



WOKINGHAM
BOROUGH COUNCIL

2019 Air Quality Annual Status Report (ASR)

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

June 2019

Wokingham Borough Council

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Executive Summary: Air Quality in Our Area

Air Quality in Wokingham Borough

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 billion³.

The major source of air quality pollutants in Wokingham Borough is road transport, and in particular the contribution from the M4 has been identified as significant. The main pollutant of concern is nitrogen dioxide (NO₂) and three Air Quality Management Areas (AQMAs) have been declared for exceedances of the annual mean NO₂ objective. These are located in Wokingham Town Centre, Twyford Crossroads and along, and 60m either side of, the M4 throughout the whole of the borough (https://uk-air.defra.gov.uk/aqma/local-authorities?la_id=318).

NO₂ levels in 2018 have shown a noticeable decrease of 2017 levels for the diffusion tube sites. Overall the levels have been reducing over the last 6 years to 2018.

The automatic monitoring unit in Peach Street Wokingham recorded a level of 32.9 µg/m³, which was not record an exceedance of the annual mean NO₂ objective, although 1 diffusion tubes located within the Wokingham Town Centre AQMA showed an exceedance. There was no exceedance of the 1 hour NO₂ objective with 0 of the 18 exceedances permitted. Within the M4 AQMA, there were no exceedances of the annual mean NO₂, with a reduction in levels in Shinfield, which may be due to the new A327 road layout.

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

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Within the Twyford Crossroads AQMA there was 1 exceedances of the annual mean NO₂. A continuous monitor to monitor NO₂ is due to be set up within the AQMA at the beginning of 2019.

No diffusion tube results were recorded above 60µg/m³ which would indicate an exceedance of the 1 hour NO₂ objective.

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

The preparation of the Air Quality Action Plans for Twyford and Wokingham AQMAs has been completed. Following consultation and a Stakeholder workshop in 2017 the final Plan was agreed by and published in March 2018.

As part of 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 the borough, particularly for the four new communities being created to accommodate the majority of the construction of over 13,000 new houses in Wokingham Borough as identified in the Local Development Framework Core Strategy. The vision is to provide a cost-effective, inclusive transport network that enhances the economic, social and environmental prospects of the Borough whilst promoting the safety, health and wellbeing of those that use it. Key goals within this vision include increasing and promoting opportunities to walk and cycle, improving the affordability and availability of public transport and enabling people to make informed, safe and sustainable travel decisions. The Plan acknowledges the link with the M4 AQMA and any future AQAP's. There is also a specific Policy on Air Quality (Policy LTP HW10) which states that the Council will continue to develop and implement our Draft Air Quality Action Plan in response to pollution caused by vehicle emissions. Furthermore, a key objective of the Strategic Environmental Assessment for LTP3 was to improve air quality. LTP Strategies continue to be reviewed. The Local Plan Update (2026-2036) has commenced following which the next Transport Vision review will take place along with the next LTP.

The link between air quality, particularly from PM_{2.5}, and public health in Wokingham Borough requires further exploration however working with the Strategic Berkshire Public Health Team has continued.

Actions to Improve Air Quality

All planning applications are reviewed for their air quality impact and potential to introduce new receptors into areas of existing poor air quality in the borough. Air quality assessments have been provided where necessary and appropriate mitigation requested. Applications have included several major residential and mixed use residential and commercial schemes, traffic flow changes to road schemes, new relief road schemes and any applications which may have an impact to the AQMAs and other hotspot locations.

Wokingham Borough Council has completed all Pollution Prevention and Control inspections as required.

Environmental Health contributed to the collation of traffic data, officers have received appropriate training in fulfilling their LAQM duties and are part of appropriate internal working groups to ensure air quality impacts in specific projects or areas of highways works are considered.

A joint application with Bracknell Forest and West Berkshire 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.

Conclusions and Priorities

One of Wokingham Borough Council's priorities is to "tackle traffic congestion in specific areas of the Borough" and one of its underpinning principles is to "improve health, wellbeing and quality of life".

The following local priorities have been set in Wokingham Borough:

- Exploring the link between public health and PM2.5;
- Continuing the joint working between the Public Health and Environmental Health teams and links within the Berkshire Public Health Shared Team,

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considering the inclusion of air quality in the Public Health Work Plan and the Health and Wellbeing Strategy;

- Continuing to work within the unitary authority with the Transport Policy and Highways Teams;
- Commence the implementation of the AQAP for the Wokingham Town Centre and Twyford Crossroads;
- Increase the community awareness of air pollution through involvement in campaigns such as Clean Air Day
- Consider revocation of the M4 AQMA following the opening of the new M4 motorway overbridge as part of the Shinfield Eastern Relief Road Scheme (following a further year of monitoring); and
- Continue and expand the continuous (within the Twyford AQMA) and passive air quality monitoring programmes.

The following challenges have been identified:

- Budget allocation for progressing measures and actions however funding applications will be applied for where possible/appropriate; and
- Linking of the 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 Wokingham Borough please refer to our website at <http://info.westberks.gov.uk/index.aspx?articleid=27513>.

- Visit our My Journey website - Your one stop destination for travel information and advice in and around Wokingham borough: <http://www.myjourneywokingham.com/>

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- Individuals or members of local groups are invited to share any ideas they have to cut NO₂ levels in Wokingham Borough by emailing:

environmental.health@wokingham.gov.uk

Other useful websites include:

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

<http://jsna.wokingham.gov.uk/people-and-places/environmental-health-andlicensing>

- 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
- Search for car sharing opportunities using the Liftshare UK <https://liftshare.com/uk> or Faxi (<https://faxi.co.uk/>)
- Use the bus or train regularly and keep up-to-date with the latest bus routes timetables.

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1 Local Air Quality Management

This report provides an overview of air quality in Wokingham Borough during 2018. 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 Wokingham Borough 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 **Error! Reference source not found.** 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 Wokingham Borough 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=318

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

There are no proposals to declare a new AQMA. There are no proposals to amend any of the AQMAs.

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
M4 AQMA	Declared 2001, Amended 2004	NO2 Annual Mean	Wokingham borough	Zone 60m either side of the M4 from Council's boundaries with RBC & RBW&M throughout the borough and 10m either side of the A329(M)/A3290. The AQMA was reduced to the Council's	YES	69 (2001), 56 (2004)	µg/m3	39.1 (WOK 841)	µg/m3	refer to LTP 3		http://www.wokingham.gov.uk/parking-road-works-and-transport/transport-and-roads-guidance-and-plans/?categoryesct91f252ff-550d-4cfa-a838-92ef2cb5f83c=7749

				boundaries with RBC & RBW&M throughout the borough and 10m either side of the A329(M)/A 3290 including an extended area along the A329 Reading Rd, where it underpasses the M4.							
M4 AQMA	Declared 2001, Amended 2004	NO2 1 Hour Mean	Wokingham borough	Zone 60m either side of the M4 from Council's boundaries with RBC & RBW&M throughout the borough and 10m either side of the A329(M)/A 3290	YES	228 (percentile of hourly means)		N/A			

Twyford Crossroads AQMA	Nov-15	NO2 Annual Mean	Twyford	Residential and commercial properties along parts of High St in the west, Wargrave Rd in the northwest, London Rd in the north-east and Church St the south-east.	NO	54	µg/m3	49.1 (WOK 856)	µg/m3	WB C AQAP 2017	Mar-18	http://info.westberks.gov.uk/CHttpHandler.ashx?id=45385
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Wokingham Borough 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 Wokingham Borough

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

- a requirement to clarify the status of WOK864. WOK 864 is located at a site of relevant exposure. The 2018 result shows a decrease to 36 µg/m³, therefore the AQMA Twyford Crossroads does not require to be extended.
- the requirement to continue monitoring within the M4 AQMA. Monitoring has continued in 2019.

Wokingham Borough has taken forward a number of direct measures during the current reporting year of 2018 in pursuit of improving local air quality. Details of all measures completed, in progress or planned are set out in Table 2.2.

More detail on these measures can be found in their respective Action Plans including LTP3. Key completed measures are:

- Opening of the first phase of the Winnersh Relief Road (connecting the B3270 Lower Earley Way to the B3030 King Street Lane, being new infrastructure to improve the resilience of Wokingham Boroughs road network by helping to relieve the existing congestion through Winnersh.
- The My Journey team have worked with a number of schools to encourage active and sustainable travel, such as cycle training, setting up a walking bus, and encourage the schools to work towards Modeshift stars accreditation.

My Journey data has shown the following key statistics:

- between 2016 and 2018 there has been a 8% increase in residents indicating they cycle at least once/week and a 4% increase in walking once/week
- 1770 children were trained in bike ability in 2017/18, representing a 26% increase compared to 2015/16
- Bus usage increased by 14% from 2014/15 to 2017/18 compared to a -1% decline in the south-east, 2.5 million passenger journeys in 2017/18 in the borough

- The growth in ultra-low emission vehicles in WBC is 170% compared to 149% in the south-east from 2015/16 to 2017/18, with over 1445 in 2018 compared to 929 in 2017

Wokingham Borough expects the following measures to be completed over the course of the next reporting year:

- In 2019 construction on phase two of the Winnersh Relief Road is due to commence to connect the B3030 King Street Lane to the A329 Reading Road. This is part of the Council's multi million pound strategic new roads programme, which is being built to assist in improving network resilience to support the growth of the borough.
- commence the implementation of the AQAP for Twyford Crossroads and Wokingham Town Centre via internal officer working group
- promotion of low emission transport and car club
- promotion of active travel and travel choices via the My Journey platform
- working with Public Health colleagues
- installation of permanent cut pollution turn off your engine signage in Twyford
- commencement of Thames Valley Park and Ride development
- progress with the East Reading Mass Rapid Transit project

Wokingham Borough's priorities for the coming year are as per the 2019 measures above.

