2016 Air Quality Annual Status Report (ASR): Hertsmere Borough Council

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Experts in air quality management & assessment

Document Control

Client	Hertsmere Borough Council	**Principal Contact**	Sarah Hoggett

Job Number	J2715

Report Prepared By:	Nicole Holland

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J2715 /1/F1	16 February 2017	Final Report	Stephen Moorcroft (Director)

Air Quality Consultants Ltd
23 Coldharbour Road, Bristol BS6 7JT Tel: 0117 974 1086
12 Airedale Road, London SW12 8SF Tel: 0208 673 4313
aqc@aqconsultants.co.uk

Registered Office: 12 St Oswalds Road, Bristol, BS6 7HT
Companies House Registration No: 2814570

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

This document is Hertsmere Borough Council's Annual Status Report (ASR). Results from monitoring by the Council are presented and sources of air pollution are identified. The ASR determines those changes since the last assessment, which could lead to the risk of an air quality objective being exceeded.

This Annual Status Report confirms that concentrations of nitrogen dioxide within Hertsmere continue to exceed the annual mean objective at some locations both within and outside declared Air Quality Management Areas (AQMAs), and remain below the objectives elsewhere. At all locations where exceedences of the nitrogen dioxide annual mean objective were measured outside declared AQMAs, these exceedences do not represent relevant exposure, and the nearest sites of relevant exposure are already encompassed by AQMAs. Nitrogen dioxide concentrations remain below the 1-hour mean objective throughout the borough, and concentrations of PM_{10} and $PM_{2.5}$ remain below all relevant objectives.

As discussed in the 2015 Updating and Screening Assessment (AQC, 2015) a managed motorway scheme (including widening of the motorway) has been implemented between junctions 23 and 24 of the M25. Monitoring was undertaken in the two AQMAs in proximity to the widening scheme in order to better understand the air quality impacts, and is still on-going within the AQMAs. The ASR 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.

Air Quality in Hertsmere

Air pollution is associated with a number of adverse health impacts. It is recognised as having a significant impact on human health, including premature mortality, allergic reactions and cardiovascular diseases. 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].

[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

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 north and northeast Welwyn Hatfield District, to the north St Albans District and to the west Watford District and Three Rivers District. The M25 and M1 motorways run through Hertsmere District. The main air quality issues are related to emissions from road traffic, particularly within the towns of Potters Bar and Borehamwood, within the villages of Radlett and Elstree, and close to major roads (in particular the M25 and the M1).

There are currently eight AQMAs, of varying size, two declared in the town of Potters Bar (one within the town and one on the periphery close to the M25), one in the town of Radlett, one in the town of Borehamwood, one within the village of Elstree, two in proximity to Junction 1 and Junction 23 of the M1 motorway. and one in proximity to the village of Aldenham (adjacent to the M1) (see https://uk-air.defra.gov.uk/aqma/list for further information). Hertsmere Borough Council is actively working to improve air quality in its area through implementation of the Air Quality Action Plan (Hertsmere Borough Council, 2003) (last reviewed in 2010 (Hertsmere Borough Council, 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; and has declared two new AQMAs (one along Shenley Road, Borehamwood and one along Watling Street, Radlett).

Actions to Improve Air Quality

Hertsmere Borough Council has taken forward a number of measures in pursuit of improving local air quality. Work is currently on-going 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 low emission plant, and air quality monitoring. Since the last Updating and Screening Assessment (AQC, 2015) Hertsmere Borough Council has reviewed the AQMAs within the borough, and has declared two new AQMAs.

Hertsmere Borough Council intends to implement further measures to improve air quality within the borough in the future. These include measures to map the exposure of sensitive groups, further actions to promote travel alternatives, and further actions to manage traffic and public information measures.

[3] Defra. Abatement cost guidance for valuing changes in air quality, May 2013

Local Priorities and Challenges

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

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.

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1 Local Air Quality Management

This report provides an overview of air quality in Hertsmere during 2015. It fulfils the requirements of Local Air Quality Management (LAQM) as set out in Part IV of the Environment Act (1995) (HMSO, 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 exceedence 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 Council 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 A5.1 in Appendix A5.

2 Actions to Improve Air Quality

2.1. Air Quality Management Areas

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

2.1.1. Current AQMAs

A summary of AQMAs declared by Hertsmere Borough Council are shown in Figure 2.1 to Figure 2.5 and described in Table 2.1.

Further information related to declared or revoked AQMAs, including maps of AQMA boundaries are available online at https://uk-air.defra.gov.uk/aqma/list.

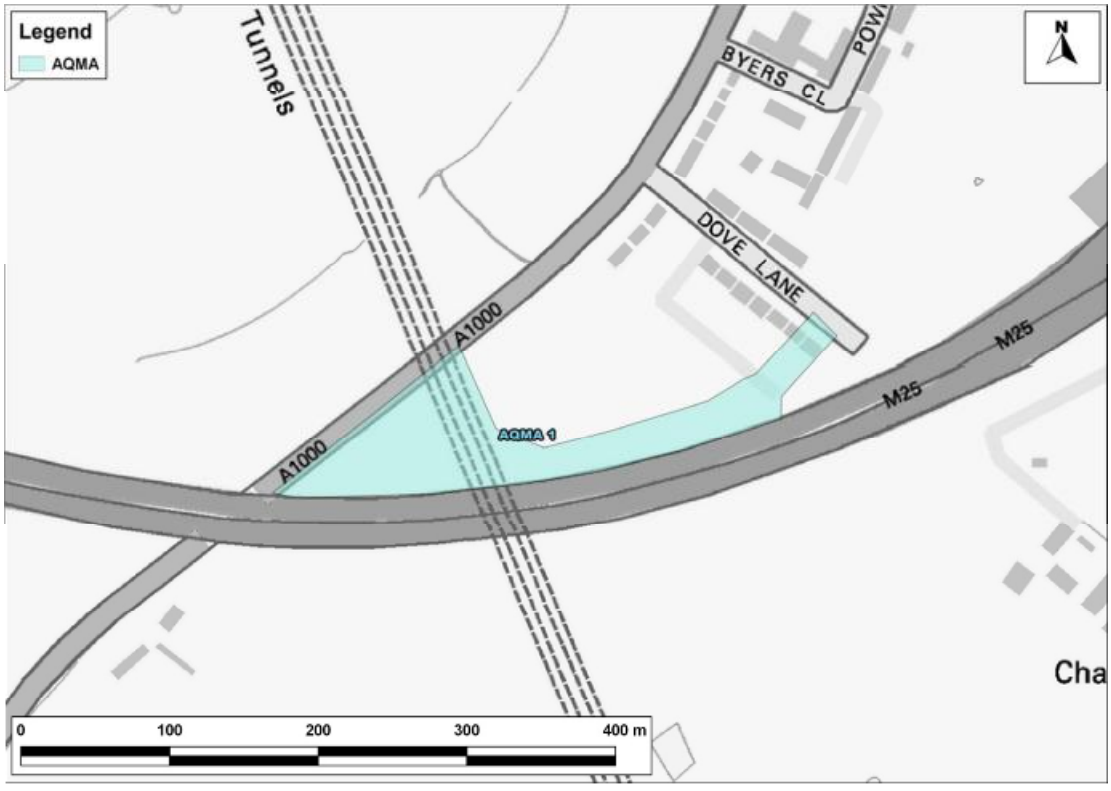

Figure 2.1: Hertsmere AQMA No. 1

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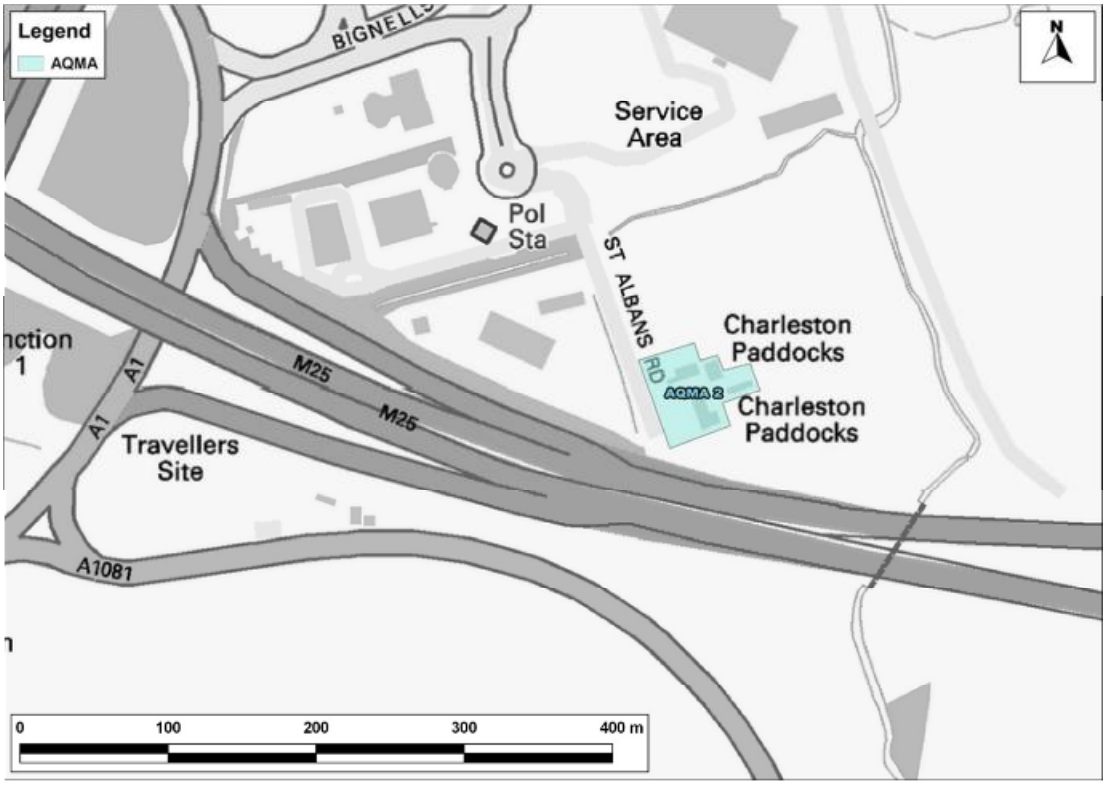

Figure 2.2: Hertsmere AQMAs No. 2

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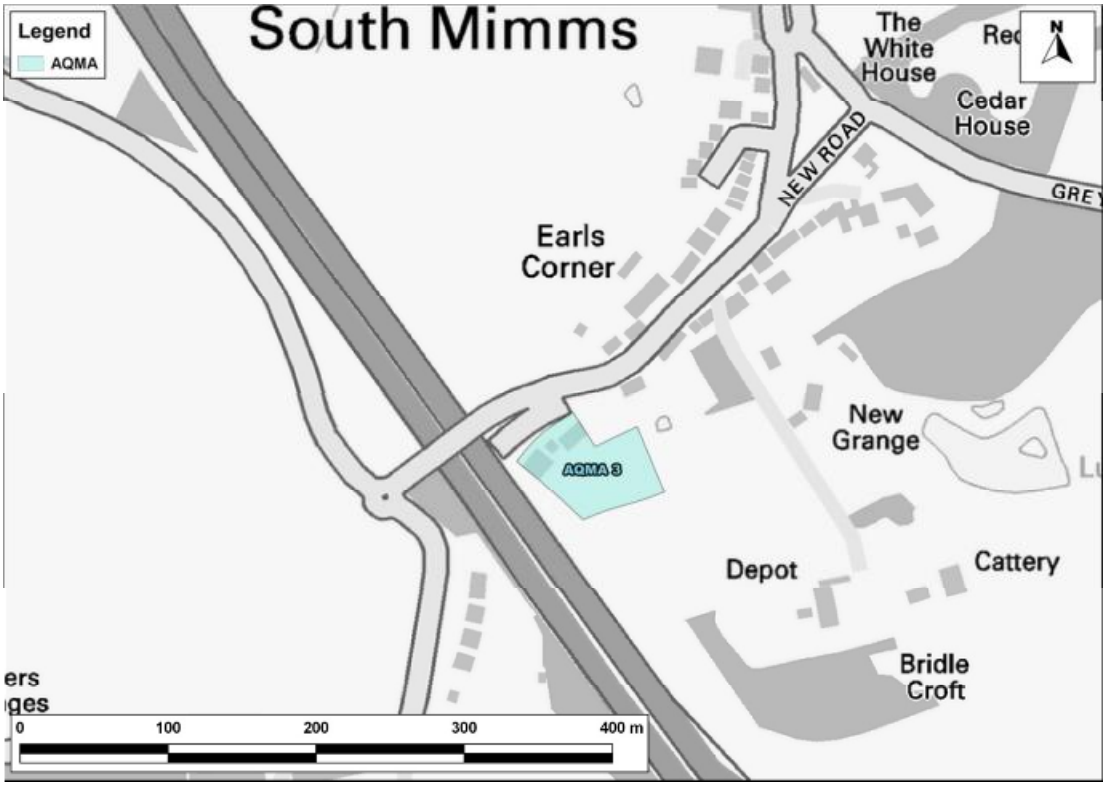

Figure 2.3: Hertsmere AQMA No. 3

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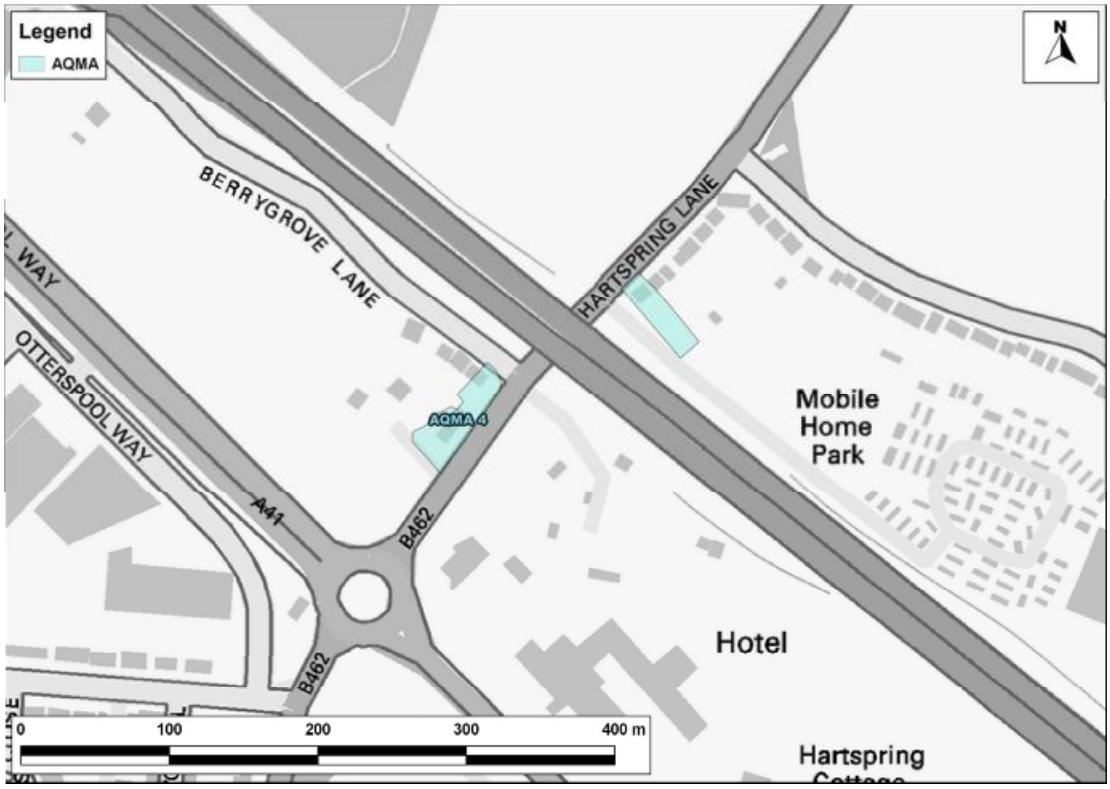

Figure 2.4: Hertsmere AQMA No. 4

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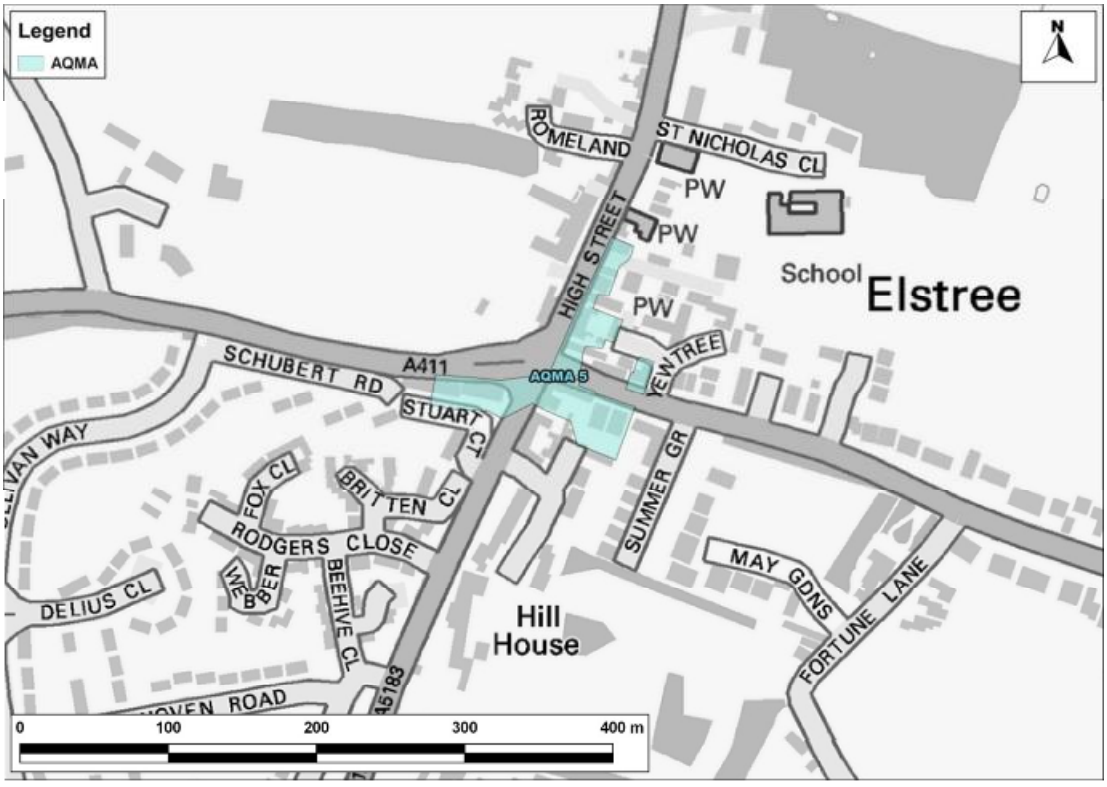

