2018 Air Quality Annual Status Report (ASR)

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

May 2018

Local Authority Officer	Suzanne McLaughlin
Department	Environmental Quality Team, Environmental Health
Address	Public Protection Partnership, Market Street, Newbury, Berkshire, RG14 5LD
Telephone	01635 503242
E-mail	ehadvice@westberks.gov.uk
Report Reference number	WestBerksASR2018
Date	May 2018

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 as significant. The main pollutant of concern is nitrogen dioxide (NO2) and two Air Quality Management Areas (AQMAs) have been declared. The Newbury AQMA was declared for exceedances of both the one-hour and annual mean NO2 objective. The Thatcham AQMA was declared for the annual mean NO2 objective. Details can be found at : https://uk-air.defra.gov.uk/aqma/list?view=W and maps are in Appendix D.

Nitrogen dioxide (NO_2) is the main pollutant of concern. The levels in 2017 have shown general decrease on 2016 levels. Overall the levels have been reducing over the last 5 years to 2017.

No extensions or amendements to the AQMAs were required nor any new AQMAs to be declared.

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

[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

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; no new strategies were implemented in 2017.

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

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 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 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.

Road signage has been erected on the A339 in Greenham at the approach to the south of Newbury to divert through traffic HGVs onto the A34 to avoid the Newbury AQMA.

In Newbury the London Road Industrial Estate intersection onto the A339 opened which has helped reduce the impact on the Robin Hood Roundabout.

An application to the Air Quality Grant Scheme 2016-17 was made but unfortunately not successful in securing a grant funding for the project for upgrading the Newbury VISSIM model which would then be used to assess the air quality impact of potential highway improvements to review the roundabout at the centre of Newbury AQMA.

A joint application with Bracknell Forest and Wokingham Councils to the Air Quality Grant Scheme 2017-18 was made but unfortunately not successful in securing grant funding for the project of involving the purchase of monitoring equipment which children/adults can wear to monitor their personal exposure to air pollution on the way to and from school against routes they have taken. It is hoped information collected can be used to help inform and review school travel plans to encourage changes in behaviour to support their plans, and long term improvements in local air quality and public health outcomes.

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. Progress has been made with the development of our Policy Guidance Planning for Air Quality document and the joint Public Health and Air Quality website.

Conclusions and Priorities

There was an exceedance of the ratified continuous monitored NO2 annual mean in 2017, the level being was 40.3 µg/m^3 so did exceed the Air Quality objective level of 40 µg/m^3 . There were 8 exceedances of the 1-hour objective, which did not exceeded the objective permitted level of 18 exceedances.

There were no exceedances of the ratified, adjusted and distance corrected diffusion tubes within the Newbury AQMA and within the Thatcham AQMA one site met the objective. There were no locations greater than 60µg/m^3 which therefore does not indicate any exceedance of the 1-hour Objective. 5 sites showed an increase in levels compared to 2016, with 38 decreased, and 1 remained the same.

Overall the concentrations were more in line with the expected concentrations following a decrease in 2015.

The areas of concern continue to be:

- Newbury AQMA - A339 / Greenham Road / A343 St Johns Road
- Thatcham AQMA – A4 Chapel Street Thatcham

The following local priorities continue to be:

- 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 - 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.
- Continue the continuous and passive air quality monitoring programmes in 2018
- Impact of National Air Quality Plan

The following challenges have been identified:

- Budget allocation for progressing measures and actions however 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 members of the public 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 routes timetables (see http://info.westberks.gov.uk/index.aspx?articleid=27888)

Table of Contents

Executive Summary: Air Quality in Our Area 1

Air Quality in West Berkshire 1

Actions to Improve Air Quality 2

Conclusions and Priorities 3

Local Engagement and How to get Involved 5

1 Local Air Quality Management 8

2 Actions to Improve Air Quality 9

2.1 Air Quality Management Areas 9

2.2 Progress and Impact of Measures to address Air Quality in West Berkshire 12

2.3 $PM_{2.5}$ – Local Authority Approach to Reducing Emissions and/or Concentrations 24

3 Air Quality Monitoring Data and Comparison with Air Quality Objectives and National Compliance 26

3.1 Summary of Monitoring Undertaken 26

3.1.1 Automatic Monitoring Sites 26

3.1.2 Non-Automatic Monitoring Sites 26

3.2 Individual Pollutants 26

3.2.1 Nitrogen Dioxide (NO_2) 26

3.2.2 Particulate Matter (PM_{10}) 34

3.2.3 Particulate Matter ($PM_{2.5}$) 34

3.2.4 Sulphur Dioxide (SO_2) 34

Appendix A: Monitoring Results 35

Appendix B: Full Monthly Diffusion Tube Results for 2017 46

Appendix C: Supporting Technical Information / Air Quality Monitoring Data QA/QC 51

Appendix D: Map(s) of Monitoring Locations and AQMAs 59

Appendix E: Summary of Air Quality Objectives in England 67

Glossary of Terms 68

List of Tables

Table 2.1 – Declared Air Quality Management Areas 10

Table 2.2 – Progress on Measures to Improve Air Quality 15

List of Figures

Figure 1 Details of 1 hour exceedances

Figure 2 Annual mean quarterly NO2 trends at Newbury
Figure 3 Annual mean NO2 trends at Newbury
Figure 4 Trends in NO2 in/near AQMA Newbury
Figure 5 Trends in NO2 in/near AQMA Thatcham
Figure 6 Trends in NO2 Newbury north
Figure 7 Trends in NO2 Newbury south and Hungerford
Figure 8 Trends in NO2 East of district

Map 1 Newbury AQMA
Map 2 Thatcham AQMA
Map 3 Continuous monitor Newbury
Map 4 In/near AQMA Newbury
Map 4 Newbury north
Map 6 Newbury south
Map 7 In/near Thatcham AQMA
Map 8 Hungerford
Map 9 Tidmarsh and Pangbourne
Map 10 Theale and Calcot

1 Local Air Quality Management

This report provides an overview of air quality in West Berkshire during 2017. 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

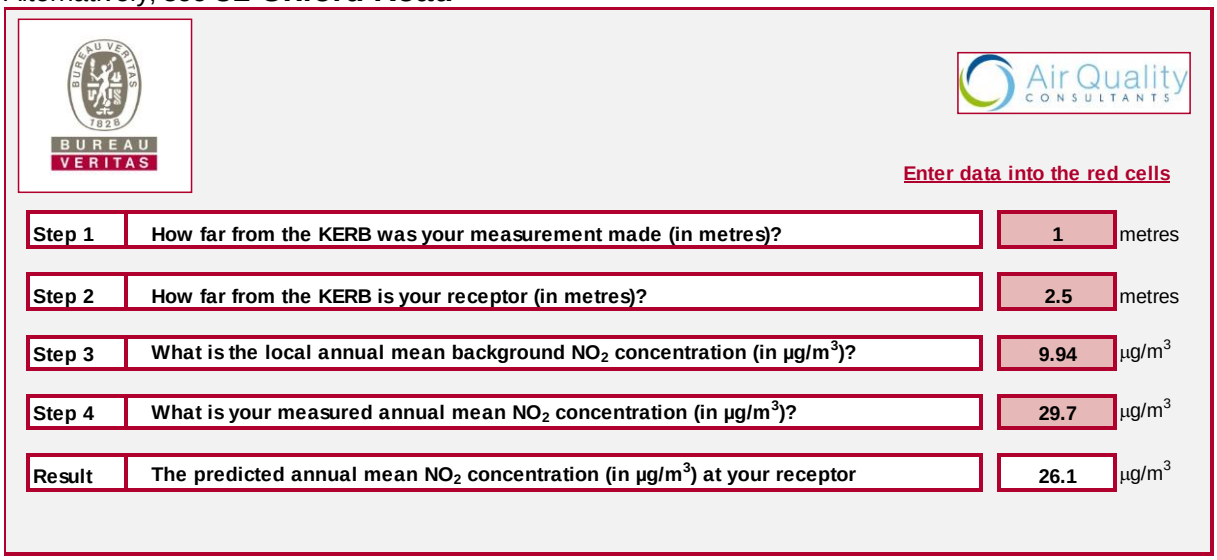
2.1 Air Quality Management Areas

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 **31 Oxford Road**



Abbeydale

Enter data into the red cells

Step 1	How far from the KERB was your measurement made (in metres)?	2	metres
Step 2	How far from the KERB is your receptor (in metres)?	22	metres
Step 3	What is the local annual mean background NO_2 concentration (in $\mu g/m^3$)?	7.91	$\mu g/m^3$
Step 4	What is your measured annual mean NO_2 concentration (in $\mu g/m^3$)?	19.9	$\mu g/m^3$
Result	The predicted annual mean NO_2 concentration (in $\mu g/m^3$) at your receptor	13.2	$\mu g/m^3$

A343 Andover Road

Enter data into the red cells

Step 1	How far from the KERB was your measurement made (in metres)?	0.75	metres
Step 2	How far from the KERB is your receptor (in metres)?	18.85	metres
Step 3	What is the local annual mean background NO_2 concentration (in $\mu g/m^3$)?	8.54	$\mu g/m^3$
Step 4	What is your measured annual mean NO_2 concentration (in $\mu g/m^3$)?	16	$\mu g/m^3$
Result	The predicted annual mean NO_2 concentration (in $\mu g/m^3$) at your receptor	11.4	$\mu g/m^3$

St James Church

Enter data into the red cells

Step 1	How far from the KERB was your measurement made (in metres)?	1	metres
Step 2	How far from the KERB is your receptor (in metres)?	7.5	metres
Step 3	What is the local annual mean background NO_2 concentration (in $\mu g/m^3$)?	17.37	$\mu g/m^3$
Step 4	What is your measured annual mean NO_2 concentration (in $\mu g/m^3$)?	24	$\mu g/m^3$
Result	The predicted annual mean NO_2 concentration (in $\mu g/m^3$) at your receptor	21.3	$\mu g/m^3$

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 1	Declared 12/05/2009	Nitrogen Dioxide 1 hour	Newbury	Newbury A339, A343 and Greenham Road junction	NO	61	hours	8	hours	Newbury AQAP	Nov 2011	http://info.westberks.gov.uk/CHttpHandler.ashx?id=36580&p=0
Newbury AQMA 2	Declared 12/05/2009	Nitrogen Dioxide annual mean	Newbury	Newbury A339, A343 and Greenham Road junction	NO	54.4	µg/m^3	40.3	µg/m^3	Newbury AQAP	Nov 2011	http://info.westberks.gov.uk/CHttpHandler.ashx?id=36580&p=0

Thatcham AQMA	Declared 25/11/2009	Nitrogen Dioxide annual mean	Thatcham	Residential properties along the A4 Chapel Street	NO	53.3	µg/m^3	40	µg/m^3			

☒ **West Berkshire Council 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 the results were acceptable for all sources and pollutants. The following describes how the comments have been addressed:

- Review of Newbury AQAP has been completed and the actions are details in Table 2.2.
- The levels within the Thatcham AQMA decreased in 2017. The highest location recording 40.0 µg/m^3 so meeting the objective. The AQAP development will currently be on hold awaiting the outcome of the 2018 results.
- It is still too soon to see the long term effect of new intersection on A339. In March 2017 the new intersection onto the A339 (known as the London Road Industrial Estate intersection) opened to link to London Road Newbury, but one site at 132 London Road Newbury did not exceed in 2017 unlike 2016. Other sites in the area also showed an increase on 2016 levels. This new intersection has provided an alternative access/egress and so diverting some of the traffic away from this location.
- The results within and outside AQMAs are detailed in section 3 with graphs showing the all results. Maps have been updated in Appendix D showing the monitoring in relation to the AQMAs

West Berkshire has taken forward a number of direct measures during the current reporting year of 2017 in pursuit of improving local air quality and reducing car trips and congestion as part as part of the Local Transport Plan 3(2011-2026). 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. Key completed measures are:

- Diversion of HGVs on A339 - road signage has been erected in Greenham at the approach to the south of Newbury to divert through traffic and HGVs onto the A34 to avoid the Newbury AQMA.

