75					31.3
HM138	Roadside	Diffusion Tube		75					35.1
HM139	Kerbside	Diffusion Tube		66.67					**43.7**
HM140	Kerbside	Diffusion Tube		75					**46.6**
HM141	Roadside	Diffusion Tube		75					**46**
HM142	Roadside	Diffusion Tube		66.67					34.7
HM143	Roadside	Diffusion Tube		66.67					**59.9**
HM144	Roadside	Diffusion Tube		75					31.5
HM145	Roadside	Diffusion Tube		75					**38.7**

Notes: Exceedances of the NO_2 annual mean objective of 40µg/m^3 are shown in **bold**.

NO_2 annual means exceeding 60µg/m^3, indicating a potential exceedance of the NO_2 1-hour mean objective are shown in **bold and underlined.**

(1) data capture for the monitoring period, in cases where monitoring was only carried out for part of the year.

(2) data capture for the full calendar year (e.g. if monitoring was carried out for 6 months, the maximum data capture for the full calendar year is 50%).

(3) Means for diffusion tubes have been bias adjusted. All means have been "annualised" as per Technical Guidance LAQM.TG16 if valid data capture for the full calendar year is less than 75%. See Appendix C for details.

Table A.4 – 1-Hour Mean NO_2 Monitoring Results

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2016 (%) (2)	NO_2 1-Hour Means > 200µg/m^3 (3)				
					2012	2013	2014	2015	2016
Hertsmere Borehamwood Roadside	Roadside	Automatic		98			0 (166)	0	2
Hertsmere Borehamwood Background	Urban Background	Automatic		99	0	0 (96)	0	0	0

Notes: Exceedances of the NO_2 1-hour mean objective (200µg/m^3 not to be exceeded more than 18 times/year) are shown in **bold.**

(1) data capture for the monitoring period, in cases where monitoring was only carried out for part of the year.

(2) data capture for the full calendar year (e.g. if monitoring was carried out for 6 months, the maximum data capture for the full calendar year is 50%).

(3) If the period of valid data is less than 85%, the 99.8th percentile of 1-hour means is provided in brackets.

Table A.5 – Annual Mean PM_{10} Monitoring Results

Site ID	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2016 (%) (2)	PM_{10} Annual Mean Concentration (µg/m^3) (3)				
				2012	2013	2014	2015	2016
Hertsmere Borehamwood Roadside	Roadside		91	-	-	21	21.8	19
Hertsmere Borehamwood Background	Urban Background		97	-	-	16	14.7	14

Notes: Exceedances of the PM_{10} annual mean objective of 40µg/m^3 are shown in **bold.**

(1) data capture for the monitoring period, in cases where monitoring was only carried out for part of the year.

(2) data capture for the full calendar year (e.g. if monitoring was carried out for 6 months, the maximum data capture for the full calendar year is 50%).

(3) All means have been "annualised" as per Technical Guidance LAQM.TG16, valid data capture for the full calendar year is less than 75%. See Appendix C for details.

Table A.6 – 24-Hour Mean PM_{10} Monitoring Results

Site ID	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2016 (%) (2)	PM_{10} 24-Hour Means > 50µg/m^3 (3)				
				2012	2013	2014	2015	2016
Hertsmere Borehamwood Roadside	Roadside		91	**-**	-	1 (42)	8	5
Hertsmere Borehamwood Background	Urban Background		97	-	1 (38)	5	4	1

Notes: Exceedances of the PM_{10} 24-hour mean objective (50µg/m^3 not to be exceeded more than 35 times/year) are shown in **bold.**

(1) data capture for the monitoring period, in cases where monitoring was only carried out for part of the year.

(2) data capture for the full calendar year (e.g. if monitoring was carried out for 6 months, the maximum data capture for the full calendar year is 50%).

(3) If the period of valid data is less than 85%, the 90.4th percentile of 24-hour means is provided in brackets.

Table A.7 – $PM_{2.5}$ Monitoring Results

Site ID	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2016 (%) (2)	$PM_{2.5}$ Annual Mean Concentration ($\mu g/m^3$) (3)				
				2012	2013	2014	2015	2016
Hertsmere Borehamwood Roadside	Roadside		90			15.3	12.0	12
Hertsmere Borehamwood Background	Urban Background		96			11.4	9.0	10

(1) Data capture for the monitoring period, in cases where monitoring was only carried out for part of the year.

(2) Data capture for the full calendar year (e.g. if monitoring was carried out for 6 months, the maximum data capture for the full calendar year is 50%).

(3) All means have been "annualised" as per Technical Guidance LAQM.TG16, valid data capture for the full calendar year is less than 75%. See Appendix C for details.

Appendix B: Full Monthly Diffusion Tube Results for 2016

Table B.1 – NO_2 Monthly Diffusion Tube Results - 2016

Site ID	NO_2 Mean Concentrations ($\mu g/m^3$)														
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean		
													Raw Data	Bias Adjusted (0.92) & Annualised[1]	Distance Corrected to nearest exposure (2)
HM39	65.4	60.2	45	-	44.7	44	51.8	43	51.1	53.4	62.5	66.5	53.4	**49.1**	37.3
HM40	36.8	34.4	22.5	23.5	19	20.6	18.5	16.1	26.9	28.5	35.6	43.2	27.1	24.9	24.9
HM41	47.6	37	-	-	33.6	-	22.3	28.94	37.1	38.7	40.2	51.5	37.5	34.5	34.5
HM45/46/47	33.1	29.2	19.8	21.3	18	16.6	14.8	14.1	24.1	22.5	30.4	39	24.1	22.1	22.1
HM48	51.6	47.1	39.7	40.6	39.7	38.7	34.4	33.2	43.6	51	46.4	61	44	**40.4**	34.2
HM49	77.5	64.3	48	57.5	52.7	64.1	57.6	53.3	77	58	57.7	71	61.6	**56.6**	**41.9**
HM50	72.1	68.7	56.3	52.6	58.3	60	56.2	35.3	66.7	62	59.7	74.5	60.2	**55.3**	38.2
HM52	47.9	50.8	37.4	39.6	37.6	38	40.8	32.2	45.8	36.8	47.7	60.3	43	**39.6**	36.1
HM53	26.4	25.2	23.7	19.3	19.2	19	15.8	15.4	25	25.1	29	36.8	23.4	21.5	21.5
HM54	33.2	38	29.5	25.5	27.3	26.7	22.4	18.1	27.5	33.4	34	43.1	30	27.6	27.6
HM55	32.1	31.1	27.7	24	22.5	19	17.3	-	25	28.5	29.2	35	26.5	24.3	24.3
HM57	58.4	57	43.6	40.6	46.6	39.5	36.1	43.2	61.4	44.5	56.4	60.2	49	**45.1**	35.2

Site ID	NO_2 Mean Concentrations ($\mu g/m^3$)														
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean		
													Raw Data	Bias Adjusted (0.92) & Annualised[1]	Distance Corrected to nearest exposure (2)
HM58	41.6	32.6	25	30	22	22.4	23.1	21.2	31.4	26.6	29.8	42.2	29	26.7	26.7
HM59	29.1	26.2	18.1	16.8	17.1	14.5	16.4	14.4	23.2	19.4	26.4	32.1	21.2	19.5	19.5
HM60	42.5	39.2	39.4	31.8	32.3	29.4	28.3	28.1	28.8	32.7	31	38.4	33.5	30.8	30.8
HM61	56	52.3	45.4	50	43.5	38.8	52.1	49.2	73.5	38.3	46.2	61	50.6	**46.5**	**40.3**
HM62	47	48.7	51.5	43.6	43.6	43.8	40.9	33.5	47.5	41	44.5	57.5	45.3	**41.6**	31.9
HM63	60.7	45.7	30.4	44.07	37.9	33.7	37.3	35.4	42.6	36.1	42	47.4	41.1	**37.8**	33.8
HM64	69	60.6	41.2	47.7	40.5	41.8	57.7	42.1	46	44.7	74.5	73.4	53.3	**49**	31
HM65	64.3	48.5	36	36	39.1	37	50	40.5	43.6	41.5	48.7	69.7	46.3	**42.5**	34.5
HM66	54.7	47.8	32	34.5	33.6	36.7	42.7	35	33.4	35.2	45.1	66.3	41.3	**38.1**	32.7
HM67	45.2	41.6	30.1	35.4	35.8	36	34	29.8	34.5	36	40.2	54.3	37.8	34.8	34.8
HM69	77.5	60.1	44.6	46.1	45.5	44	51.5	46.8	60.4	42.7	60.3	64.3	53.7	**49.4**	38.2
HM70	59.4	38.1	27.1	29.4	28.8	25.7	35.1	26.8	35.6	29.8	42.4	54.4	36.1	33.2	33.2
HM71	54.8	54.2	46	48.2	47.6	45.1	47	42.5	56	43.8	39.4	60.5	48.8	**44.8**	36.3
HM74/75/76	36.3	40.5	36.1	34.7	-	34.2	27.6	26	35.6	40.3	37.6	48	36.2	33.3	33.3
HM79/80/81	-	42.7	37.8	37.6	25.6	33.5	32.2	28	39.4	34.8	39.8	46.8	37.3	34.3	34.3