Figure 2.5: Hertsmere AQMA No. 5

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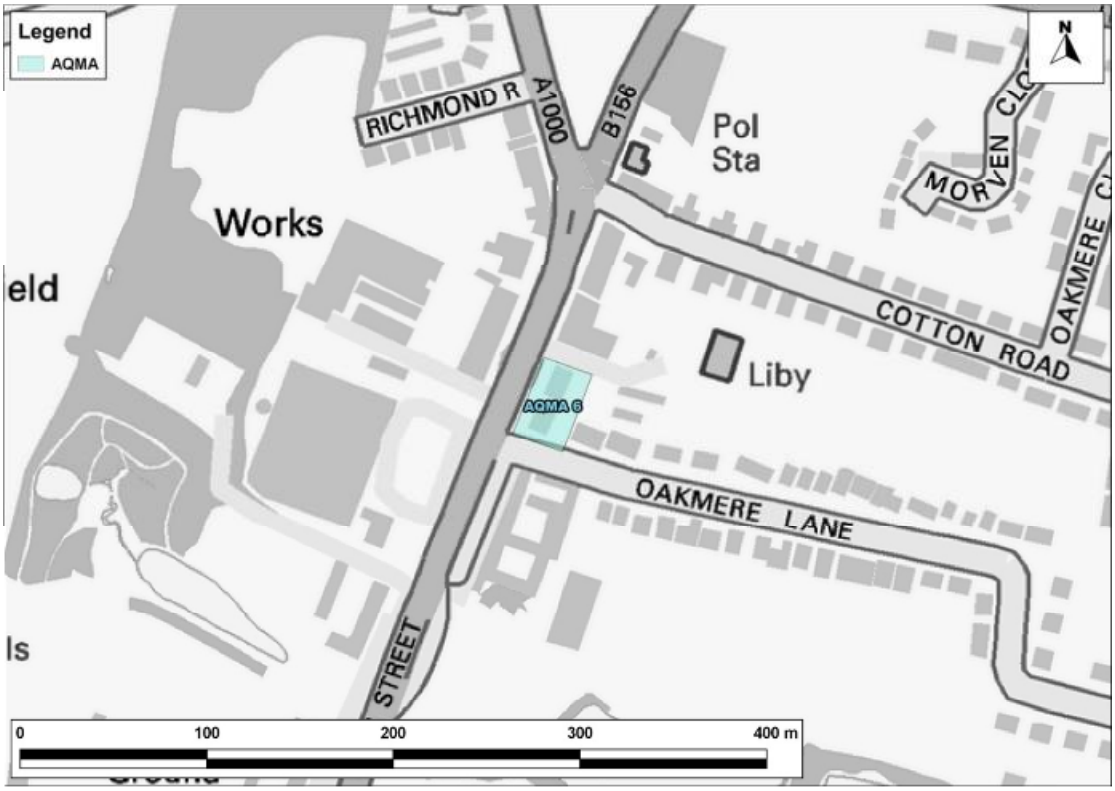

Figure 2.6: Hertsmere AQMA No. 6

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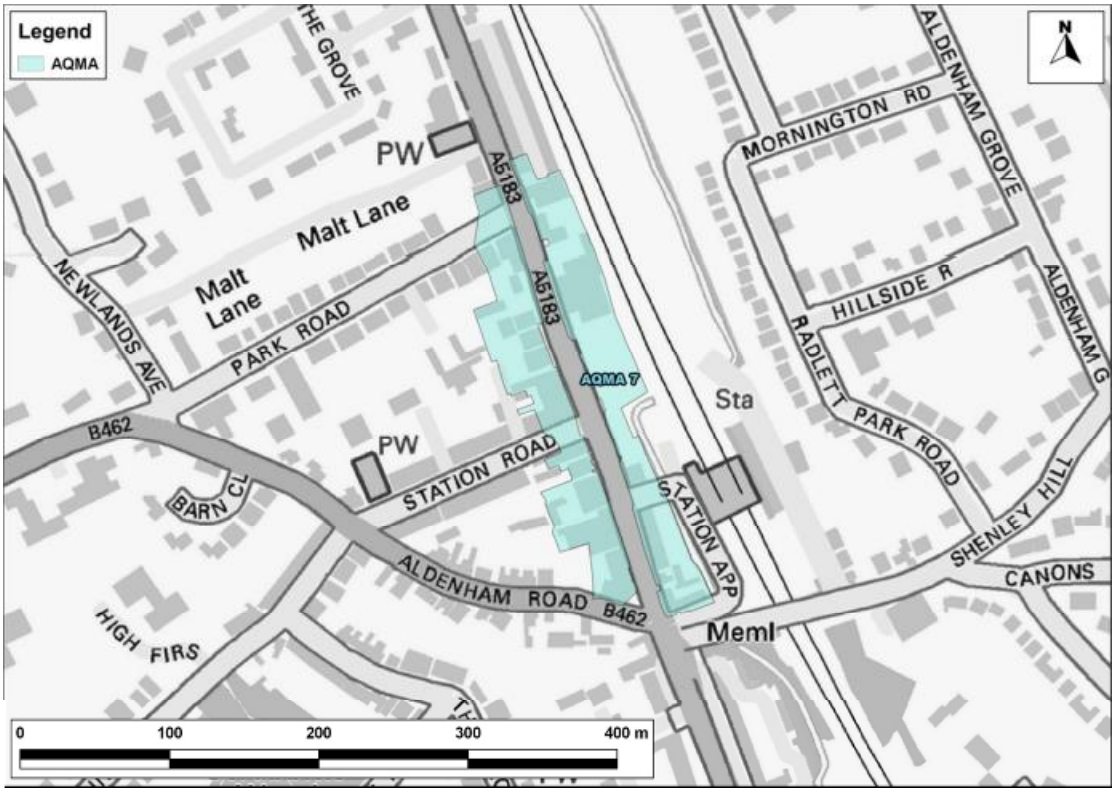

Figure 2.7: Hertsmere AQMA No. 7

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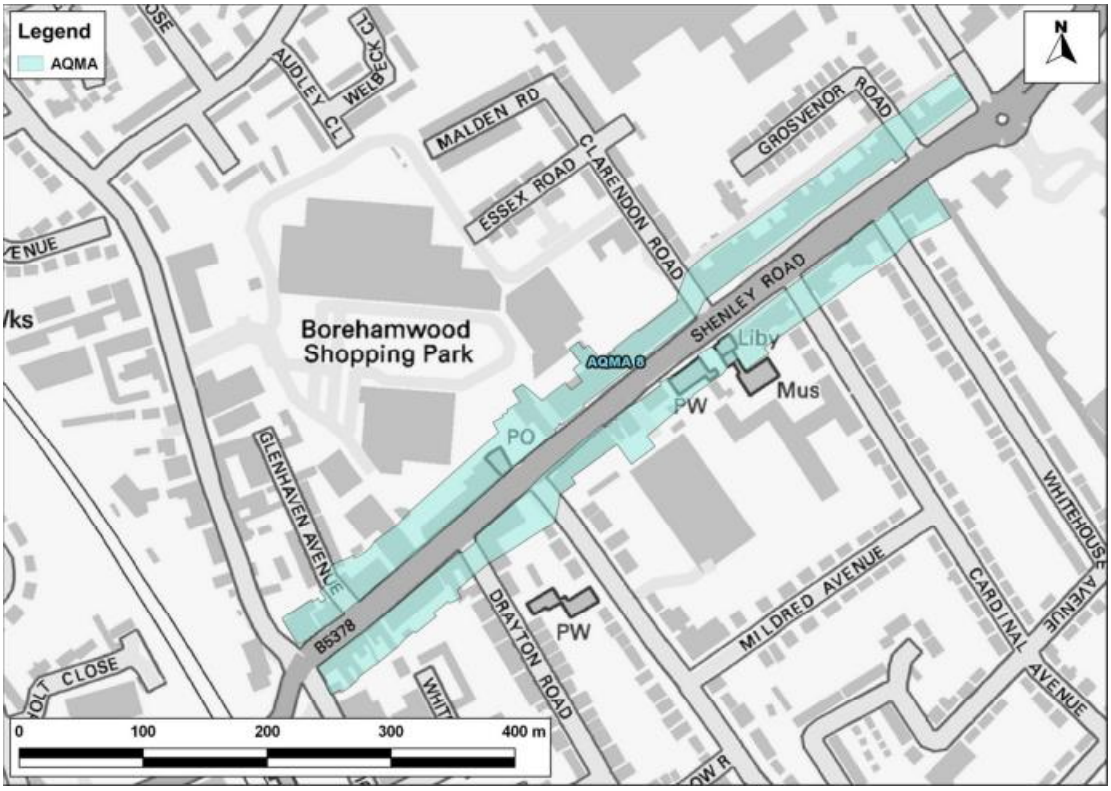

Figure 2.8: Hertsmere AQMA No. 8

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Table 2.1: Declared Air Quality Management Areas

AQMA Name	Pollutants and Air Quality Objectives	City / Town / Village	Description	Action Plan
Hertsmere AQMA No. 1	Nitrogen dioxide annual mean	Close to Potters Bar	An area comprising the domestic properties 23 – 27 Dove Lane and caravan site off A1000 Barnet Road.	Air Quality Review and Assessment; Air Quality Action Plan for Hertsmere Borough Council, (2003) (last reviewed in 2010 (Hertsmere Borough Council, 2010))
Hertsmere AQMA No. 2	Nitrogen dioxide annual mean	South Mimms	An area comprising the domestic property known as Charleston Paddocks, St Albans Road, South Mimms	Air Quality Review and Assessment; Air Quality Action Plan for Hertsmere Borough Council, (2003) (last reviewed in 2010 (Hertsmere Borough Council, 2010))
Hertsmere AQMA No. 3	Nitrogen dioxide annual mean	South Mimms	An area comprising the domestic properties 31 – 39 Blache Lane, South Mimms	Air Quality Review and Assessment; Air Quality Action Plan for Hertsmere Borough Council, (2003) (last reviewed in 2010 (Hertsmere Borough Council, 2010))
Hertsmere AQMA No. 4	Nitrogen dioxide annual mean	Aldenham	Two separate areas comprising domestic properties adjacent to Hartspring Lane, to the north and south of the M1 motorway.	Air Quality Review and Assessment; Air Quality Action Plan for Hertsmere Borough Council, (2003) (last reviewed in 2010 (Hertsmere Borough Council, 2010))
Hertsmere AQMA No. 5	Nitrogen dioxide annual mean	Elstree	An area encompassing a number of domestic properties along Watford Road, Barnet Lane and High Street, in the area surrounding the crossroads between these roads.	In development
Hertsmere AQMA No. 6	Nitrogen dioxide annual mean	Potters Bar	An area encompassing residential properties on the eastern side of High Street, immediately to the north of the junction with Oakmere Lane.	In development
Hertsmere AQMA No. 7	Nitrogen dioxide annual mean	Radlett	An area encompassing residential properties along both sides of Watling Street, between the junctions with Park Road and Aldenham Road.	In development

AQMA Name	Pollutants and Air Quality Objectives	City / Town / Village	Description	Action Plan
Hertsmere AQMA No. 8	Nitrogen dioxide annual mean	Boreham-wood	An area encompassing residential properties along both sides of Shenley Road, between the crossroad with Station Road and Theobald Street, and the roundabout joining Shenley Road and Eldon Avenue.	In development

2.1.2. Recommended amendments to AQMAs

Previously recommended amendments to AQMAs within the borough and their progress are detailed in Table 2.2 below.

Table 2.2: Progress Against Recommended Amendments to Air Quality Management Areas

Recommended Amendment	Document Recommending Amendment	Actions Undertaken	Status
New AQMA along Shenley Road, Borehamwood. Recommended to incorporate: "*the whole of Shenley Road between the roundabout with Eldon Avenue (eastern extent) and the junction with Theobald Street (western extent)…..including all residential properties that front onto this section on Shenley Road*".	Detailed Assessment of Air Quality at Bushey High Street and Shenley Road for Hertsmere Council (AQC, 2015)	New AQMA (AQMA No. 8) declared covering area as described in the recommendation.	Completed
New AQMA along Watling Street, Radlett. Recommended to incorporate "*the section of Watling Street between Park Road and Aldenham Road and sections around the junctions with these streets*".	2015 Air Quality Updating and Screening Assessment: Hertsmere Borough Council (AQC, 2015)	New AQMA (AQMA No. 7) declared covering area as described in the recommendation.	Completed
Review and possibly amend AQMA No. 4 (Mobile Home Park adjacent to Hartspring Lane). Recommended that "*the revised AQMA should include sensitive receptors along Hartspring Lane (both north and south of the M1)*".	2015 Air Quality Updating and Screening Assessment: Hertsmere Borough Council (AQC, 2015)	Boundaries of AQMA No. 4 amended to include sensitive receptors north and south of the M1. AQMA No. 4 is now in two separate sections each side of the M1 and no longer includes the mobile home park.	Completed

Recommended Amendment	Document Recommending Amendment	Actions Undertaken	Status
Extension of AQMA No. 5 (Elstree). Recommended to be extended to "*include nearby receptors and the HM48, HM49 and HM52 diffusion tube sites*".	2015 Air Quality Updating and Screening Assessment: Hertsmere Borough Council (AQC, 2015)	AQMA No. 6 extended to include nearby receptors and diffusion tube monitoring site HM52 and the nearest site of relevant exposure to diffusion tube HM49.	Completed
Extend AQMA No. 6 (Potters Bar).	2015 Air Quality Updating and Screening Assessment: Hertsmere Borough Council (AQC, 2015)	AQMA No. 6 has been relocated from encompassing commercial and residential properties adjacent to High Street immediately to the south of Oakmere Lane, to encompassing residential properties adjacent to High Street immediately to the north of Oakmere Lane	Completed

Based on 2015 monitoring (see monitoring section), it is not considered necessary to recommend any further new AQMAs or amendments to existing AQMAs.

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

Hertsmere Council has taken forward a number of measures in pursuit of improving local air quality. Details of all measures completed, in progress or proposed, are set out in Table 2.3. More detail on these measures can be found in the Air Quality Review and Assessment; Air Quality Action Plan (AQAP) for Hertsmere Borough Council (Hertsmere Borough Council, 2003) (last reviewed in 2010 (Hertsmere Borough Council, 2010)).

Hertsmere 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 to begin work on additional measures in 2017 (see Table 2.3 for further details).

Table 2.3: Progress on Measures to Improve Air Quality

Measure Number	Measure	EU Category	EU Classification	Lead Authority	Planning Phase	Implementation Phase	Key Performance Indicator [a]	Target Performance [a]	Target Pollution Reduction in the AQMA	Progress to Date	Estimated Completion Date	Comments
1	Look into the availability of health information i.e. map exposure of sensitive groups and compare between AQMA's to consider any links.	Policy Guidance & Development Control	Other Policy	Environmental Health	2010	No date set	-	-	Low	No information obtained due to previous contacts not established with the local NHS.	No date set	New partnerships have been formed with the Primary Care Trust. New enquires to be made.
2	Wherever pollution and or traffic issues have been identified to investigate and tackle through local communities local plans / strategies.	Policy Guidance & Development Control	Air Quality & Policy Guidance	Environmental Health	Completed	Completed	-	-	Low	Road layouts and traffic sequencing checked 2007 and 2008 in both AQMA's Elstree Crossroads and Potters Bar High Street to try and prevent queuing. Some improvement.	Completed	Elstree Cross Roads layout changed by Hertfordshire Highways after public consultation. The air quality improved initially but measured concentrations have since gone up again. At Potters Bar the AQMA has moved towards the traffic lights.
3	Work, support and discuss with Highways England neighbouring authorities to consider traffic schemes that affect AQMA'S on local roads and motorways.	Traffic Management	Strategic Highway Improvements	Environmental Health	On-going	On-going	-	-	Low	After attendance at all M25 widening meetings widening has now finished. One AQMA Dove Lane has improved slightly.	On-going attending meetings with Highways England and Hertfordshire Highways.	-

Measure Number	Measure	EU Category	EU Classification	Lead Authority	Planning Phase	Implementation Phase	Key Performance Indicator [a]	Target Performance [a]	Target Pollution Reduction in the AQMA	Progress to Date	Estimated Completion Date	Comments
4	Support the larger National and South East schemes that may improve air quality along motorways and promote shift to other forms of transport.	Traffic Management	Strategic Highway Improvements Other	Environmental Health & Planning	On-going	On-going	-	-	Low	No further action taken on the staff survey	No completion date. More likely to change measure into the possibility of an electric car club	Staff survey carried out to look at modes of Transport in Hertsmere Green Transport Plan.
5	Identify major fleets in the Borough to encourage cleaner vehicle technology.	Promoting Low Emissions Transport	Company Vehicle Procurement Prioritising uptake of low emission vehicles	Environmental Health	On-going	On-going	-	-	Medium	Have not identified major fleets but looking into electric car club for Council staff and residents.	2018	
6	Hertsmere supports Highways England that will result in reduction of pollution levels from traffic on the M1 and M25 and continue contact with Highways England.	Traffic Management	Strategic Highways Improvement	Highways England			-	-		Action combined with Action 3	This action to be discontinued.	
7	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 and Workplace place travel plans. Promotion of walking and cycling.	Hertfordshire County Council & Environmental Health	Early 2017	2017-2018	-	-	Low	Travel plans with schools need to be encouraged, old plans need to be updated.	2018	

Measure Number	Measure	EU Category	EU Classification	Lead Authority	Planning Phase	Implementation Phase	Key Performance Indicator [a]	Target Performance [a]	Target Pollution Reduction in the AQMA	Progress to Date	Estimated Completion Date	Comments
8	Hertsmere continue to support projects Watling Chase Community Forest Natural England	Promoting Travel Alternatives	Promotion of Cycling, Walking & Horse Riding	Hertsmere Borough Council	On-going	On-going	-	-	Low	Greenways officer position does not exist anymore but cycle, pedestrian and horse routes open.		Investigation needs to take place to see if [Hertsmere Council can support these projects further.
9	Air Quality to be taken into account when considering all planning applications particularly next and around AQMAs and adoption of air quality in specific planning guidance.	Policy Guidance & Development Control	Air Quality Planning & Policy Guidance	Environmental Health & Planning	On-going	On-going	-	-	Low	Dealt with in the Core Strategy Development Plan Document 2009. Planning officers to take into consideration AQMAs.	On-going	
10	Continue to work with planning officers with regard to new developments to take into account location near AQMAs.	Policy Guidance & Development Control	Air Quality Planning & Policy Guidance	Environmental Health			-	-		Action to be combined with Action 9.	Action to be discontinued	
11	The Council will look for evidence that developers have taken appropriate steps to minimise pollution.	Promoting Low Emissions Plant	Emission control equipment for small and medium sized stationary combustion sources	Environmental Health, Planning & Building Control	On-going	On-going	-	-	Medium	Planning produce supplementary planning guides which contain guidance on odour smoke and dust.	On-going	Environmental Health enforce the Control of Pollution Act on construction sites.

