WOKINGHAM
BOROUGH COUNCIL

2023 Air Quality Annual Status Report (ASR)

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

Date: June, 2023

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Report Reference Number	WOKASR2023
Date	June 2023 Report prepared by Public Protection Partnership on behalf of Wokingham Borough Council

Executive Summary: Air Quality in Our Area

Air Quality in Wokingham Borough Council

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

Poor Air Quality is also a contributory role in mortality. The mortality burden of air pollution within the UK is equivalent to 29,000 to 43,000 deaths at typical ages[3], with a total estimated healthcare cost to the NHS and social care of £157 million in 2017[4].

The major source of air quality pollutants in Wokingham Borough is road transport, and the main pollutant of concern is nitrogen dioxide (NO_2). Three Air Quality Management Areas (AQMAs) have been declared for exceedances of the Annual Mean NO_2 Objective. These are located in Wokingham Town Centre, Twyford Centre Crossroads, and 60m either side of, the M4 throughout the whole of the borough (Local Authority Details - Defra, UK. (See Appendix D).

The 47 diffusion tube sites of NO_2 levels in Wokingham borough have shown a decreasing trend since the 2018. No diffusion tube sites located within Wokingham exceeded the Annual Mean Objective. No diffusion tube results were recorded above 60µg/m^3, indicating no exceedances of the 1 hour NO_2 objective.

The continuous monitoring unit in Peach Street Wokingham, within the Wokingham AQMA, recorded an Annual Mean NO_2 level of 27.1µg/m^3, which meets the Annual Mean NO_2

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

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

[3] Defra. Air quality appraisal: damage cost guidance, January 2023

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

Objective (40µg/m^3) was not exceeded. The continuous monitoring also met the 1 hour NO_2 objective.

Within the Twyford AQMA the continuous monitoring recorded an Annual Mean NO_2 level of 23.6µg/m^3, which also met the objective. The continuous monitoring also met the 1 hour NO_2 objective.

Furthermore, there were no exceedances of the Annual Mean NO_2 Objective from the monitoring sites within the M4 AQMA.

Based on the all the NO_2 readings gathered in 2022 no extensions or amendments to the AQMAs are required nor any new AQMAs to be declared.

The Air Quality Action Plans (AQAPs) for the Wokingham AQMA's were published in March 2018, and are currently in the to be started or implementation stage. Some areas have been completed, and some are still unfortunately waiting for funding. A review is currently under way for updating the AQAP, and a working group of stakeholders has been working towards developing a new AQAP plan.

Environmental Health Public Protection Partnership (PPP) has continued to work in conjunction with the Transport Policy Team with the implementation of Local Transport Plan 3 (2011 – 2026). The Local Transport Plan (LTP) acknowledges the link with the M4 AQMA and any future AQAPs. A key objective of the Strategic Environmental Assessment for LTP3 was to improve air quality. LTP Strategies continue to be reviewed and the LTP 4 is due to be published in the 2023/24. The Local Plan Update (2026-2036) has commenced following which the next Transport Vision review will take place along with the next LTP.)(Wokingham Local Transport Plan Vision.pdf)

Actions to Improve Air Quality

Whilst air quality has improved significantly in recent decades, there are some areas where local action is still needed to protect people and the environment from the effects of air pollution.

The Environmental Improvement Plan[5] sets out actions that will drive continued improvements to air quality and to meet the new national interim and long-term $PM_{2.5}$

[5] Defra. Environmental Improvement Plan 2023, January 2023

targets. The National Air Quality Strategy, due to be published in 2023, will provide more information on local authorities' responsibilities to work towards these new targets and reduce $PM_{2.5}$ in their areas. The Road to Zero[6] details the approach to reduce exhaust emissions from road transport through a number of mechanisms. This is extremely important given that the majority of AQMAs are designated due to elevated concentrations heavily influenced by transport emissions.

The 2019 Clean Air Strategy[7] sets out the case for action, with goals to reduce exposure to harmful pollutants. The Road to Zero[8] sets out the approach to reduce exhaust emissions from road transport through a number of mechanisms which are extremely important given that the majority of Air Quality Management Areas (AQMAs) are designated due to elevated concentrations heavily influenced by transport emissions.

All planning applications are scrutinised for their air quality impact (dust, fires and vehicles) 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 other applications which may have an impact to the AQMAs and other hotspot locations.

Environmental Health Officers have received appropriate training in fulfilling their LAQM duties and are part of appropriate internal working groups to ensure that 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 2020 was made and we were successful in securing grant funding of £259,000 for the project of creating an anti-idling campaign, measuring $PM_{2.5}$ at the schools located near/within the AQMAs and looking at the behaviour change of our residents. In 2021 an Air Quality Officer was appointed and successfully ran the “Bumper Stickers Competition”, (Figure S.4), where children were asked to create a sticker to put in the rear of a car to

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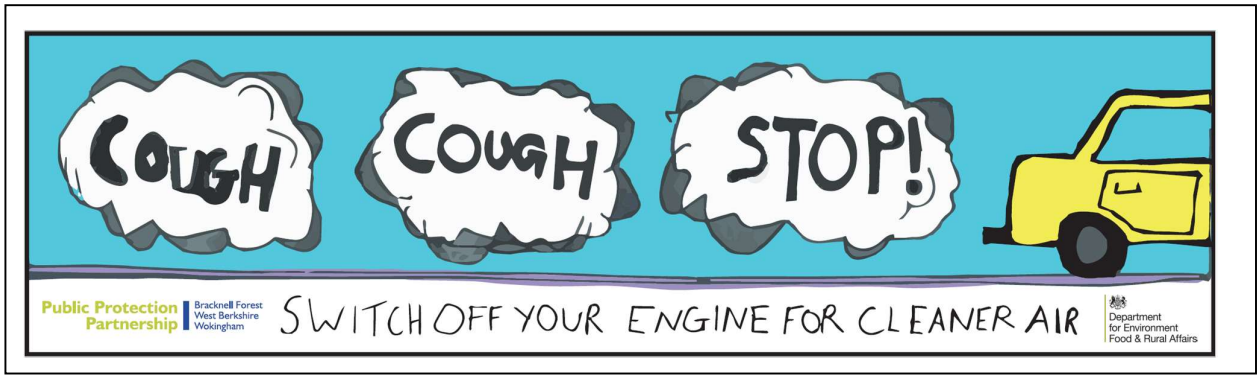
[6] DfT. The Road to Zero: Next steps towards cleaner road transport and delivering our Industrial Strategy, July 2018

7 Defra. Clean Air Strategy, 2019

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

remind the people behind to switch off their engines. (https://publicprotectionpartnership.org.uk/environmental-health/air-quality/anti-idling-bumper-sticker-schools-competition/). In 2022 the $PM_{2.5}$ School monitoring and Behaviour Change projected started and the results for the $PM_{2.5}$ project can be seen in Appendix C The results of the behaviours change project will be available in the 2024 ASR.

Figure S.1-The Bumper Sticker



MyJourney within Wokingham Borough was successful and awarded a DEFRA Grant in both 2020, 2021 & 23 which is being put towards measures 10, 20, & 38 on the AQAP.

During Clean Air Day in 2019 Wokingham Borough erected highway banners in both Wokingham and Twyford to ask drivers to cut their engines and stop idling (see Figure S.2). There are also several Green Lamp Posts in Twyford (see Figure S.3).

An anti–idling competition was run by MyJourney in 2020, along with PPP to help the children become aware of idling and how it can cause pollution. . As the banners were so popular with Schools and the Local Parishes this was continued by re-erecting them during 2021 outside schools and areas where traffic idles such as the Twyford Railway station. (See Figure S.1.) As these banners were so popular, competitions continued to be run in 2022 and more banners were produced and continue to be displayed at the winning schools or outside areas where there is idling.

Conclusions and Priorities

In conclusion there were no exceedances in the last 12 months within the Twyford Cross Roads, Wokingham Town Centre and M4 AQMAs, and there has not been for 5 years in the M4 AQMA, 3 years in both the Wokingham Town Centre and Twyford AQMAs. According

to DEFRA it is not appropriate to revoke any of the AQMAs as of yet as we will need 3 consecutive years of, pandemic free NO_2 data below the level of 36µg/m^3. The data collected indicated that no further extension are needed to be made to the AQMAs and we do not need to look at declaring anymore.

The Air Quality Action Plan is currently being implemented with more being progressed each year, which can be seen in Table 2.2. This is also in the process of being re-written with a stakeholder group.

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:

- Continuing the joint working between the Public Health and Environmental Health teams and links within the local Public Health Shared Team, 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;
- Continue the implementation of the AQAP for the Wokingham Town Centre and Twyford Crossroads, where funding allows;
- Increase the community awareness of air pollution through involvement in Clean Air Day;
- Continue the continuous monitoring in both Twyford and Peach Street and passive air quality monitoring programmes, also looking at alternative methods for reducing the NO_2;
- Working with new companies to start the innovative project to help reduce NO_2 in 2022/2023;

The following challenges have been identified:

- Budget allocation for progressing measures in the AQAP 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 in order to show any causal relationship.
- The pandemic.

Local Engagement and How to get involved

For further details on air quality in Wokingham Borough, please refer to our website

at https://publicprotectionpartnership.org.uk/environmental-health/air-quality

- Public Protection Partnership Vehicle Idling - PPP (publicprotectionpartnership.org.uk)
- Domestic Fuel information Air Quality (Domestic Solid Fuels Standards) (England) Regulations 2020 - PPP (publicprotectionpartnership.org.uk)
- Visit our MyJourney website - Your one stop destination for travel information and advice in and around Wokingham borough: http://www.myjourneywokingham.com/
- Individuals or members of local groups are invited to share any ideas they have to cut NO_2 levels in Wokingham Borough by emailing:

  environmental.health@wokingham.gov.uk
- Other useful websites include:

  Home - Defra, UK

  JSNA (Joint Strategic Needs Assessment) (wokingham.gov.uk)
- 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.

We are also on Social Media including Twitter and **Facebook @PublicProtectionPartnershipUK, Twitter @PublicPP_UK)**

Figure S.2 - A Social media Facebook post about the AQ

Local Responsibilities and Commitment

This ASR was prepared by the Environmental Quality Team of Public Protection Partnership for Wokingham Borough Council with the support and agreement of the following officers and departments:

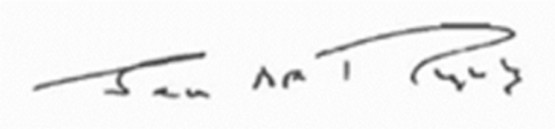
Highways Authority,

Environmental Health & Public Health,

Planning Authority

This ASR has been approved by: Sean Murphy

This ASR has been signed off by the manager of Public Protection Partnership

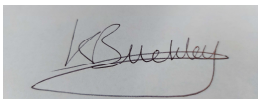


Sean Murphy

Public Protection Manager

This ASR has been approved by: Karen Buckley

This ASR has been signed off by the Head of Public Health.



Karen Buckley
Head of Public Health

If you have any comments on this ASR please send them to Environmental Health at:

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Local Air Quality Management

This report provides an overview of air quality in Wokingham Borough Council during 2022. It fulfils the requirements of Local Air Quality Management (LAQM) as set out in Part IV of the Environment Act (1995), as amended by the Environment Act (2021), 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 order to achieve and maintain the objectives and the dates by which each measure will be carried out. This Annual Status Report (ASR) is an annual requirement showing the strategies employed by Wokingham Borough Council to improve air quality and any progress that has been made.

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

1 Actions to Improve Air Quality

Air Quality Management Areas

Air Quality Management Areas (AQMAs) are declared when there is an exceedance or likely exceedance of an air quality objective. After declaration, the authority should prepare an Air Quality Action Plan (AQAP) within 18 months. The AQAP should specify how air quality targets will be achieved and maintained, and provide dates by which measures will be carried out.

A summary of AQMAs declared by Wokingham Borough Council can be found in Table 1.1. The table presents a description of the 3 AQMAs that are currently designated within Wokingham Borough Council Appendix D: Map(s) of Monitoring Locations and AQMAs provides maps of AQMAs and also the air quality monitoring locations in relation to the AQMAs. The air quality objectives pertinent to the current AQMA designations are as follows:

- NO_2 annual mean.

We have looked into proposing to revoke the AQMAs however the DEFRA Guidance LAQM.TG22 states *"The revocation of an AQMA should be considered following* ***three consecutive years of compliance*** *with the relevant objective as evidenced through monitoring. Where* NO_2 *monitoring is completed using diffusion tubes, to account for the inherent uncertainty associated with the monitoring method, it is recommended that revocation of an AQMA should be considered following* ***three consecutive years*** *of annual mean* NO_2 *concentrations being lower than 36µg/m³ (i.e. within 10% of the annual mean* NO_2 *objective). There should not be any declared AQMAs for which compliance with the relevant objective has been achieved for a consecutive five-year period."* We cannot use COVID year data for 2020 and 2021 therefore Wokingham have achieve 1 year so far under the limit of 36 µg/m³ for both the M4 and Twyford AQMA's as all the tubes within these areas were below 36 µg/m³ , however in the Wokingham Town Centre AQMA diffusion tube (WOK838) Giggling Spring was 37.2 µg/m³. See Table 2.0 for the successful years to date post COVID.

Table 2.0 – Maximum NO_2 level reached in each AQMA (µg/m^3)

AQMA	2022	2023	2024	2025	2026	Total consecutive years below 36 (µg/m^3)
M4	21.5					1
Twyford Cross Roads	32.8					1
Wokingham Town Centre	37.2					0

Table 1.1 – Declared Air Quality Management Areas

AQMA Name	Date of Declaration	Pollutants and Air Quality Objectives	One Line Description	Is air quality in the AQMA influenced by roads controlled by Highways England?	Level of Exceedance: Declaration	Level of Exceedance: Current Year	Number of Years Compliant with Air Quality Objective	Name and Date of AQAP Publication	Web Link to AQAP *(Page 12)*
M4 AQMA	Declared 2001, Amended 2004 (WOK841)	NO2 Annual Mean	Zone 60m either side of the M4 from the Councils boundaries with RBC & RBW&M throughout the borough and 10m either side of the A329 (M)/A3290. The AQMA was reduced to the Councils boundaries with RBC & RBW&M throughout the borough and 10m either side of the A329(M)/A3290 including an extended area along the A329 Reading Rd where it underpasses the M4.	YES	69 (2001) 56 (2004)	24.4	5 years (2018 to 2022)	Refer to the LTP3	Microsoft Word - WOK_ASR_2022_v2.0 (publicprotectionpartnership.org.uk)

M4 AQMA	Declared 2001, Amended 2004 (WOK841)	NO_2 1 Hour Mean	Zone 60m either side of the M4 from the Councils boundaries with RBC & RBW&M throughout the borough and 10m either side of the A329 (M)/A3290.	YES	228 (percentile of hourly mean)	n/a	n/a	WBC AQAP 2017	Microsoft Word - WOK_ASR_2022_v2.0 (publicprotectionpartnership.org.uk)
Twyford Crossroads AQMA	Declared November 2015 (WOK 850)	NO_2 Annual Mean	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	32.8	5 years (2018 to 2022)	WBC AQAP 2017	Microsoft Word - WOK_ASR_2022_v2.0 (publicprotectionpartnership.org.uk)
Wokingham Town Centre AQMA	Declared 2015 (WOK838)	NO_2 Annual Mean	Residential and commercial properties along a small part of Reading Rd and Station Rd in the northwest, along Shute End and into Broad St and Denmark St in the south-west and Peach St into London Rd in the west.	NO	52	37.2	3 years (2020 to 2023)	WBC AQAP 2017	Microsoft Word - WOK_ASR_2022_v2.0 (publicprotectionpartnership.org.uk)

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

☒ Wokingham Borough Council **confirm that all current AQAPs have been submitted to Defra.**

Progress and Impact of Measures to address Air Quality in Wokingham Borough Council

DEFRA's appraisal of last year's ASR concluded that the 2021 report was well structured, detailed, and provides the information specified in the Guidance.

DEFRA's comments are as follows:

1. Both the annual mean and 1-hour mean Air Quality Objectives for NO_2 were complied with at all monitoring locations within 2021.
2. Comments from last year's ASR have been mentioned and addressed. This is welcomed and encouraged for future ASRs.
3. The Council has an extensive NO_2 monitoring strategy. As recommended in the appraisal of last year's report, monitoring of other pollutants such as PM_{10}/$PM_{2.5}$ while not compulsory, could be considered to better inform how to tackle $PM_{2.5}$ pollution. The report includes detailed discussion of the measures the council are taking to address $PM_{2.5}$. Links are provided and discussed in regard to the Public Health Outcomes Framework and the fraction of mortality attributable to $PM_{2.5}$ emissions (percentage proportion), which is welcomed. Comparisons to the regional and national average would be beneficial to include in future reports.

Actioned: See Table 2.3 for this information.

4. Sufficient detail is included in the QA/QC procedures for both the automatic analysers and the NO_2 diffusion tubes. Calculations for local bias adjustment and annualisation are outlined in detail. Distance correction was not required. Data showing the choice of bias adjustment factors for previous years, and discussion around the choice to apply the local factor this year, has been included. Derivation of and a direct comparison against the national factor has not been demonstrated. It would be beneficial to include this in future reports. A figure showing the national bias adjustment factor determination would be welcomed.

Actioned: See Appendix C for both the 2022 national (0.83) and local bias correction value (0.87).

5. The Council have provided clear mapping of their automatic and diffusion tube monitoring network in relation to their AQMAs, as well as detailed trend graphs, which is commendable. However, graphs appear to only be included for monitoring sites that are within the AQMAs. In future years, it is recommended that the Council also include

another graph to present trends at the monitoring locations outside of the AQMAs. *For all graphs see Appendix A.*

6. The Council has included a discussion and review of its AQMAs, which is well informed due to its extensive monitoring network. Total revocation of the Wokingham/M4 AQMA (for both objectives) has been considered and decisions has been made to keep the AQMA in place for now. This is supplemented by commentary around compliance data through 2018 - 2021 likely having been affected by a mix of COVID-19 restrictions and the M4 Smart Motorway conversion. This is accepted, and if further years of compliance with the relevant objectives are monitored, full revocation of the AQMA should be considered. As exceedances of the annual mean NO2 AQO were monitored in the other two AQMAs as recently as 2019, it is understood and welcomed that these are to remain in force at this time.

Actioned: See Section 2.1 for more details.

7. The Council should ensure consistency between future reports and their AQMA records on the LAQM Portal. The 2022 ASR refers to the 'M4 AQMA', however this is recorded as 'Wokingham AQMA' on the LAQM Portal. Graph A.1. within the 2022 ASR also refers incorrectly to 'Wokingham AQMA' as it presents data for Wokingham Town Centre AQMA. This should be amended in future ASRs. In addition, the 2022 ASR also sets out that the Wokingham/M4 AQMA is declared for both the annual mean and hourly NO_2 AQO, however the LAQM Portal record shows declaration for the annual mean AQO only. The Council should update their LAQM Portal records accordingly.

Actioned: The portal has been updated.

8. The Council has taken forward a number of important measures and the progress being made on other measures is very detailed, which is commendable. However, information for certain measures (category, funding status, estimated cost, and measure status) is missing within Table 2.2. This should be provided, where possible, in future reports.

Actioned: Please see the completed Table 2.2

9. Table 2.1 does not include a link to the relevant AQAP for each AQMA, a link is instead included to the AQMA webpages on the UK AIR website. A link to the relevant AQAP documents themselves or a note as to how members of public can access these should be provided in future reports.

Microsoft Word - WOK_ASR_2022_v2.0 (publicprotectionpartnership.org.uk)

10. An Air Quality Action Plan (AQAP) that applies to the Wokingham/M4 AQMA is not referenced within the 2022 ASR. It is noted that the latest AQAP for the Wokingham Town Centre and Twyford Crossroads AQMAs was published in 2017. The Environment Act requires that a local authority must, for the purpose of achieving AQOs in an AQMA designated by that authority, prepare an action plan in relation to that area. The Act also requires that Action Plans be periodically reviewed. While no time limit is explicitly set within the Act, ideally this is expected to occur no later than every five years.

Actioned: A stakeholder working group has been set up and is reviewing/creating a new action plan for the AQMA's. This will continue in 2023/2024 with the involvement of the Local Authority Health and Well-being Team.

11. <u>The report is well structured, detailed, and provides the information specified in the Guidance.</u>

Wokingham Borough Council has taken forward a number of direct measures during the current reporting year of 2022 in pursuit of improving local air quality. Details of all measures completed, in progress or planned are set out in Table 1.2.