The principal challenges and barriers to implementation that Wokingham Borough anticipates facing are related to resources and lack of funding to progress and 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, Wokingham Borough Council anticipates that further additional measures not yet prescribed will be required in subsequent years to achieve compliance and

enable the revocation of the M4, Twyford Crossroads and Wokingham Town Centre 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 AQAP Tywford 1	Investigate the feasibility of alternative traffic routes around Tywford	Transport Planning and Infrastructure	Other	WBC	2017-2019	post 2026	Feasibility study carried out	12.1 µg/m ³	Local Plan update is ongoing. This will make recommendation regarding development and supporting infrastructure needs.	Local Plan Update process will conclude in 2020/21	Aim for some through traffic avoided through AQMA.
2 AQAP Tywford 2	Twyford Railway station 1. consider access for vehicles, taxis, cyclists and pedestrian s. 2. consider integration of public transport . 3. consider car parking and cycling provisions	Transport Planning and Infrastructure	Public transport improvements- interchanges stations and services	WBC, GWR, Twyford PC	2017-2019 onwards	2019 onwards	changes incorporated	12.1 µg/m ³	Preliminary studies have been undertaken by GWR & WBC to understand costs and option available for development	Long term project	To work with all partners to further promote and encourage sustainable transport to and from stations, this includes soft measures as well as infrastructure delivery.
3 AQAP Tywford 3	Review cycle paths	Transport Planning and Infrastructure	Cycle network	WBC	2016-2018	2018 onwards	increase in usage	12.1 µg/m ³	ongoing project	ongoing project	cycleway delivery is part of the yearly capital programme

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4 AQAP Tywford 4	investigate options of A4 and A3032 junction at Hare Hatch	Traffic Management	Strategic highway improvements, Re-prioritising road space away from cars, including Access management, Selective vehicle priority, bus priority, high vehicle occupancy lane	WBC	2018/2019	2018/2019	investigation carried out	12.1 µg/m ³	No progress to date. Budget needs to be agreed and allocated.	2018/19	Traffic more likely to travel east of village so avoiding AQMA
5 AQAP Tywford 5	Continue to monitor traffic lights and crossings to maximum efficiency and consider their functionality including left turns and peak hour use	Traffic Management	Strategic highway improvements, Re-prioritising road space away from cars, including Access management, Selective vehicle priority, bus priority, high vehicle occupancy lane	WBC	tbc	tbc	review of phases with traffic flow data and real time air quality data	12.1 µg/m ³	No progress to date. Budget needs to be agreed and allocated.	tbc	Determine effect on air quality with different phases. Linked with traffic monitoring to be set up and new continuous monitoring due to commence January 2019.
6 AQAP Tywford 6	Carry out feasibility study for Low Emission Zone for the crossroads	Promoting Low Emission Transport	Low Emission Zone (LEZ)	WBC	tbc	tbc	Feasibility study carried out	12.1 µg/m ³	no progress to date	tbc	Business case for a LEZ needs developing. Consider implications of the transfer of Criminal Parking Enforcement powers to Local Highway Authority.
7 AQAP Tywford 7	Review of bus fleet and consider alternative fuels.	Vehicle Fleet Efficiency	Promoting Low Emission Public Transport	Bus companies as contracted by WBC	2016/2017	2017/18	increase in number of buses run on alternative fuels	12.1 µg/m ³	2017 RTL run hybrid buses. CNG all low emission	ongoing with other operators	reducing emissions within AQMA

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8 AQAP Tywford 8	Install "Cut Pollution. Turn off your engine" signs when queuing traffic at traffic lights.	Public Information	Other	WBC	2018-2019	2019-2020	Drivers to follow advice	12.1 µg/m ³	Programmes of signing to be included in Highways capital programme	2019-2020	Temporary banners to be installed ahead of Clean Air Day in June 2019
9 AQAP Tywford 9	Consider feasibility of Park and Ride strategy for Twyford	Alternatives to private vehicle use	Bus based Park & Ride	WBC	2017-2019	linked to development	Feasibility study carried out	12.1 µg/m ³	no progress to date. Budget needs to be agreed and allocated	tbc	A study needs to be undertaken, including the business case
10 AQAP Tywford 10	School Travel Plans (Mode Shift Stars)	Promoting Travel Alternatives	School Travel Plans	WBC	2016	2017 and ongoing	continue to be developed and reviewed	12.1 µg/m ³	ongoing	open ended	reduction in cars travelling through AQMA
11 AQAP Wok TC 1	Intelligent traffic signals at Shute End	Traffic Management	Strategic highway improvements, Re-prioritising road space away from cars, including Access management, Selective vehicle priority, bus priority, high vehicle occupancy lane	WBC	tbc	tbc	installation of MOVA	15.5µg/m ³	no progress to date, budget needs to be agreed and allocated	tbc	intelligent signals are more costly than regular signals and budget will have to be allocated
12 AQAP Wok TC 2	Consider speed reduction through town centre	Traffic Management	Reduction of speed limits, 20mph zones	WBC Highways, TVP	tbc	tbc	tbc	15.5µg/m ³	no progress to date	tbc	Requires TRO supported by TVP. Consider design speed as well as speed limit

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13 AQAP Wok TC 3	Review traffic routes in town centre and consider if any roads require restricted access	Traffic Management	Strategic highway improvements, Re-prioritising road space away from cars, including Access management, Selective vehicle priority, bus priority, high vehicle occupancy lane	WBC	ongoing	ongoing	review carried out	15.5µg/m ³	no progress to date, business case needs to be developed	tbc	This action requires a major remodelling of the highway. Scenarios will have to be modelled to ensure that the problem is not simply transferred to another part of the network.
14 AQAP Wok TC 4	North Wokingham Distributor Road	Traffic Management	Strategic highway improvements, Re-prioritising road space away from cars, including Access management, Selective vehicle priority, bus priority, high vehicle occupancy lane	WBC	completed	2017 onwards	completion	15.5µg/m ³	under construction	2020-2021	includes bus stops and cycleways
15 AQAP Wok TC 5	South Wokingham Distributor Road	Traffic Management	Strategic highway improvements, Re-prioritising road space away from cars, including Access management, Selective vehicle priority, bus priority, high vehicle occupancy lane	WBC	commenced	ongoing	completion	15.5µg/m ³	commenced at Montague Park	2020 -2021	includes bus stops and cycleways

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16 AQAP Wok TC 6	Reconfiguration of Shute End / Broad Street / Rectory Road junction	Traffic Management	Strategic highway improvements, Re-prioritising road space away from cars, including Access management, Selective vehicle priority, bus priority, high vehicle occupancy lane	WBC	tbc	tbc	reduction in NO2	15.5µg/m3	no progress to date, business case needs to be developed	tbc	land available at Shute End is limited to provide any new solution
17 AQAP Wok TC 7	Consider outcome of feasibility study of improvements to Rectory Road / Wiltshire Road	Traffic Management	Strategic highway improvements, Re-prioritising road space away from cars, including Access management, Selective vehicle priority, bus priority, high vehicle occupancy lane	WBC	tbc	tbc	Feasibility study carried out	15.5µg/m3	no progress to date, business case needs to be developed	tbc	historically there have been a number of studies into this location and land availability has always been a limiting factor
18 AQAP Wok TC 8	Active management of car parking	Traffic Management	Workplace Parking Levy, Parking Enforcement on highway	WBC	completed	Oct-17	Implementation	15.5µg/m3	Introduction of Civil Parking Enforcement 2018.	2018	This actively manages car parking in the town centre and across the borough.
19 AQAP Wok TC 9	Alternative arrangement for access to car parks	Traffic Management	Other	WBC	2017/18	tbc	Implementation	15.5µg/m3	this is part of the Town Centre regeneration process	tbc	parking strategy e.g. Easthampstead Road carpark
20 AQAP Wok TC 10	Workplace and School travel planning	Promoting Travel Alternatives	School Travel Plans	WBC	commenced	ongoing	continue to implement number of plans	15.5µg/m3	long standing programme of school travel plans	My Journey Wokingham is a long standing project	modal shift stars programme

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21 AQAP Wok TC 11	Residential travel planning	Promoting Travel Alternatives	Personalised Travel Planning	WBC	commenced	ongoing	continue to implement number of plans	15.5µg/m3	programme started 2017/18	My Journey Wokingham is a long standing project	personalised travel planning promoting the benefits of sustainable travel
22 AQAP Wok TC 12	Carry out feasibility study for Low Emission Zone	Promoting Low Emission Transport	Low Emission Zone (LEZ)	WBC	tbc	tbc	Feasibility study carried out	15.5µg/m3	no progress to date, business case needs to be developed	tbc	This action also requires transport modelling to understand likely impacts.
23 AQAP Wok TC 13	Park and Ride for Wokingham Town Centre	Alternatives to private vehicle use	Bus based Park & Ride	WBC	2016-2018	2019-2020	installation and number of journeys	15.5µg/m3	outline plans being developed	Dec-19	using RTLs existing hybrid buses (Lion 4)
24 AQAP generic 1	Review locations and publication of EV charging points and increase provision	Promoting Low Emission Transport	Procuring alternative Refuelling infrastructure to promote Low Emission Vehicles, EV recharging, Gas fuel recharging	WBC	tbc	tbc	number of charging points	15.5µg/m3	no progress to date, business case needs to be developed	tbc	Preparing for the future will increase in update of EV use. Decrease in car emissions. Mitigation at planning stage within the new local plan.
25 AQAP generic 2	Consider implementation of parking charge related to vehicle type e.g. free for electric	Promoting Low Emission Transport	Priority parking for LEV's	WBC	tbc	tbc	policy agreed and implemented	15.5µg/m3	no progress to date	tbc	encouraging residents and commuters to consider EV vehicle
26 AQAP generic 3	Low emission vehicles - consider implementation in Council contracts / fleet cars etc. EV pool cars for WBC staff	Promoting Low Emission Transport	Company Vehicle Procurement - Prioritising uptake of low emission vehicles	WBC	16/17	16/17	vehicle usage	15.5µg/m3	WBC EH and TP/WSP have zero emission and hybrid company vehicles	tbc	requirements to have low and zero emission vehicles and plant need to be included in any new WBC let contract

