2020 Air Quality Annual Status Report (ASR)

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

June 2020

Local Authority Officer	Charlie Fielder
Department	Public Protection Partnership (PPP)
Address	Public Protection Partnership Theale Library Church Street Theale Berkshire RG7 5BZ
Telephone	01635 503242
E-mail	ehadvice@westberks.gov.uk
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Executive Summary: Air Quality in Our Area

Air Quality in West Berkshire

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

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

The major source of air quality pollutants in West Berkshire is road transport and in particular the contribution from the A339 and A4 has been identified. The main pollutant is nitrogen dioxide (NO_2) in Newbury & Thatcham and as a consequence, two Air Quality Management Areas (AQMAs) have been declared. The Newbury AQMA was declared for exceedances of both the one-hour and Annual Mean NO_2 objective. The Thatcham AQMA was declared for the Annual Mean NO_2 Objective. Details can be found at: https://uk-air.defra.gov.uk/aqma/list?view=W and maps are in Appendix D.

The Nitrogen dioxide (NO_2) levels in 2019 have showed a general decrease on 2018 levels, and no monitoring locations within West Berkshire exceeded the Annual Objective (40µg/m^3) or 1 Hourly objective NO_2 in 2019 (permitted level of 18 exceedances of 200µg/m^3 per year).

Whilst there has been a general decrease in NO_2 at a number of sites both within, close too and away from the existing AQMA's. The Newbury AQMA sites have shown increases along with one in Pangbourne, one in Thatcham, Calcot and Theale. However, overall the levels in West Berkshire have been reducing over the 5 years up to 2019.

No extensions or amendments to the AQMAs are required and no new AQMAs need to be declared.

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

As a unitary authority Environmental Health has continued to work in conjunction with the Transport Policy Team with the implementation of Local Transport Plan 3 (2011 – 2026). The Plan includes a Transport Vision setting out the long-term transport strategy for each of the 4 main geographical areas of the District, as identified in the Local Development Framework Core Strategy. These Visions have been prepared taking into account a "Mixed Strategy" approach of looking to provide people in the District with more sustainable travel choices. The Plan acknowledges the link with the existing AQAP and any future AQAP's and there is a specific Policy on Air Quality (Policy LTP K6) which states that:

The Council will fulfil its responsibilities for Local Air Quality Management and

focus on the following:

i. Highlighting ways in which air quality can be protected through the development management process

ii. Identifying areas where the Air Quality Objective values are being or are likely to be exceeded

iii. Establishing a framework for air quality improvements

iv. Investigating the feasibility of using mobile alerts to highlight periods of higher pollution levels

v. LTP Strategies continue to be reviewed; no new strategies were implemented in 2019.

vi. Working on the link between air quality, particularly from $PM_{2.5}$ and public health in West Berkshire continues. There has been closer working with the Berkshire Strategic Public Health Team and Public Health England.

Actions to Improve Air Quality

Wokingham Environmental Health is working with the development control applications to review the air quality impact. Air quality assessments have been provided where necessary for a variety of applications and appropriate mitigation requested. Applications included significant housing development sites, STOR power generation plant, traffic flow changes to a road scheme, and any applications which may have an impact to the AQMAs.

West Berkshire Council

West Berkshire Council has completed all Pollution Prevention and Control inspections as required for the control of emission to air from industrial processes.

In 2019 the Bear Lane, A339 (Sainsbury's roundabout) improvements works to enable improved traffic flow have been completed, and traffic lights were decided against following the modelling impact results.

A joint application with Bracknell Forest and Wokingham Councils to the Air Quality Grant Scheme 2019 was made however it was not successful in securing grant funding for the project.

In 2019 31 Electric vehicle (EV) charging points were installed in West Berkshire, the EV chargers are all plotted on the council's web page https://info.westberks.gov.uk/onstreetev

National Cycle Network 422 expansion – A4 Newbury to Thatcham and on to Calcot was completed in 2019. This provision of improved cycle ways goes through the Thatcham AQMA, and potentially links Newbury to Legoland, https://osmaps.ordnancesurvey.co.uk/51.40608,-1.41302,10,

Our Policy Guidance Planning for Air Quality document, the joint Public Health and Air Quality website and the Public Protection Partnership website (https://publicprotectionpartnership.org.uk/results/?query=air+quality) all contain information for residents, businesses and consultants regarding air quality and air pollution matters, this is reviewed regularly and updated as necessary.

The bus station at The Wharf, Newbury opened on 7th December 2018, at the start of the Market Street redevelopment, this is a key part of the Newbury Vision 2026. In addition to 232 new homes the scheme will deliver additional parking capacity in the town centre, a new station plaza and landscaped step-free pedestrian routes. This bus station is having Bio-Gas Buses pass through as they run into Reading which has strict AQ standards and West Berkshire benefits from these.

Looking ahead there are a great number of road initiatives to be carried out, electric vehicle charging points to be installed, further developments to be made to cycle routes, improvements to the cycles and facilities at schools.

West Berkshire Council also continues to support and recognises the softer Education, Training and Publicity (ETP) elements provided by the Road Safety Team as well as being active members of the Cycle Forum and wider Berkshire Safer

Roads group (other partners include Wokingham, Bracknell, Slough and Windsor and Maidenhead). The collaborative work under Berkshire Safer Roads ensures we maintain a wider and more consistent message across borders.
The Road Safety team aims and objectives are to find opportunities to change behaviour in relation to Active Travel and break down the barriers to encourage more walking and cycling.

Conclusions and Priorities

There was no exceedance of the monitored NO_2 Annual Mean Objective (40µg/m$^{3)}$ in 2019, the level was 35.9µg/m^3 at the continuous monitor located in Newbury. The hourly objective (permitted level of 18 exceedances of 200µg/m^3 per year) was also met as there were only 2 occasions when it was exceeded.

There were no exceedances of the Annual Air Quality Objective level of 40µg/m^3 from the ratified and bias adjusted diffusion tubes within the Newbury AQMA or the Thatcham AQMA. There were no locations greater than 60µg/m^3 which indicates no exceedance of the 1-hour Objective. A total of 9 sites showed an increase in levels compared to the 2018 results, 26 showed decreased levels, one remained the same and there was one new site.

Overall, the concentrations have been showing a trend of decreasing NO_2 since 2015.

The following local priorities continue to be:

- Nationally exploring the link between public health and $PM_{2.5}$
- Joint working between Public Health and Environmental Health teams and links within the Berkshire Public Health Shared Team
- Continuing to work within the unitary authority with Transport Policy and Highways Teams - There are some localised areas of congestion at peak times which require managing and investment, where improvements are needed to increase capacity at key junctions or effectively manage traffic flow. New development is planned through the Local Development Framework Core Strategy and additional transport and highway measures are planned alongside these new developments which will assist in addressing the impact and manage the additional trips associated with new developments.

- Carry on with the continuous and passive air quality monitoring programmes in 2020
- The EV chargers continue to be plotted on the interactive map on the intranet, or the council's web page https://info.westberks.gov.uk/onstreetev to help promote the use of the vehicles in the borough.

The following challenges have been identified:

- Budget allocation for progressing measures and actions. Funding applications will be applied for where possible/appropriate.
- Linking of Public Health Outcome Framework and Health profiles to air quality to show any causal relationship.

Local Engagement and How to get Involved

For further details on air quality in West Berkshire please refer to our website at http://info.westberks.gov.uk/index.aspx?articleid=27513 .

Individuals or members of local groups are invited to share any ideas they have to cut nitrogen dioxide levels in West Berkshire by emailing ehadvice@westberkshire.gov.uk

Other useful websites are:

https://uk-air.defra.gov.uk/

https://www.gov.uk/government/publications/2010-to-2015-government-policy-environmental-quality/2010-to-2015-government-policy-environmental-quality#appendix-5-international-european-and-national-standards-for-air-quality

There are a number of ways our residents can help to improve local air quality:

- Walk or cycle short distances of less than one or two miles rather than driving (see http://info.westberks.gov.uk/index.aspx?articleid=27868 for routes in West Berkshire).
- Search for car sharing opportunities using Lift share (see https://liftshare.com/uk) or Faxi (https://faxi.co.uk/) to share journeys with work colleagues
- Newbury Car Club (see http://www.co-wheels.org.uk/newbury)
- Use the bus or train regularly and keep up-to-date with the latest bus route timetables (see http://info.westberks.gov.uk/index.aspx?articleid=27888)

- Urban Limits http://urbanlimits.org/
- Safer Steps http://safersteps.co.uk/
- Road Rangers http://theroadrangers.co.uk/
- Travel Planning (Get Your Coat App) https://getyourcoat.app/
- Independent Travel (RouteGuard App) www.routeguard.co.uk

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1 Local Air Quality Management

This report provides an overview of air quality in West Berkshire during 2019. It fulfils the requirements of Local Air Quality Management (LAQM) as set out in Part IV of the Environment Act (1995) and the relevant Policy and Technical Guidance documents.

The LAQM process places an obligation on all local authorities to regularly review and assess air quality in their areas, and to determine whether or not the air quality objectives are likely to be achieved. Where an exceedance is considered likely the local authority must declare an Air Quality Management Area (AQMA) and prepare an Air Quality Action Plan (AQAP) setting out the measures it intends to put in place in pursuit of the objectives. This Annual Status Report (ASR) is an annual requirement showing the strategies employed by West Berkshire to improve air quality and any progress that has been made.

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

2 Actions to Improve Air Quality

2.1 Air Quality Management Areas

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

A summary of AQMAs declared by West Berkshire can be found 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/local-authorities?la_id=304 .

Alternatively, see Appendix D: Map(s) of Monitoring Locations and AQMAs, which provides for a map of air quality monitoring locations in relation to the AQMA(s).

Table 2.1 – Declared Air Quality Management Areas

AQMA Name	Date of Declaration	Pollutants and Air Quality Objectives	City / Town	One Line Description	Is air quality in the AQMA influenced by roads controlled by Highways England?	Level of Exceedance (maximum monitored/modelled concentration at a location of relevant exposure)				Action Plan		
						At Declaration		Now		Name	Date of Publication	Link
Newbury AQMA	2009	NO_2 1 Hour Mean	Newbury	An area encompassing a very small number of properties at the roundabout junction of the A339, A343 St John's Road and Greenham Road	NO	61	Exceedances	0	Exceedances *(met objective level as only 2 exceedances of the 18 permitted occasions)*	Newbury AQAP	Nov 2011	http://info.westberks.gov.uk/CHttpHandler.ashx?id=36580&p=0
Newbury AQMA	2009	NO_2 Annual Mean	Newbury	An area encompassing a very small number of properties at the roundabout junction of the A339, A343 St John's Road and Greenham Road	NO	54.4	µg/m^3	0	Exceedances *(met objective as Annual mean of 35.9 µg/m^3)*	Newbury AQAP	Nov 2011	http://info.westberks.gov.uk/CHttpHandler.ashx?id=36580&p=0

Thatcham AQMA	2009	NO_2 Annual Mean	Thatcham	*An area encompassing a small number of properties along the A4 Chapel Street from X to Y*	NO	53.3	µg/m^3	0	Exceedances *(met objective as Annual mean of 31.6 µg/m^3)*	n/a	n/a	n/a

☒ **West Berkshire confirm the information on UK-Air regarding their AQMA(s) is up to date.**

2.2 Progress and Impact of Measures to address Air Quality in West Berkshire

Defra's appraisal of last year's ASR concluded that the Council has made progress with measures to address air quality in West Berkshire in 2019. The council have improved sustainable travel infrastructure, with a contract for the installation of 40 electric car charge points on the highway in and around Newbury, the New Newbury bus station opening in December 2018 and cycle facilities improved on the A4 between Newbury and Thatcham. The council has identified priorities for 2019 including continuing to work within the unitary authority with Transport Policy and Highways Teams to improve traffic management. Also following the recommendations in the 2018 report regarding an AQAP for Thatcham, there were no exceedances therefore to have no AQAP remains appropriate. This should be reviewed again if any exceedances are recorded in the Thatcham AQMA in future years.

West Berkshire has taken forward a number of direct measures during the current reporting year of 2019 in pursuit of improving local air quality. Details of all measures completed, in progress or planned are set out in Table 2.2.

More detail on these measures can be found in their respective Action Plans (http://info.westberks.gov.uk/CHttpHandler.ashx?id=36580&p=0) key measures are:

- Further A339 Bear Lane (Sainsbury's roundabout) improvement works to enable improved traffic flow have been completed and traffic lights were decided against following the modelling impact results. The results of the impact for the changes will not be available until 2022 reports as we will need at least a year's worth of data without the C-19 impact included.
- Bio-Gas Buses pass through as they run to and from Reading which has strict AQ standards, this in turn benefits Newbury.
- The car club (set up in 2016) continues to grow and now has one electric vehicle. At the end of 2019 the car club had 103 members and the car with the highest use had 374 bookings.
- All-Electric trains are now running through the borough and in December 2019 there was a change to the time table. As a result the Thatcham Level crossing is

being monitored by the Highways Department to investigate the knock-on effect of those changes.

- Active work on the reduction of HGVs through Newbury with the erection of Positive Signage in 2019 to influence the travel direction of the freight and greater use of the bypass. Further walking, running and cycling groups such as Let's Ride, Run Together and Walking for Health (led walks across West Berkshire) have been set up to provide activities for beginners, mental health groups and other interested parties.
- In 2019 31 Electric vehicle (EV) charging points were installed in West Berkshire, the EV chargers are all plotted on the council's web page https://info.westberks.gov.uk/onstreetev
- National Cycle Network 422 expansion – A4 Newbury to Thatcham and on to Calcot was completed in 2019. This provision of improved cycle ways through the Thatcham AQMA, and potentially linking Newbury to Legoland, Windsor https://osmaps.ordnancesurvey.co.uk/51.40608,-1.41302,10,
- Pedestrian and cyclist directional signage – this project commenced in 2018/19 to promote and improve walking and cycling facilities.
- Cycle parking – improvements to existing facilities and introduction of new ones began and continues in schools into 2020.

West Berkshire expects the following measures to be completed over the course of the next reporting year 2020:

Newbury

- New station/Council offices car park at Market Street.
- Improvements to the capacity of Robin Hood Roundabout (subject to external funding).
- A4 cycle track, further improvements.
- A339 Sandleford, create junction for new school and future housing development.
- Start construction of Kings Road Link Road (to be completed 2021/22).
- Further on-street EV charge points throughout the borough.
- New EV charge points in car parks, locations to be confirmed.
- Investment in cycle parking at schools.

Thatcham

- Further development of A4 cycle route.
- Optimisation of traffic signal timings on A4.
- On-street electric vehicle charge points.

Theale

- On-street electric vehicle charge points.

Pangbourne

- On-street electric vehicle charge points

Borough wide

- Clean Air Day in October 2020 to increase awareness and promote health.

West Berkshire's priorities for the coming year are:

- Implementation of an Air Quality Guidance Note for planning applications
- Joint working between Public Health England and the Public Protection Partnership (https://publicprotectionpartnership.org.uk/) and links within the Berkshire Public Health Shared Team.
- Continuing to work within the unitary authority with Transport Policy and Highways Teams as well as Development Control.
- Carry on the continuous and passive air quality monitoring programmes.
- Establish the feasibility of monitoring $PM_{2.5}$, as it is not a statutory requirement from DEFRA.

The principal challenges and barriers to implementation anticipated for West Berkshire include lack of funding and resources.

The measures stated above and in Table 2.2 will help to contribute towards maintaining compliance and enable the revocation of Newbury and Thatcham AQMAs. These actions and ideas are ever evolving as is the technology now available to us all.