43 measures are included within Table 1.2, with the type of measure and the progress Wokingham Borough Council have made during the reporting year of 2022 presented. Where there have been, or continue to be, barriers restricting the implementation of the measure, these are also presented within Table 1.2.

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

- Construction on phase two of the Winnersh Relief Road to connect the B3030 King Street Lane to the A329 Reading Road, was completed in early 2022. 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. The project has reduced the level of traffic passing through Winnersh Crossroads.
- Active Travel Fund Tranche 2 has been developed further with the selected scheme (Woodley to Reading Active Travel Route) consulted on in February 2022. Following consultation further design work is required to deliver a scheme more acceptable to the public.

- Active Travel Fund Tranche 3 has awarded £2.95m to the borough to enable us to complete the route from Woodley to Reading. As described above, we are currently redesigning the scheme but hope to complete implementation of some of the scheme in the next 12 months.
- Local Cycling and Walking Infrastructure Plan (LCWIP) for Wokingham Borough is underway with consultation on public views regarding walking and cycling in the borough completed. As part of the LCWIP outputs are cycling and walking network plans which identify preferred routes and core zones for further development and a prioritised schedule of infrastructure was in June 2022.
- In 2022 we complete personalised travel planning for new communities and delivered these enhanced PTP projects covering two development sites in 2022.
- Our Electric Vehicle (EV) charge points have continued to be expanded with the addition of 64 new publicly available charge points made available in 2022 bringing the total to 318. In addition, the Council's Executive approved on-street and in public car park charge point provision using the DfT's Office for Zero Emission Vehicles' On-street Residential Chargepoint Scheme. The bid document for this has been prepared though needs amendment following a change in the bidding criteria; once completed this should add approximately 60 charge points (locations to be confirmed) https://app.vendelectric.com/
- My Journey Promotion of active travel and travel choices website is on-going. There were 79,821 visitors to the website. We have continued to promote active travel through our social media feeds, and our followers increased to 1,978 (Facebook) and 1,048 (Twitter) in 2022/23 (financial year) with our top Facebook post reaching 10,878 people.
- MyJourney has continued to partner with Love to Ride and once again ran four cycling campaigns across the borough from 1st April 2022 to 31st March 2023. They achieved the following
    - 30,892 rides logged
    - 407,943 miles
    - 12,546 transport trips
    - 65,375 transport miles
    - 268 new user accounts

- During the Cycle September Event, they also had an excellent turn out and saved 6,335 lbs of CO2.
    - 42 workplaces participated
    - 494 riders registered for the challenge
    - 46,259 miles logged
    - 3,754 trips logged
    - 1,814 trips for transport
    - 9,892 transport miles

- Bikeability figures for 2022 – 2023 :
    - Bikeability Level 1 courses (training off road): April 2022 – February 2023: **161 places** delivered (0 booked for March)
    - Bikeability Level 1/Level 2 courses (on road): April 2022 – Feb 2023: 1360 places + 225 booked for March = **1585 places**
    - Bikeability Level 3 (advanced) courses: April 2022 – February 2023: 56 places delivered + 41 booked in March = **97 places**
    - Bikeability Learn to Ride (teaching younger children to ride): 236 places delivered + 30 in March = **266 children trained**
    - Also new - Bikeability Family training: **15 families trained** (included 19 adults + 27 children.)
- Wokingham have also been awarded a larger Bikeability Grant by the Department for Transport for 2022 – 2023: a grant of £77,500 to train 1,800 children on Bikeability Courses + £5,832 for Learn to Ride training, making a total of **£83,332.**
- Bus services are continuing to suffer significantly from reduced patronage due to Covid-19. Reading Buses are continuing to operate services, though we have seen some reduced in frequency or cancelled completely due to lack of use. We continue to work with the bus operators to try to maintain a good level of service.
- WBC has just completed the Coppid Beech Park and Ride facility and continue to expand the Winnersh Triangle Park and Ride site. In addition, the Thames Valley Park and Ride site is also available for use. Despite this, there are currently only buses serving the Thames Valley Park and Ride due to this low usage and low expected uptake in the near future.

- We have completed our Local Bus Service Improvement Plan as required by the new national bus strategy. This will help us to enable increases in bus use and better, more reliable.

In 2022 WBC was awarded funding by DEFRA to MyJourney to complete Air Quality education work in school in and around its AQMA's. The borough has appointed an Air Quality Active Travel Officer who has been working with schools to raise awareness of the issues and encourage increased active travel. As part of the initiative, they were to use an Innovation Valley Reward app Innovation Valley Rewards - My Journey Wokingham Challenge! Since My Journey Wokingham launched the app in March 2022:

- 1,926 people have joined the challenge.
- £5,200 worth of ValleyCoins have been earned or won.
- 686,000 miles of active or sustainable travel have been recorded.
- 294,000 walks, 48,000 cycles and 26,000 bus journeys have been recorded.
- 171,000kgs of CO2 has been avoided, which is equivalent to an average petrol car being driven approximately 420,000 miles.
- 33,400,000 calories have been burned.

Figure 2.1 - A MyJourney promotion poster for the Innovation Valley App.

Wokingham Borough Council expects the following measures to continue to be completed over the course of the next reporting year.

- Completion of the LCWIP for the whole borough. https://wokinghamlcwip.commonplace.is/about
- Development of our new Local Transport Plan (LTP4) in conjunction with a new Local Plan to 2038 which will define the locations of major development in the borough.
- MyJourney's extension of their DEFRA funded Eco-Travel Officer role. They will continue to work with schools in AQMAs. One of the main aspects of the project is to work closely with primary schools that are near Wokingham's AQMA's to monitor their Nitrogen Dioxide, assist with travel plans to aim for Modeshift Stars accreditations, deliver lesson packs, competitions, activities, assemblies, and events. Though this has been difficult with COVID-19 schools know how important the health and safety of their pupils is and therefore, with the individual school, the project adapts. Monitoring only outside the school and delivering resources digitally. There are 10 schools involved in the project and following a recent funding announcement we will now be aiming increase the number of schools working with us next year.
- Continued promotion of Active Travel through the MyJourney platforms.
- Development of EV Strategy to help increase the uptake of EV in the borough (this was completed in the summer 2022).
- Development of a Low Emission Transport Strategy to assist with both improved air quality and reduced Carbon emissions.
- Continual working with Public Health Colleagues, MyJourney Colleagues, Climate Change Colleagues, and Transport & Planning Officers.
- Winnersh Triangle Park and Ride, is expanding the decking of the existing site to provide a minimum of 160 additional spaces on the site, works started in March 2021, via LEP funding and will continue this year. https://www.wokingham.gov.uk/business-and-licensing/business-and-growth/local-enterprise-partnership-lep/

Wokingham Borough Council worked to implement these measures in partnership with the following stakeholders during 2022:

- Neighbouring local authorities;
- The Highways Authority;

- The Planning Authority
- MyJourney
- The Public
- Local Schools
- Public Protection Partnership

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 some measures has been slower than expected due to the lack of funding available to complete the projects.

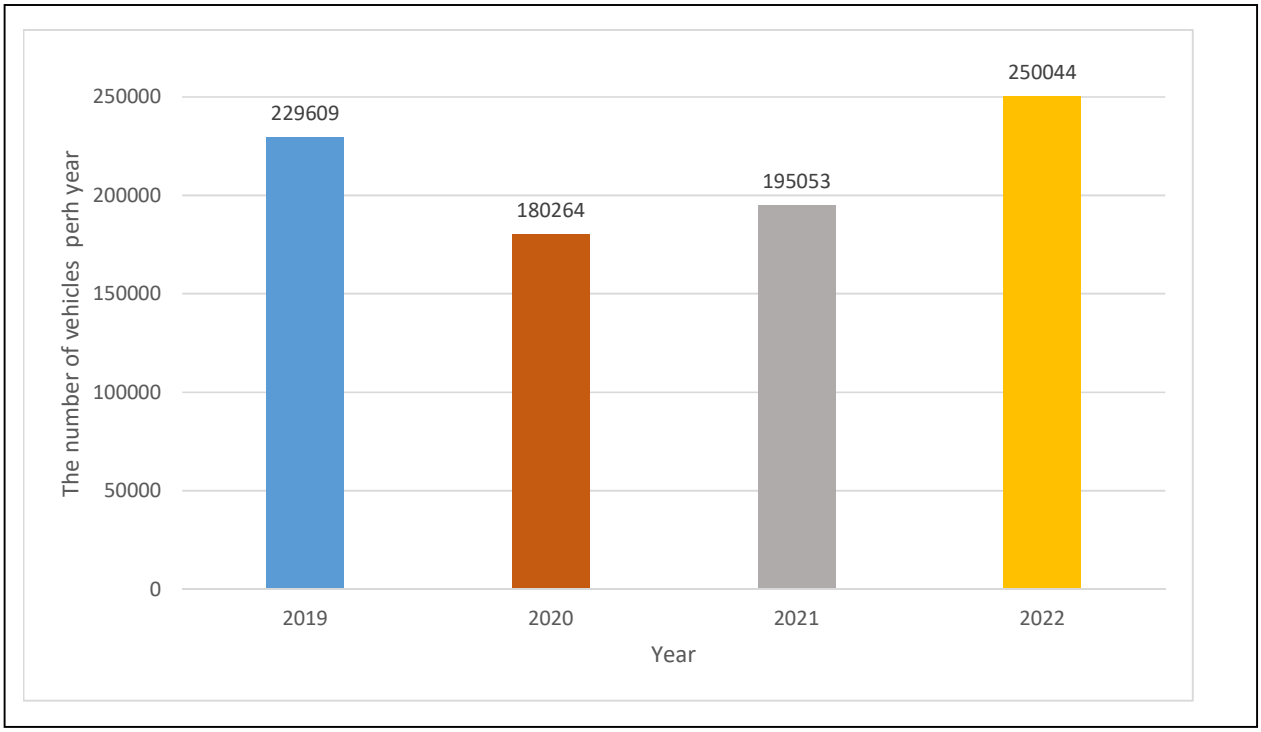
Whilst the measures stated above and in Table 1.2 will help to contribute towards compliance, Wokingham Borough Council anticipates that further additional measures not yet prescribed will be required in subsequent years to achieve compliance and enable the revocation of the Twyford Crossroads, M4 and Wokingham Town Centre AQMAs.

Traffic Data for Wokingham Borough Council

The traffic is monitored at two places in Wokingham Borough Council A4 Bath Road and the A329 Reading Road.

The A329 Reading Road (between Albany Park Drive & Arbor Lane), sensor data could not provide a comparison this year, due to technical problems, however the A4 Bath Road (between B4446 Sonning Lane and Parkway Drive), was working well and shows an increase in traffic since 2019. See graphs 2.1 and 2.2.

Graph 2.1 – A4 Bath Road (between B4446 Sonning Lane and Parkway Drove)
Annual Traffic Flow Comparison between 2019 - 2022



Graph 2.2 – A4 Bath Road (between B4446 Sonning Lane and Parkway Drove)
Monthly Traffic Flow Comparison between 2019 - 2022

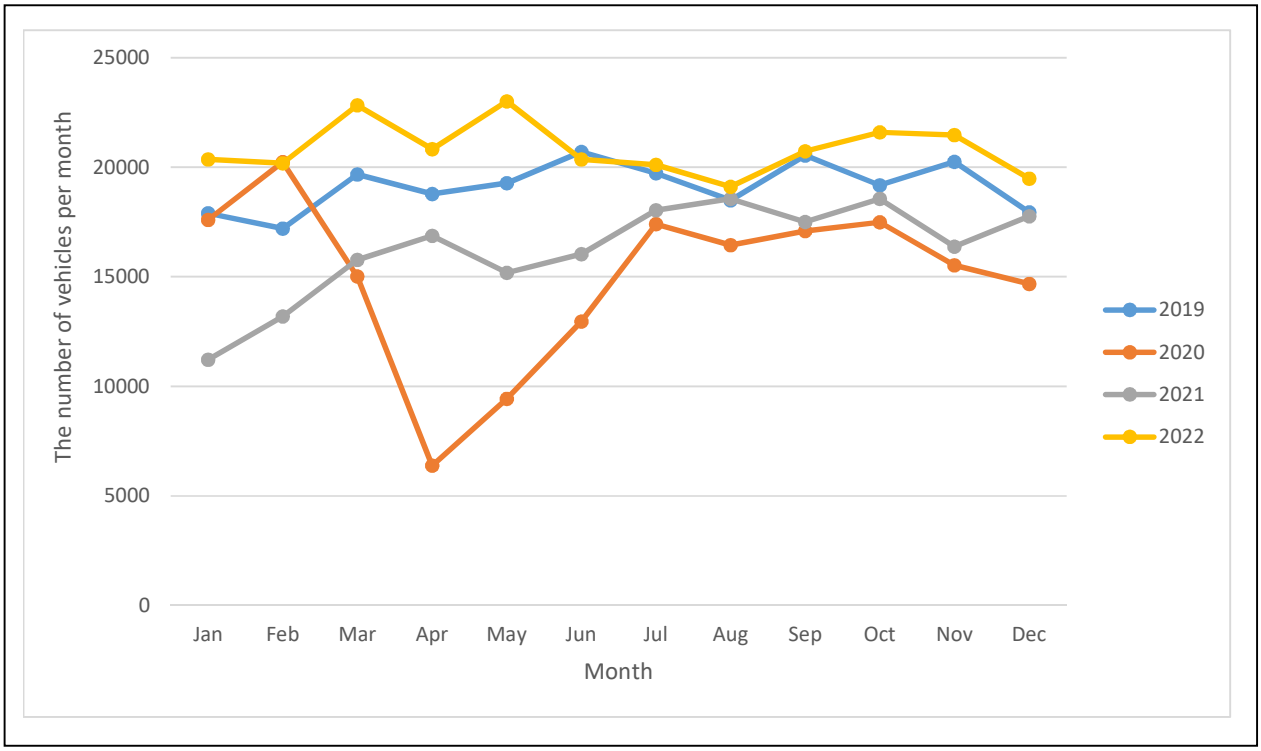


Table 1.2 – Progress on Measures to Improve Air Quality

Measure No.	Measure	Category	Classification	Year Measure Introduced in AQAP	Estimated / Actual Completion Date	Organisations Involved	Funding Source	Defra AQ Grant Funding	Funding Status	Estimated Cost of Measure	Measure Status	Reduction in Pollutant / Emission from Measure	Key Performance Indicator	Progress to Date	Comments / Barriers to Implementation
1 AQAP Twyford 1	Investigate the feasibility of alternative traffic routes around Twyford	Traffic Management	Strategic highway improvements, Re-prioritising road space away from cars, including Access management, Selective vehicle priority, bus priority, high vehicle occupancy lane	2017	2019	WBC	WBC	NO	Fully funded	£100k - £500k	Planning	12.1 µg/m3	Feasibility study carried out.	Local Plan update is ongoing. This will make recommendation regarding development and supporting infrastructure needs.	Aim for some through traffic avoided through AQMA.
2 AQAP Twyford 2	Twyford Railway station 1. Consider access for vehicles, taxis, cyclists and pedestrians. 2. Consider integration of public transport. 3. consider car parking and cycling provisions	Transport Planning and Infrastructure	Other	2017	2025	WBC, GWR, Twyford PC	WBC, GWR, Twyford PC	NO	Partially Funded	£1 million - £10 million	Planning	12.1 µg/m3	Changes incorporated.	Some cycle parking added in 2020 however, there is now a feasibility study underway with a view to make improvements using Station Improvement Funding from DfT	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 Twyford 3	Review cycle paths	Promoting Travel Alternatives	Promotion of cycling	2016	2025	WBC	WBC	NO	Partially Funded	£1 million - £10 million	Implementation	12.1 µg/m3	Increase in usage.	Cycle paths are continually reviewed, however, a strategic LCWIP is underway which help us identify measures and prioritise improvements for future years. To be published March 2023.	Cycleway delivery is part of the yearly capital programme
4 AQAP Twyford 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	2018	2019	WBC	WBC	NO	Not Funded	tbc	Planning	12.1 µg/m3	Investigation carried out.	No progress to date. Budget needs to be agreed and allocated.	Traffic more likely to travel east of village so avoiding AQMA
5 AQAP Twyford 5	Continue to monitor traffic lights and crossings to	Traffic Management	Strategic highway improvements, Re-prioritising	2016	2030	WBC	WBC	NO	Not Funded	tbc	Planning	12.1 µg/m3	Review of phases with traffic flow data	Ongoing investigation into whether this would work	Determine effect on air quality with different phases. Linked with traffic

Measure No.	Measure	Category	Classification	Year Measure Introduced in AQAP	Estimated / Actual Completion Date	Organisations Involved	Funding Source	Defra AQ Grant Funding	Funding Status	Estimated Cost of Measure	Measure Status	Reduction in Pollutant / Emission from Measure	Key Performance Indicator	Progress to Date	Comments / Barriers to Implementation
	maximum efficiency and consider their functionality including left turns and peak hour use		road space away from cars, including Access management, Selective vehicle priority, bus priority, high vehicle occupancy lane										and real time air quality data		monitoring to be set up and new continuous monitoring commence January 2019.
6 AQAP Twyford 6	Carry out feasibility study for Low Emission Zone for the crossroads	Promoting Low Emission Transport	Low Emission Zone (LEZ)	2023	2025	WBC	WBC	NO	Not Funded	£100k - £500k	Planning	12.1 µg/m3	Feasibility study carried out.	Ongoing investigation into whether this would work. LTP considering this in 2024. Looking into vehicle admission parking related fees.	
7 AQAP Twyford 7	Review of bus fleet and consider alternative fuels.	Vehicle Fleet Efficiency	Promoting Low Emission Public Transport	2016	2040	Bus companies as contracted by WBC	Bus companies as contracted by WBC	NO	Partially Funded	< £10k	Implementation	12.1 µg/m3	Increase in number of buses run on alternative fuels.	2017 RTL run hybrid buses. CNG all low emission. Courtney Buses Contract to be retendered in 2022 for implementation 2023.	
8 AQAP Twyford 8	Install "Cut Pollution. Turn off your engine" signs when queuing traffic at traffic lights.	Public Information	Other	2018	2023	WBC	WBC	NO	Not Funded	< £10k	Completed	12.1 µg/m3	Drivers to follow advice.	Completed	
9 AQAP Twyford 9	Consider feasibility of Park and Ride strategy for Twyford	Alternatives to private vehicle use	Rail based Park & Ride	2017	2025	WBC	WBC	NO	Partially Funded	£1 million - £10 million	Planning	12.1 µg/m3	Feasibility study carried out.	Potential to connect to existing P&R though no viable bus service currently due to low patronage following Covid.	
10 AQAP Twyford 10	School Travel Plans (Mode Shift Stars)	Promoting Travel Alternatives	School Travel Plans	2016	2040	WBC	WBC	YES	Funded	£10k - 50k	Implementation	12.1 µg/m3	Continue to be developed and reviewed.	Ongoing – DEFRA funding awarded to employ an Eco-Travel officer for schools in October 2023 and to accelerate mode shift. The Eco-Travel Officer role will continue for a further year.	27 % of primary schools carried out school travel survey with Modeshift STARS 21/22
11 AQAP Wok TC 1	Intelligent traffic signals at Shute End	Traffic Management	Strategic highway improvements, Re-prioritising road space away from	2020	2030	WBC	WBC	NO	Funded	£100 - £500k	Implementation	15.5µg/m3	Installation of MOVA.	Currently under review	

Measure No.	Measure	Category	Classification	Year Measure Introduced in AQAP	Estimated / Actual Completion Date	Organisations Involved	Funding Source	Defra AQ Grant Funding	Funding Status	Estimated Cost of Measure	Measure Status	Reduction in Pollutant / Emission from Measure	Key Performance Indicator	Progress to Date	Comments / Barriers to Implementation
			cars, including Access management, Selective vehicle priority, bus priority, high vehicle occupancy lane												
12 AQAP Wok TC 2	Consider speed reduction through town centre	Traffic Management	Reduction of speed limits, 20mph zones	2017	2027	WBC Highways,	WBC Highways,	NO	Not Funded	£100k - £500k	Planning	15.5µg/m3	tbc	Currently the scheme is on hold potentially to be reviewed again in 2024.	There is no political demand for it or funding.
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	2022	2027	WBC	WBC	NO	Not Funded	£100k - £500k	Implementation	15.5µg/m3	Review carried out.	Looking in LTP	Temporary banners were installed ahead of Clean Air Day in June 2019.
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	2020	2022	WBC	WBC/Developers	NO	Not Funded	> £10 million	Completed	15.5µg/m3	Completion.	Finished May 2022	
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	2023	2027	WBC	WBC/Business Rates Retention Fund/Developer funding	NO	Funded	> £10 million	Implementation	15.5µg/m3	Completion.	Commenced at Montague Park, new rail bridge completed, full SWDR will be completed as developers come forward and commence house building	Phase 1 completed.
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,	2020	tbc	WBC	WBC	NO	Not Funded	tbc	Planning	15.5µg/m3	Reduction in NO2	Design underway, but on hold.	

