



2022 Air Quality Annual Status Report (ASR)

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

Date: June, 2022

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Executive Summary: Air Quality in Our Area

Air Quality in Welwyn Hatfield Borough Council

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, the elderly, and those with existing heart and lung conditions. There is also often a strong correlation with equalities issues because areas with poor air quality are also often less affluent areas^{1,2}.

The mortality burden of air pollution within the UK is equivalent to 28,000 to 36,000 deaths at typical ages³, with a total estimated healthcare cost to the NHS and social care of £157 million in 2017⁴.

The monitoring results show that pollution levels within the borough are generally decreasing even following the increased traffic activity as the pandemic is easing. There was clearly reduction in pollution during the pandemic in 2020 and there was concern that pollution levels would return to pre pandemic levels. Fortunately, to date this has not occurred. The results show that some areas have increased marginally in 2020 compared to 2021. The pollutants of concern are PM2.5 and Nitrogen dioxide and these will be closely monitored going

¹ Public Health England. Air Quality: A Briefing for Directors of Public Health, 2017

² Defra. Air quality and social deprivation in the UK: an environmental inequalities analysis, 2006

³ Defra. Air quality appraisal: damage cost guidance, July 2021

⁴ Public Health England. Estimation of costs to the NHS and social care due to the health impacts of air pollution: summary report, May 2018

forward. The current pollution levels across the borough are below any of the target objectives that have been set.

Actions to Improve Air Quality

Whilst air quality has improved significantly in recent decades and will continue to improve due to national policy decisions, there are some areas where local action is needed to improve air quality further.

The 2019 Clean Air Strategy⁵ sets out the case for action, with goals to reduce exposure to harmful pollutants. The Road to Zero⁶ sets out the approach to reduce exhaust emissions from road transport through a number of mechanisms; this is extremely important given that the majority of Air Quality Management Areas (AQMAs) are designated due to elevated concentrations heavily influenced by transport emissions.

The air quality within the borough is largely consistent in terms of fluctuation of pollution levels. The pandemic in 2020 reduced pollution levels across the borough and this is evident from the results presented in the graphs later in this report. This provides a good data set showing the proportion of localised pollution in relation to road traffic. There are some instances in the data where pollution levels have increased in 2021 compared to 2020. However, in most cases they have not returned to pre pandemic levels. A new way of working has been adopted by many across the borough which hopefully is set to continue.

Monitoring locations are still being closely monitored and diffusion tube sites will be relocated when necessary. There is not a particular issue with any one pollutant across the borough. The main aim is to reduce all levels of pollution as much as possible.

The Hertfordshire and Bedfordshire air quality group are working closely with Hertfordshire County Council to join forces and align joint practices to make improvements across the county. This relationship is blossoming, and improvements are being made going forward.

⁵ Defra. Clean Air Strategy, 2019

⁶ DfT. The Road to Zero: Next steps towards cleaner road transport and delivering our Industrial Strategy, July 2018

Conclusions and Priorities

The results show that pollution levels have reduced slightly or remain unchanged. There are currently no locations across the borough that breach the air quality objectives so there is no requirement to declare an air quality action area. The monitoring network is well established, and this is gathering very important data across the borough. Work is ongoing with planning development to install and provide more green transport solutions. Green transport facilities should be provided for new developments to aid the green transport infrastructure across the borough.

Local Engagement and How to get Involved

The authority has engaged with Hertfordshire County Council and other stakeholders. There has been regular engagement and communication with the Hertfordshire and Bedfordshire air quality group. Local engagement has come via social media and the air quality schools project. This has included the promotion of air quality, green travel, development control and being aware of the differences that can be made at a local level.

This ASR was prepared by the Environmental Health Department of Welwyn Hatfield Borough Council with the support and agreement of the following officers:

Terry Vincent and Lee Clark.

This ASR has been approved by:

The council's Corporate Management Team.

If you have any comments on this ASR please send them to Terry Vincent at:

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1 Local Air Quality Management

This report provides an overview of air quality in Welwyn and Hatfield during 2021. 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 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 Welwyn Hatfield Borough Council to improve air quality and any progress that has been made.

The statutory air quality objectives applicable to LAQM in England are presented in Table E.1.

2 Actions to Improve Air Quality

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 should prepare an Air Quality Action Plan (AQAP) within 12 months setting out measures it intends to put in place in pursuit of compliance with the objectives.

Welwyn Hatfield Borough Council currently does not have any declared AQMAs.

Progress and Impact of Measures to address Air Quality in Welwyn and Hatfield

Defra's appraisal of last year's ASR concluded:

The report is well structured, detailed, and provides the information specified in the Guidance. The following comments are designed to help inform future reports.

1. Some formatting errors such as page/bookmark links in the report, which requires correction.
2. Council have added 18 new sites deployed in 2020. The monitoring review demonstrates the Councils proactive and dedicated approach to improving air quality across the area.
3. Following the installation of the roadside NO₂ automatic monitoring station it is recommended that the Council co-locate a set of triplicate diffusion tubes to enable the calculation of a local bias adjustment factor.
4. No diffusion tube NO₂ monitoring locations within Welwyn Hatfield Borough Council are required distance correction during 2020.
5. All monitoring locations are detailed and labelled in the maps presented within the ASR. However, some labels are overlapped on each other.
6. Generally, the report is very good, provides a great deal of information and acts as a good first point of reference for members of the Public. The Council should continue their hard work in developing partnerships and improving local air quality.

Welwyn Hatfield Borough Council has taken forward several direct measures during the current reporting year of 2021 in pursuit of improving local air quality. Details of all measures completed, in progress or planned are set out in Table 2.1.

Table 2.1 – Progress on Measures to Improve Air Quality

Measure No.	Measure	Category	Classification	Year Measure Introduced	Estimated / Actual Completion Year	Organisations Involved	Funding Source	Defra AQ Grant Funding	Funding Status	Estimated Cost of Measure	Measure Status	Reduction in Pollutant / Emission from Measure	Key Performance Indicator	Progress to Date	Comments / Barriers to Implementation
1	AQ schools project	Promoting Travel Alternatives	School Travel Plans	2020	2023	Local Authority Environmental Health, Local Authority Transport Dept.	Local authority/Charity/Volunteer	NO	Fully funded	< £10k	Planning	Reduced vehicle emissions	60%	Ongoing	Continue obtaining data using diffusion tubes.
2	Development control	Policy Guidance and Development Control	Intensive active travel campaign & infrastructure	2020	2023	Local Authority Environmental Health	Environmental health	NO	Funded	< £10k	Implementation	Reduced vehicle emissions	100%	Implementation on-going	For development projects, air quality conditions are being put on applications for provision of cycle storage and electric vehicle charging points
3	Herts Living Lab	Transport Planning and Infrastructure	Other	2020	2024	Environmental Health, Herts County Council, Ocado, Univeristy of Hertfordshire	Multiple project schemes	NO	Funded	£10k - 50k	Planning	Reduced vehicle emissions	10%	Implementation on-going	This project was delayed due to the pandemic, partners are now coming back together in 2022 to restart the project
4	Electric Cars	Alternatives to private vehicle use	Car Clubs	2017	2023	Local authority	Local authority	NO	Funded	< £10k	Completed	Reduced vehicle emissions	80%	Ongoing	The electric cars are used for air quality monitoring work where possible. There have been technical issues with the cars at times which meant that they have been unavailable
5	Working at home/hybrid working	Promoting Travel Alternatives	Encourage / Facilitate home-working	2020	2024	Local authority	Local authority	NO	Funded	< £10k	Implementation	Reduced vehicle emissions	80%	Ongoing	The council are still introducing the hybrid working scheme and making changes to office layouts and facilities. Home working is still very much in place and is set to continue.
6	Permits	Environmental Permits	Other measure through permit systems and economic instruments	2020	2023	Local authority	Local authority/consultant	NO	Funded	< £10k	Implementation	Permitted process emission controls	70%	Ongoing	A consultant has been employed to assist with the permitting process and to ensure that inspections are carried out and

Measure No.	Measure	Category	Classification	Year Measure Introduced	Estimated / Actual Completion Year	Organisations Involved	Funding Source	Defra AQ Grant Funding	Funding Status	Estimated Cost of Measure	Measure Status	Reduction in Pollutant / Emission from Measure	Key Performance Indicator	Progress to Date	Comments / Barriers to Implementation
															permits are issued
7	Herts & Beds AQ Group	Policy Guidance and Development Control	Regional Groups Co-ordinating programmes to develop Area wide Strategies to reduce emissions and improve air quality	2020	2023	Local authority	Local authority	NO	Funded	£10k - 50k	Implementation	Reduced vehicle emissions	70%	Ongoing	The group meet quarterly through the year and have regular contact at other times - Promotion and implementation of air quality strategies - promotion and sharing knowledge regarding improvements to air quality via development control - sharing new guidance - sharing measures adopted across the county to improve air quality - Links to Hertfordshire County Council Public Health to network and link in with projects to improve and promote public health county wide
8	Air Alert Scheme	Public Information	Via the Internet	2020	2023	Local authority	Local authority	NO	Funded	< £10k	Completed	Awareness of AQ in locality and promotion of green travel	100%	Ongoing	Whilst this is a free alert scheme taken from live analysers, combined with press releases and promotion via social media, it raises awareness regarding local pollution, local monitoring, getting people thinking about air quality, walking/cycling instead of driving

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9	Electric pool bike scheme	Alternatives to private vehicle use	Other	2021	2023	Local authority	Local authority	NO	Not Funded	< £10k	Planning	Green staff travel in addition to e car scheme	20%	Ongoing	The council currently have a cycle hire scheme, however despite promotion uptake has been minimal. As staff would need them for visits, it would not always be practical to turn up exhausted to a visit from cycling across the district. A plan is being proposed to try and introduce electric bikes, this would hopefully encourage use, make them more convenient and appealing to use, provide a back up when the two e cars are in use and booked
10	Cycle to work scheme	Alternatives to private vehicle use	Other	2020	2023	Local authority	Local authority	NO	Partially Funded	< £10k	Completed	Reducing vehicle emissions	50%	Ongoing	Scheme available for staff to purchase bikes once every 6 months through the subsidised scheme

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11	Climate Change Carbon Emission Reduction - Herts County Council Sustainability Partnership	Other	Other	2021	2030	Local authority	Local authority	NO	Partially Funded	£10k - 50k	Planning	Decarbonisation	20%	Ongoing	Most of the changes in how and what the community, (households and businesses) consumes as energy will change radically over the coming decades. Most of that change will depend on central government policy on decarbonisation of electricity production. There will be a switch to electrical heating of homes, as we move to greener electricity production. The Council, as most local authority in the country will have to manage and facilitate this change by providing help to the most vulnerable households, to reduce fuel poverty and offering advice and managing behavioural change as we move to net zero emissions.

Measure No.	Measure	Category	Classification	Year Measure Introduced	Estimated / Actual Completion Year	Organisations Involved	Funding Source	Defra AQ Grant Funding	Funding Status	Estimated Cost of Measure	Measure Status	Reduction in Pollutant / Emission from Measure	Key Performance Indicator	Progress to Date	Comments / Barriers to Implementation
12	Strategic Action Plan Transport - Herts County Council Sustainability Partnership	Promoting Low Emission Transport	Other	2021	2030	Local authority	Local authority	No	Partially Funded	£10k - 50k	Planning	Decarbonisation	20%	Ongoing	<p>Deliver net zero carbon emissions for local authority transport operations by 2030 - Work towards zero carbon emissions for Hertfordshire's transport network by 2050 - Embed sustainable transport policies in Local Plans and prioritise the needs of sustainable travel within every planning decision</p> <ul style="list-style-type: none"> - Only support new developments where they will have full sustainable transport access - Systematically pursue opportunities for active travel in everything we do - Look to reduce air pollution arising from local transport sources - Promote a shift to active travel and public transport through behaviour change campaigns and infrastructure improvements - Facilitate a move to BEV for taxis across the county - Facilitate appropriate EV charging networks across Hertfordshire

Measure No.	Measure	Category	Classification	Year Measure Introduced	Estimated / Actual Completion Year	Organisations Involved	Funding Source	Defra AQ Grant Funding	Funding Status	Estimated Cost of Measure	Measure Status	Reduction in Pollutant / Emission from Measure	Key Performance Indicator	Progress to Date	Comments / Barriers to Implementation
13	Links with Air quality and public health - hertfordshire county council	Other	Other	2021	2024	Local authority	Local authority	YES	Not Funded	< £10k	Implementation	Increased awareness	70%	Ongoing	Hertfordshire County Council have employed an air quality programme manager - this has provided a very useful link between the district councils and the county council. This link is vital, because it allows communication with multiple departments, links with highways, public health, schools. It permits a very broad range of facilities to promote and improve air quality awareness

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 2.5µm 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.

Welwyn Hatfield Borough Council is taking the following measures to address PM_{2.5}: The council still operate the electric scheme run by e car. We ensure that the cars are used for as many operational site visits as possible. The cars are booked in advance for each monthly diffusion tube run throughout the year.

The council officers, aside from core emergency staff, are mostly working to a hybrid scheme. This has resulted in staff working at home some of the time and then working in the office for the rest of the time. This has significantly reduced the need for all staff to commute to work every day. The council have also continued to undertake virtual meetings where possible with the main view to reducing carbon emissions from reduced travel.

The air quality schools project has continued following the ease of the pandemic, and air quality monitoring is still taking place at all three sites.

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

This section sets out the monitoring undertaken within 2021 by Welwyn Hatfield Borough Council and how it compares with the relevant air quality objectives. In addition, monitoring results are presented for a five-year period between 2017 and 2021 to allow monitoring trends to be identified and discussed.

Summary of Monitoring Undertaken

3.1.1 Automatic Monitoring Sites

Welwyn Hatfield Borough Council undertook automatic (continuous) monitoring at 2 sites during 2021. Table A.1 in Appendix A shows the details of the automatic monitoring sites. The webpage⁷ presents automatic monitoring results for Welwyn Hatfield Borough Council with automatic monitoring results also available through the UK-Air website .

Maps showing the location of the monitoring sites are provided in Appendix D. 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

Welwyn Hatfield Borough Council undertook non- automatic (i.e. passive) monitoring of NO₂ at 51 sites during 2021. Table A.2 in Appendix A presents the details of the non-automatic sites.

Maps showing the location of the monitoring sites are provided in Appendix D. Further details on Quality Assurance/Quality Control (QA/QC) for the diffusion tubes, including bias adjustments and any other adjustments applied (e.g. annualisation and/or distance correction), are included in Appendix C.

⁷ Air quality status report ready for CMT approval https://www.airqualityengland.co.uk/local-authority/?la_id=408

Individual Pollutants

The air quality monitoring results presented in this section are, where relevant, adjusted for bias, annualisation (where the annual mean data capture is below 75% and greater than 25%), and distance correction. Further details on adjustments are provided in Appendix C.

3.1.3 Nitrogen Dioxide (NO₂)

Table A.3 and Table A.4 in Appendix A compare the ratified and adjusted monitored NO₂ annual mean concentrations for the past five years with the air quality objective of 40µg/m³. Note that the concentration data presented represents the concentration at the location of the monitoring site, following the application of bias adjustment and annualisation, as required (i.e. the values are exclusive of any consideration to fall-off with distance adjustment).

For diffusion tubes, the full 2021 dataset of monthly mean values is provided in Appendix B. Note that the concentration data presented in Table B.1 includes distance corrected values, only where relevant.

Table A. in Appendix A compares the ratified continuous monitored NO₂ hourly mean concentrations for the past five years with the air quality objective of 200µg/m³, not to be exceeded more than 18 times per year.

3.1.4 Particulate Matter (PM₁₀)

Pollutant not monitored.

3.1.5 Particulate Matter (PM_{2.5})

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

3.1.6 Sulphur Dioxide (SO₂)

Pollutant not monitored.

