2016 Air Quality Annual Status Report (ASR)

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

(August 2016)

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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].

Nitrogen dioxide(NO_2) is the main pollutant of concern. The levels in 2015 have shown a decrease on 2014 levels and locations There was no exceedance of the ratified continuous monitiored NO_2 annual mean in 2015. The level was 34.8 µg/m^3 so did not exceed the Air Quality Objective level of 40 µg/m^3 . There were only 3 exceedances of the 1-hour Objective. This is did not exceed the Objective level of 18 exceedances.

For 2015 the ratified and adjusted diffusion tubes annual mean levels also did not show any levels above the Objective nor were there any results greater than 60µg/m^3 which therefore does not indicate any exceedance of the 1-hour Objective. All the sites showed a decrease in levels compared to 2014 except for the sites at A339 Newbury Central and 31 Shaw Road Newbury. Overall the levels have been reducing over the last 5 years.

There were no exceedances within the Air quality Management Areas (AQMAs) (https://uk-air.defra.gov.uk/aqma/local-authorities?la_id=304), which are located in Newbury and Thatcham.

Detailed Assessments for 2 locations, Shaw Road Newbury and Church Road Pangbourne, are required in 2016 and theoutcome will determine if any additional AQMAs are required 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

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 is 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 limit 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

LTP Strategies continue to be reviewed and/ or implemented. In 2015 the Freight Strategy was finalised. Existing Parking, Smarter Modes of Transport, Active Travel, Smarter Choices, Road Safety and Passenger Transport Strategies all link with the AQAP. The new Supplementary Planning Document on new parking standards for new housing developments has also been implemented.

The link between air quality, particularly from $PM_{2.5}$, and public health in West Berkshire requires exploration.

Actions to Improve Air Quality

Work through development control applications were reviewed for the air quality impact. Air quality assessments have been provided where necessary for a variety of applications and appropriate mitigation requested. Applications included a significant

housing development site, an energy centre with diesel power generation, a backup gas fired power generation plant, a wood burning biomass plant, traffic flow changes to road scheme, and any applications which may have an impact to the AQMAs and other hotspot locations.

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

There were no grant funded projects in 2015, and due to lack of funds we were unable to spend on projects directly however staff resources and external contacts were used to work on developing actions.

Local Priorities and Challenges

The following local priorities have been set:

- Exploring the link between public health and PM2.5
- 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
- Progress the Detailed Assessments for Shaw Road Newbury and Church Road Pangbourne
- Review of the Newbury AQAP
- Revoke the Thatcham AQMA
- Continue the continuous and passive air quality monitoring programmes

The following challenges have been identified:

- Budget allocation for progressing measures and actions
- Linking of Public Health Outcome Framework and health profiles to air quality to show any causal relationship.

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

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1 Local Air Quality Management

This report provides an overview of air quality in West Berkshire during 2015.. 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 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.

In 2016 we are planning on carrying out two Detailed Assessments for Shaw Road Newbury and The Cross Key Church Road Pangbourne as recommended in the Updating and Screening Assessment 2015. Therefore a decision will be made in 2016 as to whether or not 1 or 2 new AQMAs will be declared.

There are no proposals to amend either of the AQMAs.

We propose to revoke Thatcham AQMA (see monitoring section). It is proposed to consider the revoking of the AQMA for Thatcham in 2016, as for the last 3 years the results have shown a decrease in levels and no exceedances of the annual mean in 2015. Monitoring continues in 2016 for 6 of the sites and if the levels continue to decrease in the AQMA may be revoked during 2016.

Table 2.1 – Declared Air Quality Management Areas

AQMA Name	Pollutants and Air Quality Objectives	City / Town	One Line Description	Action Plan
Newbury AQMA	NO_2 annual mean NO_2 1-hour mean	Newbury	An area encompassing a number of properties at the roundabout intersection of A339, Greenham Road and A343 Andover Road,	Newbury AQAP http://info.westberks.gov.uk/CHttpHandler.ashx?id=36580&p=0
Thatcham AQMA	NO_2 annual mean	Thatcham	Residential properties along the A4 Chapel Street	

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

West Berkshire has taken forward a number of measures during the current reporting year of 2015 in pursuit of improving local air quality. Details of all measures completed, in progress or planned are set out in Table 2.2.

Key completed measures are:

- Much progress has been made in the provision of electric charging points and provision for electric vehicles
- The launch of the car club in Newbury.

Progress on the following measures has been slower than expected due to:

- Funding issues has resulted in a lack of "spend" on projects directly but we have used our staff resources and external contacts etc to work on developing actions
- Provision of signage on the A339 Newbury to direct through traffic away from the AQMA due to the cost of the signage and agreement

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

- Provision of traffic data to support modelling work
- Completed Detailed Assessments for Shaw Road Newbury and Church Road Pangbourne
- Completed traffic and air quality modelling of the intersection of the AQMA Newbury
- increased awareness campaign of electric vehicles
- Implementation of air quality guidance note for planning applications
- Reduction of HDVs through Newbury through provision of signage

The following local priorities have been set for the coming year are:

- 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

These are to follow on from the Joint Strategic Needs Assessment (http://info.westberks.gov.uk/CHttpHandler.ashx?id=37515&p=0) and the Health and Wellbeing Strategy 2015 – 2018 **(**http://info.westberks.gov.uk/CHttpHandler.ashx?id=33954&p=0) both for West Berkshire.

The JSNA uses data and evidence from the current health and wellbeing in West Berkshire, to highlight the health needs of the whole community. It shows how needs might vary for different age groups and identifies health differences in disadvantaged or vulnerable groups. The JSNA also looks at a wider range of factors that help shape the health and wellbeing of individuals, families and local communities such as education, employment and the environment. Air Pollution is under the environment section.

Efforts to reduce the volume of urban traffic and to promote walking and cycling are likely to have appreciable net benefits on population health and is one of the priorities set in the Health and Wellbeing Strategy.

- Continuing to work within the unitary authority with Transport Policy and Highways Teams as well as Development Control

There are some localised areas of congestion at peak times in west Berkshire. These areas 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 this new development. This will help address the impact and manage the additional trips associated with new development.

- Progress the Detailed Assessments for Shaw Road Newbury and Church Road Pangbourne

Following the outcome of our last air quality report, Updating and Screening Assessment 2015, consultants are carrying out the modelling work required in 2016.

- Review of the Newbury AQAP

The five year review of the Action Plan is required by the end of 2016.

- Revoke the Thatcham AQMA

As the levels have seen a decreasing trend over the last 3 years the revocation will be considered in 2016.

- Continue the continuous and passive air quality monitoring programmes

The continuous monitoring within the Newbury AQMA and 60 diffusion tube locations to be continued to be carried out during 2016.

Table 2.2 – Progress on Measures to Improve Air Quality

Measure No.	Measure	EU Category	EU Classification	Lead Authority	Planning Phase	Implementation Phase	Key Performance Indicator	Target Pollution Reduction in the AQMA	Progress to Date	Estimated Completion Date	Comments
1	Variable message Signing (VMS) linked to Newbury car Park System	Traffic Management	UTC, Congestion management, traffic reduction	WBC	2010-11	2011-14	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	WBC	2012-16	2017-2018	Reduction in queuing time and congestion within AQMA and reduction in NO2 and emission levels	15 ug/m3(based on 2008 data)	Changes to roundabout being looked at along with Bear Lane by WBC consultants. Modelling a number of further improvements to the A339 Sainsbury's and Burger King junctions to commence April 2016.	2017/18	Any improvements to be implemented by 2018.

Measure No.	Measure	EU Category	EU Classification	Lead Authority	Planning Phase	Implementation Phase	Key Performance Indicator	Target Pollution Reduction in the AQMA	Progress to Date	Estimated Completion Date	Comments
3	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	WBC	2010-2011	2012	Queuing time and congestion close to AQMA and reduction in NO2 levels	15 ug/m3(based on 2008 data)	Complete. Changes to roundabout being looked at along with Bear Lane by WBC consultants - see new action.	Completed 2012	Actual AQ data available. Transport Policy Journey Time Survey in 2015 (baseline 2013) indicates journey times northbound have improved with southbound slightly worsening- likely due to Boundary Road works.
4	Improved local bus services to reduce short car journeys	Transport Planning and Infrastructure	Bus route improvements	WBC	2011	2015-2016	Increase in no. Of passenger journeys	negligible	Capital works - Complete. New developer-funded bus service - starting May 2016	2016	Ongoing monitoring of passenger journeys.
5	Smarter Choices (1) Investigate the feasibility of a district wide car share scheme	Alternatives to private vehicle use	Car Clubs	WBC	2012-2013	2012-2014	No. of car share cars and their useage	negligible	Works commenced.	2014	Complete: District wide car sharing isn't feasible - a focus on location journeys instead- see (3).

Measure No.	Measure	EU Category	EU Classification	Lead Authority	Planning Phase	Implementation Phase	Key Performance Indicator	Target Pollution Reduction in the AQMA	Progress to Date	Estimated Completion Date	Comments
6	Smarter Choices (2) Investigate the feasibility of a car club for Newbury and Thatcham area (Racecourse)	Alternatives to private vehicle use	Car Clubs	WBC	2012-2013	2012-2014	No. of car share cars and their useage	negligible	5 Car Newbury scheme being introduced. 3 non-electric vehicles in use, sited at Oddfellows Rd, Eight Bells car park and West Street. One electric vehicle to be delivered April 16. An additional hybrid vehicle for Boundary Rd can also be utilised. All town centre locations. Public launch of scheme April 16.	2016	2016/17 Public launch, promoting & monitoring uptake. Data will be available on number of members, vehicle usage, number of miles, trips etc.

Measure No.	Measure	EU Category	EU Classification	Lead Authority	Planning Phase	Implementation Phase	Key Performance Indicator	Target Pollution Reduction in the AQMA	Progress to Date	Estimated Completion Date	Comments
7	Smarter Choices (3) Promote Car sharing opportunities within the district	Alternatives to private vehicle use	Car Clubs	WBC	2012-2013	2012-2016	No. of car share cars and their useage	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.

Measure No.	Measure	EU Category	EU Classification	Lead Authority	Planning Phase	Implementation Phase	Key Performance Indicator	Target Pollution Reduction in the AQMA	Progress to Date	Estimated Completion Date	Comments
8	Electrification of Newbury to Reading railway line	Transport Planning and Infrastructure	Public transport improvements-interchanges stations and services	Network Rail	2011	2012-2015	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 resighting. Worked have completed on many bridges Boundary Road Bridge work begun in 2015, due for completion Jan 17.).	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)

Measure No.	Measure	EU Category	EU Classification	Lead Authority	Planning Phase	Implementation Phase	Key Performance Indicator	Target Pollution Reduction in the AQMA	Progress to Date	Estimated Completion Date	Comments
9	Supplementary Planning Document for AQ	Policy Guidance and Development Control	Air Quality Planning and Policy Guidance	WBC	2012	2013/14	Reduce reliance of car in new development. Us of s106 funds	negligible	Discussion with Planning Policy. Due to changes to PPS23/NPPF a Guidance Note" or a "Position Statement" now likely. Commenced development of planning policy within the NPPF in relation to air quality. Currently considering 'guidance note'. Where applicable AQ Assessments are requested for planning applications e.g. Biomass, CHP, large housing and mixed use developments.	2016/17	Proposed emissions from large scale developments more quantifiable than from small scale.

Measure No.	Measure	EU Category	EU Classification	Lead Authority	Planning Phase	Implementation Phase	Key Performance Indicator	Target Pollution Reduction in the AQMA	Progress to Date	Estimated Completion Date	Comments
10	Reduction of HDVs using A339 through Newbury	Freight and Delivery Management	Route Management Plans/ Strategic routing strategy for HGV's	WBC	2013 -2016	2013-	Reduction in HDV journeys along this section of road network and decrease in NO2 levels measured.	Links with 15 µg/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.	ongoing	16/17 Look for opportunities- replacement/funding for signage in West Berks controlled areas.

Measure No.	Measure	EU Category	EU Classification	Lead Authority	Planning Phase	Implementation Phase	Key Performance Indicator	Target Pollution Reduction in the AQMA	Progress to Date	Estimated Completion Date	Comments
11	Electric Charging Points	Promoting Low Emission Transport	Procuring alternative Refuelling infrastructure to promote Low Emission Vehicles, EV recharging, Gas fuel recharging	WBC	2012	2012-2014	Use of charging points Increase in EV ownership and use of/demand for (public) chargepoints	Negligible	(1) Successful OLEV grant to install chargepoints on WBC land 2013-15. (2) Ecotricity Rapid chargepoints 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	(1) March 2015 (2) 2015 (3) Unknown (4) Complete Oct 2015 (5) April 2016 (6) 2016 (7) ongoing	(1) Council chargepoints installed for WBC use at Kennet Centre (Mar 13) and Ampere Road, Newbury (Mar 14) under OLEV public Sector charging scheme. (2) Ran 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 chargepoints, 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 15, 200 attendees. Next event 28/05/16 planned.

Measure No.	Measure	EU Category	EU Classification	Lead Authority	Planning Phase	Implementation Phase	Key Performance Indicator	Target Pollution Reduction in the AQMA	Progress to Date	Estimated Completion Date	Comments
12	Health Education	Public Information	Other	WBC/ PCT	2012-2016	2016/17	Decrease in hospital admissions from asthma. Increase in walking and cycling.		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. 16/17 AQ & PH to investigate opportunities for joint promotion working.		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.

Measure No.	Measure	EU Category	EU Classification	Lead Authority	Planning Phase	Implementation Phase	Key Performance Indicator	Target Pollution Reduction in the AQMA	Progress to Date	Estimated Completion Date	Comments
13	National Cycle Route (Newbury to Legoland)	Promoting Travel Alternatives	Promotion of cycling	Wokingham BC	2016-2017	2017-2019	Cycle way 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 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.	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.
14	Park and Ride	Alternatives to private vehicle use	Bus based Park & Ride	WBC	2011	Not to be implemented	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	

Measure No.	Measure	EU Category	EU Classification	Lead Authority	Planning Phase	Implementation Phase	Key Performance Indicator	Target Pollution Reduction in the AQMA	Progress to Date	Estimated Completion Date	Comments
15	Cycle lane on A343 St Johns Road between Burger King Roundabout and St Johns Roundabout	Transport Planning and Infrastructure	Cycle network	WBC	2011	2012	Reduction in car journeys along this section of road network and decrease in NO2 levels measured.	negligible	Implemented	2012	Part of Cycle way improvement programme for 2011/12. Approx £100k per annum (£50k capital grant & £50k Developer Contributions (S106)

Measure No.	Measure	EU Category	EU Classification	Lead Authority	Planning Phase	Implementation Phase	Key Performance Indicator	Target Pollution Reduction in the AQMA	Progress to Date	Estimated Completion Date	Comments
16	Travel Planning	Promoting Travel Alternatives	Personalised Travel Planning	WBC	2011	2013-2014	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.
17	Low Emission Zone	Promoting Low Emission Transport	Low Emission Zone (LEZ)	WBC	2012	Not to be implemented	Reduction in polluting vehicles	15 ug/m3(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	

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.

West Berkshire Council 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 to increase active travel, to reduce obesity and inactivity.
- For 2016 the joint action plan between Public Health and Environmental Health for air quality will consider in detail how West Berkshire will be considering the impact on PM2.5 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 PM2.5) can be improved such as active travel and the uptake of electric vehicles.
- Work in 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.

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 objectives.

West Berkshire Council undertook automatic (continuous) monitoring at 1 site during 2015. Table A.1 in Appendix A shows the details of this sites. NB. Local authorities do not have to report annually on the following pollutants: 1,3 butadiene, benzene, carbon monoxide and lead, unless local circumstances indicate there is a problem. National monitoring results are available at https://uk-air.defra.gov.uk/data/exceedence.

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 Council undertook non- automatic (passive) monitoring of NO_2 at 60 sites during 2015. Table A.2 in Appendix A shows the details of the sites. 1 of the locations was a co-location study for the whole year on the continuous monitoring station within the Newbury AQMA. 1 further site was a co-location study for the first 3 months of the year within the Thatcham AQMA.

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

3.2 Individual Pollutants

The air quality monitoring results presented in this section are, where relevant, adjusted for “annualisation” and bias. 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.

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

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. For 2015 there were only 3 exceedances of the 1-hour objective. These occurred on Thursday 9th April at 06:00, Wednesday 24th June at 06:00 and Tuesday 30th June at 18:00. These exceedances all happened during the morning or evening rush hour periods. This is a reduction on 2014 when there were 6 exceedances.

There were no exceedance of the ratified continuous monitored NO_2 annual mean in 2015. The level was much reduced at 34.8 µg/m^3 compared to 45.5 µg/m^3 in 2014.

There were no exceedances within the AQMAs.

For 2015 the ratified and adjusted diffusion tubes annual mean levels also did not show any levels above the air quality objective nor were there any results greater than 60µg/m^3 which therefore does not indicate any exceedance of the 1-hour objective. All the sites showed a decrease in levels compared to 2014 except for the sites at A339 Newbury Central and 31 Shaw Road Newbury. These 2 locations are not within the Newbury AQMA, however the former does not represent relevant exposure as it is a roadside site, and the latter is within the location where one of the Detailed Assessments is being carried out in 2016 so will be assessed in further detail.

The areas of concern continue to be:

- Newbury AQMA - A339 / Greenham Road / A343 St Johns Road
- Thatcham AQMA - Chapel Street Thatcham
- Shaw Road Newbury
- Church Road Pangbourne

There are 9 diffusion tube sites within (3) and in close proximity (6) to the Thatcham AQMA. For the last 3 years the results have shown a decrease in levels. Exceedances of the annual mean objective has been seen at nos. 17(2013 and 2014), 31 (2013 and 2014) and 40(2013 only) Chapel Street in the last 3 years and the 2015 levels are all below. Monitoring continues in 2016 for 6 of the sites and if the levels continue to decrease in the AQMA may be revoked during 2016.

3.2.2 Particulate Matter (PM_{10})

No monitoring of PM_{10} is carried out by West Berkshire Council.