Measure Number	Measure	EU Category	EU Classification	Lead Authority	Planning Phase	Implementation Phase	Key Performance Indicator [a]	Target Performance [a]	Target Pollution Reduction in the AQMA	Progress to Date	Estimated Completion Date	Comments
12	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 Initiatives	Environmental Health and Licensing team Promoted at Officers Forum	On-going	On-going	-	-	Low	Have had an increase from 1 vehicle to 6	On-going	
13	Environmental Health will begin an on-going campaign to discourage the excessive idling of vehicle engines.	Traffic Management	Anti-Idling Enforcement	Environmental Health	Will look at this 2017-2018	2017-2018	-	-	Low	In the past have promoted anti-idling at Potters Bar Bus Station which bordered an AQMA. Will start promotion next year [2017]	Will be on-going	Work needs to be carried out to promote and discourage idling engines at schools and look at street signage.
14	Testing Taxis and private hire vehicles to continue. VOSA to be contacted for joint roadside testing for MOT emission standards compliance.	Traffic Management	Testing Vehicle Emissions	Environmental Health	No work been carried out on this. No planning phase at present	No implement ation stage	-	-	N/A	N/A	N/A	Hertsmere will review this measure at a later date.
15	Environmental Health continues to provide comprehensive control over Part B processes and industry where powers exist.	Environmental Permits	Measures to reduce pollution through IPPC Permits	Environmental Health	On-going	On-going	-	-	Medium	All inspections have been carried out with a satisfactory outcome.	On-going	

Measure Number	Measure	EU Category	EU Classification	Lead Authority	Planning Phase	Implementation Phase	Key Performance Indicator [a]	Target Performance [a]	Target Pollution Reduction in the AQMA	Progress to Date	Estimated Completion Date	Comments
16	Environmental Health will continue to investigate complaints and take action where necessary.	Policy Guidance & Development Control	Other policy	Environmental Health	This measure is to be integrated into No. 17		-	-		Action to be combined with 17		
17	Improved information and advice to residents and companies in the area about problems caused by bonfires. Encourage residents to compost waste.	Public Information	Other	Environmental Health	On-going	On-going	-	-	Low	Hertsmere at present supply reduced price composters. In the last year Hertsmere has dealt with 140 complaints relating to bonfire smoke dust and odour.	On-going	
18	The Council continue to monitor air quality to the existing quality with the change of use of the AQMS at the Furzehill site. The diffusion tube network continues and is reviewed yearly.	Policy Guidance & Development Control	Other Policy	Environmental Health	On-going	On-going	-	-	Low	The AQMS has been moved from Furzehill School to Hertswood School. Diffusion tubes are continued. Diffusion tube locations are reviewed every year. Hertsmere also have a new AQMS (roadside).	On-going	

Measure Number	Measure	EU Category	EU Classification	Lead Authority	Planning Phase	Implementation Phase	Key Performance Indicator [a]	Target Performance [a]	Target Pollution Reduction in the AQMA	Progress to Date	Estimated Completion Date	Comments
19	We will seek to improve the availability of cleaner fuels by encouraging local service stations to stock alternative fuels.	Promoting Low Emission Transport	Procuring alternative refuelling infrastructure to promote Low Emission Vehicles, EV recharging, gas fuel recharging	Environmental Health	On-going	On-going	-	-	Low	Review needs to be carried out and integrated into the Green Travel Plan	On-going	
20	Hertsmere are part of the Herts and Beds Air Alert scheme launched in Nov 08. We will continue to promote the service.	Public Information	Via other mechanisms	Environmental Health	2017-2018	2017-2018	-	-	Low	The Herts and Beds Air Quality Group are looking into starting up the Air Alert service.	On-going	

[a] Information not available.

2.3. $PM_{2.5}$: Local Authority Approach to Reducing Emissions and Concentrations

As detailed in Policy Guidance LAQM.PG16 Chapter 7 (Defra, 2016a), local authorities are expected to work towards reducing emissions and/or concentrations of $PM_{2.5}$ (particulate matter with an aerodynamic diameter of 2.5µm 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.

Contained within the AQAP and the Hertfordshire Local Transport Plan (Hertfordshire County Council, 2011) 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 2.3 for further information.

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

3.1. Summary of Monitoring Undertaken

3.1.1. Automatic Monitoring Sites

This section sets out the monitoring that has taken place and how the results compare with the objectives.

Hertsmere Council undertook automatic (continuous) monitoring at two sites during 2015. Table A1.1 in Appendix A1 shows the details of the sites.

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

Maps showing the location of the monitoring sites are provided in Appendix A4. Further details on how the monitors are calibrated, and how the data has been adjusted, are included in Appendix A3.

3.1.2. Non-Automatic Monitoring Sites

Hertsmere Borough Council undertook non-automatic (passive) monitoring of NO_2 at 44 sites during 2015, 14 triplicate studies and 30 single diffusion tube studies. Table A1.2 in Appendix A1 shows the details of the sites.

Maps showing the location of the monitoring sites are provided in Appendix A4. Further details on Quality Assurance/Quality Control (QA/QC) and bias adjustment for the diffusion tubes are included in Appendix A3.

3.2. Individual Pollutants

The air quality monitoring results presented in this section have, where relevant, been bias adjusted and annualised. Further details on the adjustments applied are provided in Appendix A3.

3.2.1. Nitrogen Dioxide (NO_2)

Table A1.3 in Appendix A1 compares the ratified and adjusted monitored NO_2 annual mean concentrations for the past 5 years with the air quality objective of 40 µg/m^3.

For diffusion tubes, the full 2015 dataset of monthly mean values is provided in Appendix A2.

Table A1.4 in Appendix A1 compares the ratified continuous monitored NO_2 hourly mean concentrations for the past 5 years with the air quality objective of 200 µg/m^3, not to be exceeded more than 18 times per year.

Exceedences of the nitrogen dioxide annual mean objective were measured at 11 diffusion tube monitoring sites (HM39, HM49, HM50, HM57, HM61, HM64, HM69 HM86, HM71/HM72/HM73 triplicate, HM102/HM103/HM104 triplicate and HM108/HM109/HM110 triplicate). All measured exceedences were below 60 µg/m^3, which indicates that an exceedence of the 1-hour mean objective at these sites is not likely. Of the 11 sites exceeding the annual mean objective in 2015, six sites were located outside an AQMA (HM39, HM61, HM64, HM69, HM86 and co-location site HM102/HM103/HM104). No exceedences of the annual mean or the 1-hour mean objectives were measured at the two automatic monitoring stations.

The locations of the diffusion tube monitoring sites exceeding the objective in 2015 are as follows:

- Two sites (HM64 and HM69) located in central Potters Bar adjacent to High Street and Southgate Road respectively. HM67 is in proximity (within approximately 24 m) to AQMA No. 6;
- Two sites located on the periphery of South Mimms in proximity to the M25, one adjacent to Blanche Lane in proximity to AQMA No. 3 (HM61) and one close to St Albans Road in proximity to AQMA No. 2 (HM86);
- Two sites (HM71/HM72/HM73 and HM102/HM103/HM104) located in central Radlett adjacent to Watling Street. Site HM71/HM72/HM73 is located within AQMA No. 7 and site HM102/HM103/HM104 is located in close proximity (within approximately 9.5 m) of AQMA No. 7;
- Two sites located in central Elstree, one (HM49) adjacent to Barnet Lane in proximity to AQMA No. 6, and one (HM50) adjacent to the crossroads between Barnet Lane, Elstree High Street, Watford Road and Roman Road. Both sites are located within AQMA No. 5;
- Two sites (HM57 and HM108/HM109/HM110) located adjacent to Hartspring Lane, in proximity (i.e. within approximately 55 m) to the M1. Both sites are located within AQMA No. 4; and
- One site (HM39) located in central Borehamwood adjacent to Shenley Road, in close proximity to AQMA No. 8.

Of the six sites exceeding the annual mean objective located outside an AQMA, the closest site of relevant exposure to five of these sites (sites HM39, HM61, HM64, HM86 and

HM102/HM103/HM104) are already located within AQMAs. It is therefore not considered to be necessary to amend existing or create new AQMAs in these locations.

As the other site located outside an AQMA (HM69) where an exceedence was recorded, there is no relevant exposure; the concentration at the nearest relevant receptors to this site has been estimated using Defra's "NO_2 with Distance from Roads Calculator" tool (Defra, 2016). The results are presented in Table 3.1 below.

Table 3.1: Fall-off with Distance Calculator Results

Site	Distance from Diffusion Tube Monitoring Site to Kerb (m)	Distance from Receptor to Kerb (m)	Local Annual Mean Background NO_2 Concentration ($\mu g/m^3$)	Measured Annual Mean Background NO_2 Concentration ($\mu g/m^3$) at Site	Predicted Annual Mean Background NO_2 Concentration ($\mu g/m^3$) at Receptor
HM69	3.1	15.3	25.8	**43.7**	36.2

Notes: Exceedences of the NO_2 annual mean objective of 40 $\mu g/m^3$ are shown in **bold**.

Table 3.1 indicates that concentrations experienced at the nearest site of relevant exposure to diffusion tube monitoring site HM69 would not be estimated to exceed the objective.

3.2.2. Particulate Matter (PM_{10})

Table A1.5 in Appendix A1 compares the ratified and adjusted monitored PM_{10} annual mean concentrations for the past 5 years with the air quality objective of 40$\mu g/m^3$.

Table A1.6 in Appendix A1 compares the ratified continuous monitored PM_{10} daily mean concentrations for the past 5 years with the air quality objective of 50$\mu g/m^3$, not to be exceeded more than 35 times per year.

These tables show that there were no measured exceedences of the annual mean or 24-hour mean PM_{10} objectives at either of the local automatic monitoring sites. As such, no AQMAs are recommended as being necessary as a result of measured PM_{10} concentrations.

There is insufficient data available to identify any trends in measured PM_{10} concentrations from 2011 to 2015.

3.2.3. Particulate Matter ($PM_{2.5}$)

Table A1.7 in Appendix A1 presents the ratified and adjusted monitored $PM_{2.5}$ annual mean concentrations for the past 5 years.

This table shows that there were no measured exceedences of the annual mean $PM_{2.5}$ objective at either of the local automatic monitoring sites. As such no AQMAs are recommended as being necessary as a result of measured $PM_{2.5}$ concentrations.

There is insufficient data available to identify any trends in measured $PM_{2.5}$ concentrations from 2014 to 2015.

Appendices

A1 Appendix A: Monitoring Results

Table A1.1: Details of Automatic Monitoring Sites

Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In AQMA?	Monitoring Technique	Distance to Relevant Exposure (m) [a]	Distance to kerb of nearest road (m) [b]	Inlet Height (m)
Hertsmere Borehamwood Roadside	Roadside	520317	197089	NO_2, PM_{10}, $PM_{2.5}$	N	Chemiluminescent, FDMS	10.9	6	2.5
Hertsmere Borehamwood Background	Background	520156	197364	NO_2, PM_{10}, $PM_{2.5}$	N	Chemiluminescent, FDMS	40.0	N/A	4.0

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

[b] N/A if not applicable.

Table A1.2: Details of Non-Automatic Monitoring Sites

Site ID	Site Name / Location	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In AQMA?	Distance to Relevant Exposure (m) [a]	Distance to kerb of nearest road (m) [b]	Co-located with a Continuous Analyser and / or Triplicate	Height (m)
HM39	117 Shenley Road, Borehamwood	Roadside	519418	196681	NO_2	Y	7	1.3	N	2.1
HM40	17 Essex Road, Borehamwood	Roadside	519281	196779	NO_2	N	5.3	2.1	N	2.1
HM41	39 Theobald Street, Borehamwood	Roadside	519022	196612	NO_2	N	6.4	1.9	N	2.3
HM45 / HM46 / HM47	AQMS 3 / AQMS 2 / AQMS 3	Urban Background	520156	520156	NO_2	N	0	0	N	4
HM48	Elstree Crossroads 1 (Nursery High Street)	Roadside	517846	195346	NO_2	Y	4.4	1.9	N	2
HM49	Elstree Crossroads 2 (The Haven Barnet Lane)	Roadside	517861	195226	NO_2	Y	5.9	1.1	N	2
HM50	Elstree Crossroads 3 (High Street/Barnet Lane)	Roadside	517802	195249	NO_2	Y	9.5	1.2	N	2
HM52	Elstree Crossroads 5 (6 Walton Terrace)	Roadside	517744	195247	NO_2	Y	1.8	1.8	N	2

Site ID	Site Name / Location	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In AQMA ?	Distance to Relevant Exposure (m) [a]	Distance to kerb of nearest road (m) [b]	Co-located with a Continuous Analyser and / or Triplicate	Height (m)
HM53	Caldecote Lane Bushey Heath (stables)	Urban Background	515581	195094	NO_2	N	0.2	0	N	2.1
HM54	19 High Road Bushey	Kerbside	514596	194364	NO_2	N	4.5	0.5	N	2.1
HM55	Highwood Avenue Garages Bushey	Urban Background	512770	197834	NO_2	N	0	0	N	2
HM57	Hartspring Lane (11 Grove Place) Bush	Roadside	513517	197819	NO_2	Y	9.2	1.8	N	2
HM58	Pegmire Lane Aldenham (junction with Hilfield Lane	Kerbside	513966	197615	NO_2	N	2.5	0.5	N	2
HM59	7 Aldenham Grove Radlett	Kerbside	516570	200159	NO_2	N	6.8	0	N	2
HM60	Bell Lane London Colney (1 Council Cottages)	Roadside	518586	202939	NO_2	N	13.6	8.8	N	1.9
HM61	31 Blanche Lane South Mimms	Motorway	522038	200670	NO_2	Y	14.6	14.6	N	1.9
HM62	24 The Broadway Potters Bar	Roadside	524943	201154	NO_2	N	12.5	3.1	N	1.9
HM63	27 Dove Lane Potters Bar	Motorway	526079	200026	NO_2	Y	19.2	29.1	N	2
HM64	Bus Garage 1 (outside Holly House)	Roadside	526208	201454	NO_2	N	23.3	2.1	N	2
HM65	Hatfield Road Potters Bar (250-252 High Street)	Roadside	526252	201597	NO_2	N	7.7	2.8	N	2.1
HM66	Bus Garage 2 Potters Bar (Oakmere Lane)	Roadside	526245	201458	NO_2	Y	5.9	3	N	2.1
HM67	Bus Garage 3 Potters Bar (147 High Street)	Roadside	526211	201402	NO_2	N	0.5	11.3	N	2
HM69	Southgate Road Potters Bar (Abbey House)	Roadside	526034	200832	NO_2	N	15	3.1	N	2
HM70	9 Park Avenue Potters Bar	Roadside	526402	200457	NO_2	N	9.2	1.5	N	2
HM71	2 Park Road Radlett 1	Roadside	516291	200035	NO_2	Y	4.3	1.5	Triplicate	2.1
HM72	2 Park Road Radlett 2	Roadside	516291	200035	NO_2	Y	4.3	1.5	Triplicate	2.1
HM73	2 Park Road Radlett 3	Roadside	516291	200034	NO_2	Y	4.3	1.5	Triplicate	2.1
HM74	301 Watling Street Radlett 1	Roadside	516456	199624	NO_2	N	9.2	6.6	Triplicate	2