Measure No.	Measure	Category	Classification	Year Measure Introduced in AQAP	Estimated / Actual Completion Date	Organisations Involved	Funding Source	Defra AQ Grant Funding	Funding Status	Estimated Cost of Measure	Measure Status	Reduction in Pollutant / Emission from Measure	Key Performance Indicator	Progress to Date	Comments / Barriers to Implementation
			Selective vehicle priority, bus priority, high vehicle occupancy lane												
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	2020	2023	WBC	WBC	NO	Funded	tbc	Implementation	15.5µg/m3	Feasibility study carried out.	Design underway, but on hold.	Requires TRO supported by TVP. Consider design speed as well as speed limit. Traffic travels at approx. 20mph.
18 AQAP Wok TC 8	Active management of car parking	Traffic Management	Workplace Parking Levy, Parking Enforcement on highway	2017	2018	WBC	WBC	NO	Not Funded	£10k - 50k	Implementation	15.5µg/m3	Implementation.	Introduction of Civil Parking Enforcement 2018.	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.
19 AQAP Wok TC 9	Alternative arrangement for access to car parks	Traffic Management	Other	2017	2023	WBC	WBC	NO	Not Funded	£1 million - £10 million	Implementation	15.5µg/m3	Implementation (some of regen completed, more planned in future).	This is part of the Town Centre regeneration process	Includes bus stops and cycle ways.
20 AQAP Wok TC 10	Workplace and School travel planning	Promoting Travel Alternatives	School Travel Plans	2017	2030	WBC	WBC	YES	Funded	£10k - 50k	Implementation	15.5µg/m3	Continue to implement number of plans.	Long standing programme of school travel plans, DEFRA funding awarded for Eco-Travel Officer and Better Points in Wokingham AQAP.	Modal shift stars programme. COVID-19 and phased return to schools and workplaces.
21 AQAP Wok TC 11	Residential travel planning	Promoting Travel Alternatives	Personalised Travel Planning	2022	2030	WBC	S106 (developer)	NO	Partially Funded	£10k - 50k	Implementation	15.5µg/m3	Continue to implement number of plans.	Continuing in 2023	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)	tbc	tbc	WBC	DEFRA AQ Grant	YES	Not Funded	£100k - £500k	Planning	15.5µg/m3	Feasibility study carried out.	No progress to date, business case needs to be developed, no progress 2022.	Business case for a LEZ needs developing.
23 AQAP Wok TC 13	Park and Ride for Wokingham Town Centre	Alternatives to private vehicle use	Bus based Park & Ride	2016	2022	WBC	WBC	NO	Funded	£1 million - £10 million	Completed	15.5µg/m3	Installation and number of journeys.	Coppid Beech P&R completed but awaiting better conditions before launch of service, lack of demand v's	This actively manages car parking in the town centre and across the borough.

Measure No.	Measure	Category	Classification	Year Measure Introduced in AQAP	Estimated / Actual Completion Date	Organisations Involved	Funding Source	Defra AQ Grant Funding	Funding Status	Estimated Cost of Measure	Measure Status	Reduction in Pollutant / Emission from Measure	Key Performance Indicator	Progress to Date	Comments / Barriers to Implementation
														costs. Park and ride reduction of 40% since covid.	
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	2018	2023	WBC	DfT (OZEV)	NO	Partially Funded	£1 million - £10 million	Implementation	15.5µg/m3	Number of charging points	Bid documents for ORCS bid completed, BID successful and will be installing 38 points by the end of 2023. Car parks, and residential streets.	This will be the initial phase, further works planned as an ongoing programme. Encouraging residents and commuters to consider EV vehicle.
25 AQAP generic 2	Consider implementation of parking charge related to vehicle type e.g. free for electric	Promoting Low Emission Transport	Company Vehicle Procurement - Prioritising uptake of low emission vehicles	2022	2024	WBC	WBC	NO	Not Funded	£10k - 50k	Planning	15.5µg/m3	Policy under consultation internally in 2023	No progress to date	Requirements to have low and zero emission vehicles and plant need to be included in any new WBC let contract.
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	2016	2040	WBC	WBC	NO	Not Funded	£1 million - £10 million	Implementation	15.5µg/m3	Vehicle usage.	WBC EH and TP/WSP have zero emission and hybrid company vehicles. Meetings/ Reports - Energy saving trust – recommending the best way forward for the Council (2022) “Green Fleet review – green mileage”	
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	tbc	tbc	WBC	WBC	NO	Not Funded	£500k - £1 million	Planning	15.5µg/m3	tbc	Car Clubs strategy under development, draft car park strategy in the LCWIP.	LCWIP now adopted by council and makes recommendations for segregated cycle paths which will reduce parking availability in place
28 AQAP generic 5	No idling signs - for buses and taxis in waiting areas and at level crossings	Traffic Management	Anti-idling enforcement	2022	2023	WBC	WBC	YES	Partially Funded	£10k - 50k	Implementation	15.5µg/m3	Number of signs installed.	Installed as part of DEFRA grant behaviour change project in 2023 at Taxi ranks, results to been in 2024 ASR.	No physical enforcement and FPN have been issued as the borough has not adopted this regulation from the secretary of state; also Wokingham would prefer to educate than enforce.

Measure No.	Measure	Category	Classification	Year Measure Introduced in AQAP	Estimated / Actual Completion Date	Organisations Involved	Funding Source	Defra AQ Grant Funding	Funding Status	Estimated Cost of Measure	Measure Status	Reduction in Pollutant / Emission from Measure	Key Performance Indicator	Progress to Date	Comments / Barriers to Implementation
29 AQAP generic 6	Roadside emission testing, detecting and fining polluting vehicles	Traffic Management	Testing Vehicle Emissions	2017	2032	WBC	WBC	NO	Not Funded	£10k - 50k	Planning	15.5µg/m3	Number of vehicles failed.	No progress	Using RTLs existing hybrid buses (Lion 4).
30 AQAP generic 7	Improvement of cycle routes to ensure continuous and integrated	Transport Planning and Infrastructure	Cycle network	2017	2018	WBC	WBC	NO	Not Funded	> £10 million	Implementation	15.5µg/m3	Length of cycle ways provided.	LCWIP due to be completed in 2022, and adopted March in 2023, and implemented over the next 10/15 years	
31 AQAP generic 8	Residential Travel Planning	Promoting Travel Alternatives	Personalised Travel Planning	2016	2035	WBC	WBC	NO	Funded	£500k - £1 million	Implementation	15.5µg/m3	Number of plans.	Programmed started 2017/18, and is ongoing. Travel Packs sent to all new developments	Ongoing
32 AQAP generic 9	Encourage WBC staff to travel more sustainably	Promoting Travel Alternatives	Workplace Travel Planning	2017	2035	WBC	WBC	NO	Not Funded	£50k - £100k	Implementation	15.5µg/m3	Increase in commuting by alternative means.	WBC offices have adopted a travel plan. DST report.	
33 AQAP generic 10	Secure and sheltered bike parking provision	Promoting Travel Alternatives	Promotion of cycling	2017	2035	WBC	WBC	YES	Funded	£100k - £500k	Implementation	15.5µg/m3	Provided	Ongoing. 6 green roof, secure bike lockers carnival added in 2022	Work planned in schools
34 AQAP generic 11	Partnership with MyJourney	Promoting Travel Alternatives	Promotion of cycling	2016	2028	WBC	WBC	NO	Not Funded	£500k - £1 million	Implementation	15.5µg/m3	Number of events.	MyJourney Wokingham continuing to promote sustainable and active travel. Ongoing on 2022	Ongoing – cost of MJ as a whole is around £350k/yr but could be covered over many of the actions in this plan
35 AQAP generic 12	Promoting active travel via MyJourney website	Promoting Travel Alternatives	Intensive active travel campaign & infrastructure	2017	2028	WBC	WBC	YES	Funded	£500k - £1 million	Implementation	15.5µg/m3	Opening of scheme.	Completed 2021 access for hospital staff only in 2022, expanding to Public in 2023.	Link with work by Trading Standards re overloaded vehicles, will require implementation of legislation.
36 AQAP generic 13	Thames Valley Park and Ride	Alternatives to private vehicle use	Bus based Park & Ride	2016	2019	WBC/RBC	WBC	NO	Not Funded	£1 million - £10 million	Completed	Opening of scheme.	Completed 2021 access for hospital staff only in 2022, expanding to Public in 2023.	Link with work by Trading Standards re overloaded vehicles, will require implementation of legislation.	
37 AQAP generic 14	Provision of car clubs with or without EVs	Alternatives to private vehicle use	Car Clubs	2015	2023	WBC	WBC/Developers	NO	Not Funded	£100k - £500k	Implementation	15.5µg/m3	Usage of vehicles.	1 car club operational at Montague Park (pulled out in Oct 2022). Car Clubs strategy under development.	Strategy to be delivered in 2023
38 AQAP generic 15	Awareness campaign for the risks of poor air quality and promoting active and	Public Information	Via other mechanisms	2017	2035	WBC PH	WBC/RBC	YES	Funded	£50k - £100k	Implementation	15.5µg/m3	Increased awareness.	MyJourney Wokingham promoting active travel and using social media to raise awareness	PTP promoting the benefits of sustainable transport through MyJourney project.

Measure No.	Measure	Category	Classification	Year Measure Introduced in AQAP	Estimated / Actual Completion Date	Organisations Involved	Funding Source	Defra AQ Grant Funding	Funding Status	Estimated Cost of Measure	Measure Status	Reduction in Pollutant / Emission from Measure	Key Performance Indicator	Progress to Date	Comments / Barriers to Implementation
	sustainable travel													of Clean Air Day – DEFRA funding secured to add air quality page to MyJourney website in 2020/21	Linked to future development.
39 AQAP generic 16	Air Quality included in to JSNA and Health and Wellbeing Strategy	Policy Guidance and Development Control	Other policy	2016	2018	WBC, PH Berkshire	WBC	NO	Not Funded	£10k - 50k	Completed	15.5µg/m3	Inclusion in JSNA reviews and Health and Wellbeing Strategy.	JSNA published in March 2019 and considers air quality. Active 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	2019	2035	WBC Planning and PH	WBC PH	NO	Funded	£100k - £500k	Implementation	15.5µg/m3	Implementation.	Public Health and Planning teams working together on Local Plan and LTP4, draft in 2023, adopted in 2024.	2019 - Aside from Travel Plan requirements there is a planning policy requirement to provide parking – including cycle storage – in line with standards so all development will include appropriate provision (including shelter for long-term storage - i.e. residential, employee.)
41 AQAP generic 18	Linking with Highway Asset Management Plans	Policy Guidance and Development Control	Other policy	-	-	WBC	WBC, PH Berkshire	NO	Not Funded	-	Planning	15.5µg/m3	tbc	No progress	Active Travel Officer promotes all forms of sustainable transport doing public demonstrations and events.
42 AQAP generic 19	Neighbourhood Development Plans to consider air quality	Policy Guidance and Development Control	Air Quality Planning and Policy Guidance	2017	2040	WBC with Town and Parish Councils	WBC Planning & EH	NO	Not Funded	£10k - 50k	Implementation	15.5µg/m3	Inclusion in plans.	All applications commented on	Ongoing, PPP comment on all planning applications where necessary with regard to AQ.
43 AQAP generic 20	Freight Management Plan	Freight and Delivery Management	Delivery and Service plans	-	-	WBC	WBC	NO	Not Funded	tbc	Planning	15.5µg/m3	Review and implementation.	No progress to date, business case needs to be developed.	Delivered in partnership with RBC and funded through the Local Growth Fund.

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

As detailed in DEFRA's Policy Guidance LAQM.PG22 (Chapter 8), local authorities are expected to work towards reducing emissions and/or concentrations of $PM_{2.5}$ (particulate matter with an aerodynamic diameter of 2.5µm or less). There is clear evidence that $PM_{2.5}$ has a significant impact on human health, including premature mortality, allergic reactions, and cardiovascular diseases.

The latest $PM_{2.5}$ data available (2018) from DEFRA show that Wokingham Borough has a maximum level of 11.24 µg/m^3 (co-ordinates x 477500 y170500), and the average level of 9.46 µg/m^3. Background Mapping data for local authorities - 2018 - Defra, UK). Figure 1.2 below shows that 0.81% of $PM_{2.5}$ is produced by Road & Transport, the other 99.19% is from other factors.

The fraction of all-cause mortality in those aged 30 years and older attributable to particulate air pollution indicator' value for Wokingham Borough and other Berkshire Local Authorities in 2021 can be seen in Table 2.3.

Table 2.3: Fraction of all-cause mortality (aged 30 years and older) attributable to particulate air pollution indicator value within Berkshire, 2021.

National England Average	**South East Region**	West Berkshire	Reading	**Wokingham**	Bracknell Forest	Windsor & Maidenhead	Slough
5.5%	5.4%	5.4%	5.9%	5.9%	5.9%	5.9%	**6.3%**

(Public health profiles - OHID (phe.org.uk))

Wokingham Borough Council is taking the following measures to address $PM_{2.5}$:

- Work in implementing the actions in the Local Transport Plan and the Local Development Framework Core Strategy, as well as looking at Planning applications and the District Plan. For example, a new housing development might contribute to alterations to nearby junctions to increase capacity whilst also improving cycle and pedestrian links and the provision of an electric vehicle charging infrastructure, also contributing to bus services so that the site is served by public transport and thereby linking many other measures together in a site travel plan to encourage people to choose sustainable travel.

- Wokingham Borough continually gives out advice, including via social media, regarding bonfires and commercial burning throughout the year and the website is regularly updated to assist public information and understanding. Smoke and bonfires - PPP (publicprotectionpartnership.org.uk),
- The Council also give advice on Domestic Burning and Trading Standards inspect the suppliers to ensure they comply with the regulations for the consumer.

  Air Quality (Domestic Solid Fuels Standards) (England) Regulations 2020 - PPP (publicprotectionpartnership.org.uk)
- In 2022 there was no statutory requirement for the Council to monitor and report on $PM_{2.5}$, however we monitored the schools near the AQMA's for a three-month period to ascertain a "snap shot" of the PM levels and looked at each school individually. This was completed following the DEFRA grant 2020/21 award of £259,000 (which is split between the PPP Authorities). See Appendix C for more details of the project.
- Through the planning process dust production & dispersion on industrial sites is managed; as is the burning of any waste.

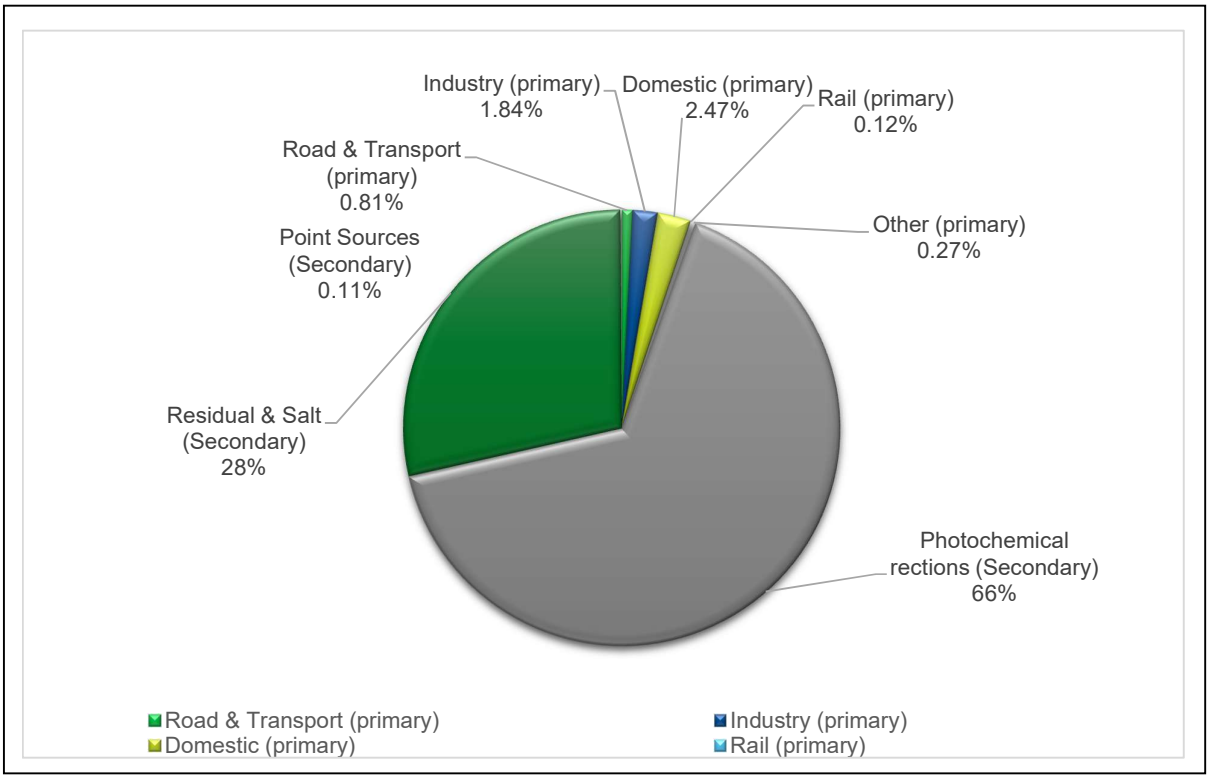


Figure 1.2 - A Pie Chart showing both the Primary and Secondary sources of $PM_{2.5}$

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

This section sets out the monitoring undertaken during 2022 by Wokingham Borough Council and how it compares with the relevant air quality objectives. In addition, monitoring results are presented for a five-year period between 2018 and 2022 to allow monitoring trends to be identified and discussed.

Summary of Monitoring Undertaken

2.1.1 Automatic Monitoring Sites

Wokingham Borough Council undertook automatic (continuous) monitoring at 2 sites during 2022. Table A.1 in Appendix A shows the details of the automatic monitoring 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.

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.

2.1.2 Non-Automatic Monitoring Sites

Wokingham Borough Council undertook non- automatic (i.e. passive) monitoring of NO_2 at 2 sites during 2022. Table A.2 in Appendix A presents the details of the non-automatic sites.

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

Individual Pollutants

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

2.1.3 Nitrogen Dioxide (NO_2)

Table A.3 and Table A.4 in Appendix A compare the ratified and adjusted monitored NO_2 annual mean concentrations for the past five years with the air quality objective of 40µg/m^3. Note that the concentration data presented represents the concentration at the location of the monitoring site, following the application of bias adjustment and annualisation, as required (i.e. the values are exclusive of any consideration to fall-off with distance adjustment).

For diffusion tubes, the full 2022 dataset of monthly mean values is provided in Appendix B. Note that the concentration data presented in Table B.1 includes distance corrected values, only where relevant.

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

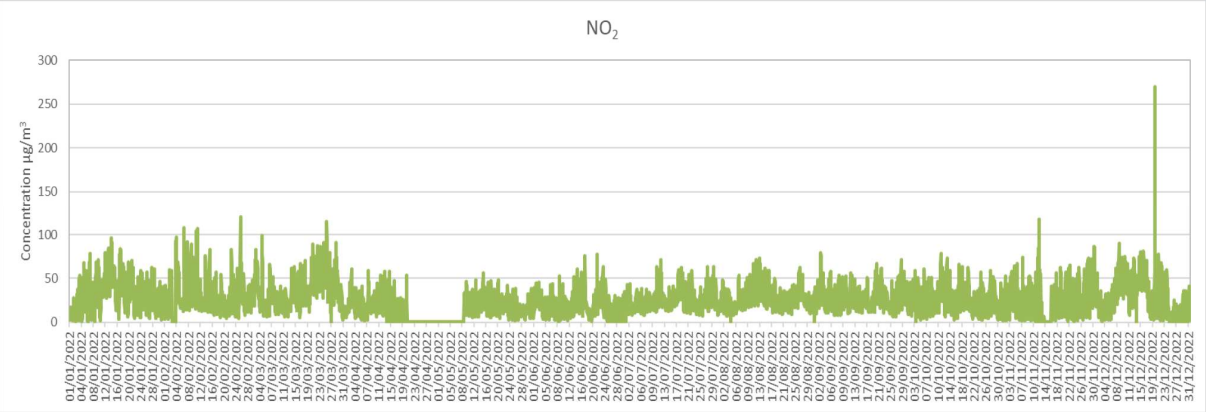
2.1.4 Continuous Monitoring Wokingham – Peach Street

An Annual Mean NO_2 concentration of 27.1µg/m^3 was recorded by the Wokingham automatic monitoring (CM2) unit in 2022. This shows that within the Wokingham Town Centre AQMA, NO_2 levels were not exceeding the objective limit at the CM2. This is a decrease on the 2019 result (33.0µg/m^3) pre-pandemic years, and the data capture was a good rate of 92.2%. However as expected it has increased slightly from 22.3µg/m^3 in 2020, when the country had 2 major lockdowns. This evidence helps indicate that traffic is the main contributor to NO_2 in Wokingham Town Centre, and that perhaps the hybrid working that some companies are carrying out is contributing to help reduce the NO_2 along with newer cars.