Table 2.2 – Progress on Measures to Improve Air Quality

Measure No.	Measure	EU Category	EU Classification	Date Measure Introduced	Organisations involved	Funding Source	Key Performance Indicator	Reduction in Pollutant / Emission from Measure	Progress to Date	Estimated / Actual Completion Date	Comments / Barriers to implementation
1	Variable message Signing (VMS) linked to Newbury car Park System	Traffic Management	UTC, Congestion management, traffic reduction	2011-14	WBC	WBC	Car park usage	Negligible	Installed as part of Parkway opening spring 2012	Spring 2012	No monitoring currently taking place, the amount of roadwork's in and around the Newbury area could skew the results. Car Parks team feedback that the signs are invaluable at directing traffic to available parking especially at busy times. Queuing has reduced at entrances. They also note that there are an increased number of parking spaces available so this may have helped reduce queuing also.
2	Study into signalising junction at Burger King Roundabout	Traffic Management	UTC, Congestion management, traffic reduction	2017-2018	WBC	WBC	Reduction in queuing time and congestion within AQMA and reduction in NO_2 and emission levels	15 ug/m^3(based on 2008 data)	Surveys ordered March 2017 and model to be completed late 2017. Model indicates some benefit to replacing the roundabout with a traffic signal controlled crossroads. No budget is currently in place to deliver such a project, but could be delivered in conjunction with the Sandleford development if funding becomes available.	**Summer 2019**	**Await findings of model to assess impact on any proposed scheme, 2019 - from the results it was decided against traffic lights.** North bound is nearer receptors, and it has added a lane in the South bound direction, which it has a modest increase in traffic flow.
3	Amendments to Bear Lane (Sainsbury's) Junction of A339, as this junction can impact on A343 Greenham Road Junction	Traffic Management	UTC, Congestion management, traffic reduction	2012	WBC	WBC	Queuing time and congestion close to AQMA and reduction in NO_2 levels	15 ug/m^3(based on 2008 data)	Complete. Changes to roundabout being looked at along with Bear Lane by WBC consultants - see new action. Sainsbury's roundabout, Cheap Street and Market Street have been redesigned to re-route traffic and improve flow. Work to begin January 2019.	Completed 2012 **Further physical works were started in Jan 2019 and completed in October 2019**	Results regarding the AQ impact will not be available until 2021/22 report, to allow for at least 2 years' worth of monitoring.
4	Improved local bus services to reduce short car journeys	Transport Planning and Infrastructure	Bus route improvements	2015-16	WBC	WBC	Increase in no. of passenger journeys	Negligible	Capital works - Complete. New developer-funded bus service - starting May 2016	2016	Ongoing monitoring of passenger journeys. Also improvements to Reading Buses fleet to alternative fuels (gas). We are on the Reading buses network and they require strict standards.
5	Smarter Choices(1) Investigate the feasibility of a district wide car share scheme	Alternatives to private vehicle use	Car Clubs	2012-2014	WBC	WBC	No. of car share cars and their usage	Negligible	Works commenced	2014	Complete: District wide car sharing isn't feasible - a focus on location journeys instead- see (3).
6	Smarter Choices(2) Investigate the feasibility of a car club for Newbury and Thatcham area (Racecourse)	Alternatives to private vehicle use	Car Clubs	2012-2014	WBC	WBC	No. of car share cars and their usage	Negligible	5 Car Newbury scheme was launched in 2016 in partnership with Co-wheels. One of the vehicles is electric. Usage is growing year on year.	2016	2016/17 Public launch, promoting & monitoring uptake. Data will be available on number of members, vehicle usage, number of miles, trips etc. **Greater promotion is desired but in 2019 the car club use continued to increase. There is promotion with a short film focused on using the electric car. As at the end of 2019, the car club had 103 Members. The car with the highest use had 374 bookings in 2019**
7	Smarter Choices(3) Promote Car sharing opportunities within the district	Alternatives to private vehicle use	Car Clubs	2012-2016	WBC	WBC	No. of car share cars and their usage	Negligible	West Berkshire Council FAXI car share/cycling & walking partner website being promoted (44 registered as of 9/3/16) and dedicated Council Car share bays (24 registered users).Car sharing within locally situated schools had been explored but wasn't a great deal of interest. AWE had invested heavily in car sharing and have their own internal system.	**ongoing**	Number of people registered and their locations and journey type. FAXI car sharing focused around Newbury Town Centre. Opportunity for greater up take. AWE car share still on going.

8	Electrification of Newbury to Reading railway line	Transport Planning and Infrastructure	Public transport improvements-interchanges stations and services	2012-2015	Network Rail	Network Rail	Increased reliability of services and increase passenger usage	Negligible. Some air pollution reductions in and around major urban train stations along route as diesel trains are replaced.	Boundary Road bridge over railway line due be carried out in 13/14, NR required to raise bridge due to electrification but there are issues re-sighting. Works have completed on many bridges. Boundary Road Bridge work began in 2015, due for completion Jan 17.). Electric trains started running on Newbury to Reading local services in Jan 2019. London to Bedwyn and London to West Country Services will run on electric power as far as Newbury and then switch to diesel.	Revised timescales: End of 2018 before any passenger services are likely running, track may be completed 2017.	Hendy Review is likely to result in any decision to electrify the Berks and Hants line to the west of Newbury being delayed beyond the end of Network Rail Control Period 6 (2019-2024). Electric trains are all running. **In December 2019 there was a change to the time table. Thatcham level crossing has been monitored in terms of the knock-on impact of the new timetable on congestion around the station.**
9	Supplementary Planning Document for AQ	Policy Guidance and Development Control	Air Quality Planning and Policy Guidance	2013/14	WBC	WBC	Reduce reliance of car in new development. Us of s106 funds	negligible	Planning and Air quality document drafted and due to be launched in 2019. No current Supplementary Planning Document.	**2019 revised document to be launched**	Proposed emissions from large scale developments more quantifiable than from small scale.
10	Reduction of HDVs using A339 through Newbury	Freight and Delivery Management	Route Management Plans/ Strategic routing strategy for HGV's	2013-2016	WBC	WBC	Reduction in HDV journeys along this section of road network and decrease in NO_2 levels measured.	links with 15 ug/m3(based on 2008 data)	Freight Strategy review commenced 2013. Discussions by WBC with HCC held. Options paper to TPTG Jan 15, recommending positive signage at a cost of £15-20k on the local network and £20-30k per sign on the A34. WBC can only really influence northbound traffic from the Swan Roundabout. Freight Route Network Maps had recently been updated- purely advisory. Direction signs now in place northbound to encourage greater use of the bypass by HGVs.	Signage now installed on A339 in 2017/2018	Completed signs are up.
11	Electric charging points	Promoting Low Emission Transport	Procuring alternative Refuelling infrastructure to promote Low Emission Vehicles, EV recharging, Gas fuel	2012-2014	WBC	WBC	Use of charging points. Increase in EV ownership and use of/demand for (public) charge points	negligible	(1) Successful OLEV grant to install charge points on WBC land 2013-15. (2) Ecotricity Rapid charge points installed at motorway service stations. (3) Agreement by FGW to install at Aldermaston and Theale stations. (4) EV Residential Guidance included in the WBC Residential Parking Guidance (5) ULEV Readiness Programme (6) ULEV Strategy proposed (7) Promoting EV Vehicles. A contract has been let to install charge points on the highway in residential areas. Funded by OLEV grant.	(1) March 2015 (2) 2015 (3) Unknown (4) Complete Oct 2015 (5) April 2016 (6) 2016 (7) ongoing	(1) Council charge points installed for WBC use at Kennet Centre (Mar 13) and Ampere Road, Newbury (Mar 14) under OLEV Public Sector charging scheme. (2) Run by Ecotricity, data on use not readily available. (3) Once installed, unlikely to have readily available data on use. (4). EVCP to be considered at all residential developments, as a minimum infrastructure enabling installation of EVCP at a later date. (5) Successful Bid for OLEV funding (Aug 15). For 2 further charge points, installed at Kennet Centre Newbury and 1 at Wokingham for the Joint EH&L Service use (Mar 16). 3 EV vans and 2 EV Cars have been procured, awaiting delivery Mar 16. (6) ULEV Strategy began by TP, for Transport Vision and revised LTP. (7) Support of EV-ENT held by WB Green Exchange in May 2016. 2 electric cars provided with Public Protection Service for work use. **2019 31 EV charging points have been installed.**

12	Health Education	Public Information	Other	Decrease in hospital admissions from asthma. Increase in walking and cycling.	2012-2016	2012-2016		Priorities with PCT did not previously relate to improving health due to poor air quality. Improved links with Public Health now within WBC, including joint working. Permanent Healthy Lifestyles Officer post promoting active travel and physical activity in schools. Cycling, running and walking groups across the district. Promotion of physical activity and active travel. Community Physical Activity fund to be launched March 2019.		Air Quality and health impact link not a priority but seen as a definite link. PH are funding a Schools Active Travel Officer post encouraging walking and cycling to school & previously part funded the personal travel plan project. PH were focussed on active travel i.e. walking and cycling. Cycling promotion- setting up cycling sessions for beginners, getting adults back into cycling. A bike shed would be installed at Northcroft so those that didn't have a cycle could loan one to take part in the sessions. In 2016 closer links with Director of PH for Berkshire, Strategic Berkshire PH Team and PHE developed. Joint AQ and PH website development created with launch in late 2017.	
13	National Cycle Route (Newbury to Legoland)	Promoting Travel Alternatives	Promotion of cycling	2017-2019	Wokingham BC	Wokingham BC	Cycleway usage	Negligible	WSP commissioned to undertake a wider feasibility into the proposal. Business Case submitted to the TV LEP. The LEP awarded the funds to the scheme in December 2015. The proposed funding for the scheme is £5.5million, with £4.2m from the LEP. West Berkshire has	**2019**	2016/17 Survey & Planning, 2017/18 & 2018/19 .On-site works NCN Route 422 is the indicative route title for a National Cycle Route potentially linking Newbury through to Ascot and Windsor **2019 objectives have been delivered.**

									committed a further £100,000 via funds from the annual Capital budget. Other funds and monies will be combined to further support the route, such as developer contributions. Cycle facilities have been improved on the A4 between Newbury and Thatcham. Further improvements planned during 2019-20.		
14	Park and Ride	Alternatives to private vehicle use	Bus based Park & Ride	Not to be implemented	WBC	WBC	Reduce emissions within the town centre by reducing the number of cars and congestion.		P&R proposal rejected by TPTG July 2011 due to cost and unsuitability of Newbury.	N/A	Closed – not to be carried out.
15	Cycle lane on A343 St Johns Road between Burger King Roundabout and St Johns Roundabout	Transport Planning and Infrastructure	Cycle network	2012	WBC	WBC	Reduction in car journeys along this section of road network and decrease in NO_2 levels measured	Negligible	Implemented	2012	Completed. Part of Cycle way improvement programme for 2011/12. Approx £100k per annum (£50k capital grant & £50k Developer Contributions (S106)
16	Travel Planning	Promoting Travel Alternatives	Personalised Travel Planning	2013-2014	WBC	WBC	No. of businesses and householders engaged in the Network, with focus on Newbury and Thatcham	Negligible	Completed: Project ran June 14-Sep 14. Targeting nearly 5000 homes. 39% had consented to participating in the programme. Also resulted in improvements in bus routes in the Wash Common area.	2014	Completed: The survey indicated a shift towards more sustainable travel journeys, with 24% of respondents walking more often, and 10% using the bus more regularly, and an 8% increase in cycling. More importantly, 15% of respondents stated that they now made fewer single occupancy car journeys. Business and school travel planning. LSTF bid for personalised travel planning and personalised travel training unsuccessful summer 2012, but plan to do a Business Travel Plan Network. AQ grant Dec 13 successful for PTP and marketing joint project EH, TP and PH. Contractor appointed and project commenced autumn 2013. Walking reward scheme at preschool near AQMA Bike ability training at 2 schools close to AQMA. AQ grant application in 2014/15 unsuccessful. **Entered a DEFRA BID 2019 for of an anti-idling campaigned and were unsuccessful**.
17	Low Emission Zone	Promoting Low Emission Transport	Low Emission Zone (LEZ	Not to be implemented	WBC	WBC	Reduction in polluting vehicles	15 ug/m^3(based on 2008 data)	Initial scope report for LEZ. Report by TP taken to TPTG agreed not to proceed as not suitable for Newbury	N/A	Not suitable for Newbury.

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

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

The latest $PM_{2.5}$ data available (2017) from DEFRA show that West Berkshire has a maximum level of 11.38 (co-ordinates x 459500 y163500), and the average level of 9.22. (https://uk-air.defra.gov.uk/data/laqm-background-maps?year=2017). Table 2.4 shows that 0.81% of $PM_{2.5}$ is produced by road & transport, the other 99.19% is from other factors.

The fraction of mortality attributable to particulate air pollution indicator value for West Berkshire and other Local Authorities within Berkshire, can be seen in Table 2.3. Further information about other areas in the UK can be can be found using the link below.https://fingertips.phe.org.uk/profile/public-health-outcomesframework/data#page/0/gid/1000043/pat/6/par/E12000005/ati/101/-are/E07000194

Table 2.3: Showing the Fraction of Mortality attributable to particulate air pollution indicator value within Berkshire.

Bracknell Forest	Reading	Slough	West Berkshire	Windsor & Maidenhead	Wokingham
5.7	6.3	6.5	5.3	5.8	5.9

West Berkshire is taking the following measures to address $PM_{2.5}$:

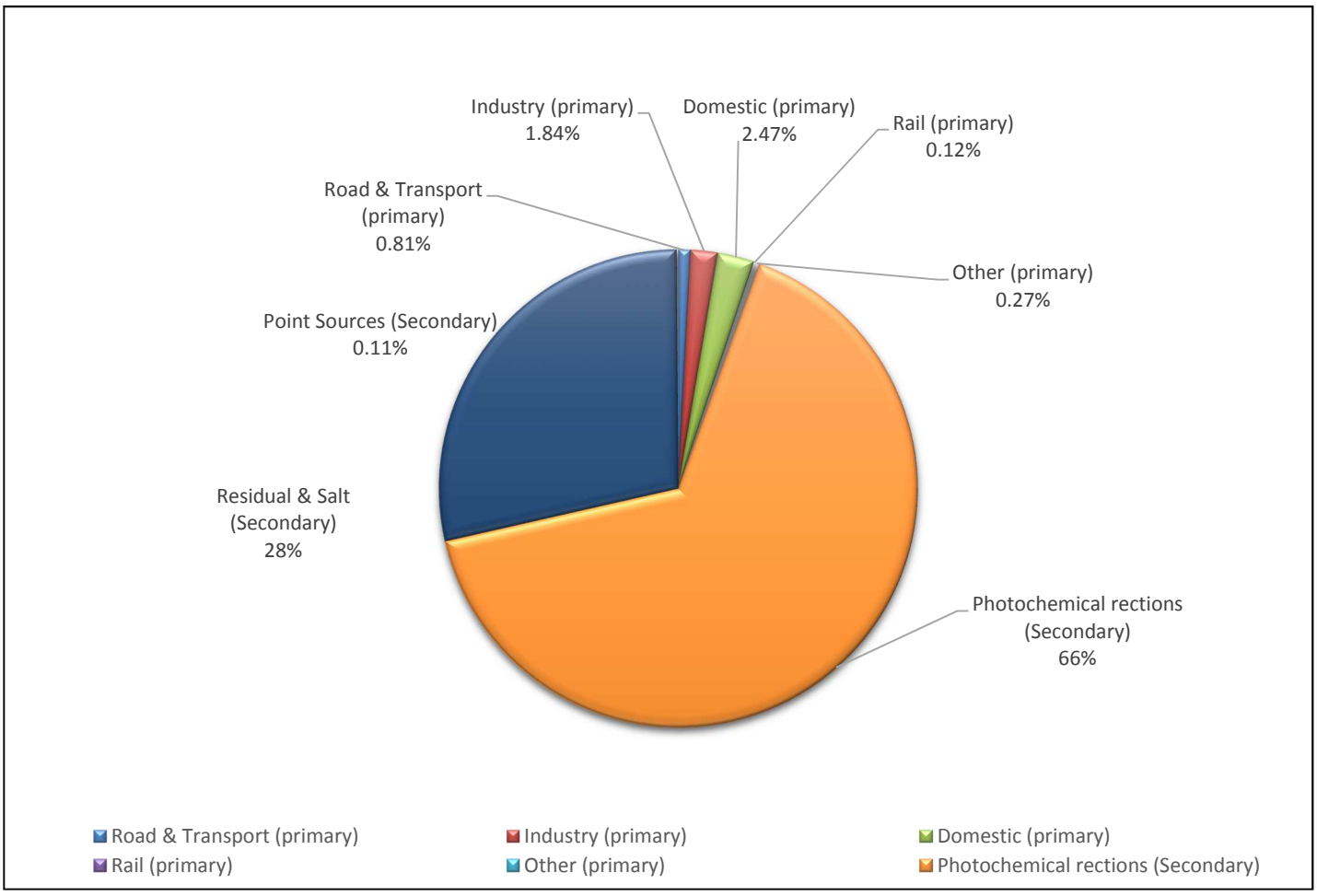
- The link of the Health and Wellbeing Strategy, Public Health Service Plan and the Public Health Action Plan include many actions to increase walking and cycling in order to encourage and increase active travel, to reduce obesity and inactivity. https://info.westberks.gov.uk/wfh