3.2.3 Particulate Matter ($PM_{2.5}$)

No monitoring of $PM_{2.5}$ is undertaken by West Berkshire Council, however the background data (source: www.air.defra.gov.uk/dataarchive/maps2011) available for 2015 shows that the range of annual mean $PM_{2.5}$ is generally between 10-13 µg/m^3, with the 3 highest levels can be found at::

13.52 µg/m^3 at 465500 171500 (west of A34 north of Enborne Road)

13.35 ug/m^3 at 464500 171500 (south west of M4 J12)

13.25 µg/m^3 at 469500 169500 (M4 west of J11 Pingewood).

The levels within or close to the AQMAs and hopspots locations are:

13.56 µg/m^3 at 447500 167500 Robin Hood Roundabout / Shaw Road Newbury

12.87 µg/m^3 at 447500 166500 Newbury AQMA

12.65 µg/m^3 at 463500 176500 Church Street Pangbourne

12.45 µg/m^3 at 451500 168500 Thatcham AQMA

3.2.4 Sulphur Dioxide (SO_2)

No monitoring of SO_2 undertaken in West Berkshire Council.

Appendix A: Monitoring Results

Table A.1 – Details of Automatic Monitoring Sites

Site ID	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In AQMA?	Monitoring Technique	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Inlet Height (m)
Newbury	**Newbury** A343, A339 & Greenham Road junction Newbury	Roadside	477407	166560	NO2	Y	Chemiluminescent	1	4.7	1.8

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

(2) N/A if not applicable.

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

Site ID	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In AQMA?	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Tube collocated with a Continuous Analyser?	Height (m)
	A339 Newbury Central	Kerbside	447463	167318	NO_2	N	10	1.9	N	2.3
	7a Bridge Street Hungerford	Roadside	433909	168815	NO_2	N	0	1.5	N	2.7
	Chaddleworth Primary School	Roadside	441669	177306	NO_2	N	57	10	N	1.9
	118A London Road Newbury	Urban Background	447693	167724	NO_2	N	0	33	N	2
	132 London Road Newbury	Roadside	447720	167678	NO_2	N	0	3	N	2.6
	Flat 1, Southview Gardens Newbury	Urban Background	447752	167667	NO_2	N	0	5	N	1.9
	1 Iden Court, Newport Road Newbury	Urban Background	447829	167640	NO_2	N	0	10	N	1.9
	374 London Road Newbury	Urban Background	449034	167520	NO_2	N	0	12.5	N	2.05
	29 Bath Road Thatcham	Urban Background	451112	167549	NO_2	N	0	14	N	2
	17 Chapel Street Thatcham	Roadside	451870	167438	NO_2	N	0	1.5	N	2.4
	40 Chapel Street Thatcham	Kerbside	451926	167460	NO_2	N	0	3.5	N	2.2

Site ID	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In AQMA?	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Tube collocated with a Continuous Analyser?	Height (m)
	Flat 1, 47 Chapel Street Thatcham	Roadside	452100	167452	NO_2	N	0	1.8	N	2
	75 Chapel Street Thatcham	Roadside	452288	167445	NO_2	N	0	3.4	N	2.2
	A4 82/78A Chapel Street Thatcham	Roadside	452071	167468	NO_2	Y	0	1.8	N	2
	159 Station Road Thatcham	Roadside	452482	166546	NO_2	N	0	3.8	N	2
	Old Bakery Tidmarsh	Roadside	463504	174864	NO_2	N	0	2.2	N	1.9
	The Greyhound PH Tidmarsh	Urban Bacground	463531	174829	NO_2	N	0	6.6	N	2.5
	4 Willows Court Pangbourne	Roadside	463442	176523	NO_2	N	0	3	N	2.3
	49 St James Close Pangbourne	Urban Background	463370	176563	NO_2	N	0	9	N	2
	1 Shooters Hill Pangbourne	Roadside	463331	176664	NO_2	N	0	2.5	N	2.1
	The Cross Key Inn, Pangbourne	Roadside	463468	176433	NO_2	N	0	4	N	2.6
	14 High Street, Pangbourne	Urban Background	463494	176485	NO_2	N	0	5.5	N	2.2

Site ID	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In AQMA?	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Tube collocated with a Continuous Analyser?	Height (m)
	20-24 Saunders Court, Purley	Urban Background	466003	176131	NO_2	N	0	8.5	N	2
	102 Langley Hill, Tilehurst	Urban Background	466321	172747	NO_2	N	3.5	13	N	2.5
	Calcot Hotel, A4 Bath Road, Calcot	Kerbside	466302	171865	NO_2	N	16	2	N	2.3
	Elizabeth Court, Theale	Urban Background	464574	171294	NO_2	N	0	32	N	2
	37 The Street, Aldermaston	Roadside	459102	165126	NO_2	N	N	1.25	N	2
	1 Avenall's Cottage, Crookham Hill	Urban Background	452485	165690	NO_2	N	0	6.8	N	2
	44 Hambridge Road, Newbury	Urban Background	448129	166909	NO_2	N	0	4.3	N	2.45
	42 King's Road, Newbury	Roadside	447433	166994	NO_2	N	0	11.3	N	1.85
	1 Winchester Court, Greenham Road, Newbury	Roadside	447409	166559	NO_2	Y	0	4.95	N	3
	Continuous monitor 1, A343, A339 and Greenham Road	Roadside	447379	166557	NO_2	Y	1	4.7	Y	1.8

Site ID	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In AQMA?	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Tube collocated with a Continuous Analyser?	Height (m)
	roundabout, Newbury									
	Continuous monitor 2, A343, A339 and Greenham Road roundabout, Newbury	Roadside	447379	166557	NO_2	Y	1	4.7	Y	1.8
	Continuous monitor 3, A343, A339 and Greenham Road roundabout, Newbury	Roadside	447379	166557	NO_2	Y	1	4.7	Y	1.8
	A339, 64 Greenham Road, Newbury	Roadside	447448	166454	NO_2	N	12	2	N	2.2
	20 Deadmans Lane, Greenham	Suburban	447508	164725	NO_2	N	0	10.5	N	2.1
	A339 New Greenham Park, Greenham	Kerbside	449805	163882	NO_2	N	204	4	N	2.1
	3 Howard Road, Newbury	Roadside	447402	166449	NO_2	N	0	11	N	2.6
	1 St John's Road, Newbury	Roadside	447036	166436	NO_2	N	0	4.8	N	2.25
	63 St John's Road, Newbury	Urban Background	447377	166533	NO_2	Y	0	6.2	N	2.2

Site ID	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In AQMA?	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Tube collocated with a Continuous Analyser?	Height (m)
	St John's PO, 1 Andover Road, Newbury	Roadside	446954	166395	NO_2	N	0	12	N	1.9
	39 Newtown Road, Newbury	Urban Background	446957	166460	NO_2	N	0	5	N	1.9
	40 Bartholomew Street, Newbury	Roadside	446939	166848	NO_2	N	0	2.7	N	2.2
	8A Craven Road, Newbury	Urban Background	446891	166878	NO_2	N	1	5	N	1.9
	6 Market Street, Newbury	Urban Centre	447211	167020	NO_2	N	9.5	1.3	N	2.1
	105 London Road, Newbury	Urban Background	447528	167708	NO_2	N	0	24	N	2.6
	31 Oxford Road, Newbury	Kerbside	446908	167657	NO_2	N	1.5	1	N	2.5
	1 Dolman Road, Newbury	Urban Background	447157	167909	NO_2	N	0	8.3	N	2.4
	43 Hawthorn Road, Newbury	Urban Background	447487	167870	NO_2	N	0	13	N	2.15
	41 Hutton Close, Newbury	Urban Background	447546	167916	NO_2	N	0	12.4	N	2.1
	Willows Edge Nursing Home, Newbury	Urban Background	447540	167970	NO_2	N	0	20	N	2

Site ID	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In AQMA?	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Tube collocated with a Continuous Analyser?	Height (m)
	112 Shaw Road, Newbury	Roadside	447773	168041	NO_2	N	0	4.9	N	2
	31 Shaw Road, Newbury	Kerbside	447688	167820	NO_2	N	3.6	0.6	N	1.7
	13 Shaw Road Newbury	Urban Background	447630	167770	NO_2	N	0	7	N	2.4
	Abbeydale, Monks Lane, Newbury	Kerbside	446922	516303	NO_2	N	21	2	N	2.5
	A343 Andover Road, Wash Common	Kerbside	445899	164705	NO_2	N	18.1	0.75	N	2.25
	Bus Stop Racecourse Road, Stroud Green	Kerbside	447727	166392	NO_2	N	58	1.4	N	2.2
	Thatcham Continuous monitor 1, junction A4 Chapel St and Coombe Court	Roadside	452018	167447	NO_2	Y	9	5.9	N	1.5
	Thatcham Continuous monitor 2, junction A4 Chapel St and Coombe Court	Roadside	452018	167447	NO_2	Y	9	5.9	N	1.5

Site ID	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In AQMA?	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Tube collocated with a Continuous Analyser?	Height (m)
	Thatcham Continuous monitor 3, junction A4 Chapel St and Coombe Court	Roadside	452018	167447	NO_2	Y	9	5.9	N	1.5
	10 Prancing Horse Close Thatcham	Urban Background	452096	167406	NO_2	N	0	6.8	N	1.8
	130 Park Avenue Thatcham	Roadside	451965	167498	NO_2	N	7	2	N	2.10
	31 Chapel Street Thatcham	Roadside	451906	167441	NO_2	Y	0	1.6	N	2.05
	110 London Road Newbury	Urban Background	447657	167724	NO_2	N	0	15	N	2

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

(2) N/A if not applicable.

Table A.3 – Annual Mean NO_2 Monitoring Results

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2015 (%) (2)	NO_2 Annual Mean Concentration ($\mu g/m^3$) (3)				
					2011	2012	2013	2014	2015

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) [1]	Valid Data Capture 2015 (%) [2]	NO_2 Annual Mean Concentration ($\mu g/m^3$) [3]				
					2011	2012	2013	2014	2015
Newbury	Roadside	Automatic	91.1	91.1	**44.9**	**44.9**	**42.2**	**45.5**	34.8
	A339 Newbury Central	Diffusion Tube	100	100	**49.66**	**55.9**	**53.7**	37.2	37.8
	7a Bridge Street Hungerford	Diffusion Tube	100	100	28.18	29.9	32.2	27.9	22.6
	Chaddleworth Primary School	Diffusion Tube	100	100	8.74	8.8	9.6	7.5	6.6
	118A London Road Newbury	Diffusion Tube	100	100	24.91	25.7	23.8	24.8	19.5
	132 London Road Newbury	Diffusion Tube	100	100	34.4	**42.8**	**42.7**	39.0	33.7
	Flat 1, Southview Gardens Newbury	Diffusion Tube	100	92	33.36	**45.9**	32.8	33.1	27.2
	1 Iden Court, Newport Road Newbury	Diffusion Tube	100	100	28.03	32.8	28.8	29.2	24.7
	374 London Road Newbury	Diffusion Tube	100	100	25.63	26.4	24.9	24.1	19.2
	29 Bath Road Thatcham	Diffusion Tube	100	92	19.82	22.7	22.1	19.1	17.1
	17 Chapel Street Thatcham	Diffusion Tube	100	100	39.54	**45.0**	**45.3**	**43.2**	36.3
	40 Chapel Street Thatcham	Diffusion Tube	100	75	**41.61**	**40.6**	**41.0**	35.8	30.7
	Flat 1, 47 Chapel Street Thatcham	Diffusion Tube	100	92	37.01	**44.8**	30.47	30.2	22
	75 Chapel Street Thatcham	Diffusion Tube	100	100	31.19	35.4	31.6	31.0	26.7

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) [1]	Valid Data Capture 2015 (%) [2]	NO_2 Annual Mean Concentration ($\mu g/m^3$) [3]				
					2011	2012	2013	2014	2015
	A4 82/78A Chapel Street Thatcham	Diffusion Tube	100	100	26.96	37.9	31.2	31.1	25.6
	159 Station Road Thatcham	Diffusion Tube	100	100	23.53	26.3	26.0	23.8	20
	Old Bakery Tidmarsh	Diffusion Tube	100	100	28.83	33.0	35.6	34.6	28.7
	The Greyhound PH Tidmarsh	Diffusion Tube	100	92	22.51	25.8	23.8	21.5	17.6
	4 Willows Court Pangbourne	Diffusion Tube	100	100	29.48	33.3	35.7	33.4	25.4
	49 St James Close Pangbourne	Diffusion Tube	100	100	18.30	21.7	21.3	20.5	15.4
	1 Shooters Hill Pangbourne	Diffusion Tube	100	100	27.17	29.1	29.3	28.2	24
	The Cross Key Inn, Pangbourne	Diffusion Tube	100	100	33.76	39.4	**40.3**	**40.6**	32.6
	14 High Street, Pangbourne	Diffusion Tube	100	100	23.75	26.9	26.0	23.4	21.7
	20-24 Saunders Court, Purley	Diffusion Tube	100	100	17.78	21.1	22.7	20.0	15.4
	102 Langley Hill, Tilehurst	Diffusion Tube	100	92	23.03	27.5	28.1	25.9	21.7
	Calcot Hotel, A4 Bath Road, Calcot	Diffusion Tube	100	83	29.38	36.7	36.9	34.6	25.3
	Elizabeth Court, Theale	Diffusion Tube	100	100	22.75	25.7	24.4	23.7	19

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) [1]	Valid Data Capture 2015 (%) [2]	NO_2 Annual Mean Concentration ($\mu g/m^3$) [3]				
					2011	2012	2013	2014	2015
	37 The Street, Aldermaston	Diffusion Tube	100	100	22.40	25.4	23.6	22.6	18.3
	1 Avenall's Cottage, Crookham Hill	Diffusion Tube	100	100	10.82	13.2	14.5	12.0	9.8
	44 Hambridge Road Newbury	Diffusion Tube	100	100	27.39	31.6	31.6	29.4	22.7
	42 King's Road, Newbury	Diffusion Tube	100	92	24.97	28.5	26.6	25.8	22.1
	1 Winchester Court, Greenham Road, Newbury	Diffusion Tube	100	100	37.80	**44.2**	**43.8**	39.2	34.2
	Continuous monitor 1, A343, A339 and Greenham Road roundabout, Newbury	Diffusion Tube	100	100	38.97	**44.6**	**42.5**	**43.3**	35.2
	Continuous monitor 2, A343, A339 and Greenham Road roundabout, Newbury	Diffusion Tube	100	100	38.15	**45.3**	**42.5**	**41.5**	35
	Continuous monitor 3, A343, A339 and Greenham Road roundabout,	Diffusion Tube	100	100	38.35	**45.8**	**41.5**	**41.4**	34.7

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2015 (%) (2)	NO_2 Annual Mean Concentration ($\mu g/m^3$) (3)				
					2011	2012	2013	2014	2015
	Newbury								
	A339, 64 Greenham Road, Newbury	Diffusion Tube	100	83	32.88	38.7	36.9	37.0	29.1
	20 Deadmans Lane, Greenham	Diffusion Tube	100	100	24.86	28.8	28.4	25.7	22.2
	A339 New Greenham Park, Greenham	Diffusion Tube	100	92	33.19	36.7	**41.0**	39.7	29.4
	3 Howard Road, Newbury	Diffusion Tube	100	100	20.57	23.9	23.7	21.5	17.2
	1 St John's Road, Newbury	Diffusion Tube	100	92	22.90	30.4	36.6	29.9	25.2
	63 St John's Road, Newbury	Diffusion Tube	100	100	27.71	26.3	27.3	25.3	20.1
	St John's PO, 1 Andover Road, Newbury	Diffusion Tube	100	100	16.03	19.8	20.5	17.5	14.4
	39 Newtown Road, Newbury	Diffusion Tube	100	100	20.43	23.2	23.0	21.2	15.5
	40 Bartholomew Street, Newbury	Diffusion Tube	100	75	33.88	37.8	39.8	35.8	29.3
	8A Craven Road, Newbury	Diffusion Tube	100	92	19.46	23.0	24.6	18.4	16.4
	6 Market Street, Newbury	Diffusion Tube	100	100	31.06	35.5	36.7	34.0	28.1
	105 London Road, Newbury	Diffusion Tube	100	100	21.82	24.1	26.1	23.3	18.5
	31 Oxford Road,	Diffusion Tube	100	100	32.05	35.2	34.8	34.0	27.1

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2015 (%) (2)	NO_2 Annual Mean Concentration ($\mu g/m^3$) (3)				
					2011	2012	2013	2014	2015
	Newbury								
	1 Dolman Road, Newbury	Diffusion Tube	100	100	19.06	23.7	22.4	21.8	19.2
	43 Hawthorn Road, Newbury	Diffusion Tube	100	100	22.24	25.7	25.7	23.5	18.7
	41 Hutton Close, Newbury	Diffusion Tube	100	100	35.39	**40.5**	38.4	34.3	30.2
	Willows Edge Nursing Home, Newbury	Diffusion Tube	100	100	23.41	27.3	24.4	25.5	20.7
	112 Shaw Road, Newbury	Diffusion Tube	100	100	24.37	27.6	27.4	25.3	21.4
	31 Shaw Road, Newbury	Diffusion Tube	100	42	35.66	**40.7**	**41.9**	35.4	37.2
	13 Shaw Road, Newbury	Diffusion Tube	100	83	38.23	**40.4**	36.4	**42.6**	33
	Abbeydale, Monks Lane, Newbury	Diffusion Tube	100	83	22.32	21.5	22.8	20.1	16.5
	A343 Andover Road, Wash Common	Diffusion Tube	100	92	38.25	**40.4**	36.4	**42.6**	15.6
	Bus Stop Racecourse Road, Stroud Green	Diffusion Tube	100	100	23.11	29.5	21.2	18.5	16.6
	Thatcham Continuous monitor 1, junction	Diffusion Tube	25	25	17.34	26.1	24.6	23.3	17.3

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2015 (%) (2)	NO_2 Annual Mean Concentration ($\mu g/m^3$) (3)				
					2011	2012	2013	2014	2015
	A4 Chapel St and Coombe Court								
	Thatcham Continuous monitor 2, junction A4 Chapel St and Coombe Court	Diffusion Tube	25	25	18.46	28.7	24.6	23.4	16.1
	Thatcham Continuous monitor 3, junction A4 Chapel St and Coombe Court	Diffusion Tube	25	25	20.30	26.3	24.6	22.1	18.5
	10 Prancing Horse Close Thatcham	Diffusion Tube	100	100	-	28.0	25.7	18.0	15.2
	130 Park Avenue Thatcham	Diffusion Tube	100	75	-	30.3	26.0	25.3	17.3
	31 Chapel Street Thatcham	Diffusion Tube	100	100	-	**51.9**	**54.5**	**45.1**	37.2
	110 London Road Newbury	Diffusion Tube	100	92	-	33.9	30.2	29.5	24.5

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

NO_2 annual means exceeding $60\mu g/m^3$, 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 Technical Guidance LAQM.TG16 if valid data capture for the full calendar year is less than 75%. See Appendix C for details.