Appendix A: Monitoring Results

Table A.1 – Details of Automatic Monitoring Sites

Site ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA? Which AQMA?	Monitoring Technique	Distance to Relevant Exposure (m) ⁽¹⁾	Distance to kerb of nearest road (m) ⁽²⁾	Inlet Height (m)
WHBAM	Great North Rd/A1000	Roadside	51.767657	0.214671	PM2.5	No	Beta Attenuation	10	8	1.5
WHNOX	West View	Roadside	51.77047	0.23175	NO2	No	Chemiluminescent	16	3	1.8

Notes:

(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

Diffusion Tube ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA? Which AQMA?	Distance to Relevant Exposure (m) ⁽¹⁾	Distance to kerb of nearest road (m) ⁽²⁾	Tube Co-located with a Continuous Analyser?	Tube Height (m)
WH1	Codicote Road, Welwyn	Roadside	522941	216641	NO2	No	10.0	3.0	No	2.0
WH2	Bessemer Road, WGC	Roadside	524340	213087	NO2	No	23.0	2.0	No	2.0
WH3	West View, Hat, next to nox analyser	Roadside	522102	209455	NO2	No	17.0	7.0	No	2.0
WH4	London Rd, Welwyn, Tenterfield Nursery School	Roadside	523146	215700	NO2	No	8.0	2.0	No	2.0
WH5	Cuffley High Street 1	Roadside	530553	202715	NO2	No	16.0	5.0	No	2.0
WH6	Cuffley High Street 2	Roadside	530502	202694	NO2	No	6.0	5.0	No	2.0
WH7	Briars Lane, Hatfield	Roadside	522193	208434	NO2	No	18.0	2.0	No	2.0
WH8	Black Fan Road - Opposite Morrisons	Roadside	525688	212769	NO2	No	14.0	3.0	No	2.0
WH9	Great North Rd Adjacent to A1(M)	Kerbside	522429	212150	NO2	No	13.0	1.0	No	2.0
WH10	Parkside, Welwyn	Near road	523347	216002	NO2	No	9.0	3.0	No	2.0
WH11	Knightsfield, WGC	Roadside	524429	214000	NO2	No	20.0	2.0	No	2.0

Diffusion Tube ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA? Which AQMA?	Distance to Relevant Exposure (m) ⁽¹⁾	Distance to kerb of nearest road (m) ⁽²⁾	Tube Co-located with a Continuous Analyser?	Tube Height (m)
WH12	St Albans Road East/Heyford Way, Hatfield	Roadside	523148	209148	NO2	No	6.0	2.0	No	2.0
WH13	Stanborough Rd 2, WGC	Near road	523416	211958	NO2	No	9.0	2.0	No	2.0
WH14	Campion Road, Hatfield	Roadside	521585	209696	NO2	No	6.0	3.0	No	2.0
WH15	Cuffley High Street 3	Near road	530439	202681	NO2	No	25.0	2.0	No	2.0
WH16	Standborough Road 1, WGC	Roadside	523358	211931	NO2	No	9.0	3.0	No	2.0
WH17	Great North Road, Hatfield (A1000)	Near road	523293	209164	NO2	No	15.0	5.0	No	2.0
WH18	B195/Broadwater Road, WGC	Near road	524285	212988	NO2	No	16.0	5.0	No	2.0
WH19	Comet Way on A1001 & A1M	Near road	522144	209516	NO2	No	50.0	5.0	No	2.0
WH20	Wellfield Road, Hatfield	Roadside	522466	208908	NO2	No	13.0	2.0	No	2.0
WH21	Roadside Laybay A414 Essendon	Background	527258	210364	NO2	No	7.0	5.0	No	2.0
WH22	Garden Village, Hatfield	Kerbside	521801	209471	NO2	No	20.0	1.0	No	2.0
WH23	Burrowfield, WGC	Roadside	523921	211698	NO2	No	10.0	2.0	No	2.0

Diffusion Tube ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA? Which AQMA?	Distance to Relevant Exposure (m) ⁽¹⁾	Distance to kerb of nearest road (m) ⁽²⁾	Tube Co-located with a Continuous Analyser?	Tube Height (m)
WH24	Ellenbrook Lane @ A1001	Near road	521164	207740	NO2	No	40.0	5.0	No	2.0
WH25	West View, Hatfield	Near road	522093	209431	NO2	No	8.0	5.0	No	2.0
WH26	West View, Hatfield	Near road	522064	209328	NO2	No	24.0	5.0	No	2.0
WH27	West View, Hatfield	Near road	522060	209289	NO2	No	8.0	5.0	No	2.0
WH28	Taxi rank WGC	Near road	523815	212960	NO2	No	15.0	5.0	No	2.0
WH29	Taxi rank Hatfield	Near road	523267	208803	NO2	No	25.0	5.0	No	2.0
WH30	Northaw Road East, Cuffley	Roadside	530424	202589	NO2	No	21.0	3.0	No	2.0
WH31	B197 - Opp The East WGC	Roadside	522579	211012	NO2	No	9.0	2.0	No	2.0
WH32	Clock Hotel, Welwyn	Near road	523438	216512	NO2	No	12.0	5.0	No	2.0
WH33	Maran Avenue, Welwyn	Roadside	523318	215663	NO2	No	18.0	2.0	No	2.0
SCH1	Monks Walk 1	Urban Background	523441	214980	NO2	No	14.0	1.0	No	2.0
SCH2	Monks Walk 2	Urban Background	523482	214966	NO2	No	17.0	3.0	No	2.0
SCH3	Monks Walk 3	Urban Background	523491	215032	NO2	No	24.0	4.0	No	2.0

Diffusion Tube ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA? Which AQMA?	Distance to Relevant Exposure (m) ⁽¹⁾	Distance to kerb of nearest road (m) ⁽²⁾	Tube Co-located with a Continuous Analyser?	Tube Height (m)
SCH4	Monks Walk 4	Urban Background	523529	215082	NO2	No	33.0	2.0	No	2.0
SCH5	Monks Walk 5	Urban Background	523480	215086	NO2	No	0.0	26.0	No	2.0
SCH6	Monks Walk 6	Urban Background	523579	215043	NO2	No	4.0	1.0	No	2.0
SCH7	Panshanger Academy 1	Urban Background	525626	213140	NO2	No	29.0	2.0	No	2.0
SCH8	Panshanger Academy 2	Urban Background	525616	213123	NO2	No	21.0	2.0	No	2.0
SCH9	Panshanger Academy 3	Urban Background	525622	213114	NO2	No	11.0	1.0	No	2.0
SCH10	Panshanger Academy 4	Urban Background	525610	213113	NO2	No	25.0	2.0	No	2.0
SCH11	Panshanger Academy 5	Urban Background	525594	213093	NO2	No	19.0	2.0	No	2.0
SCH12	Panshanger Academy 6	Urban Background	525578	213070	NO2	No	20.0	2.0	No	2.0
SCH13	Countess Anne 1	Urban Background	522985	208913	NO2	No	9.0	2.0	No	2.0
SCH14	Countess Anne 2	Urban Background	523003	208919	NO2	No	9.0	2.0	No	2.0
SCH15	Countess Anne 3	Urban Background	523018	208925	NO2	No	14.0	2.0	No	2.0
SCH16	Countess Anne 4	Urban Background	523044	208936	NO2	No	17.0	3.0	No	2.0

Diffusion Tube ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA? Which AQMA?	Distance to Relevant Exposure (m) ⁽¹⁾	Distance to kerb of nearest road (m) ⁽²⁾	Tube Co-located with a Continuous Analyser?	Tube Height (m)
SCH17	Countess Anne 5	Urban Background	523086	208961	NO2	No	13.0	2.0	No	2.0
SCH18	Countess Anne 6	Urban Background	523078	208926	NO2	No	8.0	2.0	No	2.0

Notes:

(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.3 – Annual Mean NO₂ Monitoring Results: Automatic Monitoring (µg/m³)

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2021 (%) ⁽²⁾	2017	2018	2019	2020	2021
WHNOX	51.77047	0.23175	Roadside	99	99	N/A	N/A	N/A	29	27

☐ Annualisation has been conducted where data capture is <75% and >25% in line with LAQM.TG16

☒ Reported concentrations are those at the location of the monitoring site (annualised, as required), i.e. prior to any fall-off with distance correction

Notes:

The annual mean concentrations are presented as µg/m³.

Exceedances of the NO₂ annual mean objective of 40µg/m³ are shown in **bold**.

All means have been “annualised” as per LAQM.TG16 if valid data capture for the full calendar year is less than 75%. See Appendix C for details.

Concentrations are those at the location of monitoring and not those following any fall-off with distance adjustment.

(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%).

Table A.4 – Annual Mean NO₂ Monitoring Results: Non-Automatic Monitoring (µg/m³)

Diffusion Tube ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2021 (%) ⁽²⁾	2017	2018	2019	2020	2021
WH1	522941	216641	Roadside	100	100.0	22.0	26.0	26.0	17.6	18.7
WH2	524340	213087	Roadside	82	82.7	35.0	21.0	22.0	27.4	24.9
WH3	522102	209455	Roadside	100	100.0	27.0	27.0	24.0	19.1	26.1
WH4	523146	215700	Roadside	100	100.0	22.0	17.0	19.0	14.6	14.7
WH5	530553	202715	Roadside	100	100.0	33.0	28.0	33.0	24.5	23.9
WH6	530502	202694	Roadside	100	100.0	36.0	30.0	27.0	19.7	19.8
WH7	522193	208434	Roadside	100	100.0	30.0	28.0	28.0	19.9	19.9
WH8	525688	212769	Roadside	100	100.0	20.0	17.0	27.0	21.2	19.6
WH9	522429	212150	Kerbside	82	82.7	21.0	19.0	35.0	26.8	27.6
WH10	523347	216002	Near road	100	100.0	21.0	25.0	26.0	19.0	18.2
WH11	524429	214000	Roadside	100	100.0	18.0	28.0	29.0	15.7	15.4
WH12	523148	209148	Roadside	100	100.0	17.0	15.0	27.0	19.8	18.8
WH13	523416	211958	Near road	100	100.0	17.0	14.0	20.0	14.1	34.2

Diffusion Tube ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2021 (%) ⁽²⁾	2017	2018	2019	2020	2021
WH14	521585	209696	Roadside	100	100.0	28.0	21.0	25.0	25.3	23.3
WH15	530439	202681	Near road	100	100.0	22.0	21.0	20.0	14.0	18.8
WH16	523358	211931	Roadside	100	100.0	21.0	20.0	38.0	30.2	29.2
WH17	523293	209164	Near road	100	100.0	32.0	27.0	29.0	20.8	19.4
WH18	524285	212988	Near road	100	100.0	37.0	35.0	31.0	24.0	23.2
WH19	522144	209516	Near road	100	100.0	49.0	44.0	42.0	31.8	32.4
WH20	522466	208908	Roadside	82	82.7	27.0	23.0	23.0	22.3	22.8
WH21	527258	210364	Background	100	100.0	34.0	31.0	29.0	21.6	22.0
WH22	521801	209471	Kerbside	100	100.0	43.0	35.0	37.0	28.1	26.8
WH23	523921	211698	Roadside	100	100.0	22.0	24.0	23.0	19.3	19.2
WH24	521164	207740	Near road	100	100.0	40.0	38.0	36.0	25.2	24.8
WH25	522093	209431	Near road	100	100.0	46.0	40.0	36.0	28.9	26.7
WH26	522064	209328	Near road	100	100.0	39.0	45.0	48.0	35.1	33.5
WH27	522060	209289	Near road	100	100.0	40.0	34.0	34.0	26.2	26.2

Diffusion Tube ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2021 (%) ⁽²⁾	2017	2018	2019	2020	2021
WH28	523815	212960	Near road	100	100.0	27.0	25.0	24.0	17.2	16.7
WH29	523267	208803	Near road	100	100.0	40.0	35.0	34.0	25.3	24.9
WH30	530424	202589	Roadside	100	100.0	<u>N/A</u>	23.0	21.0	18.4	17.1
WH31	522579	211012	Roadside	100	100.0	<u>N/A</u>	21.0	34.0	23.6	25.2
WH32	523438	216512	Near road	100	100.0	<u>N/A</u>	31.0	31.0	23.5	22.1
WH33	523318	215663	Roadside	100	100.0	<u>N/A</u>	21.0	20.0	15.2	14.8
SCH1	523441	214980	Urban Background	100	100.0	<u>N/A</u>	<u>N/A</u>	<u>N/A</u>	16.3	15.5
SCH2	523482	214966	Urban Background	100	100.0	<u>N/A</u>	<u>N/A</u>	<u>N/A</u>	13.4	14.7
SCH3	523491	215032	Urban Background	100	100.0	<u>N/A</u>	<u>N/A</u>	<u>N/A</u>	11.8	12.4
SCH4	523529	215082	Urban Background	90	90.4	<u>N/A</u>	<u>N/A</u>	<u>N/A</u>	11.4	12.0
SCH5	523480	215086	Urban Background	100	100.0	<u>N/A</u>	<u>N/A</u>	<u>N/A</u>	10.4	12.1
SCH6	523579	215043	Urban Background	100	100.0	<u>N/A</u>	<u>N/A</u>	<u>N/A</u>	10.2	11.1
SCH7	525626	213140	Urban Background	100	100.0	<u>N/A</u>	<u>N/A</u>	<u>N/A</u>	12.4	15.2
SCH8	525616	213123	Urban Background	100	100.0	<u>N/A</u>	<u>N/A</u>	<u>N/A</u>	14.0	16.7

Diffusion Tube ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2021 (%) ⁽²⁾	2017	2018	2019	2020	2021
SCH9	525622	213114	Urban Background	100	100.0	<u>N/A</u>	<u>N/A</u>	<u>N/A</u>	12.0	13.2
SCH10	525610	213113	Urban Background	100	100.0	<u>N/A</u>	<u>N/A</u>	<u>N/A</u>	13.8	16.0
SCH11	525594	213093	Urban Background	90	90.4	<u>N/A</u>	<u>N/A</u>	<u>N/A</u>	13.5	15.6
SCH12	525578	213070	Urban Background	100	100.0	<u>N/A</u>	<u>N/A</u>	<u>N/A</u>	14.8	16.7
SCH13	522985	208913	Urban Background	100	100.0	<u>N/A</u>	<u>N/A</u>	<u>N/A</u>	15.1	17.0
SCH14	523003	208919	Urban Background	100	100.0	<u>N/A</u>	<u>N/A</u>	<u>N/A</u>	13.6	15.7
SCH15	523018	208925	Urban Background	100	100.0	<u>N/A</u>	<u>N/A</u>	<u>N/A</u>	13.8	16.3
SCH16	523044	208936	Urban Background	100	100.0	<u>N/A</u>	<u>N/A</u>	<u>N/A</u>	13.9	15.1
SCH17	523086	208961	Urban Background	100	100.0	<u>N/A</u>	<u>N/A</u>	<u>N/A</u>	13.0	14.8
SCH18	523078	208926	Urban Background	100	100.0	<u>N/A</u>	<u>N/A</u>	<u>N/A</u>	13.7	15.7

☐ Annualisation has been conducted where data capture is <75% and >25% in line with LAQM.TG16

☒ Diffusion tube data has been bias adjusted.

☒ Reported concentrations are those at the location of the monitoring site (bias adjusted and annualised, as required), i.e. prior to any fall-off with distance correction.

Notes:

The annual mean concentrations are presented as $\mu\text{g}/\text{m}^3$.

Exceedances of the NO₂ annual mean objective of 40 $\mu\text{g}/\text{m}^3$ are shown in **bold**.