Site ID	Site Name / Location	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In AQMA ?	Distance to Relevant Exposure (m) [a]	Distance to kerb of nearest road (m) [b]	Co-located with a Continuous Analyser and / or Triplicate	Height (m)
HM75	301 Watling Street Radlett 2	Roadside	516456	199624	NO_2	N	9.2	6.6	Triplicate	2
HM76	301 Watling Street Radlett 3	Roadside	516456	199624	NO_2	N	9.2	6.6	Triplicate	2
HM79	7 The Broadway Potters Bar 1	Roadside	524988	201118	NO_2	N	12.2	1.7	Triplicate	2
HM80	7 The Broadway Potters Bar 2	Roadside	524988	201118	NO_2	N	12.2	1.7	Triplicate	2
HM81	7 The Broadway Potters Bar 3	Roadside	524988	201118	NO_2	N	12.2	1.7	Triplicate	2
HM82	10 Baker Street Potters Bar 1	Kerbside	524922	201088	NO_2	N	9.6	0.6	Triplicate	2
HM83	10 Baker Street Potters Bar 2	Kerbside	524922	201088	NO_2	N	9.6	0.6	Triplicate	2
HM84	10 Baker Street Potters Bar 3	Kerbside	524922	201088	NO_2	N	9.6	0.6	Triplicate	2
HM85	16 Andrew Close Shenley	Urban Background	518592	200948	NO_2	N	2.3	0	N	2.1
HM86	Charleston Paddocks South Mimms	Motorway	522970	199959	NO_2	Y	40.1	10.1	N	1.8
HM93	103 Baker Street Potters Bar	Roadside	524573	200633	NO_2	N	12.9	1.4	N	2.2
HM99	84 High Street 1, Bushey	Roadside	513209	195257	NO_2	N	1.9	2.4	Triplicate	2.1
HM100	84 High Street 2, Bushey	Roadside	513209	195257	NO_2	N	1.9	2.4	Triplicate	2.1
HM101	84 High Street 3, Bushey	Roadside	513209	195257	NO_2	N	1.9	2.4	Triplicate	2.1
HM102	Aldenham Road 1, Radlett (Red Lion)	Kerbside	516385	199761	NO_2	Y	4	0.5	Triplicate	1.9
HM103	Aldenham Road 1, Radlett (Red Lion)	Kerbside	516385	199761	NO_2	Y	4	0.5	Triplicate	1.9
HM104	Aldenham Road 1, Radlett (Red Lion)	Kerbside	516385	199761	NO_2	Y	4	0.5	Triplicate	1.9
HM105	Elstree Park 1	Roadside	520738	195271	NO_2	N	10.7	36.1	N	2
HM108	Hartspring Lane 1, Bushey (Hazetta House)	Kerbside	513419	197727	NO_2	Y	11.1	0.5	Triplicate	1.8

Site ID	Site Name / Location	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In AQMA ?	Distance to Relevant Exposure (m) [a]	Distance to kerb of nearest road (m) [b]	Co-located with a Continuous Analyser and / or Triplicate	Height (m)
HM109	Hartspring Lane 2, Bushey (Hazetta House)	Kerbside	513419	197727	NO_2	Y	11.1	0.5	Triplicate	1.8
HM110	Hartspring Lane 3, Bushey (Hazetta House)	Kerbside	513419	197727	NO_2	Y	11.1	0.5	Triplicate	1.8
HM111	9 Blanche Lane 1, South Mimms	Roadside	521980	200567	NO_2	N	21.1	1.2	N	1.9
HM114	Parkside 1, Potters Bar	Roadside	526164	201363	NO_2	N	16.3	9.5	N	1.9
HM117	44 High Street, Bushey 1	Roadside	513101	195286	NO_2	N	4.3	2.3	Triplicate	2
HM118	44 High Street, Bushey 2	Roadside	513101	195286	NO_2	N	4.3	2.3	Triplicate	2
HM119	44 High Street, Bushey 3	Roadside	513101	195286	NO_2	N	4.3	2.3	Triplicate	2
HM120	Mills Court, Todd Close 1	Roadside	520181	197150	NO_2	N	33.1	36.4	Triplicate	1.9
HM121	Mills Court, Todd Close 2	Roadside	520181	197150	NO_2	N	33.1	36.4	Triplicate	1.9
HM122	Mills Court, Todd Close 3	Roadside	520181	197150	NO_2	N	33.1	36.4	Triplicate	1.9
HM123	Studio Plaza, Elstree Way 1	Roadside	520263	197130	NO_2	N	34.5	3.6	Triplicate	1.9
HM124	Studio Plaza, Elstree Way 2	Roadside	520263	197130	NO_2	N	34.5	3.6	Triplicate	1.9
HM125	Studio Plaza, Elstree Way 3	Roadside	520263	197130	NO_2	N	34.5	3.6	Triplicate	1.9
HM126	63 Elstree Hill North 1	Roadside	517903	195552	NO_2	N	13.8	2.4	Triplicate	2.1
HM127	63 Elstree Hill North 2	Roadside	517903	195552	NO_2	N	13.8	2.4	Triplicate	2.1
HM128	63 Elstree Hill North 3	Roadside	517903	195552	NO_2	N	13.8	2.4	Triplicate	2.1
HM129	Allum Lane/Elstree Hill North 1	Roadside	517907	195864	NO_2	N	6.3	1.5	Triplicate	2.1
HM130	Allum Lane/Elstree Hill North 2	Roadside	517907	195864	NO_2	N	6.3	1.5	Triplicate	2.1
HM131	Allum Lane/Elstree Hill North 3	Roadside	517907	195864	NO_2	N	6.3	1.5	Triplicate	2.1
HM132	Watling Mansions, Watling Street 1	Roadside	516520	199450	NO_2	N	13.8	8.3	Triplicate	2
HM133	Watling Mansions, Watling Street 2	Roadside	516520	199450	NO_2	N	13.8	8.3	Triplicate	2
HM134	Watling Mansions, Watling Street 3	Roadside	516520	199450	NO_2	N	13.8	8.3	Triplicate	2

Site ID	Site Name / Location	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In AQMA ?	Distance to Relevant Exposure (m) [a]	Distance to kerb of nearest road (m) [b]	Co-located with a Continuous Analyser and / or Triplicate	Height (m)
HM135	Winfield Park	Motorway	513755	197599	NO_2	N	4.7	20.8	N	2

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

[b] N/A if not applicable.

Table A1.3: Annual Mean NO_2 Monitoring Results

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) 2015 [a]	Valid Data Capture 2015 (%) [b]	NO_2 Annual Mean Concentration ($\mu g/m^3$) [c]				
					2011	2012	2013	2014	2015 [d]
Hertsmere Borehamwood Roadside	Roadside	Automatic	-	99.3	-	-	-	**42.7** [e]	32.9
Hertsmere Borehamwood Background	Urban Background	Automatic	-	99.4	- [f]	-	- [f]	25.2	23.0
HM39	Roadside	Diffusion tube	-	100	**47**	**55**	**52**	**51.8**	**45.7**
HM40	Roadside	Diffusion tube	-	100	25	29	27	26.1	21.6
HM41	Roadside	Diffusion tube	-	100	33	37	36	35.4	29.8
HM45 / HM46 / HM47	Urban Background	Diffusion tube	-	100	24	25	27	25.2	20.1
HM48	Roadside	Diffusion tube	-	100	**40**	**50**	**49**	**48.2**	37.7
HM49	Roadside	Diffusion tube	-	100	**52**	**59**	**59**	**56.1**	**52.2**
HM50	Roadside	Diffusion tube	-	100	**52**	**62**	**59**	**53.9**	**53.3**
HM52	Roadside	Diffusion tube	-	100	37	**40**	**40**	**44.2**	35.8
HM53	Urban Background	Diffusion tube	-	100	21	22	22	21.3	18.4
HM54	Kerbside	Diffusion tube	-	100	28	32	31	26.9	23.3
HM55	Urban Background	Diffusion tube	-	91.7	21	25	24	23.0	20.8
HM57	Roadside	Diffusion tube	-	100	**44**	**51**	**46**	**46.8**	**41.6**
HM58	Kerbside	Diffusion tube	-	100	31	29	28	27.4	24.4
HM59	Kerbside	Diffusion tube	-	91.7	19	23	19	17.6	16.8
HM60	Roadside	Diffusion tube	-	100	32	35	33	30.8	28.9
HM61	Motorway	Diffusion tube	-	100	**47**	**50**	**45**	**46.5**	**43.3**

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) 2015 [a]	Valid Data Capture 2015 (%) [b]	NO_2 Annual Mean Concentration ($\mu g/m^3$) [c]				
					2011	2012	2013	2014	2015 [d]
HM62	Roadside	Diffusion tube	-	100	**45**	**43**	**44**	**40.9**	34.7
HM63	Motorway	Diffusion tube	-	100	**43**	**42**	36	**40.1**	34.1
HM64	Roadside	Diffusion tube	-	100	**52**	**56**	**48**	**47.2**	**41.8**
HM65	Roadside	Diffusion tube	-	100	**50**	**49**	**45**	**44.9**	38.3
HM66	Roadside	Diffusion tube	-	100	**41**	**46**	38	38.6	34.3
HM67	Roadside	Diffusion tube	-	83.3	39	**42**	39	36.1	30.4
HM69	Roadside	Diffusion tube	-	100	**55**	**53**	**51**	**48.2**	**43.7**
HM70	Roadside	Diffusion tube	-	100	37	39	32	34.0	30.1
HM71 / HM72 / HM73	Roadside	Diffusion tube	-	100	**45**	**49**	**51**	**47.5**	**40.1**
HM74 / HM75 / HM76	Roadside	Diffusion tube	-	100	35	37	**44**	37.6	31.6
HM79 / HM80 / HM81	Roadside	Diffusion tube	-	91.7	33	36	38	37.4	32.7
HM82 / HM83 / HM84	Kerbside	Diffusion tube	-	83.3	38	**40**	**43**	35.2	29.9
HM85	Urban Background	Diffusion tube	-	100	24	24	26	25.8	21.3
HM86	Motorway	Diffusion tube	-	100	**55**	**55**	**43**	**46.7**	**41.8**
HM93	Roadside	Diffusion tube	-	100	32	31	29	31.7	26.0
HM99 / HM100 / HM101	Roadside	Diffusion tube	-	100	**46**	**50**	**56**	**43.2**	38.6
HM102 / HM103 / HM104	Kerbside	Diffusion tube	-	100	37	39	**58**	**52.4**	**47.2**
HM105	Roadside	Diffusion tube	-	100	30	31	33	29.7	26.6
HM108 / HM109 / HM110	Kerbside	Diffusion tube	-	100	**40**	**47**	**69**	**64.5**	**55.9**
HM111	Roadside	Diffusion tube	-	100	29	30	31	33.5	24.3
HM114	Roadside	Diffusion tube	-	100	37	**40**	37	34.5	30.8
HM117 / HM118 / HM119	Roadside	Diffusion tube	-	83.3	**40**	**46**	**50**	**44.5**	35.6
HM120 /	Roadside	Diffusion tube	-	100	-	-	29	31.6	25.3

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) 2015 [a]	Valid Data Capture 2015 (%) [b]	NO_2 Annual Mean Concentration (µg/m^3) [c]				
					2011	2012	2013	2014	2015 [d]
HM121 / HM122									
HM123 / HM124 / HM125	Roadside	Diffusion tube	-	75.0	-	-	**46**	**47.1**	38.2
HM126 / HM127 / HM128	Roadside	Diffusion tube	-	100.0	-	-	**41**	38.3	32.5
HM129 / HM130 / HM131	Roadside	Diffusion tube	-	100.0	-	-	36	37.5	33.5
HM132 / HM133 / HM134	Roadside	Diffusion tube	-	100.0	-	-	37	32.7	29.0
HM135	Motorway	Diffusion tube	-	100.0	-	-	34	37.1	34.3

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

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

[a] Data capture for the monitoring period, in cases where monitoring was only carried out for part of the year.

[b] 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%).

[c] Means for diffusion tubes have been corrected for bias.

[d] All means have been annualised as per Technical Guidance LAQM.TG16 (Defra, 2016b) if valid data capture for the full calendar year is less than 75%. See Appendix A3 for details.

[e] Data has been annualised as per Technical Guidance LAQM.TG(16) as monitoring was not carried out for the full year.

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

Table A1.4: 1-Hour Mean NO_2 Monitoring Results

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) 2015 [a]	Valid Data Capture 2015 (%) [b]	NO_2 1-Hour Means > 200 µg/m^3				
					2011	2012	2013	2014	2015 [c]
Hertsmere Borehamwood Roadside	Roadside	Automatic	-	99.3	-	-	-	1 (166)	0
Hertsmere Borehamwood Background	Urban Background	Automatic	-	99.4	0 (99)	-	0 (96)	0	0

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

[a] Data capture for the monitoring period, in cases where monitoring was only carried out for part of the year.

[b] 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%).

[c] If the period of valid data capture is less than 85%, the 99.8th percentile of 1-hour means is provided in brackets.

Table A1.5: Annual Mean PM_{10} Monitoring Results

Site ID	Site Type	Valid Data Capture for Monitoring Period (%) 2015 [a]	Valid Data Capture 2015 (%) [b]	PM_{10} Annual Mean Concentration (µg/m^3)				
				2011	2012	2013	2014	2015 [c]
Hertsmere Borehamwood Roadside	Roadside	-	91.0	-	-	-	21 [d]	21.8
Hertsmere Borehamwood Background	Urban Background	-	96.7	10	-	- [e]	16	14.7

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

[a] Data capture for the monitoring period, in cases where monitoring was only carried out for part of the year.

[b] 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%).

[c] All means have been annualised as per Technical Guidance LAQM.TG16 (Defra, 2016b) if valid data capture for the full calendar year is less than 75%. See Appendix A3 for details.

[d] Data has been annualised as per Technical Guidance LAQM.TG(16) (Defra, 2016b) as monitoring was not carried out for the full year.

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

Table A1.6: 24-Hour Mean PM_{10} Monitoring Results

Site ID	Site Type	Valid Data Capture for Monitoring Period (%) 2015 [a]	Valid Data Capture 2015 (%) [b]	PM_{10} Annual Mean Concentration (µg/m^3)				
				2011	2012	2013	2014	2015 [c]
Hertsmere Borehamwood Roadside	Roadside	-	91.0	-	-	-	1 (42) [d]	8
Hertsmere Borehamwood Background	Urban Background	-	96.7	7 (31)	-	1 (38)	5	4

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

[a] Data capture for the monitoring period, in cases where monitoring was only carried out for part of the year.

[b] 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%).

[c] If the period of valid data capture is less than 85%, the 90.4th percentile of 24-hour means is provided in brackets.

[d] Data has been annualized as per Technical Guidance LAQM.TG(09) (Defra, 2009) as monitoring was not carried out for the full year.

Table A1.7: $PM_{2.5}$ Monitoring Results

Site ID	Site Type	Valid Data Capture for Monitoring Period (%) 2015 [a]	Valid Data Capture 2015 (%) [b]	$PM_{2.5}$ Annual Mean Concentration (µg/m^3)	
				2014	2015 [c]
Hertsmere Borehamwood Roadside	Roadside	-	90.4	15.3	12.0
Hertsmere Borehamwood Background	Urban Background	-	95.3	11.4	9.0

[a] Data capture for the monitoring period, in cases where monitoring was only carried out for part of the year.

[b] 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%).

[c] All means have been annualised as per Technical Guidance LAQM.TG16 (Defra, 2016b) if valid data capture for the full calendar year is less than 75%. See Appendix A3 for details.

A2 Appendix B: Full Monthly Diffusion Tube Results for 2015

Table A2.1: NO_2 Monthly Diffusion Tube Results 2015

Site ID	NO_2 Mean Concentrations (µg/m^3)													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean	
													Raw Data (Annualised) [a]	Bias Adjusted [b]
HM39	51.9	54.8	49.5	51.1	45.6	47.5	48.6	50.9	48.7	43.2	75.7	63.5	**52.6**	**45.7**
HM40	29.9	26.0	26.9	30.1	16.4	17.5	20.1	24.1	23.9	26.9	25.6	30.8	24.8	21.6
HM41	36.8	31.9	42.6	35	30.4	30.1	34.3	35.3	33.9	37.8	30.9	31.4	34.2	29.8
HM45	28.1	29.0	22.0	24.3	15.1	14.6	17.0	27.3	21.1	24.4	33.7	31.8	24.0	20.9
HM46	30.0	29.9	26.4	24.2	13.0	14.3	16.5	21.5	19.9	26.5	21.7	26.6	22.5	19.6
HM47	26.8	29.7	20.8	21.6	14.5	14.0	20.5	21.3	20.1	25.6	29.9	29.1	22.8	19.9
Triplicate HM45 / HM46 / HM47	28.3	29.5	23.1	23.4	14.2	14.3	18.0	23.4	20.4	25.5	28.4	29.2	23.1	20.1
HM48	44.7	46.8	47.6	49.1	34.1	34.6	38.5	44.6	44.1	48.6	44.9	43.0	**43.4**	37.7
HM49	61.0	75.8	56.5	59.4	50.6	59.0	52.9	68.3	57.7	56.7	71.8	50.5	**60.0**	**52.2**
HM50	50.1	68.0	65.0	69.0	49.9	47.7	56.4	71.1	57.3	60.0	71.9	69.1	**61.3**	**53.3**
HM52	40.2	47.6	36.7	49.1	30.7	30.6	40.0	43.3	40.8	45.0	46.7	43.4	**41.2**	35.8
HM53	24.4	27.2	21.6	24.9	14.0	12.0	14.9	20.1	20.4	24.0	24.9	25.8	21.2	18.4
HM54	28.0	31.8	32.6	33.6	19.2	18.0	23.5	24.4	26.5	34.5	22.2	27.3	26.8	23.3
HM55	25.8	27.1	25.7	25.8	16.1	17.2	No data	23.3	25.3	31.3	23.5	22.1	23.9	20.8
HM57	47.0	52.9	49.4	45.1	47.5	39.3	55.2	50.0	41.0	46.6	42.9	56.9	**47.8**	**41.6**
HM58	32.6	36.1	30.9	24.1	23.4	17.7	28.0	26.8	27.9	29.9	27.3	31.4	28.0	24.4
HM59	No data	26.9	21.6	19.8	13.4	14.6	15.2	18.4	17.9	23.0	20.9	20.6	19.3	16.8
HM60	39.8	45.1	44.5	31.7	29.2	25.8	28.0	27.2	30.9	37.9	32.3	26.1	33.2	28.9
HM61	52.4	53.5	42.3	47.1	42.7	41.2	62.1	52.7	39.0	43.6	58.6	61.8	**49.7**	**43.3**
HM62	36.5	40.9	41.6	42.2	28.6	30.1	42.3	42.0	39.4	46.7	42.7	45.4	39.9	34.7
HM63	42.0	38.2	32.3	42.8	33.0	26.8	39.8	41.9	34.6	39.6	46.9	52.1	39.2	34.1