The results have been compared to other nearby sites. Seasonal data trends seen at Wokingham Continuous Monitor are similar to those at comparable AURN monitoring sites at Oxford and Reading New Town. The results always increase in the colder weather due to the temperature invasions, and this trend was apparently at all the sites.

Figure 3.1 shows the annual trend over the last year. The 200µg/m^3 hourly mean objective was met, so we had no exceedances and this is also a decrease from the 15 in 2018.

Graph 2.1 Wokingham Daily NO_2 2022



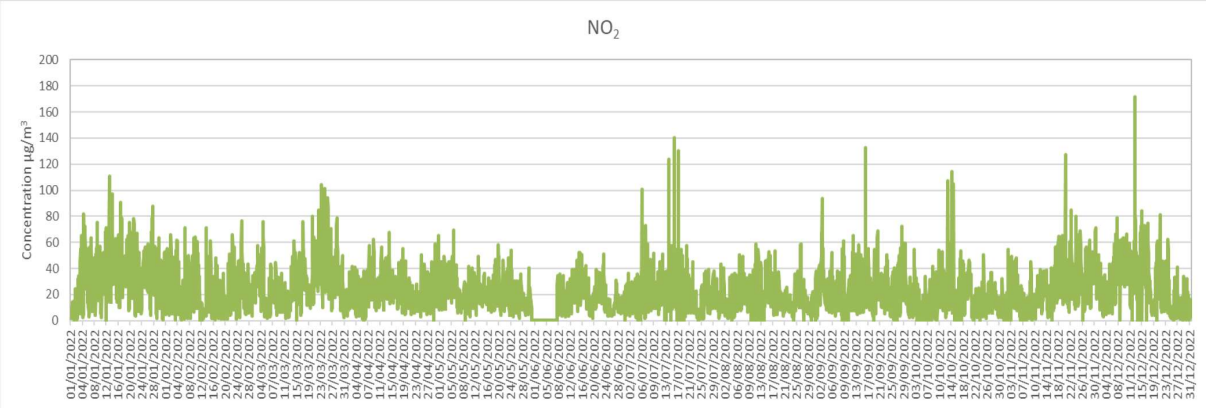
2.1.5 Continuous Monitoring Twyford – Cross Roads

An Annual Mean NO_2 concentration of 23.6 µg/m^3 was recorded by the Twyford automatic monitoring unit (CM3) in 2022. This is a decrease from the NO_2 recorded in 2019 (29.9µg/m^3) when it was installed, and has decreased further from 26.0µg/m^3 measured in 2021. This shows that within the Twyford Cross Roads AQMA, the NO_2 levels were not exceeding the objective limit (40 µg/m^3). The data capture was a good rate of 95.7%. This NO_2 data once again indicates that traffic is the main contributor to NO_2 at the Twyford Cross Roads.

There were 0 exceedances of the 200µg/m^3 hourly mean objective recorded, which is below the Air Quality Objective of 18 exceedances per year.

The Twyford and Wokingham continuous monitors also presented good correlation between Diffusion Tubes (passive data) and the continuous monitoring.

Graph 2.2 Twyford Daily NO_2 2022



2.1.6 Wokingham Borough Diffusion Tube Data

The Annual Mean Objective of 40µg/m^3 was not exceeded at any of the monitoring sites, within the Borough. The 1 site within Wokingham Town Centre AQMA, WOK838 Giggling Spring, Shute End, which exceeded in 2018 & 2019. This year (2022) measured 37.2µg/m^3 so has increased from 36.5µg/m^3 in 2021, but reduced from 41.8µg/m^3 in 2019. All the sites within the Twyford Crossroads AQMA were below the objective including, WOK850, 887, 888 - 19 High Street, which exceeded in 2018 (44.0µg/m^3) and 2019 (42.8µg/m^3) measured 32.5/m^3 in 2021 and 32.8µg/m^3 in 2022. Therefore, there has only been a slight increase this year compared to 2021and remains below the AQ objective. All mean concentrations were less that 60µg/m^3 which therefore indicates no exceedances of the 1-hour NO_2 objective.

2.1.7 M4 AQMA Diffusion Tube Data

There were no exceedances of the Annual Mean Objective within the AQMA, and all sites decreased in NO_2. All the sites within the AQMA had reduced this year mainly due to the pandemic. The NO_2 at all 7 of the sites has increased slightly since 2021, see Graph 3.1.

Table 3.1 - Marginal increases of NO_2 in the M4 AQMA

Tube Location	2021	2022
WOK53	14.7µg/m^3	16.0µg/m^3
WOK70	16.1µg/m^3	17.4µg/m^3
WOK98	15.3µg/m^3	16.1µg/m^3
WOK602	15.6µg/m^3	17.7µg/m^3
WOK836	18.7µg/m^3	21.5µg/m^3
WOK846	15.2µg/m^3	16.2µg/m^3
WOK861	14.8µg/m^3	17.8µg/m^3

The M4 has become a smart motorway and during the construction had a speed limit of 50/60/70mph in place during much of 2018 to 2021 which may also account for the reduction in levels. The works finished in 2022 and the levels have continued to stay well below the AQO in the AQMA. We have evidence from 2018 to demonstrate that the NO_2 around the M4 AQMA has constantly been meeting the AQO, see Graph 3.1. However we need three years of continuous data (discounting 2020 & 2021) before we can revoke an AQMA.

Monitoring within and outside this AQMA will continue in 2023 and until the site is revoked.

2.1.8 Wokingham Town Centre AQMA Diffusion Tube Data

8 Diffusion Tubes sites are located within the Wokingham AQMA, and one of the sites is a triplicate and co-located with the Continuous Monitor. Within this AQMA no site exceeded the Annual Mean (40µg/m^3) Objective in 2022, however 5 years ago (2018) 1 location did, and this site was:

WOK838 Giggling Spring, Shute End –This site represents relevant exposure and the NO_2 at the site has decreased from 41.0µg/m^3 in 2018 to 37.2/m^3 2022, (which is an increased from 36.5µg/m^3 in 2021).

All apart from one site (WOK844, Buckingham Court) which decreased by 0.1 µg/m^3) in this AQMA increased in NO_2 in 2022, however none of the sites have increase past the pre COVID pandemic levels of 2019. The NO_2 was expected to rise this year due to the increase of traffic, and this data also helps us correlate NO_2 to traffic fumes.

It is positive to see that after a full years' worth of pandemic/lock down free monitoring that all the NO_2 levels remain below the 2019 ones. Monitoring within and outside this AQMA will continue in 2023.

2.1.9 Twyford Crossroads AQMA Diffusion Tube Data

The Twyford Crossroads AQMA has 5 Diffusion Tubes sites, 3 of the sites are triplicated and one these is co-located with a Continuous Monitor. Within this AQMA no site exceeded the Annual Mean Objective in 2022.

In 2022 WOK (850, 887 & 888) 19 High Street has decreased in concentration since 2018 when the NO_2 exceeded the AQO, from a triplicated average of 44.0µg/m^3, to 32.8µg/m^3 in 2022, at the road side, relevant exposure site. The NO_2 at this site has increase marginally from 32.5µg/m^3 in 2021 to 32.8µg/m^3 in 2022, which may demonstrate that people are now working in a hybrid fashion as the new normal.

Within the Twyford AQMA all of the sites decreased in NO_2 from 2019 (pandemic free year), one of which was a triplicate. However, all of the sites have increased slightly from 2021 to 2022, apart from the (WOK 871, 875 876), which decreased (21.5µg/m^3 in 2021 decreased to 20.8µg/m^3 in 2022).

The general increase was to be expected as the traffic has increased.

The WOK864 1 Waltham Road site is not within the Twyford Crossroads AQMA but is only 22m to the south east, located to enable determination as to whether the AQMA boundary needs to be altered. This location decreased from 26.9 µg/m³ in 2021 to 26.8µg/m³ in 2022. However, the site has reduced over all from 37.0µg/m³ in 2019, therefore the AQMA boundary does not need to be extended at this time.

It is positive to see that after a full years' worth of pandemic/lock down free monitoring that all the NO_2 levels remain below the 2019 ones. Monitoring within and outside this AQMA will continue in 2023.

2.1.10 Outside of the AQMAs

Within the rest of Wokingham Borough, the sites met the NO_2 Annual Mean Objective of 40µg/m³. All of the sites have decreased from the last none pandemic year 2019 NO_2 levels. Since 2022 6 of the sites have decreased, and 1 has stayed the same and 39 sites have increased. This is suspected to be linked to the increase of traffic in the borough and reduction of lock downs.

None of the passive monitoring sites within the Borough were recorded above 60µg/m^3 which would indicate no exceedances of the 1 hour objective.

2.1.11 Particulate Matter (PM_{10})

Currently indicative or reference PM_{10} monitoring is not carried out in Wokingham Borough Council in line with the DEFRA LAQM guidance. Further funding is required to carry out this monitoring.

2.1.12 Particulate Matter ($PM_{2.5}$)

Currently indicative or reference $PM_{2.5}$ monitoring is not carried out in Wokingham Borough Council in line with the DEFRA LAQM guidance. Further funding is required to carry out this monitoring.

2.1.13 Sulphur Dioxide (SO_2)

SO_2 monitoring is not required in Wokingham Borough Council by DEFRA.

Appendix A: Monitoring Results

Table A.1 – Details of Automatic Monitoring Sites

Site ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA? Which 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	NO_2	YES Wokingham	Chemiluminescent	3	1.5	1.5
CM3	Twyford Cross Roads	Kerbside	332200	433540	NO_2	YES Twyford	Chemiluminescent	0	N/A	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

Diffusion Tube ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA? Which AQMA?	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Tube Co-located with a Continuous Analyser?	Tube Height (m)
WOK11	Direction Grp,Robinhood Lne,	Roadside	478133	170598	NO_2		4.0	2.4	No	2.3
WOK19	Thames St, Sonning	Roadside	475583	175704	NO_2		22.0	2.0	No	2.3
WOK52	Westende Flats, Peach St	Roadside	481521	168750	NO_2	Wokingham Town Centre AQMA	3.0	1.9	No	2.4
WOK53	Dunt Lane, Hurst	Roadside	479771	171093	NO_2	M4 AQMA	28.0	1.2	No	2.0
WOK70	Longdon Rd, Winnersh	Roadside	478011	170135	NO_2	M4 AQMA	25.0	1.7	No	2.4
WOK71	38 King St Lane, Winnersh	Roadside	477907	170191	NO_2		20.0	3.1	No	2.4
WOK98	309 Reading Road	Roadside	478611	170225	NO_2	M4 AQMA	0.0	11.8	No	1.7
WOK505	Church Road	Roadside	474444	172062	NO_2		10.0	1.8	No	2.2
WOK509	Henley Bridge	Roadside	476414	182648	NO_2		7.0	4.7	No	2.3
WOK602	Green Lane	Roadside	478739	170107	NO_2	M4 AQMA	3.0	1.7	No	1.7
WOK803	3 Wellington Road	Roadside	480651	168544	NO_2		3.0	1.1	No	2.3

Diffusion Tube ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA? Which AQMA?	Distance to Relevant Exposure (m) [1]	Distance to kerb of nearest road (m) [2]	Tube Co-located with a Continuous Analyser?	Tube Height (m)
WOK805	18 Barkham Road	Roadside	480547	168543	NO_2		0.0	5.7	No	1.9
WOK817	London Rd (298)	Roadside	483231	168817	NO_2		11.5	2.1	No	2.2
WOK825	54 High St Wargrave	Roadside	478541	178634	NO_2		0.0	2.2	No	2.1
WOK827	Station Rd, Twyford	Kerbside	479047	175831	NO_2		3.0	1.0	No	2.3
WOK829	Long Acre Thames St	Roadside	475806	175577	NO_2		0.0	1.7	No	2.3
WOK835	14 Robinhood Lane	Roadside	478192	170672	NO_2		8.0	1.5	No	2.2
WOK836	349 Old Whitley Wood Ln	Roadside	472346	168684	NO_2	M4 AQMA	7.5	1.2	No	2.3
WOK838	Giggling Spring, Shute End	Roadside	480995	168726	NO_2	Wokingham Town Centre AQMA	0.0	2.8	No	2.3
WOK841	Lane End Villas	Roadside	473130	168783	NO_2		4.5	0.2	No	2.4
WOK844	Buckingham Court	Roadside	481492	168775	NO_2	Wokingham Town Centre AQMA	1.3	1.2	No	2.4

Diffusion Tube ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA? Which AQMA?	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Tube Co-located with a Continuous Analyser?	Tube Height (m)
WOK846	4 Hatch Farm Cottages	Roadside	477131	170019	NO_2	M4 AQMA	0.0	39.0	No	1.8
WOK857	Rectory Rd, Wokingham	Roadside	481031	168725	NO_2	Wokingham Town Centre AQMA	0.3	1.2	No	2.4
WOK861	Mill Lane (by bridge)	Roadside	476997	170107	NO_2	M4 AQMA	0.0	2.0	No	1.8
WOK863	3 Wargrave Rd, Twyford	Roadside	478768	176012	NO_2	Twyford Crossroads AQMA	12.6	1.0	No	2.4
WOK866	58 Denmark Street	Roadside	481033	168300	NO_2		0.0	3.4	No	2.4
WOK867	21 Denmark St, Wok	Roadside	481104	168444	NO_2	Wokingham Town Centre AQMA	0.0	5.0	No	1.8
WOK869	Mullie (26) High Street	Roadside	478681	175998	NO_2		0.5	1.4	No	2.5
WOK870	Hunt & Nash Church St	Roadside	478813	175975	NO_2	Twyford Crossroads AQMA	0.5	0.5	No	2.5
WOK872	Registry Office, Reading Rd	Roadside	480816	168793	NO_2	Wokingham Town Centre AQMA	0.8	1.6	No	2.5

Diffusion Tube ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA? Which AQMA?	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Tube Co-located with a Continuous Analyser?	Tube Height (m)
WOK873	27 The Terrace	Roadside	480863	168787	NO_2		0.3	2.6	No	2.5
WOK874	Broad St, Wokingham	Roadside	481182	168603	NO_2	Wokingham Town Centre AQMA	0.0	0.0	No	2.4
WOK871 WOK875 WOK876	15 London Rd, Twyford 3	Roadside	478830	176025	NO_2	Twyford Crossroads AQMA	0.8	1.6	No	2.5
WOK 877	Almshouses, London Rd	Roadside	478904	176060	NO_2		0.8	1.6	No	2.4
WOK 878	17 Wargrave Rd Twyford	Roadside	478719	176100	NO_2		1.7	3.2	No	2.5
WOK 882	Sign Whitley Wd Ln	Roadside	472299	168677	NO_2		4.2	2.0	No	2.5
WOK 883	Evendons Pri Sch	Roadside	480483	167011	NO_2		3.0	1.0	No	2.5
WOK 850 WOK 887 WOK 888	19 High St Twyford 3	Roadside	478733	175985	NO_2	Twyford Crossroads AQMA	0.3	1.2	No	2.2
WOK 864 WOK 889 WOK 890	1 Waltham Rd 3	Roadside	478887	175945	NO_2		0.0	3.4	No	2.2

Diffusion Tube ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA? Which AQMA?	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Tube Co-located with a Continuous Analyser?	Tube Height (m)
WOK 891	6 Budd Grove	Roadside	477498	170218	NO_2		0.0	3.4	No	2.2
WOK 892	3A Wellington Rd	Roadside	480547	168543	NO_2		10.0	1.0	No	2.4
WOK 893	6 Barkham Rd	Roadside	480571	168569	NO_2		0.0	2.5	No	2.4
WOK 894	181 Outfield Crescent	Roadside	480737	168442	NO_2		0.0	2.5	No	2.4
WOK 895	47 Barkham Road	Roadside	480375	168399	NO_2		0.0	1.0	No	2.4
WOK 896	1A Alderman Wiley Close, Wokingham	Roadside	480703	168682	NO_2		0.0	8.0	No	2.4
WOK 879 WOK 880 WOK 881	Peach Street CM Unit 3	Roadside	481359	168606	NO_2	Wokingham Town Centre AQMA	3.0	1.5	Yes	2.0
WOK 884 WOK 885 WOK 886	Twyford CM Unit 3	Roadside	478765	175999	NO_2	Twyford Crossroads AQMA	3.0	1.5	Yes	2.0

Notes:

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

(2) N/A if not applicable.

Table A.3 – Annual Mean NO_2 Monitoring Results: Automatic Monitoring (µg/m^3)

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) [1]	Valid Data Capture 2022 (%) [2]	2018	2019	2020	2021	2022
CM2 Peach Street Wokingham	481348	168603	Roadside	92.2	100	32.9	33	22.3	24.2	27.1
CM3 Twyford Cross Roads	478765	176003	Kerbside	95.7	100		29.9	22.1	26.0	23.6

☐ **Annualisation has been conducted where data capture is <75% and >25% in line with LAQM.TG22.**

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

Notes:

The annual mean concentrations are presented as µg/m^3.

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

All means have been "annualised" as per LAQM.TG22 if valid data capture for the full calendar year is less than 75%. See Appendix C for details.