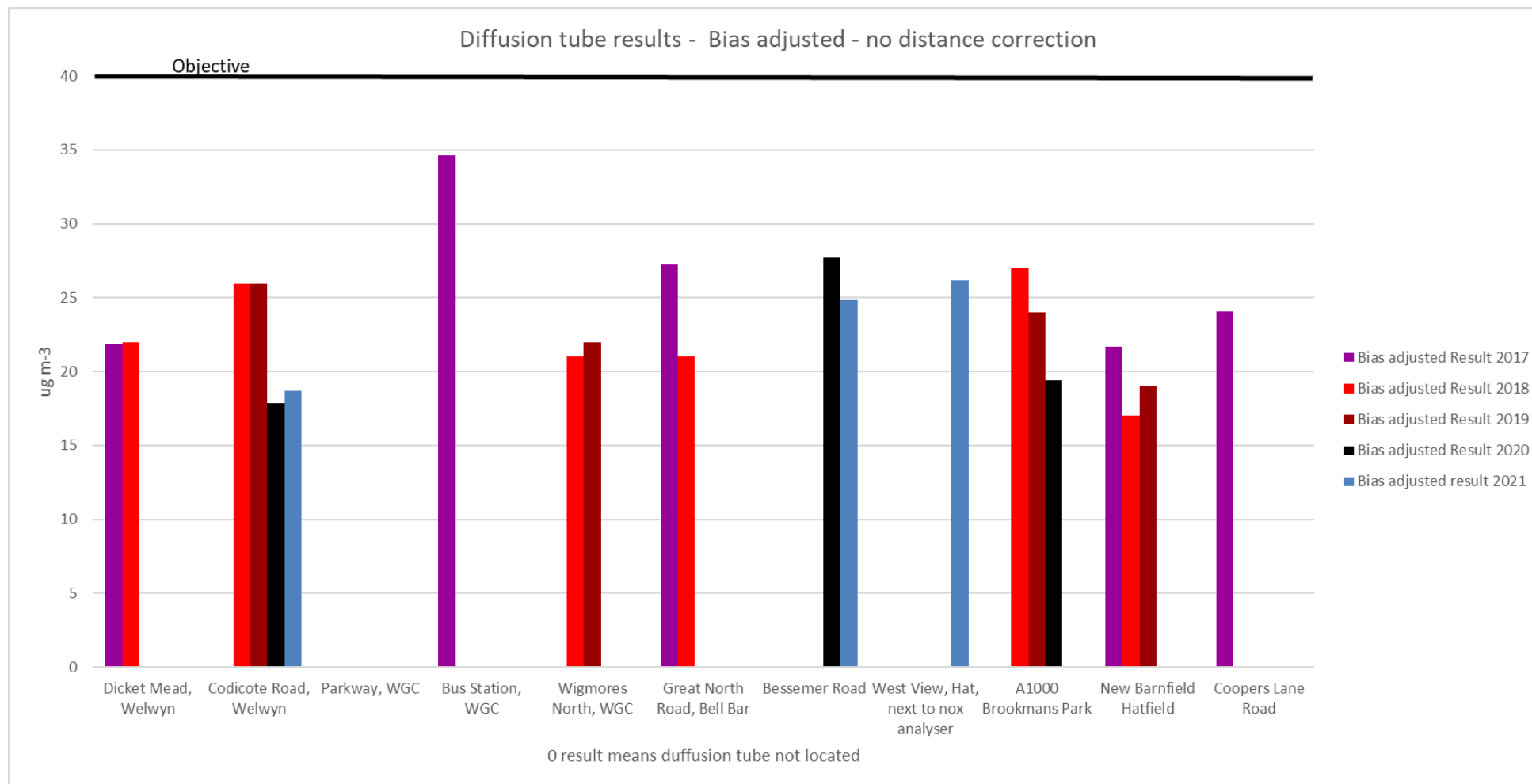
NO₂ annual means exceeding 60µg/m³, indicating a potential exceedance of the NO₂ 1-hour mean objective are shown in **bold and underlined**.

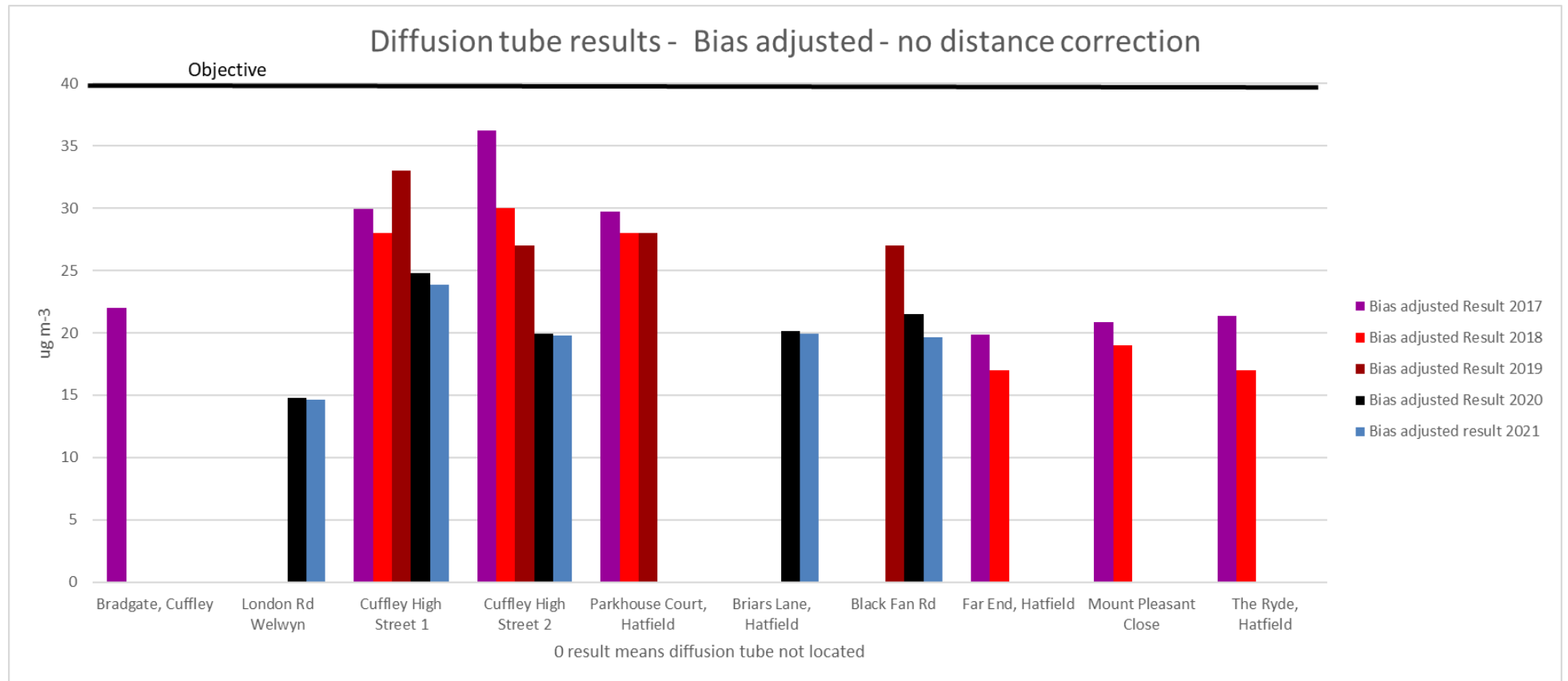
Means for diffusion tubes have been corrected for bias. All means have been “annualised” as per LAQM.TG16 if valid data capture for the full calendar year is less than 75%. See Appendix C for details.

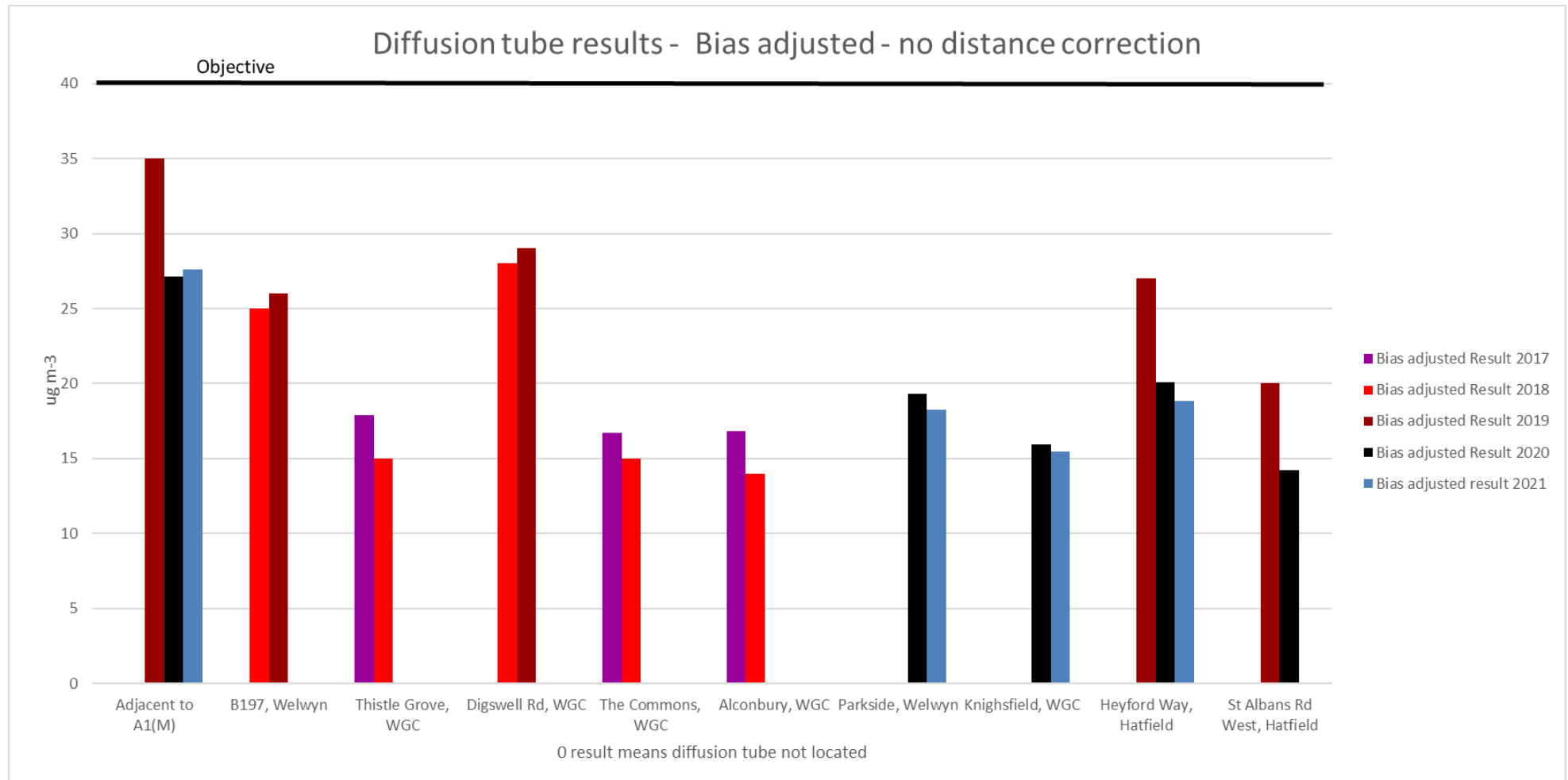
Concentrations are those at the location of monitoring and not those following any fall-off with distance adjustment.

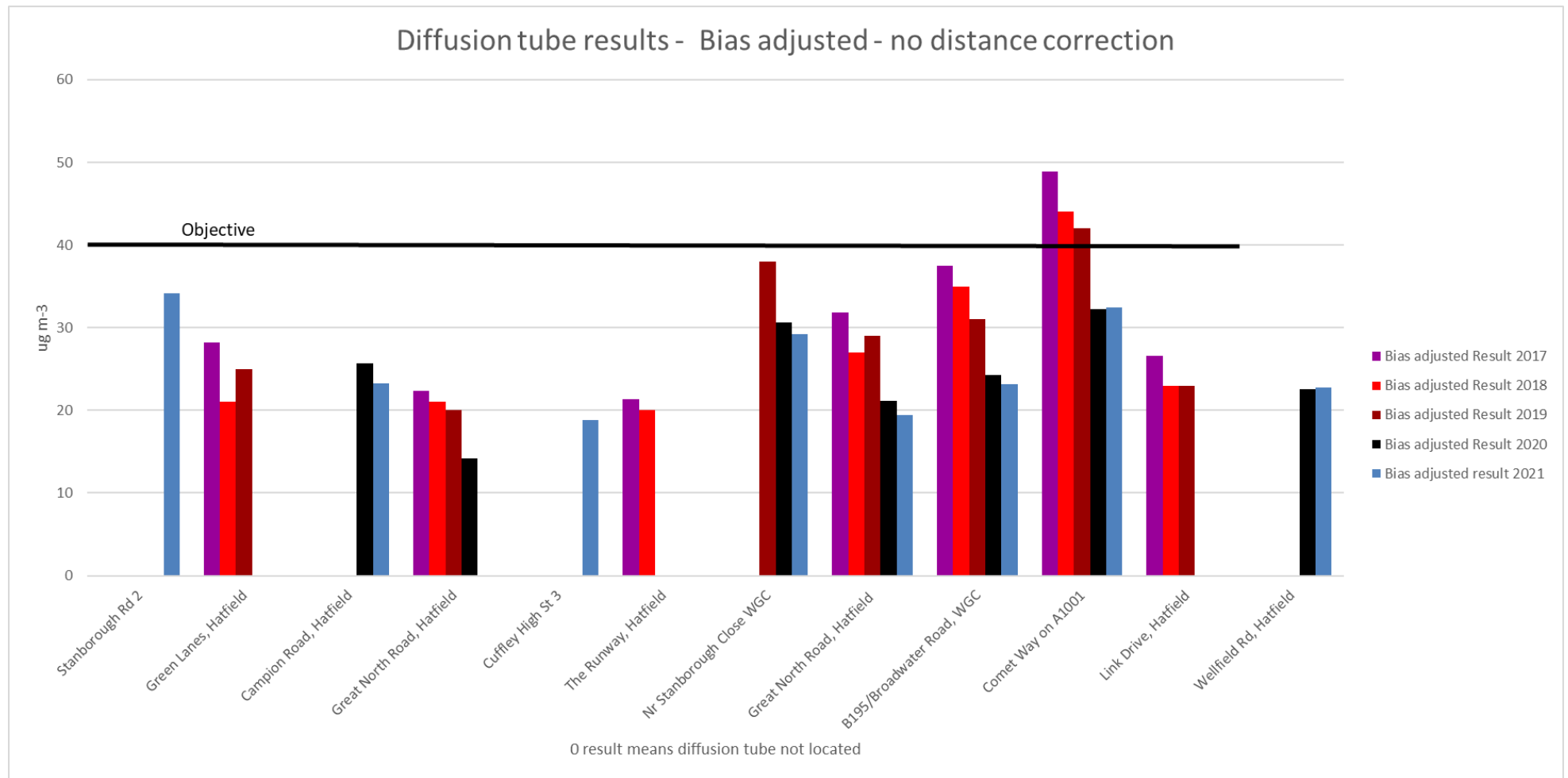
- (1) Data capture for the monitoring period, in cases where monitoring was only carried out for part of the year.
- (2) Data capture for the full calendar year (e.g. if monitoring was carried out for 6 months, the maximum data capture for the full calendar year is 50%).