- Joint working between Public Health and Environmental Health teams for air quality will consider in detail how West Berkshire will be considering the impact on $PM_{2.5}$ throughout the district and its reduction. This will be linked to the Public Health Outcomes Framework. It is likely that a marketing plan will be set up to raise awareness of how air quality (which includes $PM_{2.5}$) can be improved by active travel and the uptake of electric vehicles.
- Work on implementing the actions in the Local Transport Plan and the Local Development Framework Core Strategy. For example, a new housing development might contribute to alterations to nearby junctions to increase capacity whilst also improving cycle and pedestrian links, provision of electric vehicle charging infrastructure, contributing to bus services so that the site is served by public transport and linking many other measures together in a site travel plan to encourage people to choose sustainable travel.
- A fresh policy is being used to assess residential developments in West Berkshire. The policy has been in use since 2016 when it was at an advanced stage of development and has since been formally adopted (9th May 2017) so will continue to be used into the future.
- The new policy 'Policy P1: Residential Parking for New Development' has the following advantages for addressing stainable travel, therefore less traffic. https://info.westberks.gov.uk/CHttpHandler.ashx?id=45231&p=0. It brings down the threshold for when residential travel plans will be required from 50 dwellings for more urban areas and 80 dwellings for areas with more rural characteristics. This means there is more emphasis on encouraging walking, cycling, public transport and car sharing / car clubs for more developments than previously across the District.
- There is a requirement for new residential developments to install electric charging points, or at least the basic infrastructure, to enable them to be fitted at a later date. Before, this was simply encouraged by officers on larger developments but now it is part of the policy against which applications are assessed. In 2019 31 Electric vehicle (EV) charging points were installed in West Berkshire, the EV chargers are all plotted on the council's web page https://info.westberks.gov.uk/onstreetev
- The Council's 'Cycling and Motorcycling Advice and Standards for New Development' is also now embedded within the policy so that appropriate cycle

parking provision is included in the plans for new residential developments. This will support the encouragement of greater cycling across the district. https://osmaps.ordnancesurvey.co.uk/51.40608,-1.41302,10,

- Pedestrian and cyclist directional signage – this project commenced in 2018/19 to improve walking and cycling facilities and promotion
- Cycle parking – improvements to existing facilities and introduction of new ones began and continues in schools into 2020.
- Air Quality Action Day 2020 in October to help raise awareness.

Table 2.4. A pie chart showing both the Primary and Secondary sources of $PM_{2.5}$



(https://uk-air.defra.gov.uk/data/laqm-background-maps?year=2017)

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 what monitoring has taken place and how it compares with the objectives.

West Berkshire undertook automatic (continuous) monitoring at one site during 2019. **Error! Reference source not found.** in Appendix A shows the details of the sites. NB. DEFRA has currently stated that West Berkshire does not have to report annually on the following pollutants: 1,3 butadiene, benzene, carbon monoxide or lead. National monitoring results are available at https://uk-air.defra.gov.uk/data/

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

West Berkshire undertook non-automatic (passive) monitoring of NO_2 at 36 sites during 2019, Table A.2 in Appendix A shows the details of the sites.

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

3.2 Individual Pollutants

The air quality monitoring results presented in this section are, where relevant, adjusted for bias[4], “annualisation” (where the data capture falls below 75%), and distance correction[5]. Further details on adjustments are provided in Appendix C.

3.2.1 Nitrogen Dioxide (NO_2)

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

[4] https://laqm.defra.gov.uk/bias-adjustment-factors/bias-adjustment.html
[5] Fall-off with distance correction criteria is provided in paragraph 7.77, LAQM.TG(16)

that the concentration data presented in Table A.3 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 2019 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.

Figure A.2 – Trends in Annual Mean NO2 Concentrations within the Newbury AQMA

Figure A.3 – Trends in Annual Mean NO2 Concentrations within the Thatcham AQMA

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

Newbury

The data capture at a rate of 70.3 % was lower than last year due to an electrical issue with the unit and the data for some of July, the whole of August and part of September was unavailable.

For 2019 there was no exceedance of the annual 1 Hourly Objective (200µg/m^3 not to be exceeded more than 18 times per year), as there were only two occurrences when the NO_2 was recorded being above 200µg/m^3.

The ratified continuous monitored NO_2 annual mean did not exceed the objective with a reduction to 35.9µg/m^3 in 2019, compared to 36.4µg/m^{3}in 2018 and 40.3µg/m^3 in 2017. The concentrations were more in line with the expected concentrations and are the lowest levels since 2015. The monthly average concentrations have been compared to the co-location diffusion tube results and are generally consistent. The hourly results have been compared to the nearby monitoring stations in Wokingham, Oxford St Ebbs, Reading New Town and Horley, the data generally compares well, demonstrating similar trends but at slightly higher concentrations. Figure A.4 shows the hourly trend of NO_2 results from the Continuous Monitor.

A review of two hourly exceedance (Monday 25th February 2019 at 19:00hrs & Tuesday 26th February 2019 at 19:00hrs) shows that this data does not relate to a specific event

in Newbury, such as a racing meet. However, on both days the temperature was approximately 0.9°C at 06.00hrs and 13°C at 19:00hrs with a very little wind so the NO_2 was not dispersed during that hour and consequently built up.

Diffusion Tube Data

Newbury AQMA

There are five diffusion tubes within the Newbury AQMA and three within close proximity (see Map D.4). There were no exceedances of diffusion tubes within the AQMA however, this year two locations showed an increase on the 2018 levels (St Johns Road & 31 Shaw Road), the rest showed a decrease of NO_2 from 2018. The highest levels of NO_2 in this AQMA were recorded at the continuous monitor (see Map D.3) and the Annual Mean Objective was met, measuring 35.9 µg/m^3 NO_2. For the last five years the results have shown an overall decrease in level (see Figure A.2), monitoring continues at those five sites.

If there continues to be no exceedance in the AQMA in the 2021 ASR (omitting 2020 due to Covid-19 lockdown and the new road lay out) West Berkshire will be recommending to DEFRA that the Newbury AQMA is revoked as we have continual evidence that the NO_2 is below the National Mean Annual Objective of 40.0µg/m^3.

Thatcham AQMA

There are four diffusion tube sites (see Map D.7) within the Thatcham AQMA and two within close proximity. For the last five years the results have shown a decrease of the NO_2 Annual Mean Objective within the AQMA.

If there continues to be no exceedances in the AQMA in the 2021 ASR (omitting 2020 due to Covid-19 lockdown) West Berkshire will consider recommending to DEFRA the Thatcham AQMA is revoked as we have continual evidence that the NO_2 is below the Annual Mean Objective of 40.0µg/m^3.

The expansion to triplicate co-location studies at 17 and 40 Chapel Street which commenced in January 2018, has continued into 2020. The highest levels in this AQMA were recorded at 31 Chapel Street 31.7µg/m^3 and the levels did not exceed the Annual Mean Objective. The site has showed a consistent decrease from 43.1µg/m^3

in 2016 to 39.5µg/m^3 in 2017 and then to 36.0µg/m^3 in 2018 (Figure A.3). Monitoring will continue during 2020 at the four sites.

Outside the AQMAs

Overall, eighteen of the sites showed a decrease in levels compared to 2018, nine increased and one was only established in 2019 so has no comparable figures. However, the increased levels remain below the Annual Mean Objective (40µg/m^3).

There were no results greater than 60µg/m^3, which indicates no exceedance of the 1-hour Mean Objective.

In Newbury, five of the nine sites outside the AQMA showed an increase in NO_2 during 2019: A339 Newbury Central, 'Abbeydale' Monks Lane, 64 Greenham Road, A339 New Greenham Park and 6 Market Street.

Increases were also measured at 'The Old Bakery' Tidmarsh, St James Church Pangbourne, The Calcot Hotel, A4 Bath Road, Calcot and 75 Chapel Street, Thatcham.

No monitoring locations were ceased at the end of 2019. The new site at Newbury Gardens Day Nursery sits within the in north-west part of the Newbury AQMA and aims to represent relevant exposure. This provided a result of 19.6µg/m^3.

3.2.2 Particulate Matter (PM_{10})

No particulate matter (PM_{10}) monitoring is undertaken.

3.2.3 Particulate Matter ($PM_{2.5}$)

No particulate matter ($PM_{2.5}$) monitoring is undertaken.

3.2.4 Sulphur Dioxide (SO_2)

No sulphur dioxide monitoring is undertaken as not required by DEFRA.

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?	Monitoring Technique	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Inlet Height (m)
CM1 Newbury	Newbury A339, A343 and Greenham Road junction	Roadside	477407	166560	NO_2	YES	Chemiluminescent	1	4.7	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

Site ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA?	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Tube collocated with a Continuous Analyser?	Height (m)
A339 Newbury Central	A339 Newbury Central	Kerbside	447463	167318	NO_2	NO	10	1.9	NO	2.3
7a Bridge Street Hungerford	7a Bridge Street Hungerford	Roadside	433909	168815	NO_2	NO	0	1.5	NO	2.7
132 London Road Newbury	132 London Road Newbury	Roadside	447720	167678	NO_2	NO	0	3	NO	2.6
Flat 1, Southview Gardens Newbury	Flat 1, Southview Gardens Newbury	Urban Background	447752	167667	NO_2	NO	0	5	NO	1.5
374 London Road Newbury	374 London Road Newbury	Urban Background	449034	167520	NO_2	NO	0	12.5	NO	2.05
17 Chapel Street Thatcham (1, 2, 3)	17 Chapel Street Thatcham	Roadside	451870	167438	NO_2	YES	0	1.5	NO	2.4
40 Chapel Street Thatcham (1, 2, 3)	40 Chapel Thatcham	Kerbside	451926	167460	NO_2	YES	0	3.5	NO	2.2
75 Chapel Street Thatcham	75 Chapel Street Thatcham	Roadside	452288	167445	NO_2	NO	0	3.4	NO	2.2
82/78A Chapel	82/78A Chapel	Roadside	452071	167468	NO_2	YES	0	1.8	NO	2

Street Thatcham	Street Thatcham									
Old Bakery Tidmarsh	Old Bakery Tidmarsh	Roadside	463504	174864	NO_2	NO	0	2.2	NO	1.9
4 Willows Court Pangbourne	4 Willows Court Pangbourne	Roadside	463224	176523	NO_2	NO	0	3	NO	2.3
The Cross Key Inn Pangbourne	The Cross Key Inn Pangbourne	Roadside	463468	176433	NO_2	NO	0	4	NO	2.6
Calcot Hotel, A4 Bath Road, Calcot	Calcot Hotel, a4 Bath Road, Calcot	Kerbside	466302	171865	NO_2	NO	16	2	NO	2.3
Elizabeth Court Theale	Elizabeth Court Theale	Urban Background	464574	171294	NO_2	NO	0	32	NO	2
44 Hambridge Road Newbury	44 Hambridge Road Newbury	Urban Background	448129	166909	NO_2	NO	0	4.3	NO	2.45
42 Kings Road Newbury	42 Kings Road Newbury	Roadside	447433	166994	NO_2	NO	0	11.3	NO	1.85
1 Winchester Court Newbury	1 Winchester Court Newbury	Roadside	447409	166559	NO_2	YES	0	4.95	NO	3
Continuous monitor 1, A343, A339 and Greenham Road Newbury	Continuous monitor 1, A343, A339 and Greenham Road Newbury	Roadside	447379	166557	NO_2	YES	1	4.7	YES	1.8
Continuous monitor 2, A343, A339 and Greenham	Continuous monitor 2, A343, A339 and Greenham	Roadside	447379	166557	NO_2	YES	1	4.7	YES	1.8

Road Newbury	Road Newbury									
Continuous monitor 3, A343, A339 and Greenham Road Newbury	Continuous monitor 3, A343, A339 and Greenham Road Newbury	Roadside	447379	166557	NO_2	YES	1	4.7	YES	1.8
64 Greenham Road Newbury	64 Greenham Road Newbury	Roadside	447448	166454	NO_2	NO	12	2	NO	2.2
20 Deadmans Lane Greenham	20 Deadmans Lane Greenham	Suburban	447508	164725	NO_2	NO	0	10.5	NO	2.1
A339 New Greenham Park Greenham	A339 New Greenham Park Greenham	Kerbside	449805	163882	NO_2	NO	204	4	NO	2.1
3 Howard Road Newbury	3 Howard Road Newbury	Roadside	447402	166449	NO_2	NO	0	11	NO	2.6
1 St John's Road Newbury	1 St John's Road Newbury	Roadside	447036	166436	NO_2	NO	0	4.8	NO	2.25
63 St John's Road Newbury	63 St John's Road Newbury	Urban Background	447377	166533	NO_2	YES	0	6.2	NO	2.2
40 Bartholomew Street Newbury	40 Bartholomew Street Newbury	Roadside	446939	166848	NO_2	NO	0	2.7	NO	2.2
6 Market Street Newbury	6 Market Street Newbury	Urban Centre	447211	167020	NO_2	NO	9.5	1.3	NO	2.1

105 London Road Newbury	105 London Road Newbury	Urban Background	447528	167708	NO_2	NO	0	24	NO	2.6
43 Hawthorn Road Newbury	43 Hawthorn Road Newbury	Urban Background	447487	167870	NO_2	NO	0	13	NO	2.15
Willows Edge Nursing Home Newbury	Willows Edge Nursing Home Newbury	Urban Background	447540	167970	NO_2	NO	0	20	NO	2
31 Shaw Road Newbury	31 Shaw Road Newbury	Kerbside	447688	167820	NO_2	NO	0	0.6	NO	1.7
Abbeydale Monks Lane Newbury	Abbeydale Monks Lane Newbury	Kerbside	446922	163030	NO_2	NO	21	2	NO	2.5
A343 Andover Road Wash Common	A343 Andover Road Wash Common	Kerbside	445899	164705	NO_2	NO	18.1	0.75	NO	2.25
130 Park Avenue Thatcham	130 Park Avenue Thatcham	Roadside	451965	167498	NO_2	NO	7	2	NO	2.1
31 Chapel Street Thatcham	31 Chapel Street Thatcham	Roadside	451906	167441	NO_2	YES	0	1.6	NO	2.05
St James Church Pangbourne Hill	St James Church Pangbourne Hill	Roadside	463418	176405	NO_2	NO	6.5	1	NO	2
13 Shaw Road Newbury	13 Shaw Road Newbury	Urban Background	447630	167770	NO_2	NO	0	7	NO	2.4

Newbury Gardens Day Nursery	Newbury Gardens Day Nursery Greenham Road RG14 7HS	Building facade	447343	166612	NO_2	YES	0	11	NO	

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 NO_2 Monitoring Results

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2019 (%) (2)	NO_2 Annual Mean Concentration (µg/m^3) (3) (4)				
							2015	2016	2017	2018	2019
CM1	477407	166560	Roadside	Automatic	100	70.3	34.8	**41.7**	**40.3**	36.0	35.9
A339 Newbury Central	447463	167318	Kerbside	Diffusion Tube	100	91.7	37.8	30.9	28.1	29.4	29.9
7a Bridge Street Hungerford	433909	168815	Roadside	Diffusion Tube	100	100	22.6	29.4	28.8	26.0	23.1
132 London Road Newbury	447720	167678	Roadside	Diffusion Tube	100	100	33.7	**41.8**	35.4	32.0	28.1
Flat 1, Southview Gardens Newbury	447752	167667	Urban Background	Diffusion Tube	100	91.7	27.2	31.5	28.6	25.0	22.7
374 London Road Newbury	449034	167520	Urban Background	Diffusion Tube	100	91.7	19.2	25.7	23.4	23.0	22.1
17 Chapel Street Thatcham (1,2, 3)	451870	167438	Roadside	Diffusion Tube	100	100	36.3	**43.1**	**40.0**	36.4	31.6
40 Chapel Street Thatcham (1,2,3)	451926	167460	Kerbside	Diffusion Tube	100	91.7	30.7	39.9	34.8	31.8	28.6
75 Chapel Street Thatcham	452288	167445	Roadside	Diffusion Tube	100	91.7	26.7	31.7	29.6	27.0	27.8