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27 AQAP generic 4	Consider removal of on street parking to provide more space for cycle lanes, EVs, Car clubs, provision of on street charging points	Traffic Management	Strategic highway improvements, Re-prioritising road space away from cars, including Access management, Selective vehicle priority, bus priority, high vehicle occupancy lane	WBC	tbc	tbc	tbc	15.5µg/m3	no progress to date	tbc	this action would be considered politically and economically sensitive
28 AQAP generic 5	No idling signs - for buses and taxis in waiting areas and at level crossings	Traffic Management	Anti-idling enforcement	WBC	2018-19	2019-20	number of signs installed	15.5µg/m3	cut engine banners to be installed in 2019-2020	2019-2020	Enforcement will require TVP assistance
29 AQAP generic 6	Roadside emission testing, detecting and fining polluting vehicles	Traffic Management	Testing Vehicle Emissions	WBC, TVP	tbc	tbc	number of vehicles failed	15.5µg/m3	no progress	tbc	link with work by Trading Standards re overloaded vehicles, will require implementation of legislation
30 AQAP generic 7	Improvement of cycle routes to ensure continuous and integrated	Transport Planning and Infrastructure	Cycle network	WBC	17/18	2018/19	length of cycleways provided	15.5µg/m3	ongoing	ongoing	capital funding for improvements and updating cycle network borough wide
31 AQAP generic 8	Residential travel planning	Promoting Travel Alternatives	Personalised Travel Planning	WBC	2016/17	commenced	number of plans	15.5µg/m3	programmed started 2017/18	open ended	PTP promoting the benefits of sustainable transport through My Journey project. Linked to future development.
32 AQAP generic 9	Encourage WBC staff to travel	Promoting Travel Alternatives	Workplace Travel Planning	WBC	2017	ongoing	increase in commuting by alternative means	15.5µg/m3	WBC offices have adopted a travel plan	ongoing	WBC offices have adopted a travel plan that is supported by My

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	more sustainably										Journey Wokingham project
33 AQAP generic 10	Secure and sheltered bike parking provision	Promoting Travel Alternatives	Promotion of cycling	WBC	ongoing	ongoing	provided	15.5µg/m3	ongoing	ongoing	business and residential travel plans often have bike shelters provided as part of planning permission
34 AQAP generic 11	Partnership with Sustrans	Promoting Travel Alternatives	Promotion of cycling	WBC	2016	ongoing	number of events	15.5µg/m3	officer started in 2016 as part of My Journey Wokingham project	2020/21	active travel officer promotes all forms of sustainable transport doing public demonstrations and events
35 AQAP generic 12	Promoting active travel via My Journey website	Promoting Travel Alternatives	Intensive active travel campaign & infrastructure	WBC	2017	ongoing	projects implemented	15.5µg/m3	variety of projects implemented	ongoing	ongoing
36 AQAP generic 13	Thames Valley Park and Ride	Alternatives to private vehicle use	Bus based Park & Ride	WBC/RBC	2016-17	2017-2019	opening of scheme	15.5µg/m3	planning permission granted 2017	2019	delivered in partnership with RBC and funded through the Local Growth Fund
37 AQAP generic 14	Provision of car clubs with or without Evs	Alternatives to private vehicle use	Car Clubs	WBC	2015 feasibility study	2017 onwards	usage of vehicles	15.5µg/m3	1 car club operational at Montague Park	ongoing	developers required to deliver car clubs as part of their commitments to residential travel plans
38 AQAP generic 15	Awareness campaign for the risks of poor air quality and promoting active and sustainable travel	Public Information	Via other mechanisms	WBC PH	2017/18	tbc	increased awareness	15.5µg/m3	My Journey Wokingham promoting active travel and using social media to raise awareness of Clean Air Day	2019	Use apps or technology to show people how to avoid exposure to pollution
39 AQAP generic 16	Air Quality included in to JSNA and Health	Policy Guidance and Developm	Other policy	WBC, PH Berkshire	2016/17	2017/18	inclusion in JSNA reviews and Health and Wellbeing Strategy	15.5µg/m3	JSNA due for publication March 2019 and considers air quality. Active	2018	Link with Director of Public Health for Berkshire

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	and Wellbeing Strategy	ent Control							transport is a priority for the HWBS.		
40 AQAP generic 17	New Local Plan and LTP4 - Sustainable Transport, include EV charging points for new developments	Policy Guidance and Development Control	Other policy	WBC Planning and PH	tbc	plan period will cover 2019 - 2036	Implementation	15.5µg/m3	Public Health and Planning teams working together on Local Plan and LTP	tbc	PH team must make the correct representation to support the Planning Policy team through the EIP process, proving it is not an unnecessary burden on developers.
41 AQAP generic 18	Linking with Highway Asset Management Plans	Policy Guidance and Development Control	Other policy	WBC	tbc	tbc	tbc	15.5µg/m3	no progress	tbc	
42 AQAP generic 19	Neighbourhood Development Plans to consider air quality	Policy Guidance and Development Control	Air Quality Planning and Policy Guidance	WBC with town and parish councils	tbc	tbc	inclusion in plans	15.5µg/m3	no progress	tbc	inform parish and town councils
43 AQAP generic 20	Freight Management Plan	Freight and Delivery Management	Delivery and Service plans	WBC	2019/20	2019/20	review and implementation	15.5µg/m3	no progress to date, business case needs to be developed	tbc	Consider freight access to town centre, including destination and delivery times. Link with Freight Route Network.

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.

Wokingham Borough is continuing to take the following measures to address PM_{2.5}:

1. The Health and Wellbeing Strategy (2014-2017) and the Public Health Work Plan both include several actions to increase walking and cycling in order to encourage and increase active travel and reduce obesity and inactivity in the borough. This will lead to a decrease in shorter car trips thus also reducing vehicle pollutants including PM_{2.5}.

2. As part of the Heatwave 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 heatwaves along with the associated harm to health (including poorer air quality) and relevant public health protection plans.

3. Development of a joint action plan between Public Health and Environmental

Health for air quality will consider in detail how Wokingham Borough will consider the impact on PM_{2.5} throughout the district and its reduction. It is likely that a marketing plan will be set up to raise awareness of how air quality can be improved such as active travel and the uptake of electric vehicles.

4. 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.

Wokingham Borough undertook automatic (continuous) monitoring at one site during 2018. 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

Wokingham Borough undertook non- automatic (passive) monitoring of NO₂ at 48 sites during 2018. 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 (NO₂)

Table A.3 in Appendix A compares the ratified and adjusted monitored NO₂ annual mean concentrations for the past 5 years with the air quality objective of 40µg/m³.

For diffusion tubes, the full 2018 dataset of monthly mean values is provided in Appendix B.

Table A.4 in Appendix A compares the ratified continuous monitored NO₂ hourly mean concentrations for the past 5 years with the air quality objective of 200µg/m³, not to be exceeded more than 18 times per year.

Continuous monitoring Wokingham – Peach Street

The annual mean NO₂ concentration of 32.9 µg/m³ was recorded by the Wokingham automatic monitoring unit in 2018. This shows that within the Wokingham Town Centre AQMA, NO₂ levels were not exceeding the objective limit. This is a decrease on the 2017 annualised result and is the lowest since monitoring commenced since 2015. Data capture was a good rate of 96.0%.

The results have been compared to other nearby sites. Annual patterns in the data are generally consistent with nearby sites of Newbury and Bracknell Downshire Way, and AURN sites at Reading New Town, Oxford St. Ebbes and Horely.

Data was generally consistent with diffusion tube results, although tubes have generally been over-reading in all months except February and March.

The roadworks in the vicinity may have affected traffic and subsequent pollution levels in the second half of the year. Figures 1 and 2 below show the quarterly trend over the last 3 years and the 2018 data.

Figure 1 Wokingham quarterly mean NO₂ concentrations

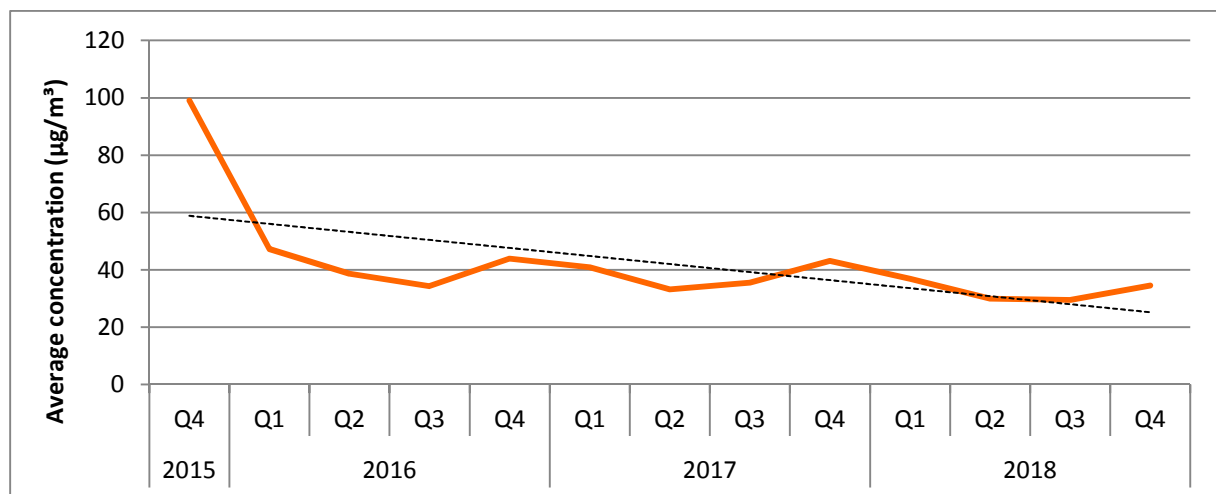
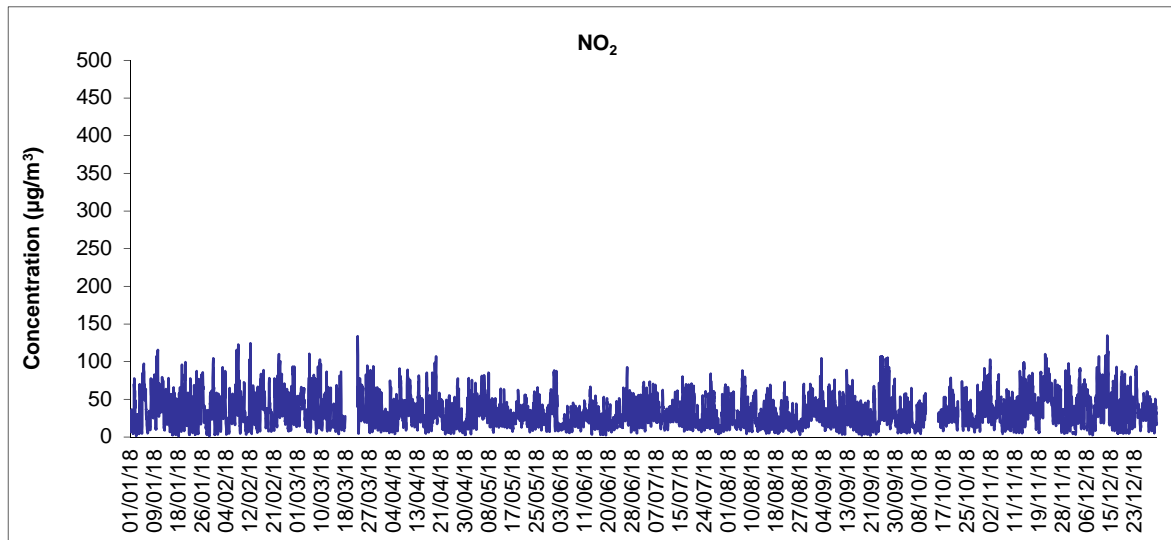


Figure 2 Wokingham NO₂ annual mean 2018



There were no exceedances of the 200µg/m³ hourly mean objective recorded. This number of exceedances is a decrease from the 15 in 2017 and 10 in 2016, and is back to the 2015 level of no exceedances.