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

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

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

Table A.4 – Annual Mean NO_2 Monitoring Results: Non-Automatic Monitoring (µg/m^3)

Diffusion Tube ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) [1]	Valid Data Capture 2022 (%) [2]	2018	2019	2020	2021	2022
WOK11	478133	170598	Roadside	92.6	92.6	28.0	32.0	20.9	20.3	23.9
WOK19	475583	175704	Roadside	90.1	90.1	22.0	28.9	18.7	19.9	22.2
WOK52	481521	168750	Roadside	100.0	100.0	26.0	30.3	21.4	22.8	23.2
WOK53	479771	171093	Roadside	100.0	100.0	23.0	21.1	15.4	14.7	16.0
WOK70	478011	170135	Roadside	67.9	67.9	25.0	25.5	16.8	16.1	17.4
WOK71	477907	170191	Roadside	90.4	90.4	25.0	31.9	21.2	21.4	22.6
WOK98	478611	170225	Roadside	92.3	92.3	31.0	25.4	16.5	15.3	16.1
WOK505	474444	172062	Roadside	100.0	100.0	29.0	36.5	31.0	29.2	28.9
WOK509	476414	182648	Roadside	100.0	100.0	21.0	23.9	16.4	16.7	17.8
WOK602	478739	170107	Roadside	100.0	100.0	25.0	21.2	13.4	15.6	17.7
WOK803	480651	168544	Roadside	100.0	100.0	27.0	30.7	19.5	22.0	18.4
WOK805	480547	168543	Roadside	100.0	100.0	24.0	25.0	17.1	18.3	18.5
WOK817	483231	168817	Roadside	92.3	92.3	24.0	21.6	14.0	15.3	15.5
WOK825	478541	178634	Roadside	83.0	83.0	30.0	31.1	21.3	23.2	23.8
WOK827	479047	175831	Kerbside	100.0	100.0	20.0	20.6	14.6	15.2	15.6
WOK829	475806	175577	Roadside	80.8	80.8	28.0	28.6	20.7	23.1	24.0
WOK835	478192	170672	Roadside	65.7	65.7	26.0	26.6	19.3	21.2	20.3

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Diffusion Tube ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) [1]	Valid Data Capture 2022 (%) [2]	2018	2019	2020	2021	2022
WOK836	472346	168684	Roadside	100.0	100.0	24.0	27.0	19.3	18.7	21.5
WOK838	480995	168726	Roadside	92.3	92.3	**41.0**	**41.8**	28.6	36.5	37.2
WOK841	473130	168783	Roadside	100.0	100.0	27.0	33.3	20.7	23.0	24.4
WOK844	481492	168775	Roadside	100.0	100.0	36.0	38.6	25.9	31.2	31.1
WOK846	477131	170019	Roadside	91.8	91.8	26.0	21.6	14.0	15.2	16.2
WOK857	481031	168725	Roadside	100.0	100.0	39.3	39.9	29.0	31.9	32.4
WOK861	476997	170107	Roadside	91.8	91.8	21.0	23.2	14.9	14.8	17.8
WOK863	478768	176012	Roadside	92.6	92.6	31.0	30.7	21.7	22.8	24.0
WOK866	481033	168300	Roadside	83.0	83.0	24.0	25.3	15.9	17.7	18.9
WOK867	481104	168444	Roadside	100.0	100.0	23.6	23.7	13.4	18.1	19.2
WOK869	478681	175998	Roadside	100.0	100.0	27.0	27.1	18.9	19.4	21.9
WOK870	478813	175975	Roadside	100.0	100.0	29.0	29.0	20.2	22.0	22.2
WOK872	480816	168793	Roadside	100.0	100.0	33.0	32.4	23.0	25.5	26.4
WOK873	480863	168787	Roadside	90.4	90.4	25.0	24.7	17.3	19.3	19.4
WOK874	481182	168603	Roadside	100.0	100.0	25.0	28.9	20.0	21.7	22.4
WOK871 , WOK875 , WOK876	478830	176025	Roadside	92.6	92.6	31.0	27.3	13.0	21.5	20.8
WOK 877	478904	176060	Roadside	100.0	100.0	22.0	22.9	14.9	16.6	16.7
WOK 878	478719	176100	Roadside	91.8	91.8	23.0	27.5	17.4	18.3	19.5

Diffusion Tube ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) [1]	Valid Data Capture 2022 (%) [2]	2018	2019	2020	2021	2022
WOK 882	472299	168677	Roadside	90.1	90.1	29.0	32.6	20.7	23.8	24.9
WOK 883	480483	167011	Roadside	90.4	90.4	27.0	29.1	19.6	22.4	22.2
WOK 850, WOK 887, WOK 888	478733	175985	Roadside	100.0	100.0	44.0	42.8	31.3	32.5	32.8
WOK864, WOK 889 , WOK890	478887	175945	Roadside	100.0	100.0	35.6	37.0	24.4	26.9	26.8
WOK 891	477498	170218	Roadside	100.0	100.0		22.2	14.3	16.9	18.5
WOK 892	480547	168543	Roadside	100.0	100.0			15.4	18.7	22.5
WOK 893	480571	168569	Roadside	100.0	100.0			18.5	20.4	20.4
WOK 894	480737	168442	Roadside	100.0	100.0			13.3	14.4	14.9
WOK 895	480375	168399	Roadside	90.4	90.4			13.5	16.4	16.6
WOK 896	480703	168682	Roadside	100.0	100.0				14.9	16.6
WOK 879, WOK 880, WOK 881	481359	168606	Roadside	100.0	100.0	33.0	22.2	24.0	27.6	28.0
WOK 884, WOK 885, WOK 886	478765	175999	Roadside	100.0	100.0		30.5	21.9	22.6	23.1

☒ **Annualisation has been conducted where data capture is <75% and >25% in line with LAQM.TG22.**

☒ **Diffusion tube data has been bias adjusted.**

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

Notes:

The annual mean concentrations are presented as µg/m^3.

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**.

Means for diffusion tubes have been corrected for bias. All means have been "annualised" as per LAQM.TG22 if valid data capture for the full calendar year is less than 75%. See Appendix C for details.

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

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

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

Figure A.1 – Trends in Annual Mean NO_2 Concentrations in the Wokingham Town Centre AQMA 2018-2022

Figure A.1 presents NO_2 annual mean concentrations for sites within the Wokingham AQMA between years 2018 to 2022. There are no exceedances of the annual mean objective in 2022 and there is a general trend of reduction experienced across the sites since 2019.

Figure A.2 – Trends in Annual Mean NO_2 Concentrations in the Twyford Crossroads AQMA 2018-2022

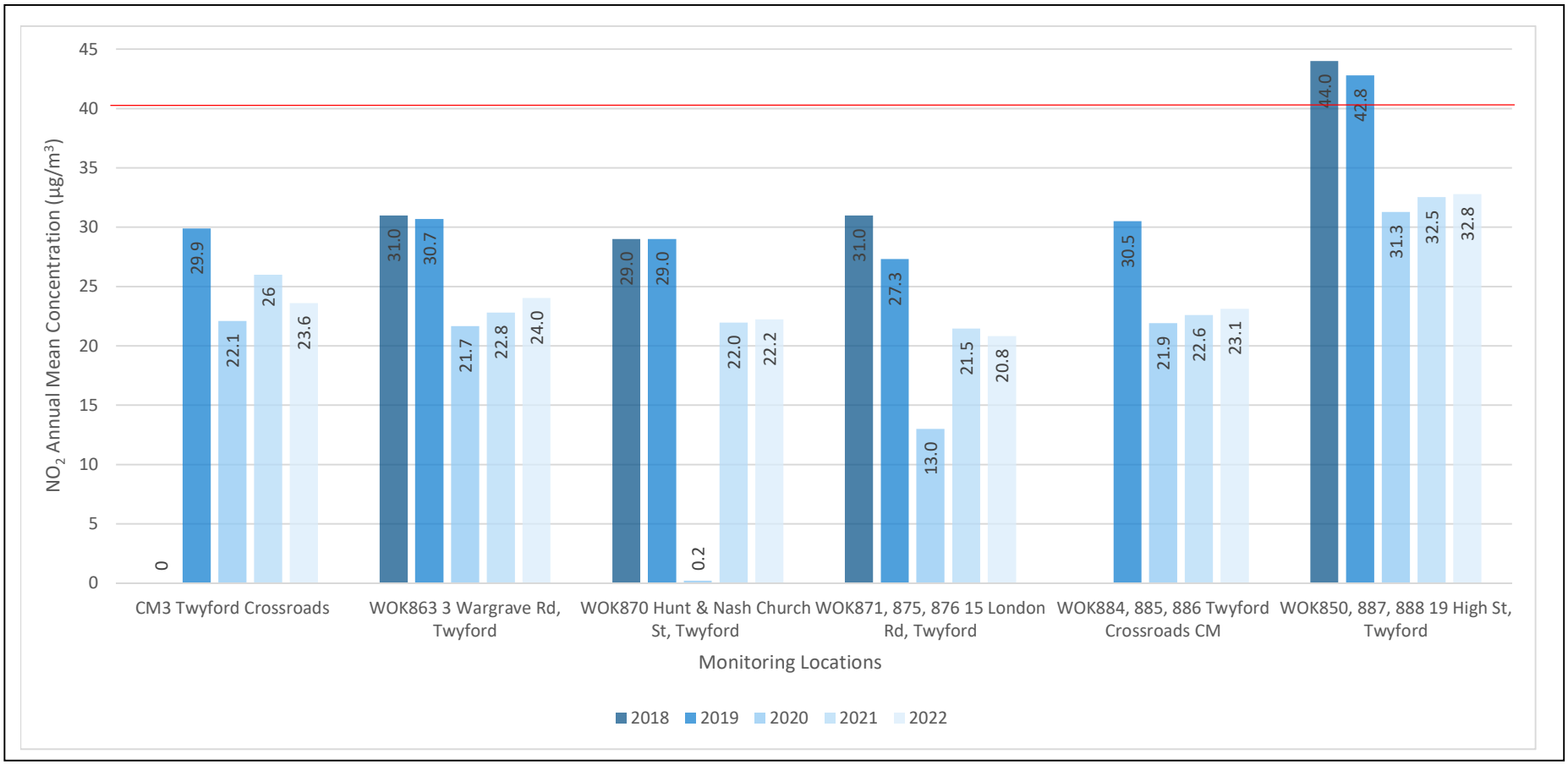

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Figure A.2 presents NO_2 annual mean concentrations for sites within the Twyford Crossroad AQMA between years 2018 to 2022. There are no exceedances of the annual mean objective in 2022 and there is a general trend of reduction experienced across the sites since 2019.

Figure A.3 – Trends in Annual Mean NO_2 Concentrations in the M4 AQMA 2018-2022

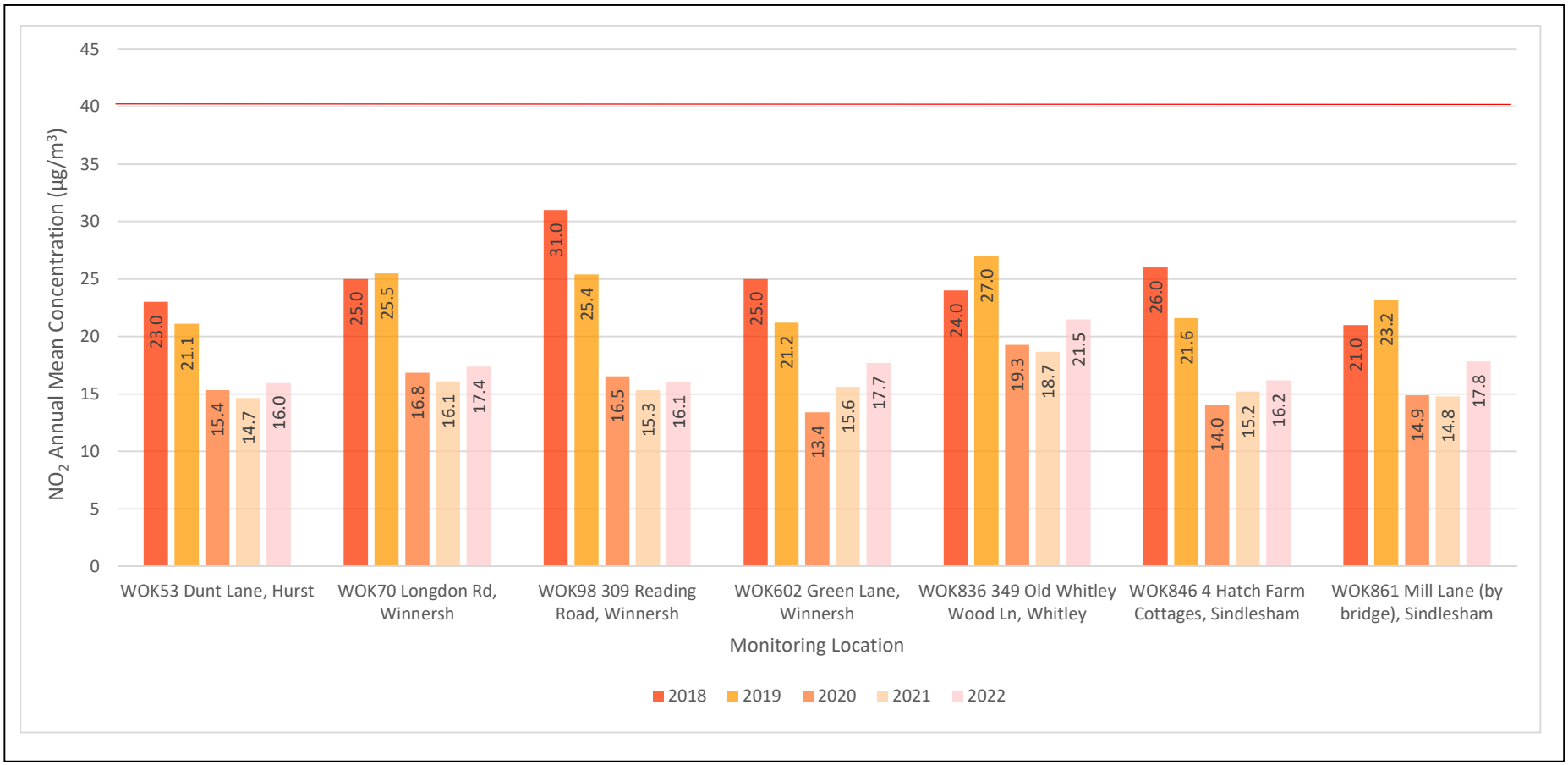

Figure A.3 presents NO_2 annual mean concentrations for sites located near the M4 AQMA between years 2018 to 2022. There are no exceedances of the annual mean objective in 2022 and there is a general trend of reduction experienced across the sites since 2018, and has continually been below the air quality objective since 2018.

Figure A.4 – Trends in Annual Mean NO_2 Concentrations within Wokingham (outside the AQMAs) 2018-2022

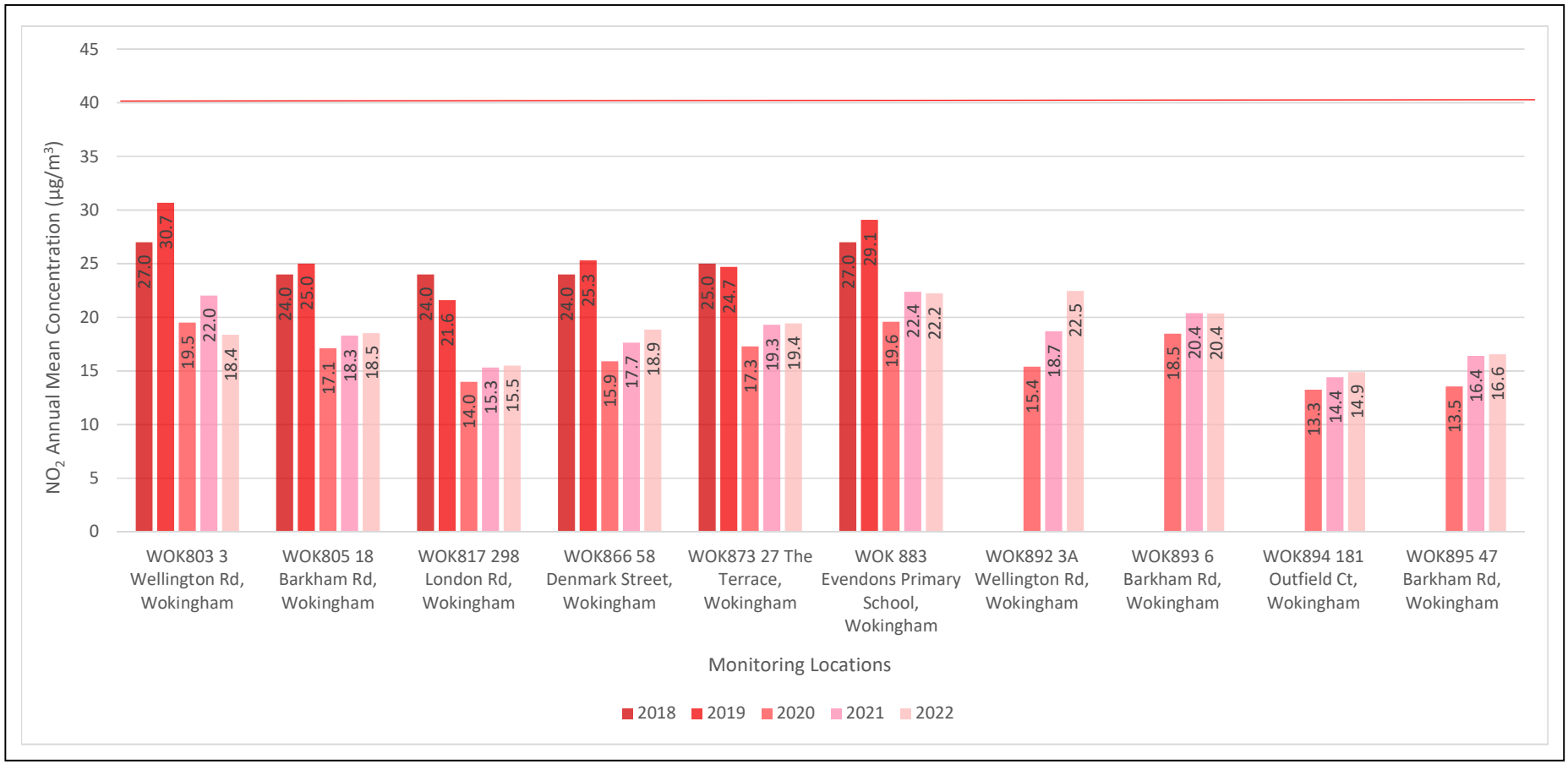

Figure A.4 presents NO_2 annual mean concentrations for sites located in Wokingham outside the AQMA in the years 2018 to 2022. There have been no exceedances of the annual mean objective since 2018 and the tubes located near the Rail Crossing WOK892, WOK893 and WK895 are securely within the objectives.

Figure A.5 – Trends in Annual Mean NO_2 Concentrations within Winnersh, Earley & Shinfield (outside AQMAs) 2018-2022

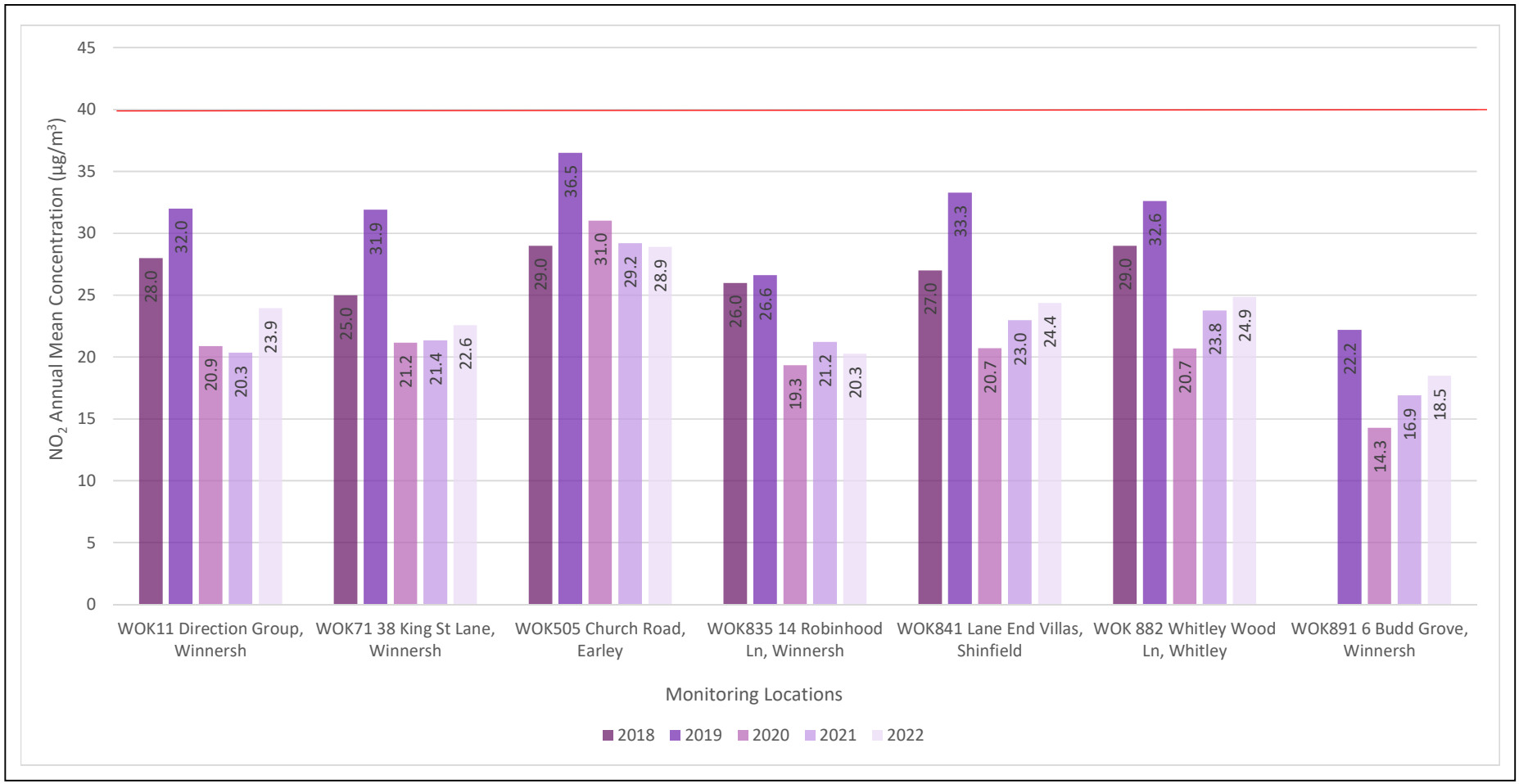

Figure A.5 presents NO_2 annual mean concentrations for sites located in Wokingham outside the AQMA in the years 2018 to 2022. There have been no exceedances of the annual mean objective since 2018 and the tubes NO_2 levels are securely within the objectives.