82/78A Chapel Street Thatcham	452071	167468	Roadside	Diffusion Tube	100	75.0	25.6	33.8	31.1	28.0	22.2
Old Bakery Tidmarsh	463504	174864	Roadside	Diffusion Tube	100	100	28.7	35.9	31.8	29.0	29.5
4 Willows Court Pangbourne	463224	176523	Roadside	Diffusion Tube	100	100	25.4	32.2	29.3	28.0	24.8
The Cross Key Inn Pangbourne	463468	176433	Roadside	Diffusion Tube	100	100	32.6	**40.2**	34.2	34.0	29.6
Calcot Hotel, A4 Bath Road Calcot	466302	171865	Kerbside	Diffusion Tube	100	100	25.3	23.1	23.1	19.3	28.4
Elizabeth Court Theale	464574	171294	Urban Background	Diffusion Tube	100	100	19	24.3	21.6	22.0	20.3
44 Hambridge Road Newbury	448129	166909	Urban Background	Diffusion Tube	100	100	22.7	27	27.3	26.0	24.1
42 Kings Road Newbury	447433	166994	Roadside	Diffusion Tube	100	100	22.1	26.1	23.4	23.0	20.3
1 Winchester Court Newbury	447409	166559	Roadside	Diffusion Tube	100	100	34.2	**43**	38.0	36.0	32.7
Continuous monitor 1, A343, A339 and Greenham Road Newbury	447379	166557	Roadside	Diffusion Tube	100	100	35.2	**40**	38.3	36.3	33.9
Continuous monitor 2, A343, A339 and	447379	166557	Roadside	Diffusion Tube	100	100	35	**40.6**	38.3	36.3	33.9

Greenham Road Newbury											
Continuous monitor 3, A343, A339 and Greenham Road Newbury	447379	166557	Roadside	Diffusion Tube	100	100	34.7	39.8	38.3	36.3	33.9
64 Greenham Road Newbury	447448	166454	Roadside	Diffusion Tube	100	100	29.1	27.3	23.4	26.2	29.9
20 Deadmans Lane Greenham	447508	164725	Suburban	Diffusion Tube	100	100	22.2	27.8	24.0	23	20.2
A339 New Greenham Park Greenham	449805	163882	Roadside	Diffusion Tube	100	83.3	29.4	39.3	33.8	18.5	31.2
3 Howard Road Newbury	447402	166449	Roadside	Diffusion Tube	100	100	17.2	22.9	17.7	22.0	18.6
1 St John's Road Newbury	447036	166436	Roadside	Diffusion Tube	100	83.3	25.2	32.6	28.4	31.0	26.8
63 St John's Road Newbury	447377	166533	Urban Background	Diffusion Tube	100	100	20.1	26.5	21.8	25.0	22.4
40 Bartholomew Street Newbury	446939	166848	Roadside	Diffusion Tube	100	83.3	29.3	36	31.7	29.0	27.4
6 Market Street Newbury	447211	167020	Urban Centre	Diffusion Tube	100	83.3	28.1	25.7	22.4	24.9	26.0

43 Hawthorn Road Newbury	447528	167708	Urban Background	Diffusion Tube	100	91.7	18.7	23.5	20.5	21.0	18.5
Willows Edge Nursing Home Newbury	447487	167870	Urban Background	Diffusion Tube	100	100	20.7	22.9	23.8	23.0	20.6
31 Shaw Road Newbury	447540	167970	Kerbside	Diffusion Tube	100	100	37.2	30.5	28.7	28.0	25.6
13 Shaw Road Newbury	447688	167820	Urban Background	Diffusion Tube	100	91.7	33	37.8	33.2	30.0	26.5
Abbeydale Monks Lane Newbury	446922	163030	Kerbside	Diffusion Tube	100	91.7	16.5	15.2	13.2	15.4	19.9
A343 Andover Road Wash Common	445899	164705	Kerbside	Diffusion Tube	100	91.7	15.6	15	11.4	14.2	15.5
130 Park Avenue Thatcham	451965	167498	Roadside	Diffusion Tube	100	75.0	17.3	19.2	21.7	18.3	19.4
31 Chapel Street Thatcham	451906	167441	Roadside	Diffusion Tube	100	91.7	37.2	**43.1**	39.5	36	31.7
St James Church Pangbourne Hill	463418	176405	Roadside	Diffusion Tube	100	100	N/A	24.3	21.3	18.7	20.4
Newbury Gardens Day Nursery	447630	167770	Building facade	Diffusion Tube	100	100	N/A	N/A	N/A	N/A	19.6

☒ **Diffusion tube data has been bias corrected**

☒ **Annualisation has been conducted where data capture is <75%**

☒ **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 adjustment**

Notes:

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

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

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

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

(3) Means for diffusion tubes have been corrected for bias. All means have been "annualised" as per Boxes 7.9 and 7.10 in LAQM.TG16 if valid data capture for the full calendar year is less than 75%. See Appendix C for details.

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

Figure A.1 – Trends in Annual Mean NO_2 Concentrations

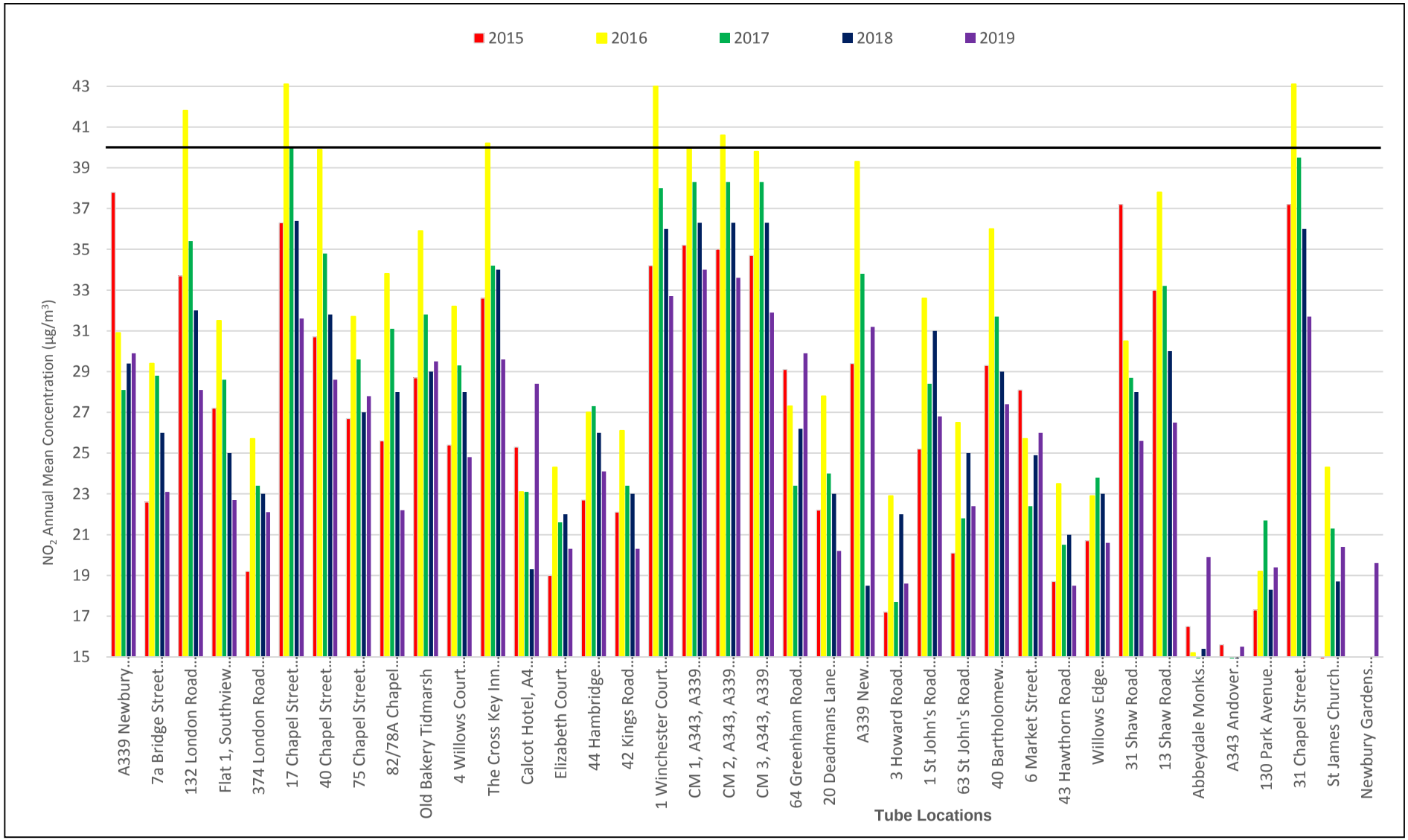


Figure A.2 – Trends in Annual Mean NO_2 Concentrations within the Newbury AQMA

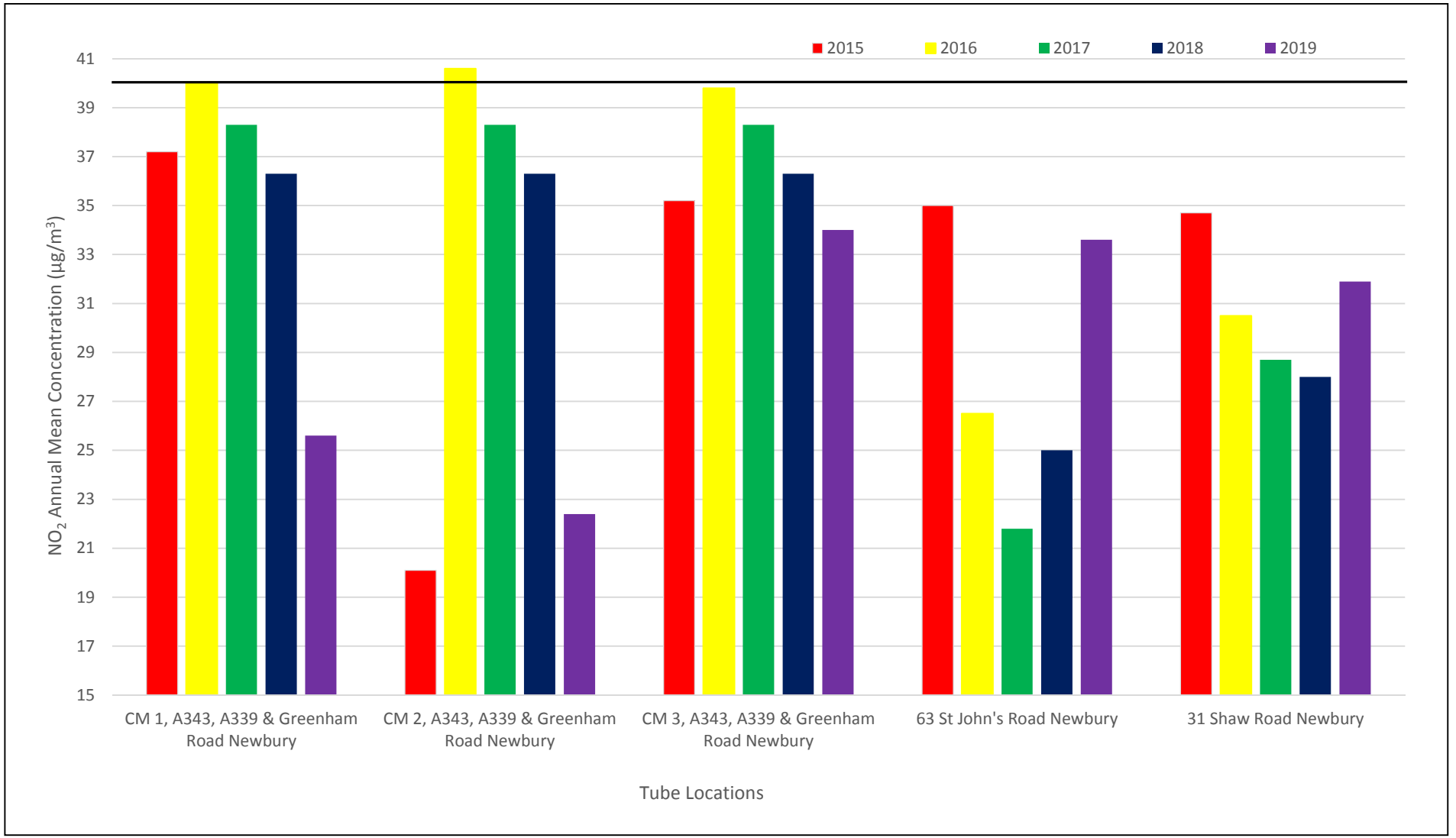


Figure A.3 – Trends in Annual Mean NO_2 Concentrations within the Thatcham AQMA

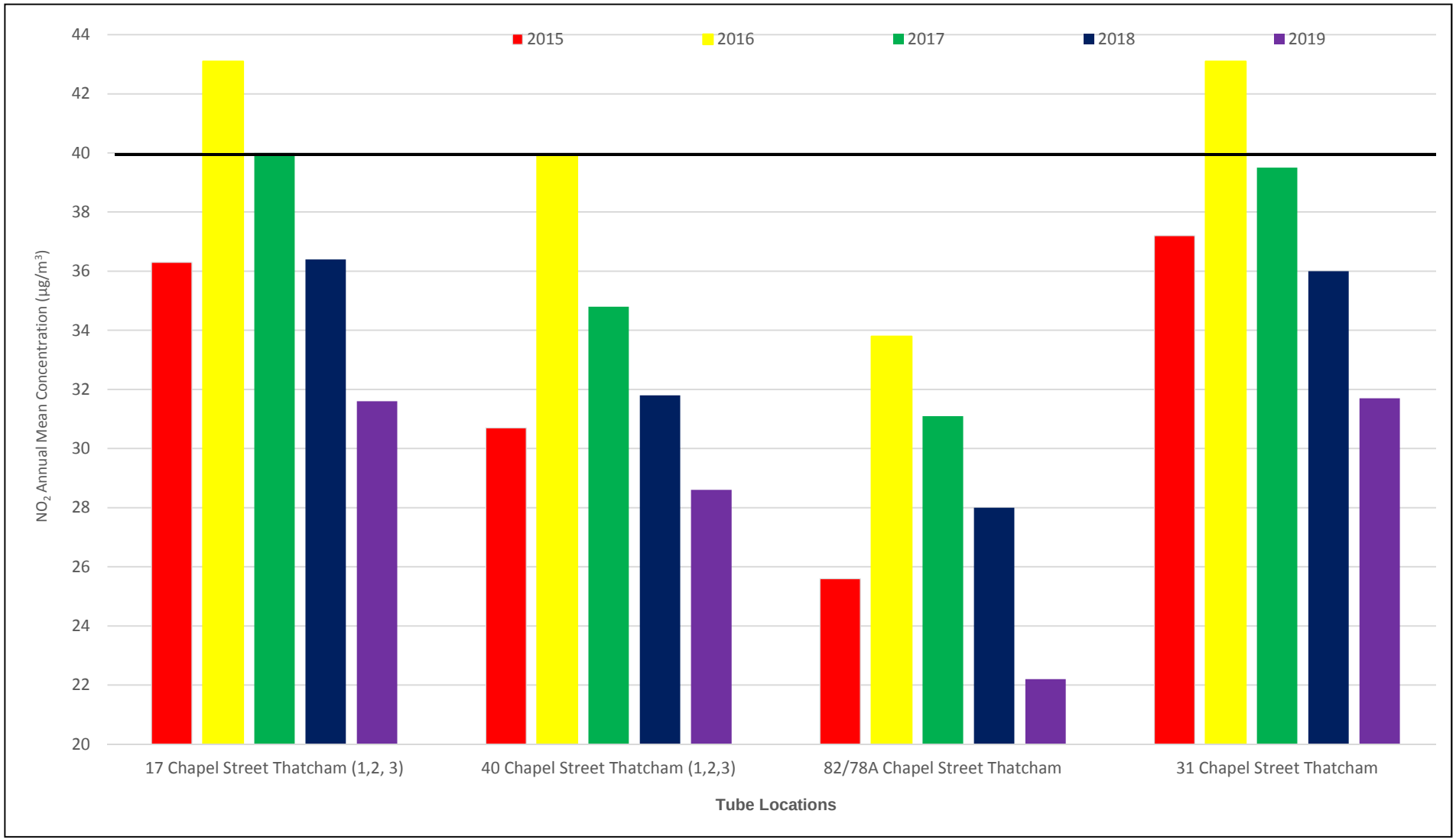


Table A.4 – 1-Hour Mean NO_2 Monitoring Results

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2019 (%) (2)	NO_2 1-Hour Means > 200µg/m^3 (3)				
							2015	2016	2017	2018	2019
CM1 Newbury	477407	166560	Roadside	Automatic	100	70.3	3	21	8	1	2 (145.63)