Diffusion Tube Data

The annual mean objective of 40 µg/m³ was exceeded at 2 of the monitoring sites, 1 within Wokingham Town Centre AQMA, and 1 within the Twyford Crossroads AQMA. All mean concentrations were less than 60µg/m³ which therefore does not indicate any exceedance of the 1-hour objective.

The overall trend was that at all of the sites except 1 the 2018 result was a reduced level compared to 2017. None of the sites increased in concentration compared to 2017 and 1 remained the same.

M4 AQMA

There were no exceedances within the AQMA and also no sites increased in levels.

WOK 841 has shown a year on year decrease since 2013. Significant changes to the road layout has taken place in this location in the last 2 years with the opening of the new motorway bridge and the Shinfield Eastern Relief Road, the latter on 31/10/17. This has seen the movement of traffic on the A327 away from this monitoring location further east to the other side of Shinfield. Roadworks within the Borough on the M4 with a speed limit of 50mph have been in place during much of 2017 and 2018 which may also account for the reduction in levels. The levels have continued to decrease

the AQMA and now consideration for future revocation needs to be considered now a full year of effect of the road layout changes has been monitored.

Monitoring within and outside this AQMA will continue in 2019. Additional monitoring by Highways England is also due to commence in 2018/19 with the commencement of the Smart Motorway Project.

Wokingham Town Centre AQMA

Within this AQMA 1 site exceeded the annual mean objective in 2018, which was:

- WOK838 Giggling Spring Shute End – this was decrease on 2017 concentration to 41 $\mu\text{g}/\text{m}^3$, and the site has exceeded for the last 5 years. This site represents relevant exposure.

This was a decrease on the 3 sites of exceedance in 2017. No sites within in this AQMA increased in 2018.

2018 has seen work being continued to be carried out to Wokingham town centre within the AQMA with the regeneration project of Peach Street, Rose Street and Market Place and the additional phases of the regeneration commence at Elms Field.

Monitoring within and outside this AQMA will continue in 2019.

Twyford Crossroads AQMA

Within this AQMA 1 (triplicate) site exceeded the annual mean objective in 2018, which was:

- WOK850 19 High Street – this was a decrease in concentration from 2017 from 44.9 $\mu\text{g}/\text{m}^3$ to 43 and this site has exceeded for last 5 years. This site is representative of relevant exposure.

There was a reduction at the WOK864 1 Waltham Road Twyford 1 site to below the level of exceedance to 36 in 2018 from 41.8 $\mu\text{g}/\text{m}^3$ in 2017. This site has decreased year on year since 2015. This site is not within the Twyford Crossroads AQMA but is only 22m to the south east. The Updated Detailed Assessment: Wokingham and Twyford (February 2017) concluded that in Twyford, the contour plot of the annual mean NO_2 concentration of 40 $\mu\text{g}/\text{m}^3$ shows that the area of exceedance of the annual mean objective remains similar to the declared Twyford Crossroads AQMA, except for an extension of the area south along Waltham Road. However, the extended area of exceedance does not include any additional locations of relevant exposure and

therefore no alteration to the declared AQMA is required. In light of this result in 2017 the monitoring result for 2018 (and now a triplicate location) shows that no extension to the AQMA is required.

Monitoring within and outside this AQMA will continue in 2019 including a continuous monitoring unit being set up within this AQMA to monitor NO₂.

Outside of the AQMAs

Following distance correction the sites all decreased from 2017 levels. One site ceased on 31/12/17 which was WOK 847.

On 11th June 2018 the Lower Earley Way new road opened just north of the M4, being the first phase of the Winnersh Relief Road connecting the B3270 Lower Earley Way to the B3030 King Street Lane and provided access to the new housing on the former Hatch Farm Dairies site. The sites close to this are WOK70 and 71 and both recorded levels of 25µg/m³ which are the same as 2016 levels recorded. A new site will be set up in 2019 at the façade of a new residential property along this new section of road.

Overall most of the sites recorded annual mean levels the lowest in the last 5 years and no sites were recorded above 60µg/m³ which would indicate exceedance of the 1 hour objective.

3.2.2 Particulate Matter (PM₁₀)

No particulate matter (PM₁₀) monitoring is undertaken.

3.2.3 Particulate Matter (PM_{2.5})

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

3.2.4 Sulphur Dioxide (SO₂)

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)
CM2	Peach Street Wokingham	Roadside	481348	168603	NO2	YES	Chemiluminescent	3	1.5	1.5

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)
WOK11	Robin Hood Lane Winnersh	Roadside	478133	170598	NO2	NO	4	2.4	NO	2.3
WOK19	Thames Street (by bridge) Sonning	Roadside	475583	175704	NO2	NO	22	2	NO	2.25
WOK52	Westende Flats London Road Wokingham	Urban Centre	481521	168750	NO2	NO	3	1.9	NO	2.35
WOK53	Dunt Lane Hurst	Roadside	479770	171088	NO2	YES	28	1.2	NO	2
WOK70	Longdon Road Winnersh	Roadside	478011	170135	NO2	YES	25	1.7	NO	2.35
WOK71	38 King Street Lane Winnersh	Roadside	477907	170191	NO2	NO	20	3.1	NO	2.4
WOK98	309 Reading Road Winnersh	Roadside	478611	170225	NO2	YES	0	11.8	NO	1.65
WOK503	25 Rainworth Close Lower Earley	Suburban	474251	169683	NO2	NO	3	0.5	NO	2.1
WOK505	23 Church Road Earley	Roadside	474444	172062	NO2	NO	10	1.8	NO	2.15

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WOK509	Henley Bridge Remenham	Roadside	476414	182648	NO2	NO	7	4.7	NO	2.3
WOK601	Sadler's Lane Winnersh	Roadside	478815	170068	NO2	NO	15	1.5	NO	1.9
WOK602	2 Green Lane Winnersh	Roadside	478739	170107	NO2	YES	3	1.7	NO	1.65
WOK803	3 Wellington Road Wokingham	Roadside	480651	168544	NO2	NO	3	1.1	NO	2.3
WOK805	18 Barkham Road Wokingham	Roadside	480547	168543	NO2	NO	0	5.7	NO	1.9
WOK817	298 London Road Wokingham	Roadside	483227	168801	NO2	NO	11.5	2.1	NO	2.2
WOK825	High Street south Wargrave	Roadside	478541	178634	NO2	NO	0	2.2	NO	2.1
WOK827	The Old Station House Station Road Twyford	Kerbside	479047	175831	NO2	NO	3	1	NO	2.3
WOK829	Long Acre Thames Street Sonning	Roadside	475806	175577	NO2	NO	0	1.7	NO	2.3
WOK835	14 Robinhood Lane Winnersh	Roadside	478192	170672	NO2	NO	8	1.5	NO	2.2
WOK836	343 Old Whitley	Roadside	472321	168688	NO2	YES	7.5	1.2	NO	2.3

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	Wood Lane Shinfield									
WOK838	Giggling Spring Shute End Wokingham	Roadside	480979	168979	NO2	YES	0	2.8	NO	2.3
WOK840	30 Finbeck Way Lower Earley	Suburban	473128	168776	NO2	NO	0	18.4	NO	1.7
WOK841	2 Lane End Villas Shinfield	Roadside	473128	168776	NO2	YES	4.5	3.2	NO	2.4
WOK842	Foxglade, Brookers Hill Shinfield	Other	472739	168658	NO2	YES	0	35.5	NO	1.6
WOK844	Buckingham Court Wokingham	Roadside	481492	168775	NO2	YES	1.32	1.21	NO	2.4
WOK846	4 Hatch Farm Cottages Sindlesham	Roadside	477135	170020	NO2	YES	0	39	NO	7.75
WOK847	Wellness Clinic High Street Wargrave	Roadside	478537	178606	NO2	NO	0	1.2	NO	2.25
WOK850	19 High Street Twyford 1	Roadside	478738	175986	NO2	YES	0.3	1.2	NO	2.35
WOK857	1 Rectory Road Wokingham	Roadside	481044	168733	NO2	YES	0	2	NO	2.4
WOK861	Mill Lane (by bridge) Sindlesham	Roadside	476981	170120	NO2	YES	12.6	1	NO	1.8

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WOK863	3 Wargrave Road Twyford	Roadside	478768	176012	NO2	YES	1.9	0.9	NO	2.35
WOK864	1 Waltham Road Twyford 1	Roadside	478891	175942	NO2	NO	0	3.4	NO	2.35
WOK866	58 Denmark Street Wokingham	Roadside	481033	168300	NO2	NO	0	5	NO	1.8
WOK867	21 Denmark Street Wokingham	Roadside	481104	168444	NO2	YES	0.5	1.4	NO	2.5
WOK868	59 London Road Wokingham	Roadside	481639	168796	NO2	YES	3.3	1.4	NO	2.45
WOK869	Muille 26 High Street Twyford	Roadside	478681	175998	NO2	NO	0.5	0.5	NO	2.45
WOK870	Hunt&Nash Church Street Twyford	Roadside	478813	175975	NO2	YES	0	1.9	NO	2.5
WOK871	15 London Road Twyford 1	Roadside	478829	176023	NO2	YES	0.8	1.6	NO	2.45
WOK872	Old Registry Office Reading Road Wokingham	Roadside	480816	168793	NO2	YES	0.3	2.6	NO	2.35
WOK873	27 The Terrace Wokingham	Roadside	480863	168787	NO2	NO	0	0	NO	2.5
WOK874	Corner Broad St & Rose St Wokingham	Roadside	481027	168721	NO2	YES	1.7	1.1	NO	2.35