Site ID	NO_2 Mean Concentrations ($\mu g/m^3$)														
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean		
													Raw Data	Bias Adjusted (0.92) & Annualised(1)	Distance Corrected to nearest exposure (2)
HM82/83/84	43.6	42.6	34.6	33.4	34.1	35	34.5	31	38.3	38.2	35.8	49.2	37.6	34.6	34.6
HM85	32.4	33	28.4	20.6	20.4	19.8	17.8	16.5	26.4	25	33.3	40.3	26.2	24.1	24.1
HM86	71.1	49	27.3	43.1	44.7	-	-	45.4	47.2	33.6	46	60.7	46.8	**43**	31.5
HM93	51	39.6	26.7	23.2	24	22.8	25.2	19.4	28.5	26	35.6	56.5	31.6	29.1	29.1
HM99/100/101	47.2	55	46	45.3	44.2	44.3	-	-	46	50.3	47	57.3	47.9	**44.1**	**40.1**
HM102	59.3	61.7	49	48.1	54	53.1	49.28	42.2	60	52	69.5	70.8	55.8	**51.3**	38
HM105	42.2	38	30	30.1	29	25.1	34	22.6	35.2	33.5	35	51.7	34	31.3	31.3
HM108/109/110	73	71.4	61.2	62.7	67.5	63	58.5	52.8	71.4	65.1	82	81	67.5	**62.1**	39.4
HM111	34.6	33.2	33.1	29.5	31.3	27.1	20.4	21.4	31.7	30.9	33.8	40	30.6	28.1	28.1
HM114	48.1	41	32.3	35.4	34	36	33.7	31.4	39.6	35.8	41.8	50.7	38.3	35.2	35.2
HM117/118/119	47.6	53.1	44.4	44.6	39.3	40	34	33.8	39.7	45.6	45.5	54	43.6	**40.1**	34
HM120/121/122	70	35.3	26.4	39.5	26	22.7	25.5	21.7	30.3	30.3	34.2	51.1	34.5	31.7	31.7
HM123/124/125	56.7	50.2	35	28	25.3	-	47.4	42.7	44	51	57.7	60.2	45.9	**42.2**	26.7
HM126	43	39.8	36.63	31.8	35.1	40.1	40.3	32.3	44.4	40.4	43.7	52.7	40.1	**36.8**	28
HM129	43.7	39.7	31.3	33	36	34.1	38	33.2	35.5	34.6	33	40	36	33.1	33.1

Site ID	NO_2 Mean Concentrations ($\mu g/m^3$)														
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean		
													Raw Data	Bias Adjusted (0.92) & Annualised[1]	Distance Corrected to nearest exposure (2)
HM132	40.6	39	37.3	32.2	32	29.4	24.2	24.8	33.5	34.8	36	42.6	33.9	31.2	31.2
HM135	45	46.5	30.3	37.6	27.2	32.4	51.4	33.1	39	32	39.6	52.1	38.9	35.8	35.8
HM136	-	-	-	24.18	27.99	23.4	29.4	25	34	-	37.3	52.7	31.8	31	31
HM137	-	-	-	25	28.6	26.4	28.6	29.7	31.6	37.5	45.1	51.8	34	31.3	31.3
HM138	-	-	-	37	33.23	31.5	34	29.7	33.1	40.8	49	55	38.2	35.1	35.1
HM139	-	-	-	54.7	37.7	37.3	33.8	36.2	42.2	42.6	44.8	-	41.2	**43.7**	37.4
HM140	-	-	-	40.5	45.7	43.3	46.8	40.2	53.5	56.1	58.1	69.8	50.5	**46.6**	39.3
HM141	-	-	-	44.2	41.5	41.6	33.2	34.8	61.4	53	72.4	63.7	50	**46**	36.2
HM142	-	-	-	33.4	29.2	32.1	33	30.8	36.8	-	40	49.7	35.6	34.7	34.7
HM143	-	-	-	42.6	56.8	-	63	50	77	58.4	78	80	63.3	**59.9**	**41.7**
HM144	-	-	-	35	28	26.5	33	27.4	35	29.4	41.8	51.5	34.2	31.5	31.5
HM145	-	-	-	40.3	43	41	39.1	32.5	35.1	40.2	47.3	59.8	42.1	**38.7**	27.5

(1) See Appendix C for details on bias adjustment & annualisation.

(2) Distance corrected to nearest public exposure.

Appendix C: Supporting Technical Information / Air Quality Monitoring Data QA/QC

New Pollution Sources in Hertsmere Borough Council

New Developments

The Elstree Way Corridor Development, situated on the edge of Borehamwood and the A1, conversion of commercial premises into residential. This new development consists of approximately 10 new residential sites.

Hertsmere examine all new developments through the planning system and request air quality assessments, where relevant. These assessments investigate the impacts of any traffic generated by the development, the impacts of any energy plant emissions generated by the development and/or the impacts of existing and new sources of pollution on proposed residents, as necessary. Where required, mitigation is requested.

Monitoring is undertaken along the Elstree Corridor by nitrogen dioxide diffusion tubes and a roadside monitor measuring nitrogen dioxides and PM_{10} and $PM_{2.5}$.

The managed motorway scheme carried out on the M25 has now been completed. This involved the addition of a fourth lane in each direction from Junction 23 South Mimms to Junction 24 Potters Bar. Monitoring of two sites, both AQMAs connected to the motorway continues HM63 and HM86.

HM61 Blanche Lane within AQMA 3 remains a declared AQMA. This part of the M25 motorway had extra lanes added keeping the existing hard shoulder and therefore does not form part of the managed motorway in Hertsmere.

The national bias adjustment factor (0.92) has been used in order to be consistent with other air quality reports. As the national bias adjustment factor is based on the significantly greater number of studies than the local bias adjustment factor, it is considered appropriate to apply the national bias adjustment factor for 2016.

QA/QC of Diffusion Tube Monitoring

Nitrogen dioxide analysis procedures are compliant with the Diffusion Tubes for Ambient NO_2 Monitoring: Practical Guidance for users and laboratories (February

2008). Hertsmere diffusion tubes are supplied and analysed by Gradko utilising the 20% TEA in water preparation method. 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.

Gradko has been assessed as part of the Workplace Analysis Scheme for Proficiency (WASP). In WASP Round 124 (March 2014 to November 2015) Gradko was 100% satisfactory in all WASP trials.

Diffusion Tube Annualisation

Four diffusion tubes HM136, HM139, HM142 and HM143 have a lower than 75% data capture rate. Annualisation for 2016 has been undertaken using the continuous monitoring site approach as detailed within Box 7.10 within LAQM (TG16). The annualisation factors applied to each of the diffusion tube results are detailed in the table below.

Diffusion Tube ID	Annualisation Factor London Haringey Priory Park South	Annualisation Factor London Bloomsbury	Annualisation Factor London N. Kensington	Average Annualisation Factor
HM136	1.0534	1.0759	1.0474	1.0589
HM139	1.1733	1.1364	1.1519	1.1539
HM142	1.0534	1.0759	1.0474	1.0589
HM143	1.0227	1.0633	1.0034	1.0298

Bias Adjustment

For 2016 the national bias-adjustment factor for Gradko International was 0.92 taken from the National Bias Adjustment Factor Spreadsheet. The National Adjustment Factor was used in this report as it is considered to be consistent with other air quality reports.

Distance Correction

Twenty-six of the diffusion tube sites required distance correction. The concentrations at these sites have therefore been distance corrected to the nearest exposure using the NO_2 fall-off with distance calculator available on the LAQM support website. Estimated background concentrations at each of the monitoring sites have been determined for 2016 using Defra's background maps. These cover the whole of the UK on a 1x1 km grid and are published for each year from 2013 until 2030.

The table below shows the distance corrected results.

Diffusion tube sites for Distance Correction

Monitoring Site	Distance from monitoring site to kerb (m)	Distance from receptor to kerb (m)	Background concentration (µg/m^3)	Bias Adjusted (0.92) & Annualised concentration at site (µg/m^3)	Distance corrected concentration (µg/m^3)
HM 39	1.3	8.3	19.1	49.1	37.3
HM 48	1.9	6.3	17.8	40.4	34.2
HM 49	1.1	7.0	17.8	56.6	**41.9**
HM 50	1.2	10.7	17.8	55.3	38.2
HM 52	1.8	3.6	17.8	39.5	36.1
HM 57	1.8	11.0	21.2	45	35.2
HM 61	14.6	29.2	26.05	46.5	**40.3**
HM 62	3.1	15.6	18.5	41.6	31.9
HM 63	29.1	48.3	25.09	37.8	33.8
HM 64	2.1	25.4	18.5	49	31

Monitoring Site	Distance from monitoring site to kerb (m)	Distance from receptor to kerb (m)	Background concentration (µg/m3)	Bias Adjusted (0.92) & Annualised concentration at site (µg/m3)	Distance corrected concentration (µg/m3)
HM 65	2.8	10.5	18.5	42.5	34.5
HM 66	3	8.9	18.5	38.1	32.7
HM 69	3.1	18.1	25.09	49.4	38.2
HM 71	1.5	5.8	16.04	44.8	36.3
HM86	10.5	32.8	21.6	43	31.5
HM99/100/101	2.4	4.3	16.3	44.1	**40.1**
HM 102	0.5	4.5	16.9	51.3	38
HM108/109/110	0.5	11.6	21.2	62.1	39.4
HM117/118/119	2.3	6.6	16.3	40.1	34
HM123/124/125	3.6	38.1	18.01	42.2	26.7
HM 126	2.4	16.2	17.8	36.8	28
HM 139	2	6	19.1	43.7	37.4
HM 140	0.9	3.4	19.1	46.6	39.3
HM 141	0.8	5.3	19.1	46	36.2
HM 143	1.4	9.6	16.04	59.9	**41.7**
HM 145	1.4	18.4	18.5	38.7	27.5

QA/QC of Automatic Monitoring Station Monitoring

Air quality measurements from Hertsmere automatic monitoring stations in 2016 were validated and ratified to the standards described in the Local Air Quality Management Technical Guidance LAQM TG (16) by Ricardo.