- Opening of the London Road Industrial Estate intersection
- Funding secured to enable Kings Road Newbury link road to be developed to ease Bear Lane roundabout
- A339 Bear Lane improvements approved to enable improved traffic flow
- Bus service provision – some changes to radial routes connecting outlying villages with Newbury, increase in commercial operations of Newbury to Reading and Newbury to Basingstoke; All vehicles Euro IV minimum emission standard, contracted routes Euro V minimum
- Walking and cycling events including: beginners ladies led rides in Newbury with skills coaching as part of the West Berkshire Let's Ride group, Run Together beginners groups including a new mental health group and Walking for Health led walks across West Berkshire

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

- A339/A343/Greenham Road roundabout – options continue to be considered at the centre of the Newbury AQMA with traffic modelling regarding potential changes to layout and crossings
- National Cycle Network 422 expansion – Newbury to Thatcham and on to Calcot has been agreed with work commencing in 2018. This provision of improved cycle ways goes through the Thatcham AQMA
- Pedestrian and cyclist directional signage – this project is programmed for 2018/19 to improve walking and cycling
- Traffic signal improvements to A4 Thatcham – this project is programmed for 2018/19 to improve SCOOT and smoothing the traffic flow through the Thatcham AQMA
- Cycle parking – improvements to existing facilities and introduction of new
- Electric charging points – consideration of increased provision at more Council sites/carparks
- ULEV strategy development – for new developments

- A339 corridor improvements including Bear Lane improvements approved to enable improved traffic flow and Funding secured to enable Kings Road Newbury link road to be developed to ease Bear Lane roundabout
- Improvements to Newbury racecourse railway station
- Relocation of Bus station in Newbury
- Consider impact of Major Road Network consultation to reduce congestion – funding opportunities possible

West Berkshire Council's local priorities which have been set for the coming year are:

- Implementation of air quality guidance note for planning applications
- 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 as well as Development Control
- Continue the continuous and passive air quality monitoring programmes.

The principal challenges and barriers to implementation that West Berkshire Council anticipates facing are related to resources and lack of funding to implement more actions.

Progress on the following measures has been slower than expected due to: resources and lack of funding to implement more actions.

Whilst the measures stated above and in Table 2.2 will help to contribute towards compliance, West Berkshire Council anticipates that further additional measures not yet prescribed will be required in subsequent years to achieve compliance and enable the revocation of Newbury and Thatcham AQMAs.

Table 2.2 – Progress on Measures to Improve Air Quality

Measure No.	Measure	EU Category	EU Classification	Organisations involved and Funding Source	Planning Phase	Implementation Phase	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	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 Roundab	Traffic Management	UTC, Congestion management, traffic reduction	WBC	2012-16	2017-2018	Reduction in queuing time and congestion within AQMA and	15 ug/m3(based on 2008 data)	Surveys ordered March 2017 and model to be completed late 2017.	2018	Await findings of model to assess impact on any proposed scheme.

	out						reduction in NO2 and emission levels				
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	Further proposed changes with consultation May2017 for new intersection on A339 southbound and changes to Bear Lane and Cheap Street
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. Also improvements to Reading Buses fleet to alternative fuels(gas).
5	Smarter Choices (1) Investigate the feasibility of a district wide car	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).

	share scheme										
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 with Co-wheels. 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. More promotion in 2017 planned
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	ongoing	Number of people registered and their locations and journey type.

									heavily in car sharing and have their own internal system.		
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)
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	Planning and Air quality document drafted	2017	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	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-	ongoing	16/17 Look for opportunities- replacement/funding for signage in West Berks controlled areas.

									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.		
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 2016. 2 electric cars provided with Public Protection Service for work use.
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.		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 206 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	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	
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)
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 PM2.5:

- 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.

- 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 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.

- As part of the Heat wave Plan for England and the heat-health watch system

Public Health will send messages to at-risk groups to provide advance warnings for hot weather and severe heat waves along with the associated harm to health (including poorer air quality) and relevant public health protection plans.

- 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.

- 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.

• A new policy is being used to assess residential developments in West Berkshire. The policy has been used during 2016 as it was at an advanced stage of development and it has now 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 PM2.5 :

- It brings down the threshold for when residential travel plans will be required to 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 there was 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 retrofitted at a later date. Before this was just encouraged by officers on larger developments but it is now part of the policy against which applications are assessed.
- 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.

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 undertook automatic (continuous) monitoring at 1 site during 2017. Table A.1 in Appendix A shows the details of the 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/ .

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 40 sites during 2017. 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, “annualisation” and distance correction. 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 2017 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.

Newbury

The data capture was a rate of 97.1% which is very good. For 2017 there were 8 exceedances of the 1-hour objective, therefore the 1 hour objective was not exceeded. The range was from 0.4 µg/m^3 to a maximum of 280µg/m^3 recorded. The exceedances are detailed in Figure 1 below, the annual mean quarterly trends shown in Figure 2 and annual mean trends shown in Figure 3.

The ratified continuous monitored NO_2 annual mean marginally exceeded the objective in 2017. The level was a reduction at 40.3 µg/m^3 compared to 41.7µg/m^3 in 2016. This is an exceedance within the AQMA. The concentrations were more in line with the expected concentrations and show a decrease on 2013 levels (42.2 µg/m^3). The monthly average concentrations have been compared to the co-location diffusion tube results and they compare very well. The hourly results have been compared to the monitoring stations in Wokingham, Oxford St Ebbs, Reading New Town and Horley.

A review of when the 1 hour exceedances occurred has taken place. These dates/times do not relate to a specific event in Newbury such as a racing meet nor during exceptional cold weather episode at the end of January. However all exceedances were observed during the period when a traffic diversion was in place to 31/01/17 with the closure of Boundary Road to the east of the AQMA causing more traffic to go through the AQMA to access the Racecourse and Greenham areas. 7 of the 8 exceedences occurred during the morning or evening rush hour periods of weekdays. The exceedance on 05/01/17 was also seen in Wokingham and Bracknell. The exceedance on 18/01/17 was also seen at the Bracknell site.

Figure 1 Details of 1 hour exceedances

Excedance number	Day	Date	Time	Level µg/m^3
1	Thursday	05/01/17	16:00-17:00	221
2	Thursday	05/01/17	17:00-18:00	231
3	Thursday	05/01/17	18:00-19:00	216
4	Wednesday	18/01/17	18:00-19:00	203
5	Friday	20/01/17	07:00-08:00	235
6	Friday	20/01/17	08:00-09:00	280
7	Friday	20/01/17	09:00-10:00	204
8	Saturday	21/01/17	16:00-17:00	201

Figure 2 Annual mean quarterly NO2 trends at Newbury

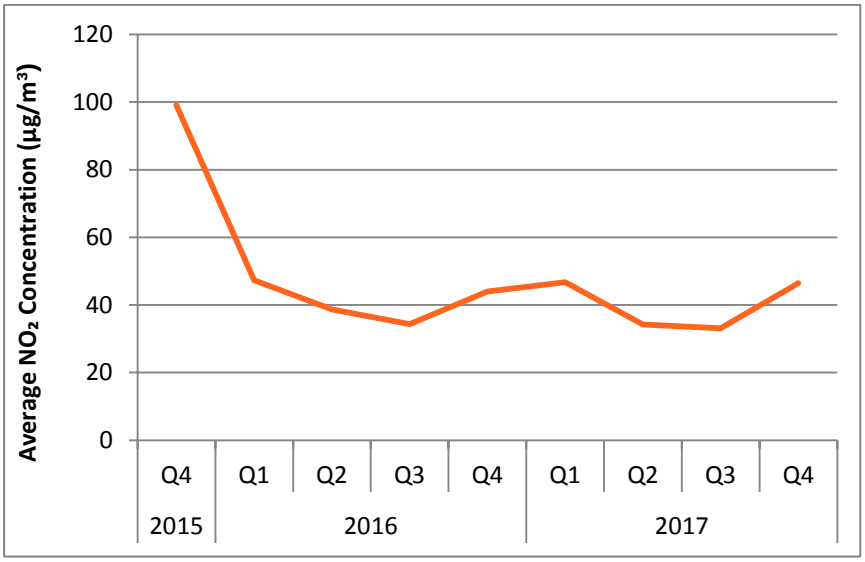
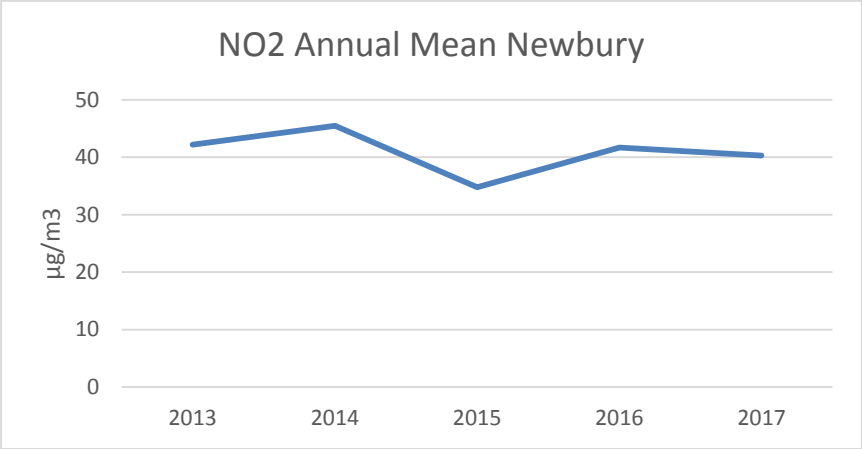