Figure A.6 – Trends in Annual Mean NO_2 Concentrations within Twyford, Sonning, Wargrave & Henley (outside AQMAs) 2018-22

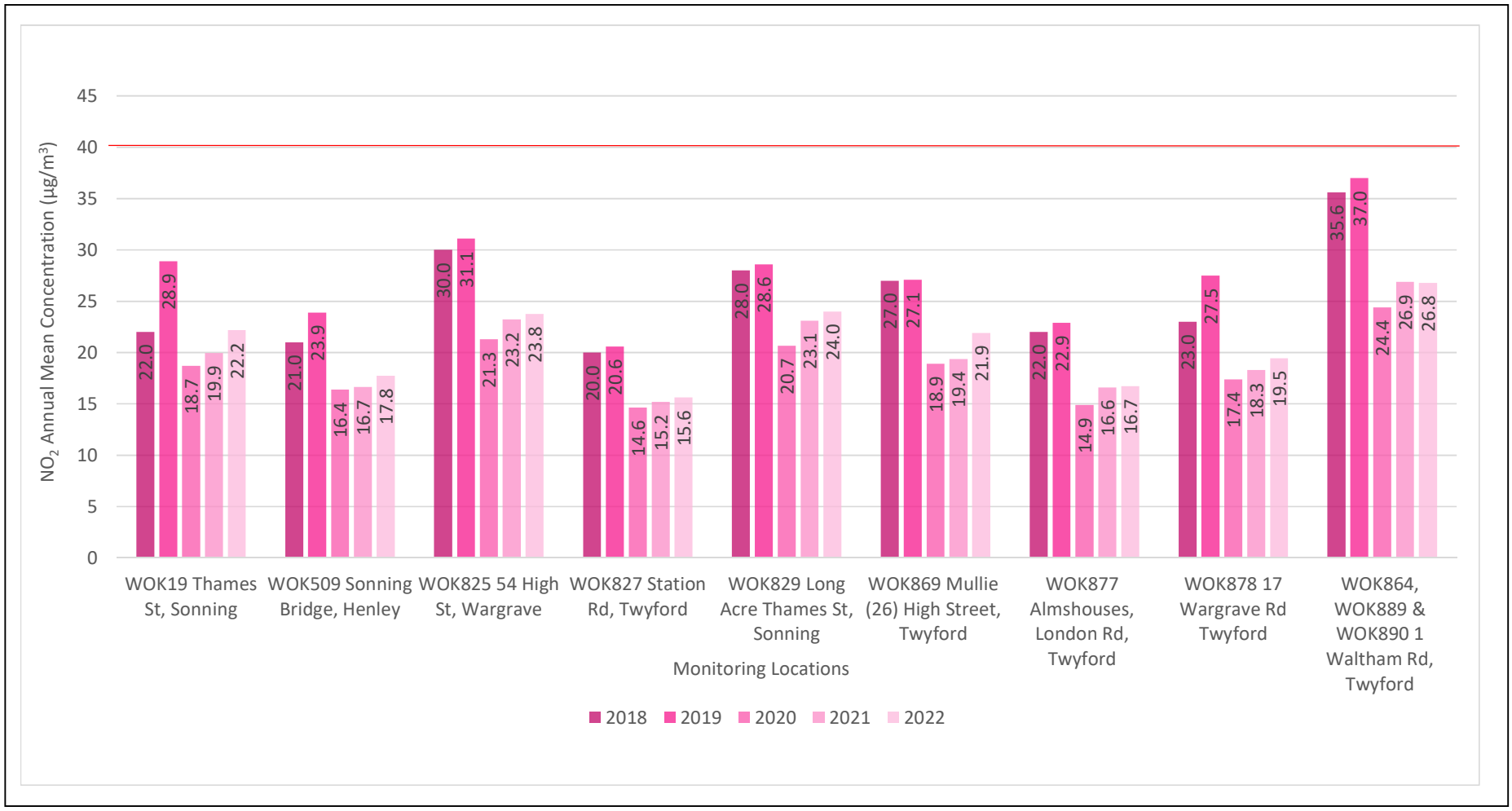

Figure A.6 presents NO_2 annual mean concentrations for sites located in Wokingham outside the AQMA in the years) 2018 to 2022. There have been no exceedances of the annual mean objective since 2018 and the tubes NO_2 levels are securely within the objectives.

Figure A.7 – Trends in Monthly Average NO_2 Concentrations from Wokingham Continuous Monitor for 2019-2022

Figure A.7 presents NO_2 monthly trends for the Continuous monitor in Wokingham Town Centre from 2019 to 2022. There have been no exceedances of the annual mean objective since before 2018 this year the annual average was 21.1 µg/m^3. You can see the typical NO_2 trend clearly represented by the change in the weather, as the NO_2 increases in the typically colder months due to the temperature inversions.

Figure A.8 – Trends in Monthly Average NO_2 Concentrations from Twyford Continuous Monitor for 2019-2022

Figure A.8 presents NO_2 monthly trends for the Continuous monitor in Twyford from 2019 to 2022. There have been no exceedances of the annual mean objective since is starting monitoring in 2018 this year the annual average was 23.6 µg/m³. You can see the typical NO_2 trend clearly represented by the change in the weather, as the NO_2 increases in the typically colder months due to the temperature inversions.

Table A.5 – 1-Hour Mean NO_2 Monitoring Results, Number of 1-Hour Means > 200µg/m^3

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2022 (%) (2)	2018	2019	2020	2021	2022
CM2 Peach Street Wokingham	481348	168603	Roadside	92.2	100	15	0	**0 (112.34)**	0	0
CM3 Twyford Cross Roads	478765	176003	Kerbside	95.7	100		0	0	13	0

Notes:

Results are presented as the number of 1-hour periods where concentrations greater than 200µg/m^3 have been recorded.

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

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

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

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

Appendix B: Full Monthly Diffusion Tube Results for 2022

Table B.1 – NO_2 2022 Diffusion Tube Results ($\mu g/m^3$)

DT ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean: Raw Data	Annual Mean: Annualised and Bias Adjusted 0.87	Annual Mean: Distance Corrected to Nearest Exposure	Comment
WOK 11	478133	170598	36.4	21.8	33.5	21.5	19.1	38.1		23.0	25.3	25.6	27.8	32.1	27.7	23.9		
WOK 19	475583	175704	34.0	24.1	31.5	20.8	20.5	23.7	23.0	22.3	26.8	26.6	28.8		25.6	22.2		
WOK 52	481521	168750	38.9	22.1	39.1	13.0	21.2	20.2	24.2	26.2	26.9	26.8	30.4	31.9	26.8	23.2		
WOK 53	479771	171093	29.4	17.5	25.1	14.1	12.7	14.3	12.9	16.1	17.6	16.6	21.9	23.0	18.4	16.0		
WOK 70	478011	170135	30.5		28.1	17.5				19.3	20.0	22.2	23.4	24.6	23.2	17.4		
WOK 71	477907	170191	33.0	23.3	33.6		19.0	22.5	21.0	25.4	26.4	26.4	27.2	29.1	26.1	22.6		
WOK 98	478611	170225		15.9	27.1	15.6	14.9	15.3	14.0	16.3	17.5	20.5	23.2	23.9	18.6	16.1		
WOK 505	474444	172062	42.0	32.0	40.8	32.2	25.9	28.4	31.5	22.7	35.3	32.6	38.0	39.2	33.4	28.9		
WOK 509	476414	182648	27.1	20.1	21.8	16.0	17.2	21.0	19.3	19.2	16.8	20.2	25.6	21.8	20.5	17.8		
WOK 602	478739	170107	26.5	12.7	28.7	21.4	14.6	14.4	18.8	32.6	22.5	15.1	14.3	23.5	20.4	17.7		
WOK 803	480651	168544	26.2	14.4	34.4	19.9	16.2	16.0	18.4	20.2	22.1	20.2	20.8	25.8	21.2	18.4		
WOK 805	480547	168543	29.3	12.8	32.6	21.1	15.7	18.1	17.5	20.0	18.0	21.4	23.9	26.5	21.4	18.5		
WOK 817	483231	168817		14.3	25.6	16.0	15.0	15.1	15.8	17.2	18.2	18.5	17.9	23.3	17.9	15.5		
WOK 825	478541	178634	39.4		28.6		20.5	23.7	25.8	26.1	26.1	25.9	27.4	31.3	27.5	23.8		
WOK 827	479047	175831	24.9	17.3	23.4	15.6	14.6	14.9	12.8	14.6	15.3	17.9	21.7	23.6	18.0	15.6		
WOK 829	475806	175577	36.5	25.3	32.5			20.8	25.3	26.7	27.9	26.3	28.6	27.2	27.7	24.0		
WOK 835	478192	170672	33.0		30.1				16.8	23.7	23.8	25.8	27.8	30.9	26.5	20.3		
WOK 836	472346	168684	30.8	27.4	36.7	19.2	18.8	21.8	21.2	22.3	21.9	25.0	25.8	27.0	24.8	21.5		
WOK 838	480995	168726		81.9	50.0	40.4	30.9	31.6	36.3	42.7	42.2	34.3	36.5	46.1	43.0	37.2		

DT ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean: Raw Data	Annual Mean: Annualised and Bias Adjusted 0.87	Annual Mean: Distance Corrected to Nearest Exposure	Comment
WOK 841	473130	168783	40.5	28.9	31.8	27.4	21.5	23.3	24.3	25.0	29.6	25.2	27.4	33.1	28.2	24.4		
WOK 844	481492	168775	48.6	28.8	42.8	33.5	29.2	28.6	33.7	33.7	36.2	34.0	38.0	44.2	35.9	31.1		
WOK 846	477131	170019	26.1	14.7	26.9	21.4	14.7	13.6	15.4			16.3	15.0	22.9	18.7	16.2		
WOK 857	481031	168725	48.5	31.5	52.0	33.3	31.1	31.4	35.3	36.7	36.7	35.3	37.4	40.3	37.4	32.4		
WOK 861	476997	170107	26.1	18.0	28.0	17.8	15.9	17.5	19.1			18.4	20.6	24.6	20.6	17.8		
WOK 863	478768	176012	37.2		30.3	24.8	23.5	22.7	24.9	25.5	27.7	26.0	30.6	32.4	27.8	24.0		
WOK 864	478887	175945	40.9	28.9	38.5	25.2	26.2	29.9	28.3	26.3	30.9	32.4	36.6	30.5	-	-		Triplicate Site with WOK864, WOK 889 and WOK890 - Annual data provided for WOK890 only
WOK 866	481033	168300	28.9		26.8	19.1		19.2	17.2	18.3	19.4	21.1	21.6	26.3	21.8	18.9		
WOK 867	481104	168444	31.3	16.7	32.1	21.2	17.9	15.5	17.6	20.9	22.4	20.1	21.4	29.2	22.2	19.2		
WOK 869	478681	175998	29.7	20.8	28.3	20.0	20.5	21.2	21.4	23.2	23.8	26.9	28.2	39.7	25.3	21.9		
WOK 870	478813	175975	32.9	23.8	33.1	22.2	21.0	22.1	23.6	22.8	26.3	26.0	26.2	28.4	25.7	22.2		
WOK 871	478830	176025	37.6	22.5	29.1	19.5	20.3	18.3	21.2	20.7	25.5	23.3		28.7	-	-		Triplicate Site with WOK871 , WOK875 and WOK876 - Annual data provided for WOK876 only
WOK 872	480816	168793	37.2	28.3	37.4	26.2	25.5	25.5	28.3	27.6	31.5	31.1	32.7	35.3	30.5	26.4		
WOK 873	480863	168787	30.0	17.0	32.5	22.2		14.8	17.9	21.5	22.9	18.8	21.2	28.0	22.4	19.4		
WOK 874	481182	168603	37.3	23.1	33.4	25.9	20.4	18.3	21.9	24.3	25.0	22.2	26.8	32.7	25.9	22.4		
WOK 875	478830	176025	31.8	22.5	29.4	21.2	20.8	18.6	20.6	20.5	24.3	23.1		26.3	-	-		Triplicate Site with WOK871 , WOK875 and WOK876 - Annual data provided for WOK876 only
WOK 876	478830	176025	35.2	23.7		22.0				21.7	25.0	23.4			24.0	20.8		Triplicate Site with WOK871 , WOK875 and WOK876 - Annual data provided for WOK876 only

DT ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean: Raw Data	Annual Mean: Annualised and Bias Adjusted 0.87	Annual Mean: Distance Corrected to Nearest Exposure	Comment
WOK 877	478904	176060	26.6	19.3	24.6	17.1	14.1	14.9	13.6	15.9	17.5	20.0	22.7	25.8	19.3	16.7		
WOK 878	478719	176100	30.2	17.7	32.0	18.7	17.1	18.0	19.4		22.4	21.6	22.9	27.4	22.5	19.5		
WOK 882	472299	168677	39.2	21.9	28.5	24.3	25.1	26.8	28.1	30.8	31.8		30.8	28.8	28.7	24.9		
WOK 883	480483	167011	32.3	21.6	32.5		19.2	22.3	21.5	23.0	26.1	25.4	28.0	30.7	25.7	22.2		
WOK 850	478733	175985	45.2	3.0	45.3	35.2	34.9	36.5	38.3	36.2	39.2	36.8	44.2	40.1	-	-		Triplicate Site with WOK 850, WOK 887 and WOK 888 - Annual data provided for WOK 888 only
WOK 887	478733	175985	75.9	38.9	40.7	32.8	32.7	35.1	39.8	37.9	35.8	38.4	41.2	30.4	-	-		Triplicate Site with WOK 850, WOK 887 and WOK 888 - Annual data provided for WOK 888 only
WOK 888	478733	175985	42.7	39.2	40.7	31.9	33.3	37.1	38.4	38.7	40.4	38.5	42.5	25.6	37.9	32.8		Triplicate Site with WOK 850, WOK 887 and WOK 888 - Annual data provided for WOK 888 only
WOK 889	478887	175945	35.4	28.8	39.7	24.3	24.6	29.7	26.8	25.1	26.7		32.6	34.0	-	-		Triplicate Site with WOK864, WOK 889 and WOK890 - Annual data provided for WOK890 only
WOK 890	478887	175945	42.7	29.9	40.8	23.7	25.4	28.7	28.1	26.7	30.9		35.2	34.6	30.9	26.8		Triplicate Site with WOK864, WOK 889 and WOK890 - Annual data provided for WOK890 only
WOK 891	477498	170218	30.4	16.4	26.2	18.6	16.4	17.3	16.5	19.5	20.7	22.4	24.7	27.4	21.4	18.5		
WOK 892	480547	168543	34.7	15.2	31.9	25.4	20.2	21.7	23.5	24.6	29.9	26.2	28.0	30.4	26.0	22.5		

☒ **All erroneous data has been removed from the NO_2 diffusion tube dataset presented in Table B.1.**

☒ **Annualisation has been conducted where data capture is <75% and >25% in line with LAQM.TG22.**

☒ **Local bias adjustment factor used.**

☐ **National bias adjustment factor used.**

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

☒ **Wokingham Borough Council confirm that all 2022 diffusion tube data has been uploaded to the Diffusion Tube Data Entry System.**

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**.

See Appendix C for details on bias adjustment and annualisation.

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

New or Changed Sources Identified Within Wokingham Borough Council During 2022

Wokingham Borough Council has not identified any new sources relating to air quality within the reporting year of 2022.

Additional Air Quality Works Undertaken by Wokingham Borough Council During 2022

An additional study of PM_{10} and $PM_{2.5}$ was initiated by Wokingham and is being carried out by TRL in from August 2021-23 across both Wokingham and Twyford. This project was developed as in 2020 Wokingham Borough Council Motion passed to monitor the level of $PM_{2.5}$ across the borough. It was established that we have monitored for NO_2 across Wokingham over 20 years however we have not had an objective level for $PM_{2.5}$, until 2022, to try and achieve. Also as part of the Clean Air Strategy (2019), there is a commitment to move toward the lower limit of 10ug/m^3 as set out in World Health Organisation (WHO) guidelines by 2025."

Due to budget constraints and what we were trying to monitor; MCERTS Osiris*9* indicative instruments were chosen as best value for short term monitoring to ascertain whether where is a localised PM problem.

The monitors were situated at 4 locations across the Wokingham Borough which were Peach Street Wokingham, Winnersh, Lower Earley and Twyford. The 12 month monitoring commenced between August & October 2021 and finished in September 2022, as the data capture was not complete in some areas due to technical errors at several of the sites, further monitoring will continue into 2023. Table C.1 shows the results taken during the 2021 to 2022 which includes $PM_{2.5}$ and PM_{10}. A further analysis will be provided in the 2023. However are findings to date show that the highest $PM_{2.5}$ level recorded was 9.76 µg/m^3 in Winnersh, and this is below the new Environmental Targets (Fine Particulate Matter)

9 https://turnkey-instruments.com/product/osiris/

(England) Regulations 2022, where by the annual level of $PM_{2.5}$ must be below 10 µg/m^3 in the target year of 2040. The highest PM_{10} level recorded was 19.0 µg/m^3 also located at the Winnersh monitor and remains well below the AQO of 40 µg/m^3 per year. The findings so far conclude that both PM levels are within the objectives.

Table C.1 Statistics of period monitoring across Wokingham and Twyford for 12 months from 2021 to 2022.

Table C.1 – $PM_{2.5}$ & PM_{10} annual results from the Study in Wokingham

	Winnersh		Peach Street		Lower Earley		Twyford	
	PM_{10}	**$PM_{2.5}$**	**PM_{10}**	**$PM_{2.5}$**	**PM_{10}**	**$PM_{2.5}$**	**PM_{10}**	**$PM_{2.5}$**
Average	19.0	9.76	12.8	6.35	9.45	6.11	13.5	6.53
Exceedances of PM_{10} National AQ objective of 24hour (50µg/m3)	11		0		0		0	
Period Data Capture (%)	75.3	68.9	86.1	86.1	100	100	78.9	47.0

That the highest $PM_{2.5}$ level recorded was 9.76 µg/m^3 in Winnersh, and this is below the new Environmental Targets (Fine Particulate Matter) (England) Regulations 2022, where by the annual level of $PM_{2.5}$ must be below 10 µg/m^3 in the target year of 2040. The highest PM_{10} level recorded was 19.0 µg/m^3 also located at the Winnersh monitor and remains well below the AQO of 40 µg/m^3 per year. The findings so far conclude that both PM levels are within the objectives.

DEFRA Grant 2021

The grant awarded was £259,000 for the projects of creating an anti-idling campaign, measuring PM2.5 at the schools located near/within the AQMAs and looking at behaviour change of our residents with the aim of reducing exposure of children at school and raising awareness of parents /carers and children and the wider community.

PM2.5 Monitoring

AECOM, air quality consultants, were appointed to monitor $PM_{2.5}$ and PM_{10} and weather at or close to 14 selected schools that were within or close to the AQMAs. Monitoring at the schools, took place between February 2022 to February 2023 for a minimum of 3 months to include term time and holiday period. This provided a snap shot of the levels around schools using a low-cost air quality sensor unit (Vortex) providing real-time measurements at 5 minute intervals. As the data was not ratified nor calibrated against a reference equivalent monitor, the data only provides an indicative measurement. The monitors were paired with weather sensors located close by to continuously measure parameters including wind speed and direction, temperature and rainfall. The air quality monitoring equipment was attached to a lamp post or street light and the weather station positions close by but on another lamp post or street light.

The data have not been annualised to represent an annual mean and are therefore the results are indicative only. However, the period means were all below the relevant air quality objectives. All the schools were within the Environmental Targets (Fine Particulate Matter) (England) Regulations 2023 for $PM_{2.5}$ (i.e. the annual mean should not exceed 25 µg/m³ and the interim target of 12 µg/m³ to be met by end 2027 and long term target of 10 µg/m³ by 2040.)

Hourly, daily and weekly results were analysed for temporal distribution and also plotted to compare the difference between school term time and holiday. Lower concentrations seen in the daytime were due to warmer temperature allowing PM to disperse; the night time cooler temperatures reduce the atmospheric boundary layer and increase stability acting to trap PM closer to the ground. The concentrations did vary, weather clearly influenced concentrations such as rainfall acts to disperse and deplete pollution more readily. The winter higher concentrations from the continent were seen as opposed to the cleaner maritime air from the Atlantic. Patterns in road traffic flow effects but not as significant as weather conditions though. The morning rush hour increase in concentration was evident, as were higher concentrations recorded around 9am and then again around 4pm coinciding with the end of the school day. Concentrations seen to be higher in the middle of the week and then at the end of the week and weekends, these are due to changes in road traffic and commercial/industrial activity in the post-covid hybrid working pattern. Overall lower concentrations were noted in holiday periods.