Notes:

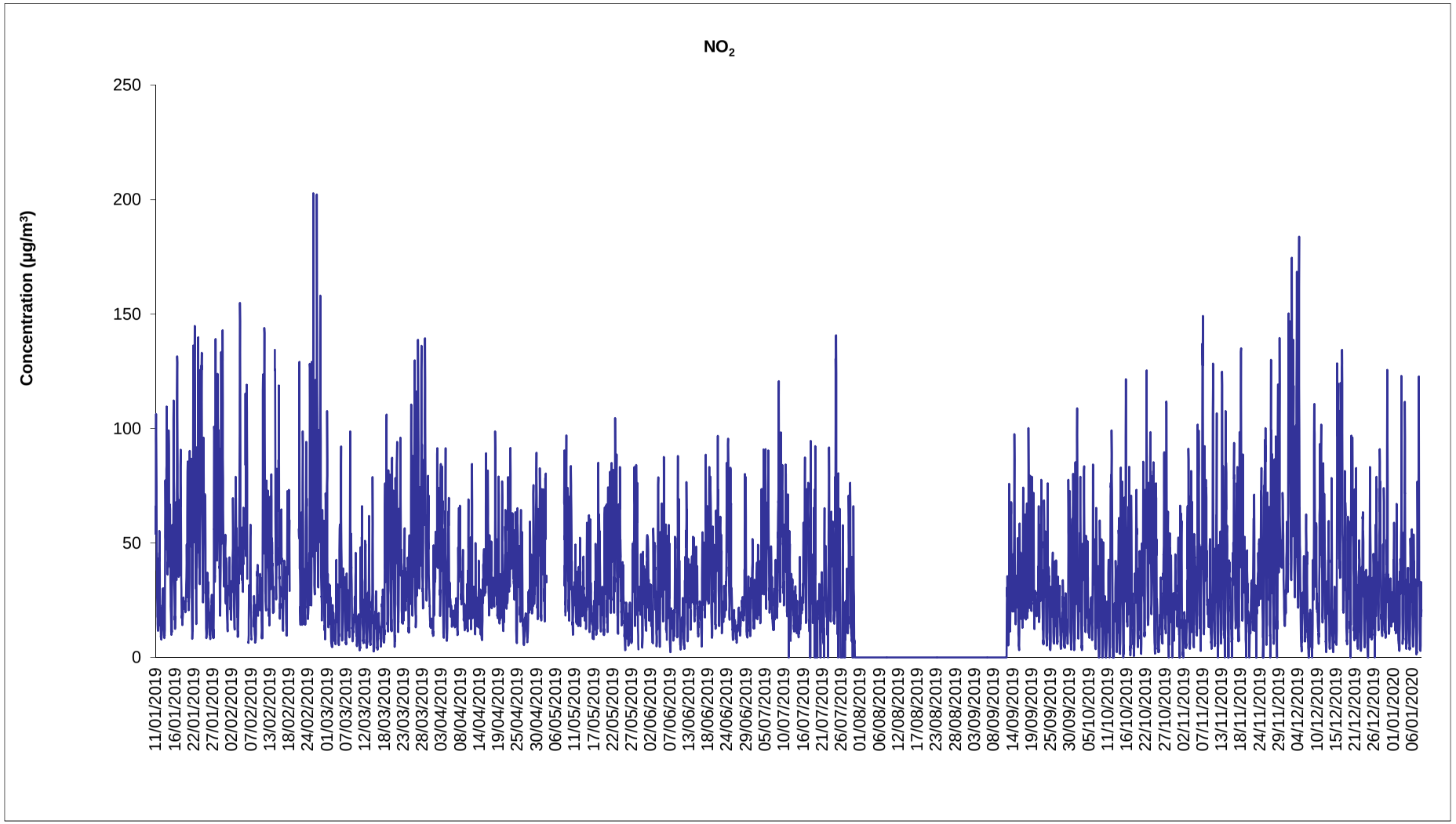
Exceedances of the NO_2 1-hour mean objective (200µg/m^3 not to be exceeded more than 18 times/year) are shown in **bold.**

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

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

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

Figure A.4 – The 2020 NO_2 1-Hour Means > 200µg/m^3 in the Newbury AQMA



Appendix B: Full Monthly Diffusion Tube Results for 2019

Table B.1 - NO_2 Monthly Diffusion Tube Results - 2019

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	NO_2 Mean Concentrations (µg/m^3)														
			Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean		
															Raw Data	Bias Adjusted (0.87) and Annualised (1)	Distance Corrected to Nearest Exposure (2)
A339 Newbury Central	477407	166560	35.9	32.3	37.9	33.9	31.6	38.4	33.7	31.8	34.1	n/a	42.5	26.2	34.4	29.9	
7a Bridge Street Hungerford	447463	167318	32.9	26.6	24.5	28.5	24.4	23.9	25.8	21.9	26.1	25.9	32.5	25.7	26.6	23.1	
132 London Road Newbury	433909	168815	38.4	36.6	32.2	37.5	28.0	29.0	28.6	28.8	28.9	32.7	40.1	28.2	32.4	28.1	
Flat 1, Southview Gardens Newbury	447720	167678	31.6	33.4	n/a	24.3	23.1	20.7	16.9	27.0	25.3	26.4	35.6	24.3	26.2	22.7	
374 London Road Newbury	447752	167667	n/a	53.4	20.7	24.6	20.5	18.9	20.0	23.8	23.6	24.3	28.0	22.4	25.5	22.1	
17 Chapel Street Thatcham 1	449034	167520	44.8	47.1	31.1	42.0	30.8	33.4	26.6	30.2	33.4	41.0	50.7	29.9	36.7	31.9	

17 Chapel Street Thatcham 2	451870	167438	44.1	45.2	36.8	41.7	30.7	26.7	28.0	30.8	34.4	35.9	49.1	27.7	35.9	31.2	
17 Chapel Street Thatcham 3	451926	167460	45.5	44.6	27.4	44.3	33.6	33.4	29.4	30.8	35.2	37.1	45.3	33.7	36.7	31.9	
40 Chapel Street Thatcham 1	452288	167445	36.5	38.2	33.7	39.3	28.2	30.6	26.6	23.6	30.3	34.6	39.5	28.2	32.4	28.3	
40 Chapel Street Thatcham 2	452071	167468	31.7	37.4	34.6	39.9	30.2	*n/a*	28.4	24.5	30.9	33.3	43.0	27.8	32.9	28.6	
40 Chapel Street Thatcham 3	463504	174864	34.9	40.8	32.4	39.4	29.3	*n/a*	28.0	25.6	29.1	32.6	43.9	30.0	33.3	29.0	
75 Chapel Street Thatcham	463224	176523	32.0	35.2	n/a	27.8	22.4	23.7	22.7	26.8	25.3	28.8	33.4	22.8	32.0	27.8	
82/78A Chapel Street Thatcham	463468	176433	26.8	n/a	n/a	n/a	23.8	25.1	21.9	22.9	0.2	48.3	36.5	25.3	25.6	22.2	
Old Bakery Tidmarsh	466302	171865	37.4	36.8	33.8	30.2	27.7	61.9	27.2	28.3	31.2	30.0	38.3	23.6	33.9	29.5	
4 Willows Court Pangbourne	464574	171294	33.3	30.6	26.2	32.8	24.2	25.8	24.4	23.2	27.7	28.1	39.5	25.7	28.5	24.8	
The Cross Key Inn Pangbourne	448129	166909	41.3	40.6	36.9	45.9	31.6	28.1	15.4	27.2	34.4	33.1	46.3	27.4	34.0	29.6	
Calcot Hotel, A4 Bath Road Calcot	447433	166994	35.8	49.6	29.7	38.8	20.8	28.9	26.1	27.1	31.8	32.8	42.9	27.8	32.7	28.4	
Elizabeth Court Theale	447409	166559	28.3	29.6	21.2	24.7	19.5	20.0	16.7	19.4	23.8	23.1	30.4	23.1	23.3	20.3	

44 Hambridge Road Newbury	447379	166557	30.2	28.2	30.4	31.9	25.3	26.6	22.3	19.5	28.3	27.9	37.7	24.2	27.7	24.1	
42 Kings Road Newbury	447379	166557	28.8	29.5	25.3	22.7	18.9	19.2	20.5	21.3	16.8	22.5	30.9	23.1	23.3	20.3	
1 Winchester Court Newbury	447379	166557	40.3	46.9	33.1	37.1	33.7	31.8	34.6	34.4	37.8	38.5	48.8	33.6	37.6	32.7	
Continuous monitor 1, A343, A339 and Greenham Road Newbury	447448	166454	47.3	48.0	39.8	37.1	31.5	30.6	38.2	36.8	37.7	37.2	50.1	35.1	39.0	33.9	
Continuous monitor 2, A343, A339 and Greenham Road Newbury	447508	164725	46.1	47.2	36.7	37.7	35.5	32.9	33.7	36.1	42.8	46.5	32.9	35.6	39.0	33.9	
Continuous monitor 3, A343, A339 and Greenham Road Newbury	449805	163882	42.2	43.3	35.5	37.5	37.0	32.0	26.0	36.2	30.8	40.4	46.4	32.6	39.0	33.9	
64 Greenham Road Newbury	447402	166449	35.9	32.3	37.9	33.9	31.6	38.4	33.7	31.8	34.1	n/a	42.5	26.2	34.4	29.9	
20 Deadmans	447036	166436	30.7	28.5	23.8	20.1	20.6	17.8	20.0	24.6	22.1	23.4	27.0	21.2	23.3	20.2	

Lane Greenham																
A339 New Greenham Park Greenham	447377	166533	43.3	35.7	39.0	46.3	32.7	35.1	n/a	n/a	31.8	26.3	43.9	n/a	35.9	31.2
3 Howard Road Newbury	446939	166848	28.6	24.9	20.7	30.1	19.0	17.8	14.9	12.2	19.7	20.2	31.1	18.3	21.4	18.6
1 St John's Road Newbury	447211	167020	n/a	34.4	27.6	35.6	27.8	30.2	24.9	21.1	n/a	30.2	51.7	24.7	30.8	26.8
63 St John's Road Newbury	447528	167708	26.7	25.4	23.0	29.6	19.7	20.8	18.9	15.3	21.9	24.5	50.3	32.3	25.7	22.4
40 Bartholomew Street Newbury	447487	167870	32.5	37.8	32.3	34.9	n/a	25.3	n/a	27.0	31.2	30.7	35.8	27.1	31.5	27.4
6 Market Street Newbury	447540	167970	34.6	37.8	28.9	36.9	24.5	22.8	n/a	n/a	24.8	30.4	33.1	25.2	29.9	26.0
43 Hawthorn Road Newbury	447688	167820	23.7	22.3	16.3	31.8	19.4	20.9	15.3	13.0	21.1	21.4	31.5	19.3	21.3	18.5
Willows Edge Nursing Home Newbury	446922	163030	29.1	32.8	23.8	21.8	19.3	16.3	19.0	22.2	23.4	22.5	29.2	26.9	23.8	20.6
31 Shaw Road Newbury	445899	164705	29.1	32.8	23.8	21.8	19.3	16.3	19.0	22.2	23.4	22.5	29.2	26.9	29.5	25.6
13 Shaw Road Newbury	451965	167498	37.7	37.5	30.8	31.7	25.9	27.4	n/a	26.6	25.9	26.2	36.6	29.0	30.5	26.5

Abbeydale Monks Lane Newbury	451906	167441	28.6	26.6	22.8	25.8	24.2	21.5	16.5	19.3	n/a	17.6	14.0	20.1	22.9	19.9	
A343 Andover Road Wash Common	463418	176405	22.7	20.1	18.3	19.1	15.6	n/a	12.7	10.6	16.9	17.8	27.2	14.3	17.8	15.5	
130 Park Avenue Thatcham	477407	166560	27.5	26.0	missing	21.9	21.3	17.2	missing	missing	18.6	22.0	27.6	18.6	22.3	19.4	
31 Chapel Street Thatcham	447463	167318	43.9	51.5	33.5	39.9	31.3	35.1	30.0	28.0	33.3	33.2	44.2	33.3	36.4	31.7	
St James Church Pangbourne Hill	433909	168815	30.8	28.7	24.0	24.7	20.6	20.4	9.7	17.8	24.6	23.6	33.2	23.2	23.4	20.4	
Newbury Gardens Day Nursery	447630	167770	24.3	24.7	17.8	31.7	18.5	22.9	16.9	14.2	20.3	22.9	35.5	20.8	22.5	19.6	

☒ **Local bias adjustment factor used**

☐ **National bias adjustment factor used**

☐ **Annualisation has been conducted where data capture is <75%**

☒ **Where applicable, data has been distance corrected for relevant exposure in the final column**

Notes:

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

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

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

(2) Distance corrected to nearest relevant public exposure.

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

QA/QC of Continuous Monitoring Stations

TRL carry out the QA/QC on behalf of West Berkshire Council, below are details of TRL's process of QA/QC.

Site operation

Routine instrument calibrations are conducted approximately once per fortnight, which involve zero and span checks, a written record of the gas analyser diagnostics and a general visual inspection of all equipment is undertaken. There is a written operating procedure and a calibration record sheet is completed at every site visit.

Data retrieval and daily data checking

Data from the monitoring station is retrieved and processed on a Campbell CR10x data logger as 15-minute mean data. The logger was interrogated via a Siemens TC35i GSM modem at 8-hourly intervals by the ENVIEW 2000 software hosted at TRL. This was used to retrieve, check and archive data. TRL's internal QA/QC procedures require all data to be backed up on a secure server and all documentation associated with each site to be uniquely identified and securely stored to provide an audit trail. Daily data inspections are undertaken during office hours using the facilities of the Data Management System. Initial observations of the Management System indicate whether the site has been contacted during its nominated 'poll time' overnight. If this has not been successful a manual poll of the site may be required. If this is not successful further investigation of the communications integrity will be required to establish contact with the site modem and data logger. Three day plots of recorded data are viewed for the requested site, and these are inspected and assessed for continuity, validity, minimum and maximum values, date and time, power failures and general integrity. All anomalies are recorded on the Daily Check sheet, as required. Any anomalies or queries arising from daily inspection of data, or system operation, are brought to the attention of the Project Manager who will evaluate the situation, and initialise any necessary action. In the event that the PM is not available, contact will be made with the next available senior person within the monitoring team. Any issues identified with equipment operation will be referred to the client for attention within 24

hours (excluding weekends). On a weekly basis, data are examined using summary statistics and outlier analysis to establish data validity. If unusual data episodes are recorded, these would be routinely examined over longer data periods to establish their impact on trends but would also be cross referenced with data peaks and troughs recorded at other national monitoring stations. In addition, integrity and validity of data logger clock times are checked, and any significant errors recorded in the Data Management System logbook. All site data recorded through the Data Management System is archived on TRL's Network. The data is backed up daily, and the TRL IT Department maintains these data within their long-term and secure archives. This secures all data in the event of any system failure.

Data calibration and ratification

Data is ratified as per AURN recommended procedures. The calibration and ratification process for automatic gas analysers corrects the raw dataset for any drift in the zero baseline and the upper range of the instrument. This is done using a Evista-based calibration and ratification file which incorporates the zero and span check information from the calibration visits. The zero reading recorded during the calibration visits is used to adjust any offset of the baseline of the data. The difference between the span value obtained between one calibration visit and the next visit is used to calculate a factor. This change is assumed to occur at the same rate over the period between calibrations and as such the factor is used as a linear data scaler. This effectively results in the start of the period having no factor applied and the end of the period being scaled with the full factor with a sliding scale of the factor in-between. After applying the calibration factors, it is essential to screen the data, by visual examination, to see if they contain any unusual measurements or outliers. Errors in the data may occur as a result of equipment failure, human error, power failures, interference or other disturbances. Data validation and ratification is an important step in the monitoring process. Ratification involves considerable knowledge of pollutant behaviour and dispersion, instrumentation characteristics, field experience and judgement. On completion of this data correction procedure, these data were converted to hourly means and a summary of these data were provided to West Berkshire Council at quarterly intervals and a calendar year annual report is prepared.