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WOK875	15 London Road Twyford 2	Roadside	478829	176023	NO2	YES	0.8	1.6	NO	2.45
WOK876	15 London Road Twyford 3	Roadside	478829	176023	NO2	YES	0.8	1.6	NO	2.45
WOK877	Almshouses London Road Twyford	Roadside	478903	176060	NO2	NO	1.7	3.2	NO	2.45
WOK878	17 Wargrave Road Twyford	Roadside	478719	176099	NO2	NO	4.2	2	NO	2.4
WOK879	Peach Street Unit 1	Roadside	481348	168603	NO2	YES	3	1.5	YES	1.4
WOK880	Peach Street Unit 2	Roadside	481348	168603	NO2	YES	3	1.5	YES	1.4
WOK881	Peach Street Unit 3	Roadside	481348	168603	NO2	YES	3	1.5	YES	1.4
WOK882	341 Whitley Wood Lane Shinfield	Roadside	472298	168679	NO2	NO	3	1	NO	2.18
WOK 883	Evendons Primary School	Roadside	480477	167003	NO2	NO	1	2.2	NO	2.2
WOK 887	19 High Street Twyford 2	Roadside	478738	175986	NO2	YES	0.3	1.2	NO	2.35
WOK 888	19 High Street Twyford 3	Roadside	478738	175986	NO2	YES	0.3	1.2	NO	2.35
WOK 889	1 Waltham Road Twyford 2	Roadside	478891	175942	NO2	NO	0	3.4	NO	2.35
WOK 890	1 Waltham Road Twyford 3	Roadside	478891	175942	NO2	NO	0	3.4	NO	2.35

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 NO₂ Monitoring Results

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2018 (%) ⁽²⁾	NO ₂ Annual Mean Concentration (µg/m ³) ⁽³⁾				
					2014	2015	2016	2017	2018
CM2 Peach Street Wokingham	Roadside	Automatic	100	96	–	35	41.3	38.1	32.9
WOK11 Direction Grp, Robinhood Lane,	Roadside	Diffusion Tube	100	100	<u>36</u>	32	31.9	35.4	28
WOK19 Thames St, Sonning	Roadside	Diffusion Tube	100	83.3	<u>25</u>	27	22.2	31.1	22
WOK52 Westende Flats, Peach St	Urban Centre	Diffusion Tube	100	100	<u>36</u>	33	30.8	34.9	26
WOK53 Dunt Lane, Hurst	Roadside	Diffusion Tube	100	100	<u>30</u>	27	22	27.8	23
WOK70 Longdon Rd, Winnersh	Roadside	Diffusion Tube	100	91.7	<u>33</u>	29	25	28.5	25
WOK71 38 King St Lane, Winnersh	Roadside	Diffusion Tube	100	100	<u>37</u>	33	24.3	33.1	25
WOK98 309 Reading Road	Roadside	Diffusion Tube	100	100	<u>32</u>	32	29	37.1	31
WOK503 Rainworth Close, B3270	Suburban	Diffusion Tube	100	100	<u>32</u>	31	27	32.2	27
WOK505 Church Road	Roadside	Diffusion Tube	100	100	<u>37</u>	38	31.5	38.3	29

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WOK509 Whitehill, Remenham	Roadside	Diffusion Tube	100	91.7	<u>28</u>	27	24.4	28.1	21
WOK601 Sadler's Lane, Wok'ham	Roadside	Diffusion Tube	100	100	<u>25</u>	25	24.8	23.1	22
WOK602 Green Lane	Roadside	Diffusion Tube	100	100	<u>27</u>	28	27.4	26.0	25
WOK803 3 Wellington Road	Roadside	Diffusion Tube	100	91.7	<u>31</u>	28	29.1	32.1	27
WOK805 18 Barkham Road	Roadside	Diffusion Tube	100	100	<u>26</u>	24	27	25.9	24
WOK817 London Rd (298)	Roadside	Diffusion Tube	100	66.7	<u>35</u>	29	26.1	33.1	24
WOK825 54 High St (north)	Roadside	Diffusion Tube	100	91.7	<u>37</u>	35	36	35.6	30
WOK827 Station Rd, Twyford	Kerbside	Diffusion Tube	100	100	<u>27</u>	27	23.4	27.9	20
WOK829 Long Acre Thames St	Roadside	Diffusion Tube	100	100	<u>31</u>	31	33	33.3	28
WOK835 14 Robinhood Lane	Roadside	Diffusion Tube	100	91.7	<u>32</u>	33	28.5	32.4	26
WOK836 343 Old Whitley Wood Ln	Roadside	Diffusion Tube	100	100	<u>42</u>	38	29.6	33.6	24
WOK838 Giggling Spring, Shute End	Roadside	Diffusion Tube	100	91.7	<u>51</u>	43	45	44.0	41
WOK840 30 Finbeck Way	Suburban	Diffusion Tube	100	91.7	<u>27</u>	24	24	24.9	22

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WOK841 Lane End Villas	Roadside	Diffusion Tube	100	100	<u>42</u>	39	37.2	39.1	27
WOK842 Foxglade, Brookers Hill	Roadside	Diffusion Tube	100	91.7	<u>27</u>	26	29	25.0	25
WOK844 Buckingham Court	Roadside	Diffusion Tube	100	100	<u>46</u>	39	40.5	45.0	36
WOK846 4 Hatch Farm Cottages	Roadside	Diffusion Tube	100	100	<u>26</u>	27	29	27.4	26
WOK850 19 High St, Twyford	Roadside	Diffusion Tube	100	91.7	<u>54</u>	46	43	44.9	42
WOK857 Rectory Rd, Wokingham	Roadside	Diffusion Tube	100	100	<u>52</u>	41	45	49.1	39
WOK861 Mill Lane (by bridge)	Roadside	Diffusion Tube	100	100	<u>45</u>	42	29	34.1	21
WOK863 3 Wargrave Rd, Twyford	Roadside	Diffusion Tube	100	91.7	<u>38</u>	35	33.3	36.7	31
WOK864 1 Waltham Rd, Twyford	Roadside	Diffusion Tube	100	91.7	<u>41</u>	42	43	41.8	36
WOK866 58 Denmark Street	Roadside	Diffusion Tube	100	91.7	<u>34</u>	31	32	27.6	24
WOK867 21 Denmark St, Wok	Roadside	Diffusion Tube	100	91.7	-	28	28.2	27.6	23
WOK868 59 London Road	Roadside	Diffusion Tube	100	83.3	-	31	27.8	30.5	26
WOK869 Mullie (26) High Street	Roadside	Diffusion Tube	100	100	-	32	28.1	30.7	27

Wokingham Borough Council

WOK870 Hunt & Nash Church St	Roadside	Diffusion Tube	100	100	-	33	33	34	29
WOK871 15 London Rd, Twyford 1	Roadside	Diffusion Tube	100	91.7	-	32	30.7	32.3	27
WOK872 Registry Office, Reading Rd	Roadside	Diffusion Tube	100	100	-	32	36.4	38.1	33
WOK873 27 The Terrace	Roadside	Diffusion Tube	100	100	-	24	27	26.5	25
WOK874 Broad St, Wokingham	Roadside	Diffusion Tube	100	91.7	-	23	24.9	26.9	25
WOK875 15 London Rd, Twyford 2	Roadside	Diffusion Tube	100	91.7	-	31	30.7	31.8	27
WOK876 15 London Rd, Twyford 3	Roadside	Diffusion Tube	100	91.7	-	32	30.7	32.7	28
WOK 877 Almshouses, London Rd	Roadside	Diffusion Tube	100	75	-	27	25.9	26.9	22
WOK 878 17 Wargrave Rd Twyford	Roadside	Diffusion Tube	100	100	-	28	27.4	30.2	23
WOK879 Peach Street Unit 1	Roadside	Diffusion Tube	100	100	-	38	35.5	39.0	33
WOK880 Peach Street Unit 2	Roadside	Diffusion Tube	100	100	-	36	35.5	39.7	33
WOK881 Peach Street Unit 3	Roadside	Diffusion Tube	100	100	-	38	35.5	38.9	33

WOK 882 Sign Whitley Wd Ln	Roadside	Diffusion Tube	100	100	-	-	30.6	39.5	29
WOK 883 Evendons Pri Sch	Roadside	Diffusion Tube	100	91.7	-	-	-	-	27
WOK 887 19 High Street Twyford 2	Roadside	Diffusion Tube	100	100	-	-	-	-	43
WOK 888 19 High Street Twyford 3	Roadside	Diffusion Tube	100	100	-	-	-	-	43
WOK 889 1 Waltham Road Twyford 2	Roadside	Diffusion Tube	100	83.3	-	-	-	-	35
WOK 890 1 Waltham Road Twyford 3	Roadside	Diffusion Tube	100	91.7	-	-	-	-	36

Diffusion tube data has been bias corrected

Annualisation has been conducted where data capture is <75%

Notes:

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

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

(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 NO₂ Monitoring Results

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2018 (%) ⁽²⁾	NO ₂ 1-Hour Means > 200µg/m ³ ⁽³⁾				
					2014	2015	2016	2017	2018
CM2 Peach Street Wokingham	Roadside	Automatic	100	96	–	0(127)	10	15	0

Notes:

Exceedances of the NO₂ 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 2018