Appendix D: Map(s) of Monitoring Locations

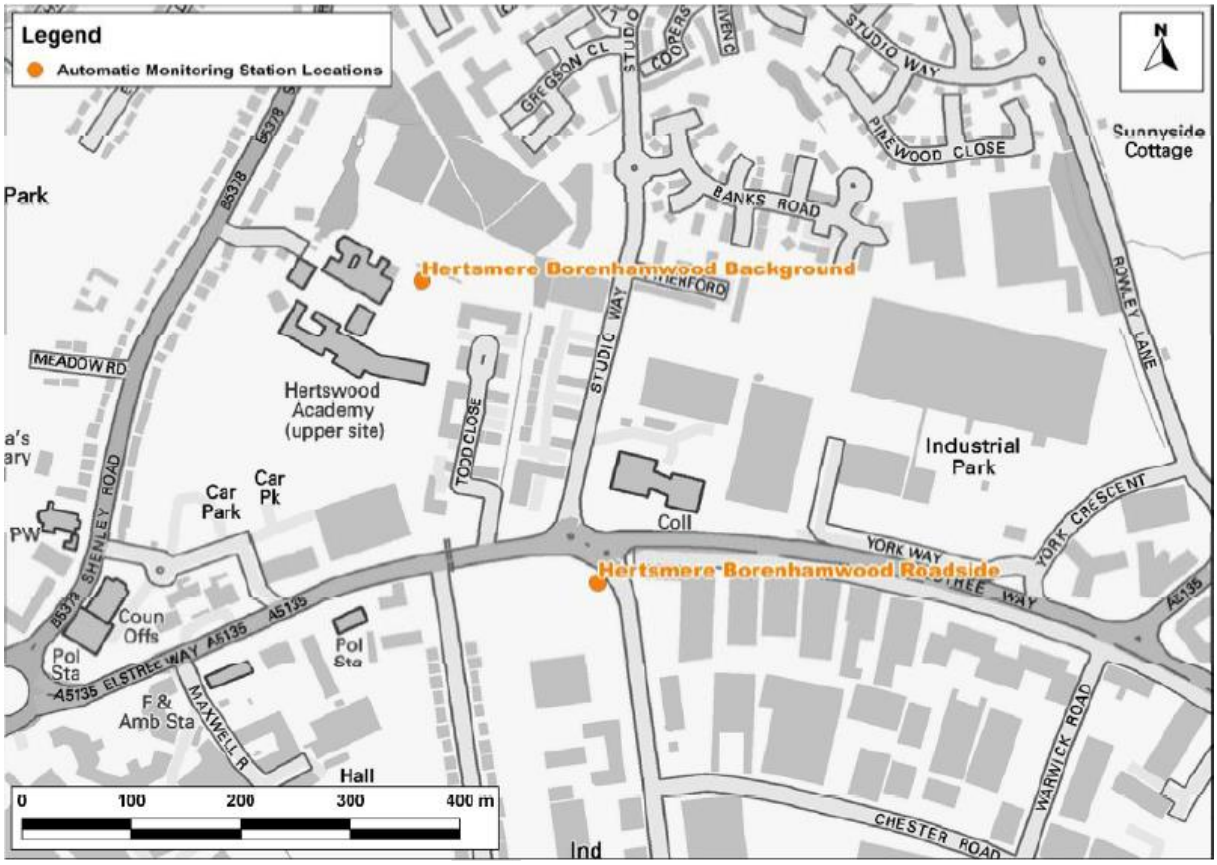

Figure A4.1 Hertsmere Automatic Monitoring Station Locations

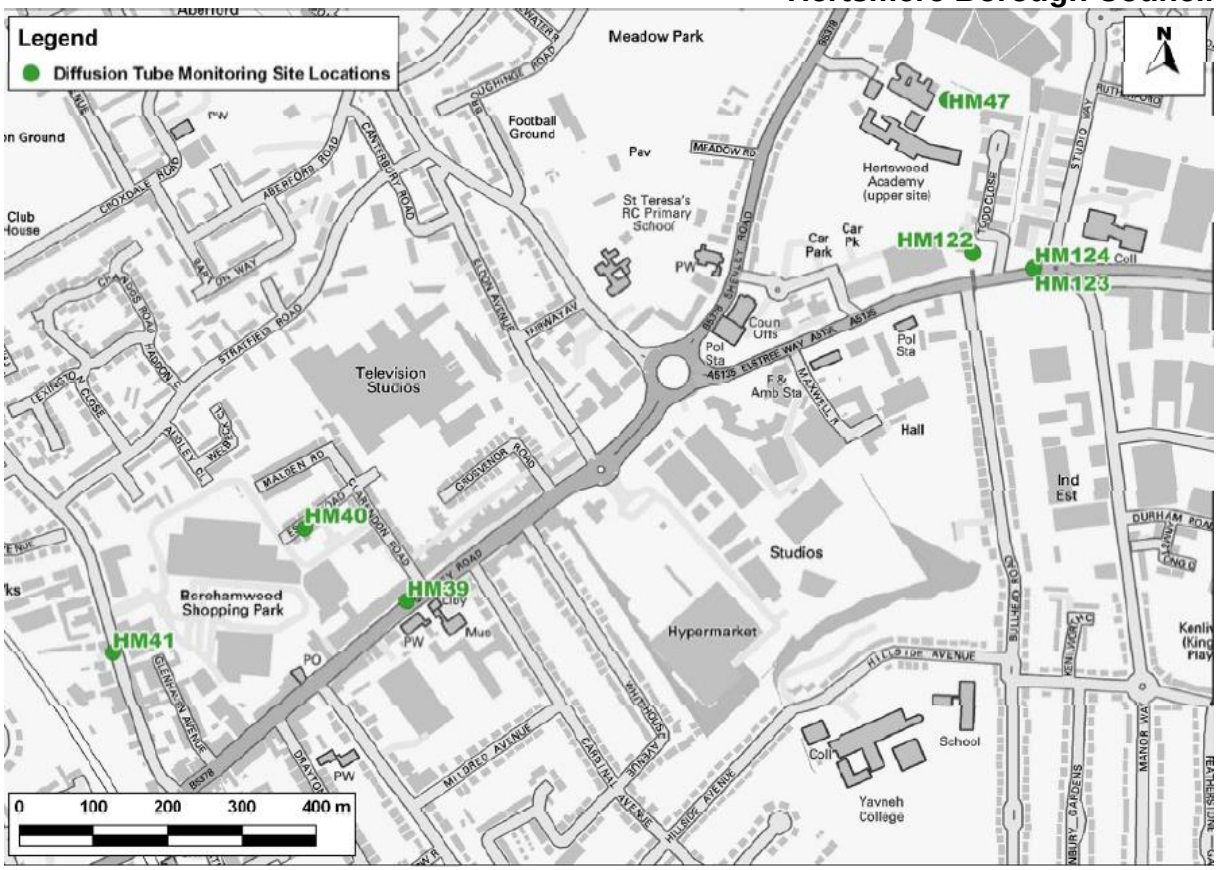

Figure A4.2 Hertsmere Diffusion Tube Monitoring Site Location, Borehamwood Centre.