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

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2015 (%) (2)	NO_2 1-Hour Means > 200µg/m^3 (3)				
					2011	2012	2013	2014	2015
Continuous monitor A343, A339 and Greenham Road roundabout, Newbury	Roadside	Automatic	100	91.1	8	**19**	3	6	3

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 90%, the 99.8th percentile of 1-hour means is provided in brackets.

Appendix B: Full Monthly Diffusion Tube Results for 2015

Table B.1 – NO_2 Monthly Diffusion Tube Results - 2015

Site ID	NO_2 Mean Concentrations ($\mu g/m^3$)													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean	
													Raw Data	Bias Adjusted (1)
A339 Newbury Central	45.63	44.78	38.34	34.77	40.29	39.96	42.27	44.68	43.14	46.05	-	-	42	37.8
7a Bridge Street Hungerford	18.43	26.70	27.03	22.57	22.74	24.79	23.68	27.01	29.12	33.03	24.57	22.21	25.16	22.6
Chaddleworth Primary School	9.63	8.61	8.65	6.84	5.23	5.97	4.78	5.84	7.96	11.28	6.02	6.77	7.3	6.6
The Greyhound PH Tidmarsh	21.59	20.43	18.68	16.82	16.13	-	17.99	19.61	22.26	24.47	17.66	19.26	19.54	17.6
Old Bakery Tidmarsh	35.80	33.72	29.75	30.21	28.50	33.01	29.18	32.42	34.36	37.70	31.50	26.20	31.89	28.7

Site ID	NO_2 Mean Concentrations (µg/m^3)													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean	
													Raw Data	Bias Adjusted (1)
49 St James Close Pangbourne	19.56	18.86	18.08	16.92	12.14	17.31	15.38	17.33	21.49	24.28	12.29	11.15	17.07	15.4
1 Shooters Hill Pangbourne	29.07	27.13	22.92	24.59	24.93	23.77	29.08	25.23	29.18	30.39	26.94	27.08	26.7	24
4 Willows Court Pangbourne	33.83	25.85	29.58	29.33	20.80	30.24	24.56	30.19	36.46	38.46	24.06	24.96	28.19	25.4
The Cross Key Inn Pangbourne	35.50	34.65	37.16	34.76	29.05	38.60	28.98	37.82	50.78	46.72	28.64	32.01	36.22	32.6
14 High Street Pangbourne	26.66	34.27	23.36	24.14	18.49	19.77	20.77	22.09	25.74	27.26	25.08	22.12	24.15	21.7
20-24 Saunders Court Purley	16.54	18.11	19.19	16.83	11.76	16.30	12.84	17.08	25.76	26.38	11.13	13.42	17.11	15.4

Site ID	NO_2 Mean Concentrations ($\mu g/m^3$)													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean	
													Raw Data	Bias Adjusted (1)
102 Langley Hill Tilehurst	-	29.09	25.72	22.89	18.29	23.21	17.36	22.15	27.26	31.82	24.82	23.09	24.15	21.7
Calcot Hotel	35.34	30.31	-	27.51	20.42	21.65	-	25.30	32.47	34.95	25.66	27.52	28.11	25.3
Elizabeth Court Theale	11.09	21.98	22.81	25.33	15.81	18.96	20.42	21.14	26.13	25.77	21.39	23.00	21.15	19
37 The Street Aldermaston	27.42	24.94	24.44	23.00	17.29	20.80	19.68	19.90	21.62	23.85	22.00	21.05	20.33	18.3
1 Avenells Cottage Crookham Hill	13.23	12.74	12.29	10.45	7.10	10.23	7.67	11.17	12.85	15.08	9.22	9.11	10.93	9.3
159 Station Road Thatcham	29.24	24.98	24.34	17.44	20.75	19.42	18.88	20.27	24.86	26.15	20.63	19.06	22.17	20
75 Chapel Street Thatcham	36.14	29.30	28.33	27.14	27.06	28.17	30.38	26.98	29.55	29.94	32.78	30.60	29.7	26.7

Site ID	NO_2 Mean Concentrations ($\mu g/m^3$)													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean	
													Raw Data	Bias Adjusted (1)
Thatcham continuous Monitoring station A	30.21	23.57	23.02	-	-	-	-	-	-	-	-	-	19.71 (annualised)	17.3
Thatcham continuous Monitoring station B	29.22	23.61	24.48	-	-	-	-	-	-	-	-	-	19.84 (annualised)	16.1
Thatcham continuous Monitoring station C	28.26	26.35	25.58	-	-	-	-	-	-	-	-	-	20.58 (annualised)	18.5
Flat 1 47 Chapel Street Thatcham	33.67	30.61	34.75	-	20.57	24.45	23.67	25.36	27.45	33.11	22.06	20.11	24.44	22
10 Prancing Horse Close Thatcham	24.21	19.53	20.78	14.84	11.31	12.56	11.13	13.57	20.02	24.26	14.22	16.00	16.87	15.2

Site ID	NO_2 Mean Concentrations ($\mu g/m^3$)													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean	
													Raw Data	Bias Adjusted (1)
A4 (80-82) Chapel St Thatcham	35.03	26.97	29.52	30.20	22.99	29.40	25.87	26.85	35.25	33.10	25.56	21.17	28.49	25.6
40 Chapel Street Thatcham	35.12	-	33.51	32.40	29.32	35.98	34.96	35.18	-	42.11	-	28.36	34.1	30.7
130 Park Avenue Thatcham	-	22.90	18.55	21.15	13.64	16.29	18.82	17.46	-	-	21.78	21.93	19.17	17.3
31 Chapel Street Thatcham	48.38	47.58	40.32	34.17	34.34	40.11	42.73	40.76	43.92	46.32	41.60	36.60	**41.37**	37.2
17 Chapel Street Thatcham	47.51	42.75	36.36	38.92	38.87	42.28	38.20	38.62	47.54	43.06	36.26	33.95	**40.36**	36.3
29 Bath Road Thatcham	23.01	21.28	20.62	20.61	12.47	16.69	14.56	16.32	22.99	25.17	14.69	-	18.95	17.1

Site ID	NO_2 Mean Concentrations ($\mu g/m^3$)													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean	
													Raw Data	Bias Adjusted (1)
374 London Road Newbury	22.94	21.92	21.58	20.53	19.00	19.12	15.44	22.50	26.21	28.27	21.27	17.63	21.37	19.2
44 Hambridge Road Newbury	27.50	29.32	30.99	25.30	20.21	28.18	21.30	24.53	27.39	28.17	21.91	18.42	25.27	22.7
42 Kings Road Newbury	29.69	25.20	27.16	21.18	20.43	21.80	22.58	26.04	23.57	26.27	26.64	-	24.6	22.1
1 Winchester Court Newbury	43.44	43.62	36.91	31.21	35.69	38.31	40.03	43.07	40.47	42.74	34.85	25.18	37.96	34.2
Newbury continuous monitor 1	43.13	45.19	36.61	38.33	31.50	37.93	38.50	43.00	39.61	47.35	36.12	31.89	39.1	35.2
Newbury continuous monitor 2	42.35	39.98	37.39	33.58	34.99	37.14	40.97	41.96	34.44	48.83	40.47	34.01	38.84	35

Site ID	NO_2 Mean Concentrations (µg/m^3)													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean	
													Raw Data	Bias Adjusted (1)
Newbury continuous monitor 3	42.39	42.59	37.35	32.21	35.92	38.90	38.15	43.69	39.23	45.17	34.52	31.88	38.5	34.7
A339 (64) Greenham Road Newbury	37.93	36.04	-	36.12	30.18	33.72	31.41	35.34	-	35.64	25.21	21.92	32.32	29.1
Bus Stop Racecourse Road Newbury	22.21	20.97	37.97	18.79	11.68	12.24	12.44	16.55	20.49	22.41	13.89	11.67	18.44	16.6
20 Deadmans Lane Greenham	26.49	25.81	17.89	20.60	30.39	25.99	24.58	28.30	26.52	22.08	28.03	19.93	24.72	22.2
A339 New Greenham Park	45.06	-	20.81	36.93	35.42	35.81	26.16	29.87	38.21	40.99	20.09	29.43	32.62	29.4

Site ID	NO_2 Mean Concentrations ($\mu g/m^3$)													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean	
													Raw Data	Bias Adjusted (1)
A343 Andover Rd (Parkhouse School) Wash Common	23.14	18.78	19.11	15.20	-	16.29	12.34	16.00	19.69	22.89	14.13	12.53	17.28	15.6
Abbeydale Monks Lane Newbury	-	19.97	19.04	18.08	13.22	-	14.59	16.77	22.52	25.50	17.28	15.89	18.29	16.5
3 Howard Road Newbury	21.54	23.16	22.75	19.00	13.03	15.52	12.88	18.36	23.74	30.13	14.03	15.16	19.11	17.2
63 St Johns Road Newbury	25.70	24.26	24.55	24.18	16.37	20.94	17.49	22.62	28.93	31.92	15.77	14.85	22.33	20.1
1 St Johns Road Newbury	31.03	28.45	31.61	26.27	18.92	28.39	20.83	26.97	32.94	42.56	-	19.63	27.96	25.2

Site ID	NO_2 Mean Concentrations ($\mu g/m^3$)													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean	
													Raw Data	Bias Adjusted (1)
39 Newtown Road Newbury	19.31	21.73	19.60	18.55	13.12	14.18	10.61	17.53	19.34	22.28	14.94	15.00	17.18	15.5
St John's PO 1 Andover Rd Newbury	19.01	17.92	19.11	16.01	10.26	13.60	13.78	14.69	21.28	22.16	12.46	11.74	16	14.4
40 Bartholomew Street Newbury	34.52	34.52	28.59	32.33	-	29.60	34.65	33.31	-	36.50	-	29.17	32.58	29.3
8A Craven Road Newbury	20.69	19.18	21.55	20.96	13.17	16.04	13.74	17.60	-	28.39	14.49	14.41	18.2	16.4
6 Market Place Newbury	32.73	36.33	32.48	29.36	24.29	31.70	27.77	31.48	35.40	36.91	27.87	27.91	31.19	28.1
105 London Road Newbury	23.51	22.18	23.15	23.74	13.90	19.93	14.50	19.45	27.54	29.97	13.88	15.21	20.58	18.5
31 Oxford Road Newbury	30.30	32.34	29.00	27.10	24.10	27.45	27.65	30.34	31.76	36.51	32.72	31.94	30.1	27.1

Site ID	NO_2 Mean Concentrations ($\mu g/m^3$)													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean	
													Raw Data	Bias Adjusted (1)
1 Dolman Road Newbury	25.51	24.19	26.93	21.39	16.45	18.33	18.23	19.26	22.31	24.53	19.50	18.99	21.3	19.2
43 Hawthorn Road Newbury	22.21	22.88	24.82	23.30	13.70	20.35	14.58	20.27	27.39	30.82	13.58	16.10	20.83	18.7
41 Hutton Close Newbury	31.70	35.59	29.05	27.33	33.74	33.35	34.50	35.35	32.87	38.29	38.79	31.61	33.51	30.2
Willows Edge Nursing Home Newbury	29.23	26.65	22.29	20.03	17.76	18.32	20.89	21.57	21.70	22.89	28.11	25.96	22.95	20.7
112 Shaw Road Newbury	28.60	26.54	22.70	20.49	19.19	20.72	21.01	22.74	27.96	27.84	23.85	23.24	23.74	21.4
31 Shaw Road Newbury	-	-	-	-	-	31.99	32.23	-	37.38	38.84	-	37.63	35.61	37.2
13 Shaw Road Newbury	41.57	37.15	33.47	30.95	-	-	41.52	39.44	34.51	40.11	33.18	35.20	36.71	33

Site ID	NO_2 Mean Concentrations ($\mu g/m^3$)													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean	
													Raw Data	Bias Adjusted (1)
110 London Road Newbury	31.39	26.83	22.67	24.44	30.40	26.49	27.97	29.12	27.00	29.07	-	23.49	27.17	24.5
118A London Road Newbury	26.87	25.35	20.86	18.50	17.63	21.16	21.40	20.06	20.44	23.29	24.41	19.47	21.62	19.5
132 London Road Newbury	41.18	39.82	36.67	37.44	24.66	40.57	37.27	39.64	45.13	44.37	34.35	28.25	37.46	33.7
Flat 1 Southview Gardens Newbury	33.90	33.52	28.94	30.06	27.49	29.38	29.22	29.51	26.82	31.29	32.88	-	30.27	27.2
1 Iden Court Newport Road Newbury	31.83	35.79	25.61	24.89	27.38	24.09	26.92	26.55	26.67	26.30	28.65	24.73	27.45	24.7

(1) See Appendix C for details on bias adjustment

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

QA/QC for continuous monitoring

TRL carry out the QA/QC on behalf of West Berkshire Council.

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. In the event that 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

Microsoft Excel-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 to ensure the nitrogen dioxide analyser is operating correctly. The audit that is carried out utilises 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.

The site audit was carried out at the Newbury site on the 18th August 2015.

The converter in the NOx analyser was tested and found to be 98.9% efficient with NO_2 concentrations of 238 ppb. The recommended range for instrumentation in the national automatic air monitoring network is in the range of 98% to102% efficient. This was a good result. To ensure that the analyser is sampling only ambient air the instrument was leak checked. The result was 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's flow rate was measured using a calibrated flow meter and compared against the analyser's flow rate sensor to evaluate its accuracy. The analyser's flow rate sensor was within 10% of the calibrated flow meter and therefore passed this test. Based on the NOx analyser's response to the audit standard and audit zero, the concentrations of the stations NO cylinders 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 and the result was an increase of 1.9%.

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 will be 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 AR004 – AR010 (Jan 2015 – Nov 2015) were as follows: AIR PT AR006 = 100%, AIR PT AR007 = 100%, AIR PT AR009 = 100% and AIR PT AR010 = 100%, which relates to the % of results which are satisfactory.

Diffusion Tube Bias Adjustment Factors

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. 03/16) suggested a bias adjustment factor of **0.95** be applied. A copy of the co-location spreadsheet used is provided below. Using Newbury co-location study a local bias adjustment factor has been calculated as **0.90**. The national bias adjustment factor has not been used due to the availability of a local bias adjustment factor.

For the purposes of the ASR 2016 for the 2015 data the bias adjustment factor is **0.90** derived from the Newbury co-location study.

In determining the bias adjustment factor for the 2015 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 – the Newbury and Thatcham co-location studies are 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 Newbury co-location study is predominantly influenced by road traffic.
- For tubes exposed in a similar setting to the co-location site – the Newbury co-location study site is a roadside location, as are over 30 of 64 of the diffusion tubes located in West Berkshire. Therefore the bias adjustment factor determined from either of these locations may not be 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 Newbury co-location study and diffusion tube surveys are all for a full calendar year.
- 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 18 studies therefore it would be better to use the Newbury co-location study factor.
- Where the co-location study is spread across more than one calendar year – The Newbury co-location study and diffusion tube surveys are for a full calendar year (2015).
- 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 Newbury co-location study achieved “good” precision and the Newbury chemiluminescence results (automatic monitoring) 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 – Approximately half of our diffusion tube monitoring sites are roadside sites as is the Newbury co-location study site
- Where the co-location study is for less than nine months, although the diffusion tube monitoring is for a longer period - The Newbury co-location study and diffusion tube surveys are for a full calendar year (2015).
- Where the automatic analyser has been operated using local, rather than national, QA/QC procedures - The Newbury 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 the Newbury automatic monitor was 91.1% in 2015.
- 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 Newbury co-location study 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 local (Newbury) bias adjustment factor should be used to adjust the 2015 data.

C.1 Newbury co-location study precision and accuracy

Checking Precision and Accuracy of Triplicate Tubes

AEA Energy & Environment
From the AEA group

Diffusion Tubes Measurements									
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
1	06/01/2015	04/02/2015	43.1	42.4	42.4	43	0.4	1	1.1
2	04/02/2015	04/03/2015	45.2	40.0	42.6	43	2.6	6	6.5
3	04/03/2015	01/04/2015	36.6	37.4	37.4	37	0.4	1	1.1
4	01/04/2015	07/05/2015	38.3	33.6	32.2	35	3.2	9	8.0
5	07/05/2015	04/06/2015	31.5	35.0	35.9	34	2.3	7	5.8
6	04/06/2015	02/07/2015	37.9	37.1	38.9	38	0.9	2	2.2
7	02/07/2015	06/08/2015	38.5	41.0	38.2	39	1.5	4	3.8
8	06/08/2015	03/09/2015	43.0	42.0	43.7	43	0.9	2	2.2
9	03/09/2015	05/10/2015	39.6	34.4	39.2	38	2.9	8	7.2
10	05/10/2015	03/11/2015	47.4	48.8	45.2	47	1.8	4	4.6
11	03/11/2015	03/12/2015	36.1	40.5	34.5	37	3.1	8	7.6
12	03/12/2015	07/01/2016	31.9	34.0	31.9	33	1.2	4	3.0
13									

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

Automatic Method		Data Quality Check	
Period Mean	Data Capture (% DC)	Tubes Precision Check	Automatic Monitor Data
33.45	100	Good	Good
35.75	100	Good	Good
33.67	99.4	Good	Good
36.61	88.23	Good	Good
27	99.7	Good	Good
27	87.02	Good	Good
37	84.82	Good	Good
38	51.04	Good	or Data Capture
40	99.88	Good	Good
42	78.01	Good	Good
36.05	99.88	Good	Good
34.4	99.88	Good	Good
Overall survey -->		Good precision	Good Overall

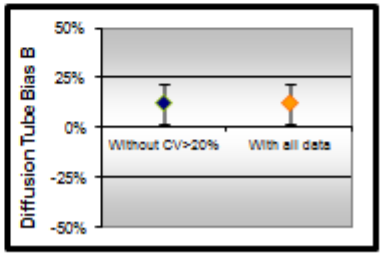
(Check average CV & DC from Accuracy calculations)

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	0.9 (0.83 - 1)
Bias B	11% (0% - 21%)
Diffusion Tubes Mean:	38 μgm^{-3}
Mean CV (Precision):	5
Automatic Mean:	35 μgm^{-3}
Data Capture for periods used:	94%
Adjusted Tubes Mean:	35 (32 - 38) μgm^{-3}

Accuracy (with 95% confidence interval) WITH ALL DATA	
Bias calculated using 11 periods of data	
Bias factor A	0.9 (0.83 - 1)
Bias B	11% (0% - 21%)
Diffusion Tubes Mean:	38 μgm^{-3}
Mean CV (Precision):	5
Automatic Mean:	35 μgm^{-3}
Data Capture for periods used:	94%
Adjusted Tubes Mean:	35 (32 - 38) μgm^{-3}



Jaume Targa, for AEA
Version 04 - February 2011

Short-term to Long-term Data Adjustment

When referring to LAQM.TG (16) the calculations for annualising for 31 Shaw Road Newbury and Thatcham continuous monitor triplicate co-location has been possible using 2015 data as recommended in this guidance.