Table B.1 – NO₂ Monthly Diffusion Tube Results - 2018

Site ID	NO ₂ Mean Concentrations (µg/m ³)												Annual Mean		
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Raw Data	Bias Adjusted (0.88) and Annualised ⁽¹⁾	Distance Corrected to Nearest Exposure ⁽²⁾
WOK11	34.9	34.7	34.5	35.7	31.6	28.4	33.5	25.3	29.1	35.8	38.5	35.9	33.2	29	28
WOK19	37.3	32.0		27.3	m	26.2	28.7	26.1	27.7	32.9	32.2	30.5	30.1	26.0	22.0
WOK52	39.1	33.4	43.0	30.5	34.8	29.6	29.6	25.8	25.8	33.3	35.8	37.6	33.2	29.0	26.0
WOK53	35.8	31.5	30.5	29.0	14.6	14.1	25.0	19.1	24.2	26.5	32.3	27.8	25.9	23.0	
WOK70	35.4	24.3	29.9	27.1	22.1	19.9	28.0		50.4	28.7	39.1	36.5	31.0	27.0	25.0
WOK71	30.4	34.4	35.3	31.6	34.9	32.2	38.0	29.1	31.4	36.1	43.2	35.8	34.4	30.0	25.0
WOK98	49.5	33.7	41.8	36.6	33.0	29.8	40.4	35.1	28.8	28.3	38.1	29.9	35.4	31.0	
WOK503	29.9	30.2	32.2	30.3	25.9	21.5	28.3	27.4	28.4	34.3	37.8	37.3	30.3	27.0	
WOK505	53.1	47.4	42.7	37.4	41.5	43.3	46.7	33.0	33.1	43.5	40.4	41.3	41.9	37.0	29.0
WOK509		24.8	30.6	25.9	23.4	23.2	36.1	24.2	23.7	27.6	30.4	28.2	27.1	24.0	21.0
WOK601	19.9	27.6	27.5	23.6	32.2	28.5	21.3	17.9	20.2	29.4	28.7	28.2	25.4	22.0	22.0
WOK602	28.6	33.5	27.4	24.0	32.3	34.4	26.3	24.0	26.4	31.8	28.0	26.5	28.6	25.0	25.0
WOK803		37.7	37.6	32.4	43.7	31.5	37.4	29.0	26.7	37.4	38.8	31.9	34.9	31.0	27.0
WOK805	28.6	26.6	28.6	27.4	27.4	26.1	27.4	20.3	22.1	27.4	34.0	27.6	26.9	24.0	
WOK817		34.9	31.2		29.9	33.4	34.9		29.2	32.7	35.4		32.7	29.0	24.0

Wokingham Borough Council

WOK825	32.4	34.5	34.5	33.5	37.7		37.5	29.5	31.8	35.4	33.5	28.6	33.5	30.0	
WOK827	27.1	27.8	29.1	25.9	21.3	19.4	22.3	20.3	22.9	25.2	25.4	25.3	24.3	21.0	20.0
WOK829	37.3	33.6	30.1	31.6	30.4	29.1	32.9	26.5	28.4	32.7	34.8	34.5	31.8	28.0	
WOK835	41.4	30.8	33.1	30.5	30.8	31.2	32.6	20.0		31.1	37.3	30.5	31.8	28.0	26.0
WOK836	28.8	30.8	31.4	30.2	25.5	22.1	34.3	27.5	28.3	30.3	36.8	31.2	29.8	26.0	24.0
WOK838	44.6	39.9	39.2	41.6	62.5	47.5	49.5	37.4		50.0	51.4	53.2	47.0	41.0	
WOK840	31.9	25.0	28.4	25.0	20.0	19.3	22.7	20.0	20.8	23.3	33.9		24.6	22.0	
WOK841	45.6	36.8	39.1	31.1	38.8	31.2	30.6	31.3	31.6	36.8	31.1	26.1	34.2	30.0	27.0
WOK842	27.5	32.3	28.1	28.3	30.9	29.3	26.0	23.7	26.6	29.4	25.1		27.9	25.0	
WOK844	42.7	35.7	44.7	39.6	47.1	37.0	39.8	35.1	36.8	45.2	47.7	40.2	41.0	36.0	
WOK846	28.4	33.4	30.0	23.8	31.9	34.5	26.5	23.3	24.7	32.9	29.0	30.1	29.0	26.0	
WOK850	51.1	42.9	47.6	49.5	43.7		58.4	45.9	42.8	47.3	53.7	49.8	48.4	43.0	42.0
WOK857	50.0	46.6	51.4	42.3	46.6	40.5	43.7	36.8	38.7	44.1	50.9	43.8	44.6	39.0	
WOK861	25.2	28.4	32.3	27.7	30.8	30.5	33.4	25.0	27.2	27.4	38.8	32.3	29.9	26.0	21.0
WOK863	38.8	36.9	43.4	37.8	29.6	30.2	39.0		69.7	37.5	31.2	38.8	39.4	35.0	31.0
WOK864	45.5	37.6	47.4	42.3	30.7	32.7	45.3	34.7	40.5		46.9	42.6	40.6	36.0	
WOK866	32.4	28.6	25.3	24.6		20.7	26.1	22.3	27.3	28.3	30.6	28.7	26.8	24.0	
WOK867	27.0	32.3	27.7		35.1	18.2	15.6	19.3	24.2	30.4	30.2	28.2	26.2	23.0	23.0
WOK868	41.8		40.3	34.6	29.0	31.3	32.0		27.3	36.2	36.9	35.0	34.4	30.0	26.0
WOK869	33.2	30.8	36.7	30.8	26.2	31.3	36.0	27.1	27.0	33.4	38.2	32.0	31.9	28.0	27.0
WOK870	36.9	32.8	37.0	36.7	31.4	27.6	33.4	27.5	29.5	35.5	39.3	32.4	33.3	29.0	
WOK871	35.5	31.5	34.7	32.6	29.1	25.9	31.9	27.6	28.0		32.4	33.2	31.1	27.0	
WOK872	40.4	32.3	35.6	34.2	38.9	32.9	42.5	33.5	38.1	39.9	45.8	38.2	37.7	33.0	33.0
WOK873	28.3	31.8	24.5	24.3	33.9	27.4	25.9	21.4	24.6	33.6	32.1	27.9	28.0	25.0	
WOK874		29.5	32.4	27.2	30.8	33.0	33.0	24.3	24.7	35.3	39.0	39.6	31.7	28.0	25.0
WOK875	28.0	34.2	37.7	32.5	28.5	27.8	33.1	28.5	29.6		31.2	31.0	31.1	27.0	
WOK876	36.1	33.8	36.7	32.6	29.8	26.4	33.3	30.6	29.7		32.1	33.4	32.2	28.0	

Wokingham Borough Council

WOK877	31.6	28.2		28.5	22.0	19.8	24.6	20.3			30.7	28.3	26.0	23.0	22.0
WOK878	31.0	28.3	35.7	29.3	24.4	25.4	29.7	21.9	24.4	30.3	34.2	29.5	28.7	25.0	23.0
WOK879	43.2	32.3	36.6	35.5	30.1	37	37.2	29.7	31.4	39	47.2	43.6	36.9	33.0	
WOK880	42	32.3	38.8	33.2	34.8	33.8	45.8	31.1	34.2	39.1	43.1	45.8	37.8		
WOK881	38.7	34.2	38.4	35.5	36.1	36	41.9	29.4	35.5	41.6	45.7	42.7	38.0		
WOK882	39.2	36.5	42.4	34.8	34.1	31.9	41.1	36.5	37.0	40.1	41.7	40.6	38.0	33.0	29.0
WOK 883	26.5	26.6		42.8	35.0	36.6	30.8	22.1	24.3	31.1	32.2	24.4	30.2	27.0	27.0
WOK 887	55.6	50.6	53.4	50.9	43.5	40.1	55.3	46.3	43.6	51.2	47.7	43.2	48.4	43.0	
WOK 888	58.0	45.2	53.7	46.0	45.0	44.2	56.0	46.5	48.8	45.2	50.0	43.4	48.5	43.0	
WOK 889	49.3	40.3	45.8	49.3	27.6	28.7	40.2	32.2			48.9	39.3	40.1	35.0	
WOK 890	50.5	45.9	47.0	42.4	31.5	31.8	40.3	38.1	36.6		48.3	32.4	40.4	36.0	

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

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

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

(2) Distance corrected to nearest relevant public exposure.

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

QA/QC of Continuous Monitoring Stations

TRL carry out the QA/QC on behalf of Wokingham Borough 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 Wokingham Borough Council at quarterly intervals and a calendar year annual report is prepared.

Independent Site Audits

In addition to these checks an independent site audit is carried out every 12 months to ensure the nitrogen dioxide analyser is operating correctly. The audits that are carried out utilise procedures that are applied within DEFRA's National Automatic Air Monitoring Networks Quality Control Programme. The efficiency of the analyser's converter 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 for the Wokingham Town Centre automatic monitoring unit was carried out on 17th August 2018. A major factor governing the analyser's performance is the NO_x analyser's converter and its ability to reduce the nitrogen dioxide to nitric oxide. Our tests show the converters in these analysers to be 100.0% efficient with NO₂ concentrations of 258 ppb. The recommended range for instrumentation in the national automatic air monitoring network is in the range of 98% - 102% efficient. This is a good result. The analyser exhibited good steady state responses to both zero and span (calibration) gases with acceptable levels of variation (noise). Although it was reported that the analyser response to the internal zero scrubber was marginally high readings especially when the compared to audit zero gas readings. Therefore, it was recommended that the scrubber materials are replaced. To ensure that the analyser is sampling only ambient air the instrument was leak checked. The NO_x 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 outside the ($\pm 10\%$) recommended limit and it was advised the underlying reason be investigated and rectified. It was suspected by the auditor that the flow rate sensor might be faulty, and it was suggested this be checked and repaired/replaced if necessary. Based on the NO_x analyser's response to the audit standard and audit zero, the concentrations of the stations NO cylinder have been reassessed. The recalculated results for the site NO cylinder at the TRL Wokingham monitoring site were stable, within the definition adopted above, and can therefore reliably be used to scale ambient data.

QA/QC of Diffusion Tube Monitoring

Wokingham Borough Council

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 NO₂ 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.

Wokingham Borough Council use Gradko International for the supply and analysis of the nitrogen dioxide diffusion tubes for their non-automatic monitoring programme. Gradko's performance for AIR PT AR024 (Jan 2018 – Feb 2018) = 100%, AR025 (Apr 2018- May 2018) = 100%, AR027 (July 2018 – Aug 2018) = 100%, and AR028 (Sept 2018 – Oct 2018) = 100%, (which relates to the % of results which are satisfactory.