The schools have all been sent their site-specific Particulate Monitoring Report and Action Plan. This detailed the details of the monitoring, the results and details analysis, a number of actions to further investigate the sources of pollution and to target air quality

improvements for children at the school and the surrounding area. It is recommended that an audit of sources around the school is considered before considering the most appropriate actions are taken forward. The audit could include looking at the age of boilers and where flues are positioned; considering the location of the playground to busy roads and does any screening exist; school travel plans and how accessibility for cycling/scooting to school; review of vehicle engine idling or traffic queuing outside the school. In addition a number of mitigation measures were identified, divided into generic which could be applicable across the district/borough and more specific to the school. For each measure an approximate timescale and cost was given based on the following criteria: potential air quality benefits; cost; deliverability; and wider benefits (e.g. improved safety, child health and promotion of sustainable transport). See Appendix A for an example of a generic and specific mitigation measure table.

While the study did not identify any significant health risks associated with exposure to PM2.5 recommendations have been made to reduce the levels of PM2.5 in the air wherever possible.

Biggest Loser

During 2022 the Biggest Loser section of the DEFRA Grant award was started and this involved using diffusion tubes to measure the NO_2 outside 14 Schools within Wokingham Borough Council which are located closest to the 3 AQMA's. The 2022 results will be compared against the 2023 results to see if the Behaviour change experiment of education children & carers and erecting signs asking for the guardians who drop off the children actually makes a difference outside a school.

QA/QC of Diffusion Tube Monitoring

Wokingham Borough Council uses GRADKO as the supplier used for diffusion tubes within 2022 and the method of preparation, e.g. 20% TEA in water. The monitoring that has been completed is in adherence with the 2022 Diffusion Tube Monitoring Calendar.

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.

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 please see Table C.2. Nitrogen Dioxide AIR PT 2019.

Diffusion Tube Annualisation

Both Sites WOK70 and WOK835 required annualisation as the data capture was less than 75% but greater than 25%. Both sites only captured 66.6 %. Details of the calculation method undertaken provided in Table C.1. WOK70 was missing the data due from the tubes being absent on change over day in February, May, June and July. WOK835 was also missing the data due from the tubes being absent in February, April, May and June. If both of these sites had continued to have data missing then they would have been relocated to

a new nearby receptor or lamppost. Three sites have been used for annualisation as the fourth nearest site Reading (URN REA1 2022) had insufficient (<85%) data capture and could not be used.

Table C.1 – Annualisation Summary (concentrations presented in µg/m^3)

Site ID	Annualisation Factor Oxford URN Site OX8 2022	Annualisation Factor Swindon URN Site SWHO 2022	Annualisation Factor Chilbolton Observatory URN CHBO 2022	Average Annualisation Factor	Raw Data Annual Mean	Annualised Annual Mean
WOK70	0.8802	0.8446	0.8704	0.8651	23.2	20.1
WOK835	0.8808	0.8712	0.9002	0.8841	26.5	23.4

Diffusion Tube Bias Adjustment Factors

The diffusion tube data presented within the 2022 ASR have been corrected for bias using an adjustment factor. Bias represents the overall tendency of the diffusion tubes to under or over-read relative to the reference chemiluminescence analyser. LAQM.TG22 provides guidance with regard to the application of a bias adjustment factor to correct diffusion tube monitoring. Triplicate co-location studies can be used to determine a local bias factor based on the comparison of diffusion tube results with data taken from NO_x/NO_2 continuous analysers. Alternatively, the national database of diffusion tube co-location surveys provides bias factors for the relevant laboratory and preparation method.

Wokingham Borough Council have applied a local bias adjustment factor of **0.87** to the 2022 monitoring data. A summary of bias adjustment factors used by Wokingham Borough Council over the past five years is presented in Table C.2. The sites which were used were Peach Street in Wokingham Town Centre (AQMA) and Twyford Cross Roads (AQMA). 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 local co-located sites combined are used as bias adjustment factor 0.83 was applied. A copy of the co-location spreadsheet used is provided below.

In determining the bias adjustment factor for the 2022 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 weekly or fortnightly – the Wokingham sites are town centre & Twyford Village Cross Roads, and the co-location study is monthly.
- For co-location sites with “good” precision for the diffusion tubes and with high quality chemiluminescence results – It can be seen from Figure C.4 below that both the Wokingham Town Centre & Twyford Village Cross Roads co-location study achieved “good” precision, and “good Data Capture” both at 95% & 96%. The chemiluminescence monitors 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 & Twyford Village Cross Roads co-location study and diffusion tube surveys are for a full calendar year (2020).
- 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. Due to Data capture from the Wokingham Town centre automatic monitor was 95% in 2020 (Figure C.3) & the data capture from the Twyford Cross Roads automatic monitor was 96% in 2021 (Figure C.3).
- 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 both the Wokingham Town Centre & Twyford Village Cross Roads 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 due to the high data capture rate from the both the automatic analyser in Twyford (96%) and Wokingham (95%) that the combined back Local Bias Adjustment Factor was of 0.87 was used.

Table C.2 – Bias Adjustment Factor

Monitoring Year	Local or National	If National, Version of National Spreadsheet	Adjustment Factor
2022	Local		0.87
2021	Local	-	0.83
2020	National	-	0.81
2019	National	09/20	0.88
2018	Local	-	0.95

Table C.3 – Local Bias Adjustment Calculation

	Local Bias Adjustment Wokingham	Local Bias Adjustment Twyford
Periods used to calculate bias	11	11
Bias Factor A	0.85 (0.79 - 0.93)	0.89 (0.83 - 0.96)
Bias Factor B	18% (8% - 27%)	13% (5% - 21%)
Diffusion Tube Mean (µg/m^3)	32.7	26.2
Mean CV (Precision)	2.8%	3.1%
Automatic Mean (µg/m^3)	27.8	23.2
Data Capture	95%	96%
Adjusted Tube Mean (µg/m^3)	28 (26 - 30)	23 (22 - 25)

Notes:

A combined local bias adjustment factor of **0.87** has been used to bias adjust the 2022 diffusion tube results.

NO_2 Fall-off with Distance from the Road

Wherever possible, monitoring locations are representative of exposure. However, where this is not possible, the NO_2 concentration at the nearest location relevant for exposure has been estimated using the Diffusion Tube Data Processing Tool/NO_2 fall-off with distance calculator available on the LAQM Support website. Where appropriate, non-automatic annual mean NO_2 concentrations corrected for distance are presented in Table B.1. No diffusion tube NO_2 monitoring locations within Wokingham Borough Council required distance correction during 2022.

QA/QC of Automatic Monitoring

TRL carry out the QA/QC on behalf of Wokingham Borough Council, below is their QA/QC procedure.

Site operation

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

Data retrieval and daily data checking

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

significant errors recorded in the Data Management System logbook. All site data recorded through the Data Management System is archived on TRL's Network. The data is backed up daily, and the TRL IT Department maintains these data within their long-term and secure archives. This secures all data in the event of any system failure.

Data calibration and ratification

Data is ratified as per AURN recommended procedures. The calibration and ratification process for automatic gas analysers corrects the raw dataset for any drift in the zero baseline and the upper range of the instrument. This is done using Evista software-based calibration and ratification process 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, the data set is converted to hourly means and a summary of the data is 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 monitoring equipment is operating correctly. The audits that are carried out utilise procedures that are applied within DEFRA's National Automatic Air Monitoring Networks Quality Control Programme. The efficiency of the analyser's convertor is checked, and the analyser is also flow and 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.

Wokingham Town Centre

The site audit for the Wokingham Town Centre automatic monitoring unit was carried out on the 20th of December 2022 however, as the analyser exhibited a very unstable response to the site zero system, therefore repeated the audit took place for both monitors on 26th January 2023. The repeat visit using an audit zero cylinder gave a good steady state response in stark contrast to the site zero system. The equipment audits utilise procedures that are applied within the National Automatic Air Monitoring Network Quality Control Programme.

A major factor governing the analyser's performance is the NOx analyser's converter and its ability to reduce the nitrogen dioxide to nitric oxide. The recommended range for instrumentation in the national automatic air monitoring network is in the range of 98% - 102% efficient. Our tests show the converter in the Wokingham analyser to be 98.4% efficient at an NO_2 concentration of 249ppb and 99.1% efficient at an NO_2 concentration of 118ppb. These are good results.

To ensure that the analyser was sampling only ambient air the instrument was leak checked. The result was satisfactory, indicating that the analyser sampling systems was free of significant leaks. The analyser exhibited good steady state responses to both zero and span (calibration) gases with acceptable levels of variation (noise).

The analyser flow rate was measured using a calibrated flow meter and compared against the analyser's flow rate sensor to evaluate its accuracy. The analyser's flow rate sensor was within ±10% of the calibrated flow meter and therefore passed this test.

Based on the NOx analyser's response to the audit standard and audit zero, the concentrations of the stations NO cylinder have been reassessed. This provides an indication of the on-site standards stability (the gas concentration stabilities). 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 supplier's stated concentrations. The site cylinder was tested at all four TRL air quality monitoring stations and at each station the cylinder recalculation results were all within 3%. The results of the recalculations are presented in Table C.3

Table C.3 Wokingham Town Centres Recalculated Concentrations

TRL Wokingham – NO cylinder 21901300298589				
	NOx (ppb)	**% change from stated**	**NO (ppb)**	**% change from stated**
Manufacturers Stated Concentration	**445**	**---**	**444**	**---**
Recalculated concentration (26/01/23)	457	2.8	448	1.0

The recalculated results for the site NO cylinder 21901300298589 indicates the concentrations are stable, within the definition adopted above, and can therefore reliably be used to scale ambient data.

Twyford Village Cross Roads

The site audit for the Twyford Town Centre automatic monitoring unit was carried out on 26th January 2023. A major factor governing the analyser's performance is the NOx analyser's converter and its ability to reduce the nitrogen dioxide to nitric oxide. The recommended range for instrumentation in the national automatic air monitoring network is in the range of 98% - 102% efficient. Our tests show the converter in the Twyford analyser to be 99.5% efficient at an NO_2 concentration of 271 ppb. Our tests show the converter in the Twyford analyser to be 99.5% efficient at an NO_2 concentration of 138 ppb. These are good result.

To ensure that the analyser was sampling only ambient air the instrument was leak checked. The results were satisfactory, indicating that the analyser sampling systems were free of significant leaks. The analyser exhibited good steady state responses to both zero and span (calibration) gases with acceptable levels of variation (noise).

As mentioned in the introduction, the site zero system produced a very unstable response, therefore the audit zero cylinder was used to determine the zero response of the analyser. In order to provide reliable zero calibration results, we recommend the zero scrubber materials are changed at the next available opportunity.

The analyser flow rate was measured using a calibrated flow meter and compared against the analyser’s flow rate sensor to evaluate its accuracy. The analyser’s flow rate sensor was within ±10% of the calibrated flow meter and therefore passed this test.

Based on the NOx analyser's response to the audit standard and audit zero, the concentrations of the stations NO cylinder have been reassessed. This provides an indication of the on-site standards stability (the gas concentration stabilities). 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 suppliers stated concentrations. The site cylinder was tested at all four TRL air quality monitoring stations and at each station the cylinder recalculation results were all within 3%. The results of the recalculations are presented in Table C.4.

Table C.4 Twyford Village Cross Roads Recalculated Concentrations

TRL Twyford – NO cylinder 21901300298589				
	NOx (ppb)	**% change from stated**	**NO (ppb)**	**% change from stated**
Manufacturers Stated Concentration	**445**	**---**	**444**	**---**
Recalculated concentration (26/01/23)	457	2.8	448	1.0

The recalculated results for the site NO cylinder 21901300298589 indicates the concentrations are stable, within the definition adopted above, and can therefore reliably be used to scale ambient data.

Certificate of Calibration

Calibration factors and zeros have been produced on the basis of the audit calibrations conducted. All of these calibrations were conducted with transfer standards traceable to national metrology standards. The Certificate of Calibration provides the calibration and zero response factors for the oxides of nitrogen analysers under test on the day of the audits. It is available upon request from TRL.

Data Management

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

- Compare the TRL database scaling factors for the day of the audit with the factors and zeros on the Certificate of Calibration. If a deviation greater than the uncertainty

associated with the calibration factor on the certificate is found, investigate the underlying reason and implement suitable data management actions.

Automatic Monitoring Annualisation

All automatic monitoring locations within Wokingham Borough Council recorded data capture of greater than 75% therefore it was not required to annualise any monitoring data.

NO_2 Fall-off with Distance from the Road

Wherever possible, monitoring locations are representative of exposure. However, where this is not possible, the NO_2 concentration at the nearest location relevant for exposure has been estimated using the NO_2 fall-off with distance calculator available on the LAQM Support website. Where appropriate, non-automatic annual mean NO_2 concentrations corrected for distance are presented in Table B.1.)

No automatic NO_2 monitoring locations within Wokingham Borough Council required distance correction during 2022.