Figure 3 Annual mean NO2 trends at Newbury



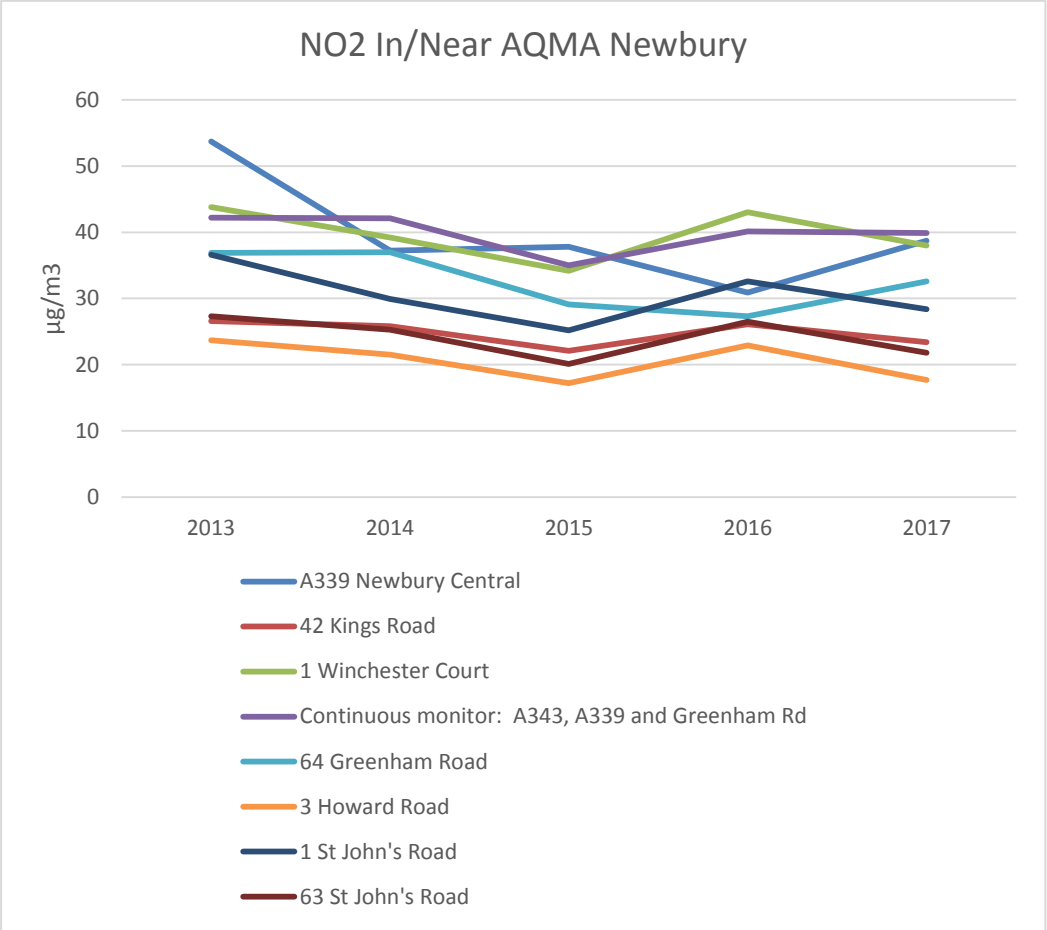
Diffusion tube data

Newbury AQMA

There are 5 diffusion tubes within the Newbury AQMA and 3 within close proximity. There were no exceedances of diffusion tubes within the AQMA. For the last 5 years the results have shown an overall decrease in levels compared to 2012 levels, as shown in Figure 4 below.

Monitoring continues in 2018 for the 5 sites.

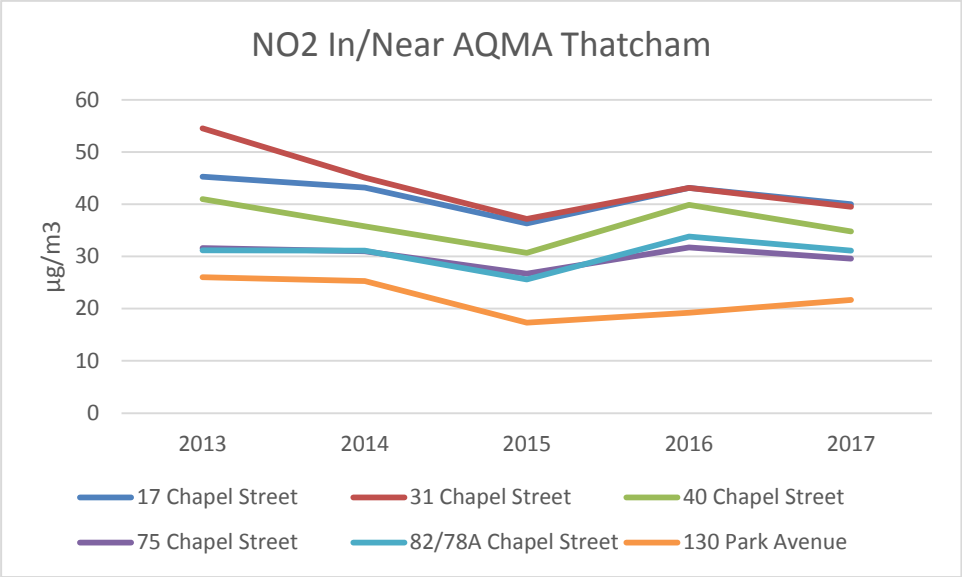
Figure 4 Trends in NO2 in/near AQMA Newbury



Thatcham AQMA

There are 4 diffusion tube sites within the Thatcham AQMA and 2 within close proximity . For the last 5 years the results have shown a decrease in levels, as shown in Figure 5 below. The annual mean objective was met in 2017 at the 17 Chapel Street site, measured at 40.0 ug/m^3 following a decrease form 2016 level of 43.1 ug/m^3. Although there were no current exceedances in the AQMA the AQMA will not be revoked in for the time being. Monitoring continues in 2018 for 6 of the sites and a triplicate co-location studies at 17 and 40 Chapel Street with commence in January 2018. The ASR 2019 will consider the results of another year of monitoring.

Figure 5 Trends in NO2 in/near AQMA Thatcham



Outside the AQMAs

Overall 38 of the sites showed a decrease in levels compared to 2016, as did the continuous monitor.

1 site showed an increase in levels compared to 2016. This was at 44 Hambridge Road Newbury, which was a slight increase in level from 2016, but a reduction from 2013 and 2014 levels. This may have been due to the impact of the Boundary Road closure.

1 site remained the same, this was at A4 Calot Hotel.

There were no results greater than 60µg/m^3, which therefore does not indicates that any exceedance of the 1-hour mean objective.

The trends are shown in the Figures 6, 7 and 8 below.

Figure 6 Trends in NO2 Newbury north

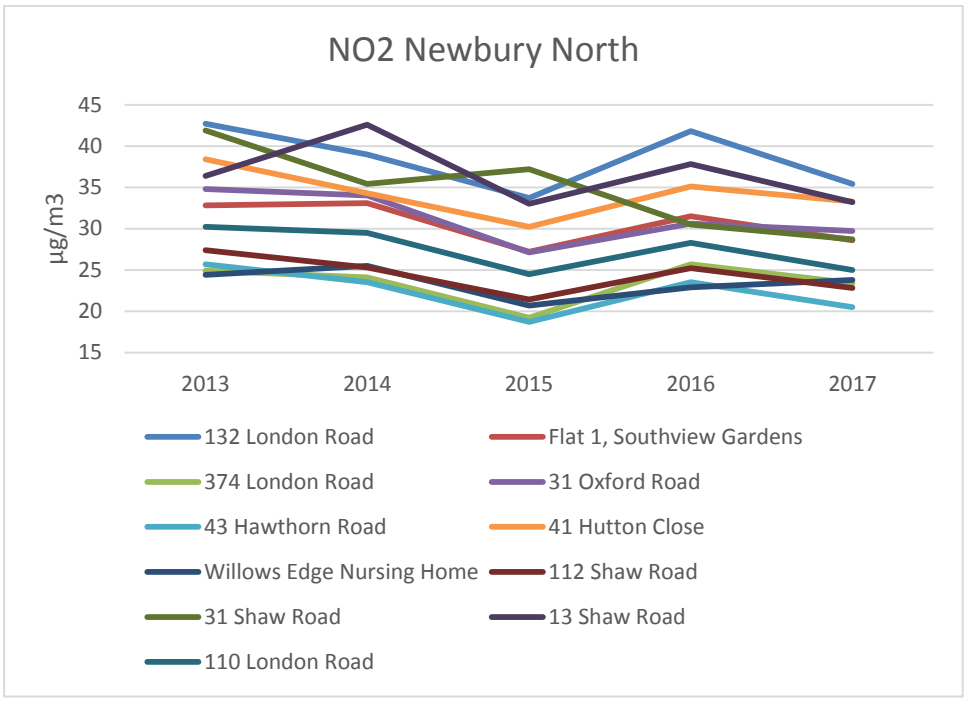


Figure 7 Trends in NO2 Newbury south and Hungerford

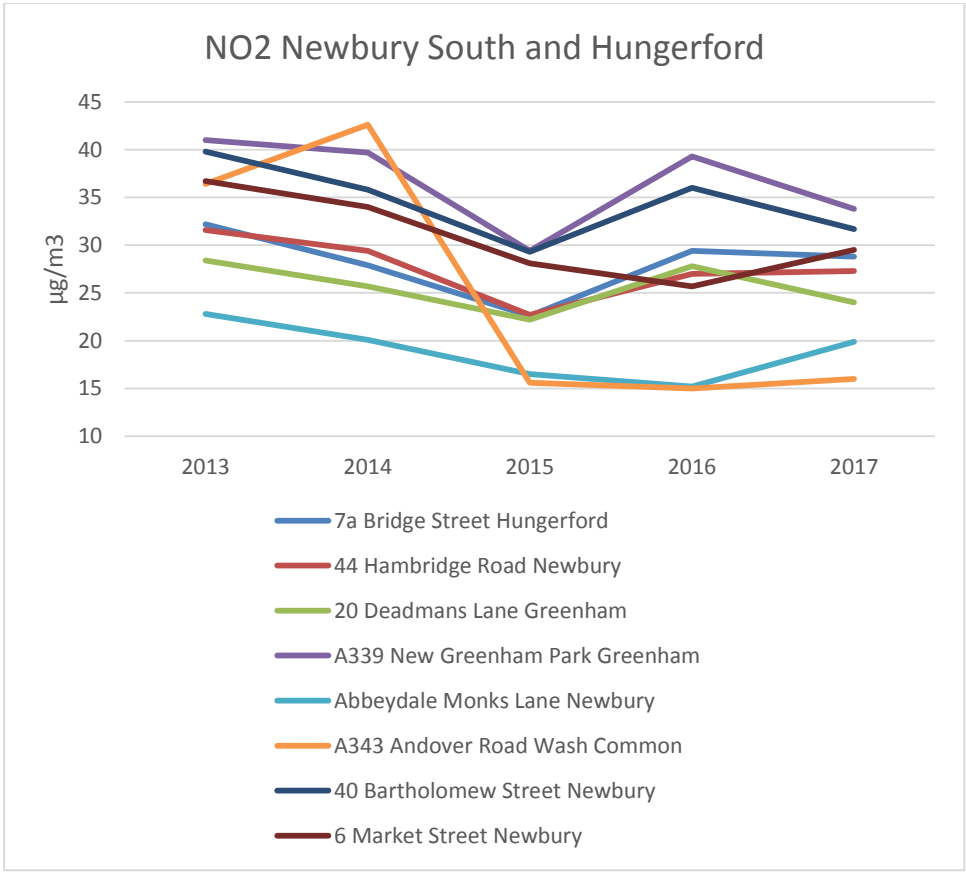
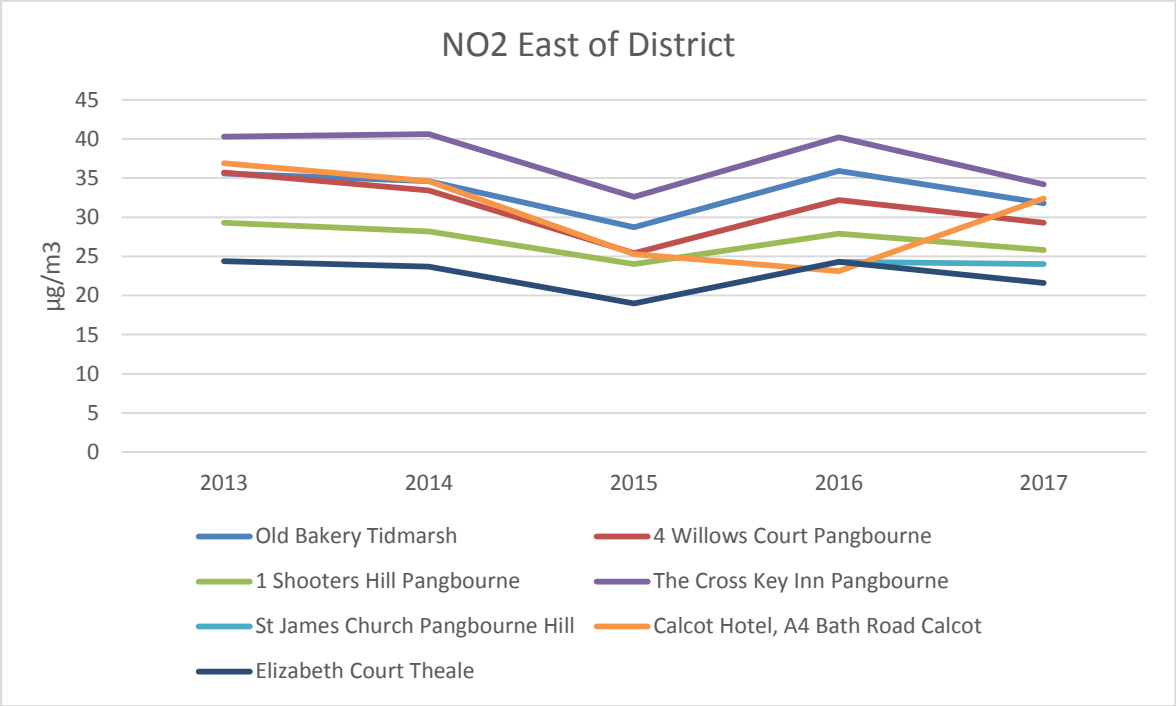