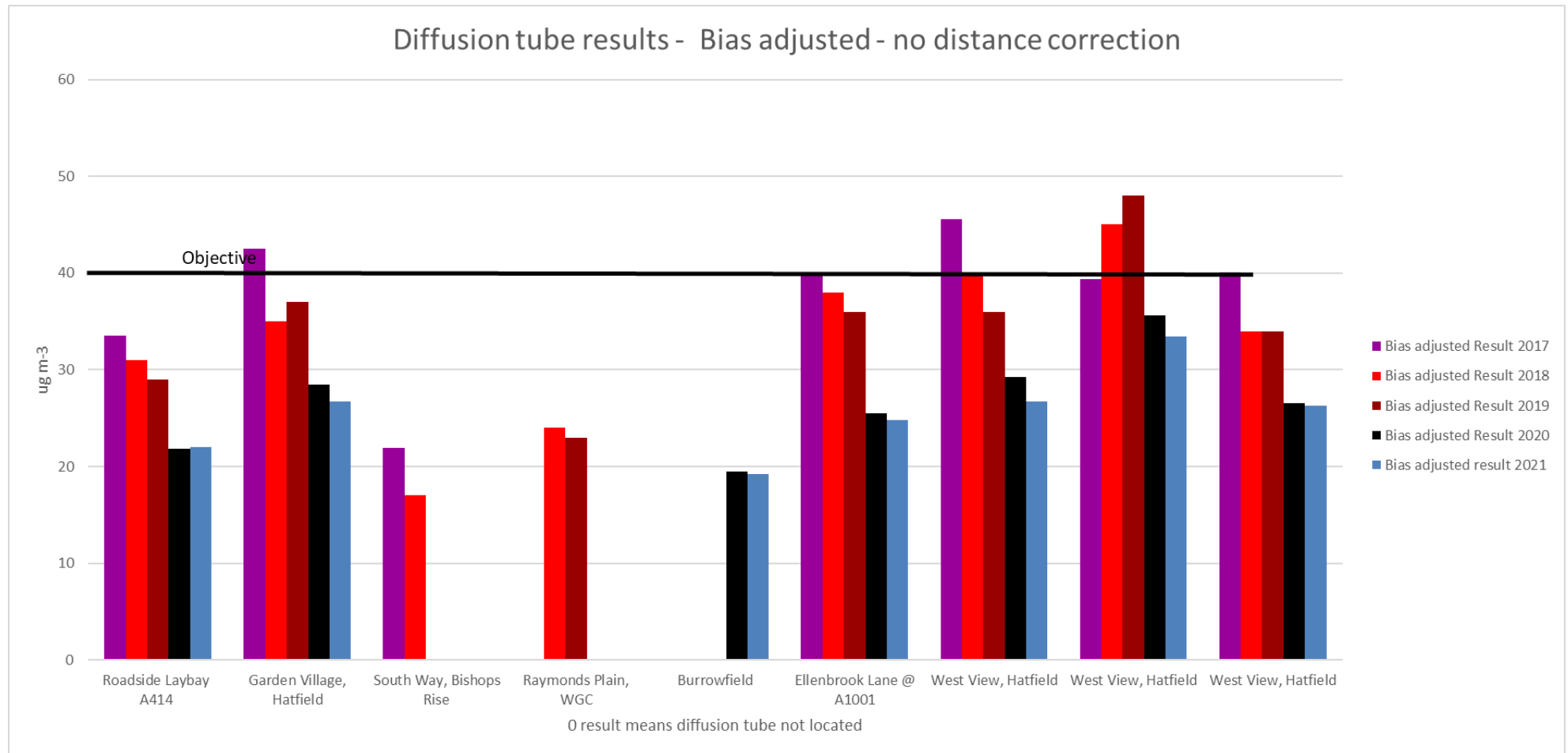
Figure A.1 – Trends in Annual Mean NO₂ Concentrations

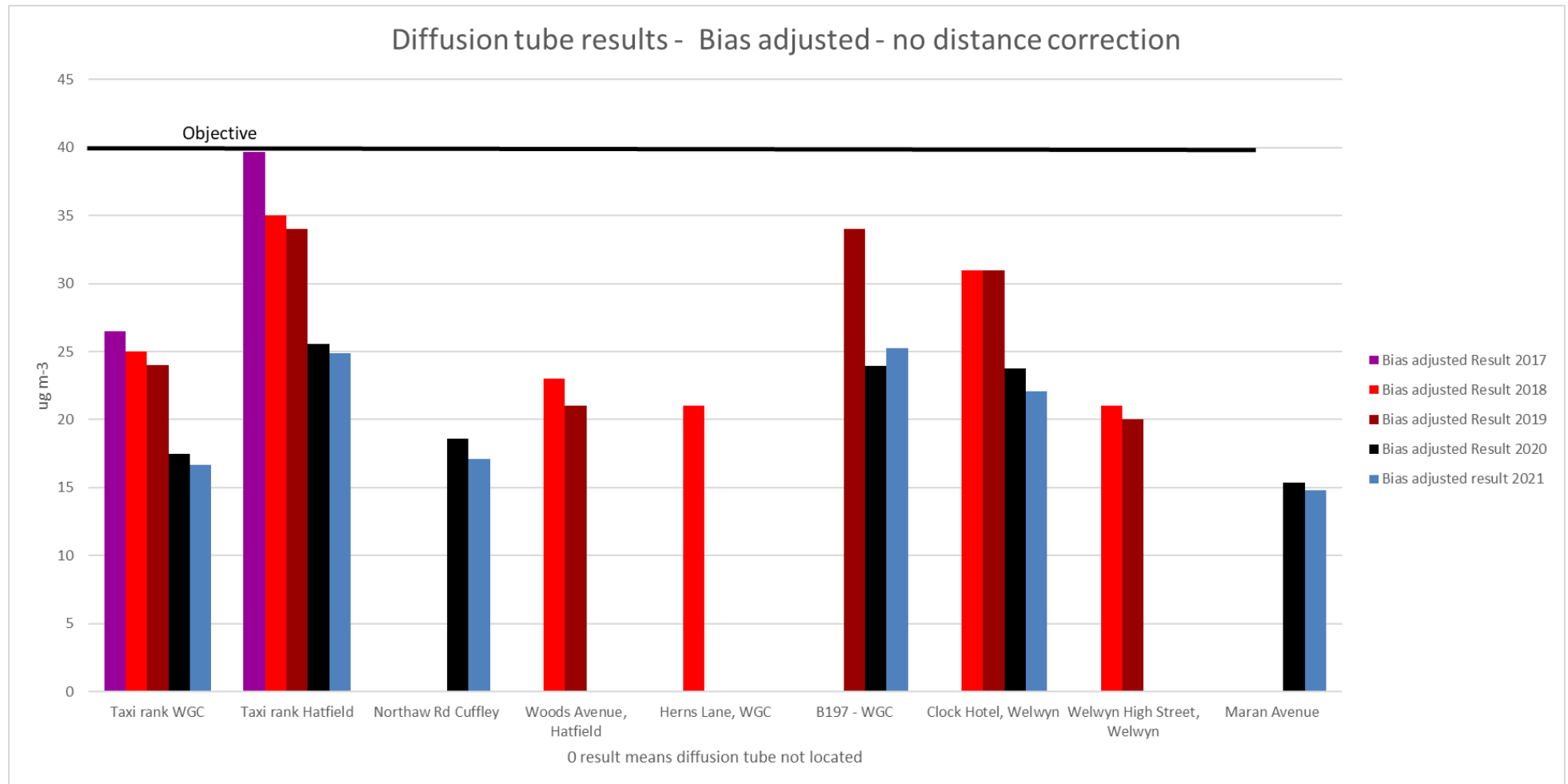












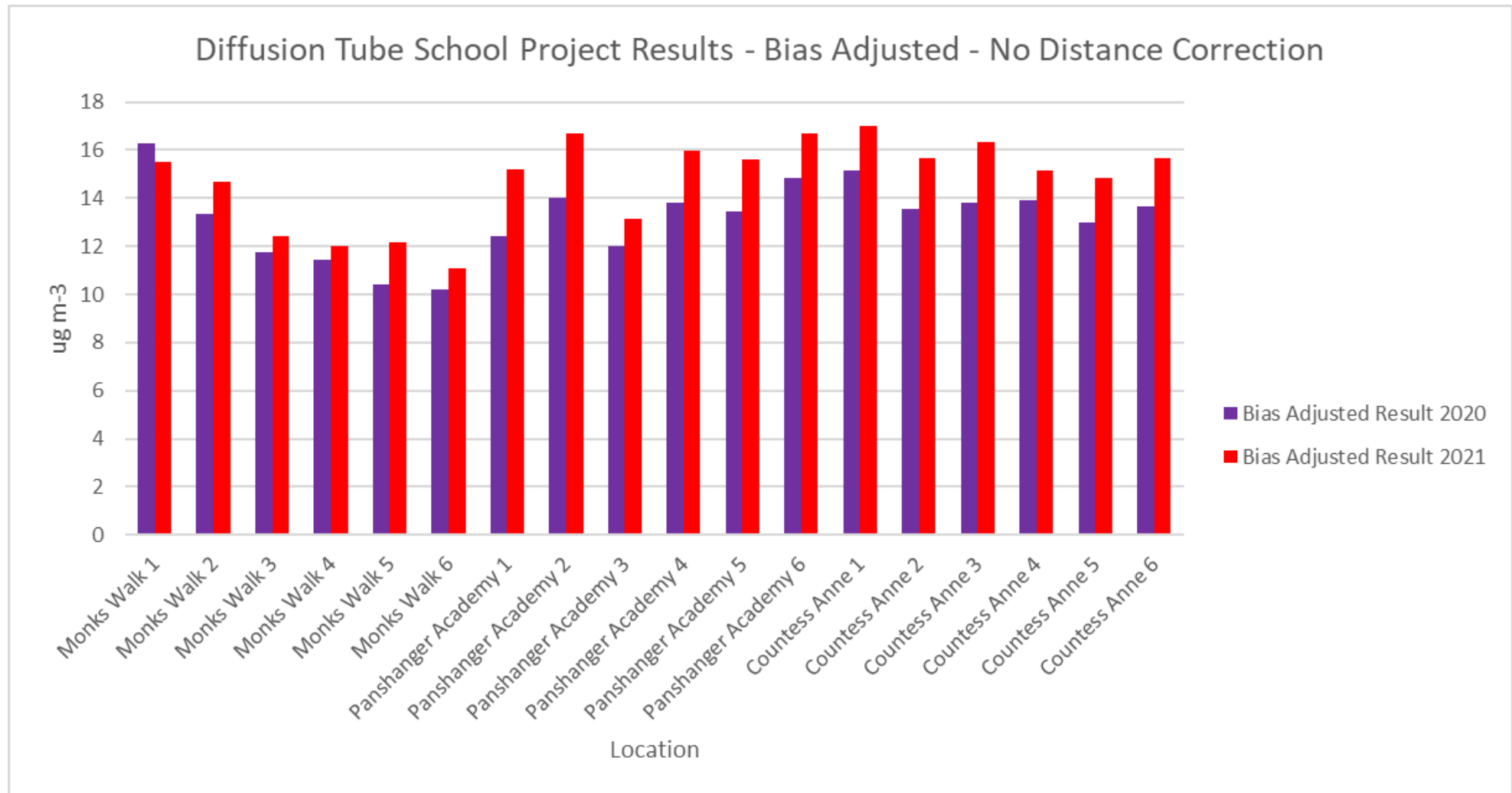


Table A.2 – 1-Hour Mean NO₂ Monitoring Results, Number of 1-Hour Means > 200µg/m³

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2021 (%) ⁽²⁾	2017	2018	2019	2020	2021
WHNOX	51.77047	0.23175	Roadside	99	99	N/A	N/A	N/A	0	0

Notes:

Results are presented as the number of 1-hour periods where concentrations greater than 200µg/m³ have been recorded.

Exceedances of the NO₂ 1-hour mean objective (200µg/m³ not to be exceeded more than 18 times/year) are shown in **bold**.

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

(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%).

Table A.5 – Annual Mean PM_{2.5} Monitoring Results (µg/m³)

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2021 (%) ⁽²⁾	2017	2018	2019	2020	2021
WHBAM	51.767657	0.214671	Roadside	97	97	13	11	10	9	9

☐ **Annualisation has been conducted where data capture is <75% and >25% in line with LAQM.TG16**

Notes:

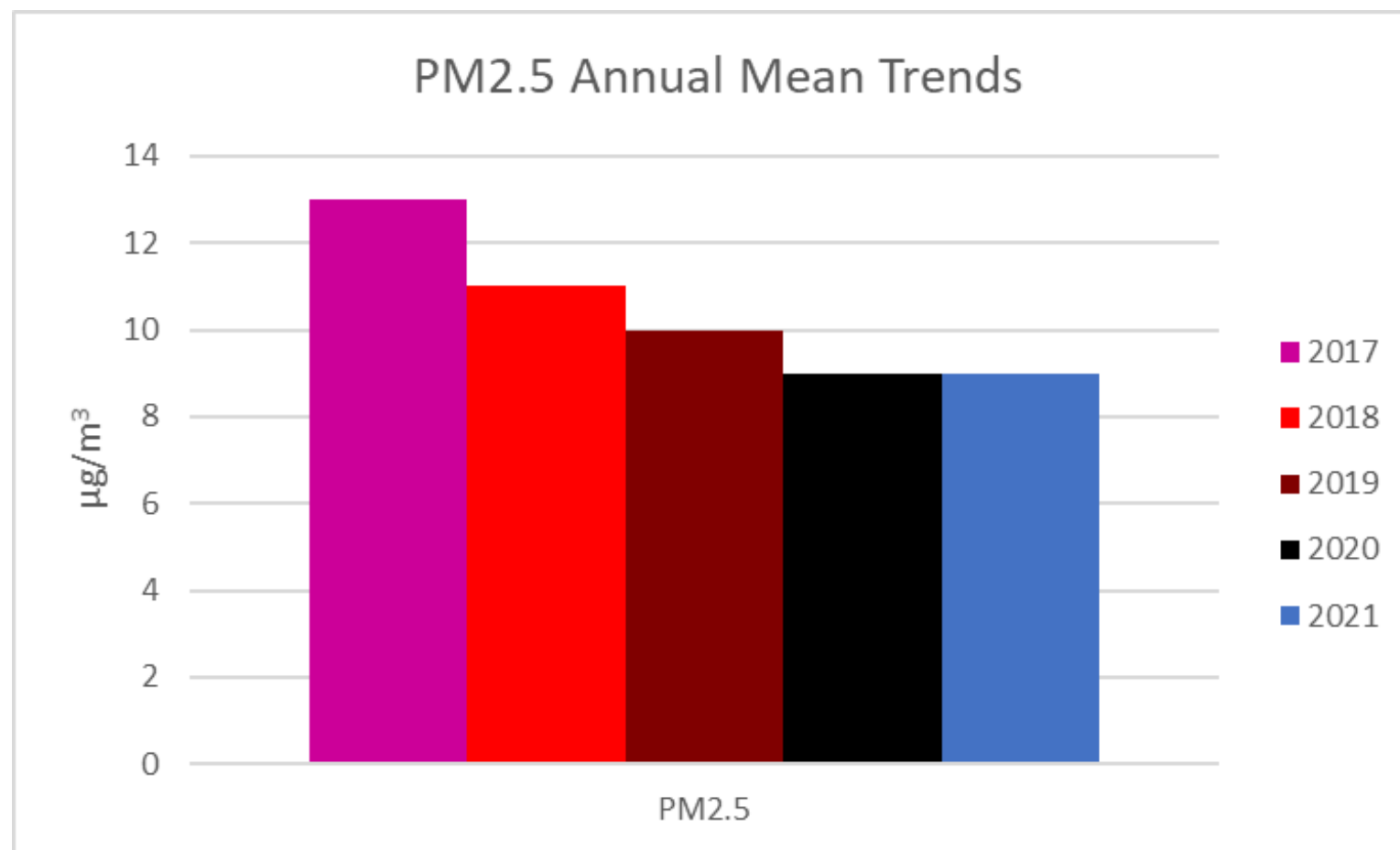
The annual mean concentrations are presented as µg/m³.

All means have been “annualised” as per LAQM.TG16 if valid data capture for the full calendar year is less than 75%. See Appendix C for details.

(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%).