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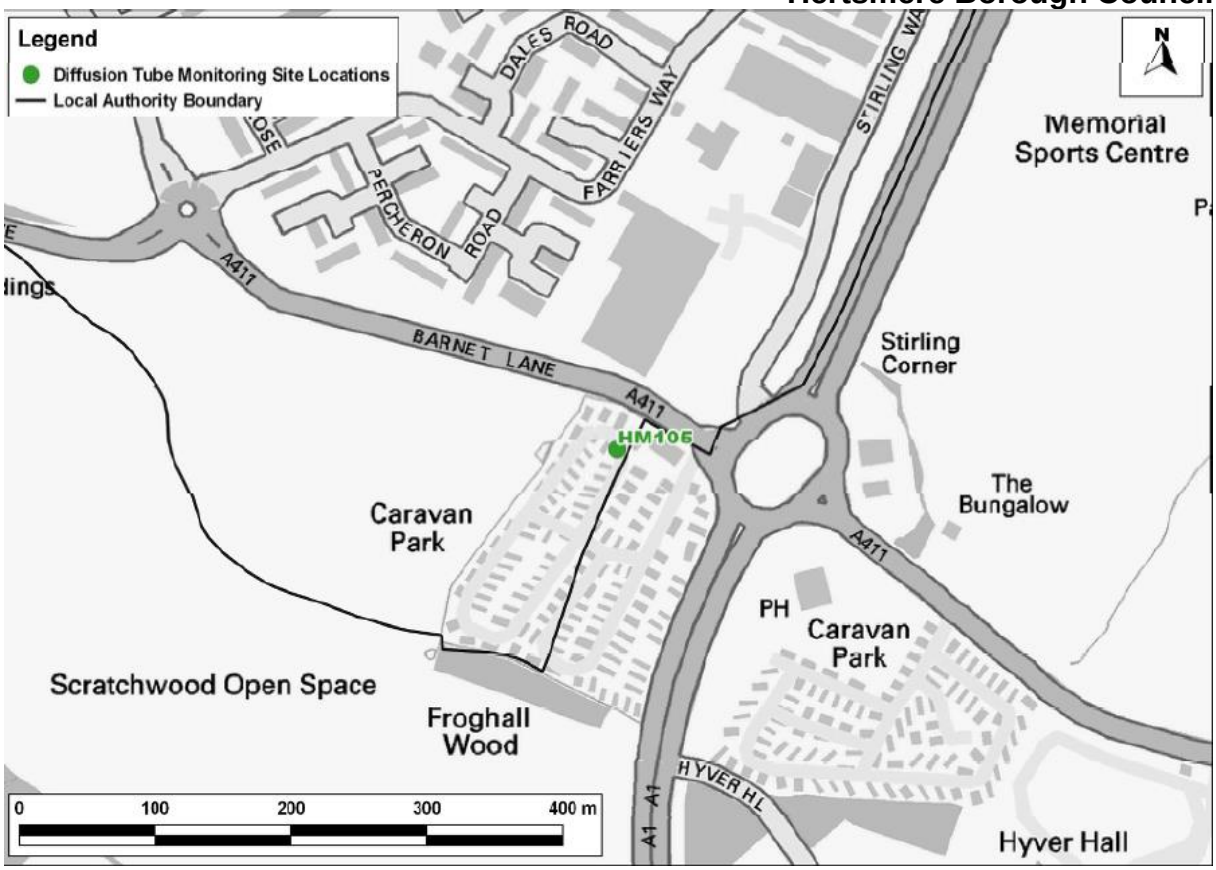

Figure A4.3 Hertsmere Diffusion Tube Monitoring Site Location, Borehamwood South.

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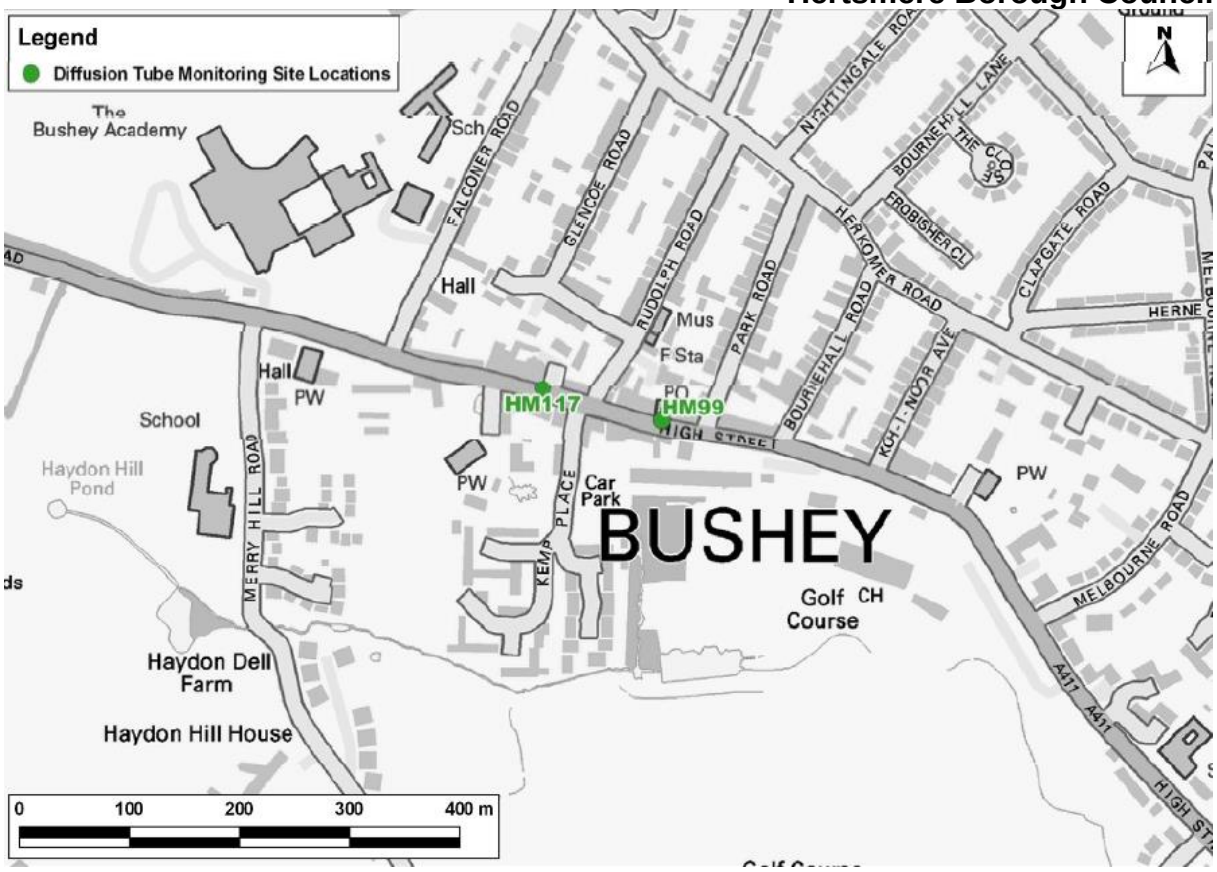