Table C.2 – Short term to long term data adjustment - 31 Shaw Road

Site	Site Type	Annual Mean 2015 (µg/m^3)	Period Mean 2015 (µg/m^3)	Ratio
Reading	Background	21	15.2	1.38
Oxford St Ebbes		14	13	1.08
Canterbury		11	9.8	1.12
Average				1.16
Measured mean concentration (35.61) x average				**41.31**

Table C.3 – Short term to long term data adjustment - Thatcham continuous monitor co-location study

Site	Site Type	Annual Mean 2015 (µg/m^3)	Period Mean 2015 (µg/m^3)	Ratio
Reading	Background	21	28.3	0.74
Oxford St Ebbes		14	18.3	0.77
Canterbury		11	14	0.79
Average				0.77
Measured mean concentration (25.6) x average				19.71
Measured mean concentration (25.77) x average				19.84
Measured mean concentration (26.73) x average				20.58

Nitrogen Dioxide fall off distance calculation

Using the guidance in LAQM.TG (16), fall off distance calculation was carried out using the background site Reading New Town (21 µg/m^3).

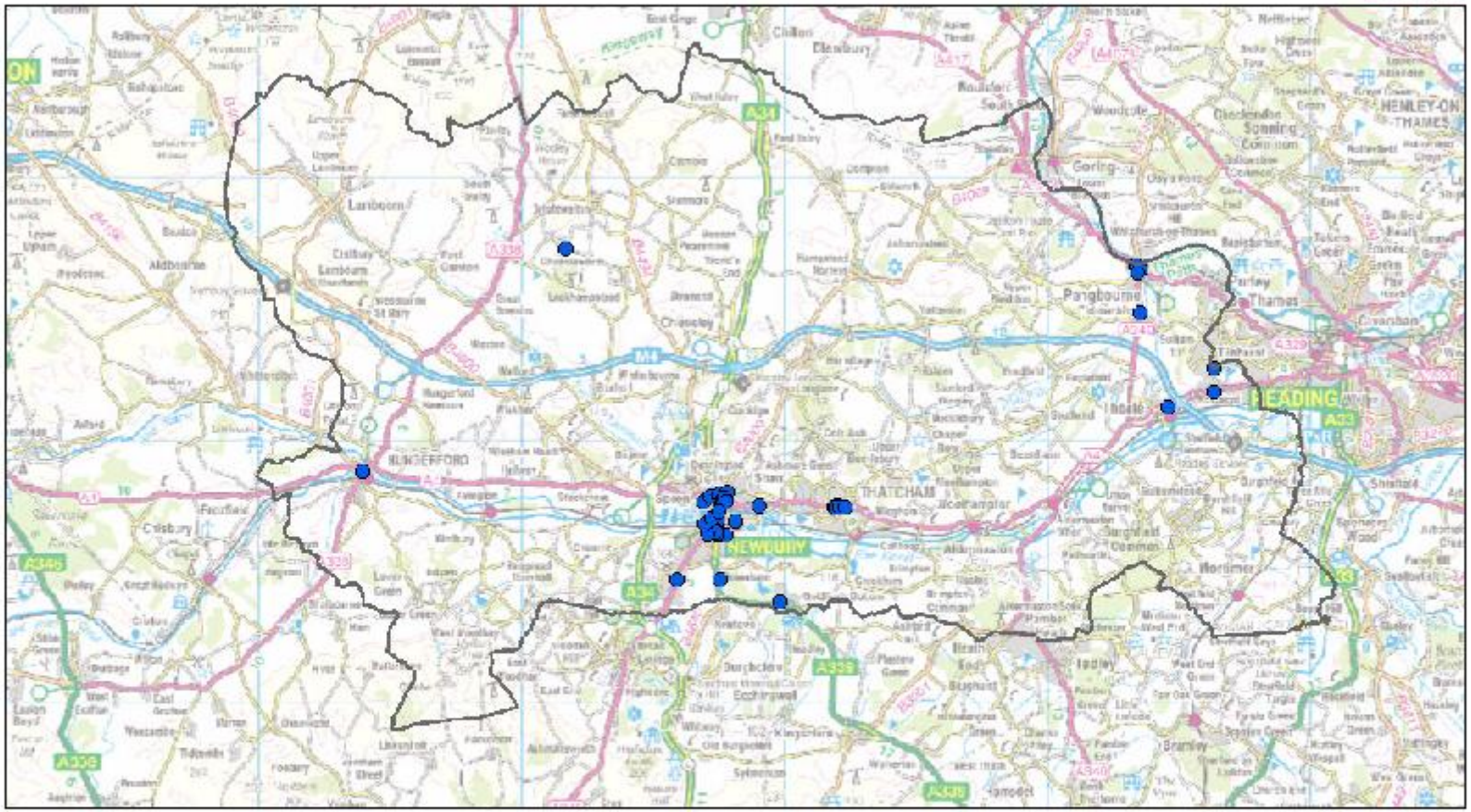
Table C.4 Fall off distance calculation

Site	Current Annual Mean (µg/m^3) (Not bias corrected)	Prediction Annual Mean (µg/m^3)
A339 Newbury Central	42	
31 Shaw Road	41.31	
A339 New Greenham Park	32.62	n/a as more than 20m to nearest receptor

Appendix D: Maps of Monitoring Locations

Figure 1 All locations within West Berkshire

All difusion tube locations



Newbury (North)

Figure 2 Dolman Close, Newbury

Figure 3 112 Shaw Road

Figure 4 41 Hutton Close, Willows Edge Home, 43 Hawthorn Road and 31 Shaw Road

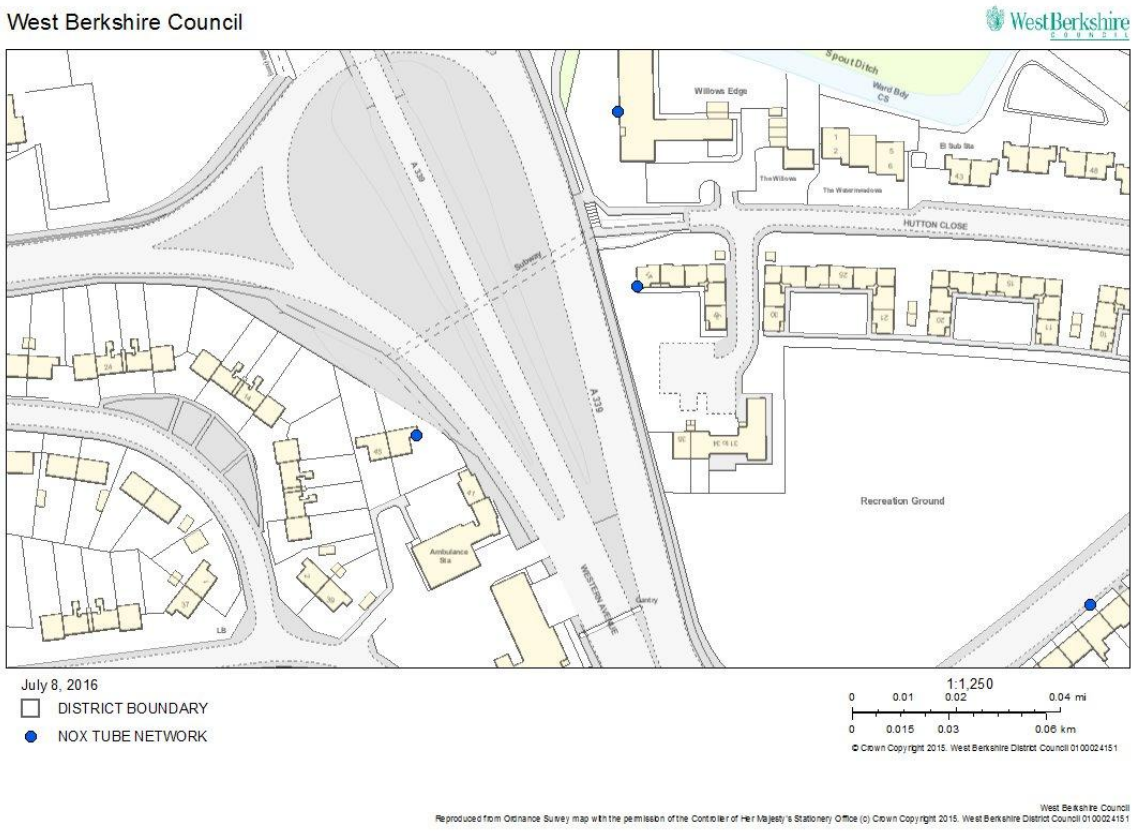
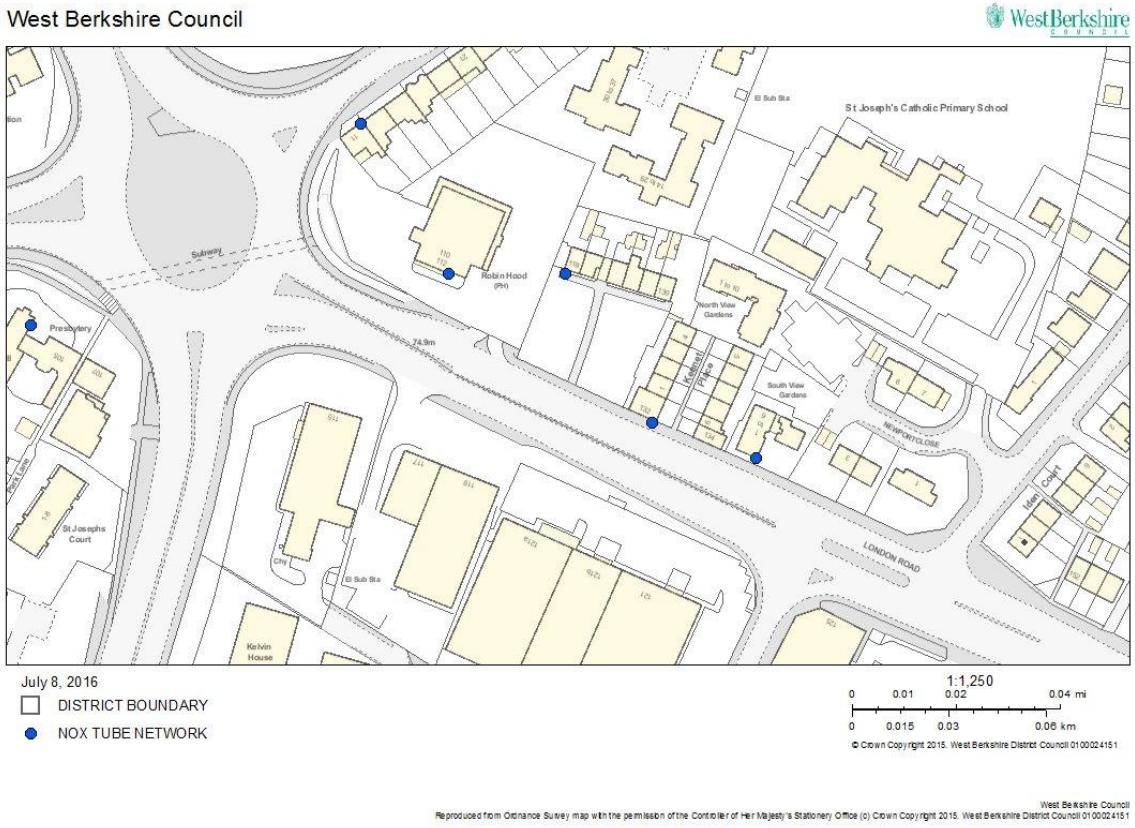


Figure 5 105 London Road, 110 London Road, 118A London Road, 132 London Road, 13 Shaw Road, Flat 1 Southview Gardens, & 1 Iden Court