Figure 8 Trends in NO2 East of district



The areas of concern continue to be:

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

One site in London Road Newbury (132) did not exceed in 2017 unlike 2016. Other sites in the area also showed an increase on 2016 levels. In March 2017 the new intersection onto the A339 (known as the London Road Industrial Estate intersection) opened which has already shown a positive impact on this location by providing an alternative access/egress and so diverting some of the traffic away from this location.

Monitoring at 7 sites were ceased at the end of 2016 due to levels well below the annual mean. They were: Chaddleworth School, 118 London Road Newbury, Flat 1 47 Chapel Street Thatcham, 14 High Street Pangbourne, 102 Langley Hill Tilehurst, 105 London Road Newbury and 1 Dolman Road Newbury.

Monitoring at 3 sites were ceased at the end of 2017 due to levels well below the annual mean. They were: 31 Oxford Road Newbury, 112 Shaw Road Newbury and 1 Shooters Hill Pangbourne.

1 site, Willows Nursing Home Newbury, was moved to a different location on the same building due to accessibility.

No new sites commenced in 2017.

3.2.2 Particulate Matter (PM_{10})

No particulate matter (PM10) monitoring is undertaken.

3.2.3 Particulate Matter ($PM_{2.5}$)

No particulate matter (PM2.5) monitoring is undertaken.

3.2.4 Sulphur Dioxide (SO_2)

No sulphur dioxide monitoring is undertaken.

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 A339, A343 and Greenham Road junction	Roadside	477407	166560	NO2	YES	Chemiluminescent	1	4.7	1.8	Newbury A339, A343 and Greenham Road junction

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	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	A339 Newbury Central	Kerbside	447463	167318	NO2	NO	10	1.9	NO	2.3
7a Bridge Street Hungerford	7a Bridge Street Hungerford	Roadside	433909	168815	NO2	NO	0	1.5	NO	2.7
132 London Road Newbury	132 London Road Newbury	Roadside	447720	167678	NO2	NO	0	3	NO	2.6
Flat 1, Southview Gardens Newbury	Flat 1, Southview Gardens Newbury	Urban Background	447752	167667	NO2	NO	0	5	NO	1.5
374 London Road Newbury	374 London Road Newbury	Urban Background	449034	167520	NO2	NO	0	12.5	NO	2.05
17 Chapel Street Thatcham	17 Chapel Street Thatcham	Roadside	451870	167438	NO2	YES	0	1.5	NO	2.4
40 Chapel Street Thatcham	40 Chapel Thatcham	Kerbside	451926	167460	NO2	YES	0	3.5	NO	2.2
75 Chapel Street Thatcham	75 Chapel Street Thatcham	Roadside	452288	167445	NO2	NO	0	3.4	NO	2.2
82/78A Chapel Street Thatcham	82/78A Chapel Street Thatcham	Roadside	452068	167467	NO2	YES	0	1.8	NO	2

Old Bakery Tidmarsh	Old Bakery Tidmarsh	Roadside	463504	174864	NO2	NO	0	2.2	NO	1.9
4 Willows Court Pangbourne	4 Willows Court Pangbourne	Roadside	463224	176523	NO2	NO	0	3	NO	2.3
1 Shooters Hill Pangbourne	1 Shooters Hill Pangbourne	Roadside	463331	176664	NO2	NO	0	2.5	NO	2.1
The Cross Key Inn Pangbourne	The Cross Key Inn Pangbourne	Roadside	463468	176433	NO2	NO	0	4	NO	2.6
Calcot Hotel, A4 Bath Road Calcot	Calcot Hotel, a4 Bath Road, Calcot	Kerbside	466302	171865	NO2	NO	16	2	NO	2.3
Elizabeth Court Theale	Elizabeth Court Theale	Urban Background	464574	171294	NO2	NO	0	32	NO	2
44 Hambridge Road Newbury	44 Hambridge Road Newbury	Urban Background	448129	166909	NO2	NO	0	4.3	NO	2.45
42 Kings Road Newbury	42 Kings Road Newbury	Roadside	447433	166994	NO2	NO	0	11.3	NO	1.85
1 Winchester Court Newbury	1 Winchester Court Newbury	Roadside	447409	166559	NO2	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	NO2	YES	1	4.7	YES	1.8
Continuous monitor 2, A343, A339 and	Continuous monitor 2, A343, A339 and	Roadside	447379	166557	NO2	YES	1	4.7	YES	1.8

Greenham Road Newbury	Greenham Road Newbury									
Continuous monitor 3, A343, A339 and Greenham Road Newbury	Continuous monitor 3, A343, A339 and Greenham Road Newbury	Roadside	447379	166557	NO2	YES	1	4.7	YES	1.8
64 Greenham Road Newbury	64 Greenham Road Newbury	Roadside	447448	166454	NO2	NO	12	2	NO	2.2
20 Deadmans Lane Greenham	20 Deadmans Lane Greenham	Suburban	447508	164725	NO2	NO	0	10.5	NO	2.1
A339 New Greenham Park Greenham	A339 New Greenham Park Greenham	Kerbside	449805	163882	NO2	NO	204	4	NO	2.1
3 Howard Road Newbury	3 Howard Road Newbury	Roadside	447402	166449	NO2	NO	0	11	NO	2.6
1 St John's Road Newbury	1 St John's Road Newbury	Roadside	447036	166436	NO2	NO	0	4.8	NO	2.25
63 St John's Road Newbury	63 St John's Road Newbury	Urban Background	447377	166533	NO2	YES	0	6.2	NO	2.2
40 Bartholomew Street Newbury	40 Bartholomew Street Newbury	Roadside	446939	166848	NO2	NO	0	2.7	NO	2.2
6 Market Street	6 Market Street	Urban Centre	447211	167020	NO2	NO	9.5	1.3	NO	2.1

Newbury	Newbury									
105 London Road Newbury	105 London Road Newbury	Urban Background	447528	167708	NO2	NO	0	24	NO	2.6
31 Oxford Road Newbury	31 Oxford Road Newbury	Kerbside	446908	167657	NO2	NO	1.5	1	NO	2.5
43 Hawthorn Road Newbury	43 Hawthorn Road Newbury	Urban Background	447487	167870	NO2	NO	0	13	NO	2.15
41 Hutton Close Newbury	41 Hutton Close Newbury	Urban Background	447546	167916	NO2	NO	0	12.4	NO	2.1
Willows Edge Nursing Home Newbury	Willows Edge Nursing Home Newbury	Urban Background	447540	167970	NO2	NO	0	20	NO	2
112 Shaw Road Newbury	112 Shaw Road Newbury	Roadside	447773	168041	NO2	NO	0	4.9	NO	2
31 Shaw Road Newbury	31 Shaw Road Newbury	Kerbside	447688	167820	NO2	NO	0	0.6	NO	1.7
Abbeydale Monks Lane Newbury	Abbeydale Monks Lane Newbury	Kerbside	446922	163030	NO2	NO	21	2	NO	2.5
A343 Andover Road Wash Common	A343 Andover Road Wash Common	Kerbside	445899	164705	NO2	NO	18.1	0.75	NO	2.25
130 Park Avenue Thatcham	130 Park Avenue Thatcham	Roadside	451965	167498	NO2	NO	7	2	NO	2.1
31 Chapel Street Thatcham	31 Chapel Street Thatcham	Roadside	451906	167441	NO2	YES	0	1.6	NO	2.05

110 London Road Newbury	110 London Road Newbury	Urban Background	447657	167724	NO2	NO	0	15	NO	2
St James Church Pangbourne Hill	St James Church Pangbourne Hill	Roadside	463418	176405	NO2	NO	6.5	1	NO	2
13 Shaw Road Newbury	13 Shaw Road Newbury	Urban Background	447630	167770	NO2	NO	0	7	NO	2.4

Notes:

(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 2017 (%) (2)	NO_2 Annual Mean Concentration (µg/m^3) (3)				
					2013	2014	2015	2016	2017
CM1	Roadside	Automatic	100	97.1	42.2	45.5	34.8	41.7	40.3
A339 Newbury Central	Kerbside	Diffusion Tube	100	75	53.7	37.2	37.8	30.9	38.7
7a Bridge Street Hungerford	Roadside	Diffusion Tube	100	91.7	32.2	27.9	22.6	29.4	28.8
132 London Road Newbury	Roadside	Diffusion Tube	100	91.7	42.7	39	33.7	41.8	35.4
Flat 1, Southview Gardens Newbury	Urban Background	Diffusion Tube	100	91.7	32.8	33.1	27.2	31.5	28.6
374 London Road Newbury	Urban Background	Diffusion Tube	100	100	24.9	24.1	19.2	25.7	23.4
17 Chapel Street Thatcham	Roadside	Diffusion Tube	100	83.3	45.3	43.2	36.3	43.1	40.0
40 Chapel Street Thatcham	Kerbside	Diffusion Tube	100	91.7	41	35.8	30.7	39.9	34.8
75 Chapel Street Thatcham	Roadside	Diffusion Tube	100	100	31.6	31	26.7	31.7	29.6
82/78A Chapel Street Thatcham	Roadside	Diffusion Tube	100	91.7	31.2	31.1	25.6	33.8	31.1
Old Bakery Tidmarsh	Roadside	Diffusion Tube	100	100	35.6	34.6	28.7	35.9	31.8
4 Willows Court	Roadside	Diffusion Tube	100	100	35.7	33.4	25.4	32.2	29.3