Figure A.2 – Trends in Annual Mean PM_{2.5} Concentrations



Appendix B: Full Monthly Diffusion Tube Results for 2021

Table B.1 – NO₂ 2021 Diffusion Tube Results (µg/m³)

DT ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Easting)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean: Raw Data	Annual Mean: Annualised and Bias Adjusted (0.78)	Annual Mean: Distance Corrected to Nearest Exposure	Comment
WH1	522941	216641	28.0	25.0	21.4	23.0	21.6	22.5	14.1	18.3	31.0	24.9	28.4	29.2	24.0	18.7	-	
WH2	524340	213087	34.4	38.1			32.5	26.9	14.6	28.0	33.8	39.7	40.6	30.2	31.9	24.9	-	
WH3	522102	209455	40.8	33.0	40.1	27.1	25.0	29.4	16.2	30.9	36.0	37.6	45.3	40.8	33.5	26.1	-	
WH4	523146	215700	23.6	22.3	17.7	16.7	16.4	16.0	9.1	14.2	22.1	22.9	22.1	22.3	18.8	14.7	-	
WH5	530553	202715	34.3	29.2	35.4	24.6	30.5	28.9	15.6	23.6	35.2	37.6	38.4	34.2	30.6	23.9	-	
WH6	530502	202694	29.4	32.1	29.4	20.8	20.7	19.8	12.5	20.4	27.5	29.7	31.9	30.4	25.4	19.8	-	
WH7	522193	208434	34.5	26.4	29.2	24.5	19.0	21.3	13.3	24.1	28.8	30.0	36.0	19.4	25.5	19.9	-	
WH8	525688	212769	31.9	29.4	23.7	20.6	21.1	18.1	13.2	22.7	24.6	32.1	37.1	27.8	25.2	19.6	-	
WH9	522429	212150	40.0	38.5	35.4	38.3	34.5	33.9	18.4	32.5	42.3			40.2	35.4	27.6	-	
WH10	523347	216002	26.0	31.1	20.0	19.2	21.3	17.6	11.7	20.0	28.7	31.1	21.9	31.9	23.4	18.2	-	
WH11	524429	214000	25.7	25.7	20.0	17.0	16.1	15.6	9.4	13.8	23.7	18.0	28.5	24.0	19.8	15.4	-	
WH12	523148	209148	29.4	29.0	35.8	19.0	22.6	16.1	11.2	16.0	26.5	29.9	34.1	20.1	24.1	18.8	-	
WH13	523416	211958	35.2	51.9	45.1	37.2	46.4	40.0	24.0	38.1	53.5	55.6	52.7	46.3	43.8	34.2	-	
WH14	521585	209696	37.6	26.1	31.3	24.8	27.1	22.0	13.7	20.6	33.4	42.0	37.6	42.2	29.9	23.3	-	
WH15	530439	202681	25.7	28.1	26.2	22.5	22.8	20.3	12.5	20.2	25.3	28.4	29.6	27.6	24.1	18.8	-	
WH16	523358	211931	43.0	33.3	34.7	35.6	35.6	36.0	17.0	34.8	48.1	47.3	40.5	43.5	37.5	29.2	-	
WH17	523293	209164	32.1	28.4	27.0	20.3	21.7	17.0	9.2	20.1	27.1	30.0	34.6	31.4	24.9	19.4	-	
WH18	524285	212988	40.4	39.1	29.0	24.2	26.8	26.9	14.7	21.1	34.3	28.6	32.8	38.3	29.7	23.2	-	

DT ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Easting)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean: Raw Data	Annual Mean: Annualised and Bias Adjusted (0.78)	Annual Mean: Distance Corrected to Nearest Exposure	Comment
WH19	522144	209516	50.4	36.9	42.1	46.7	28.4	43.1	19.6	40.1	44.8	46.0	54.6	46.2	41.6	32.4	-	
WH20	522466	208908	35.1	29.1	29.0	20.3	19.5	18.5			29.2	36.0	40.2	35.0	29.2	22.8	-	
WH21	527258	210364	33.6	25.6	25.4	30.2	29.8	29.2	13.2	21.9	33.2	29.4	37.0	30.1	28.2	22.0	-	
WH22	521801	209471	44.9	40.4	24.1	26.0	29.7	25.3	13.7	25.3	40.2	42.6	60.6	38.9	34.3	26.8	-	
WH23	523921	211698	33.3	28.2	25.9	19.0	17.6	20.1	10.1	18.4	27.0	28.4	34.6	33.0	24.6	19.2	-	
WH24	521164	207740	45.5	41.0	35.8	37.6	30.2	31.7	19.8	25.0	38.4	33.2	33.3	10.7	31.9	24.8	-	
WH25	522093	209431	29.3	31.6	40.6	35.8	26.1	27.7	17.9	35.6	39.4	38.9	56.4	32.1	34.3	26.7	-	
WH26	522064	209328	45.0	39.5	51.6	40.3	41.3	41.2	19.3	39.0	45.0	41.6	61.2	50.1	42.9	33.5	-	
WH27	522060	209289	38.6	33.4	38.1	33.0	28.9	29.0	14.9	30.4	34.9	36.8	47.8	38.0	33.7	26.2	-	
WH28	523815	212960	27.1	25.7	22.0	15.3	19.0	16.9	9.7	15.5	24.4	25.3	26.2	29.7	21.4	16.7	-	
WH29	523267	208803	39.0	34.3	33.7	23.6	27.5	26.7	14.1	27.9	34.6	38.3	44.8	38.7	31.9	24.9	-	
WH30	530424	202589	26.0	24.8	23.2	19.9	20.6	19.6	11.9	16.2	23.7	25.8	25.8	25.2	21.9	17.1	-	
WH31	522579	211012	34.5	31.1	24.9	39.7	34.4	34.1	14.7	25.0	41.4	35.9	37.9	34.7	32.4	25.2	-	
WH32	523438	216512	36.4	33.2	31.5	27.4	28.5	23.2	11.0	26.1	33.0	33.9	36.9	18.7	28.3	22.1	-	
WH33	523318	215663	25.4	21.9	20.1	17.4	17.4	9.7	8.5	15.4	21.6	22.0	23.3	24.9	19.0	14.8	-	
SCH1	523441	214980	32.7	31.0	29.5	19.1	11.4	11.2	11.6	13.6	16.6	17.7	22.8	21.2	19.9	15.5	-	
SCH2	523482	214966	24.0	23.2	19.4	17.0	16.8	13.7	12.8	15.1	18.7	17.0	25.0	23.1	18.8	14.7	-	
SCH3	523491	215032	20.8	18.9	18.4	13.3	11.8	10.6	11.9	9.8	15.7	16.2	22.5	21.2	15.9	12.4	-	
SCH4	523529	215082	21.1	19.9	16.5	12.8	9.8	10.2	10.9	11.6	16.1	18.2	22.5		15.4	12.0	-	
SCH5	523480	215086	20.6	18.1	16.5	13.8	9.2	11.6	10.5	11.2	14.8	18.4	20.5	21.6	15.6	12.1	-	
SCH6	523579	215043	17.8	16.3	13.7	12.2	12.5	10.3	10.4	6.8	16.3	16.6	19.3	18.6	14.2	11.1	-	

DT ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Easting)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean: Raw Data	Annual Mean: Annualised and Bias Adjusted (0.78)	Annual Mean: Distance Corrected to Nearest Exposure	Comment
SCH7	525626	213140	26.1	19.9	16.3	15.3	17.6	13.2	12.8	14.4	17.7	24.1	29.7	26.7	19.5	15.2	-	
SCH8	525616	213123	29.2	23.8	23.4	14.7	14.7	13.7	13.4	16.2	19.0	26.3	31.8	31.0	21.4	16.7	-	
SCH9	525622	213114	17.6	20.7	16.0	13.8	14.5	11.2	11.4	13.6	16.1	19.3	23.4	24.8	16.9	13.2	-	
SCH1 0	525610	213113	28.4	20.8	20.8	15.0	26.9	12.1	11.0	13.4	18.8	22.9	30.6	25.4	20.5	16.0	-	
SCH1 1	525594	213093	22.3	23.0	19.9	16.1	16.1	13.8	13.5	19.0	21.0		28.4	26.9	20.0	15.6	-	
SCH1 2	525578	213070	17.4	22.3	21.9	17.0	20.8	12.0	14.9	15.8	22.3	26.6	34.3	31.4	21.4	16.7	-	
SCH1 3	522985	208913	28.0	23.9	22.8	19.5	11.8	16.3	15.7	17.3	20.0	22.9	33.7	30.0	21.8	17.0	-	
SCH1 4	523003	208919	28.0	23.1	22.8	15.3	11.2	14.6	14.0	16.0	18.3	20.8	27.6	29.4	20.1	15.7	-	
SCH1 5	523018	208925	26.2	24.6	22.2	17.1	16.1	12.7	13.3	14.0	19.6	23.6	34.8	27.0	20.9	16.3	-	
SCH1 6	523044	208936	25.4	21.0	20.4	15.7	14.6	12.5	13.4	15.1	19.0	22.5	26.7	26.7	19.4	15.1	-	
SCH1 7	523086	208961	25.5	24.9	18.9	16.5	11.7	13.8	13.2	15.3	19.3	21.0	25.1	23.0	19.0	14.8	-	
SCH1 8	523078	208926	28.6	21.3	18.6	15.4	18.0	17.2	11.6	13.9	19.0	21.9	28.8	26.5	20.1	15.7	-	

☒ All erroneous data has been removed from the NO₂ diffusion tube dataset presented in Table B.1

☐ Annualisation has been conducted where data capture is <75% and >25% in line with LAQM.TG16

☐ Local bias adjustment factor used

☒ National bias adjustment factor used.

☐ Where applicable, data has been distance corrected for relevant exposure in the final column.

☒ Welwyn Hatfield Borough Council confirm that all 2021 diffusion tube data has been uploaded to the Diffusion Tube Data Entry System.

Notes:

Exceedances of the NO₂ annual mean objective of 40µg/m³ are shown in **bold**.

NO₂ annual means exceeding 60µg/m³, indicating a potential exceedance of the NO₂ 1-hour mean objective are shown in **bold and underlined**.

See Appendix C for details on bias adjustment and annualisation.

Where boxes are blank in the above table, this means that a diffusion tube was either stolen or not placed for some reason.

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

New or Changed Sources Identified Within Welwyn Hatfield Borough Council During 2021:

Welwyn Hatfield Borough Council has not identified any new sources relating to air quality within the reporting year of 2021

Additional Air Quality Works Undertaken by Welwyn Hatfield Borough Council During 2021:

Welwyn Hatfield Borough Council has not completed any additional works within the reporting year of 2021.

QA/QC of Diffusion Tube Monitoring

The samples have been analysed in accordance with Socotec (Didcot) standard operating procedure ANU/SOP/1015 Issue 1. This method meets the guidelines set out in DEFRA's 'Diffusion Tubes For Ambient NO₂ Monitoring: Practical Guidance.'

The tubes were prepared by spiking acetone:triethanolamine (50:50) onto the grids prior to the tubes being assembled. The tubes were desorbed with distilled water and the extract analysed using a segmented flow autoanalyser with ultraviolet detection. All samples were received in good condition, unless otherwise stated in the comments field of results table.

Please note:

(i) As set out in the practical guidance, the results were initially calculated assuming an ambient temperature of 11°C, the reported values **have** been adjusted to 20°C to allow for direct comparison with EU limits.

(ii) The reported results have not been bias adjusted.

This analysis of diffusion tube samples to determine the amount of nitrogen dioxide present on the tube is within the scope of our UKAS schedule. Any further calculations and

assessments requiring exposure details and conditions fall outside the scope of our accreditation.

Diffusion Tube Annualisation

All diffusion tube monitoring locations within Welwyn Hatfield Borough Council recorded data capture of 75% therefore it was not required to annualise any monitoring data. In addition, any sites with a data capture below 25% do not require annualisation.

Diffusion Tube Bias Adjustment Factors

The diffusion tube data presented within the 2022 ASR have been corrected for bias using an adjustment factor. Bias represents the overall tendency of the diffusion tubes to under or over-read relative to the reference chemiluminescence analyser. LAQM.TG16 provides guidance with regard to the application of a bias adjustment factor to correct diffusion tube monitoring. Triplicate co-location studies can be used to determine a local bias factor based on the comparison of diffusion tube results with data taken from NO_x/NO₂ continuous analysers. Alternatively, the national database of diffusion tube co-location surveys provides bias factors for the relevant laboratory and preparation method.

Welwyn Hatfield Borough Council have applied a national bias adjustment factor of 0.78 to the 2021 monitoring data. A summary of bias adjustment factors used by Welwyn Hatfield Borough Council over the past five years is presented in Table C.1.

The national bias adjustment factor has been taken from spreadsheet version 03/22. The laboratory used is Socotec Didcot 50% TEA in acetone over 23 studies.

Table C.1 – Bias Adjustment Factor

Monitoring Year	Local or National	If National, Version of National Spreadsheet	Adjustment Factor
2021	National	03/22	0.78
2020	National	06/21	0.76
2019	National	03/20	0.75
2018	National	03/19	0.76
2017	National	03/18	0.77

NO₂ Fall-off with Distance from the Road

Wherever possible, monitoring locations are representative of exposure. However, where this is not possible, the NO₂ concentration at the nearest location relevant for exposure has been estimated using the Diffusion Tube Data Processing Tool/NO₂ fall-off with distance calculator available on the LAQM Support website. Where appropriate, non-automatic annual mean NO₂ concentrations corrected for distance are presented in Table B.1.

No diffusion tube NO₂ monitoring locations within Welwyn Hatfield Borough Council required distance correction during 2021.

QA/QC of Automatic Monitoring

The council are supported with data management by Ricardo Energy and Environment. The council are also supported by Enviro Technology who regularly service and maintain the automatic analysers and respond to breakdowns when required. Where equipment requires calibration, this is done remotely.

PM₁₀ and PM_{2.5} Monitoring Adjustment

The PM_{2.5} (BAM 1020 Analyser) data supplied to Welwyn Hatfield Borough Council is processed by Ricardo Energy and Environment. All data is ratified before it is displayed in this report.

Automatic Monitoring Annualisation

All automatic monitoring locations within Welwyn Hatfield Borough Council recorded data capture of greater than 75% therefore it was not required to annualise any monitoring data. In addition, any sites with a data capture below 25% do not require annualisation.

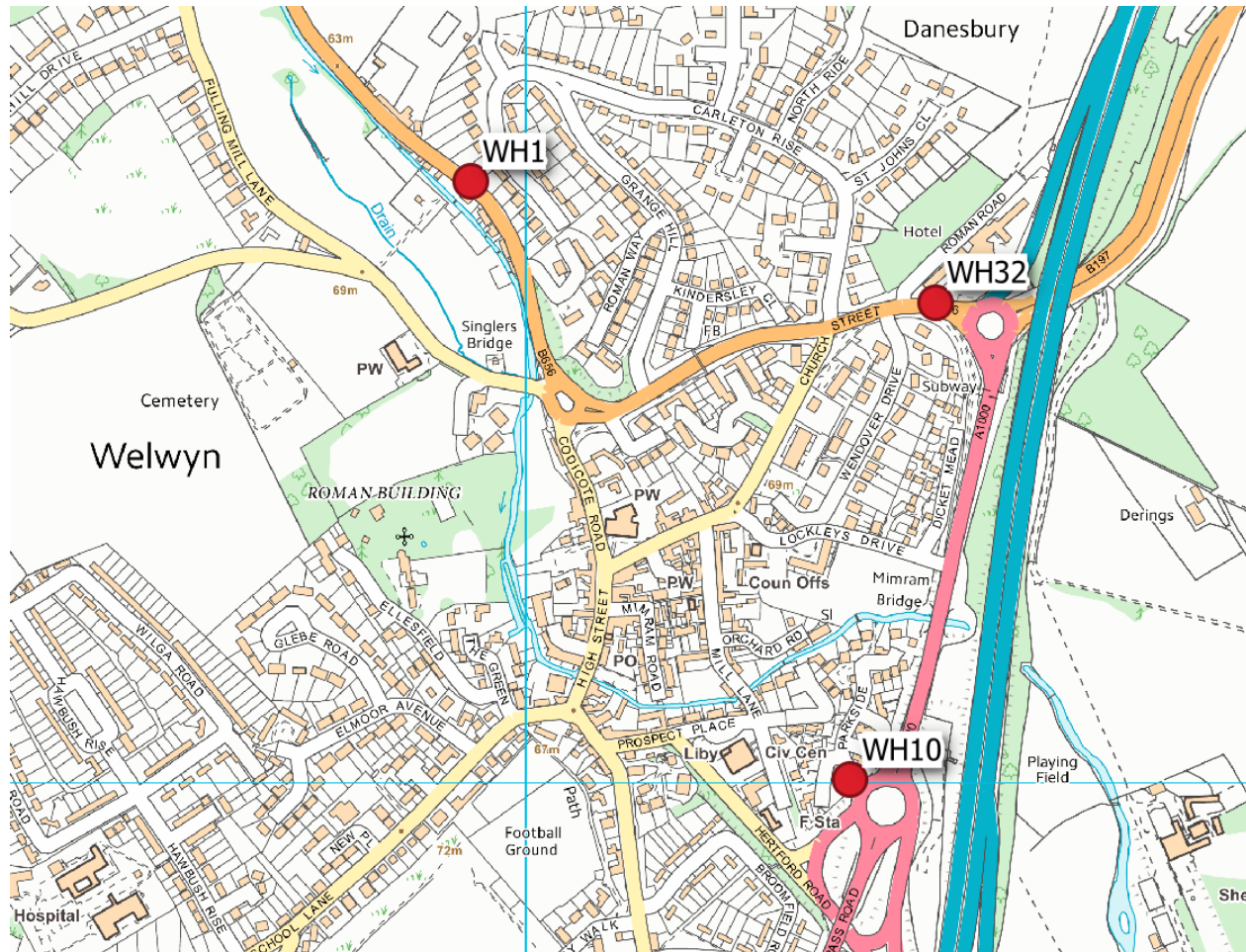
NO₂ Fall-off with Distance from the Road