Newbury Central

Figure 6 6 Market Place, A339 Lamp post, 42 Kings Road

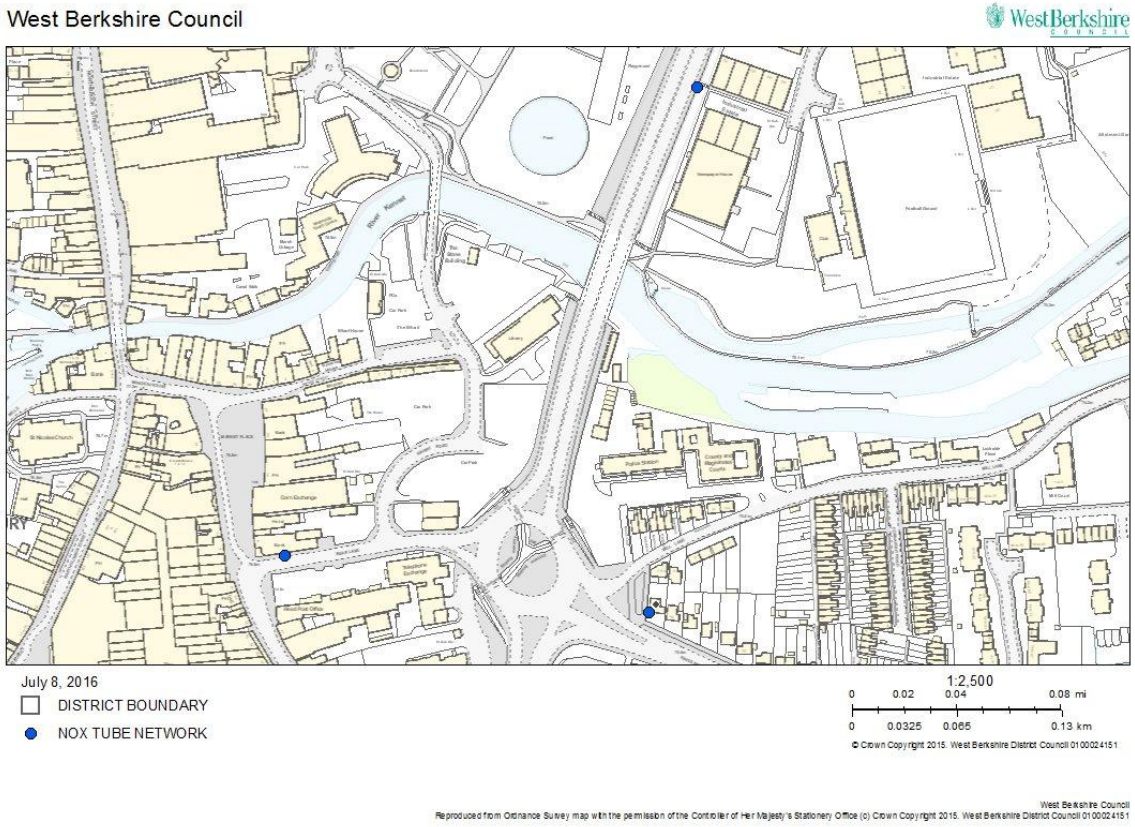


Figure 7 40 Bartholomew St and 8A Craven Road, Newbury

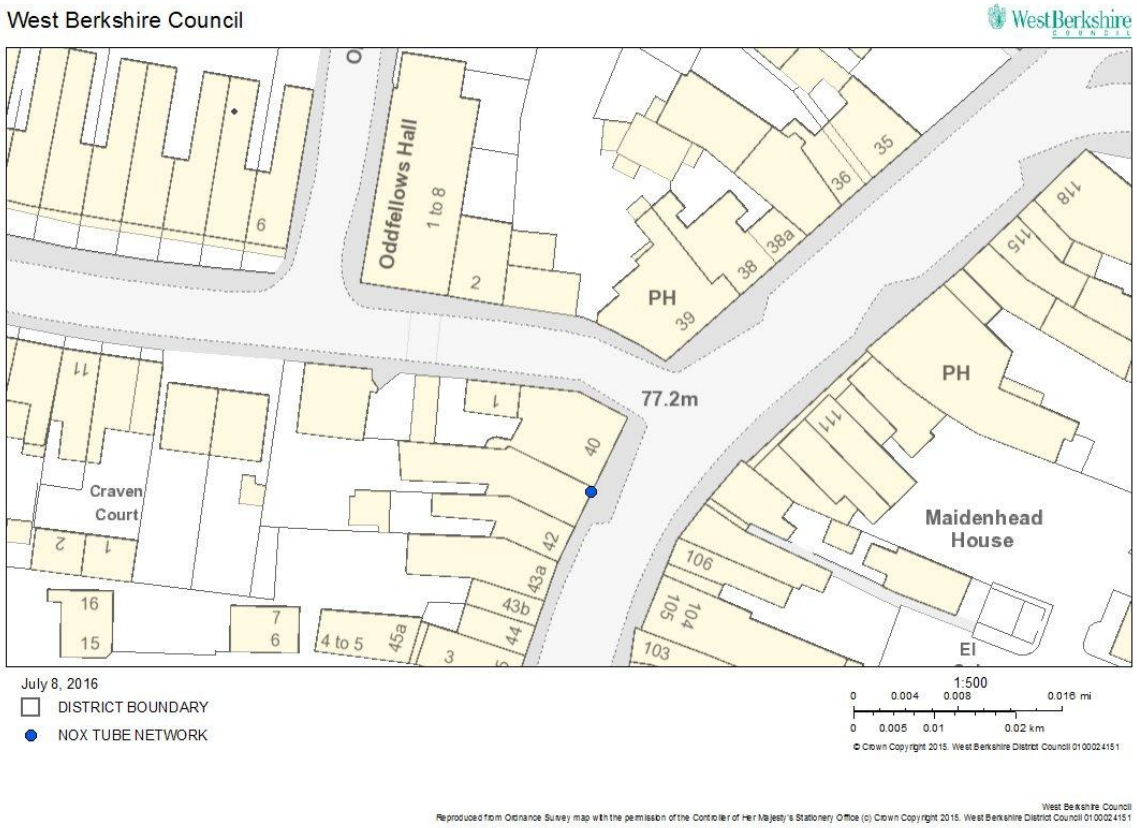


Figure 8 31 Oxford Street, Newbury

Figure 9 44 Hambridge Road, Newbury

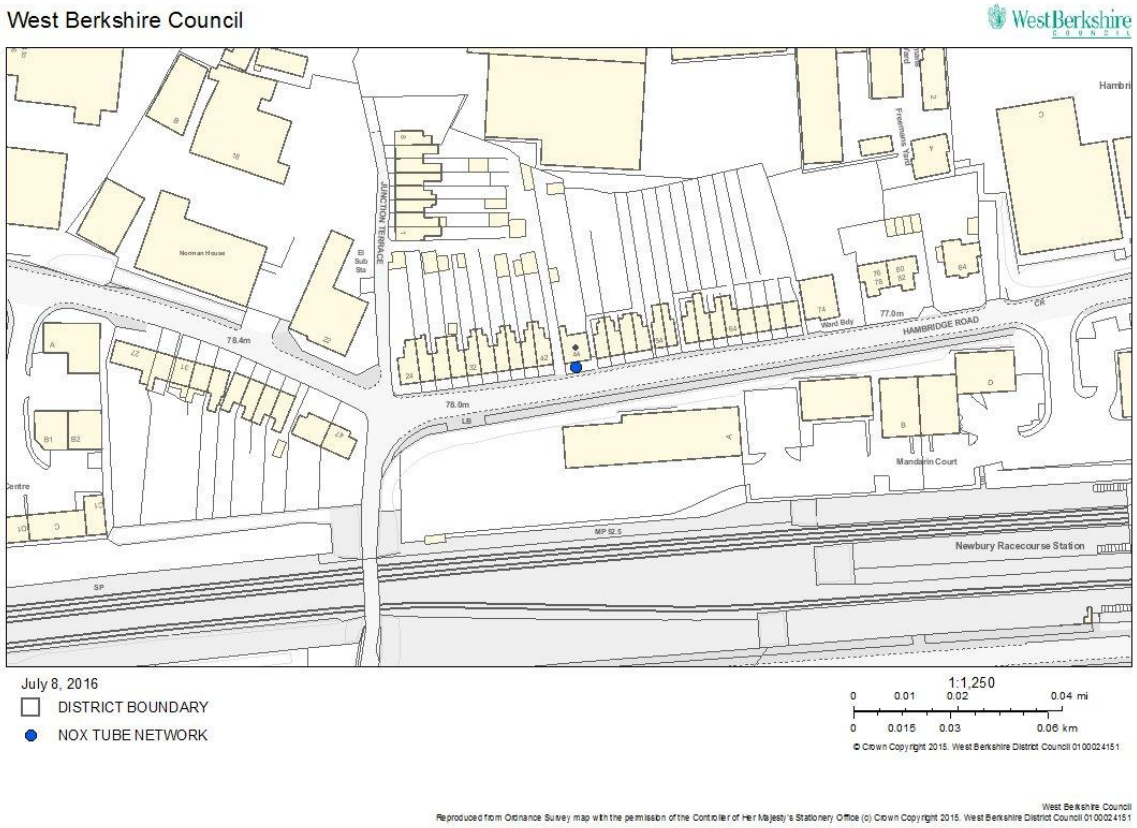
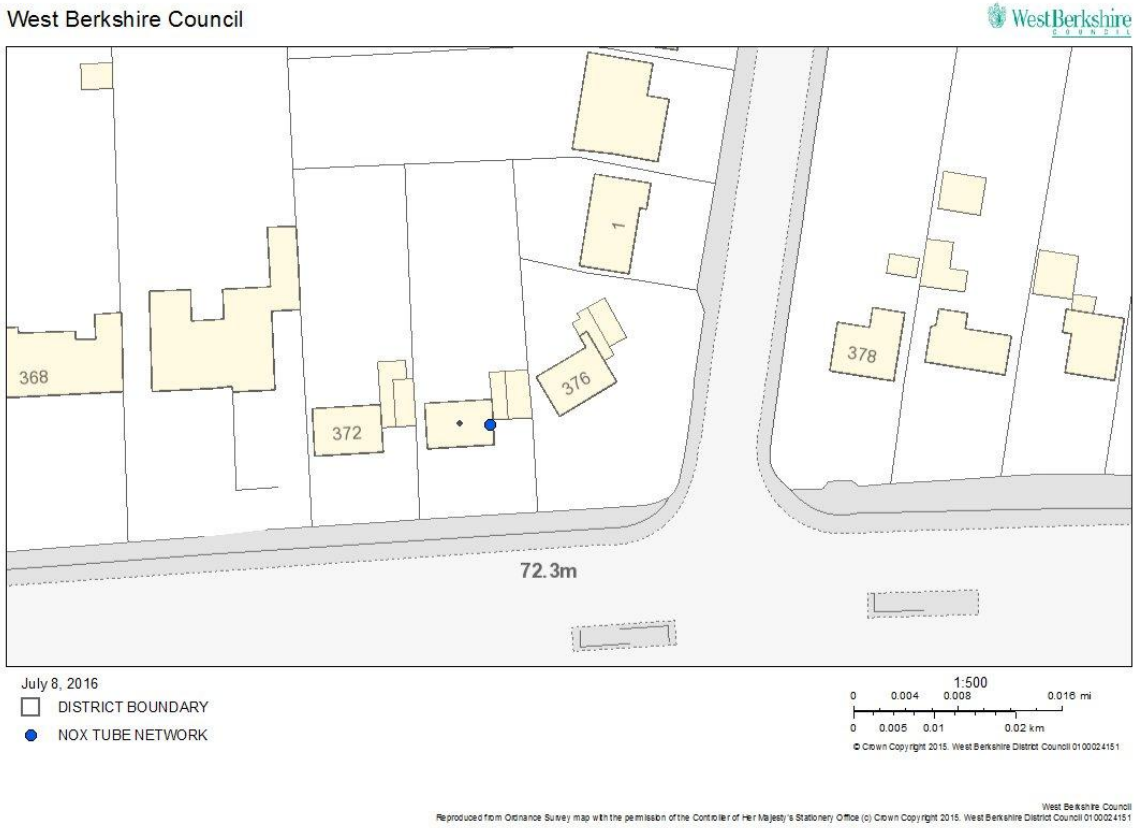


Figure 10 374 London Road, Newbury



Newbury South

Figure 21 1 St Johns Rd, 39 Newtown Rd

Figure 12 St John's PO 1 Andover Road

1 St Johns PO Newbury

August 9, 2016

DISTRICT BOUNDARY

1:500

0 0.004 0.008 0.016 mi

0 0.005 0.01 0.02 km

Figure 13 3 1 Winchester Court, 3x Continuous Monitor adjacent to 1 Winchester Court, 63 St Johns Rd, 3 Howard Rd, 64 Greenham Rd, Newbury

Figure 44 Racecourse Road, Bus Stop, Newbury

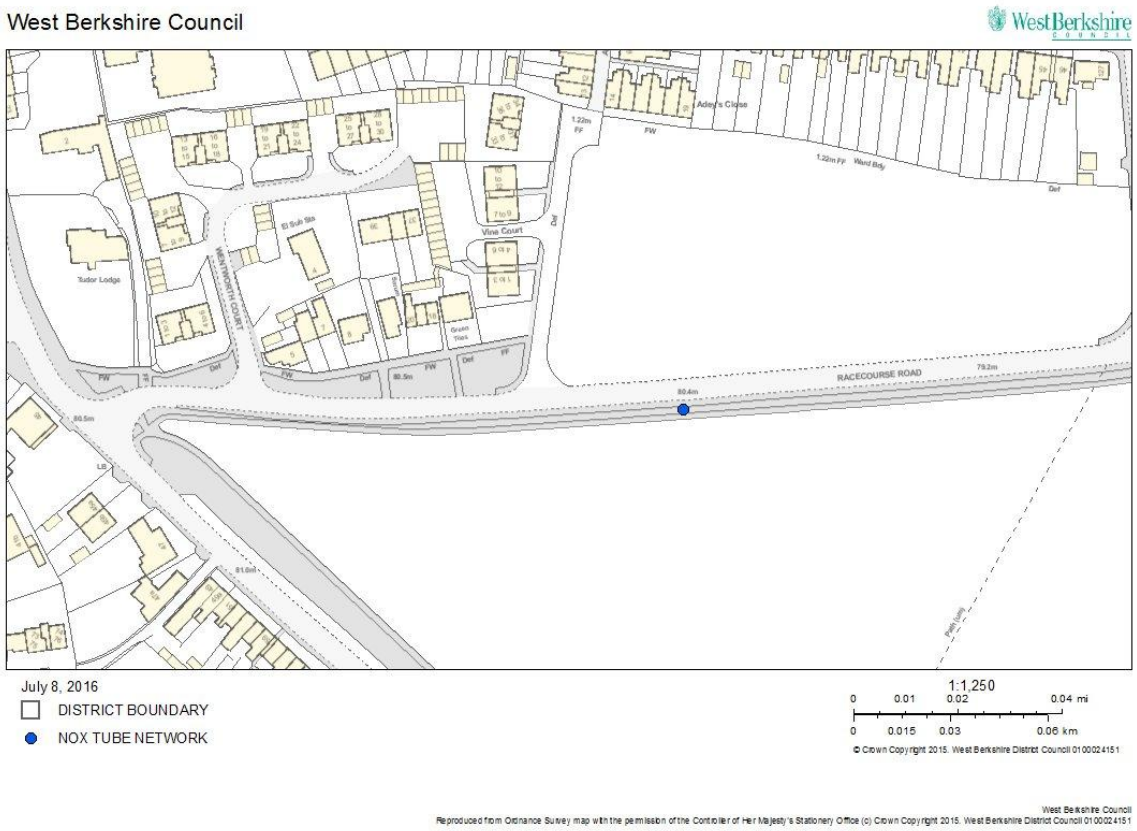


Figure 5 A343 Andover Road, Wash Common

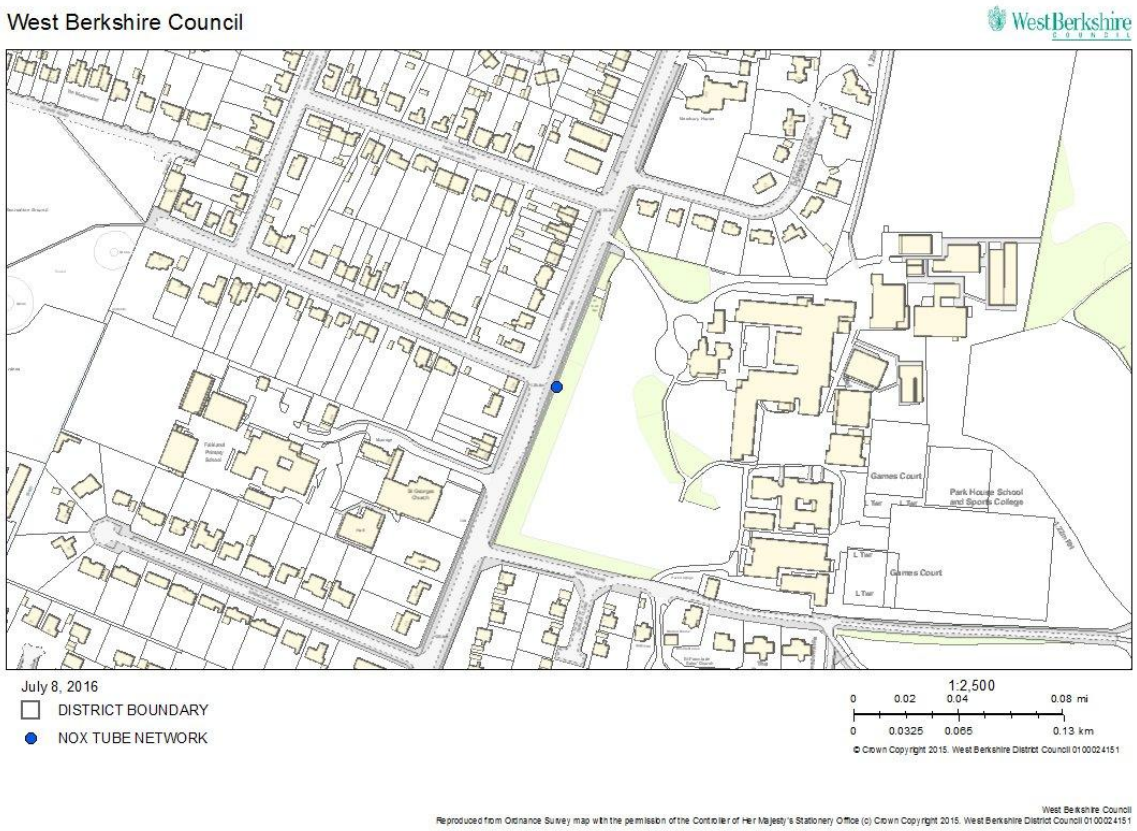
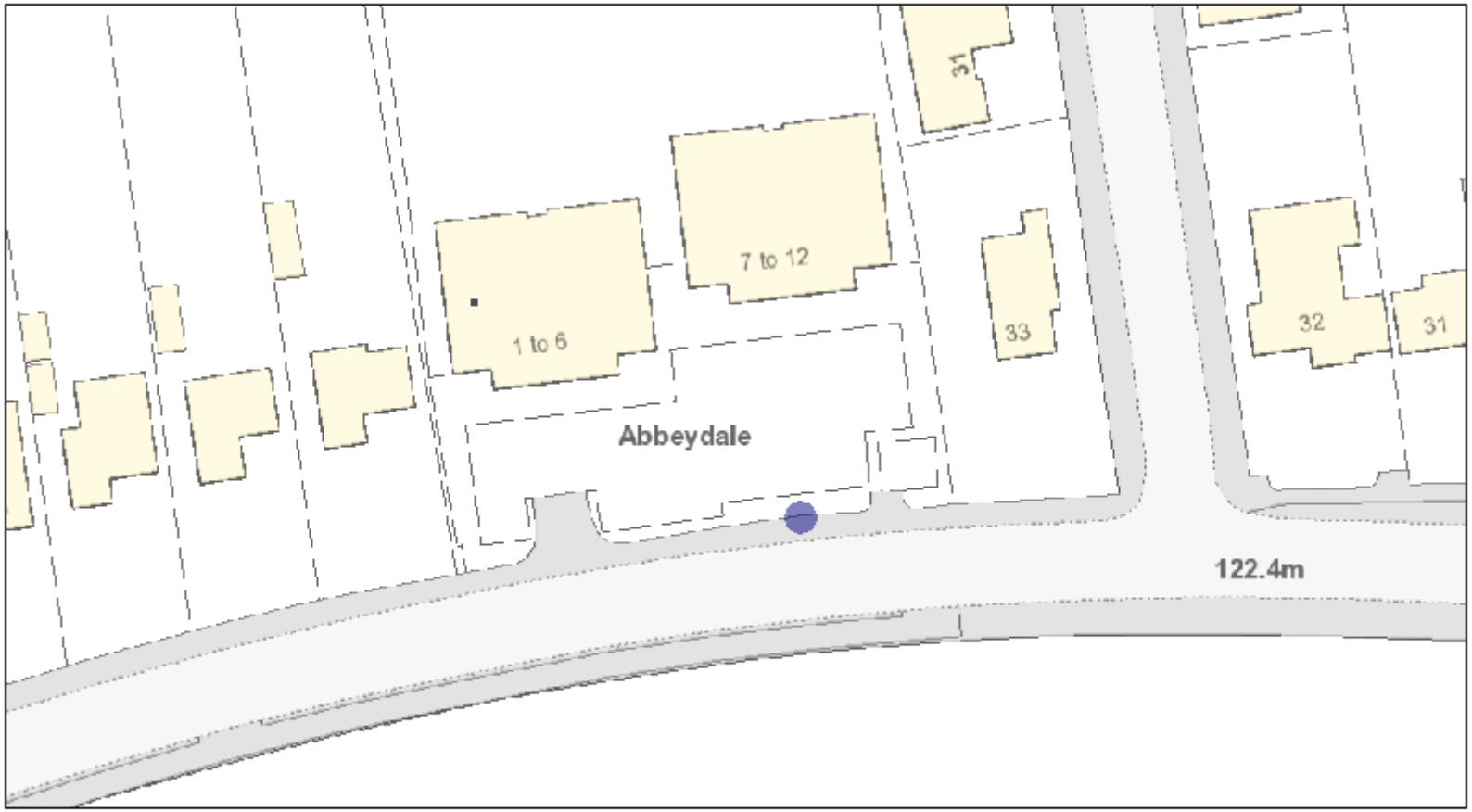