Diffusion Tube Bias Adjustment Factors

Gradko International Ltd of St Martin's House 77 Wales Street Winchester Hampshire is the supplier and analyst of the nitrogen dioxide diffusion tubes. The tubes are analysed by U.V. spectrophotometry. The limit of detection is 20% TEA/Water.

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

The national study of bias adjustment factors spreadsheet (ref. 03/19 update) suggested a bias adjustment factor of **0.88** be applied. A copy of the co-location spreadsheet used is provided below.

In determining the bias adjustment factor for the 2018 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 Wokingham town centre co-location study is monthly.
- If the co-location site is unusual in some way: for example, affected by specific large nitrogen oxides (NO_x) sources other than road traffic, such as local industrial installations –the Wokingham town centre co-location study is predominantly influenced by road traffic.
- For tubes exposed in a similar setting to the co-location site – the Wokingham town centre co-location study site is a roadside location, as are over 95% of the diffusion tubes located in Wokingham Borough. Therefore the bias adjustment factor determined from either of these locations may not be deemed appropriate to apply to the Wokingham Borough 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 Wokingham town centre 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 Wokingham town centre co-location study factor.
- 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 Wokingham town centre co-location study achieved “good” precision and the Wokingham town centre 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 – this is not the case for Wokingham Borough
- Where the co-location study is for less than nine months, although the diffusion tube monitoring is for a longer period - The Wokingham town centre co-location study and diffusion tube surveys are for a full calendar year (2018).

- Where the automatic analyser has been operated using local, rather than national, QA/QC procedures - The Wokingham town centre 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 Wokingham town centre automatic monitor was 96% in 2018.
- 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 Wokingham town centre 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 (Wokingham Town Centre) bias adjustment factor of 0.88 should be used to adjust the 2018 data.

Precision and Accuracy

Checking Precision and Accuracy of Triplicate Tubes

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	05/01/2018	31/01/2018	43.2	42.0	38.7	41	2.3	6	5.7
2	31/01/2018	28/02/2018	32.3	32.3	34.2	33	1.1	3	2.7
3	28/02/2018	28/03/2018	36.6	38.8	38.4	38	1.2	3	2.9
4	28/03/2018	02/05/2018	35.5	33.2	35.3	35	1.3	4	3.2
5	02/05/2018	06/06/2018	30.1	34.8	36.1	34	3.2	9	7.9
6	06/06/2018	04/07/2018	37.0	33.8	36.0	36	1.6	4	4.0
7	04/07/2018	01/08/2018	37.2	45.8	41.9	42	4.3	10	10.7
8	01/08/2018	05/09/2018	29.7	31.1	29.4	30	0.9	3	2.3
9	05/09/2018	03/10/2018	31.4	34.2	35.5	34	2.1	6	5.2
10	03/10/2018	31/10/2018	39.0	39.1	41.6	40	1.5	4	3.7
11	31/10/2018	05/12/2018	47.2	43.1	45.7	45	2.1	5	5.2
12	05/12/2018	09/01/2019	43.6	45.8	42.7	44	1.6	4	3.9
13									

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

AEA Energy & Environment
From the AEA group

Automatic Method		Data Quality Check	
Period Mean	Data Capture (% DC)	Tubes Precision Check	Automatic Monitor Data
36.8	99.68	Good	Good
37.8	99.55	Good	Good
38.3	78.42	Good	Good
32.6	99.52	Good	Good
30.0	99.64	Good	Good
28.0	99.55	Good	Good
29.2	98.96	Good	Good
27.8	99.54	Good	Good
30.7	99.69	Good	Good
27.79	80.06	Good	Good
40.45	96.31	Good	Good
38.88	87.50	Good	Good

Overall survey →

Good precision	Good Overall DC
----------------	-----------------

(Check average CV & DC from Accuracy calculations)

Site Name/ID: Peach Street Wokingham

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	0.88 (0.81 - 0.97)
Bias B	13% (3% - 24%)
Diffusion Tubes Mean:	38 μgm^{-3}
Mean CV (Precision):	5
Automatic Mean:	33 μgm^{-3}
Data Capture for periods used:	95%
Adjusted Tubes Mean:	33 (30 - 36) μgm^{-3}

Accuracy (with 95% confidence interval)	
WITH ALL DATA	
Bias calculated using 12 periods of data	
Bias factor A	0.88 (0.81 - 0.97)
Bias B	13% (3% - 24%)
Diffusion Tubes Mean:	38 μgm^{-3}
Mean CV (Precision):	5
Automatic Mean:	33 μgm^{-3}
Data Capture for periods used:	95%
Adjusted Tubes Mean:	33 (30 - 36) μgm^{-3}

Jaume Targa, for AEA
Version 04 - February 2011

Annualisation


None of the sites required to be annualised.

Fall Off Distance correction

Wokingham Borough Council

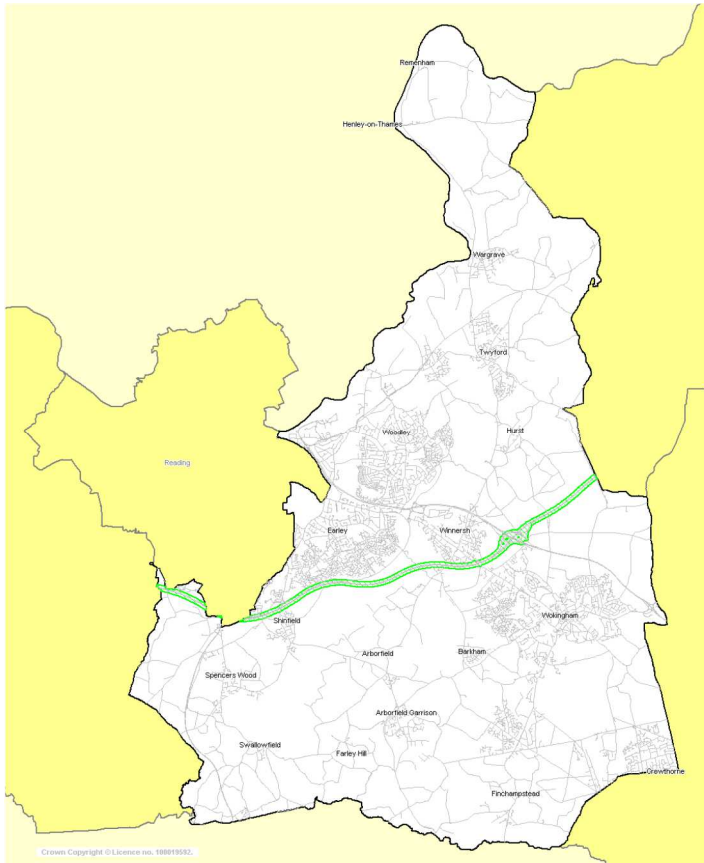
The NO₂ fall off with distance calculator (version 4.2) (March 2018) was used for the following WOK sites: 11 (as shown below), 19, 52,53, 70,71, 503, 505, 509, 601, 602, 803, 817, 827, 835, 836, 841, 850, 861, 863, 867, 868, 869, 871,872, 874, 875, 876, 877, 878, 879, 880, 881, and 882.

WOK11

			
<u>Enter data into the pink cells</u>			
Step 1	How far from the KERB was your measurement made (in metres)?	2.4	metres
Step 2	How far from the KERB is your receptor (in metres)?	6.4	metres
Step 3	What is the local annual mean background NO ₂ concentration (in µg/m ³)?	24	µg/m ³
Step 4	What is your measured annual mean NO ₂ concentration (in µg/m ³)?	29	µg/m ³
Result	The predicted annual mean NO ₂ concentration (in µg/m ³) at your receptor	27.8	µg/m ³