Figure A4.4 Hertsmere Diffusion Tube Monitoring Site Locations, Northwest Bushey

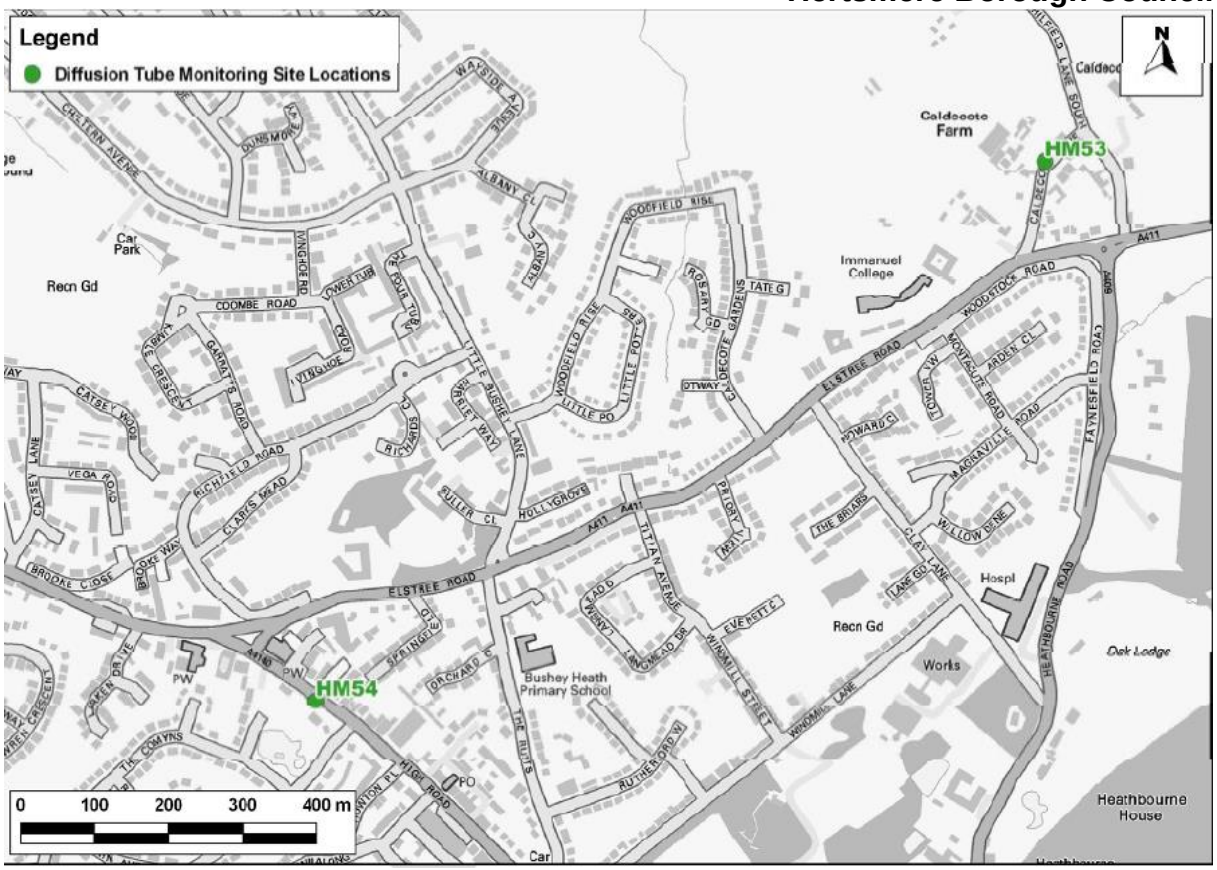

Figure A4.5 Hertsmere Diffusion Tube Monitoring Site Locations, Southeast Bushey

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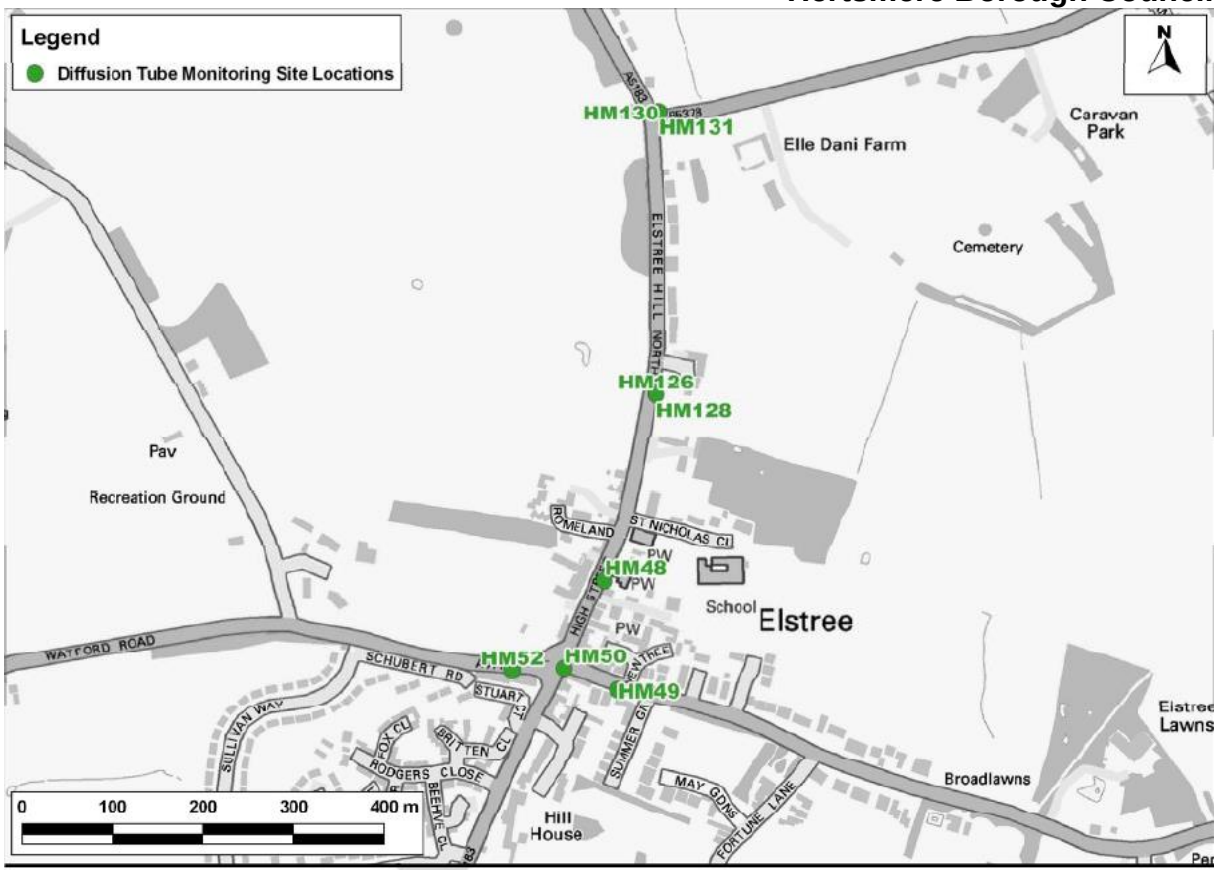

Figure A4.6 Hertsmere Diffusion Tube Monitoring Site Locations, Elstree

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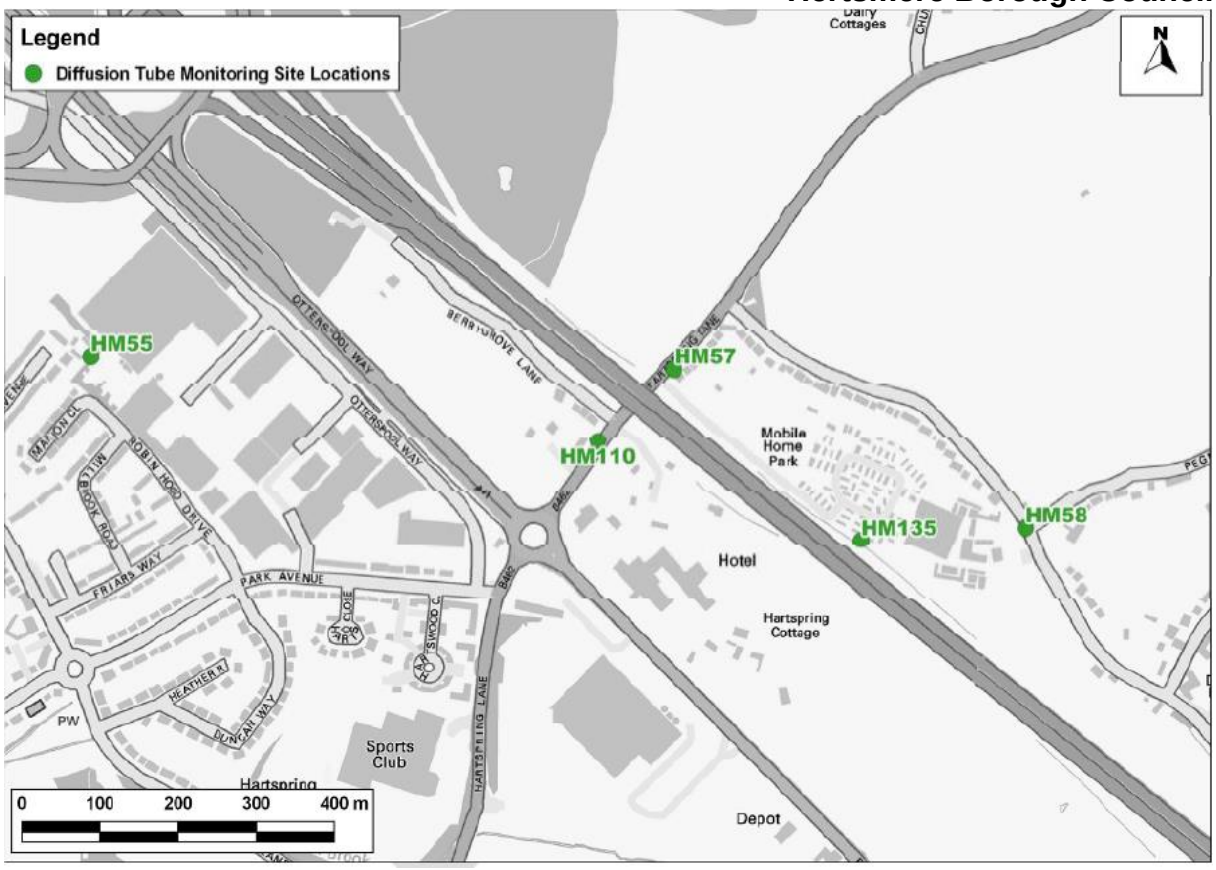

Figure A4.7 Hertsmere Diffusion Tube Monitoring Site Locations, M1 near Aldenham

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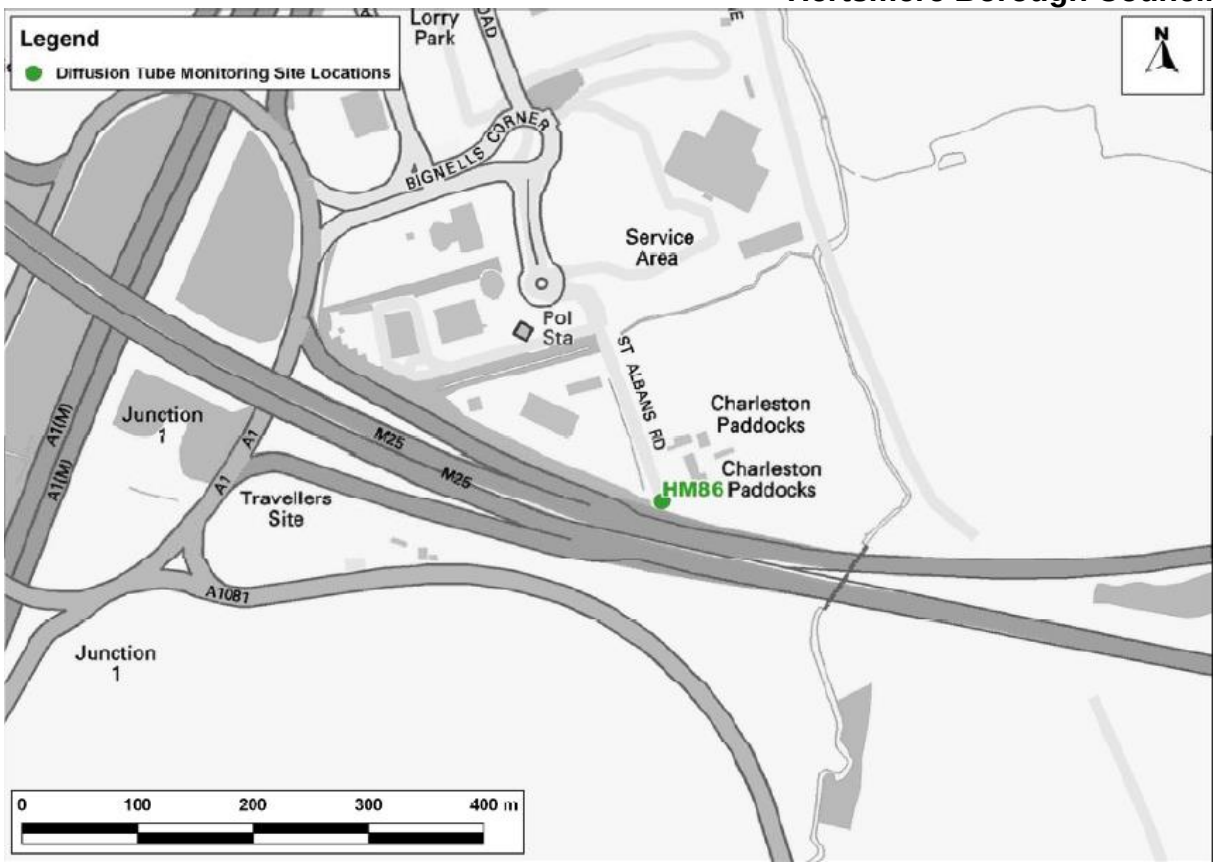

Figure A4.8 Hertsmere Diffusion Tube Monitoring Site Location, M25 near junction 1 A1, South Mimms.