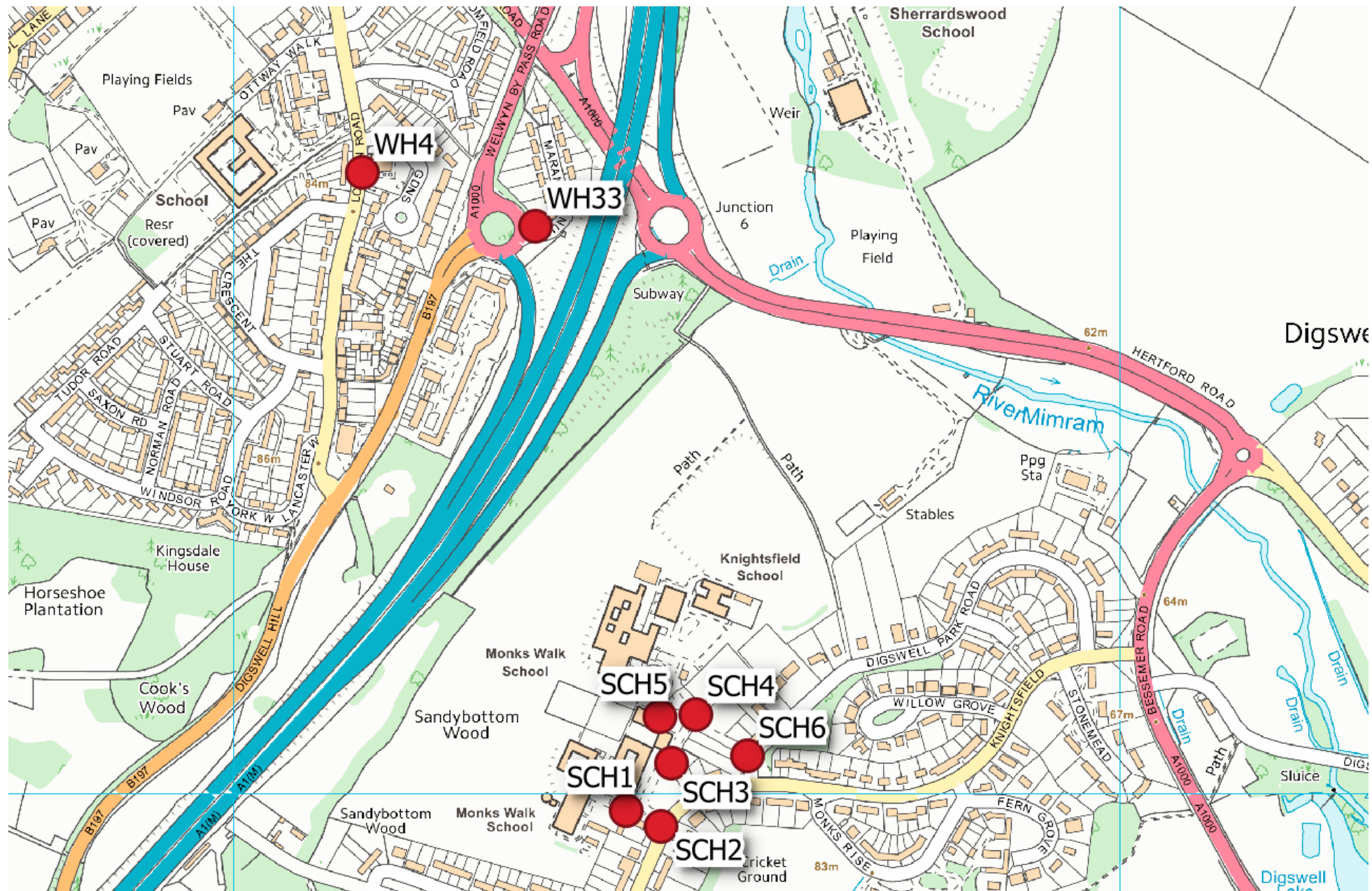
Wherever possible, monitoring locations are representative of exposure. However, where this is not possible, the NO₂ concentration at the nearest location relevant for exposure has been estimated using the NO₂ fall-off with distance calculator available on the LAQM Support website. Where appropriate, non-automatic annual mean NO₂ concentrations corrected for distance are presented in Table B.1.

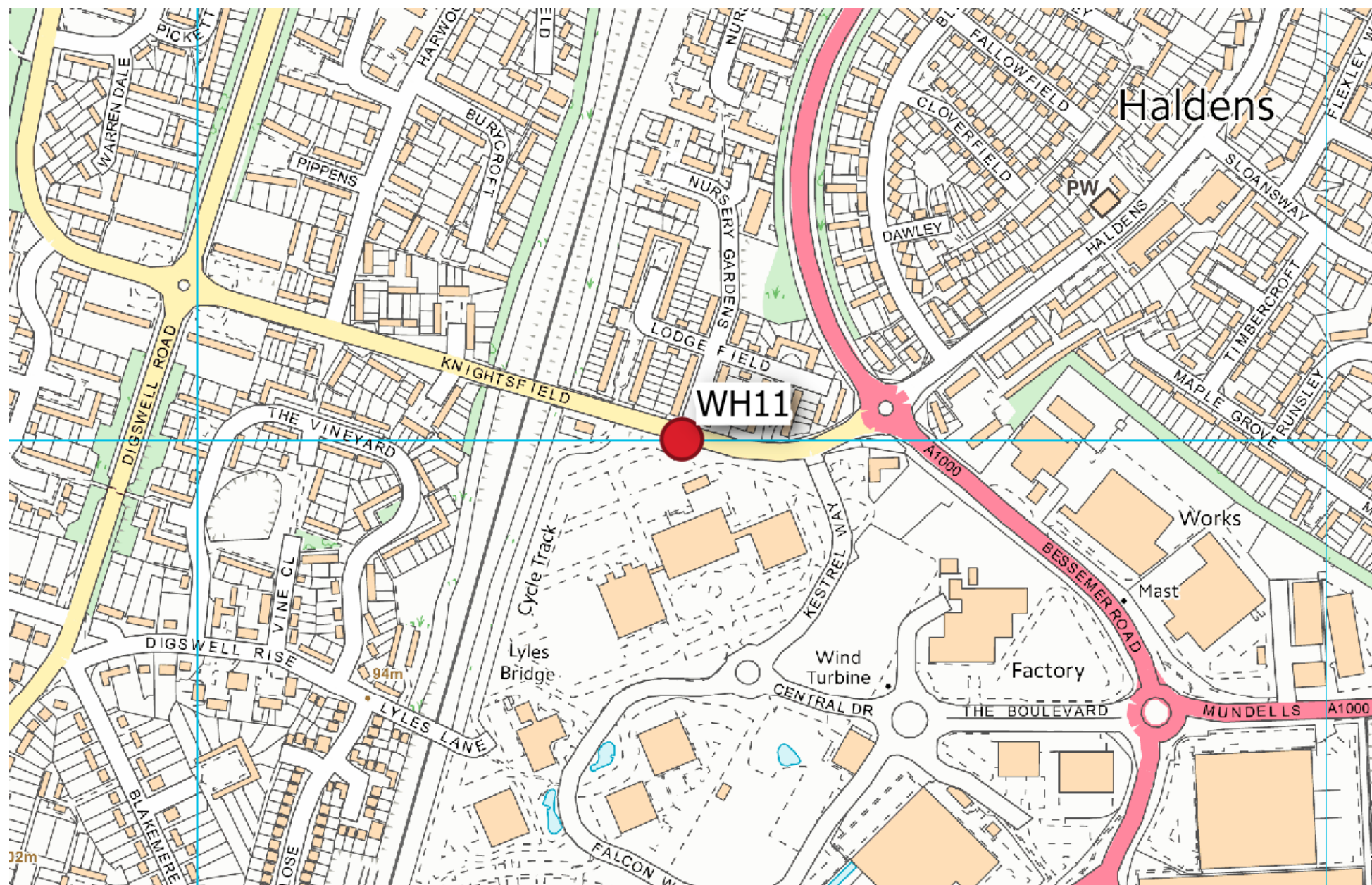
No automatic NO₂ monitoring locations within Welwyn Hatfield Borough Council required distance correction during 2021.

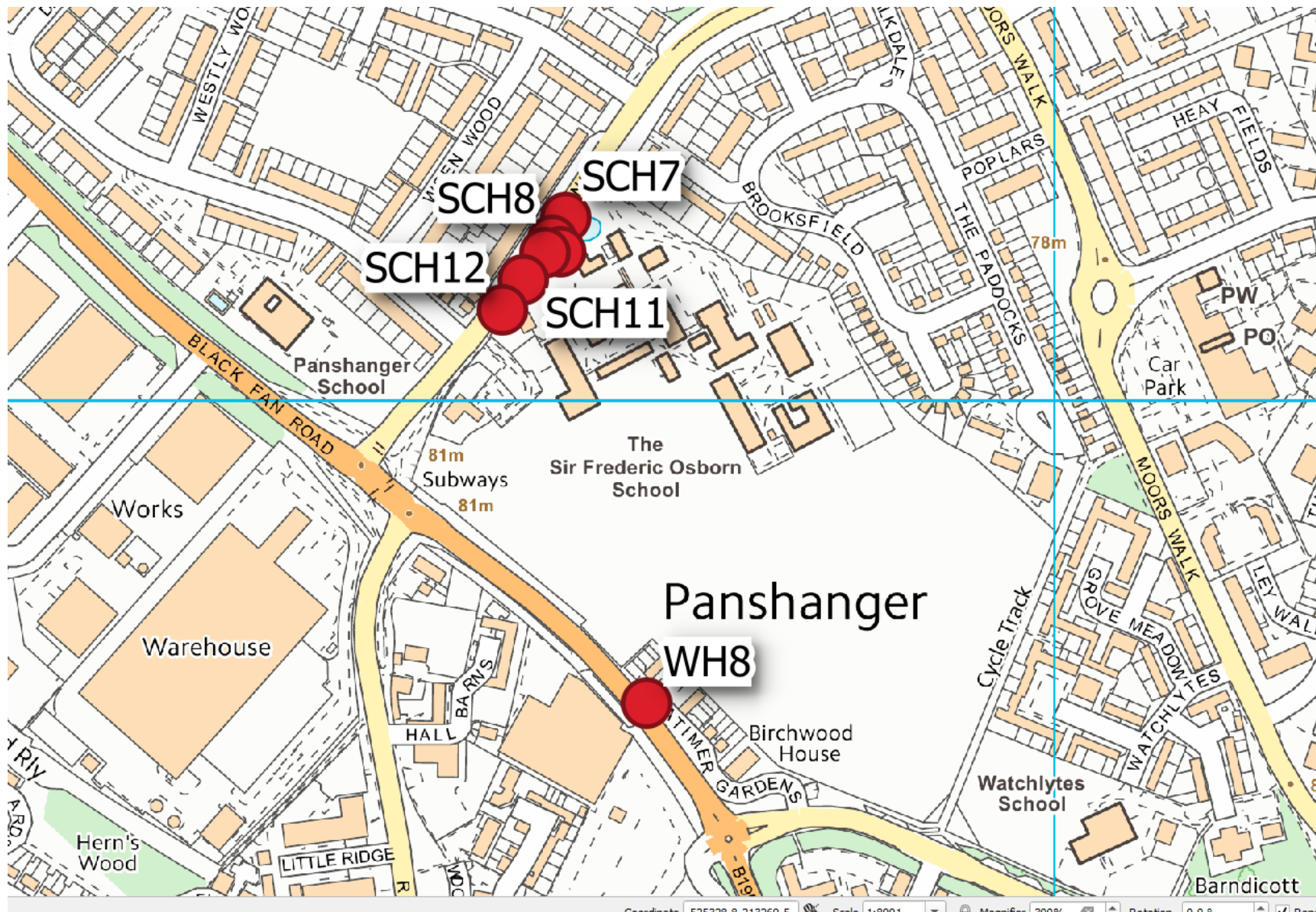
Appendix D: Map(s) of Monitoring Locations and AQMAs