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

M4 AQMA



Wokingham Town Centre AQMA



Twyford AQMA



Sites 803 and 805



Site 827



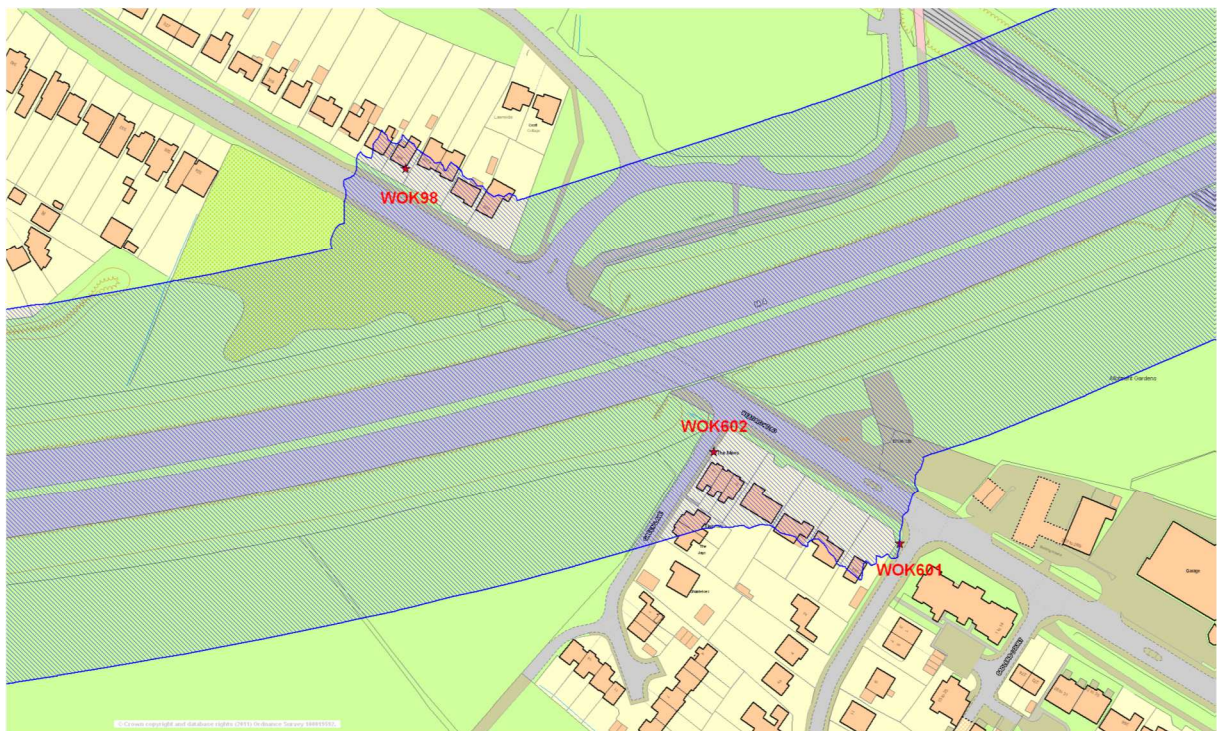
Sites 866 and 867



Sites 52 and 844



Sites 98 and 602



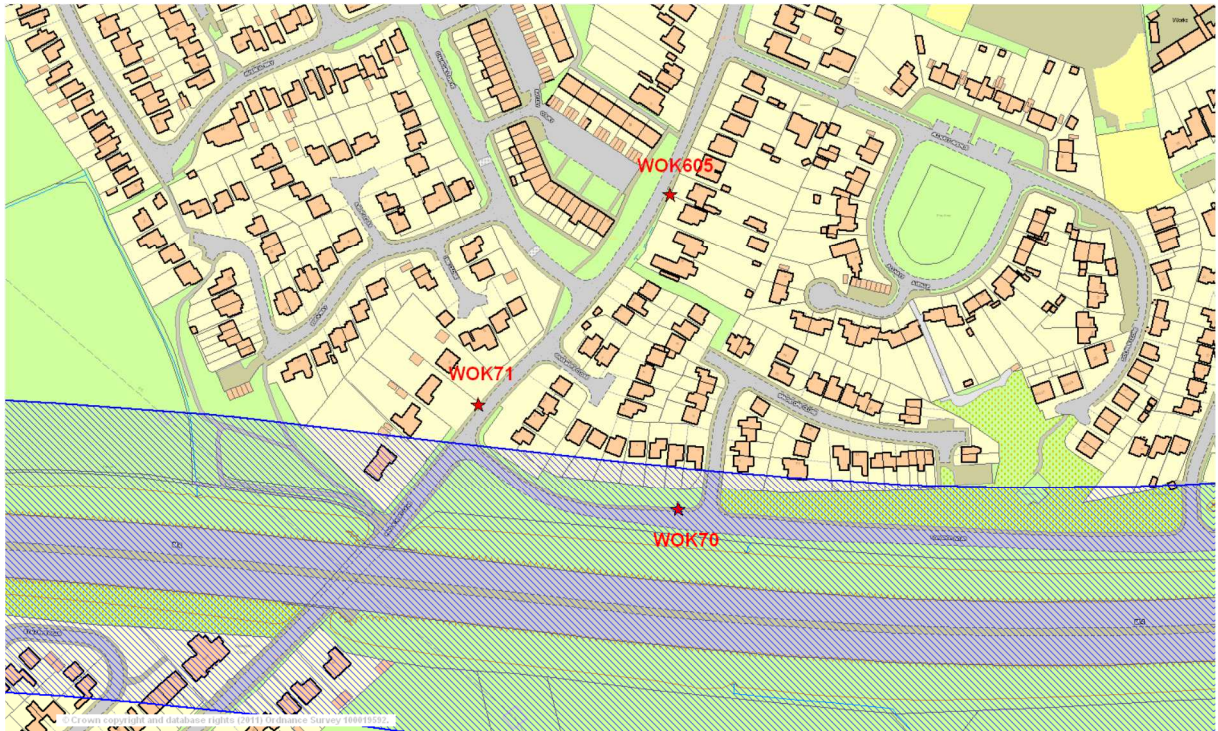
Sites 11 and 835



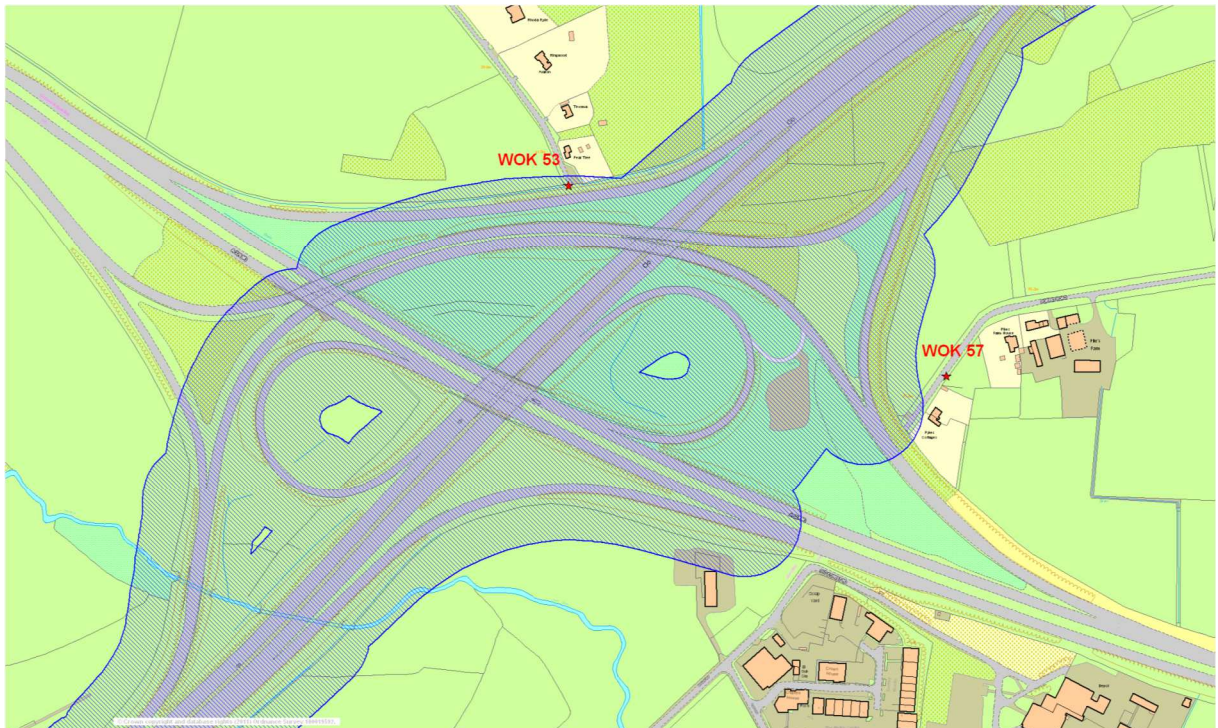
Sites 446 and 861



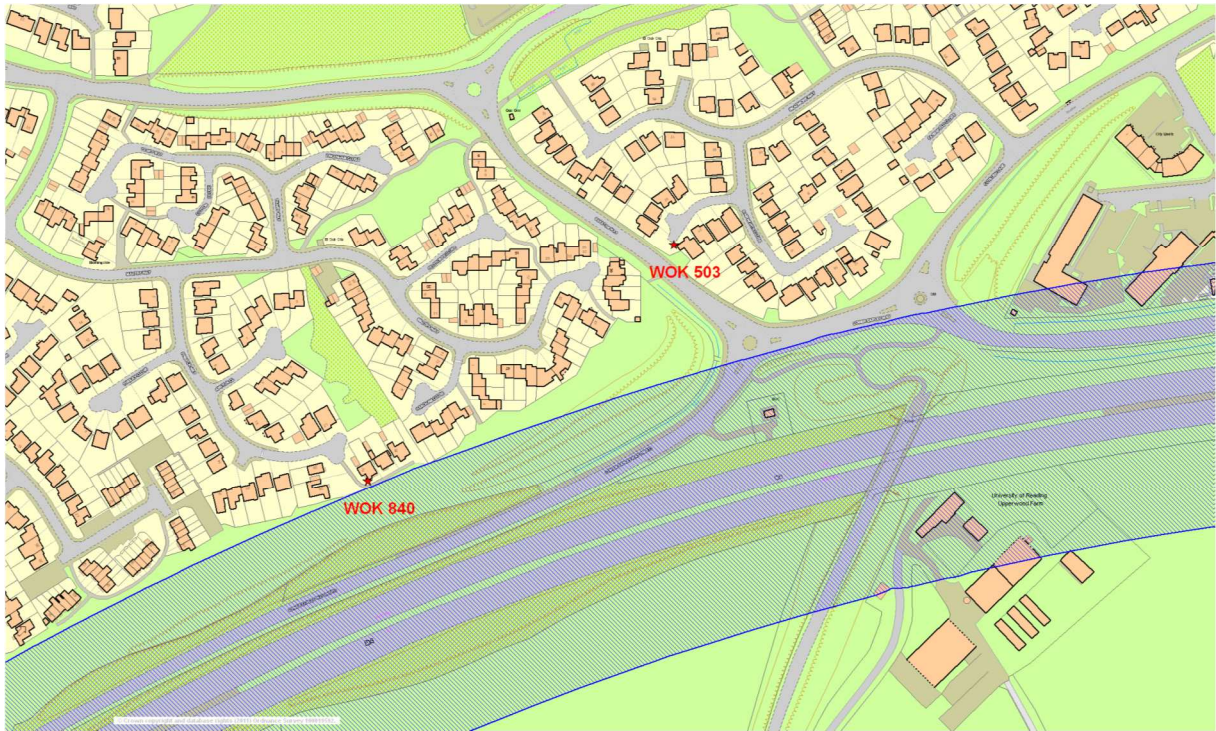
Sites 70 and 71



Site 53



Sites 503 and 840



Site 841



Sites 850, 863, 864, 869, 870, 871, 875, 876, 877 and 878



Sites 825 and 847



Site 817



Site 505



Sites 838, 872, 873 and 857



Sites 874, 879, 880 and 881



Site 19



Site 509



Sites 836, 842 and 882



Site 883 (new for 2018)



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/m³).

Glossary of Terms

Abbreviation	Description
AQAP	Air Quality Action Plan - A detailed description of measures, outcomes, achievement dates and implementation methods, showing how the local authority intends to achieve air quality limit values'
AQMA	Air Quality Management Area – An area where air pollutant concentrations exceed / are likely to exceed the relevant air quality objectives. AQMAs are declared for specific pollutants and objectives
ASR	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