HM64	57.3	52.7	49.0	38.5	49.3	45.4	43.3	44.9	46.8	49.9	56.7	43.4	**48.1**	**41.8**
HM65	46.3	48.6	46.4	40.0	40.1	36.7	43.0	42.9	37.2	44.5	58.5	44.5	**44.1**	38.3
HM66	55.5	42.4	38.8	31.4	35.4	29.5	36.9	35.8	31.5	40.4	56.6	39.3	39.5	34.3
HM67	39.7	44.3	38.2	35.4	27.9	28.5	32.4	34.0	33.6	No data	No data	35.7	35.0	30.4
HM69	59.7	55.0	49.7	48.6	40.1	45.2	47.6	47.7	43.7	55.9	59.3	49.6	**50.2**	**43.7**
HM70	38.3	41.8	33.1	32.1	28.3	25.0	35.4	37.1	29.5	32.1	38.2	44.5	34.6	30.1
HM71	51.1	60.7	43.4	40.8	44.2	46.0	47.5	41.6	42.1	42.8	47.8	40.9	**45.7**	39.8
HM72	45.8	52.1	50.4	51.7	44.3	42.4	45.6	45.4	44.5	48.0	44.9	49.5	**47.0**	**40.9**
HM73	47.7	55.7	48.9	49.5	40.7	39.2	40.3	41.6	41.2	46.1	46.2	47.0	**45.3**	39.4
Triplicate HM71 / HM72 / HM73	48.2	56.1	47.6	47.3	43.1	42.6	44.4	42.9	42.6	45.6	46.3	45.8	**46.0**	**40.1**
HM74	36.4	43.5	45.2	41.2	28.3	24.6	31.5	34.7	38.6	44.4	33.9	30.8	36.1	31.4
HM75	33.4	50.0	42.1	43.7	28.0	26.6	30.2	33.6	41.0	42.7	34.2	33.7	36.6	31.8
HM76	41.4	41.3	42.0	42.2	25.4	26.8	31.6	33.8	40.3	42.8	34.3	33.8	36.3	31.6
Triplicate HM74 / HM75 / HM76	37.1	44.9	43.1	42.3	27.2	26.0	31.1	34.0	40.0	43.3	34.1	32.8	36.3	31.6
HM79	34.4	55.3	46.5	40.4	34.9	33.2	45.8	31.2	36.0	No data	No data	34.7	39.2	34.1
HM80	39.6	52.8	37.6	40.9	35.1	36.9	41.0	3.6	37.8	No data	No data	32.6	35.8	31.1
HM81	38.2	57.9	42.7	37.4	32.7	31.0	32.2	36.1	33.7	No data	38.4	32.3	37.5	32.6
Triplicate HM79 / HM80 / HM81	37.4	55.3	42.3	39.6	34.2	33.7	39.7	23.6	35.8	No data	38.4	33.2	37.6	32.7
HM82	44.9	43.2	36.1	38.5	29.3	25.3	32.1	33.3	32.9	No data	No data	40.4	35.6	31.0
HM83	39.7	43.8	41.2	32.6	29.3	25.5	31.0	30.0	32.5	No data	No data	38.3	34.4	29.9
HM84	30.6	43.9	38.5	35.4	26.5	25.3	31.7	32.0	32.9	No data	No data	34.5	33.1	28.8

Triplicate HM82 / HM83 / HM84	38.4	43.6	38.6	35.5	28.4	25.4	31.6	31.8	32.8	No data	No data	37.8	34.4	29.9
HM85	26.7	31.6	27.0	25.1	15.3	16.2	18.4	22.6	22.1	29.9	28.4	30.5	24.5	21.3
HM86	49.5	54.4	48.1	45.9	39.0	29.3	52.2	51.6	45.2	42.0	61.2	58.6	**48.1**	**41.8**
HM93	38.0	35.7	28.8	26.5	21.4	20.9	26.4	28.8	25.3	30.3	35.2	41.1	29.9	26.0
HM99	42.3	No data	46.6	48.0	38.4	35.9	40.4	43.3	44.2	49.8	37.9	35.2	**42.0**	36.5
HM100	44.3	46.5	48.9	45.5	39.6	42.4	45.0	41.5	47.5	No data	48.5	37.1	**44.3**	38.5
HM101	57.3	50.7	No data	46.3	38.7	43.9	43.5	44.8	45.7	48.4	44.8	38.3	**45.7**	39.7
Triplicate HM99 / HM100 / HM101	48.0	48.6	47.8	46.6	38.9	40.7	43.0	43.2	45.8	49.1	43.7	36.9	**44.4**	38.6
HM102	56.2	65.7	53.6	59.7	44.7	45.7	51.6	43.7	56.6	51.6	76.7	59.5	**55.4**	**48.2**
HM103	47.8	54.5	57.5	54.3	49.0	38.8	52.9	47.5	52.9	48.9	58.8	65.4	**52.4**	**45.5**
HM104	49.9	71.0	54.6	59.5	45.9	46.0	52.9	46.9	54.5	53.7	63.4	60.2	**54.9**	**47.7**
Triplicate HM102 / HM103 / HM104	51.3	63.7	55.3	57.8	46.5	43.5	52.5	46.0	54.6	51.4	66.3	61.7	**54.2**	**47.2**
HM105	32.2	36.6	29.5	36.6	22.1	18.1	25.4	31.5	31.0	35.6	33.5	35.0	30.6	26.6
HM108	70.0	36.4	81.8	86.4	51.2	57.1	67.8	65.5	65.2	79.2	69.3	74.4	**67.0**	**58.3**
HM109	59.1	37.1	62.0	75.9	57.0	60.1	58.2	55.4	64.1	81.9	67.0	63.1	**61.8**	**53.7**
HM110	59.0	71.6	84.1	72.3	55.2	46.1	55.8	60.0	61.9	59.0	74.3	66.9	**63.9**	**55.6**
Triplicate HM108 / HM109 / HM110	62.7	48.4	76.0	78.2	54.5	54.5	60.6	60.3	63.8	73.4	70.2	68.1	**64.2**	**55.9**
HM111	28.9	34.3	32.6	36.5	20.4	18.6	21.9	27.9	30.5	38.4	17.1	27.7	27.9	24.3
HM114	42.8	42.2	37.5	33.2	30.6	25.1	33.6	38.2	34.4	37.8	34.6	35.5	35.5	30.8
HM117	46.5	No data	54.3	No data	33.1	29.4	37.3	42.9	42.7	48.4	42.4	32.9	**41.0**	35.7
HM118	47.0	No data	47.0	No data	35.3	33.8	33.0	39.7	No data	52.1	41.7	37.4	**40.8**	35.5

HM119	No data	No data	46.2	No data	No data	40.0	38.6	35.6	No data	47.9	41.5	34.3	**40.4**	37.7
Triplicate HM117 / HM118 / HM119	46.7	No data	49.2	No data	34.2	34.4	36.3	39.4	42.7	49.5	41.9	34.9	40.9	35.6
HM120	30.7	35.7	28.4	31.1	19.8	19.6	28.5	28.6	27.0	31.2	29.2	37.2	28.9	25.2
HM121	34.2	32.0	30.7	29.1	22.0	17.9	26.4	30.2	29.1	29.0	34.7	32.6	29.0	25.2
HM122	31.6	36.8	29.1	31.2	21.3	21.9	24.3	28.8	29.2	30.8	33.3	33.4	29.3	25.5
Triplicate HM120 / HM121 / HM122	32.2	34.8	29.4	30.5	21.0	19.8	26.4	29.2	28.4	30.3	32.4	34.4	29.1	25.3
HM123	47.8	52.6	No data	48.9	No data	35.6	No data	No data	42.3	48.9	40.2	31.6	**40.1**	34.9
HM124	43.6	43.6	45.1	41.7	No data	39.8	No data	No data	46.5	39.0	49.0	35.0	**42.6**	37.0
HM125	50.5	No data	52.0	42.4	No data	No data	No data	No data	No data	45.4	47.3	37.0	39.6	34.5
Triplicate HM123 / HM124 / HM125	47.3	48.1	48.5	44.3	No data	37.7	No data	No data	44.4	44.4	45.5	34.5	43.9	38.2
HM126	39.8	46.4	26.7	36.6	28.1	30.2	33.5	40.4	35.2	43.8	42.4	36.1	36.6	31.8
HM127	39.5	45.2	37.4	34.6	29.7	30.1	32.8	42.4	34.7	42.2	33.5	38.4	36.7	31.9
HM128	41.7	41.1	37.8	36.7	32.0	31.1	33.8	43.6	38.5	45.8	43.0	40.5	38.8	33.8
Triplicate HM126 / HM127 / HM128	40.3	44.2	34.0	35.9	29.9	30.5	33.4	42.1	36.1	43.9	39.7	38.4	37.4	32.5
HM129	34.7	38.0	35.6	41.2	35.0	34.3	42.3	32.9	36.8	37.7	43.1	42.5	37.8	32.9
HM130	38.4	38.6	34.6	41.7	35.1	34.6	45.8	35.2	36.7	39.6	32.8	40.8	37.8	32.9
HM131	39.4	44.2	37.3	39.9	33.2	36.4	43.6	43.7	39.3	39.8	40.3	39.5	39.7	34.5
Triplicate HM129 / HM130 / HM131	37.5	40.3	35.8	41.0	34.4	35.1	43.9	37.3	37.6	39.0	38.7	40.9	38.5	33.5
HM132	36.5	44.3	41.1	37.7	27.8	29.5	31.4	27.2	32.0	37.4	28.0	35.7	34.1	29.6
HM133	38.1	48.2	40.4	36.4	27.3	25.4	27.8	27.3	37.2	40.8	30.3	29.0	34.0	29.6

HM134	33.0	29.7	37.8	42.6	24.9	23.0	29.9	28.8	32.8	40.2	34.9	27.8	32.1	27.9
Triplicate HM132 / HM133 / HM134	35.9	40.7	39.8	38.9	26.6	26.0	29.7	27.8	34.0	39.4	31.0	30.8	33.4	29.0
HM135	42.8	44.9	36.6	30.3	38.9	28.3	42.2	39.7	35.8	36.5	57.9	38.8	39.4	34.3

[a] All means have been annualised as per Technical Guidance LAQM.TG16 (Defra, 2016b) if valid data capture for the full calendar year is less than 75%. See Appendix A3 for details.

[b] See Appendix A3 for details on bias adjustment

A3 Appendix C: Supporting Technical Information / Air Quality Monitoring Data QA/QC

New Pollution Sources and Developments

Changed and new sources of pollution have been investigated and any changes to existing sources, or new sources are listed below:

Table A3.1: New Pollution Sources

Source Description	Screening Assessment Required?
New Developments: The Elstree Way corridor development. Consists of approximately 10 new residential sites on the edge of Borehamwood and the A1. Conversion of commercial premises into residential.	All new developments are examined through the planning system and air quality assessments requested 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 necessary, mitigation is requested. Monitoring within and around the Elstree Way Corridor area should alert Hertsmere Council to any situation where cumulatively, additional traffic and / or energy plant affects monitored concentrations. This will be reported annually through the LAQM process.
A managed motorway scheme has been implemented on a section of the M24 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 flow.	It was recommended in the Updating and Screening Assessment 2015 (AQC, 2015) that monitoring should continue to be undertaken at diffusion tube monitoring sites HM63 and HM86 (in close proximity to the two AQMAs close Junctions 23 and 24), and that a detailed assessment should be undertaken should concentrations increase significantly at these sites. Monitoring still continues at sites HM063 and HM086. Measured concentrations at both sites decreased between 2014 and 2015, therefore a detailed assessment is not considered to be necessary.

Diffusion Tube Bias Adjustment Factors

Hertsmere Council use diffusion tubes prepared and analysed by Gradko International (50% TEA in water). For 2015 the national bias-adjustment factor for Gradko International is 0.87 (National Diffusion Tube Bias Adjustment Factor Spreadsheet (09/16) (Local Air Quality Management Helpdesk, 2016).

There was a single co-location study conducted in 2015 at Borehamwood Background automatic monitoring site. Data from this study was used to produce a local bias adjustment factor for 2015. The local bias adjustment factor was calculated to be 1.00 (Local Bias Adjustment Factor Tool (Version 04)) (Defra, 2011).

The national bias adjustment factor (0.87) has been used in order to be consistent with other air quality reports (all Hertsmere Updating and Screening Assessment reports (USAs) between 2010 and 2015 have adjusted diffusion tube results using national bias adjustment factors). As the national bias adjustment factor is based on a significantly greater number of studies than the local bias adjustment factor, it is considered appropriate to apply the national bias adjustment factor for 2015.

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). The 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 was 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.

QA/QC of Automatic Monitoring Station Monitoring

Air quality measurements from automatic monitoring stations operated by Hertsmere Council in 2015 were validated and ratified to the standards described in the Local Air Quality Management – Technical Guidance LAQM TG(16) by Air Quality Data Management (AQDM).

A4 Appendix D: Maps of Monitoring Locations

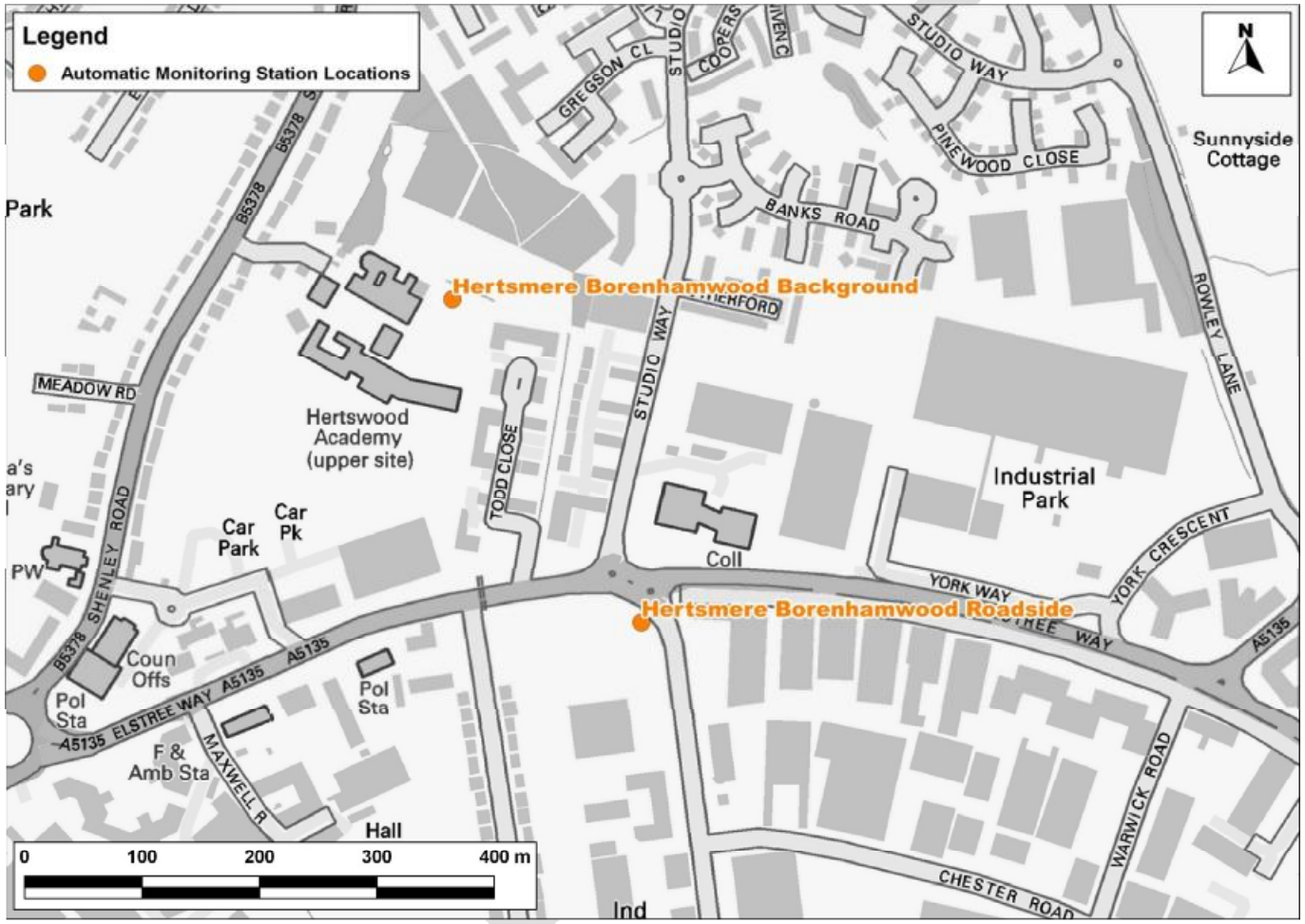

Figure A4.1: Hertsmere Automatic Monitoring Station Locations

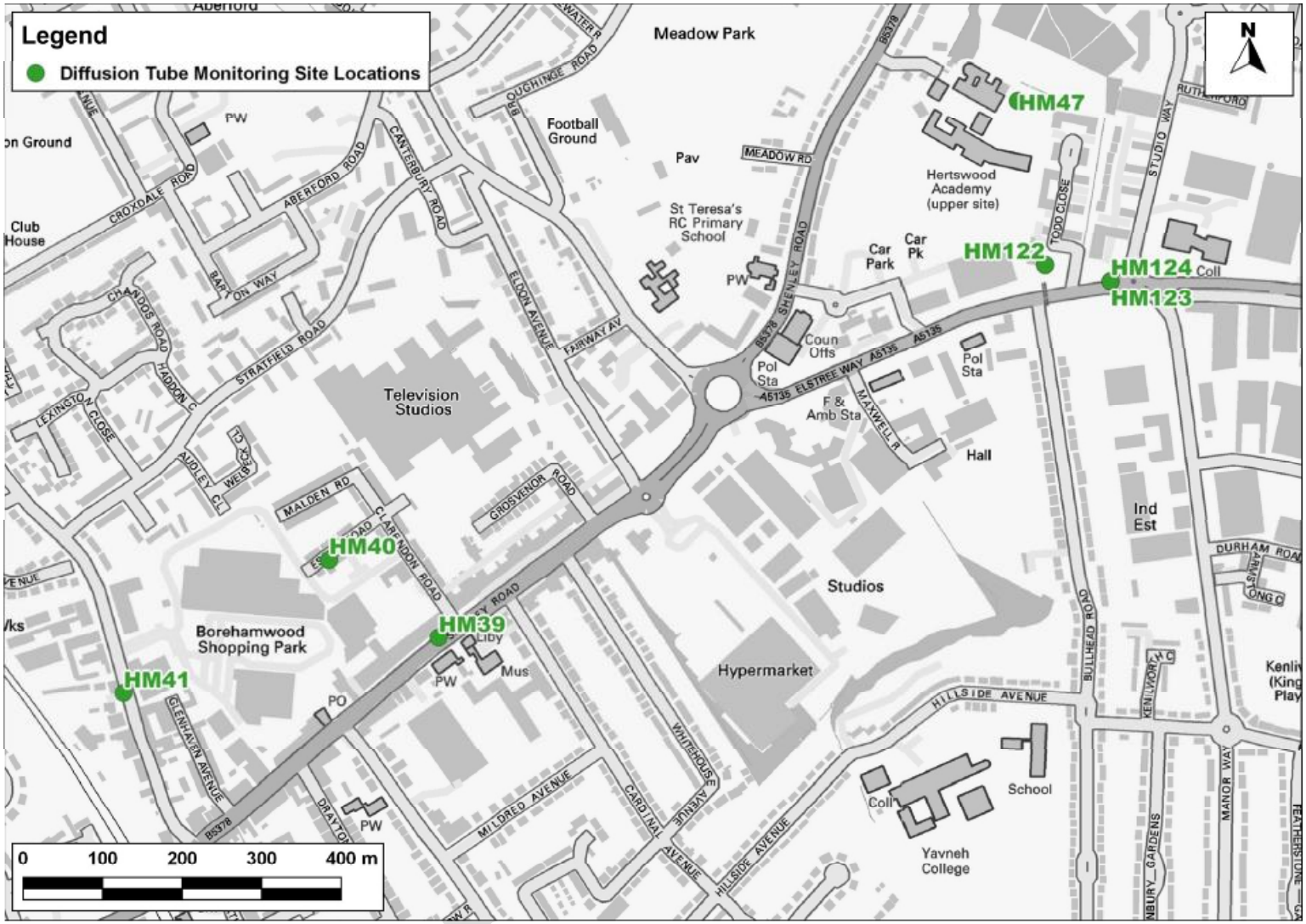

Figure A4.2: Hertsmere Diffusion Tube Monitoring Site Locations, Borehamwood Centre