Figure D.1 – Maps of Monitoring Sites

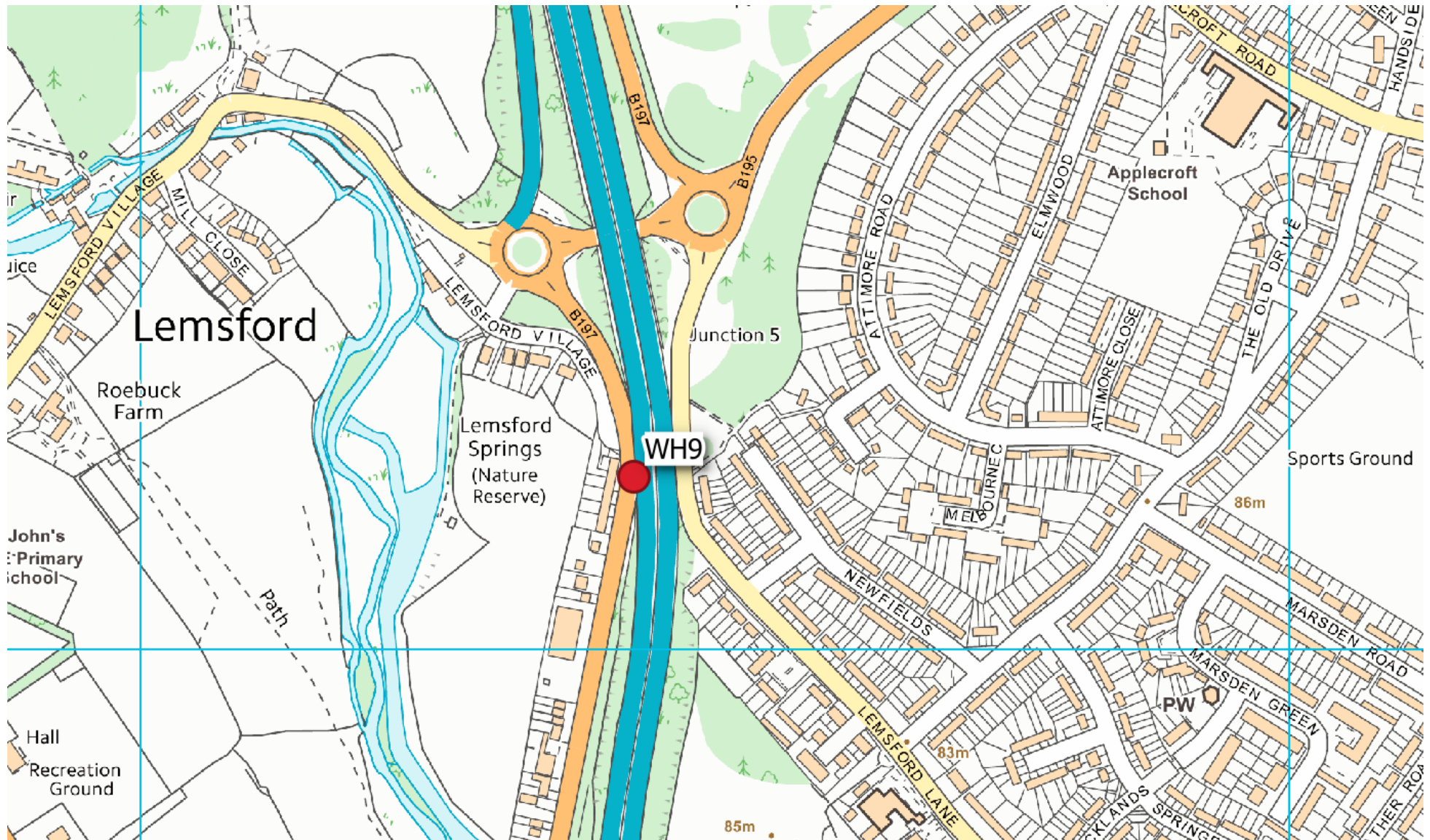


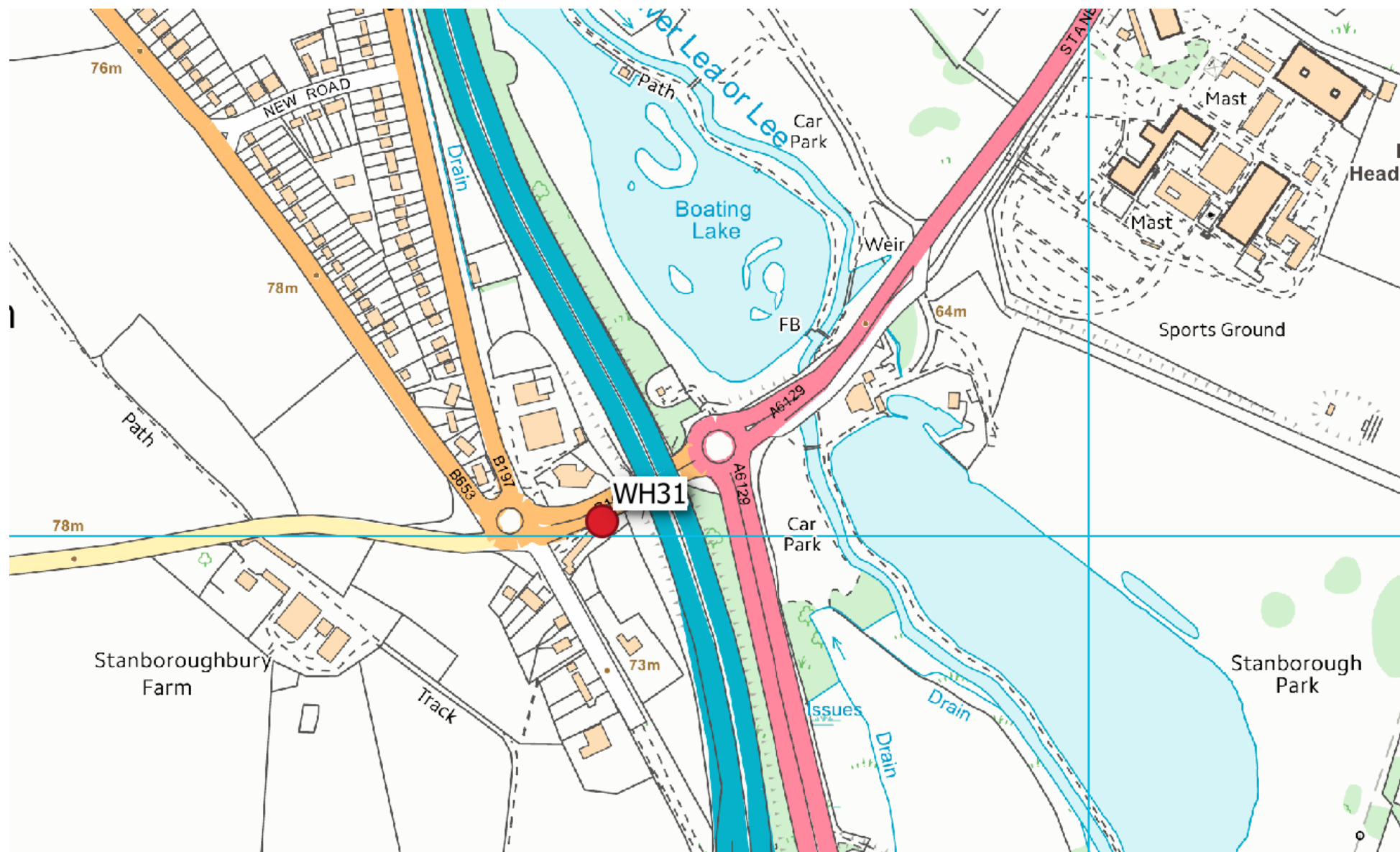


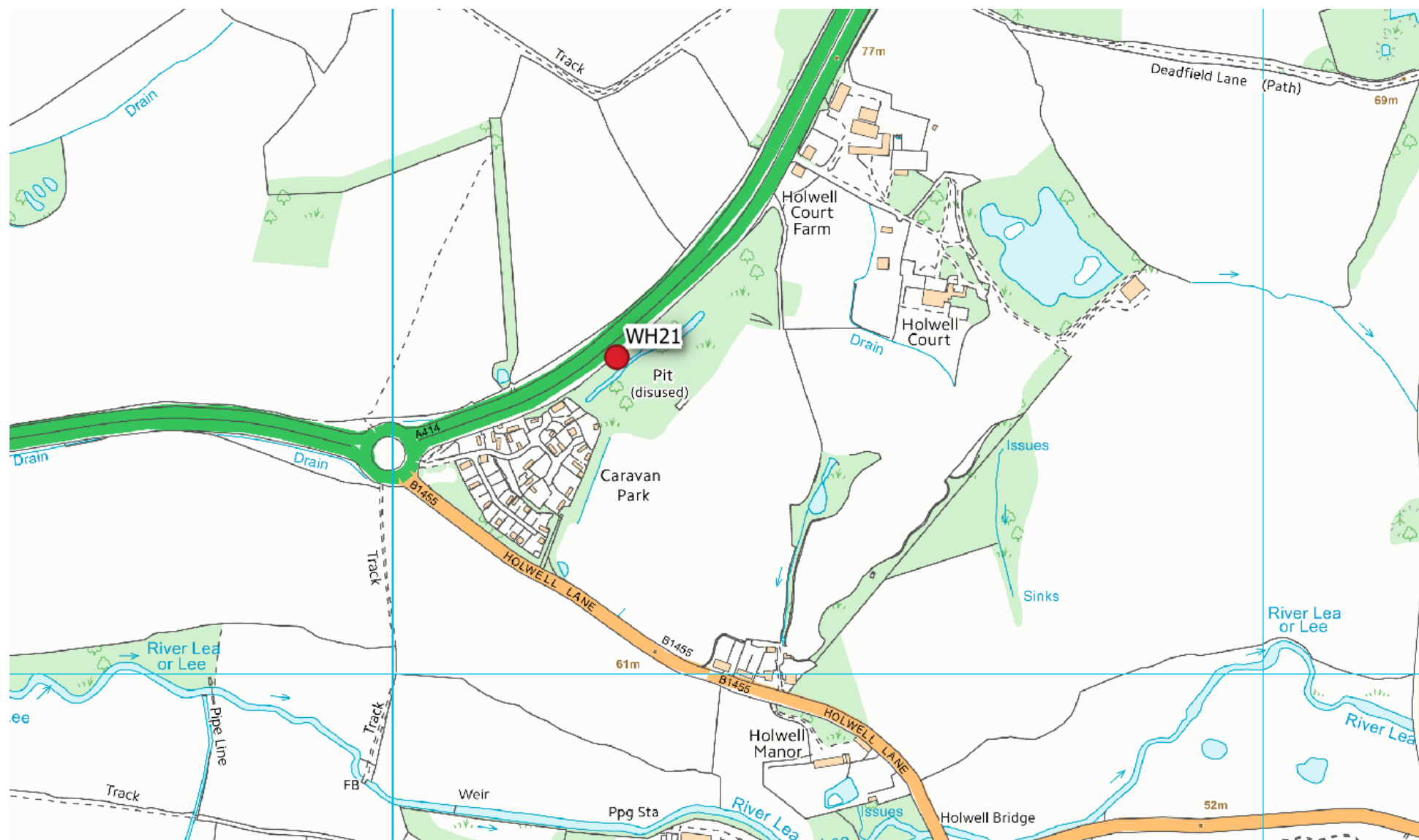


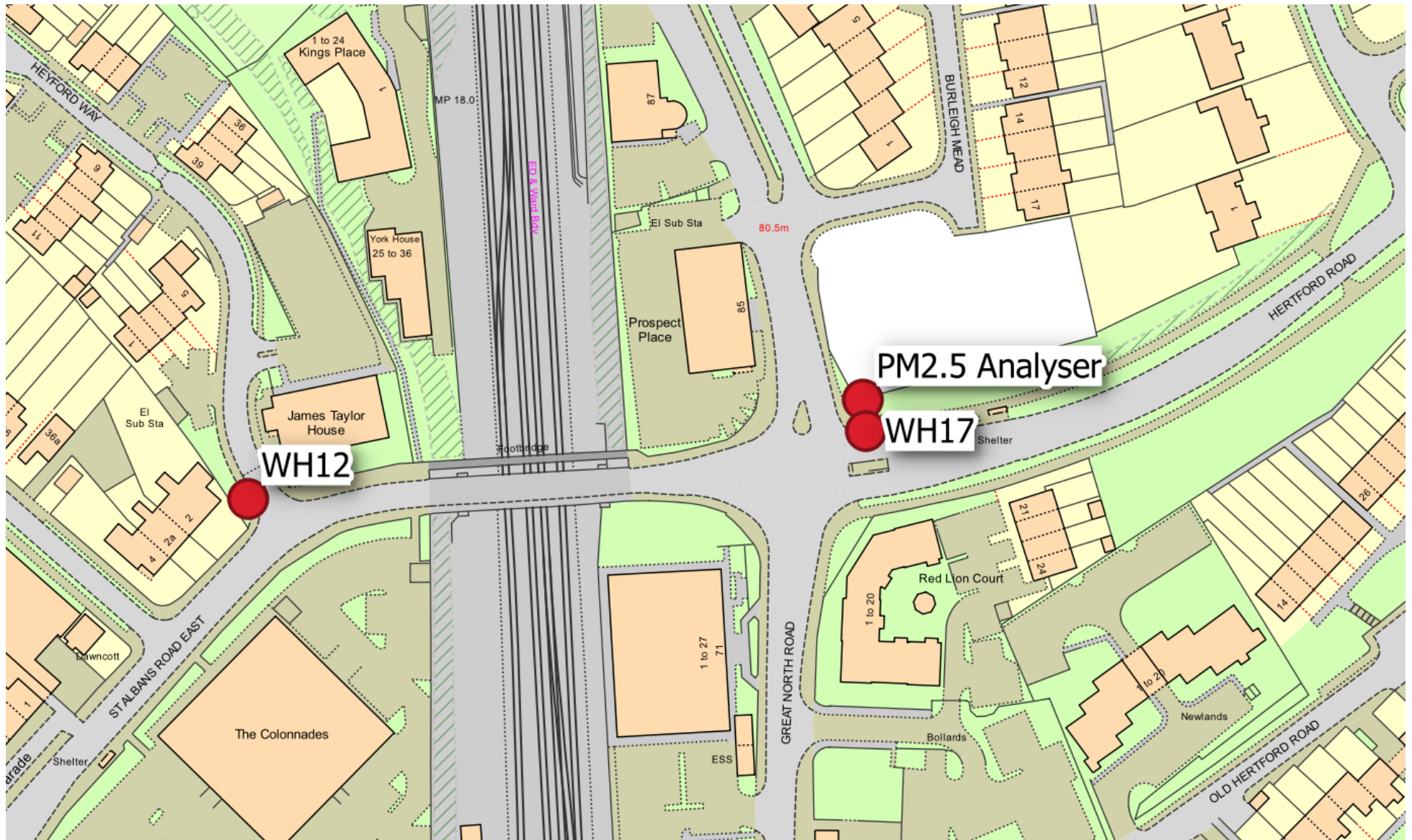




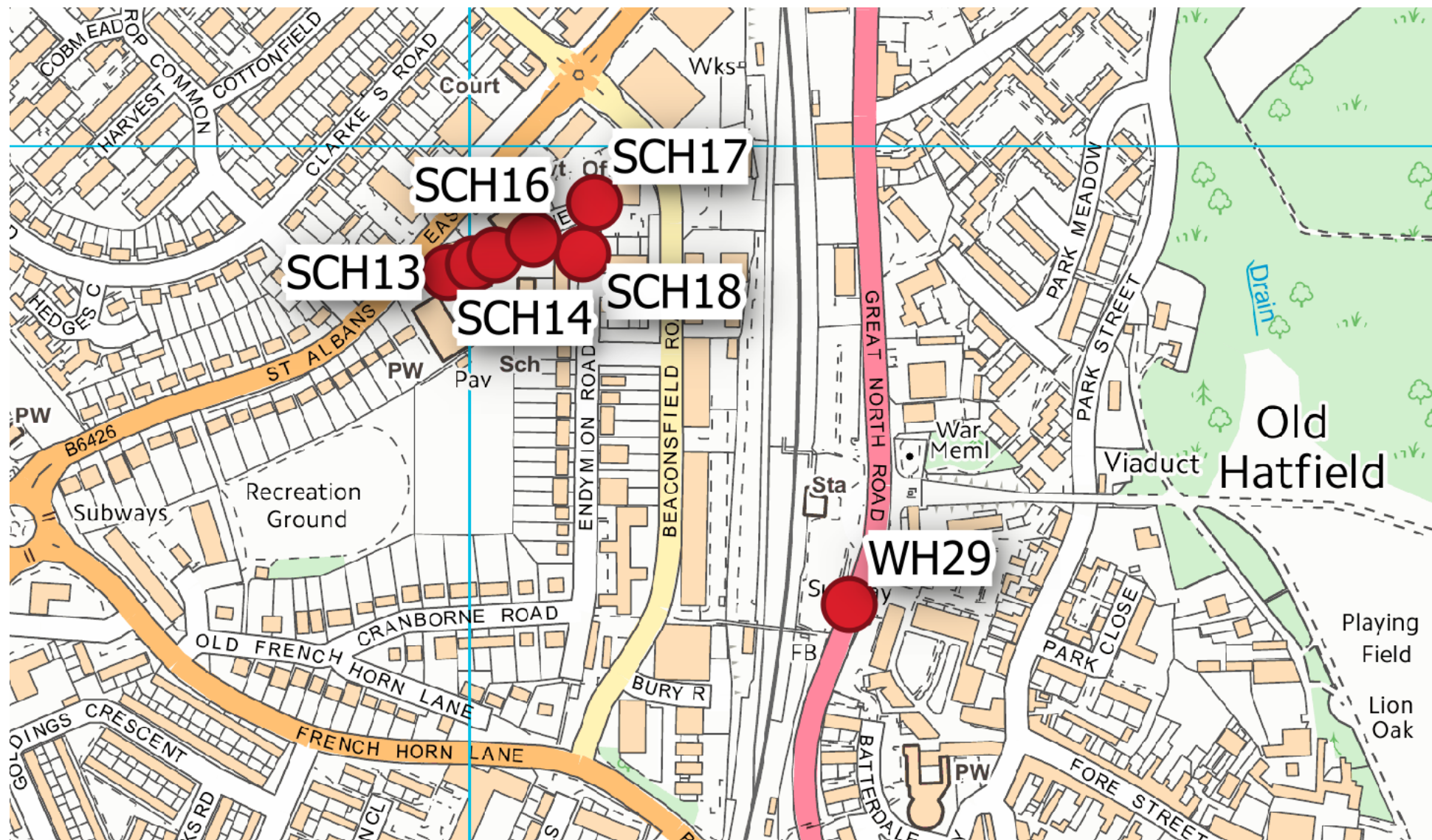




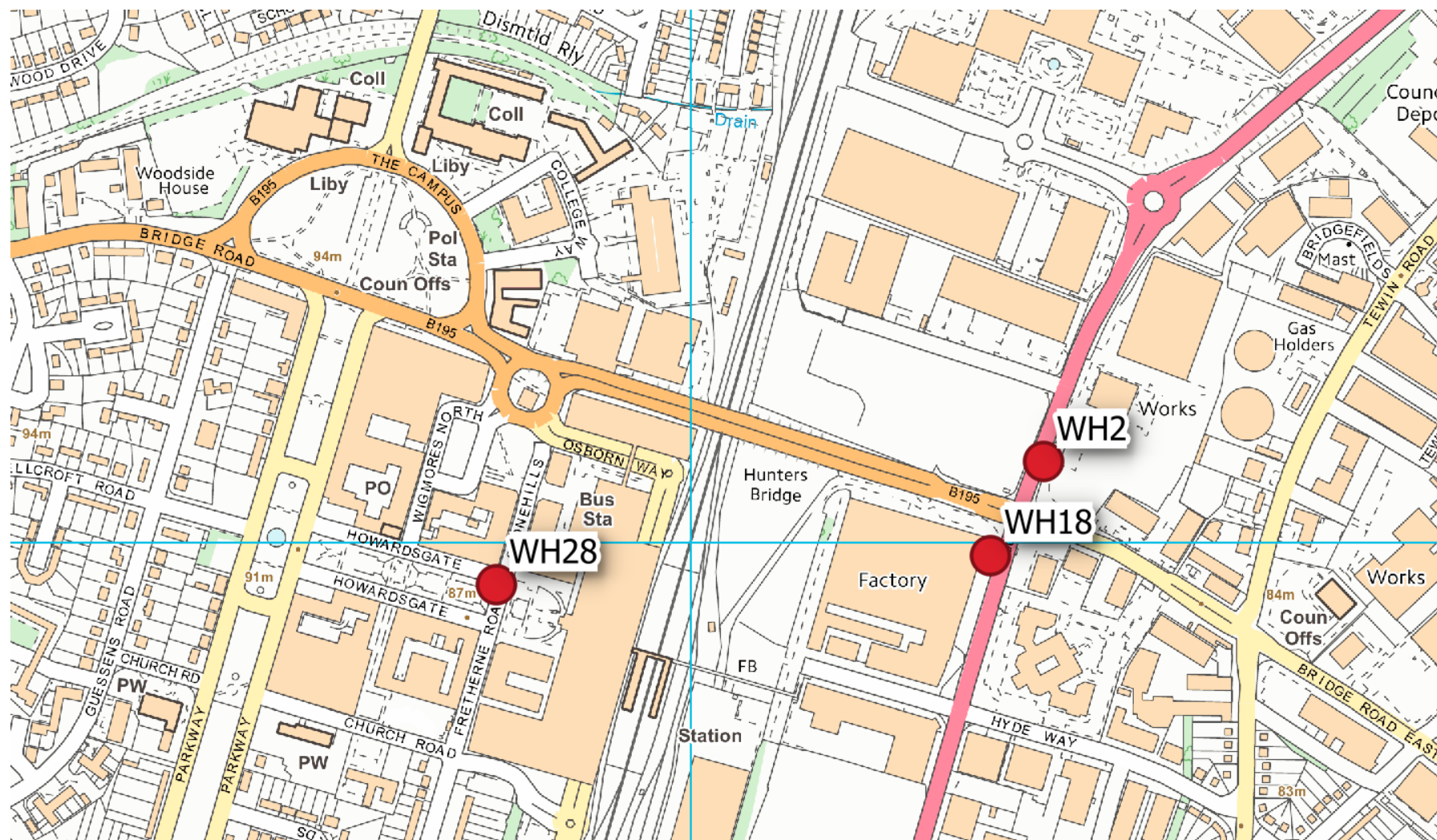


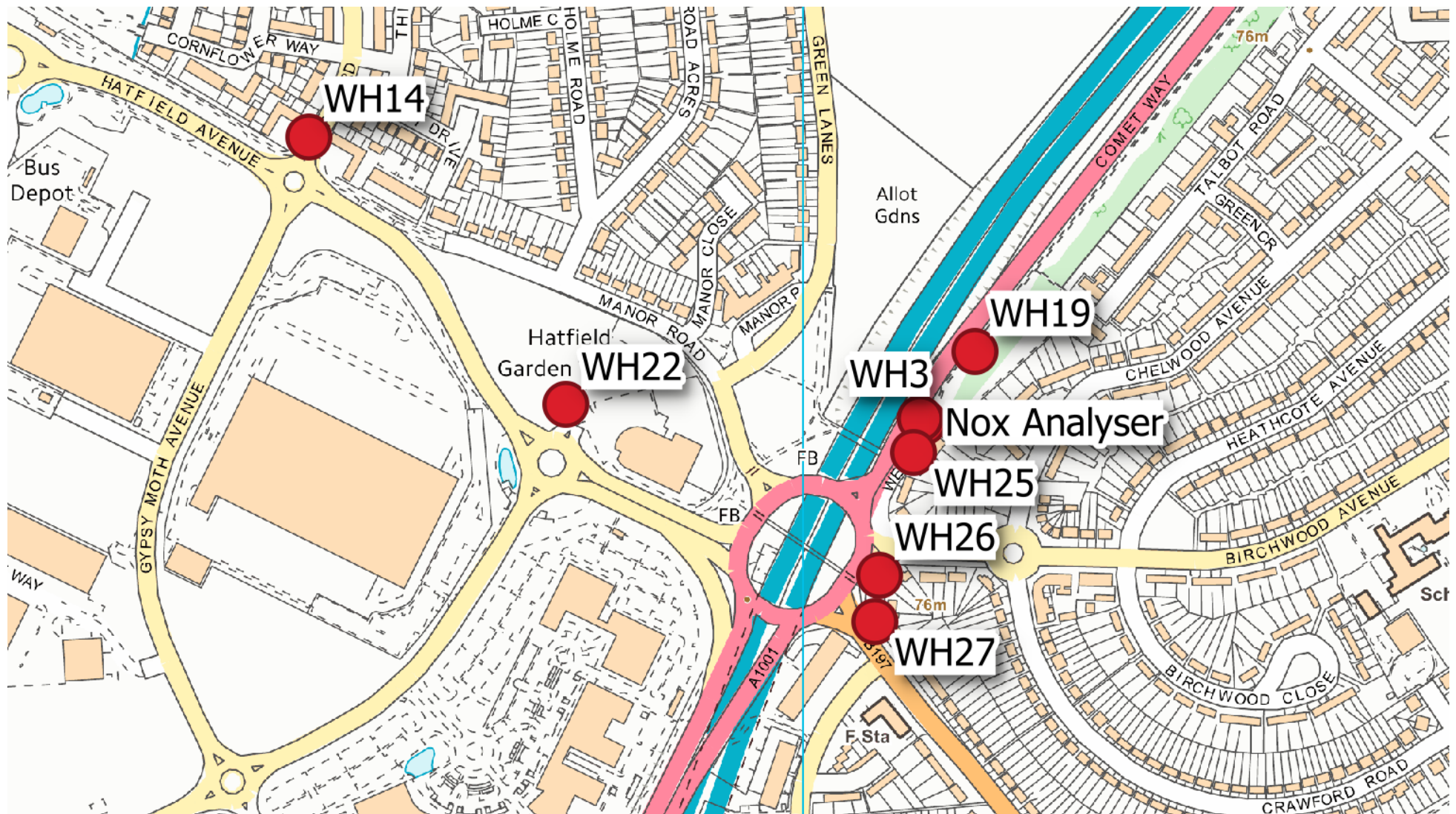


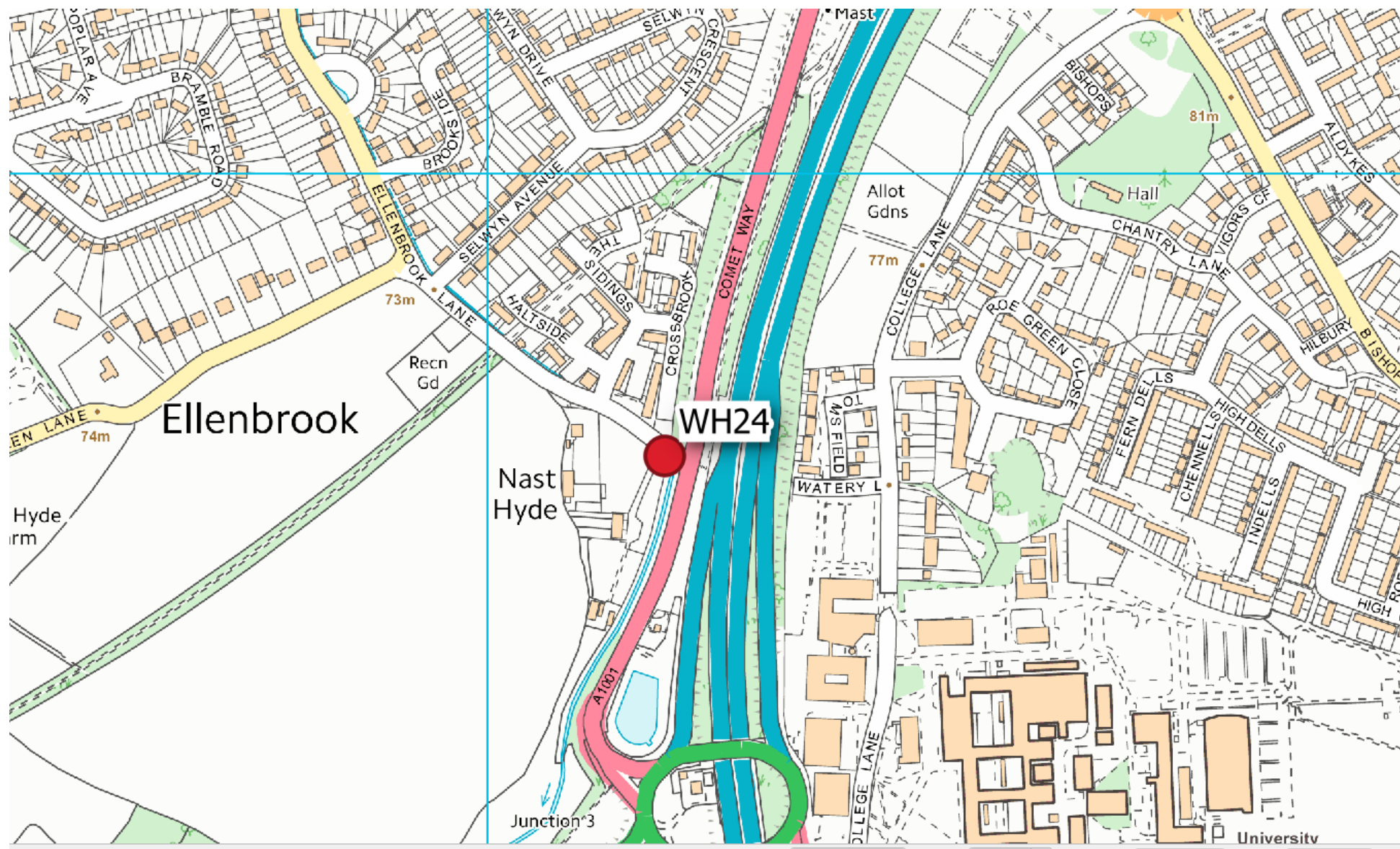


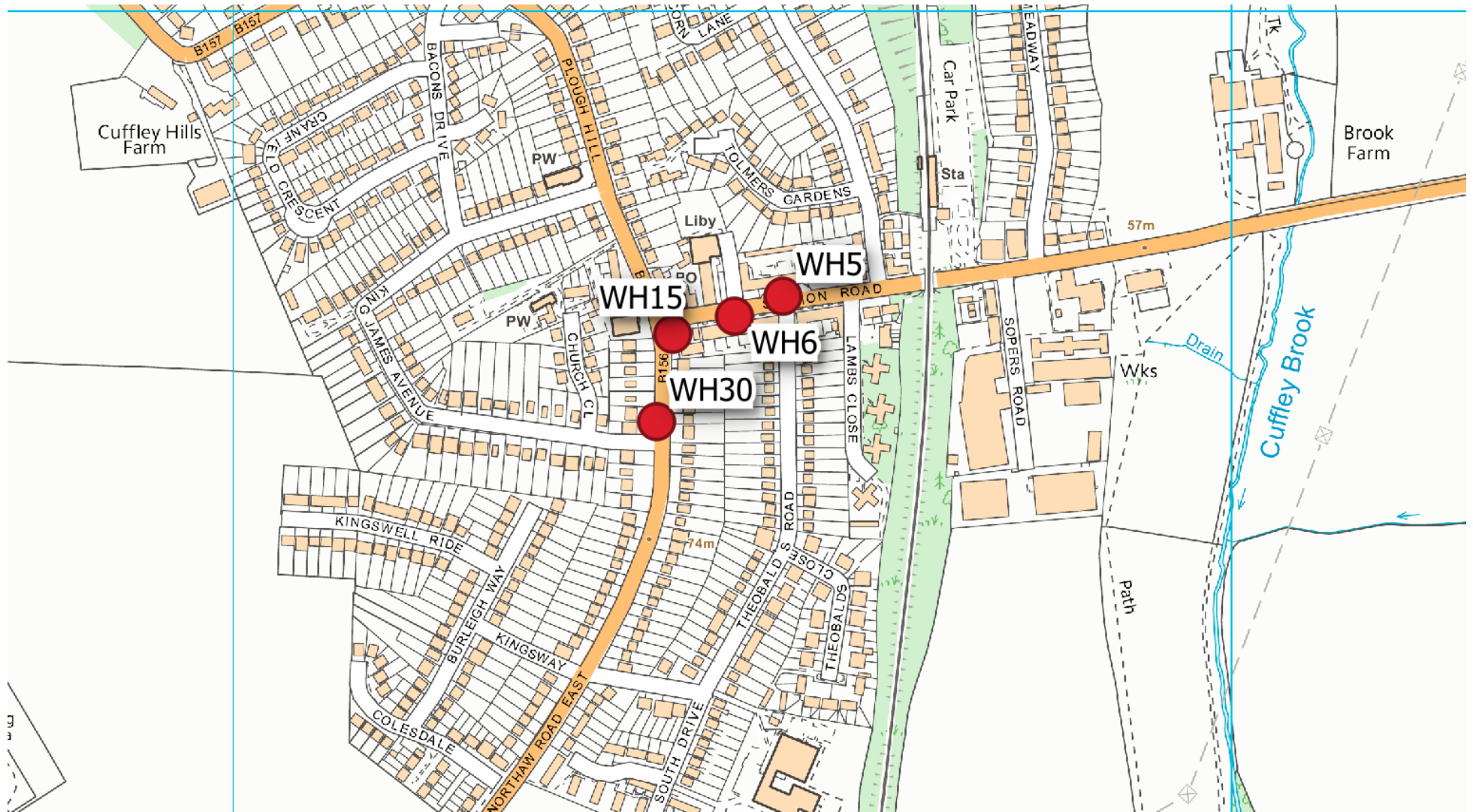












Appendix E: Summary of Air Quality Objectives in England

Table E.1 – Air Quality Objectives in England⁸

Pollutant	Air Quality Objective: Concentration	Air Quality Objective: Measured as
Nitrogen Dioxide (NO ₂)	200µg/m ³ not to be exceeded more than 18 times a year	1-hour mean
Nitrogen Dioxide (NO ₂)	40µg/m ³	Annual mean
Particulate Matter (PM ₁₀)	50µg/m ³ , not to be exceeded more than 35 times a year	24-hour mean
Particulate Matter (PM ₁₀)	40µg/m ³	Annual mean
Sulphur Dioxide (SO ₂)	350µg/m ³ , not to be exceeded more than 24 times a year	1-hour mean
Sulphur Dioxide (SO ₂)	125µg/m ³ , not to be exceeded more than 3 times a year	24-hour mean
Sulphur Dioxide (SO ₂)	266µg/m ³ , not to be exceeded more than 35 times a year	15-minute mean

⁸ The units are in microgrammes of pollutant per cubic metre of air (µg/m³).

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	Annual Status Report
Defra	Department for Environment, Food and Rural Affairs
DMRB	Design Manual for Roads and Bridges – Air quality screening tool produced by National Highways
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 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

References

- Local Air Quality Management Technical Guidance LAQM.TG16. April 2021.
Published by Defra in partnership with the Scottish Government, Welsh Assembly Government and Department of the Environment Northern Ireland.
- Local Air Quality Management Policy Guidance LAQM.PG16. May 2016. Published by Defra in partnership with the Scottish Government, Welsh Assembly Government and Department of the Environment Northern Ireland.
- <https://laqm.defra.gov.uk/review-and-assessment/tools/tools.html>
- **Air quality data collection website:**
- https://www.airqualityengland.co.uk/local-authority/?la_id=408
- **Air quality alert scheme:**
- <https://www.airqualityengland.co.uk/local-authority/knr-subscriptionv>
- **Diffusion tube supplier and laboratory:**
<https://www.socotec.co.uk/services/laboratory-and-analytical-services/>
- **Public health indicators:**
- <https://fingertips.phe.org.uk/profile/public-health-outcomes-framework/data#page/3/qid/1000043/pat/6/par/E12000006/ati/101/are/E07000241/iid/30101/age/230/sex/4>