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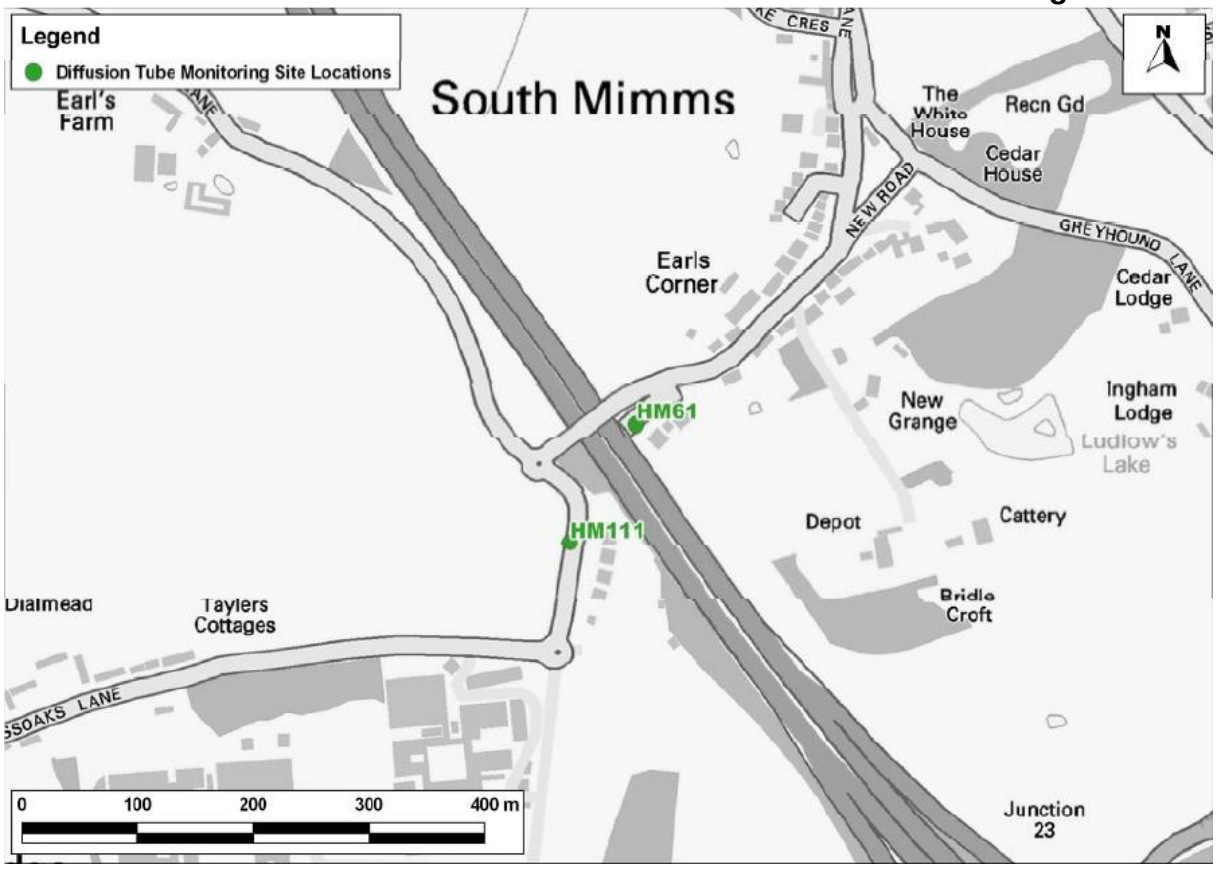

Figure A4.9 Hertsmere Diffusion Tube Monitoring Site Locations, M25 near Junction 23 South Mimms.

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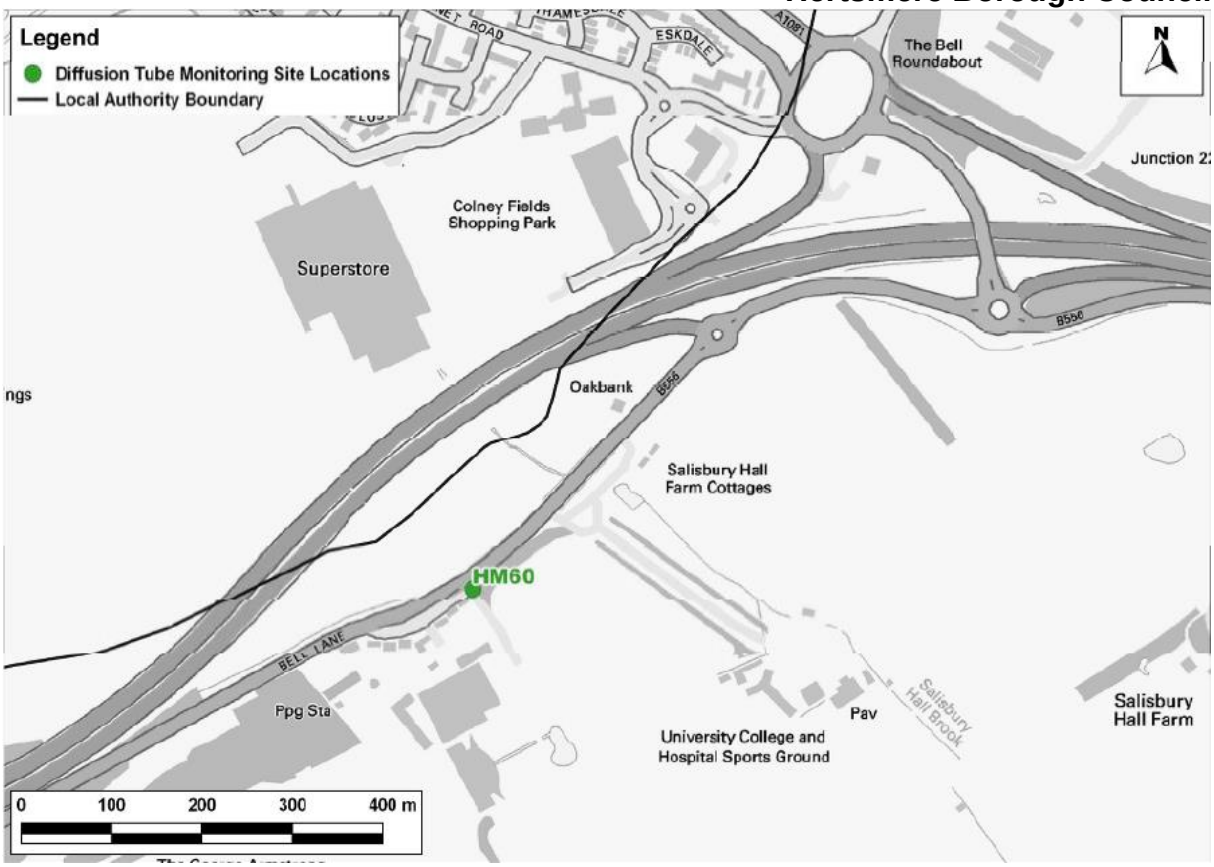

Figure A4.10 Hertsmere Diffusion Tube Monitoring Site Location, M25 near Junction 22