Pangbourne									
1 Shooters Hill Pangbourne	Roadside	Diffusion Tube	100	100	29.3	28.2	24	27.9	25.8
The Cross Key Inn Pangbourne	Roadside	Diffusion Tube	100	75	40.3	40.6	32.6	40.2	34.2
Calcot Hotel, A4 Bath Road Calcot	Kerbside	Diffusion Tube	100	91.7	36.9	34.6	25.3	23.1	32.4
Elizabeth Court Theale	Urban Background	Diffusion Tube	100	100	24.4	23.7	19	24.3	21.6
44 Hambridge Road Newbury	Urban Background	Diffusion Tube	100	100	31.6	29.4	22.7	27	27.3
42 Kings Road Newbury	Roadside	Diffusion Tube	100	100	26.6	25.8	22.1	26.1	23.4
1 Winchester Court Newbury	Roadside	Diffusion Tube	100	91.7	43.8	39.2	34.2	43	38.0
Continuous monitor 1, A343, A339 and Greenham Road Newbury	Roadside	Diffusion Tube	100	100	42.5	43.3	35.2	40	40
Continuous monitor 2, A343, A339 and Greenham Road Newbury	Roadside	Diffusion Tube	100	100	42.5	41.5	35	40.6	40.1
Continuous monitor 3, A343, A339 and Greenham Road Newbury	Roadside	Diffusion Tube	100	100	41.5	41.4	34.7	39.8	39.6

64 Greenham Road Newbury	Roadside	Diffusion Tube	100	100	36.9	37	29.1	27.3	32.6
20 Deadmans Lane Greenham	Suburban	Diffusion Tube	100	100	28.4	25.7	22.2	27.8	24.0
A339 New Greenham Park Greenham	Roadside	Diffusion Tube	100	100	41	39.7	29.4	39.3	33.8
3 Howard Road Newbury	Roadside	Diffusion Tube	100	100	23.7	21.5	17.2	22.9	17.7
1 St John's Road Newbury	Roadside	Diffusion Tube	100	83.3	36.6	29.9	25.2	32.6	28.4
63 St John's Road Newbury	Urban Background	Diffusion Tube	100	100	27.3	25.3	20.1	26.5	21.8
40 Bartholomew Street Newbury	Roadside	Diffusion Tube	100	91.7	39.8	35.8	29.3	36	31.7
6 Market Street Newbury	Urban Centre	Diffusion Tube	100	100	36.7	34	28.1	25.7	29.5
31 Oxford Road Newbury	Kerbside	Diffusion Tube	100	100	34.8	34	27.1	30.6	29.7
43 Hawthorn Road Newbury	Urban Background	Diffusion Tube	100	100	25.7	23.5	18.7	23.5	20.5
41 Hutton Close Newbury	Urban Background	Diffusion Tube	100	100	38.4	34.3	30.2	35.1	33.3
Willows Edge Nursing Home Newbury	Urban Background	Diffusion Tube	100	91.7	24.4	25.5	20.7	22.9	23.8
112 Shaw Road Newbury	Roadside	Diffusion Tube	100	91.7	27.4	25.3	21.4	25.2	22.8
31 Shaw Road Newbury	Kerbside	Diffusion Tube	100	91.7	41.9	35.4	37.2	30.5	28.7
13 Shaw Road	Urban	Diffusion	100	100	36.4	42.6	33	37.8	33.2

Newbury	Background	Tube							
Abbeydale Monks Lane Newbury	Kerbside	Diffusion Tube	100	83.3	22.8	20.1	16.5	15.2	19.9
A343 Andover Road Wash Common	Kerbside	Diffusion Tube	100	91.7	36.4	42.6	15.6	15	16
130 Park Avenue Thatcham	Roadside	Diffusion Tube	100	75	26	25.3	17.3	19.2	21.7
31 Chapel Street Thatcham	Roadside	Diffusion Tube	100	100	54.5	45.1	37.2	43.1	39.5
110 London Road Newbury	Urban Background	Diffusion Tube	100	83.3	30.2	29.5	24.5	28.3	25.0
St James Church Pangbourne Hill	Roadside	Diffusion Tube	100	100	N/A	N/A	N/A	24.3	24

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

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

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.

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 2017 (%) (2)	NO_2 1 Hour Means > 200µg/m³ (3)				
					2013	2014	2015	2016	2017
CM1 Newbury	Roadside	Automatic	100	100	3	6	3	21	8

Notes:

Exceedances of the NO_2 1-hour mean objective (200µg/m³ 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.

Appendix B: Full Monthly Diffusion Tube Results for 2017

Table B.1 – NO_2 Monthly Diffusion Tube Results - 2017

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 (**1.0**) and Annualised (1)	Distance Corrected to Nearest Exposure (2)
A339 Newbury Central	-	-	33	39.2	33.1	39.9	38.5	40.5	40.1	43.2	-	40.6	38.7	38.7	28.1
7a Bridge Street hungerford	34.7	26.8	25.4	-	40.5	25.1	24.4	24	26.6	25.8	33.7	29.5	28.8	28.8	
132 London Road Newbury	48.6	35.9	33.3	34.1	-	34.3	29.4	33	31.8	32.7	38.3	38.1	35.4	35.4	
Flat1, Southview Gardens Newbury	35.9	33.4	30.9	24.7	25.7	28.9	23.8	25.5	25.7	28.8	31.5	-	28.6	28.6	
374 London Road Newbury	31.5	23.1	23.6	17	20.4	27.6	18.5	20.8	24.2	25	26.4	23.2	23.4	23.4	
17 Chapel Street Thatcham	54.1	41.8	41.1	33.6	34.1	35.2	35.9	34.6	-	45.8	43.7	-	40.0	**40.0**	
40 Chapel Street	52.3	-	30	28.8	32.9	37.5	27.7	28.1	29.5	40.3	41.5	34.3	34.8	34.8	

Thatcham															
75 Chapel Street Thatcham	39.6	32	27.3	24.4	23.7	32.1	24.9	25.4	25.8	34.7	33.3	31.8	29.6	29.6	
82/78A Chapel Street Thatcham	41.9	31.6	28.1	25.4	23.8	30.4	21.3	23.6	-	39.5	43.3	32.6	31.1	31.1	
Old Bakery Tidmarsh	40.3	31	30.1	32.7	30.9	33.9	27.1	29	28.7	32.6	36.2	29.6	31.8	31.8	
4 Willows Court Pangbourne	44.6	29.1	31.3	26.7	29.7	28.2	23.3	24.4	25.8	29.6	31.8	27.2	29.3	29.3	
1 Shooters Hill Pangbourne	38.1	30.1	26.3	21	23.5	26.8	22.2	21	23.3	26.9	26.8	23.2	25.8	25.8	
The Cross Key Inn Pangbourne	48.5	36.2	33.9	36.4	24	-	30.2	31	-	-	35.5	32.1	34.2	34.2	
Calcot Hotel A4 Bath Road Calcot	53.3	36.4	34	19.7	-	32.8	25.7	25.3	28.2	37.2	31.9	32	32.4	32.4	23.1
Elizabeth Court Theale	26.3	22.1	22.4	16	21.7	22	17.6	17.8	21	23	25	23.7	21.6	21.6	
44 Hambridge Road Newbury	34.8	31.2	25.7	27	25.5	25.3	21.7	23.6	24.6	29.3	30.6	28.4	27.3	27.3	
42 Kings Road Newbury	28.3	25	20.9	22.8	18.8	19.9	19.3	19.7	22.2	24.9	29	29.9	23.4	23.4	
1 Winchester Court Newbury	35.9	41.4	38.1	38.2	32.3	34.4	33.8	39.5	37.4	40.3	47	-	38.0	38.0	
Continuous monitor 1, A343, A339 and Greenham	53.3	41.1	35.3	36.1	34	35.1	37.3	37.1	39.6	42.6	44.9	43	40.0	**40.0**	38.3

Road Newbury															
Continuous monitor 2, A343, A339 and Greenham Road Newbury	48	42	37.6	42.4	33.8	33.3	35.3	38.6	40.3	44.7	43.8	41.6	40.1	**40.1**	
Continuous monitor 3, A343, A339 and Greenham Road Newbury	43.2	41.2	37.3	43.3	33.2	36.1	33	40.8	41.1	38.6	45.8	42.1	39.6	39.6	
64 Greenham Road Newbury	32.5	32.3	28.1	35.5	30.9	30.4	28.4	32.8	32.2	31.6	42.1	33.8	32.6	32.6	23.4
20 Deadmans Lane Greenham	25.2	25.3	21.7	22.7	18.2	23.9	22.3	25.2	25.5	26.5	30.6	20.9	24.0	24.0	
A339 New Greenham Park	41.9	39.8	38.6	37.8	34	31.2	29.7	33.4	29.9	23.6	33.1	33.2	33.8	33.8	
3 Howard Road Newbury	28.3	22.5	15.6	17.1	18.2	14.7	12.3	14.7	16.7	14	19.6	18.5	17.7	17.7	
1 St Johns Road Newbury	44.5	-	24	23.9	29.1	29.7	17	-	30.1	25.1	29.8	30.9	28.4	28.4	
63 St Johns Road Newbury	32.4	25.4	21	22.3	22.1	22.9	17.8	18.0	19.3	18.3	22.3	19.5	21.8	21.8	
40 Bartholomew Street	40.5	36.1	30.9	28.9	29.9	31.4	25	-	28.8	30	36.6	31.1	31.7	31.7	

Newbury															
6 Market Place Newbury	43.2	32.2	28.8	26.3	29.7	29	24	25	26	29.1	31.4	29.5	29.5	29.5	22.4
31 Oxford Road Newbury	39.2	34.5	28.2	23.9	29.3	33.1	23.4	25.2	29.2	29.1	32.2	28.6	29.7	29.7	26.1
43 Hawthorn Road Newbury	31.8	22.7	18	20	23.1	23.8	14.6	16.1	18.9	15.8	21	18.6	20.5	20.5	
41 Hutton Close Newbury	34.3	37.7	32	33.7	22.8	34.6	30.5	32.4	29.1	35.8	39.7	37.2	33.3	33.3	
Willows Edge Nursing Home Newbury	31.8	23.3	21.5	17.4	16.2	22.2	17.1	-	35.7	21.9	25.5	29.6	23.8	23.8	
112 Shaw Road Newbury	33.8	26.8	22.9	19.2	21.4	23.2	17.4	19.2	19.8	18	29	-	22.8	22.8	
31 Shaw Road Newbury	-	37.6	32.9	23.9	29.0	20.8	25.3	25.7	28.7	28.2	32.3	31.4	28.7	28.7	
Abbeydale Monks Lane Newbury	29.8	18.9	20.4	13	-	19.0	14.4	14.1	-	17.7	27.5	23.9	19.9	19.9	13.2
A343 Andover Rd(Parkhouse School)	16.6	18.7	15.7	19.3	14	-	11.4	12.7	13.2	14.9	22.2	17.8	16.0	16.0	11.4
130 Park Avenue Thatcham	35.4	24.5	20	-	17.4	16.1	-	13.4	19.9	25.9	-	23.1	21.7	21.7	
31 Chapel Street Thatcham	50.3	39.4	37.8	32.3	39.3	37.3	34.5	36.9	35.3	48.2	42.4	40.7	39.5	39.5	
110 London Road Newbury	-	-	23.1	25.1	22	23.7	22.6	23.4	25.2	26.2	29.7	29.4	25.0	25.0	

St James Church Pangbourne Hill	34.4	26	22.1	22.6	22	24.1	22.2	22.9	24.6	13.8	28.2	25.4	24.0	24.0	21.3
A343 Andover Rd(Parkhouse School)	16.6	18.7	15.7	19.3	14	-	11.4	12.7	13.2	14.9	22.2	17.8	16.0	16.0	11.4

☒ **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**

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 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 20th July 2017.

The converter in the NOx analyser was tested and found to be 100.1% efficient with NO_2 concentrations of 279 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 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, by your Equipment Support Unit.

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 5.3%.