Figure 16 Abbeydale, Monks Lane

Abbeydale Monks Lane Newbury



August 9, 2016

DISTRICT BOUNDARY

1:500

0 0.004 0.008 0.016 mi

0 0.005 0.01 0.02 km

Figure 17 20 Deadmans Lane Greenham

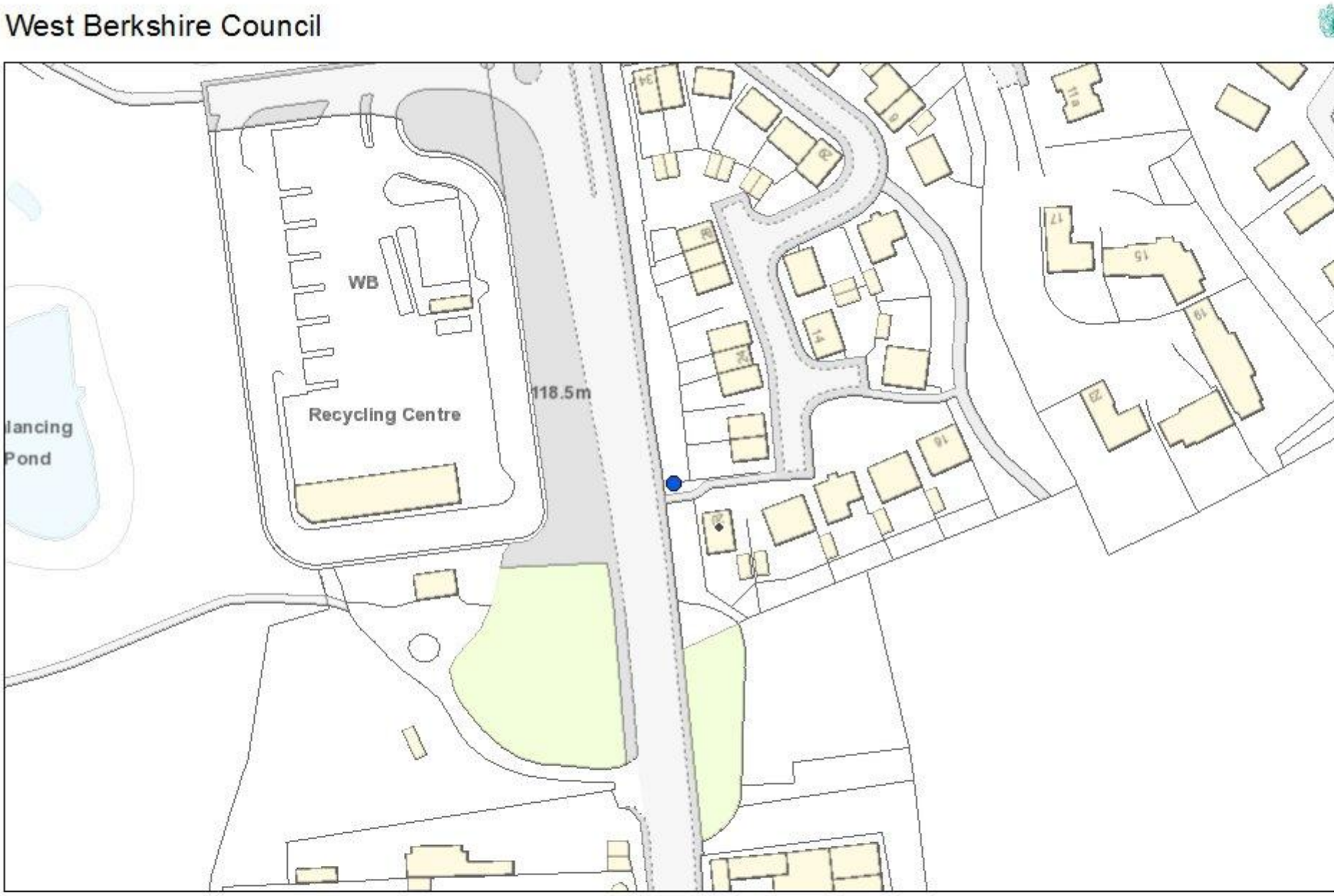

West Berkshire Council
WB
Recycling Centre
118.5m
lancing
Pond
July 8, 2016
DISTRICT BOUNDARY
NOX TUBE NETWORK
1:1,250
0
0.01
0.02
0
0.015
0.03

Figure 18 A339 New Greenham Park Greenham

West Berkshire Council

July 8, 2016

DISTRICT BOUNDARY

1:4,000

0 0.0325 0.065

East of district

Figure 19 Elizabeth Court

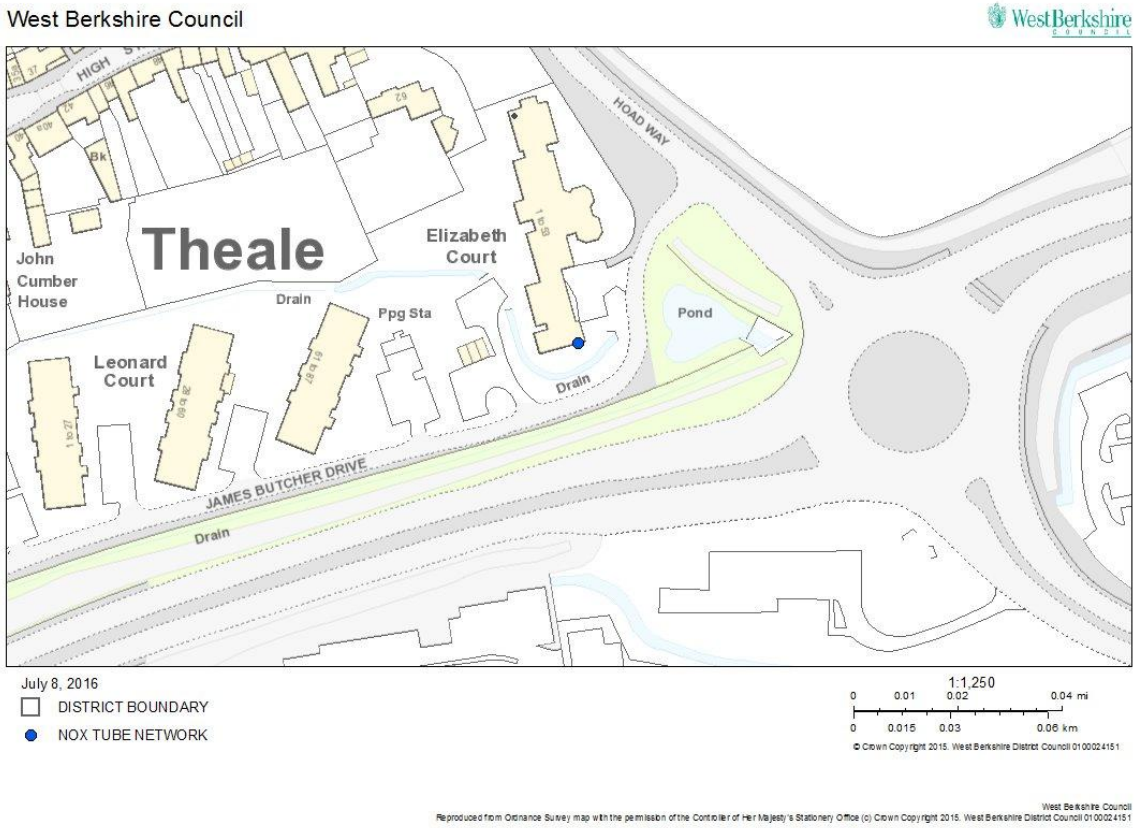
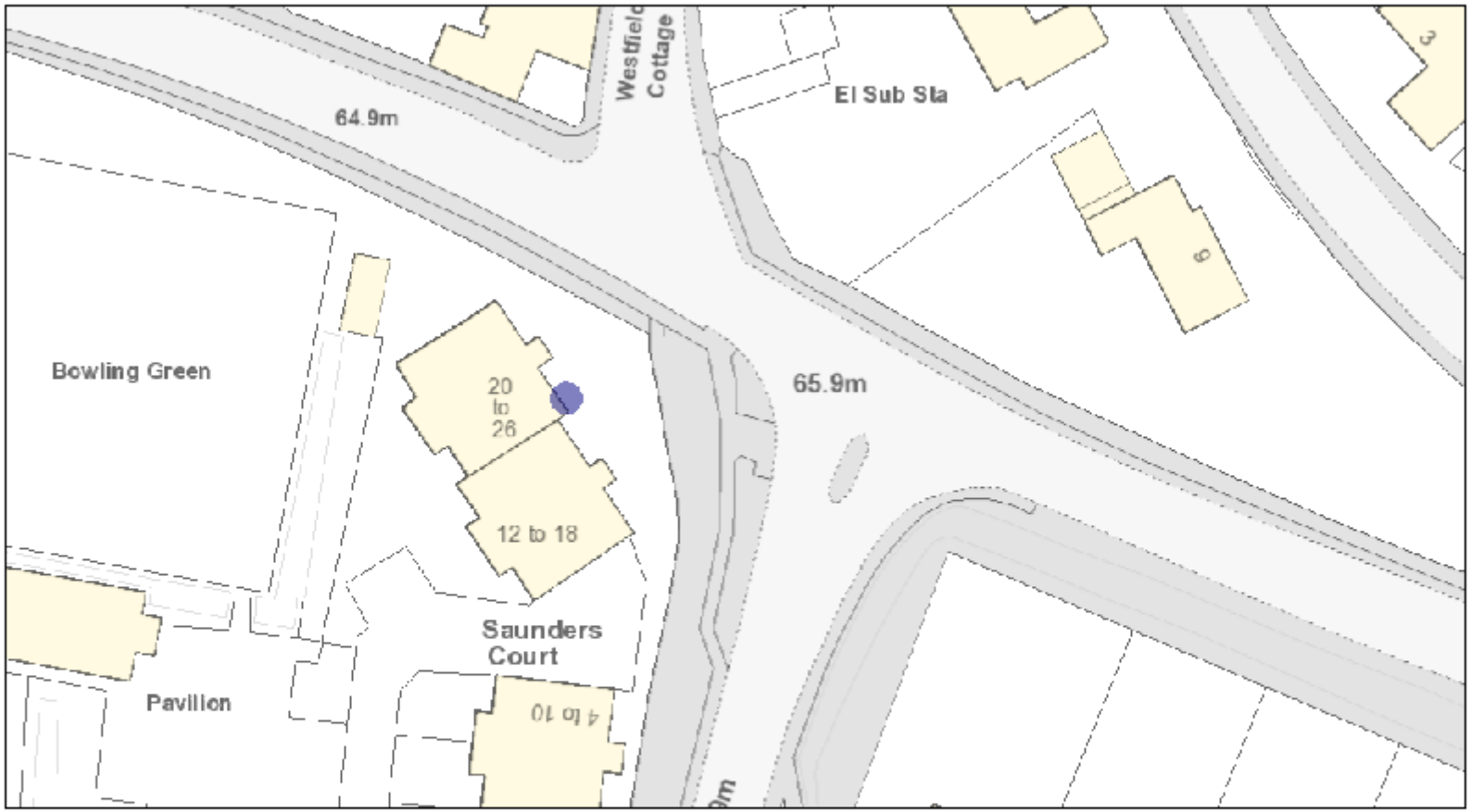


Figure 20 102 Langley Hill, Tilehurst

Figure 21 Calcot Hotel, A4 Bath Road Calcot

Figure 22 20-24 Saunders Court, Purley

20-24 Saunders Court Purley



August 9, 2016

DISTRICT BOUNDARY

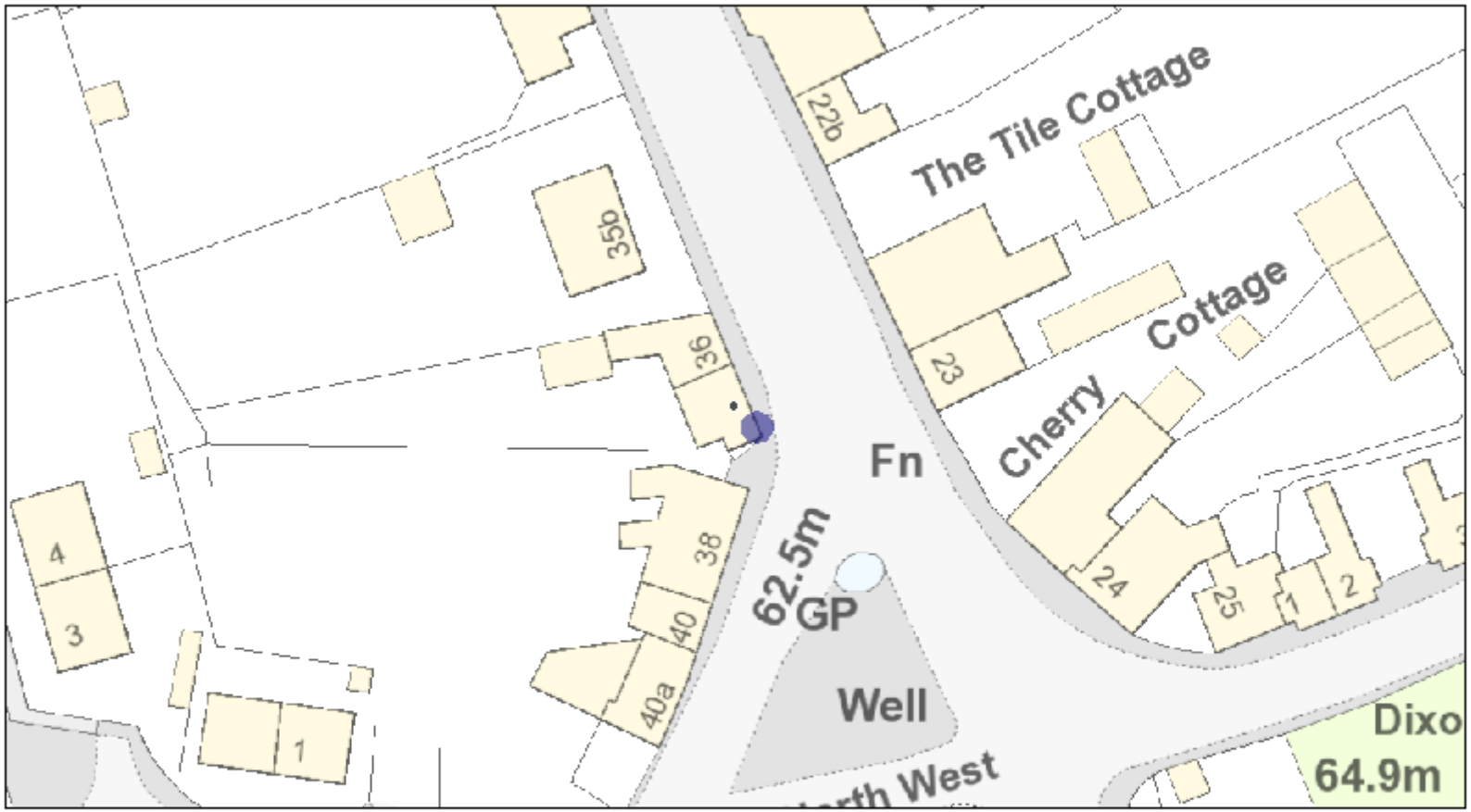
1:500

0 0.004 0.008 0.016 mi

0 0.005 0.01 0.02 km

Figure 23 37 The Street Aldermaston

37 The Street Aldermaston



August 9, 2016

DISTRICT BOUNDARY

1:500

0 0.004 0.008 0.016 mi

0 0.005 0.01 0.02 km

West of district

Figure 104 7a Bridge Street, Hungerford

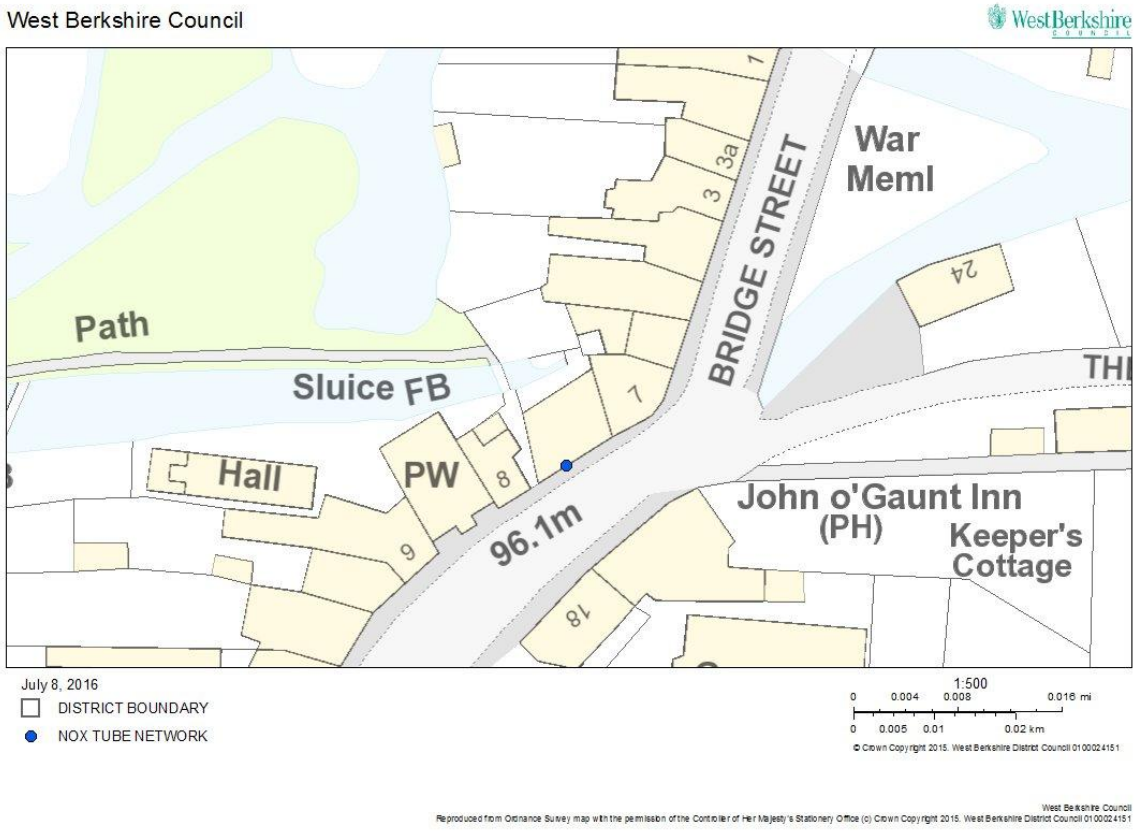
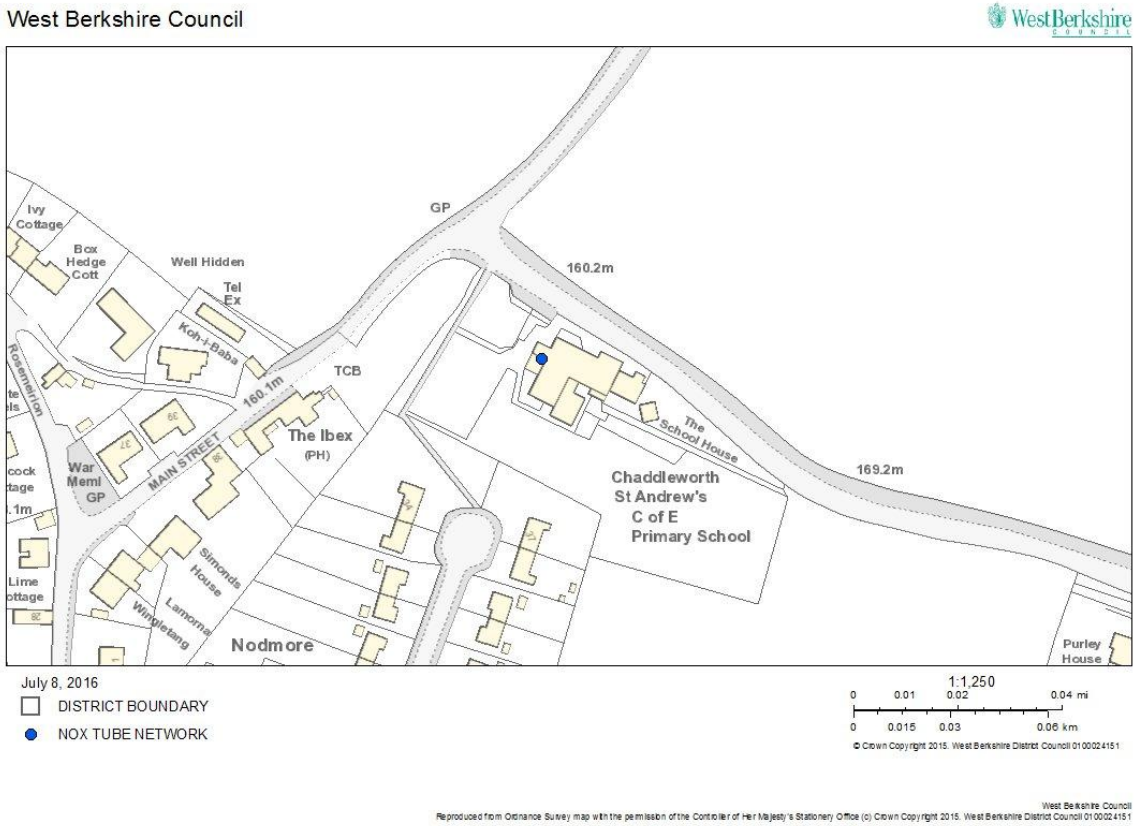