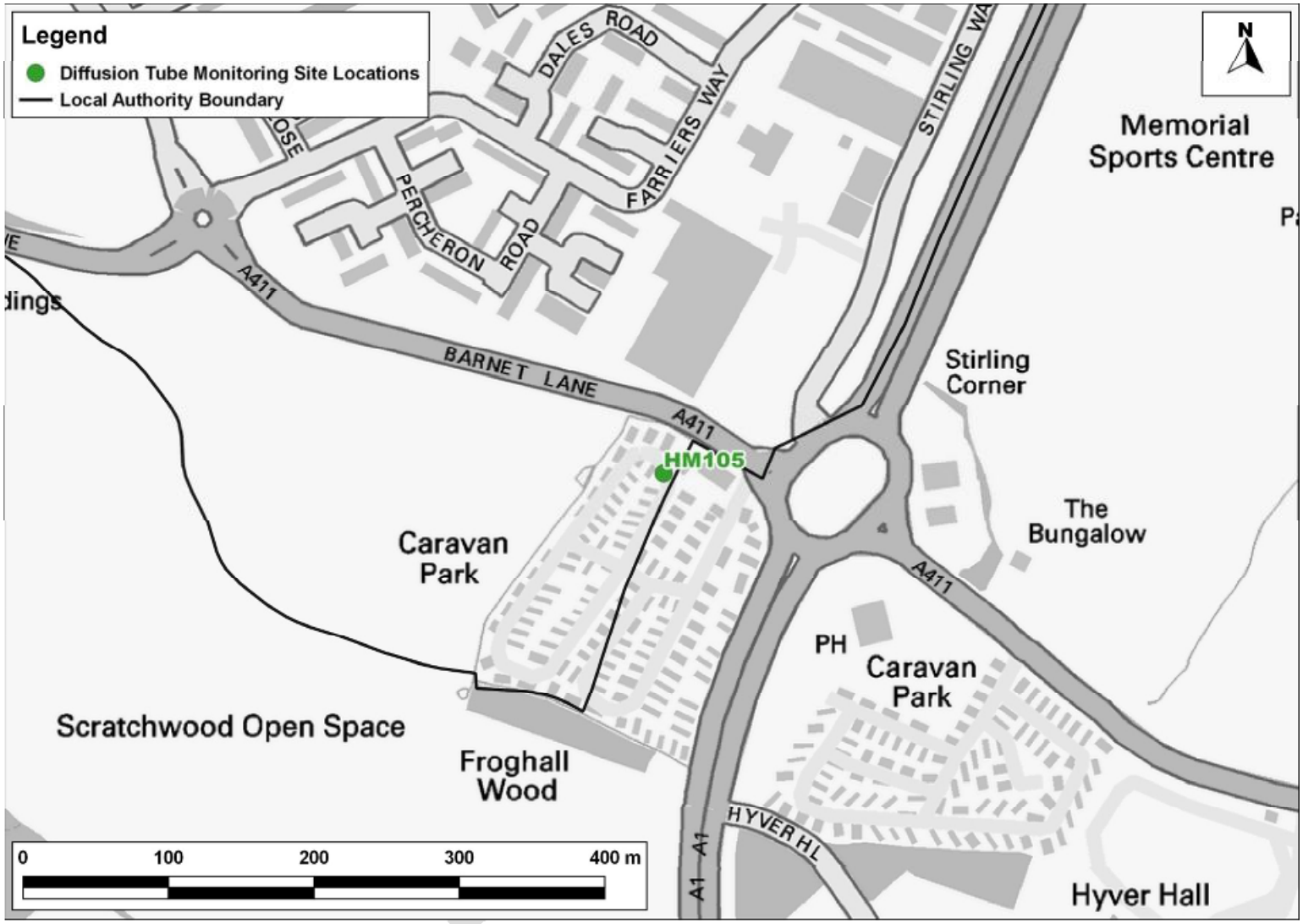

Figure A4.3: Hertsmere Diffusion Tube Monitoring Site Location, Borehamwood South

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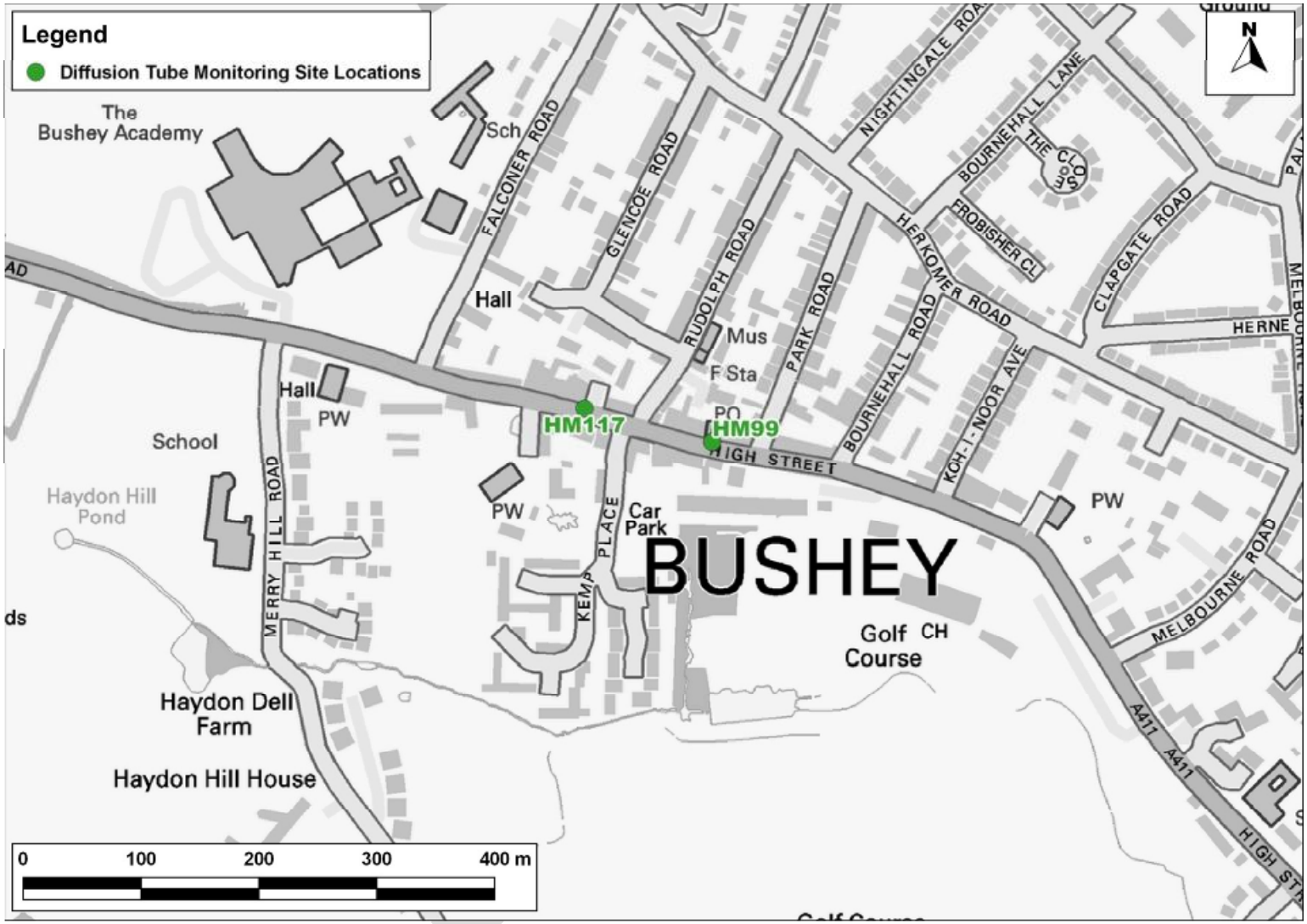

Figure A4.4: Hertsmere Diffusion Tube Monitoring Site Locations, Northwest Bushey

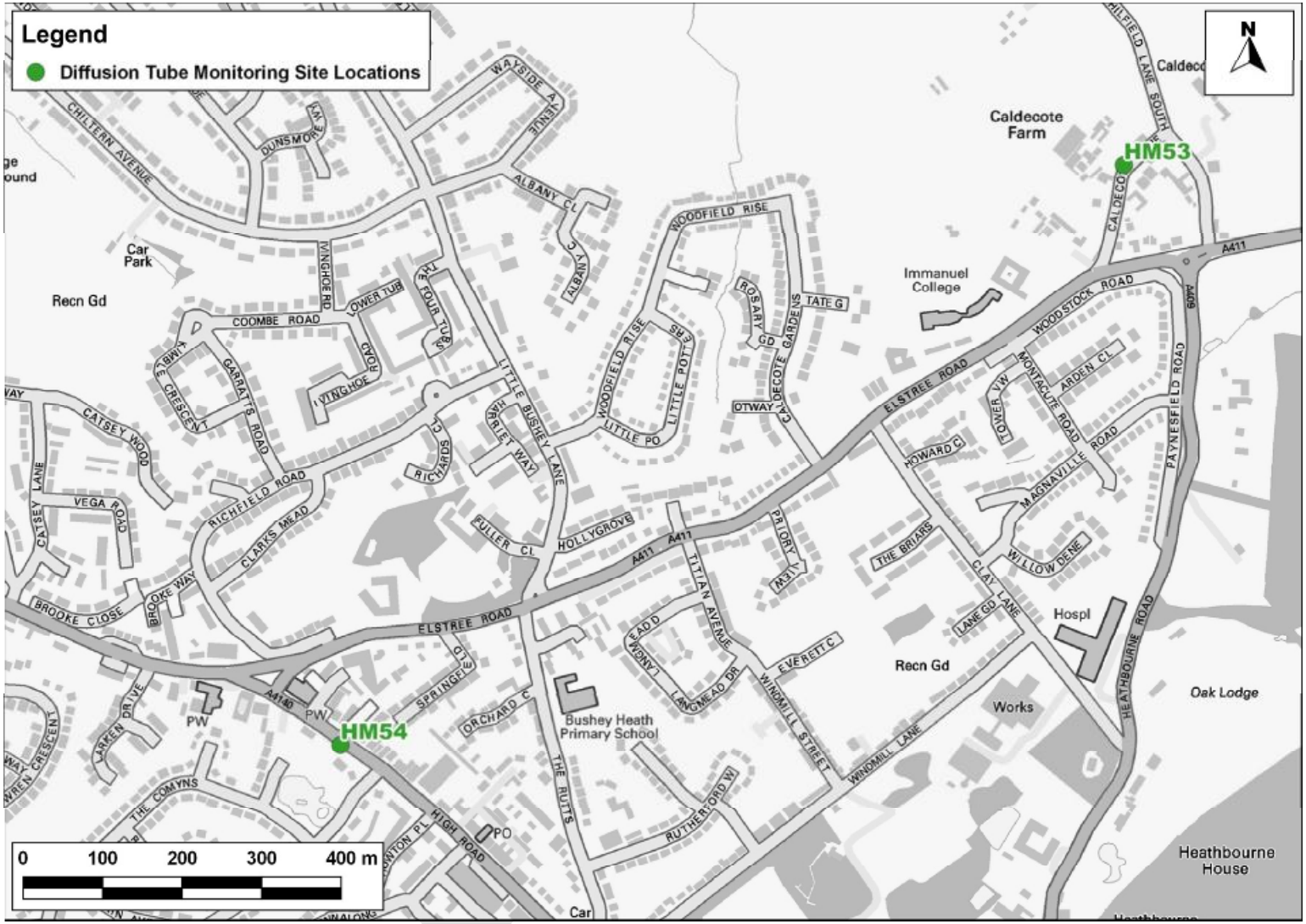

Figure A4.5: Hertsmere Diffusion Tube Monitoring Site Locations, Southeast Bushey