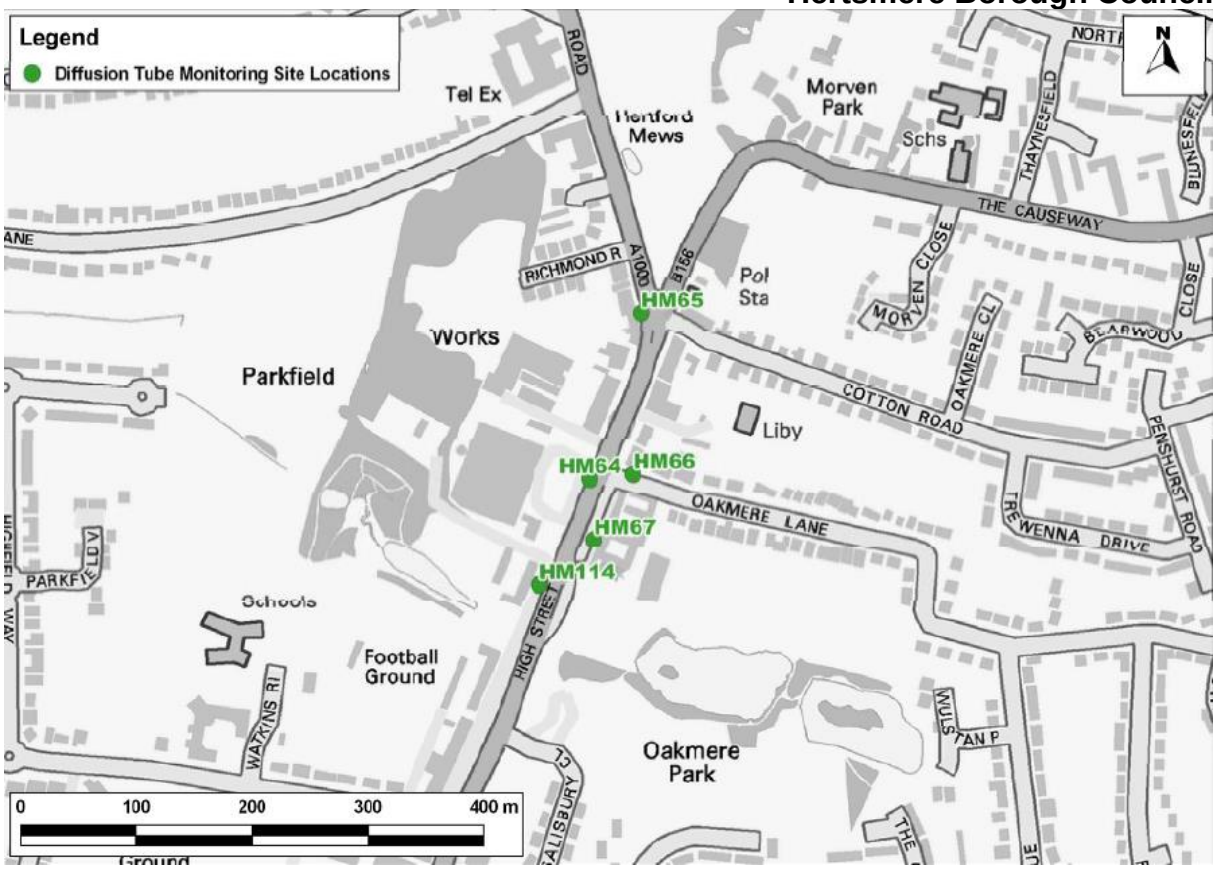

Figure A4.11 Hertsmere Diffusion Tube Monitoring Site Locations, Potters Bar Centre

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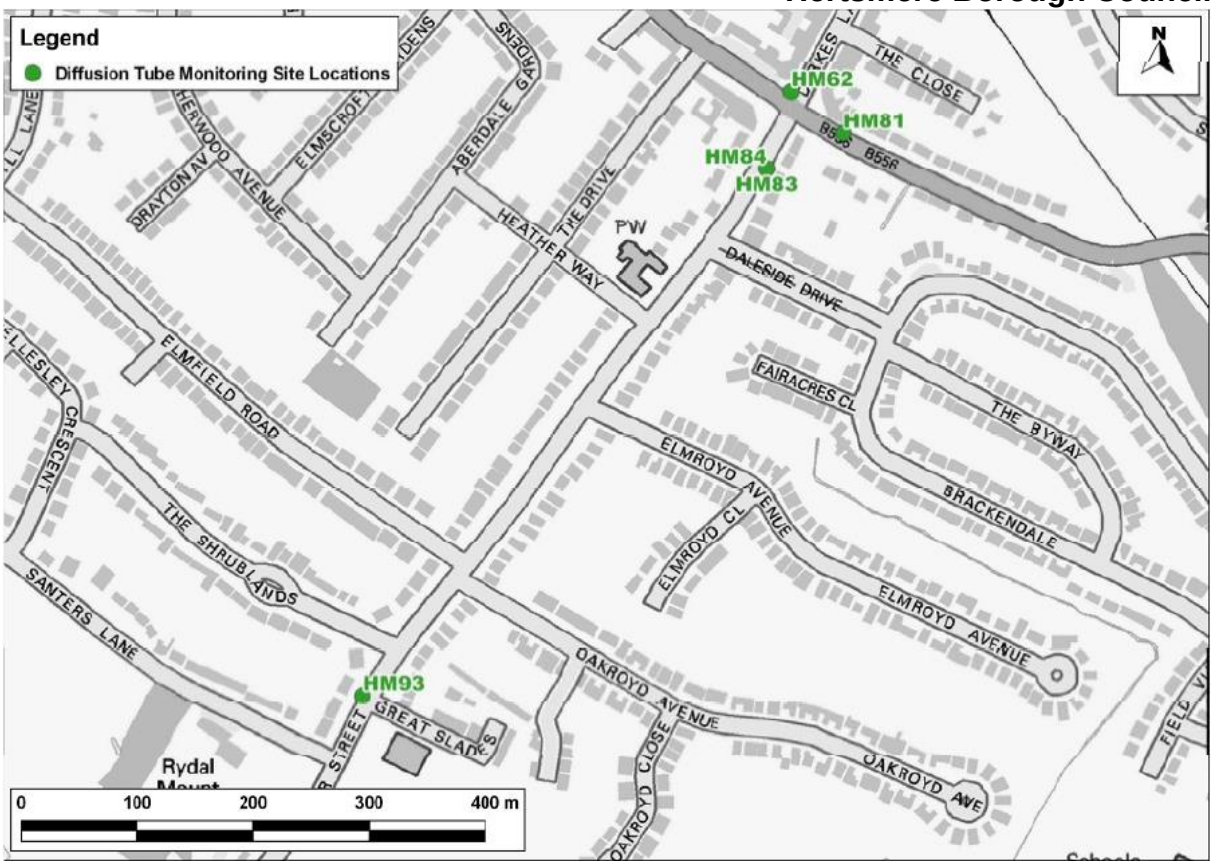

Figure A4.12 Hertsmere Diffusion Tube Monitoring Site Locations, Potters Bar South west.

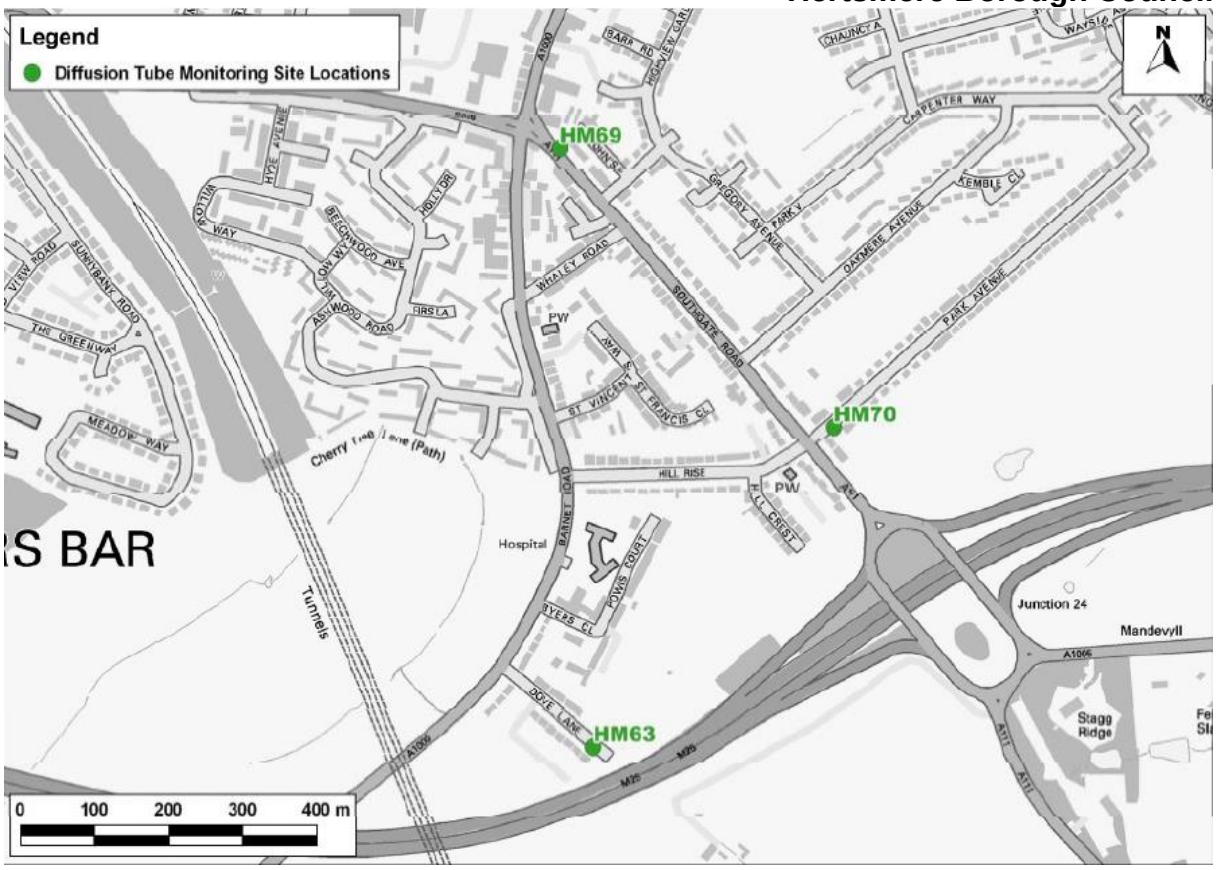

Figure A4.13 Hertsmere Diffusion Tube Monitoring Site Locations, Potters Bar South, near M25