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 AR018 (Jan 2017 – Feb 2017) = 100%, AR019 (Apr 2017- May 2017) = 100%, AR021 (July 2017 – Aug 2017) = 100% and AR022 (Sept 2017 – Oct 2017) = 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. 03/18 update) suggested a bias adjustment factor of **0.97** 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 **1.0**. 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 2018 for the 2017 data the bias adjustment factor is derived from the Newbury co-location study.

In determining the bias adjustment factor for the 2017 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 co-location study 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 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 24 of the 41 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 (2017).
- 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 (2017).

- 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 97.1 % in 2017.
- 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 2017 data.

Precision and accuracy table

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	05/01/2017	02/02/2017	53.3	48.0	43.2	48	5.1	11	12.6
2	02/02/2017	02/03/2017	41.1	42.0	41.2	41	0.5	1	1.3
3	02/03/2017	30/03/2017	35.3	37.6	37.3	37	1.2	3	3.0
4	30/03/2017	27/04/2017	36.1	42.4	43.3	41	3.9	10	9.7
5	27/04/2017	01/06/2017	34.0	33.8	33.2	34	0.4	1	1.1
6	01/06/2017	29/06/2017	35.1	33.3	36.1	35	1.4	4	3.6
7	29/06/2017	03/08/2017	37.3	35.3	33.0	35	2.2	6	5.4
8	03/08/2017	31/08/2017	37.1	38.6	40.8	39	1.9	5	4.6
9	31/08/2017	28/09/2017	39.6	40.3	41.1	40	0.8	2	1.9
10	28/09/2017	02/11/2017	42.6	44.7	38.6	42	3.1	7	7.6
11	02/11/2017	07/12/2017	44.9	43.8	45.8	45	1.0	2	2.5
12	07/12/2017	04/01/2018	43.0	41.6	42.1	42	0.7	2	1.8
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
58.6	100.0	Good	Good
41.9	100.0	Good	Good
38.8	100.0	Good	Good
40.5	100.0	Good	Good
32.2	99.6	Good	Good
31.2	89.3	Good	Good
28.9	79.6	Good	Good
33.1	99.9	Good	Good
36.2	99.0	Good	Good
43.3	99.8	Good	Good
52.2	100.0	Good	Good
40.5	99.7	Good	Good
	Overall survey -->	Good precision	Good Overall DC

(Check average CV & DC from Accuracy calculations)

Site Name/ ID:	Newbury

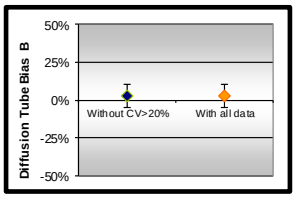
Precision: 12 out of 12 periods have a CV smaller than 20%

Accuracy (with 95% confidence interval) without periods with CV larger than 20%

Bias calculated using 12 periods of data
Bias factor A: 1 (0.93 - 1.08)
Bias B: 0% (-7% - 8%)
Diffusion Tubes Mean: 40 µgm^{-3}
Mean CV (Precision): 5
Automatic Mean: 40 µgm^{-3}
Data Capture for periods used: 97%
Adjusted Tubes Mean: 40 (37 - 43) µgm^{-3}

Accuracy (with 95% confidence interval) WITH ALL DATA

Bias calculated using 12 periods of data
Bias factor A: 1 (0.93 - 1.08)
Bias B: 0% (-7% - 8%)
Diffusion Tubes Mean: 40 µgm^{-3}
Mean CV (Precision): 5
Automatic Mean: 40 µgm^{-3}
Data Capture for periods used: 97%
Adjusted Tubes Mean: 40 (37 - 43) µgm^{-3}



Jaume Targa, for AEA
Version 04 - February 2011

Distance Correction

9 sites required distance correction calculation using the NO2 fall off with distance calculator v4.2, released April 2018.

A339 Newbury Central

Enter data into the red cells

Step 1	How far from the KERB was your measurement made (in metres)?	1.9	metres
Step 2	How far from the KERB is your receptor (in metres)?	11.9	metres
Step 3	What is the local annual mean background NO_2 concentration (in µg/m^3)?	13.65	µg/m^3
Step 4	What is your measured annual mean NO_2 concentration (in µg/m^3)?	38.7	µg/m^3
Result	The predicted annual mean NO_2 concentration (in µg/m^3) at your receptor	28.1	µg/m^3

Calcot Hotel

Enter data into the red cells

Step 1	How far from the KERB was your measurement made (in metres)?	2	metres
Step 2	How far from the KERB is your receptor (in metres)?	18	metres
Step 3	What is the local annual mean background NO_2 concentration (in µg/m^3)?	14.38	µg/m^3
Step 4	What is your measured annual mean NO_2 concentration (in µg/m^3)?	32.4	µg/m^3
Result	The predicted annual mean NO_2 concentration (in µg/m^3) at your receptor	23.1	µg/m^3

Continuous monitor

Enter data into the red cells

Step 1	How far from the KERB was your measurement made (in metres)?	4.7	metres
Step 2	How far from the KERB is your receptor (in metres)?	5.7	metres
Step 3	What is the local annual mean background NO_2 concentration (in µg/m^3)?	12.42	µg/m^3
Step 4	What is your measured annual mean NO_2 concentration (in µg/m^3)?	39.9	µg/m^3
Result	The predicted annual mean NO_2 concentration (in µg/m^3) at your receptor	38.3	µg/m^3

64 Greenham Road

Enter data into the red cells

Step 1	How far from the KERB was your measurement made (in metres)?	2	metres
Step 2	How far from the KERB is your receptor (in metres)?	14	metres
Step 3	What is the local annual mean background NO_2 concentration (in µg/m^3)?	12.42	µg/m^3
Step 4	What is your measured annual mean NO_2 concentration (in µg/m^3)?	32.6	µg/m^3
Result	The predicted annual mean NO_2 concentration (in µg/m^3) at your receptor	23.4	µg/m^3

6 Market Street

Enter data into the red cells

Step 1	How far from the KERB was your measurement made (in metres)?	1.3	metres
Step 2	How far from the KERB is your receptor (in metres)?	10.8	metres
Step 3	What is the local annual mean background NO_2 concentration (in µg/m^3)?	13.65	µg/m^3
Step 4	What is your measured annual mean NO_2 concentration (in µg/m^3)?	29.5	µg/m^3
Result	The predicted annual mean NO_2 concentration (in µg/m^3) at your receptor	22.4	µg/m^3

31 Oxford Road

Enter data into the red cells

Step 1	How far from the KERB was your measurement made (in metres)?	1	metres
Step 2	How far from the KERB is your receptor (in metres)?	2.5	metres
Step 3	What is the local annual mean background NO_2 concentration (in µg/m^3)?	9.94	µg/m^3
Step 4	What is your measured annual mean NO_2 concentration (in µg/m^3)?	29.7	µg/m^3
Result	The predicted annual mean NO_2 concentration (in µg/m^3) at your receptor	26.1	µg/m^3

Abbeydale

Enter data into the red cells

Step 1	How far from the KERB was your measurement made (in metres)?	2	metres
Step 2	How far from the KERB is your receptor (in metres)?	22	metres
Step 3	What is the local annual mean background NO_2 concentration (in µg/m^3)?	7.91	µg/m^3
Step 4	What is your measured annual mean NO_2 concentration (in µg/m^3)?	19.9	µg/m^3
Result	The predicted annual mean NO_2 concentration (in µg/m^3) at your receptor	13.2	µg/m^3

A343 Andover Road

Enter data into the red cells

Step 1	How far from the KERB was your measurement made (in metres)?	0.75	metres
Step 2	How far from the KERB is your receptor (in metres)?	18.85	metres
Step 3	What is the local annual mean background NO_2 concentration (in µg/m^3)?	8.54	µg/m^3
Step 4	What is your measured annual mean NO_2 concentration (in µg/m^3)?	16	µg/m^3
Result	The predicted annual mean NO_2 concentration (in µg/m^3) at your receptor	11.4	µg/m^3

St James Church

Enter data into the red cells

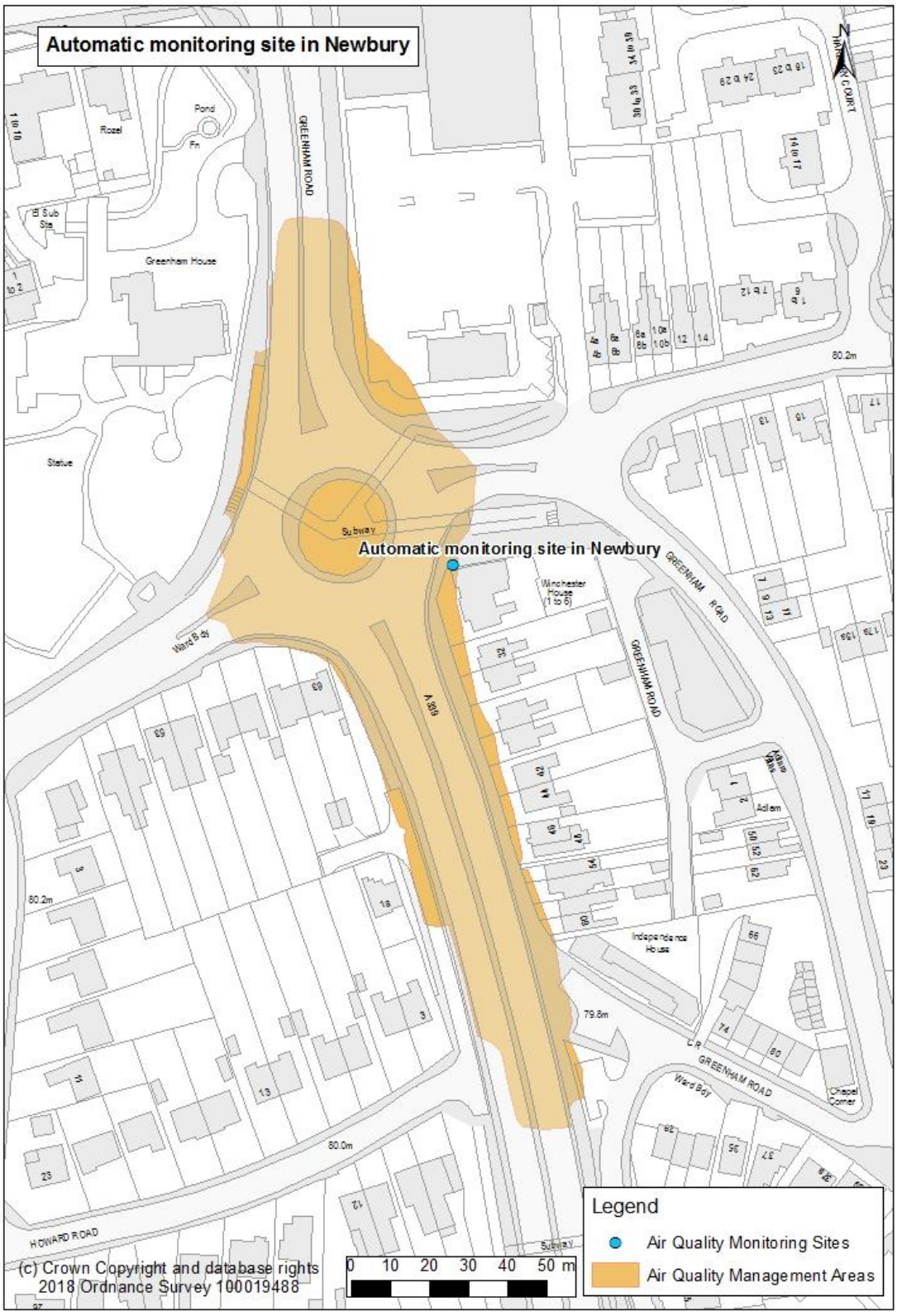
Step 1	How far from the KERB was your measurement made (in metres)?	1	metres
Step 2	How far from the KERB is your receptor (in metres)?	7.5	metres
Step 3	What is the local annual mean background NO_2 concentration (in µg/m^3)?	17.37	µg/m^3
Step 4	What is your measured annual mean NO_2 concentration (in µg/m^3)?	24	µg/m^3
Result	The predicted annual mean NO_2 concentration (in µg/m^3) at your receptor	21.3	µg/m^3