Independent Site Audits

In addition to these checks an independent site audit is carried out every 12 months to ensure the nitrogen dioxide analyser is operating correctly. The audits that are carried out utilise procedures that are applied within DEFRA's National Automatic Air Monitoring Networks Quality Control Programme. The efficiency of the analyser's convertor is checked and the analyser is also leak tested. The gas bottle used for calibrations on site is also checked against the auditor's gas bottle to ensure the stability of the gas concentration.

Due to technical issues on site in 2019, the last audit for the Newbury automatic monitoring unit was carried out on 19th October 2018. A major factor governing the analyser's performance is the NOx analyser's converter and its ability to reduce the nitrogen dioxide to nitric oxide. Our tests show the converters in these analysers to be 95.6% efficient with NO_2 concentrations of 245 ppb. The recommended range for instrumentation in the national automatic air monitoring network is in the range of 98% - 102% efficient. The second test to be 94.2% efficient at an NO_2 concentration of 129 ppb. This is outside the recommended range and a poor result.

In order for data to be BS EN14211 compliant this result should be considered within the data management process for this pollutant. If a NOx converter is between 95-98% efficient we recommend the dataset be rescaled. NOx converter results below 95% efficient should be investigated and the data rejected as being unrepresentative of ambient concentrations where appropriate. It is the responsibility of the data ratification team to critically assess all evidence including calibrations, audits and equipment support unit reports to quantify the impact of this result. This instrument was recommended as requiring immediate attention from your equipment support unit. To ensure that the analysers are sampling only ambient air the instruments were leak checked. The results were satisfactory, indicating that the analyser sampling systems were free of significant leaks. The analysers exhibited good steady state responses to both zero and span (calibration) gases with acceptable levels of variation (noise).

The NOx analyser flow rate was measured using a calibrated flow meter and compared against the analyser's flow rate sensor to evaluate its accuracy. The measured flow rate result was slightly outside the (±10%) recommended limit and it was advised the underlying reason be investigated at the next service.

Based on the NOx analyser's response to the audit standard and audit zero, the concentrations of the stations NO cylinder have been reassessed. This provides an indication of the site standards stability. For the purpose of these stability checks, the criteria adopted within the national network, and used here, is that the recalculated concentration should lie within 10% of the stated concentrations. The recalculated results for the TRL West Berkshire, Newbury NO cylinder were stable, within the definition adopted above, and can therefore reliably be used to scale ambient data.

The following recommendations and comments can be made as a result of these audits:

Compare the TRL database scaling factors for the day of the audit with the factors and zeros on the Certificate of Calibration. If a deviation greater than the uncertainty associated with the calibration factor on the certificate is found, investigate the underlying reason and implement suitable data management actions, and the NOx analyser converter efficiency was measured at the time of audit as 95.6% at a NO_2 conc. of 245 ppb. As this is below the national automatic air monitoring network criteria of 98% efficiency but above 95% you will need to review all the evidence and take appropriate action during the ratification process for this pollutant, considering all the evidence.

QA/QC of Diffusion Tube Monitoring

The Workplace Analysis Scheme for Proficiency (WASP) is an independent analytical performance testing scheme, operated by the Health and Safety Laboratory (HSL). WASP formed a key part of the former UK NO_2 Network's QA/QC and remains an important QA/QC exercise for laboratories supplying diffusion tubes to Local Authorities for use in the context of Local Air Quality Management. The laboratory participants analyse four spiked tubes and report the results to HSL. HSL assign a performance score to each laboratory's result, based on their deviation from the known mass of nitrite in the analyte. The Performance criteria are due to be changed, at present the criteria are based on the z-score method, and equates to the following:

GOOD: Results obtained by the participating laboratory are on average within 13% of the assigned value. This equates to a Rolling Performance Index (RPI) of 169 or less.

ACCEPTABLE: Results obtained by the participating laboratory are on average within 13- 26% of the assigned value. This equates to an RPI of 169 - 676.

WARNING: Results obtained by the participating laboratory are on average within 26 – 39% of the assigned value. This equates to an RPI of 676 - 1521.

FAILURE: Results obtained by the participating laboratory differ by more than 39% of the assigned value. This equates to an RPI of greater than 1521.

However, from April 2009, the criteria has been based upon the Rolling Performance Index (RPI) statistic and will be tightened to the following:

GOOD: Results obtained by the participating laboratory are on average within 7.5% of the assigned value. This equates to an RPI of 56.25 or less.

ACCEPTABLE: Results obtained by the participating laboratory are on average within 15% of the assigned value. This equates to an RPI of 225 or less.

UNACCEPTABLE: Results obtained by the participating laboratory differ by more than 15% of the assigned value. This equates to an RPI of greater than 225.

West Berkshire Council use Gradko International for the supply and analysis of the nitrogen dioxide diffusion tubes for their non-automatic monitoring programme. Gradko's performance for AIR PT AR024 (Jan 2019 – Feb 2019) = 100%, AR025 (Apr 2019- May 2019) = 100%, AR027 (July 2019 – Aug 2019) = 100%, and AR028 (Sept 2019– Oct 2019) = 100%, (which relates to the % of results which are satisfactory).

Diffusion Tube Bias Adjustment Factors

Gradko International Ltd of St Martin's House 77 Wales Street Winchester Hampshire is the supplier and analyst of the nitrogen dioxide diffusion tubes. The tubes are analysed by U.V. spectrophotometry. The limit of detection is 50% TEA /Acetone.

Factor from Local Co-location Studies and Discussion of Choice of Factor to Use

The national study of bias adjustment factors spreadsheet (ref. 03/20 update) suggested a bias adjustment factor of **0.87** be applied. A copy of the co-location spreadsheet used is provided below.

In determining the bias adjustment factor for the 2019 data the following was taken into consideration:

Cases where the locally obtained bias adjustment factor may be more representative:

- Where the diffusion tube exposure periods are weekly or fortnightly – co-location study in Newbury is monthly.
- If the co-location site is unusual in some way: for example, affected by specific large nitrogen oxides (NOx) sources other than road traffic, such as local industrial installations – the co-location study of Newbury location is predominantly influenced by road traffic.
- For tubes exposed in a similar setting to the co-location site – the co-location study of Newbury site is a roadside location, as are over 95% of the diffusion tubes located in West Berkshire. Therefore, the bias adjustment factor determined from either of these locations may not be of deemed appropriate to apply to the West Berkshire non-roadside sites.
- Where the duration of the whole diffusion tube study is less than one year, especially if it is less than nine months – the co-location study at Newbury and diffusion tube surveys are all for a full calendar year (automatic monitoring is for the full year, however due to some data loss, the data capture is less than 90%).
- Where the Review and Assessment Helpdesk spreadsheet (national database) contains data from fewer than five other studies using the same laboratory and preparation. – The national database contains 8 studies therefore both co-location or National factors can be used.
- For co-location sites with “good” precision for the diffusion tubes and with high quality chemiluminescence results – It can be seen from the table below that the co-location study in Newbury achieved “good” precision, where data is available and the automatic monitoring results from Newbury chemiluminescence are high quality (see the QA/QC of Automatic Monitoring section above).

Cases where the combined (national) bias adjustment factor may be more representative:

- Where the survey consists of tubes exposed over a range of settings, which differ from the co-location site – this is not the case for West Berkshire (Newbury).
- Where the co-location study is for less than nine months, although the diffusion tube monitoring is for a longer period - The West Berkshire co-location study and diffusion tube surveys are for a full calendar year (2019).

- Where the automatic analyser has been operated using local, rather than national, QA/QC procedures - The West Berkshire chemiluminescence results (automatic monitoring) are high quality, see the QA/QC of Automatic Monitoring section above.
- Where data capture from the automatic analyser is less than 90%, or there have been problems with data quality – Data capture from Newbury automatic monitor was 70.3% in 2019, hence National bias adjustment factor should be used.
- For co-location sites with "poor" precision or laboratories with predominately "poor" precision, as set out on the Review & Assessment Helpdesk website - It can be seen from the table below that the co-location study in Newbury achieved "good" precision and the laboratory precision was "good". See the QA/QC of Diffusion Tube Monitoring section above.

In conclusion it can be seen from the discussion above that the National bias adjustment factor of 0.87 should be used to adjust the 2019 data.

Table C.1 Precision and Accuracy of the 2019 data

Checking Precision and Accuracy of Triplicate Tubes

AEA Energy & Environment
From the AEA group

Diffusion Tubes Measurements										Automatic Method		Data Quality Check	
Period	Start Date dd/mm/yyyy	End Date dd/mm/yyyy	Tube 1 µgm^{-3}	Tube 2 µgm^{-3}	Tube 3 µgm^{-3}	Triplicate Mean	Standard Deviation	Coefficient of Variation (CV)	95% CI of mean	Period Mean	Data Capture (% DC)	Tubes Precision Check	Automatic Monitor Data
1	11/01/2019	07/02/2019	47.3	46.1	42.2	45	2.7	6	6.6	47.0	96.76	Good	Good
2	07/02/2019	07/03/2019	48.0	47.2	43.3	46	2.5	5	6.2	41.5	85.12	Good	Good
3	07/03/2019	02/04/2019	39.8	36.7	35.5	37	2.2	6	5.5	34.4	100	Good	Good
4	02/04/2019	02/05/2019	37.1	37.7	37.5	37	0.3	1	0.7	32.9	99.6	Good	Good
5	02/05/2019	06/06/2019	31.5	35.5	37.0	35	2.9	8	7.1	32.6	84.2	Good	Good
6	06/06/2019	04/07/2019	30.6	32.9	32.0	32	1.2	4	2.9	29.8	99.3	Good	Good
7	04/07/2019	08/08/2019	38.2	35.6	26.0	33	6.5	19	16.0	35.7	55.5	Good	or Data Capture
8	08/08/2019	05/09/2019	36.8	33.7	36.2	36	1.6	5	4.1	No data	No data	Good	Good
9	05/09/2019	03/10/2019	37.7	36.1	30.8	35	3.6	10	9.0	28.8	76.8	Good	Good
10	03/10/2019	07/11/2019	37.2	42.8	40.4	40	2.8	7	7.0	31.2	96.6	Good	Good
11	07/11/2019	05/12/2019	50.1	46.5	46.4	48	2.1	4	5.2	44.8	98.1	Good	Good
12	05/12/2019	09/01/2020	35.1	32.9	32.6	34	1.4	4	3.4	33.2	98.1	Good	Good
13													
										Overall survey -->		Good precision	Good Overall DC

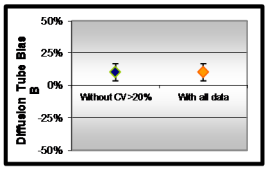
It is necessary to have results for at least two tubes in order to calculate the precision of the measurements

(Check average CV & DC from Accuracy calculations)

Site Name/ ID:	Newbury
Precision	12 out of 12 periods have a CV smaller than 20%

Accuracy (with 95% confidence interval) without periods with CV larger than 20%	
Bias calculated using 11 periods of data	
Bias factor A	0.92 (0.87 - 0.98)
Bias B	8% (2% - 15%)
Diffusion Tubes Mean:	39 µgm^{-3}
Mean CV (Precision):	5
Automatic Mean:	36 µgm^{-3}
Data Capture for periods used:	93%
Adjusted Tubes Mean:	35 (34 - 38) µgm^{-3}

Accuracy (with 95% confidence interval) WITH ALL DATA	
Bias calculated using 11 periods of data	
Bias factor A	0.92 (0.87 - 0.98)
Bias B	8% (2% - 15%)
Diffusion Tubes Mean:	39 µgm^{-3}
Mean CV (Precision):	5
Automatic Mean:	36 µgm^{-3}
Data Capture for periods used:	93%
Adjusted Tubes Mean:	35 (34 - 38) µgm^{-3}



Jaume Targa, for AEA
Version 04 - February 2011

If you have any enquiries about this spreadsheet please contact the LAQM Helpdesk at: LAQMHelpdesk@uk.bureauveritas.com

Annualisation

In order to annualise, two to four background monitoring sites must be identified. These must form part of the AURN network, be within 50 miles of the site, have >85% data capture and should be background urban suburban or rural locations.

The selected sites for the **continuous monitor** were:

- London Hillingdon (LH)
- Oxford St Ebbes (OSE)

Table C.2 – Average Annualisation Factor for the Continuous Monitor

Annualisation Factor Oxford St Ebbes	Annualisation Factor London Hillingdon	Average Annualisation Factor
0.99	1.01	1.0

As required anualisation of data was carried out for 2 separate sites, referring to procedure in TG(16) (updated Feb 2017) Box 7.9.

Table C.3 – Anualisation Method for NO_2 data

Site	Annual Mean (M)	Annualise Mean (µg/m^3) (*1.0)	
Newbury (CM)	35.9	35.9	

It has only been possible to carry out monitoring at Newbury for 70.3% of the year. The NO_2 measured mean concentration M for this period is 35.9 µg/m^3, and the annualised mean is 35.9µg/m^3.

Distance correction

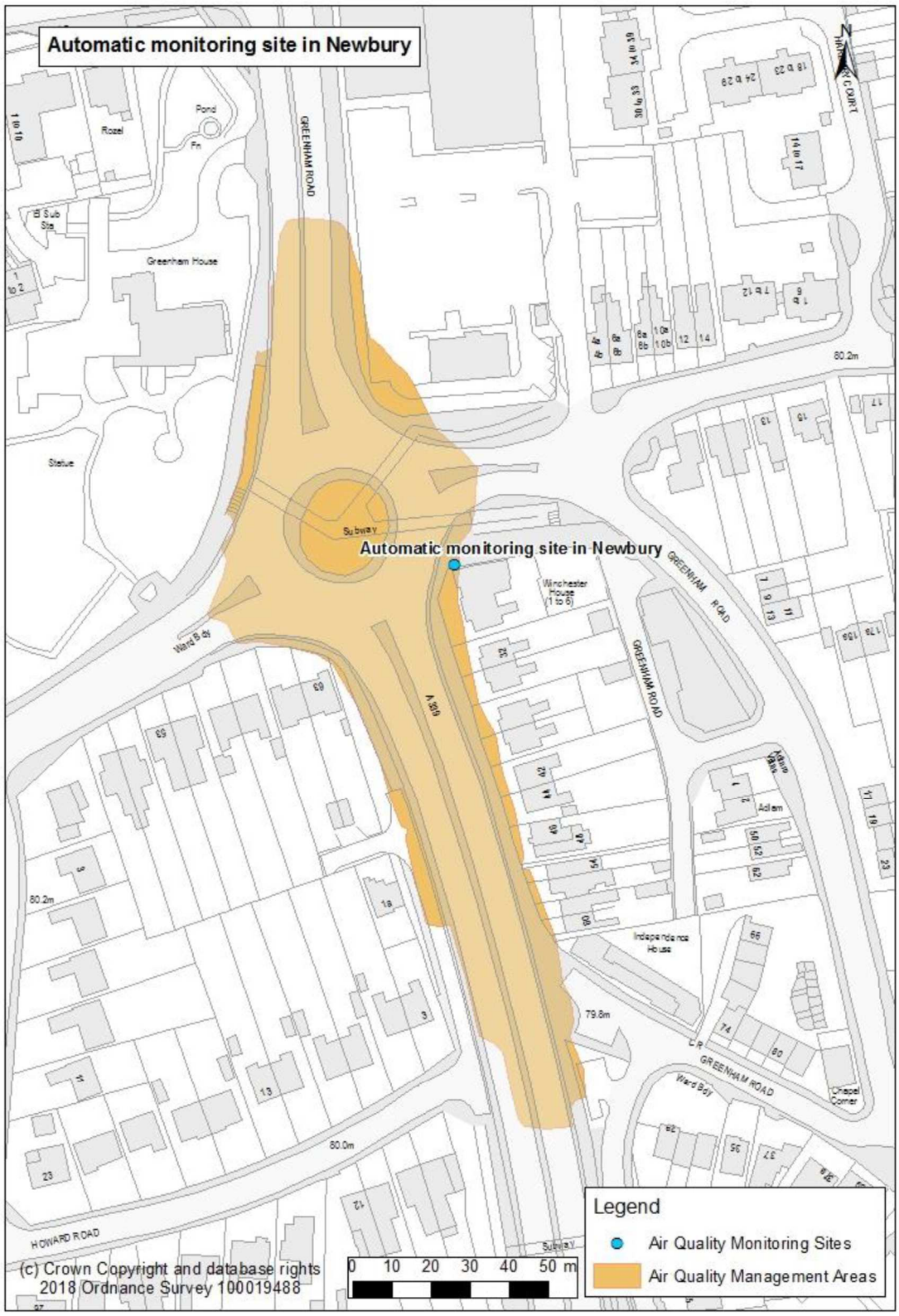
Distance correction is only required if the bias corrected sites is reported above 36 mg/m^3 (TG.16 para 7.78) and there is influence from the one road present in relation to the nearest sensitive receptor (receptor within 20m of monitoring location). As none of the NO_2 levels exceeded 36mg/m^3 no distance correction was required.