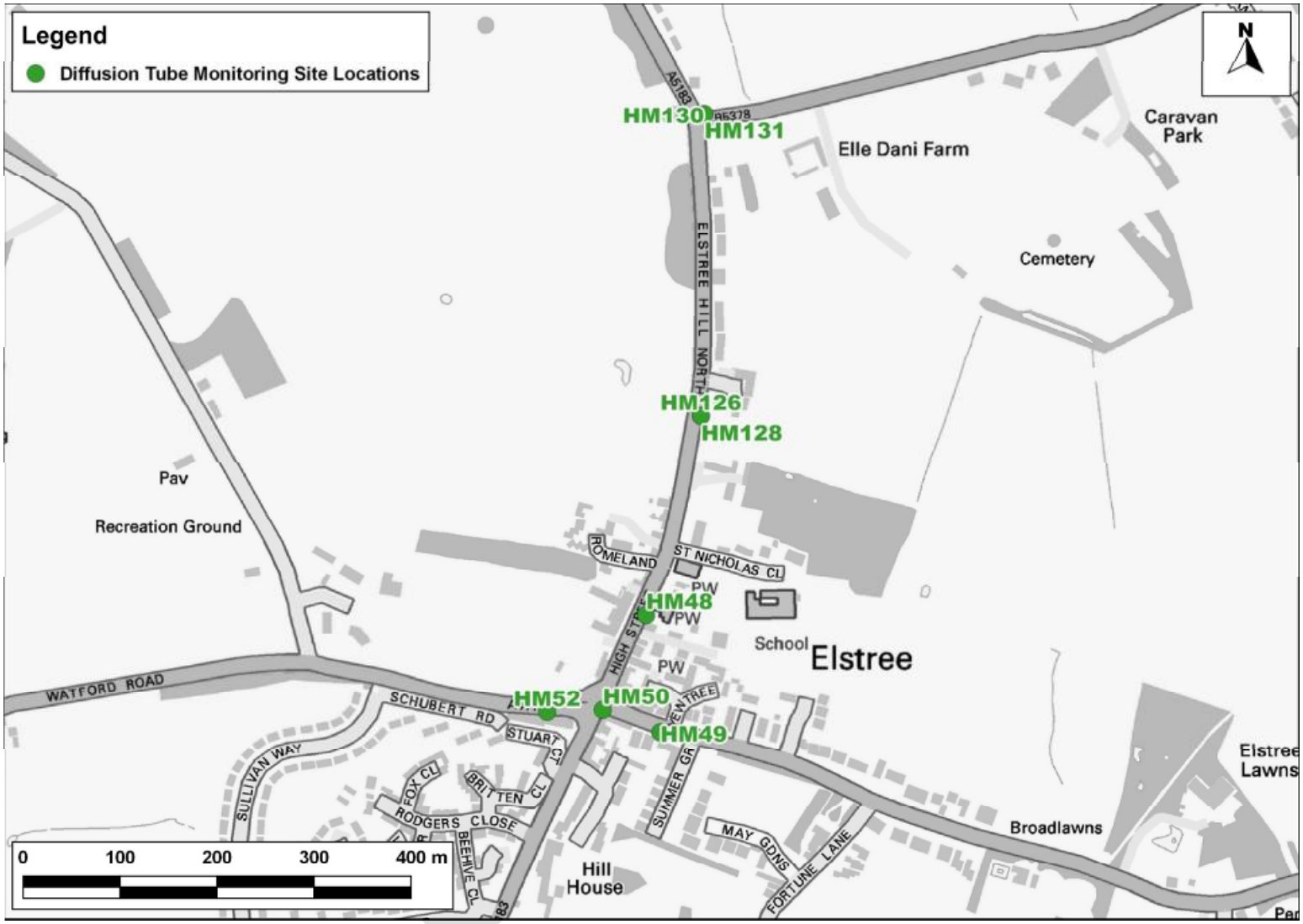

Figure A4.6: Hertsmere Diffusion Tube Monitoring Site Locations, Elstree

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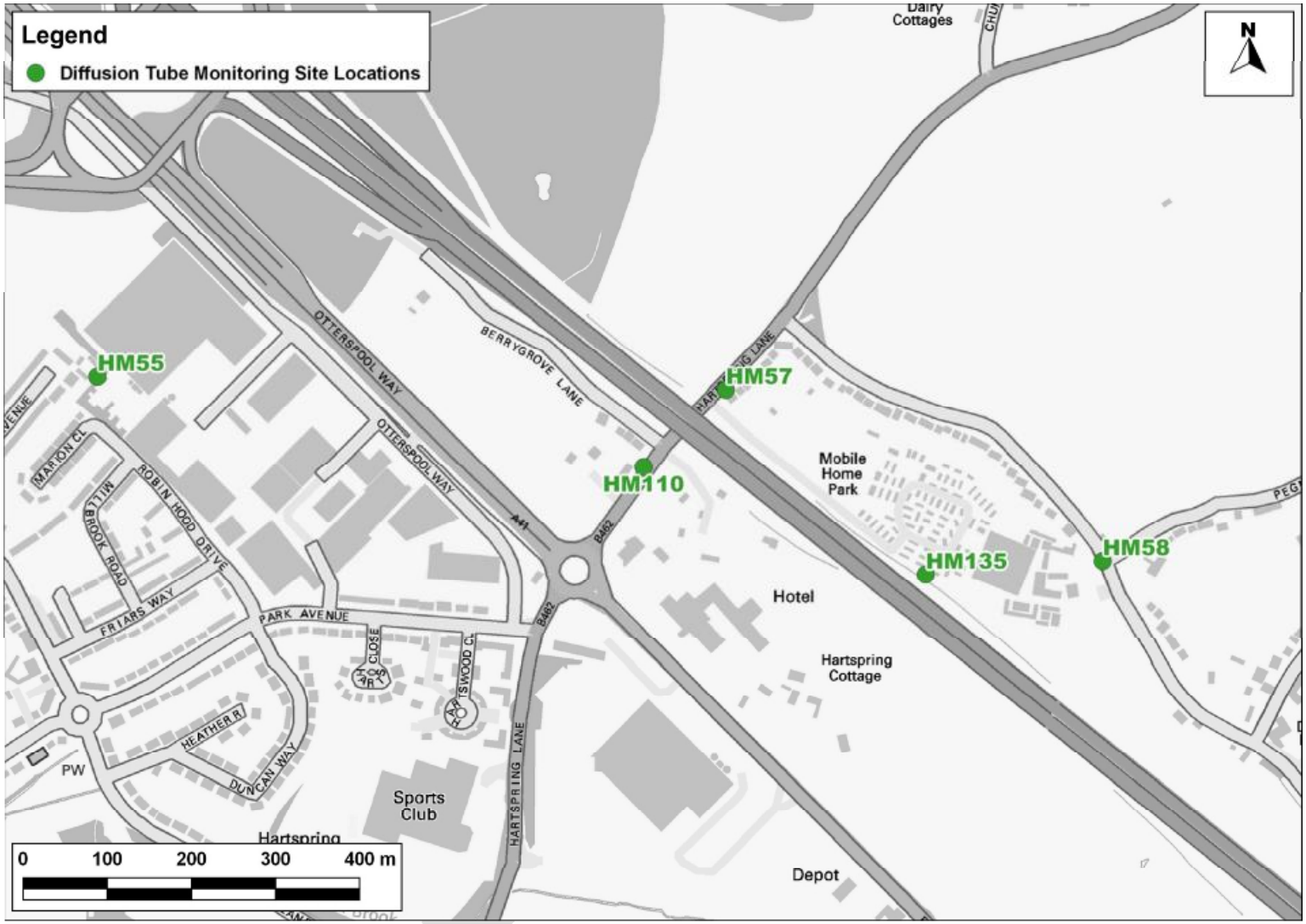

Figure A4.7: Hertsmere Diffusion Tube Monitoring Site Locations, M1 near Aldenham

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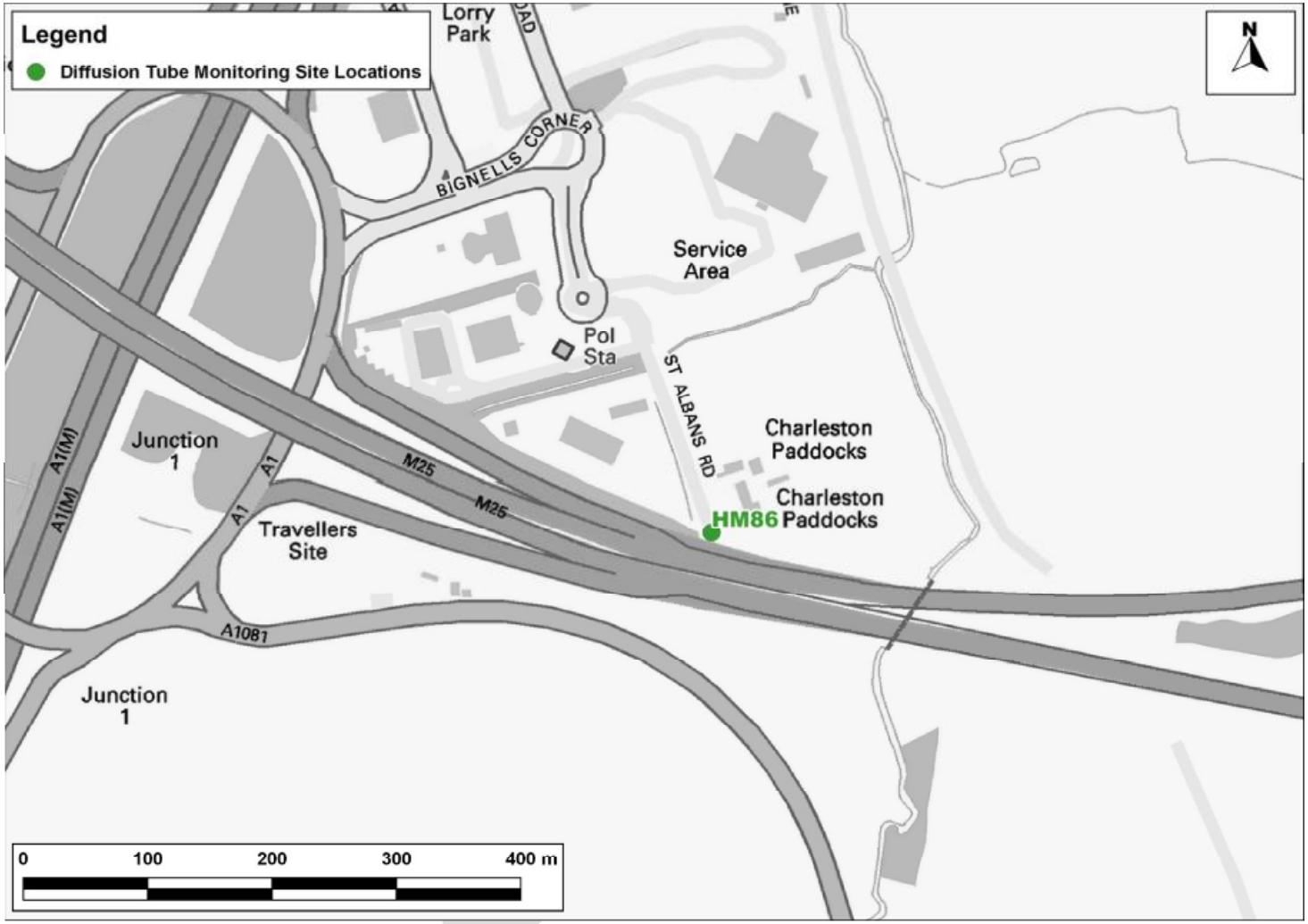

Figure A4.8: Hertsmere Diffusion Tube Monitoring Site Location, M25 near Junction 1, South Mimms

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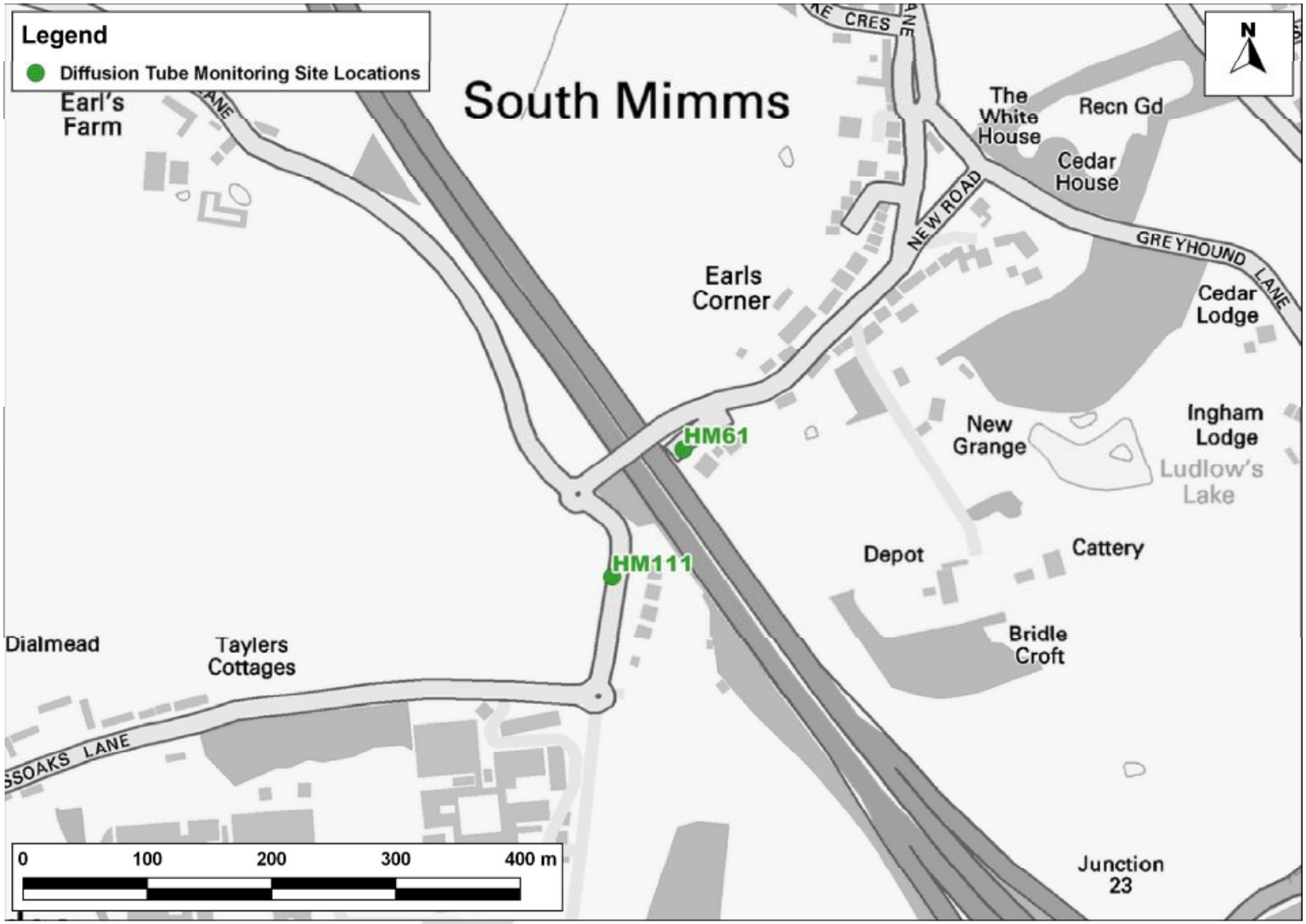

Figure A4.9: Hertsmere Diffusion Tube Monitoring Site Locations, M25 near Junction 23, South Mimms

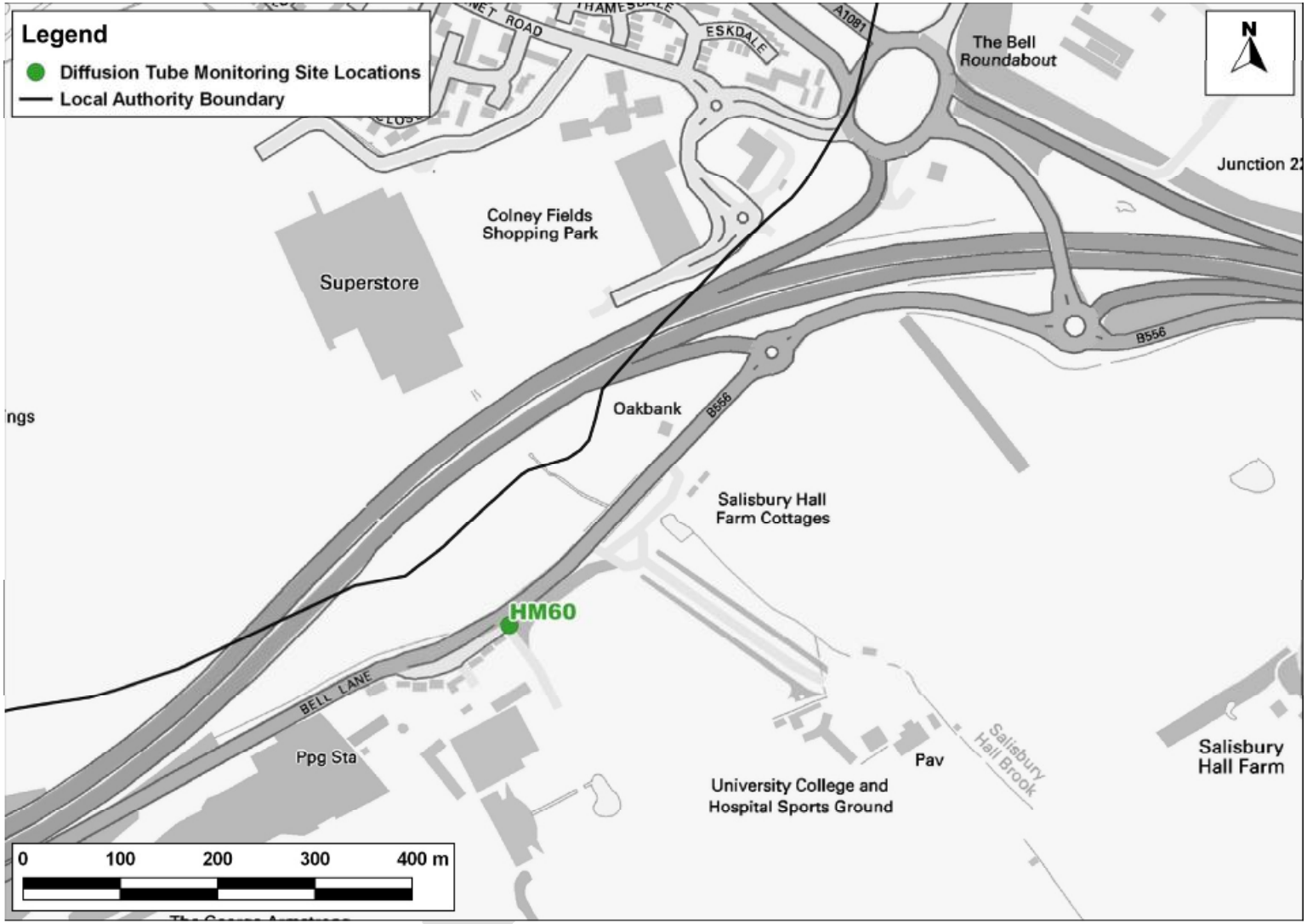

Figure A4.10: Hertsmere Diffusion Tube Monitoring Site Location, M25 near Junction 22

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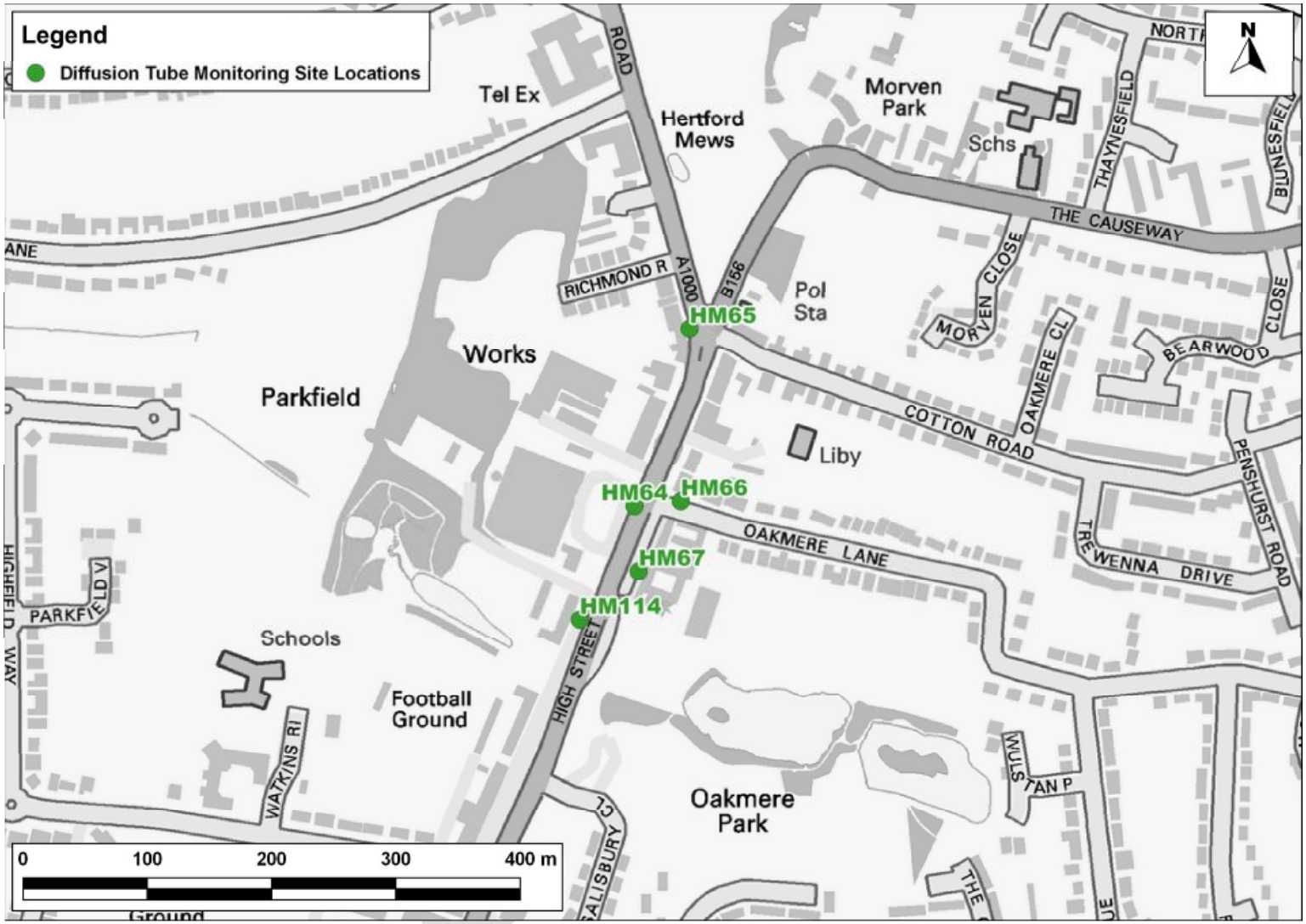