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

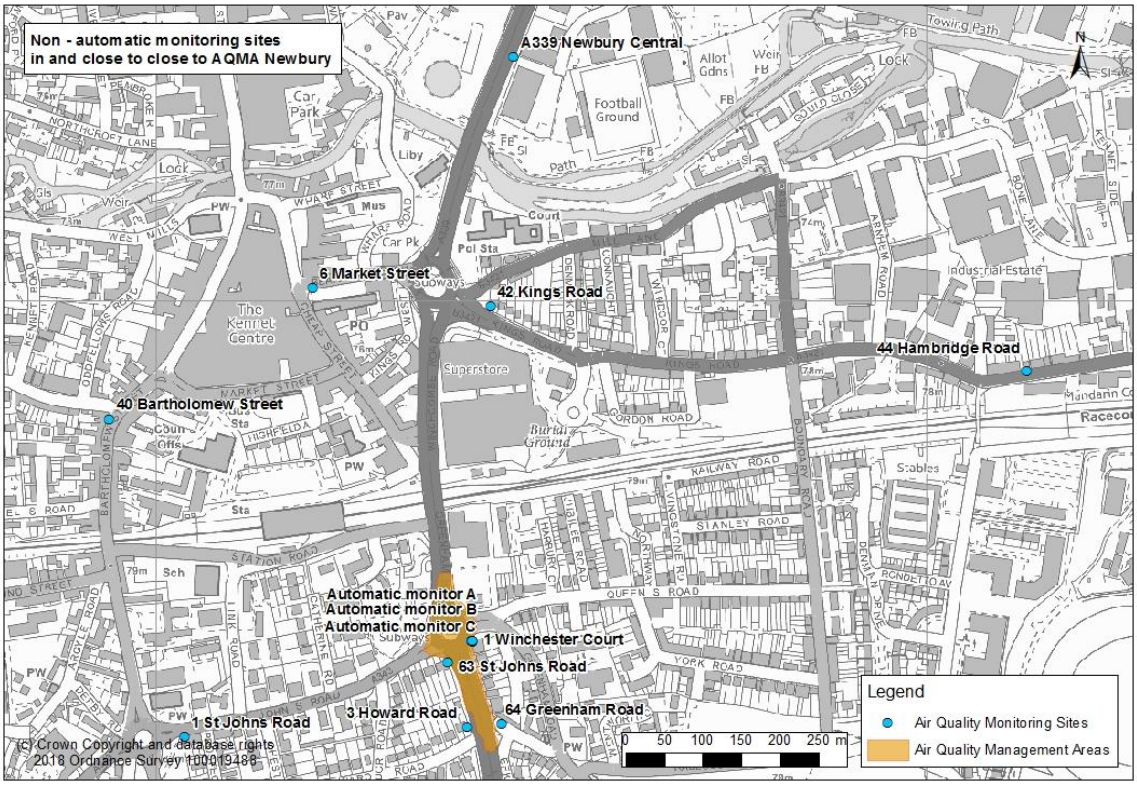
Map 1 Newbury AQMA

Map 2 Thatcham AQMA

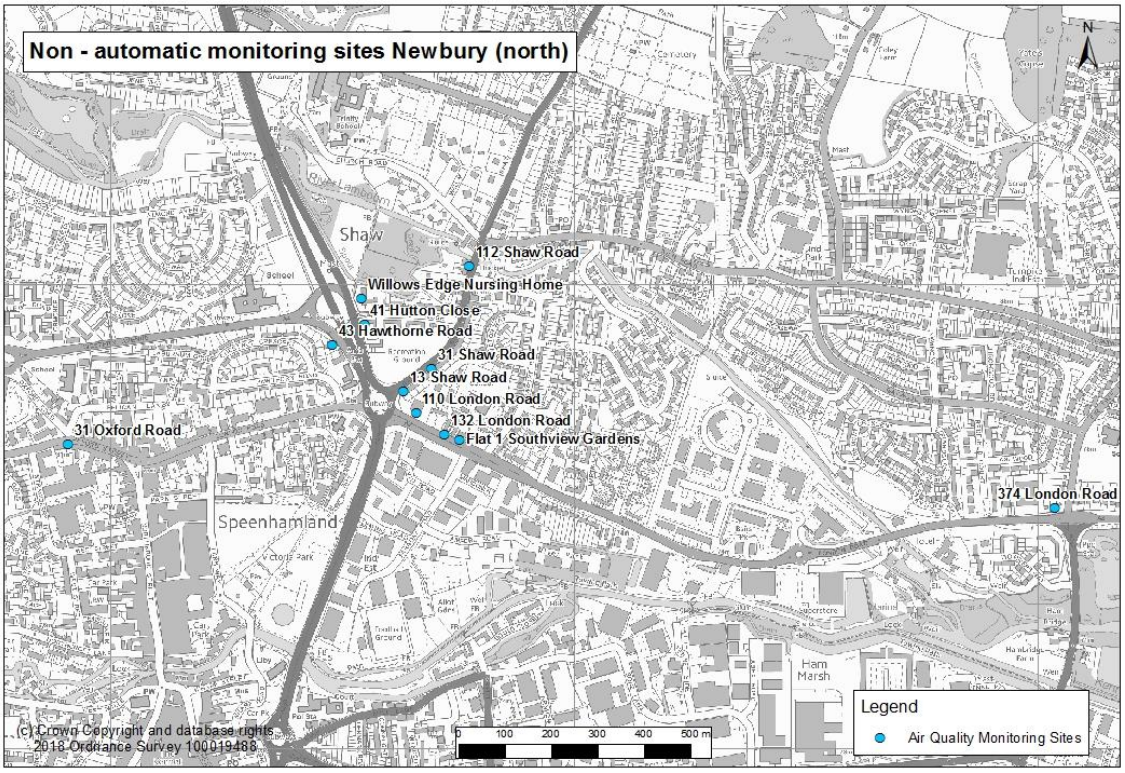
Map 3 Continuous monitor Newbury



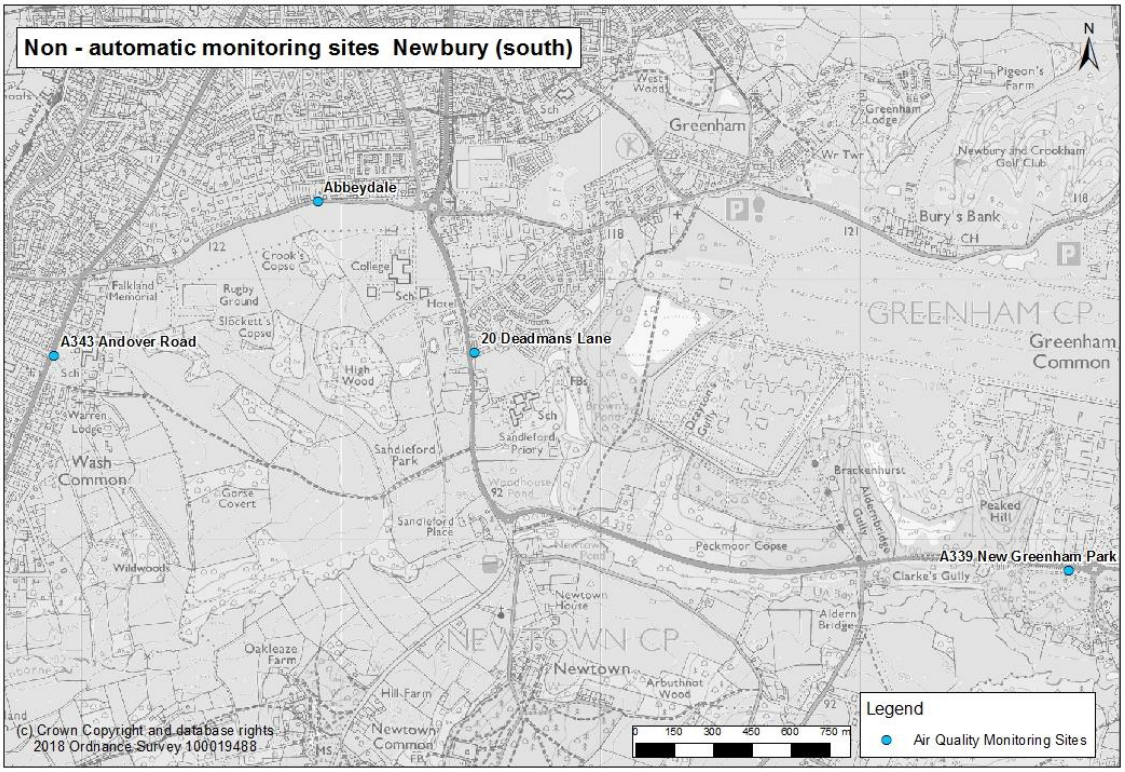
Map 4 In/near AQMA Newbury



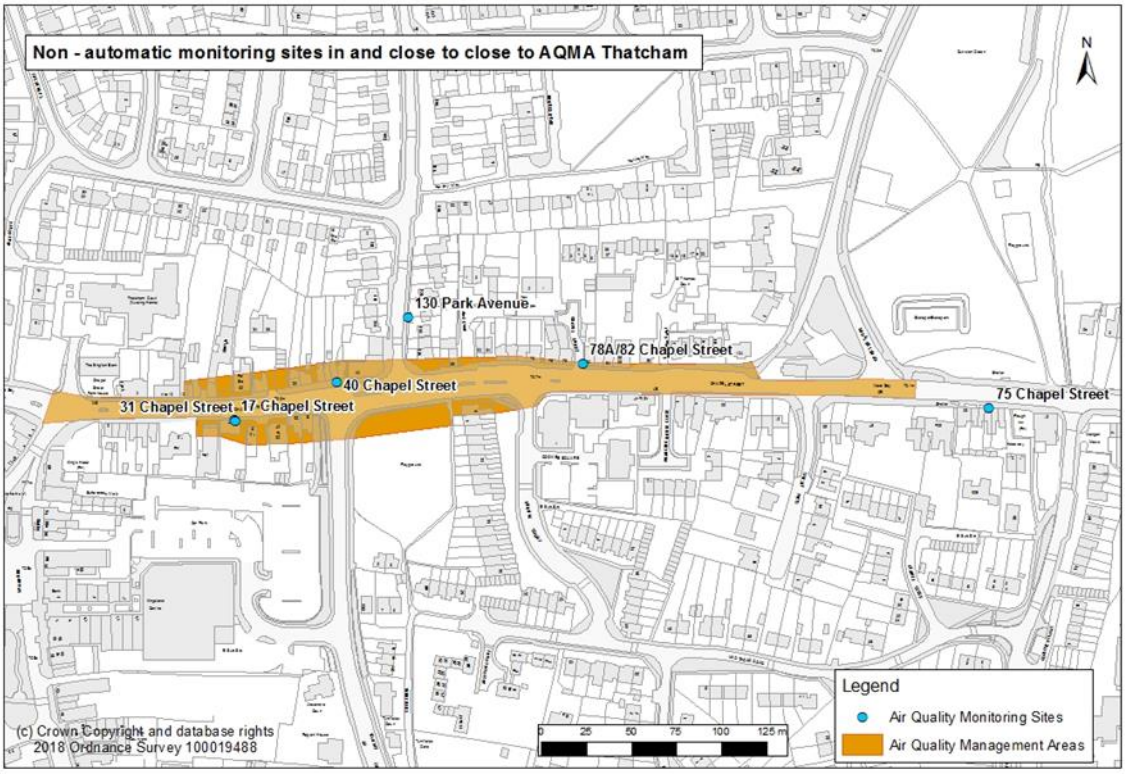