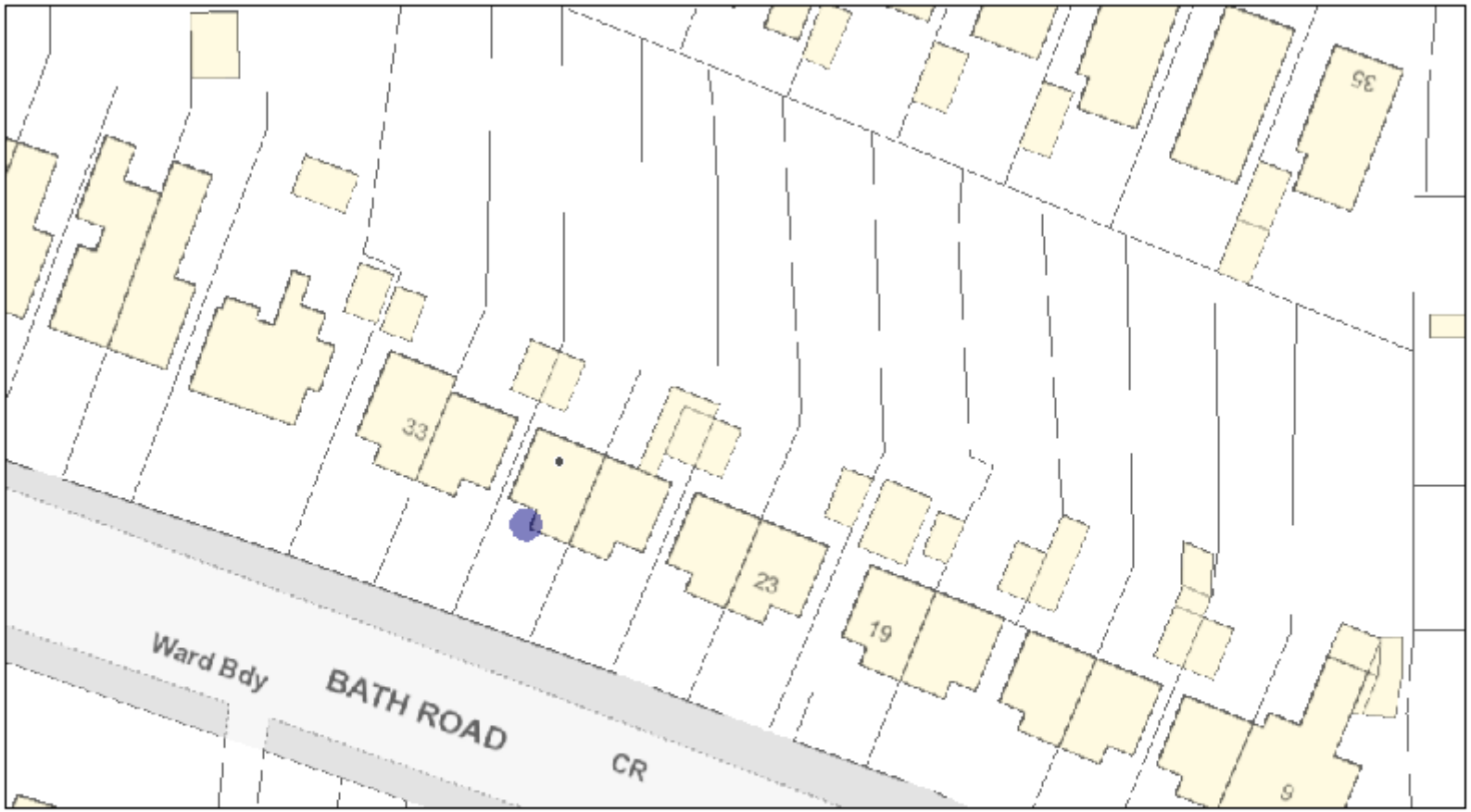
Figure 25 Chaddleworth Primary School, Chaddleworth