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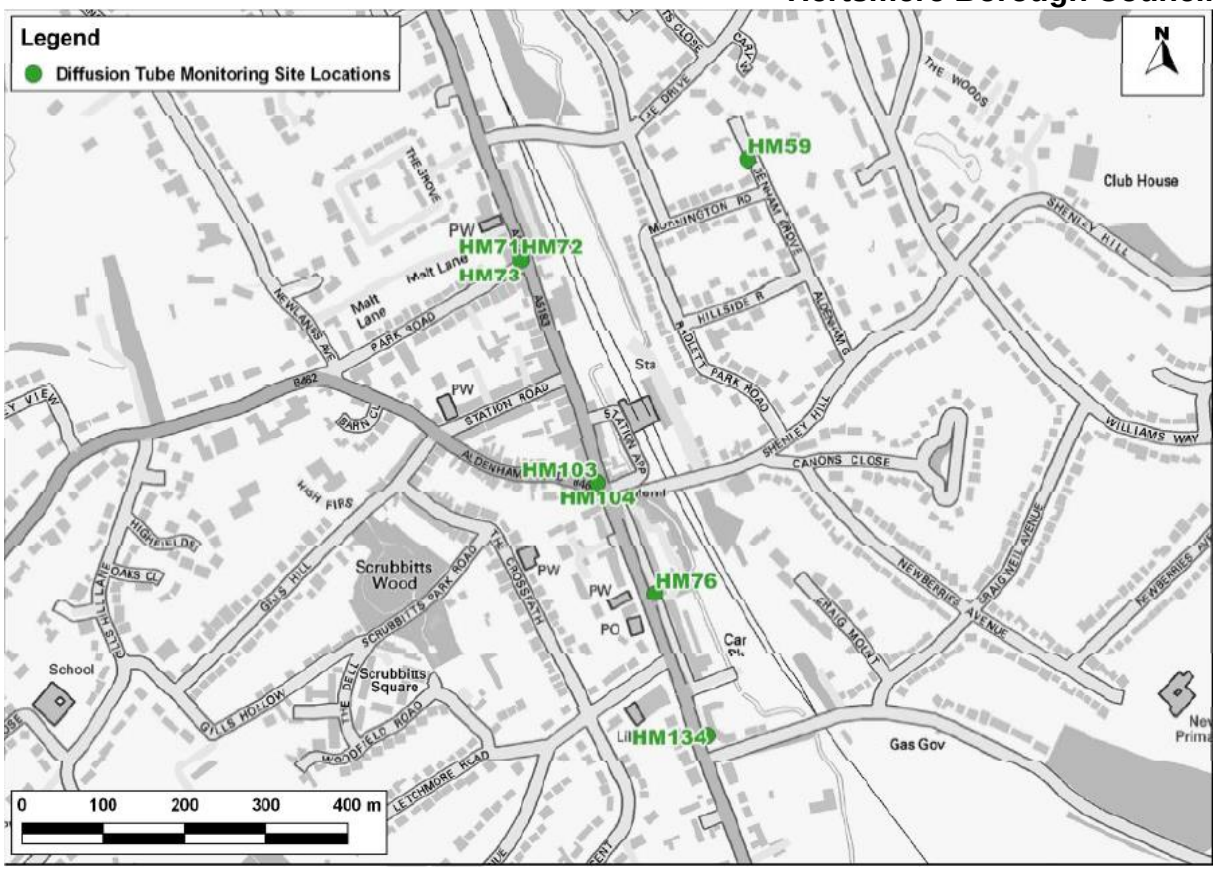

Figure A4.14 Hertsmere Diffusion Tube Monitoring Site Locations, Radlett

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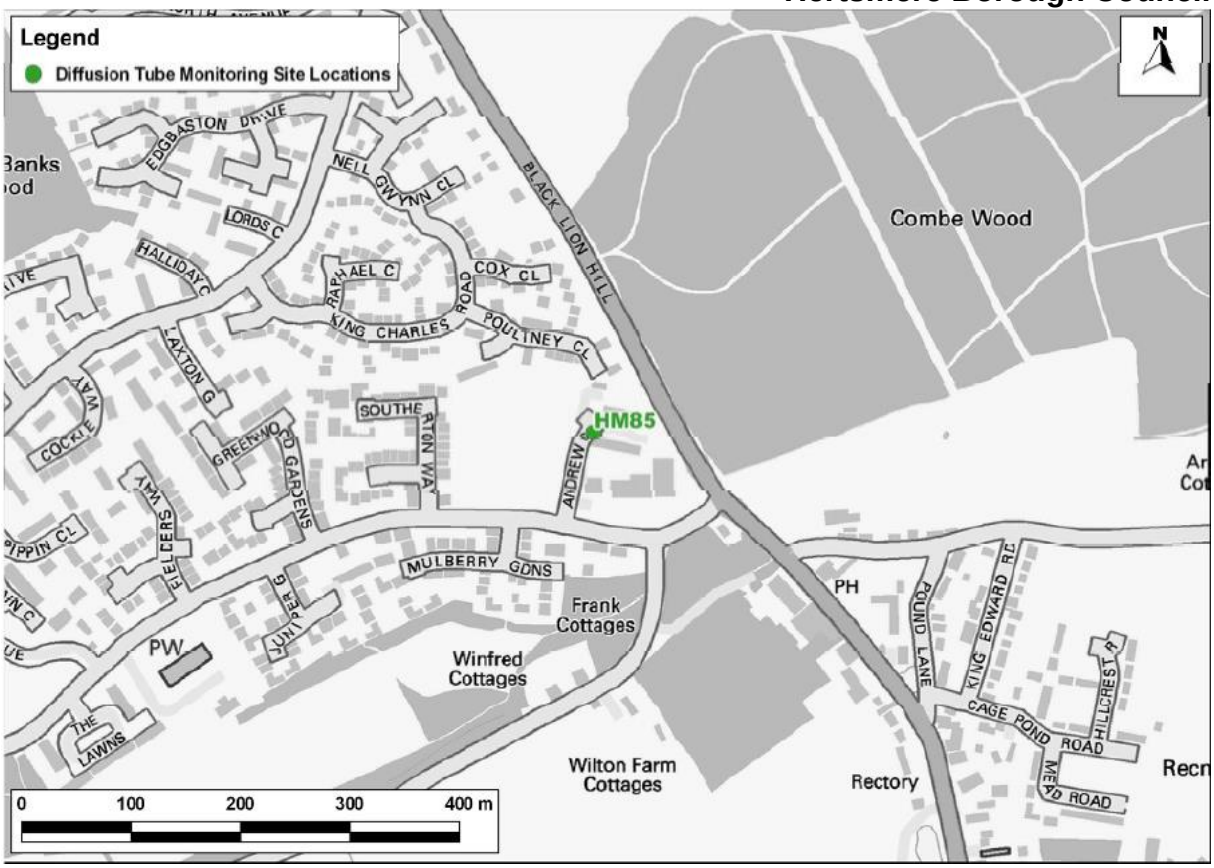

Figure A4.15 Hertsmere Diffusion Tube Monitoring Site Location, Shenley

Appendix E: Summary of Air Quality Objectives in England

Table E.1 – Air Quality Objectives in England

Pollutant	Air Quality Objective[4]	
	Concentration	Measured as
Nitrogen Dioxide (NO_2)	200 µg/m^3 not to be exceeded more than 18 times a year	1-hour mean
	40 µg/m^3	Annual mean
Particulate Matter (PM_{10})	50 µg/m^3, not to be exceeded more than 35 times a year	24-hour mean
	40 µg/m^3	Annual mean
Sulphur Dioxide (SO_2)	350 µg/m^3, not to be exceeded more than 24 times a year	1-hour mean
	125 µg/m^3, not to be exceeded more than 3 times a year	24-hour mean
	266 µg/m^3, not to be exceeded more than 35 times a year	15-minute mean

4. The units are in microgrammes

Glossary of Terms

Abbreviation	Description
AQAP	Air Quality Action Plan - A detailed description of measures, outcomes, achievement dates and implementation methods, showing how the local authority intends to achieve air quality limit values'
AQMA	Air Quality Management Area – An area where air pollutant concentrations exceed / are likely to exceed the relevant air quality objectives. AQMAs are declared for specific pollutants and objectives
ASR	Air quality Annual Status Report
Defra	Department for Environment, Food and Rural Affairs
DMRB	Design Manual for Roads and Bridges – Air quality screening tool produced by Highways England
EU	European Union
FDMS	Filter Dynamics Measurement System
LAQM	Local Air Quality Management
NO_2	Nitrogen Dioxide
NO_x	Nitrogen Oxides
PM_{10}	Airborne particulate matter with an aerodynamic diameter of 10µm (micrometres or microns) or less
$PM_{2.5}$	Airborne particulate matter with an aerodynamic diameter of 2.5µm or less
QA/QC	Quality Assurance and Quality Control
SO_2	Sulphur Dioxide
…	…

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