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

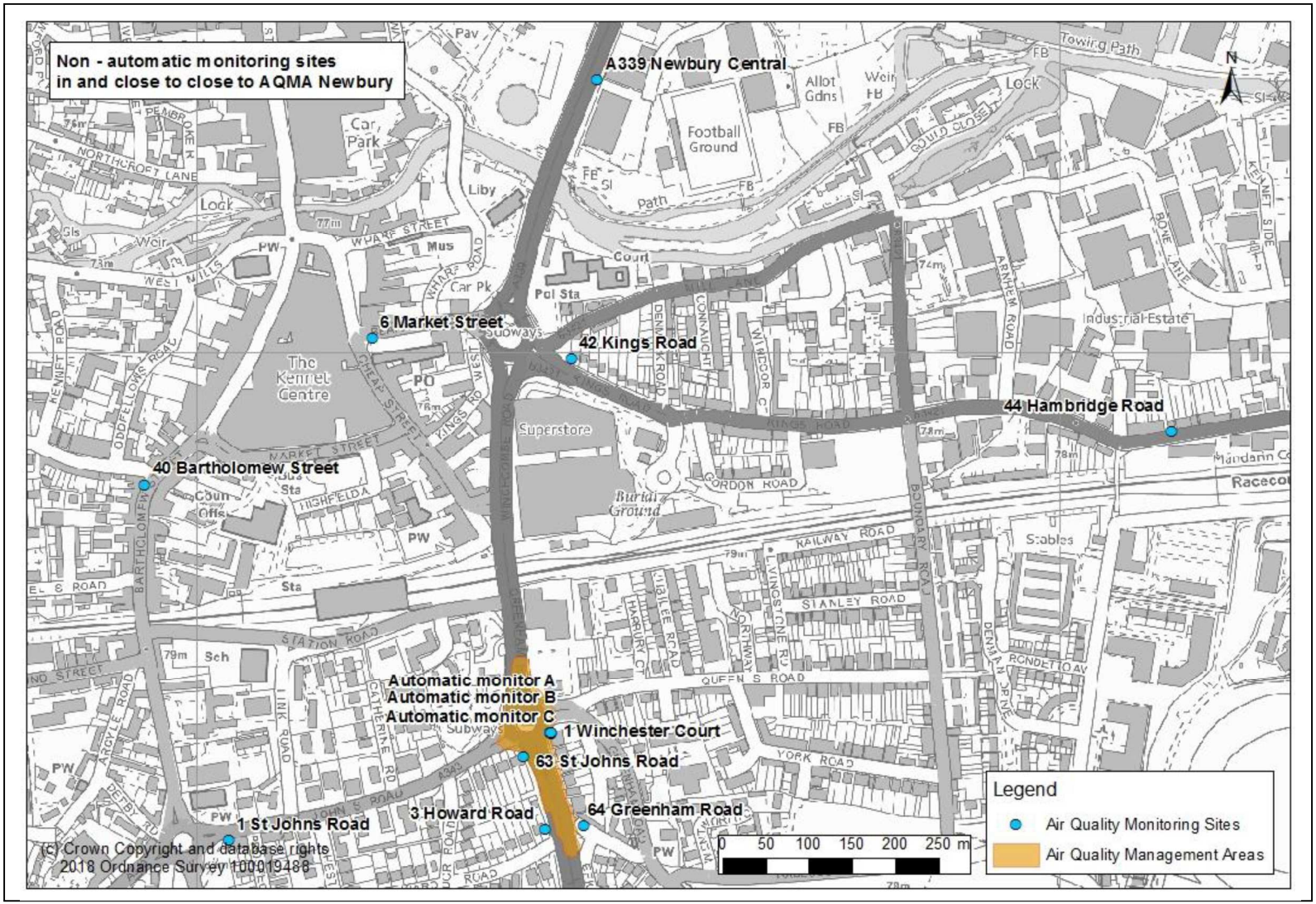
Map D.1: Newbury AQMA

Map D.2: Thatcham AQMA

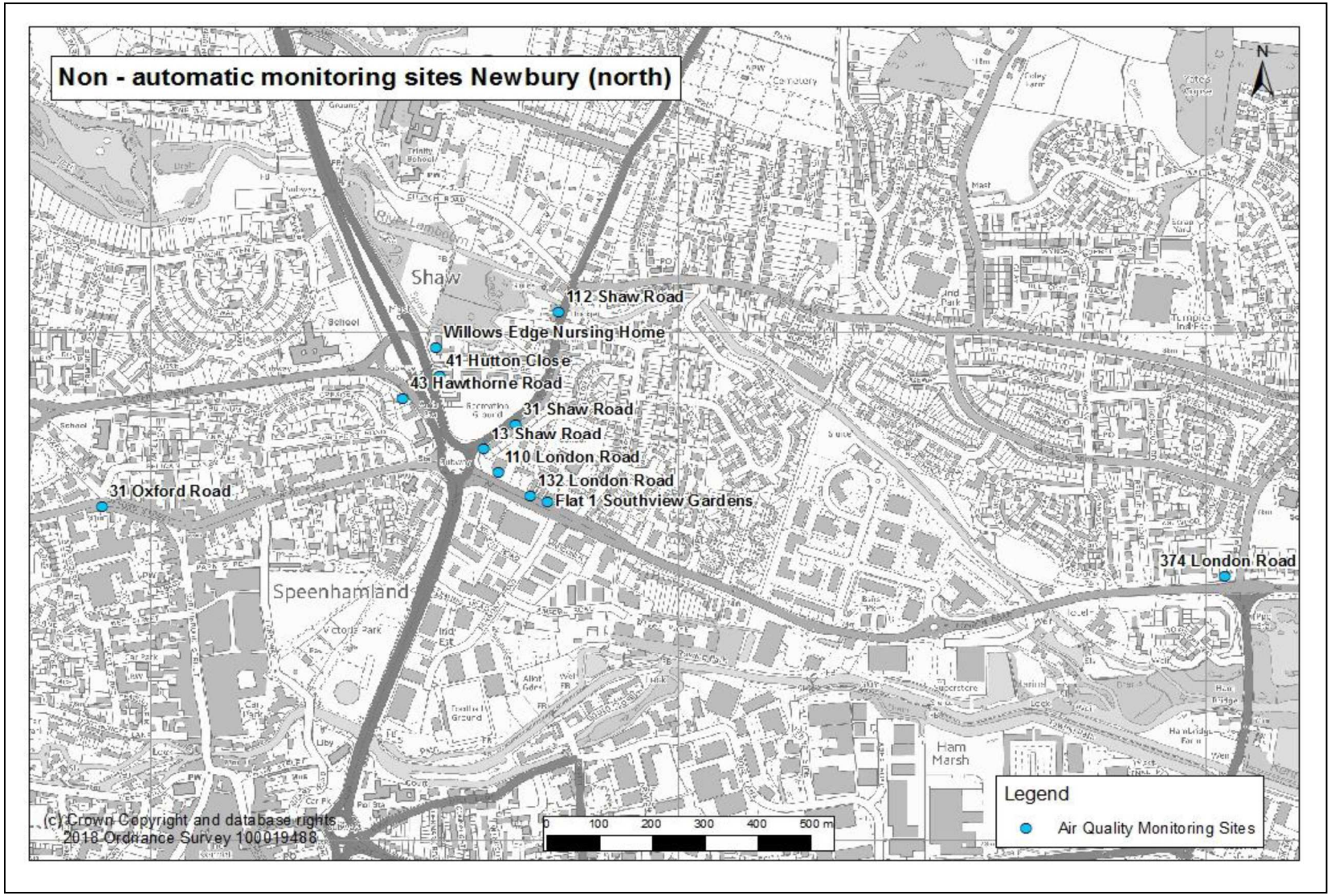
Map D.3: Automatic monitoring site in Newbury



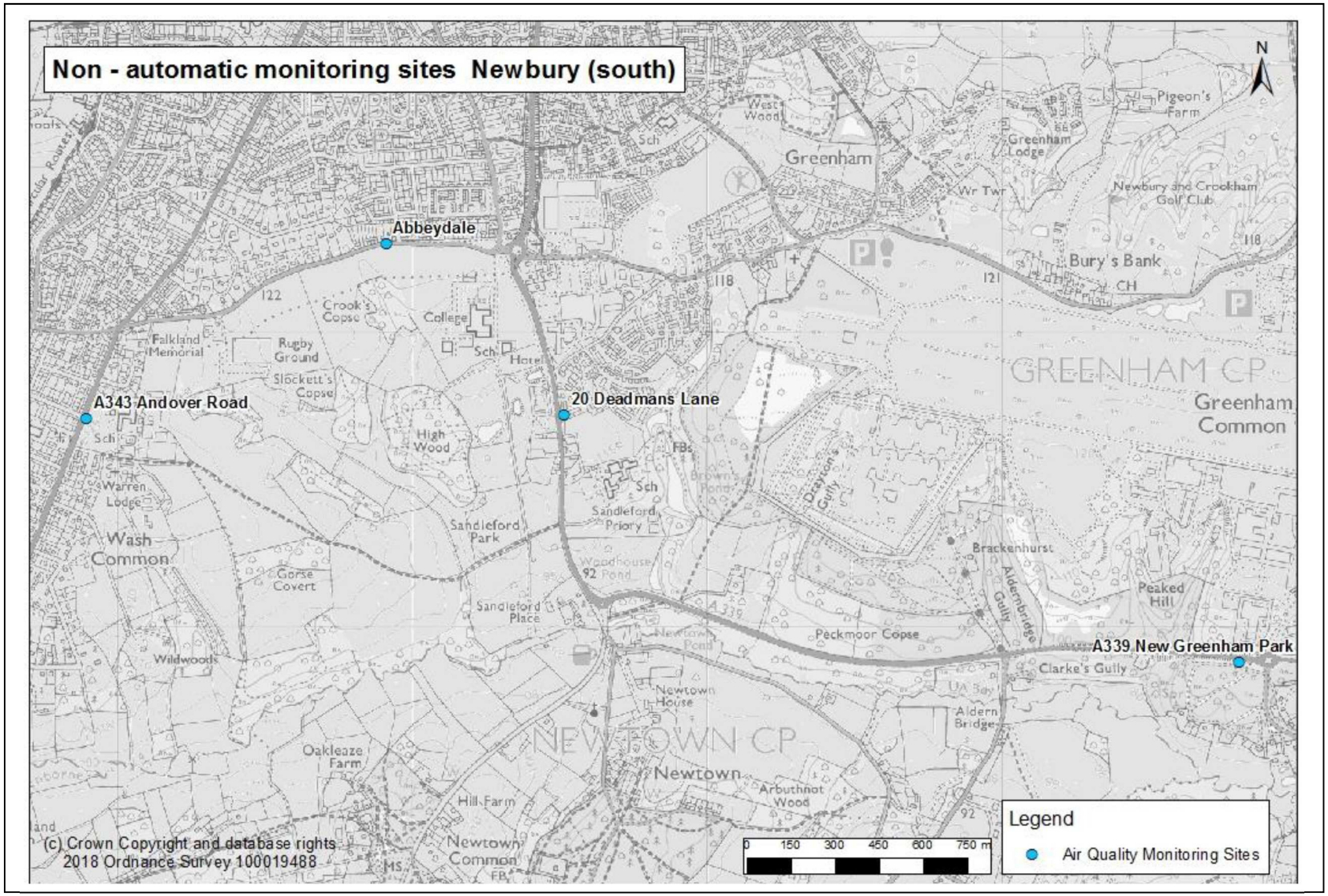
Map D.4: Diffusion Tube monitoring sites in and close to Newbury AQMA



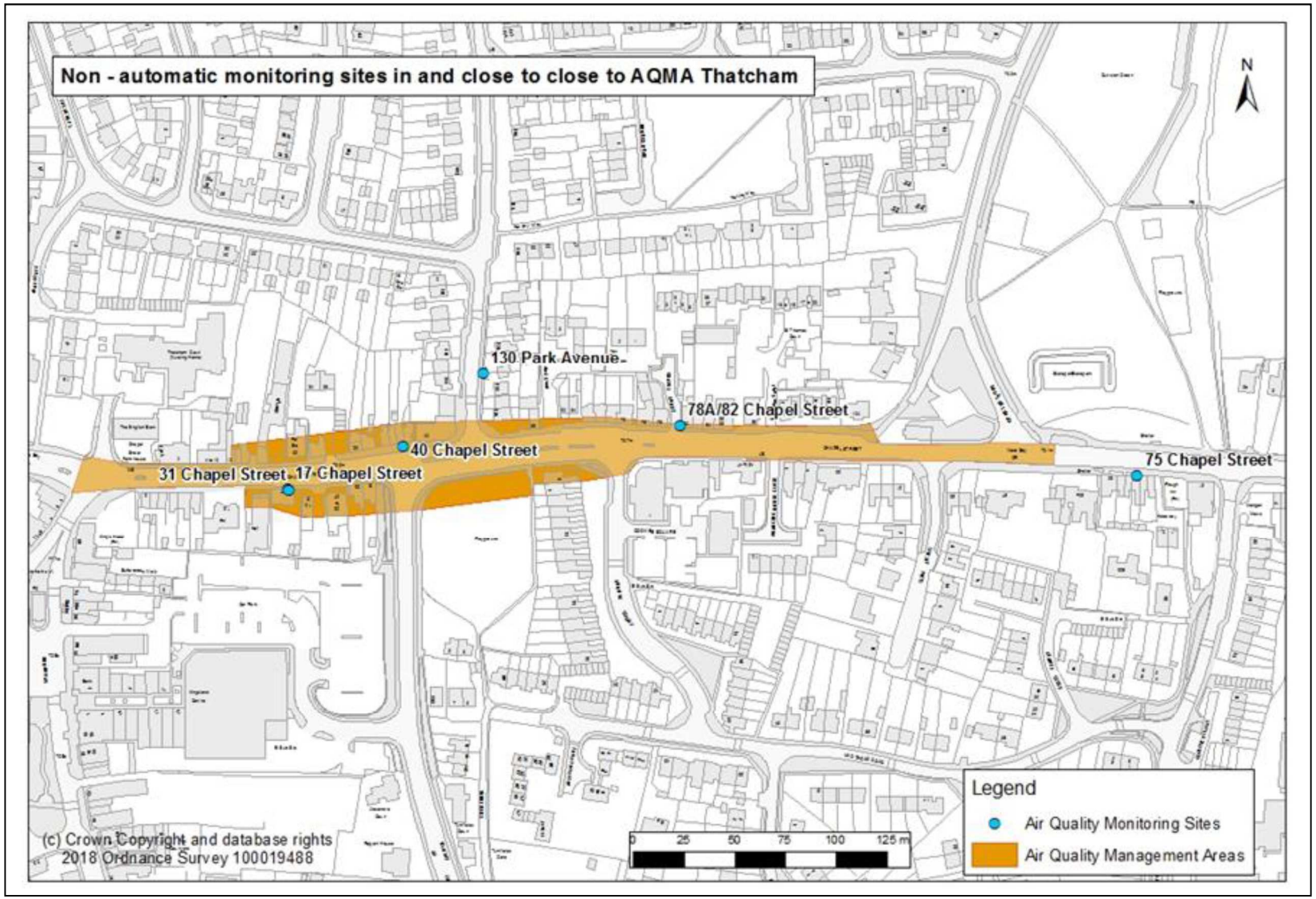
Map D.5: Diffusion Tube monitoring sites in Newbury (North)