Figure A4.11: Hertsmere Diffusion Tube Monitoring Site Locations, Potters Bar Centre

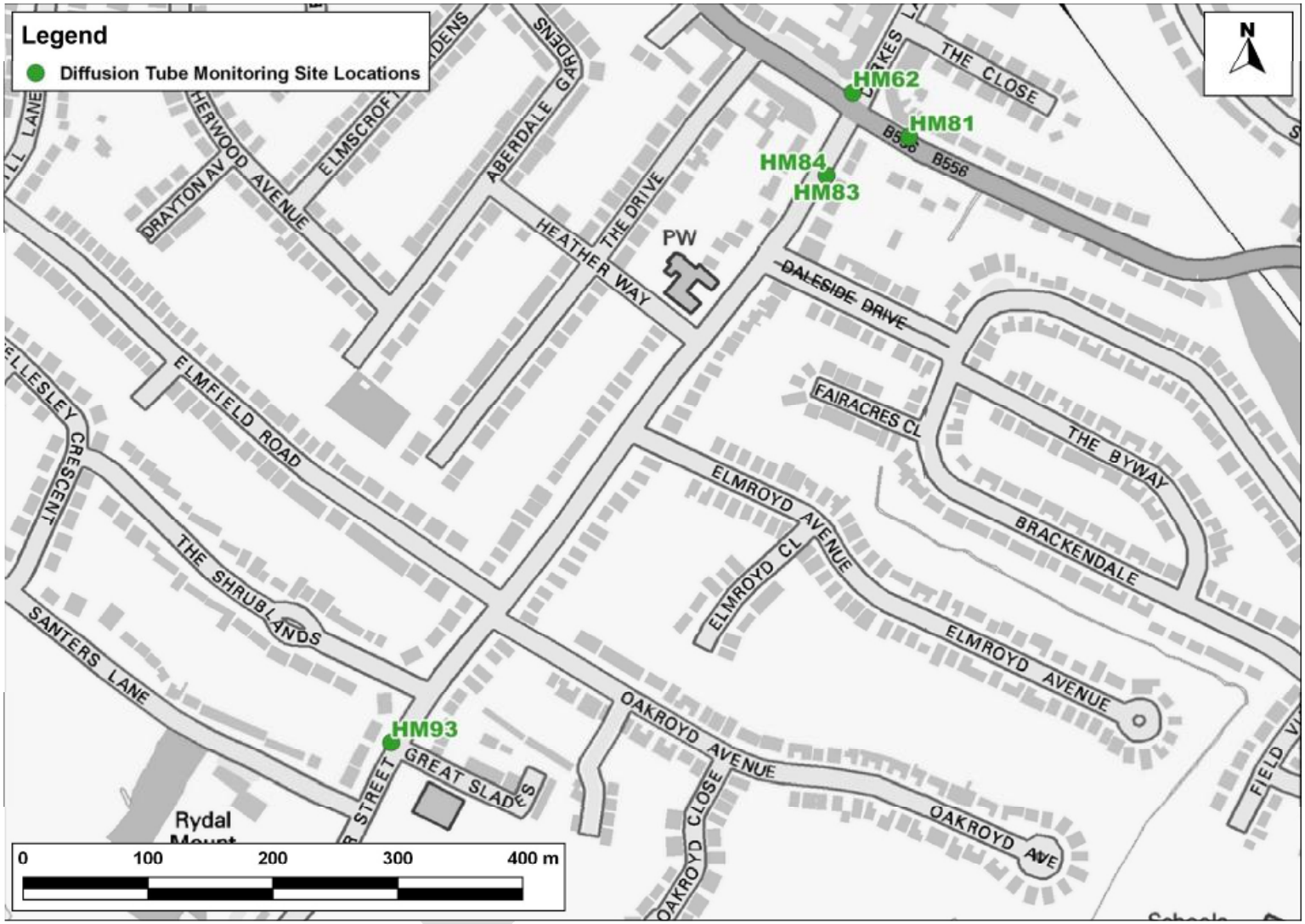

Figure A4.12: Hertsmere Diffusion Tube Monitoring Site Locations, Potters Bar Southwest

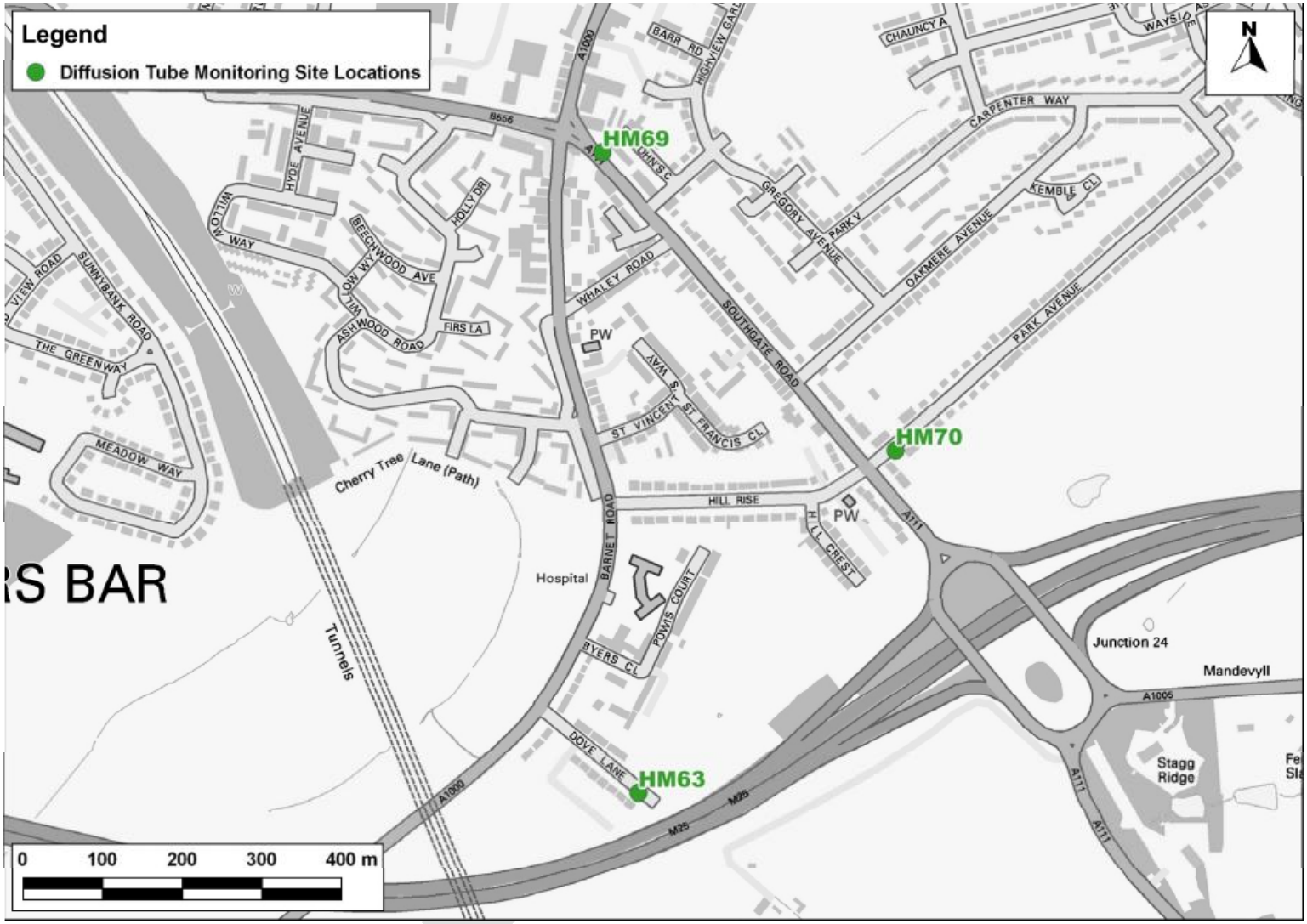

Figure A4.13: Hertsmere Diffusion Tube Monitoring Site Locations, Potters Bar South, near M25

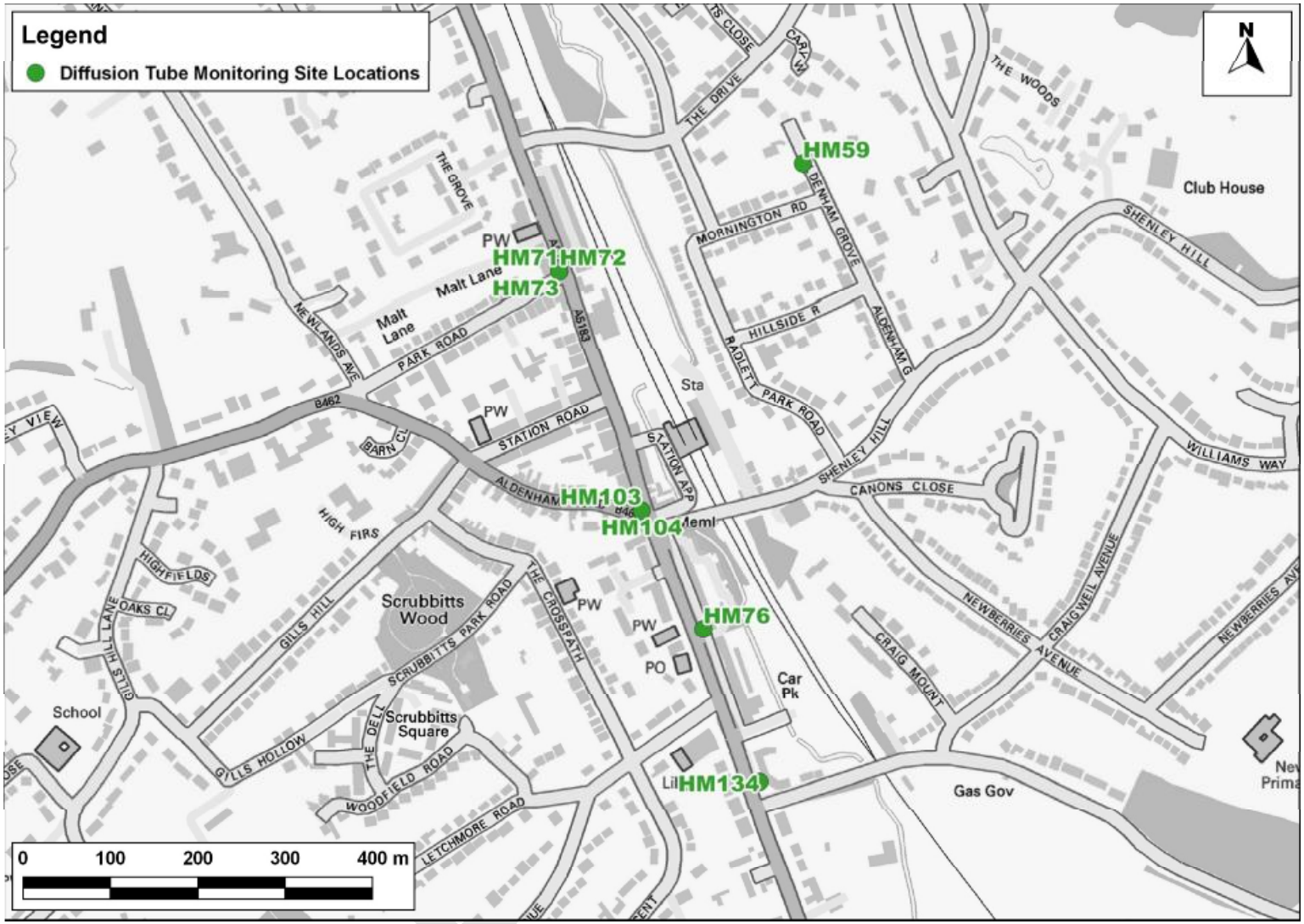

Figure A4.14: Hertsmere Diffusion Tube Monitoring Site Locations, Radlett

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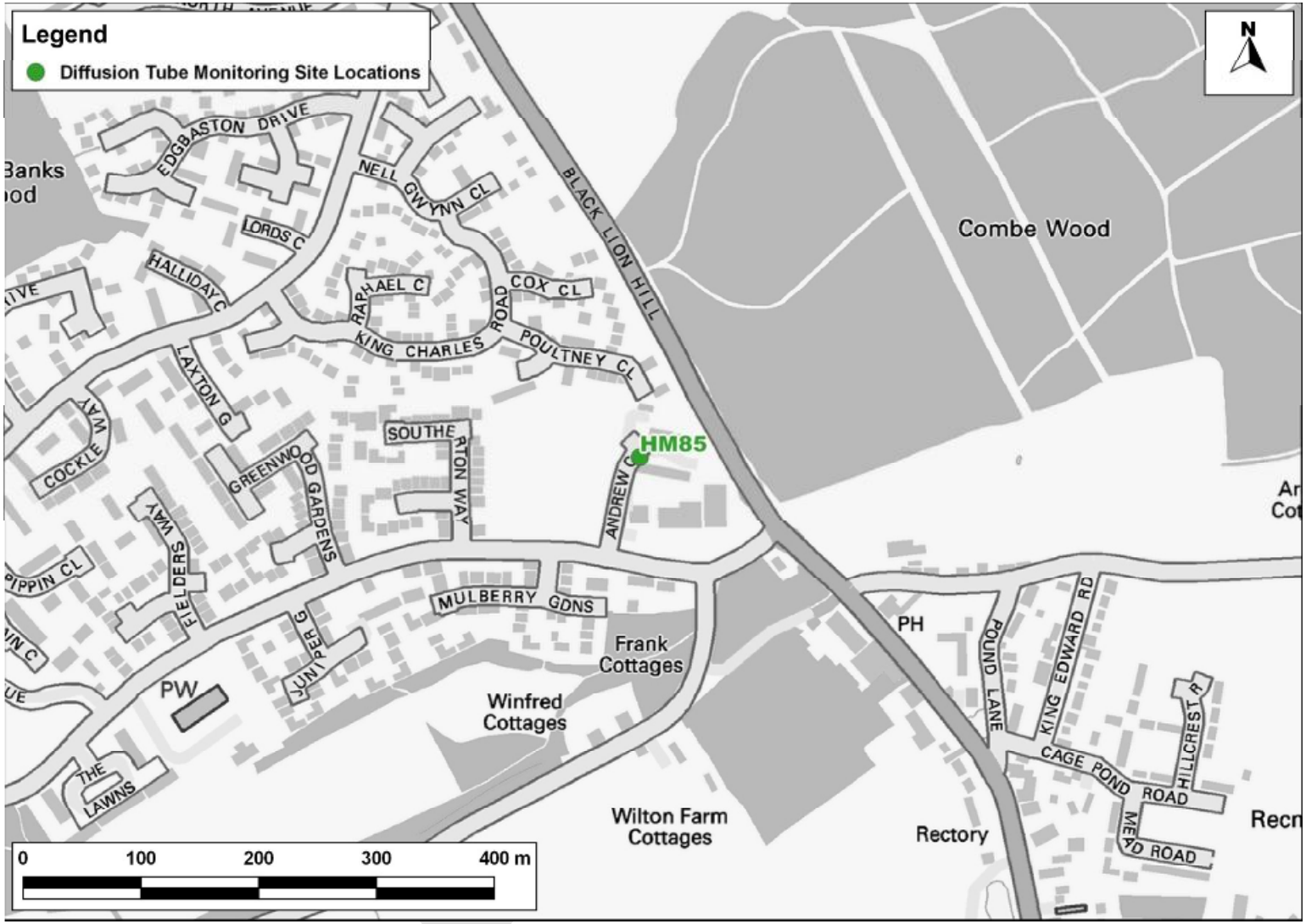

Figure A4.15: Hertsmere Diffusion Tube Monitoring Site Location, Shenley

A5 Appendix E: Summary of Air Quality Objectives in England

Table A5.1: Air Quality Objectives in England

Pollutant	Air Quality Objective [a]	
	Objective	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
Fine Particles (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

[a] The units are in microgrammes of pollutant per cubic metre of air (µg/m^3).

Glossary of Terms

AQC	Air Quality Consultants
AQMA	Air Quality Management Area
Defra	Department for Environment, Food and Rural Affairs
Exceedence	A period of time when the concentration of a pollutant is greater than the appropriate air quality objective. This applies to specified locations with relevant exposure
FDMS	Filter Dynamics Measurement System
LAQM	Local Air Quality Management
µg/m^3	Microgrammes per cubic metre
NHS	National Health Service
NO	Nitric oxide
NO_2	Nitrogen dioxide
NOx	Nitrogen oxides (taken to be NO_2 + NO)
Objectives	A nationally defined set of health-based concentrations for nine pollutants, seven of which are incorporated in Regulations, setting out the extent to which the standards should be achieved by a defined date. There are also vegetation-based objectives for sulphur dioxide and nitrogen oxides
PM_{10}	Small airborne particles, more specifically particulate matter less than 10 micrometres in aerodynamic diameter
$PM_{2.5}$	Small airborne particles less than 2.5 micrometres in aerodynamic diameter
Standards	A nationally defined set of concentrations for nine pollutants below which health effects do not occur or are minimal

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