Map 5 Newbury north



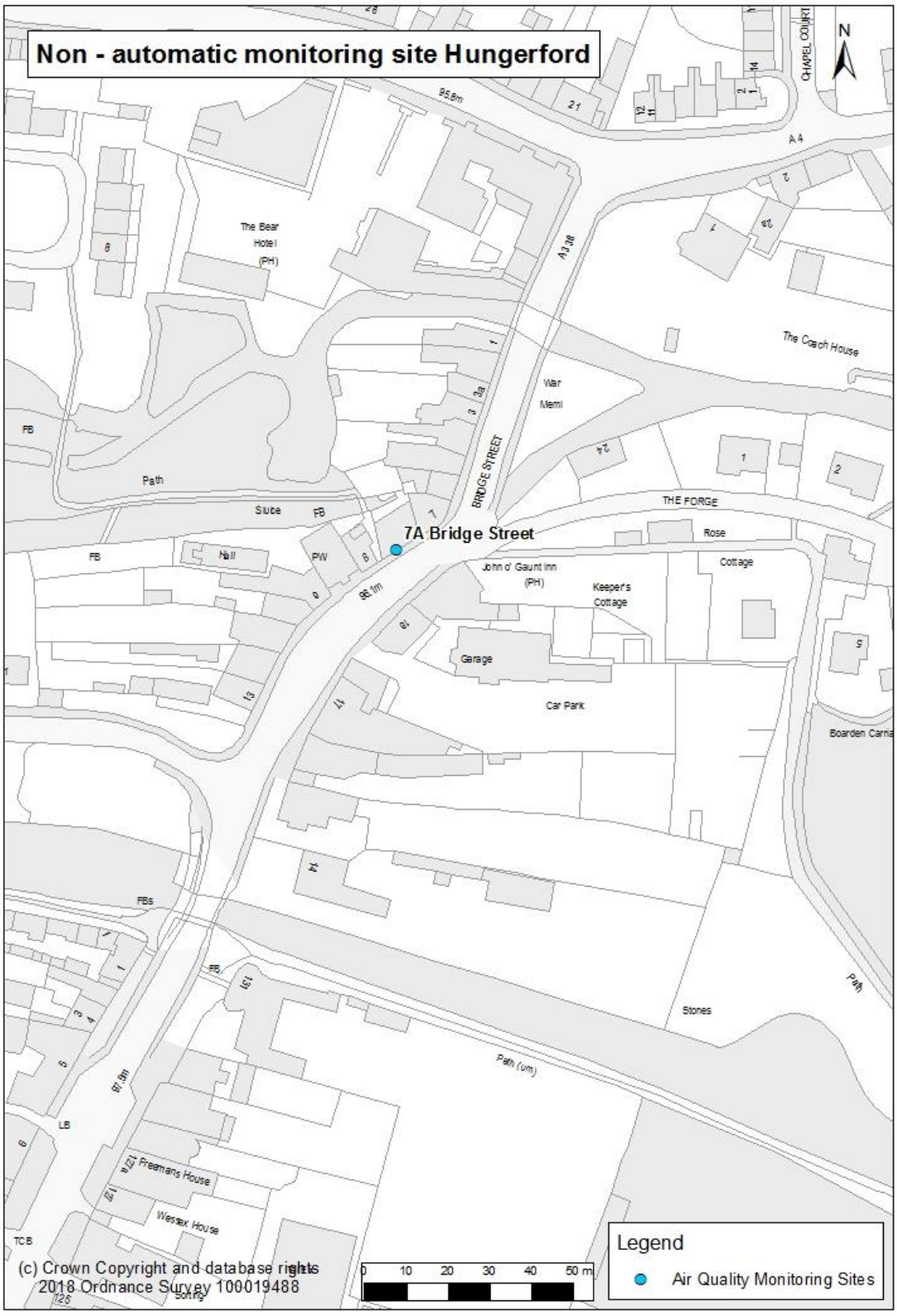
Map 6 Newbury south



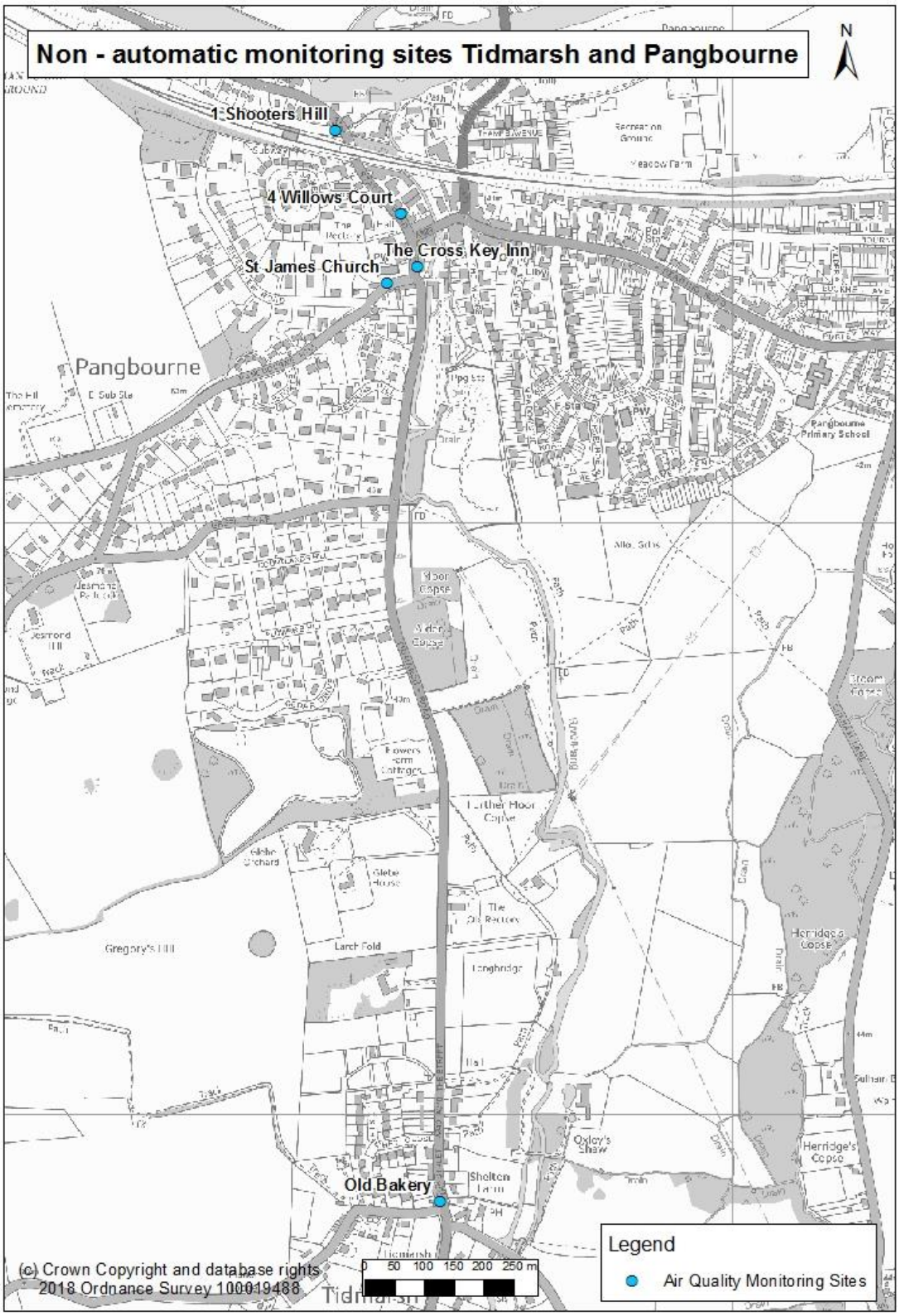
Map 7 In/near Thatcham AQMA



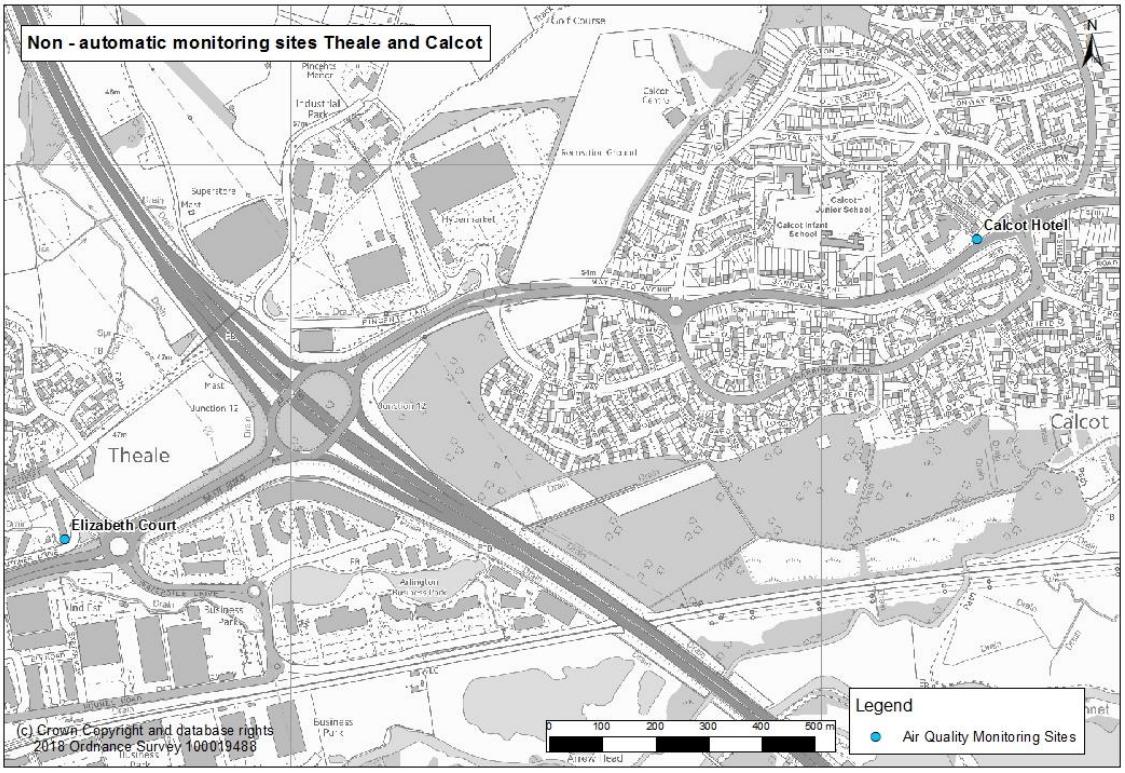
Map 8 Hungerford



Map 9 Tidmarsh and Pangbourne



Map 10 Theale and Calcot



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