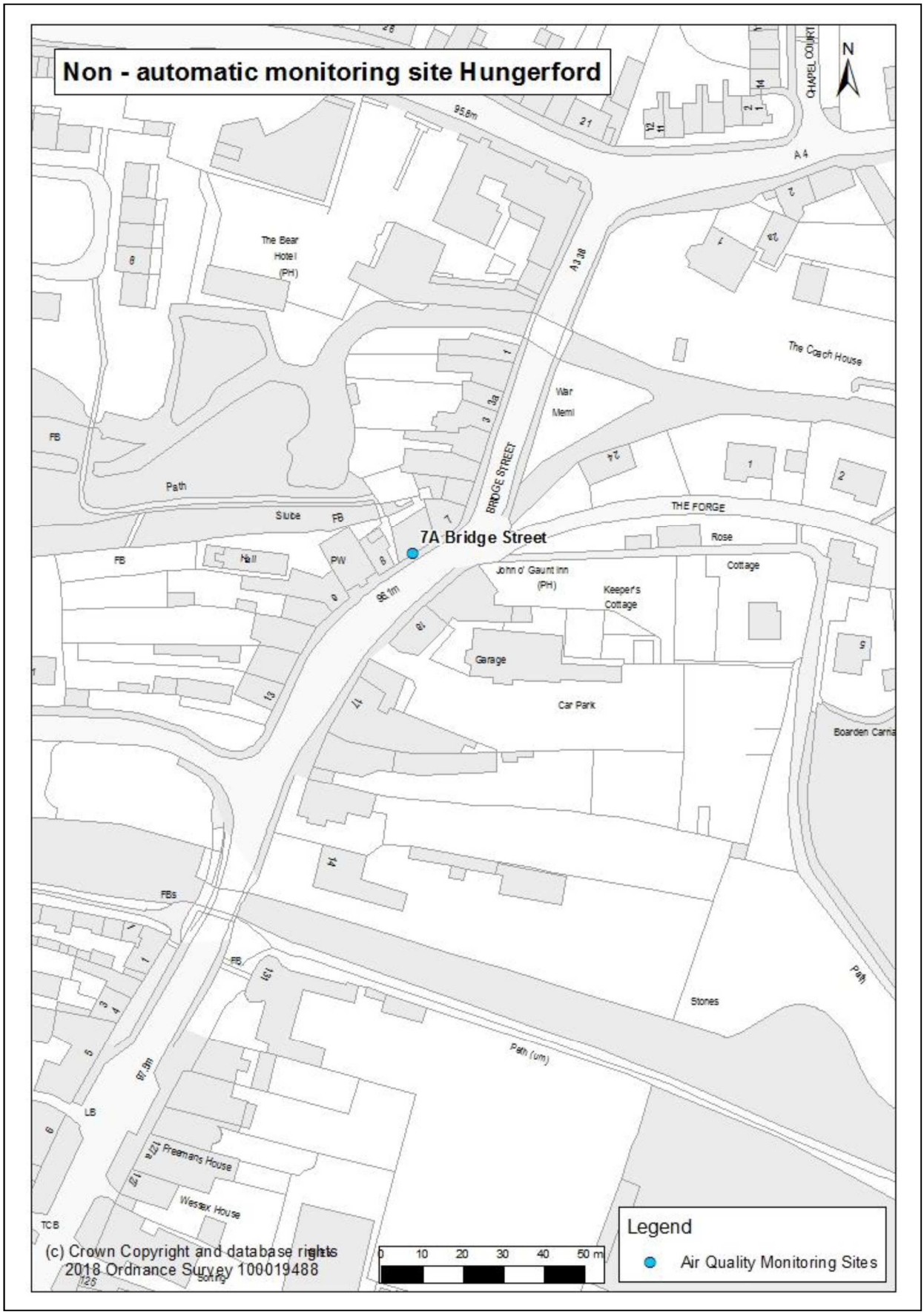
Map D.6: Diffusion Tube monitoring sites in Newbury (South)



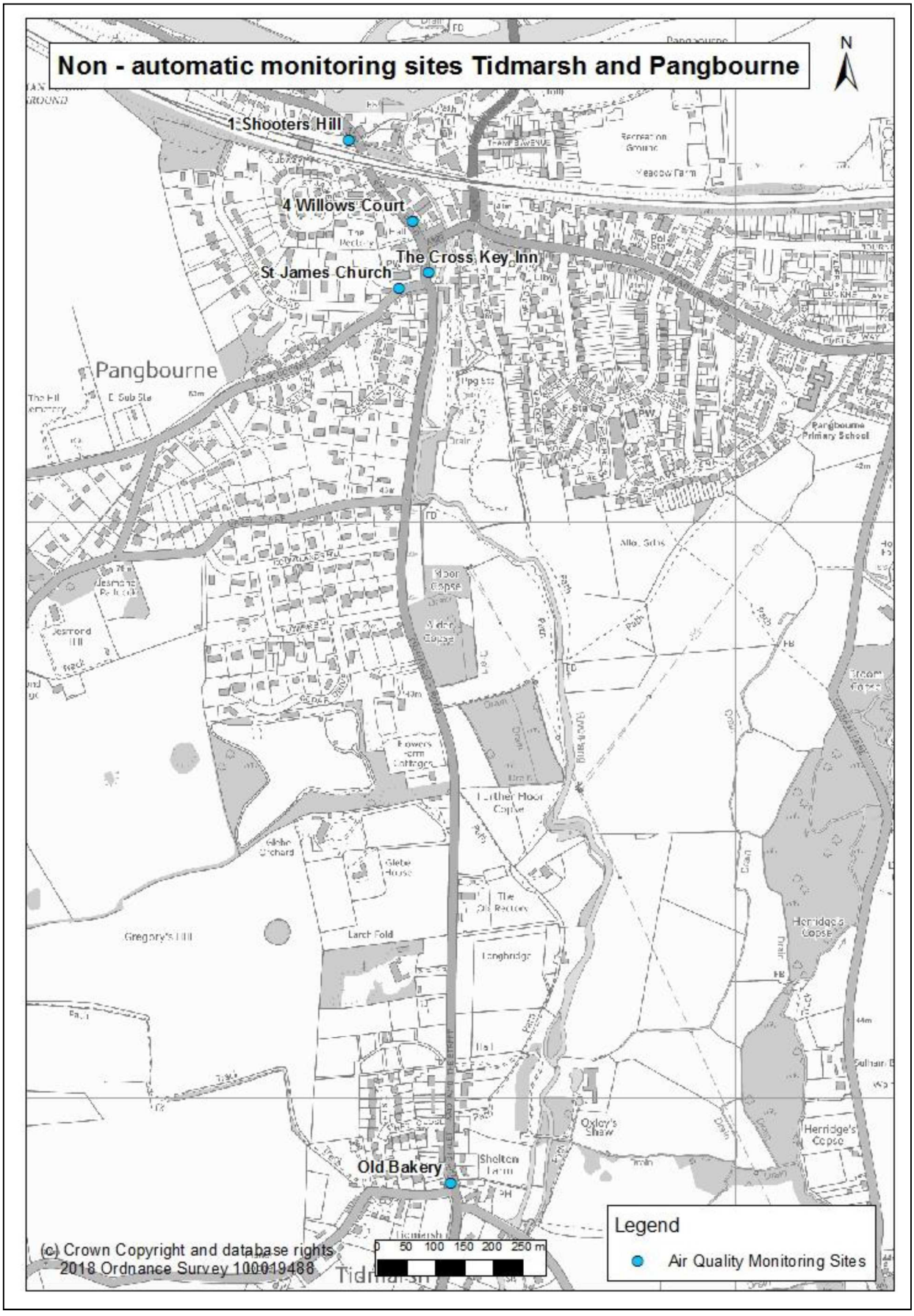
Map D.7: Diffusion Tube Monitoring sites in and close to the AQMA in Thatcham



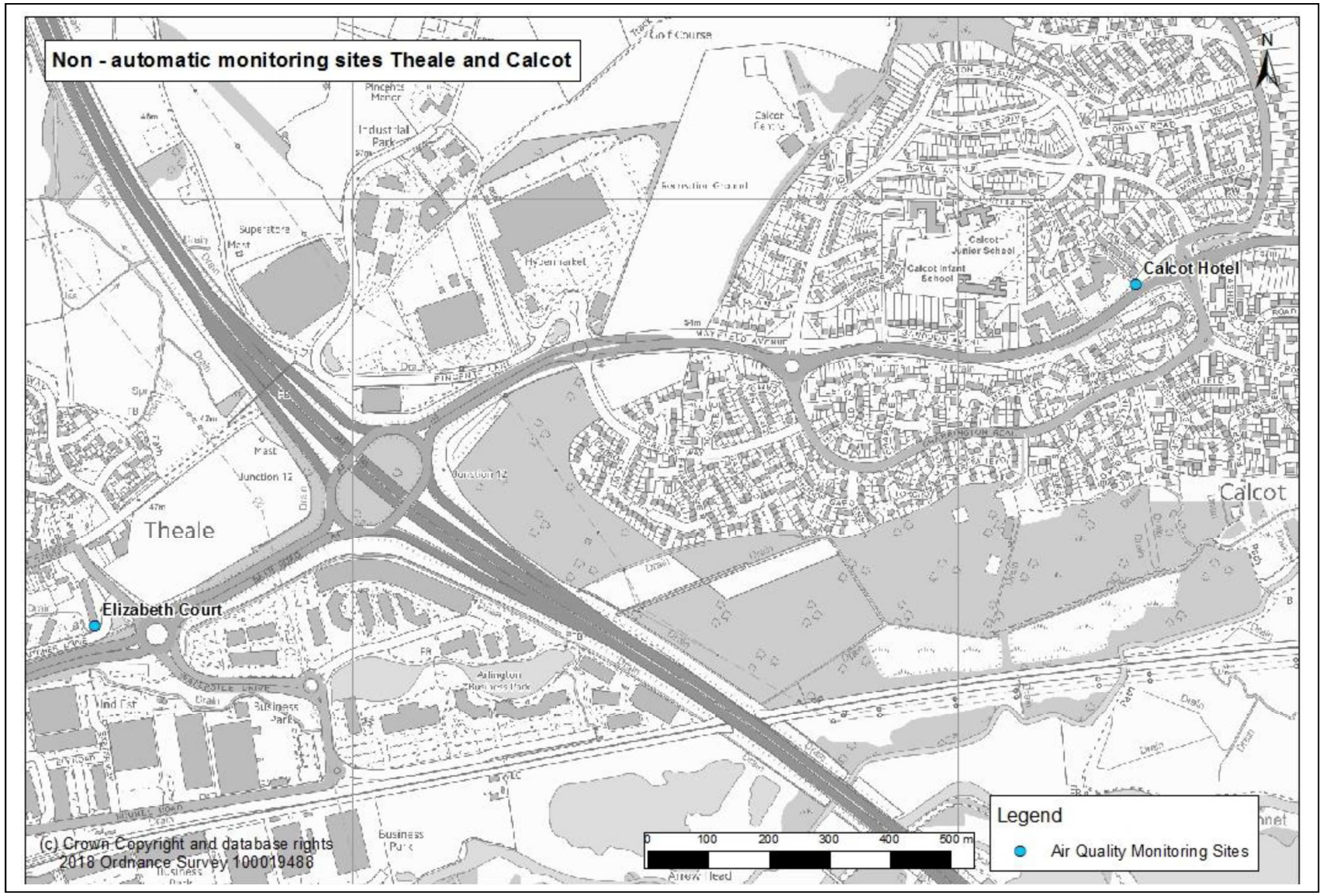
Map D.8: Diffusion Tube locations in Hungerford



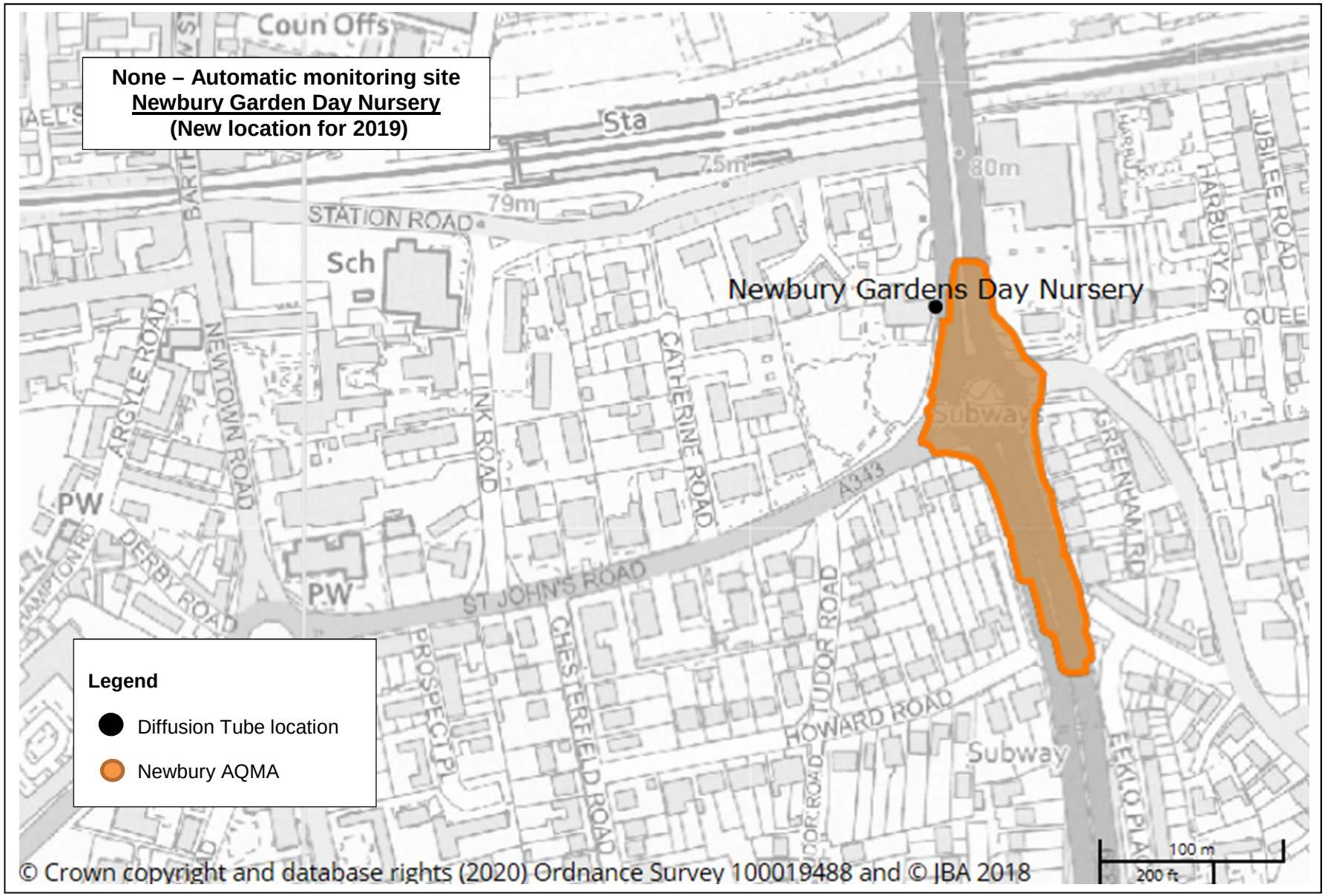
Map D.9: Diffusion Sites in Tidmarsh & Pangbourne



Map D.10: Diffusion Tube sites in Theale & Calcot



Map D.11: Diffusion site location for the Newbury Garden Day Nursery (new to 2019)



Appendix E: Summary of Air Quality Objectives in England

Table E.1 – Air Quality Objectives in England

Pollutant	Air Quality Objective[6]	
	Concentration	Measured as
Nitrogen Dioxide (NO_2)	200 µg/m^3 not to be exceeded more than 18 times a year	1-hour mean
	40 µg/m^3	Annual mean
Particulate Matter (PM_{10})	50 µg/m^3, not to be exceeded more than 35 times a year	24-hour mean
	40 µg/m^3	Annual mean
Sulphur Dioxide (SO_2)	350 µg/m^3, not to be exceeded more than 24 times a year	1-hour mean
	125 µg/m^3, not to be exceeded more than 3 times a year	24-hour mean
	266 µg/m^3, not to be exceeded more than 35 times a year	15-minute mean

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

Glossary of Terms

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