Thatcham

Figure 26 29 Bath Road

29 Bath Road Thatcham



August 9, 2016

DISTRICT BOUNDARY

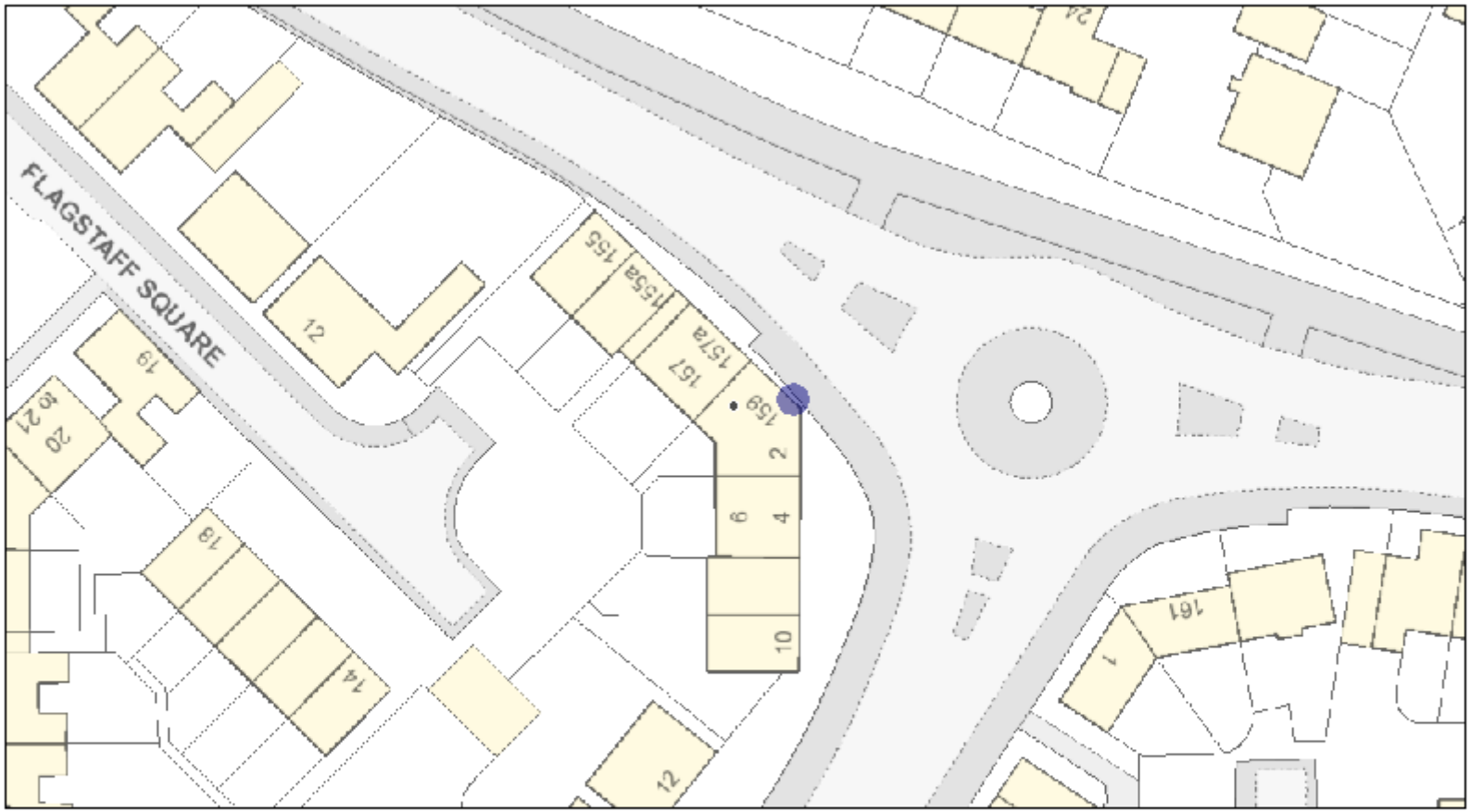
1:500

0 0.004 0.008 0.016 mi

0 0.005 0.01 0.02 km

Figure 27 159 Station Road

159 Station Road Thatcham



August 9, 2016

DISTRICT BOUNDARY

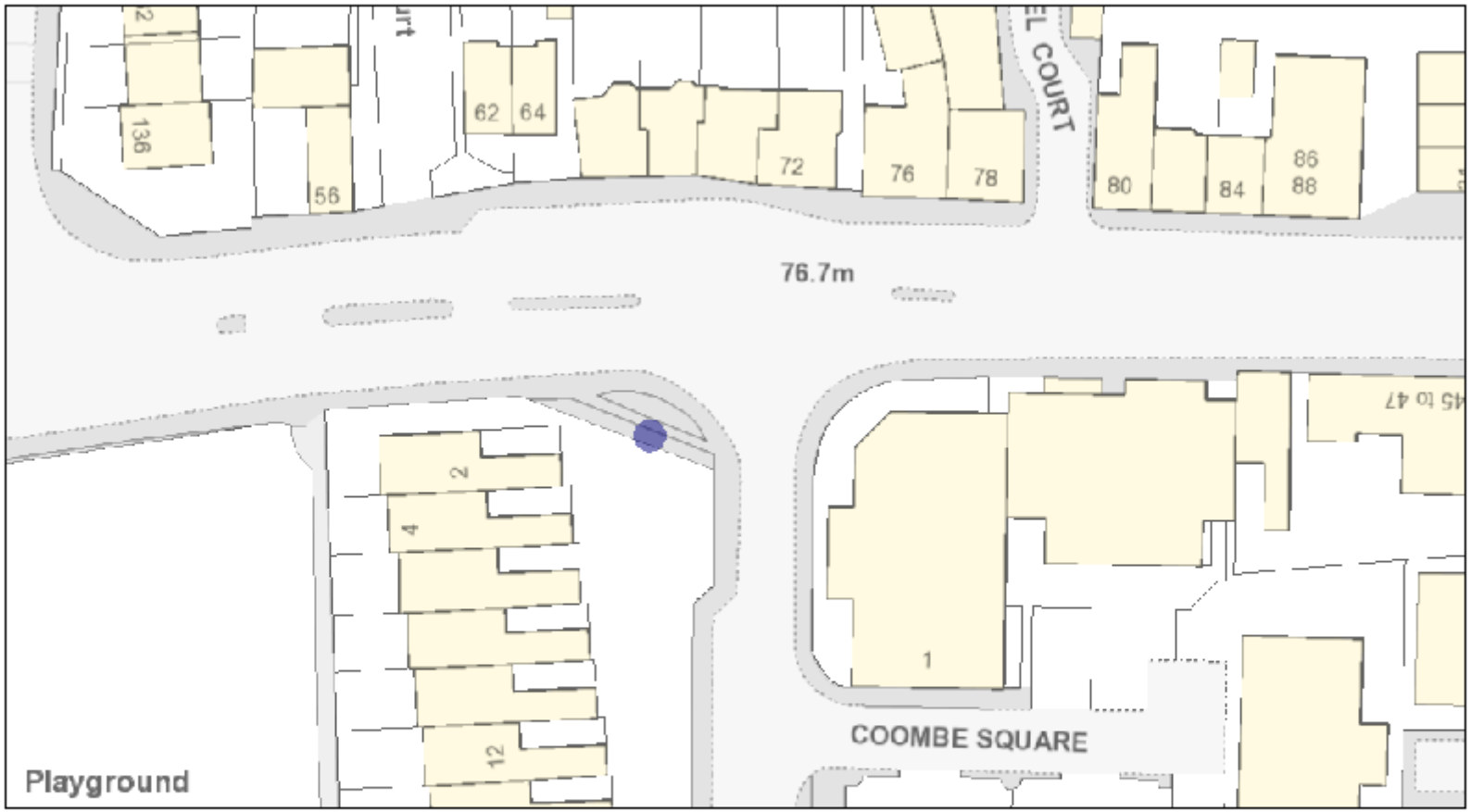
1:500

0 0.004 0.008 0.016 mi

0 0.005 0.01 0.02 km

Figure 28 Triplicate tubes Chapel Street

Triplicate tubes Chapel Street Thatcham



August 9, 2016

DISTRICT BOUNDARY

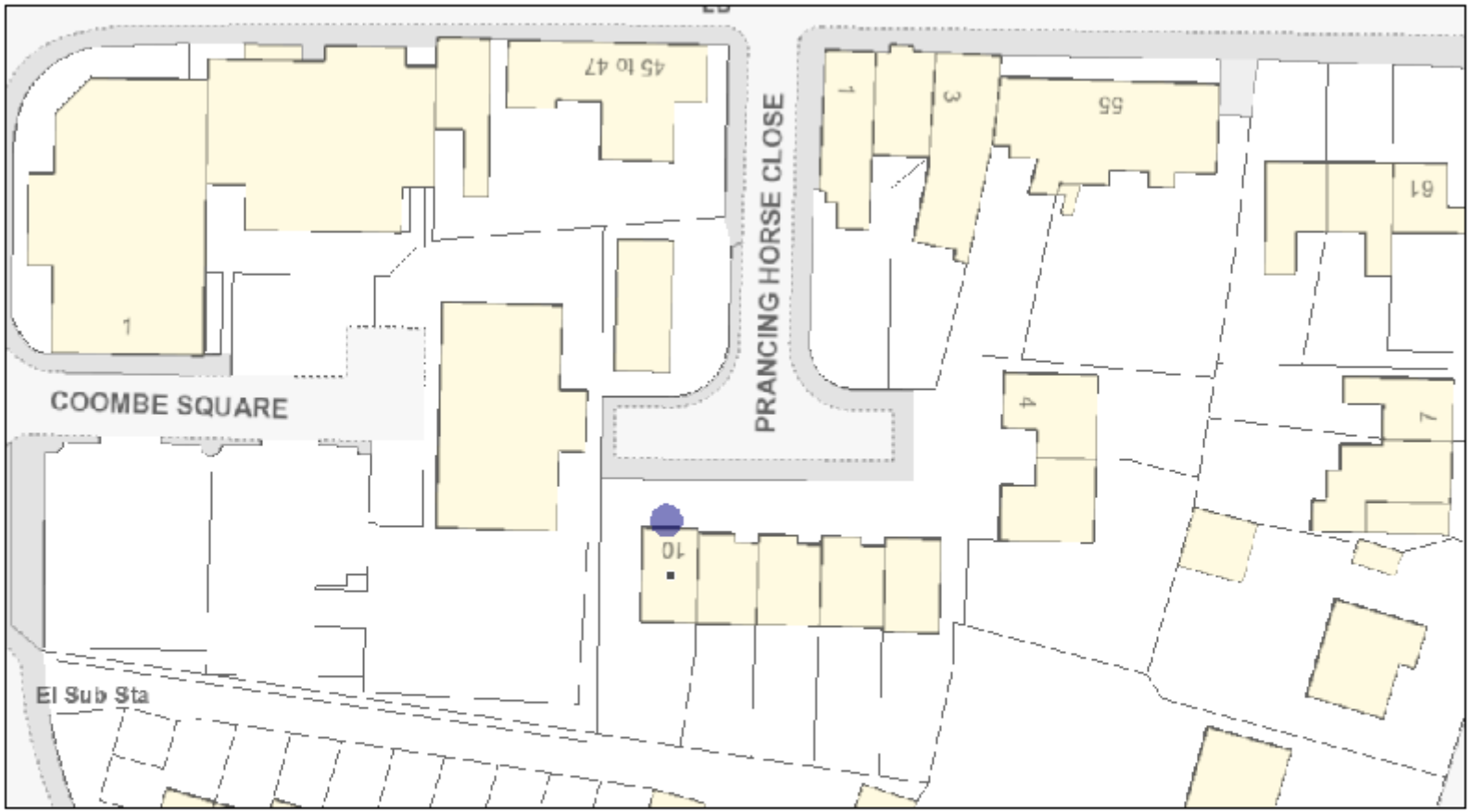
1:500

0 0.004 0.008 0.016 mi

0 0.005 0.01 0.02 km

Figure 29 10 Prancing Horse Close

10 Prancing Horse Close Thatcham



August 9, 2016

DISTRICT BOUNDARY

1:500

0 0.004 0.008 0.016 mi

0 0.005 0.01 0.02 km

Figure 30 17, 31, Flat 1 47, 75, 78a Chapel Street, 130 Park Street

West Berkshire Council

July 8, 2016

DISTRICT BOUNDARY

NOX TUBE NETWORK

1:1,250

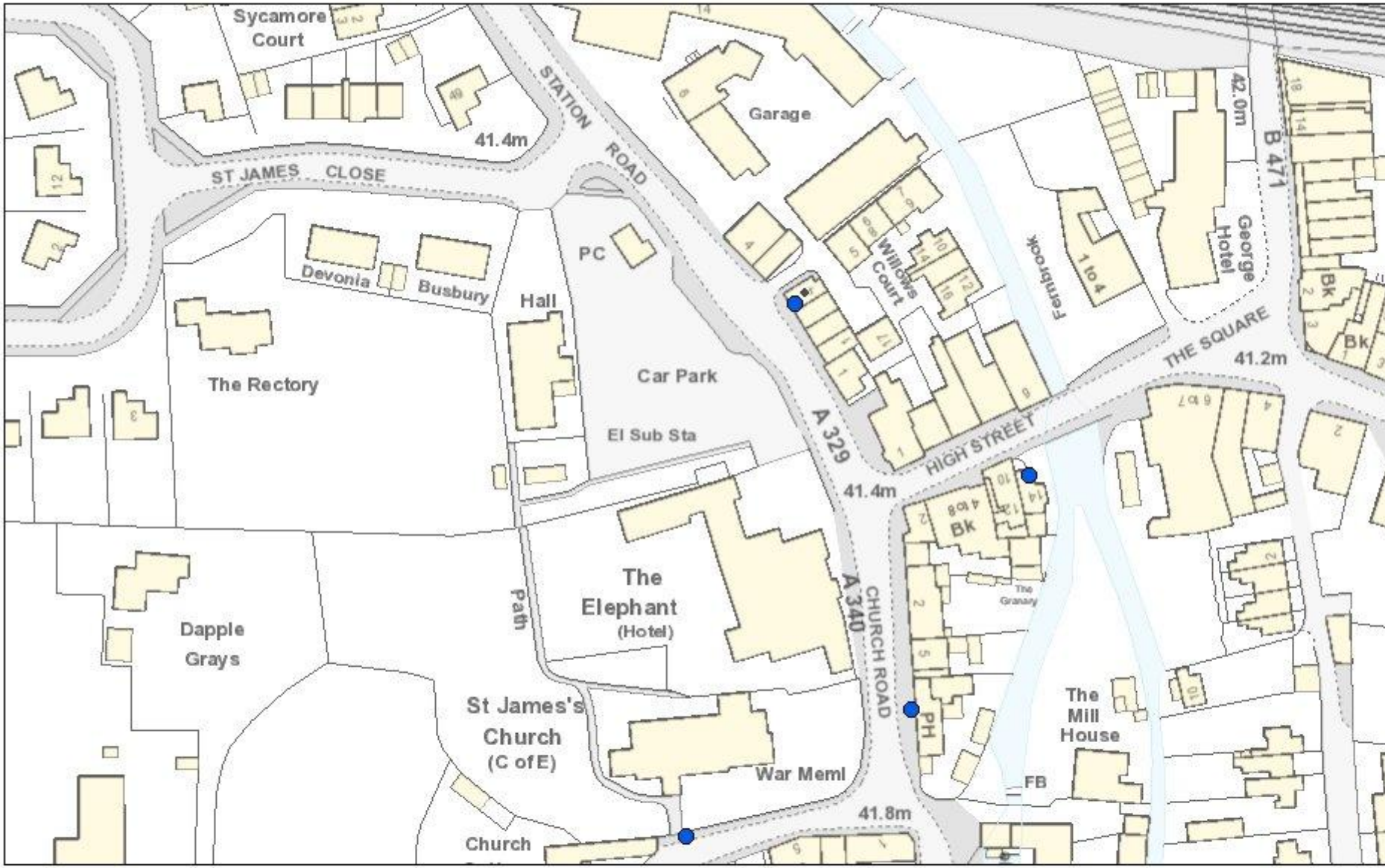
0 0.01 0.02

0 0.015 0.03

Pangbourne

Figure 31 14 High Street, The Cross Keys, St James Church, 4 Willows Court

West Berkshire Council



July 8, 2016

DISTRICT BOUNDARY

NOX TUBE NETWORK

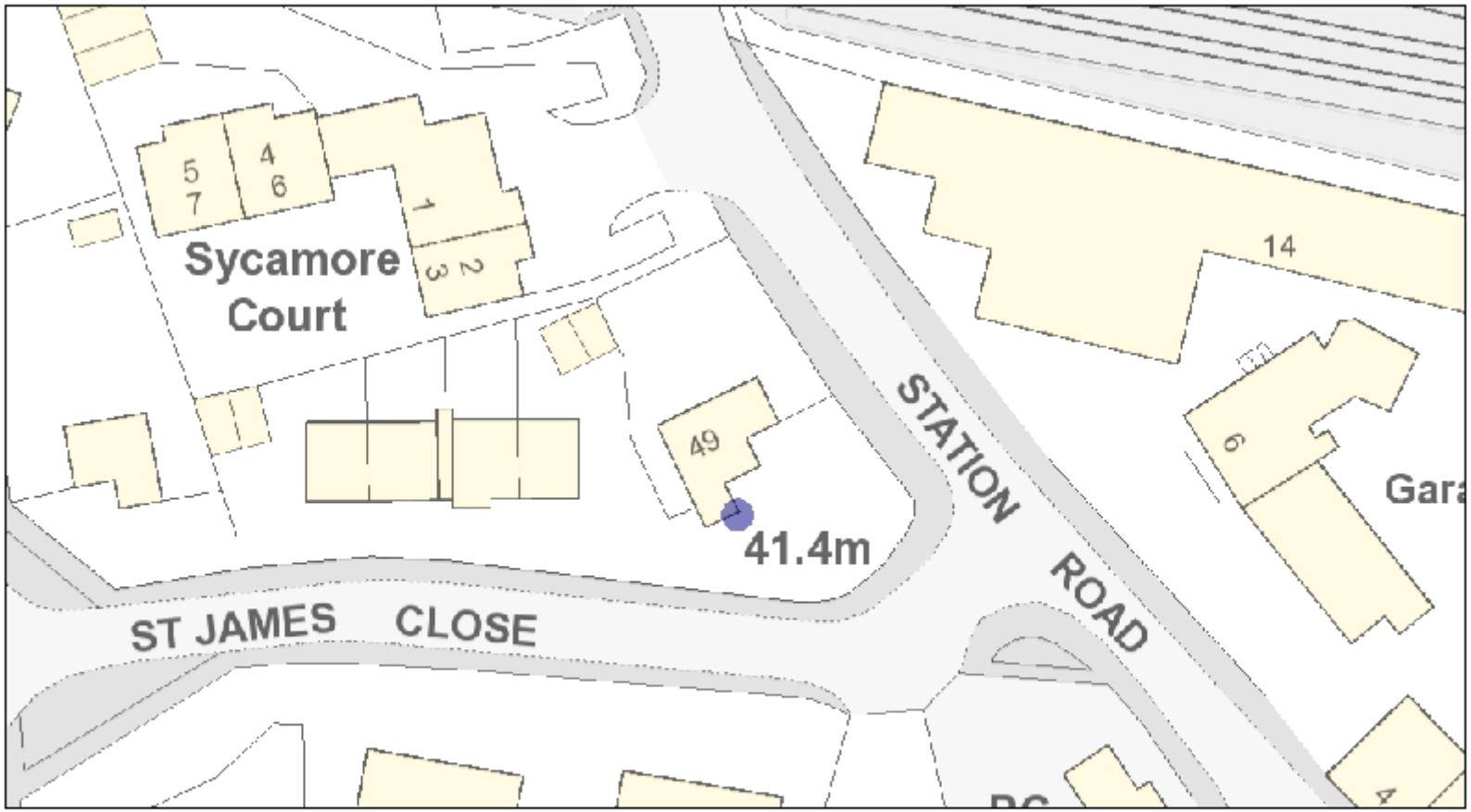
1:1,250

0 0.01 0.02

0 0.015 0.03

Figure 32 49 St James Close

49 St James Close Pangbourne



August 9, 2016

DISTRICT BOUNDARY

1:500

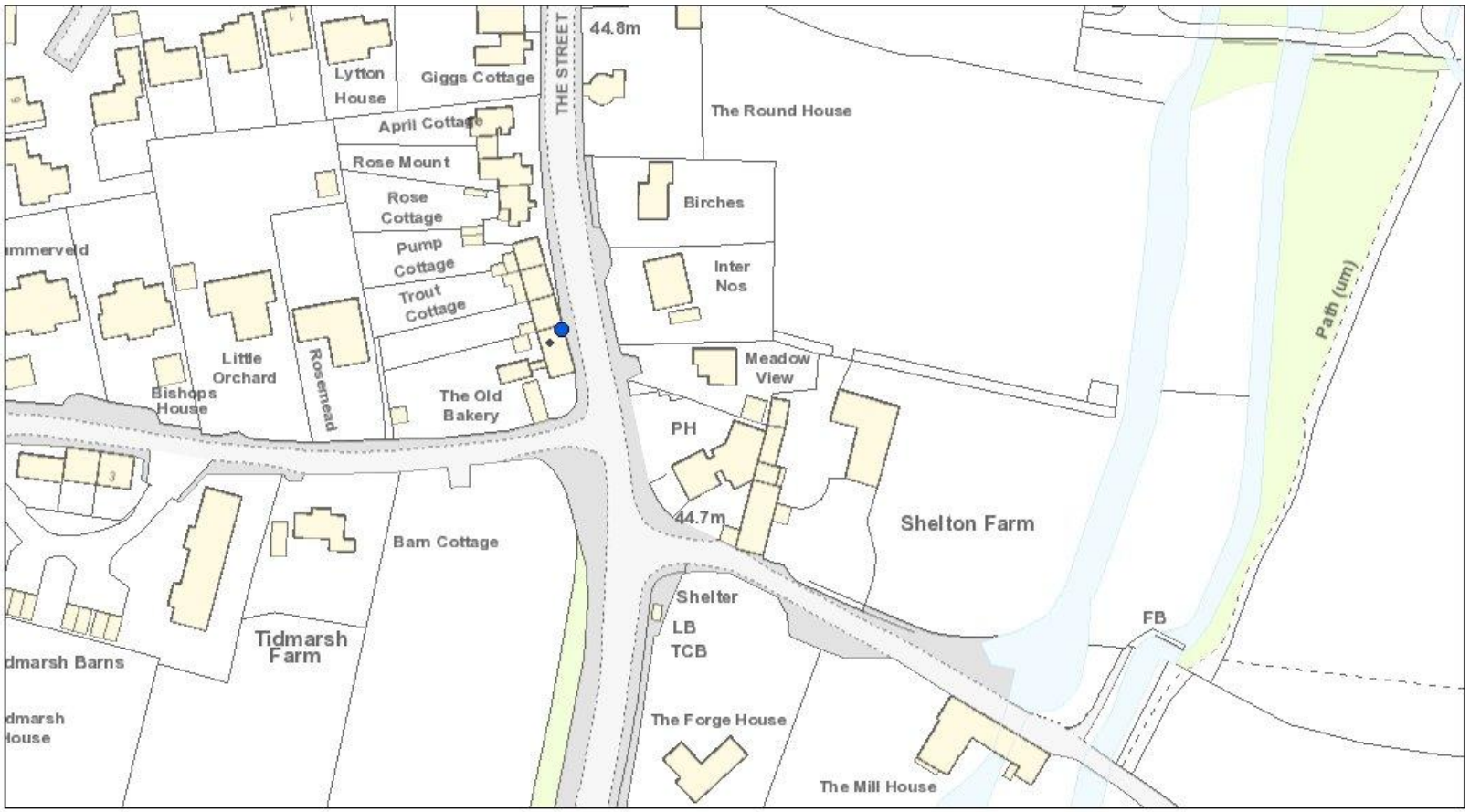
0 0.004 0.008 0.016 mi

0 0.005 0.01 0.02 km

Figure 33 1 Shooters Hill

Tidmarsh
Figure 34 Old Bakery

West Berkshire Council



July 8, 2016

DISTRICT BOUNDARY

NOX TUBE NETWORK

1:1,250

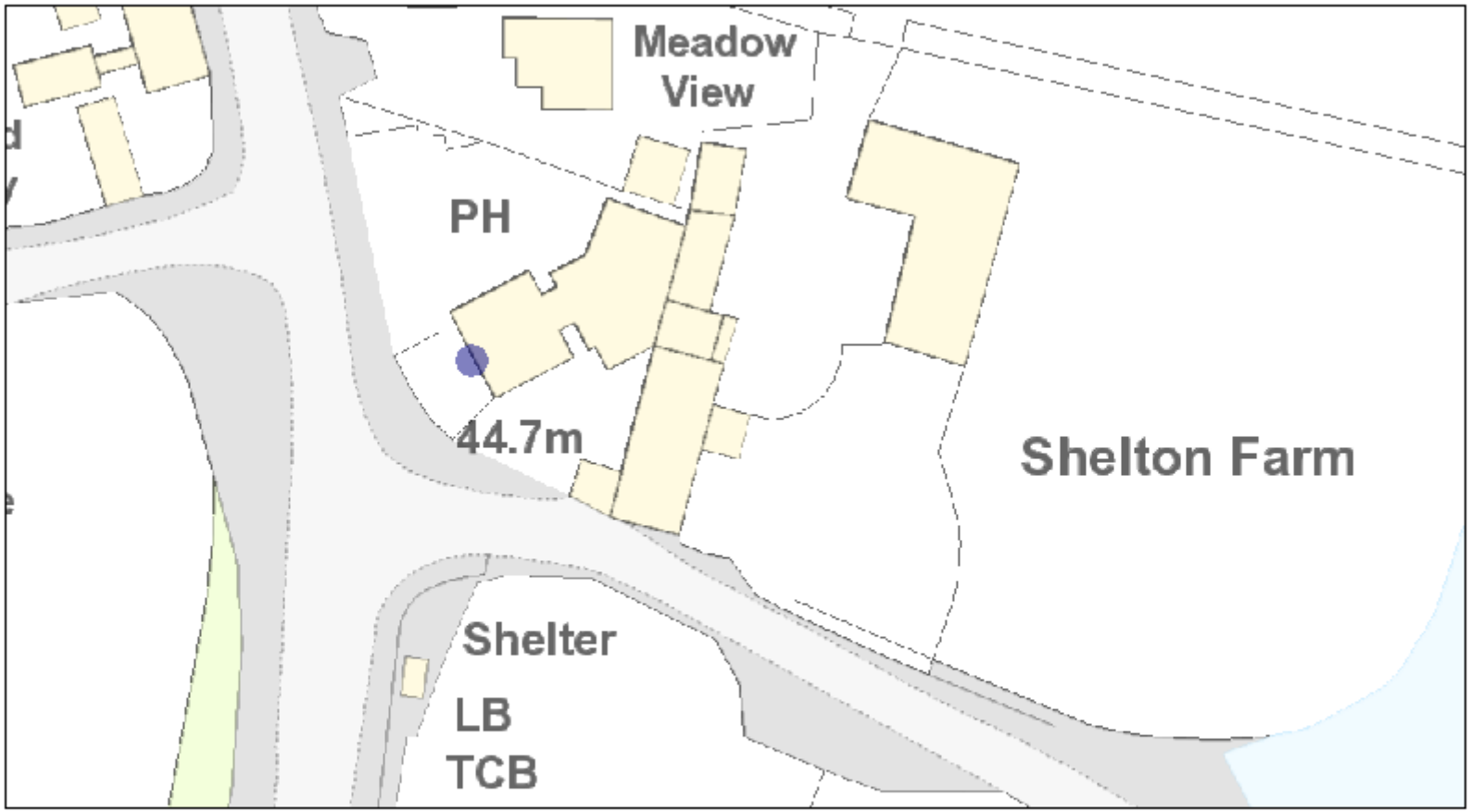
0 0.01 0.02 0.04 mi

0 0.015 0.03 0.06 km

West Berkshire Council

Figure 35 The Greyhound

The Greyhound Tidmarsh



August 9, 2016

DISTRICT BOUNDARY

1:500

0 0.004 0.008 0.016 mi

0 0.005 0.01 0.02 km

Figure 36 1 Avenell's Cottage Crookham Hill

1 Avenells Cottages Crookham Hill

August 9, 2016

DISTRICT BOUNDARY

1:500

0 0.004 0.008 0.016 mi

0 0.005 0.01 0.02 km

Figure 37 Location of continuous monitor

Figure 2.1: Location of Continous NO_2 Monitor - A343, A339 and Greenham Road Roundabout, Newbury

Grid Reference: 447407 , 166560

Legend

Continuous Monitor

Appendix E: Summary of Air Quality Objectives in England

Table E.1 – Air Quality Objectives in England

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

[4] The units are in microgrammes 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
FDMS	Filter Dynamics Measurement System
LAQM	Local Air Quality Management
NO_2	Nitrogen Dioxide
NO_x	Nitrogen Oxides
PM_{10}	Airborne particulate matter with an aerodynamic diameter of 10µm (micrometres or microns) or less
$PM_{2.5}$	Airborne particulate matter with an aerodynamic diameter of 2.5µm or less
QA/QC	Quality Assurance and Quality Control
SO_2	Sulphur Dioxide
USA	Updating and Screening Assessment

References

DifTPrecisionAccuracyBias Spreadsheet (Version AEA_DifTPAB_v04/11) accessed on the UK Air Quality Achieve website

Policy Guidance LAQM.PG (16), DEFRA

Technical Guidance LAQM.TG (16), DEFRA

The Air Quality (England) Regulations 2000 (SI 928)

The Air Quality (England) (Amendment) Regulations 2002 (SI 3043)

UK National Air Quality Information Archive, accessed at www.airquality.co.uk

Updating and Screening Assessment 2015, West Berkshire Council