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

Figure D.1 – Map of Wokingham Town Centre AQMA

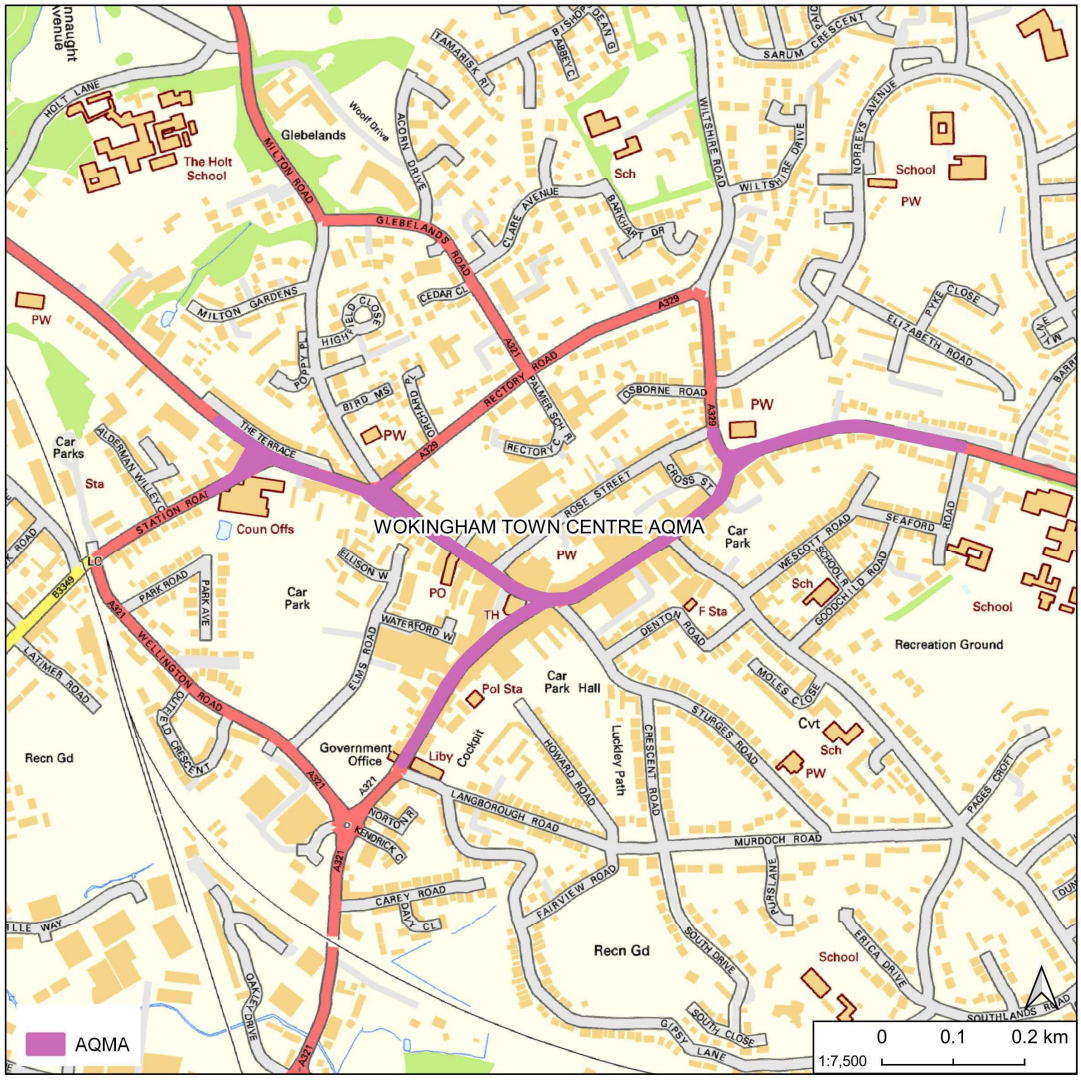


Figure D.2 – Map of Tywford Crossroads AQMA

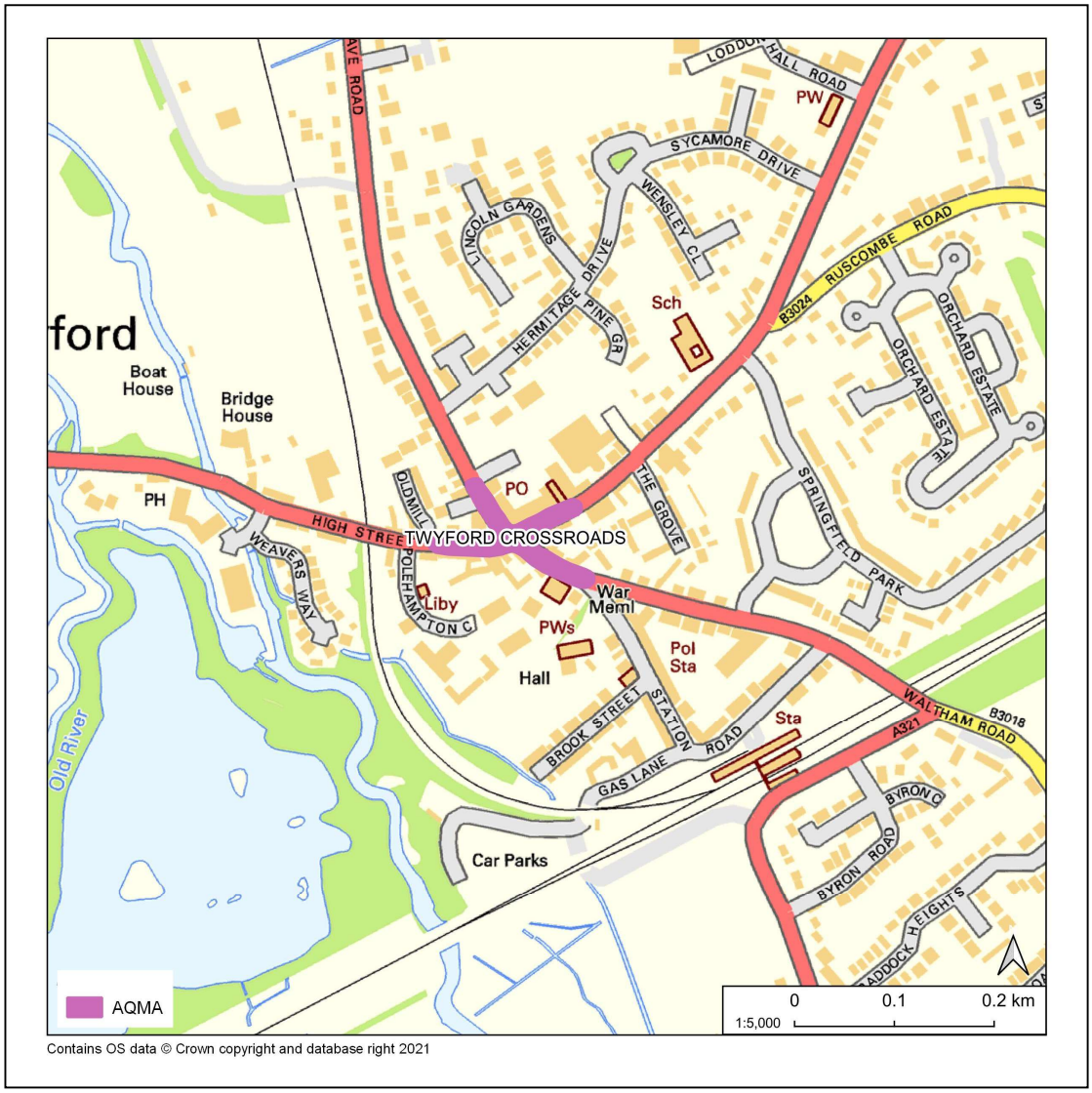


Figure D.3– Map of M4 AQMA

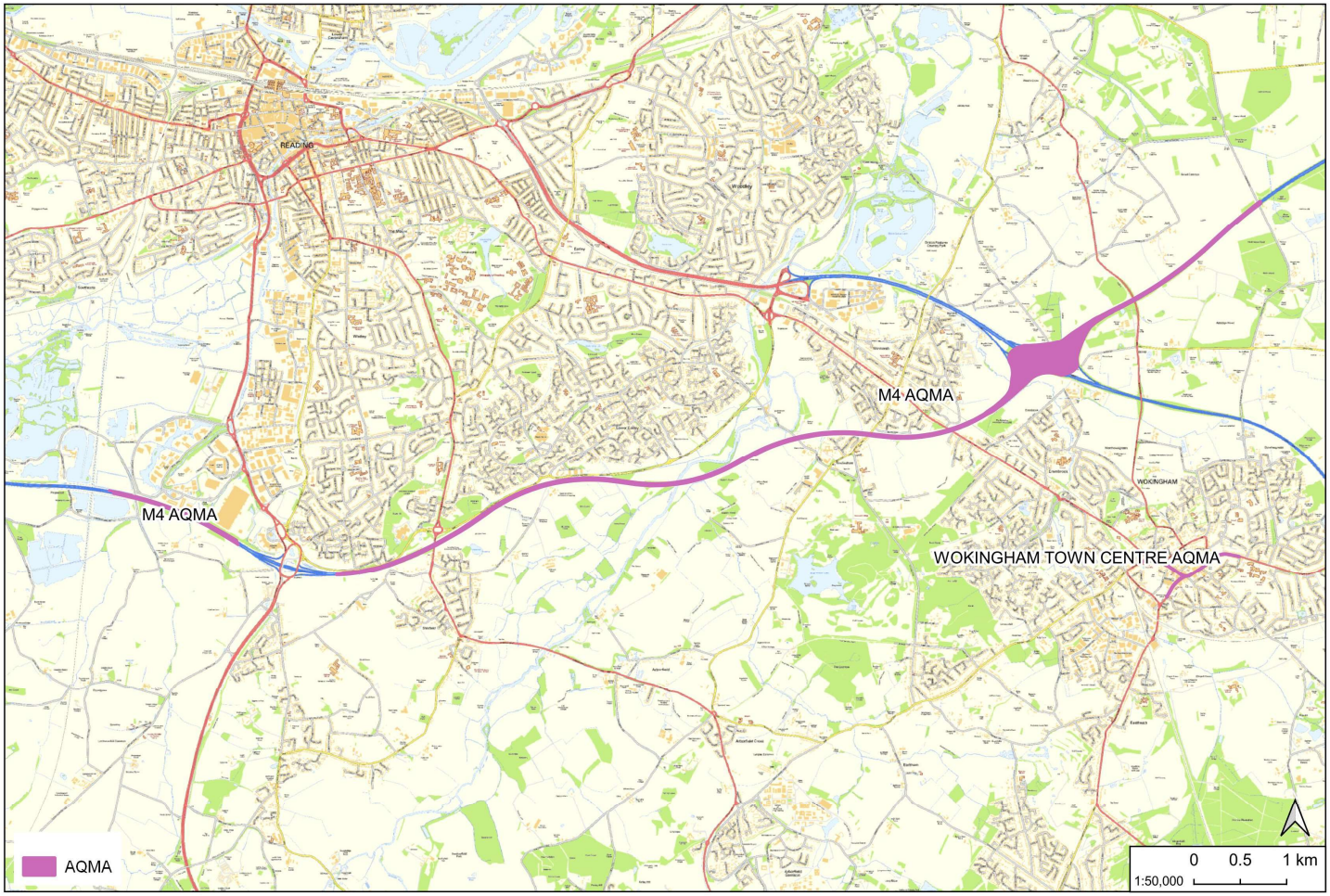
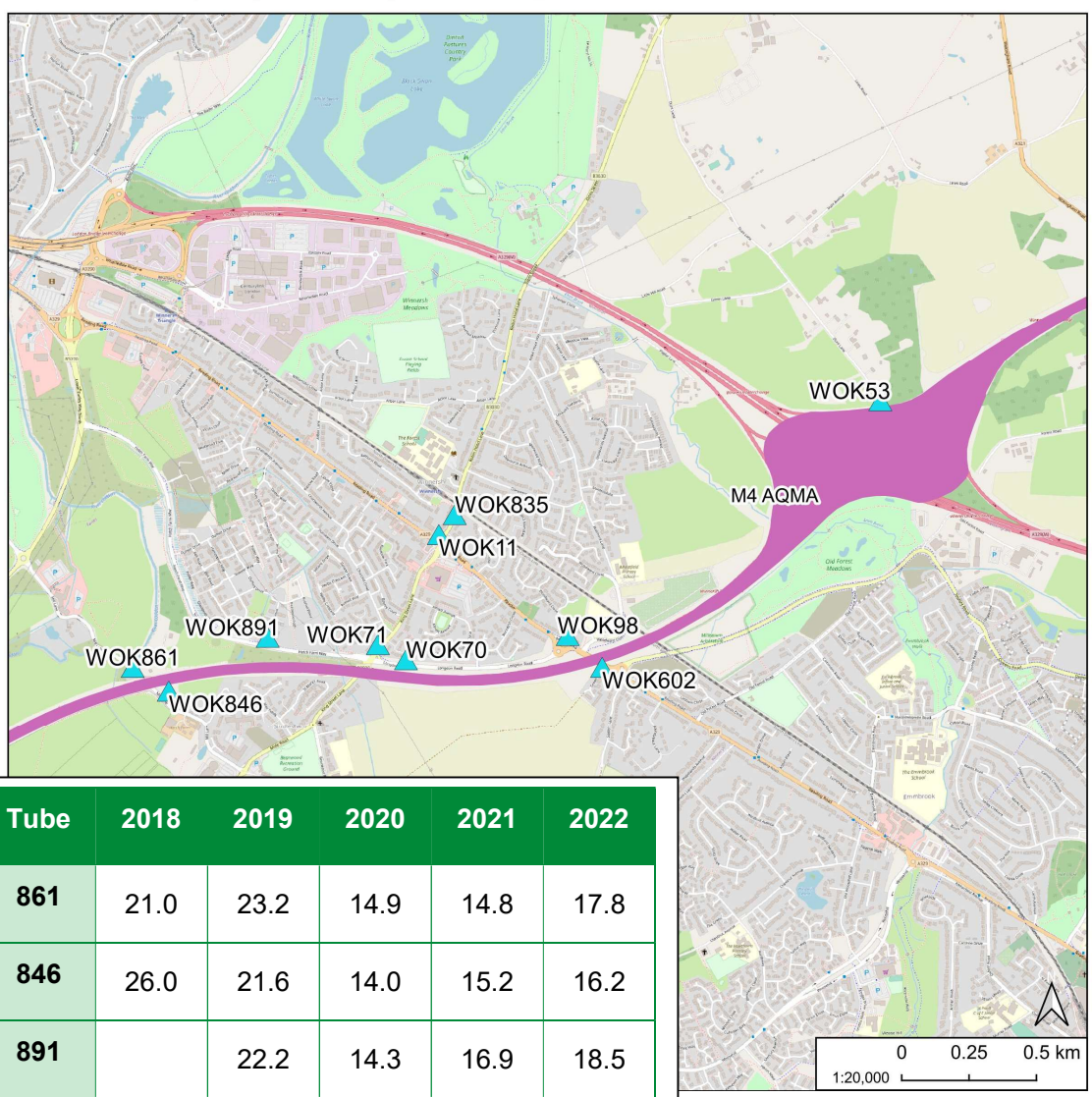
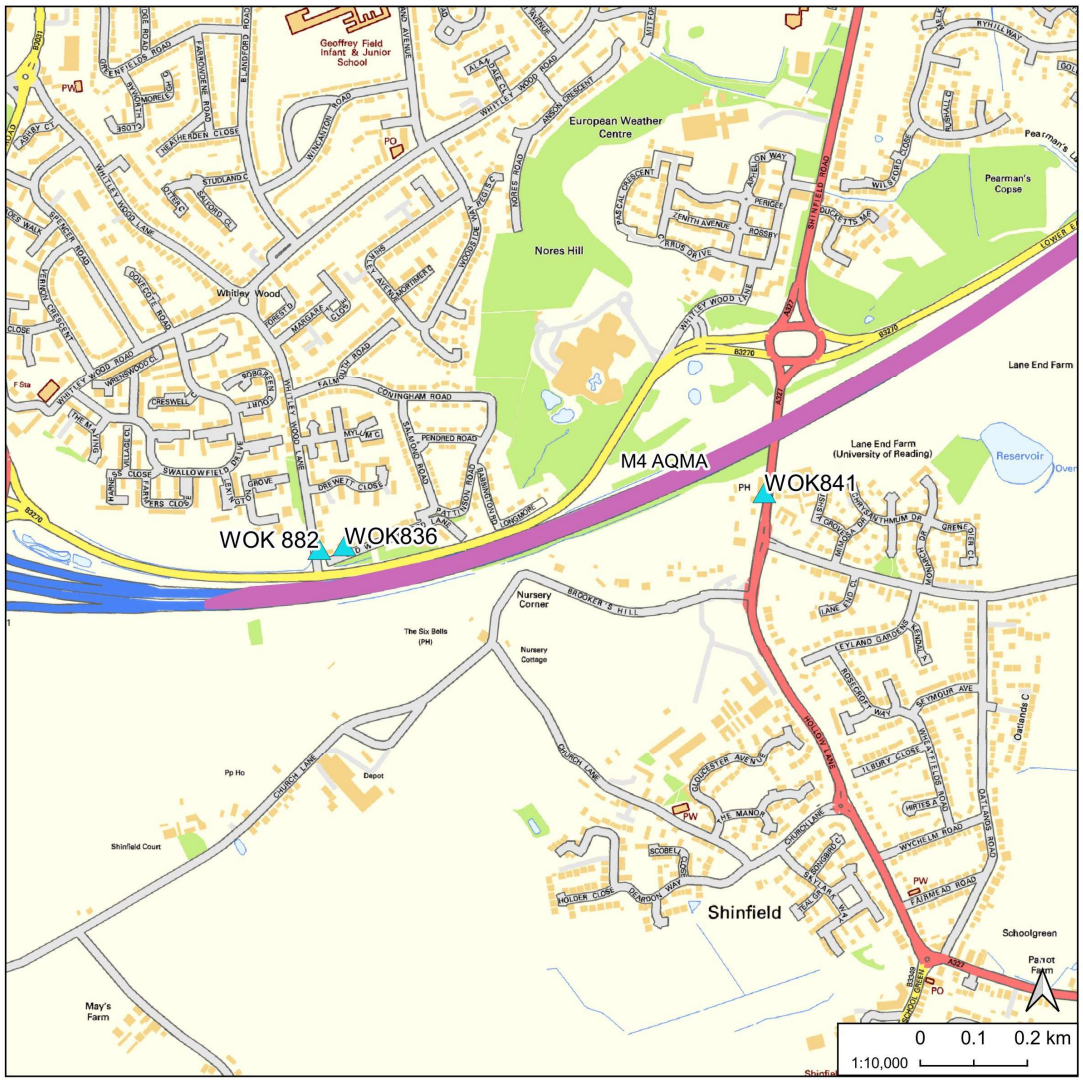


Figure D.4 – Map of M4 (East) Air Quality Monitoring Sites



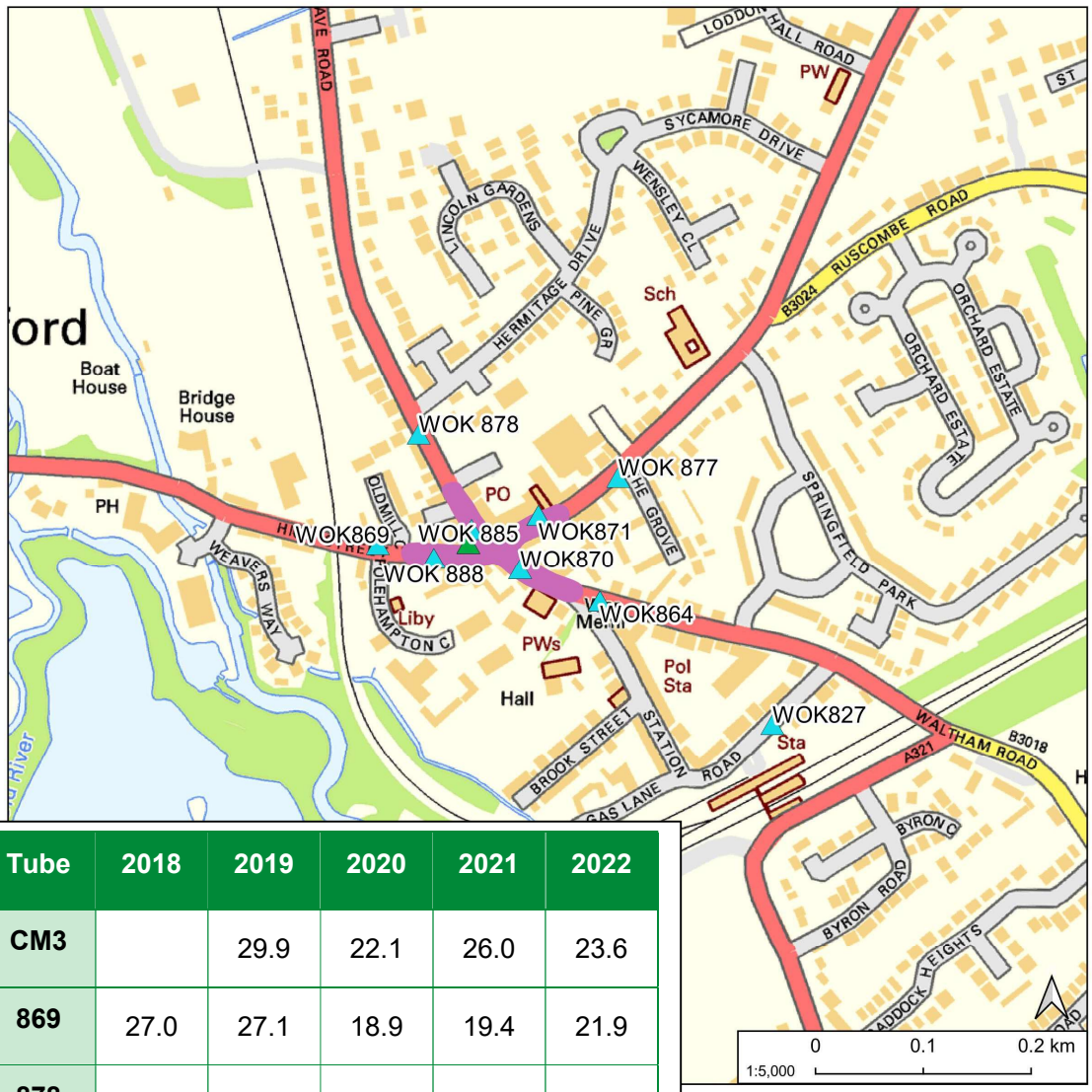
Tube	2018	2019	2020	2021	2022
861	21.0	23.2	14.9	14.8	17.8
846	26.0	21.6	14.0	15.2	16.2
891		22.2	14.3	16.9	18.5
71	25.0	31.9	21.2	21.4	22.6
70	25.0	25.5	16.8	16.1	17.4
11	28.0	32.0	20.9	20.3	23.9
835	26.0	26.6	19.3	21.2	20.3
98	31.0	25.4	16.5	15.3	16.1
602	25.0	21.2	13.4	15.6	17.7
53	23.0	21.1	15.4	14.7	16.0

Figure D.5 – Map M4 (West) Air Quality Monitoring Sites



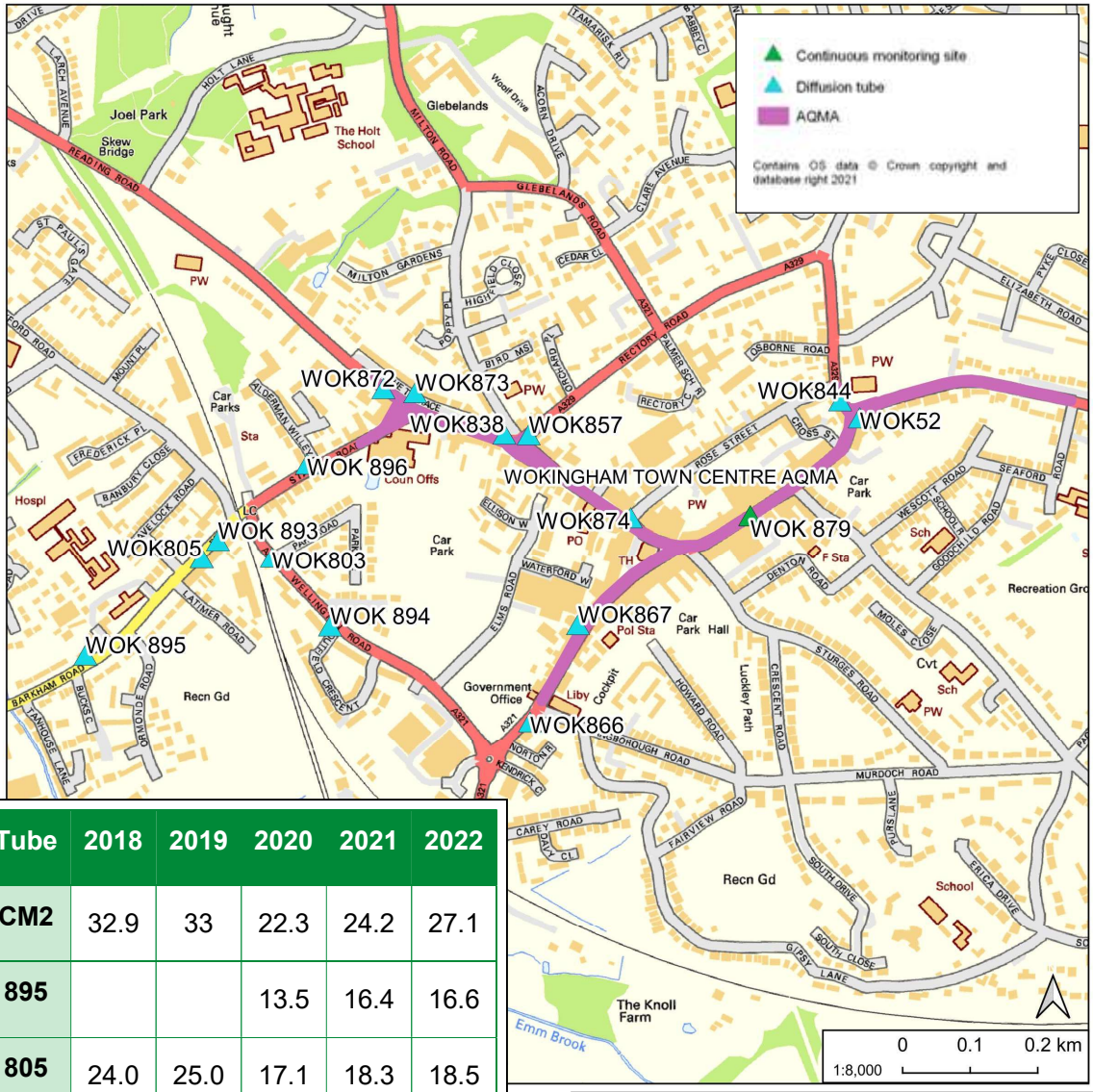
Tube	2018	2019	2020	2021	2022
882	29.0	32.6	20.7	23.8	24.9
836	24.0	27.0	19.3	18.7	21.5
841	27.0	33.3	20.7	23.0	24.4

Figure D.6 – Map of Twyford Crossroads AQMA Air Quality Monitoring sites



Tube	2018	2019	2020	2021	2022
CM3		29.9	22.1	26.0	23.6
869	27.0	27.1	18.9	19.4	21.9
878	23.0	27.5	17.4	18.3	19.5
888	44.0	42.8	31.3	32.5	32.8
885	30.5	21.9	22.6	23.1	30.5
870	29.0	29.0	20.2	22.0	22.2
871	31.0	27.3	13.0	21.5	20.8
864	35.6	37.0	24.4	26.9	26.8
877	22.0	22.9	14.9	16.6	16.7
827	20.0	20.6	14.6	15.2	15.6

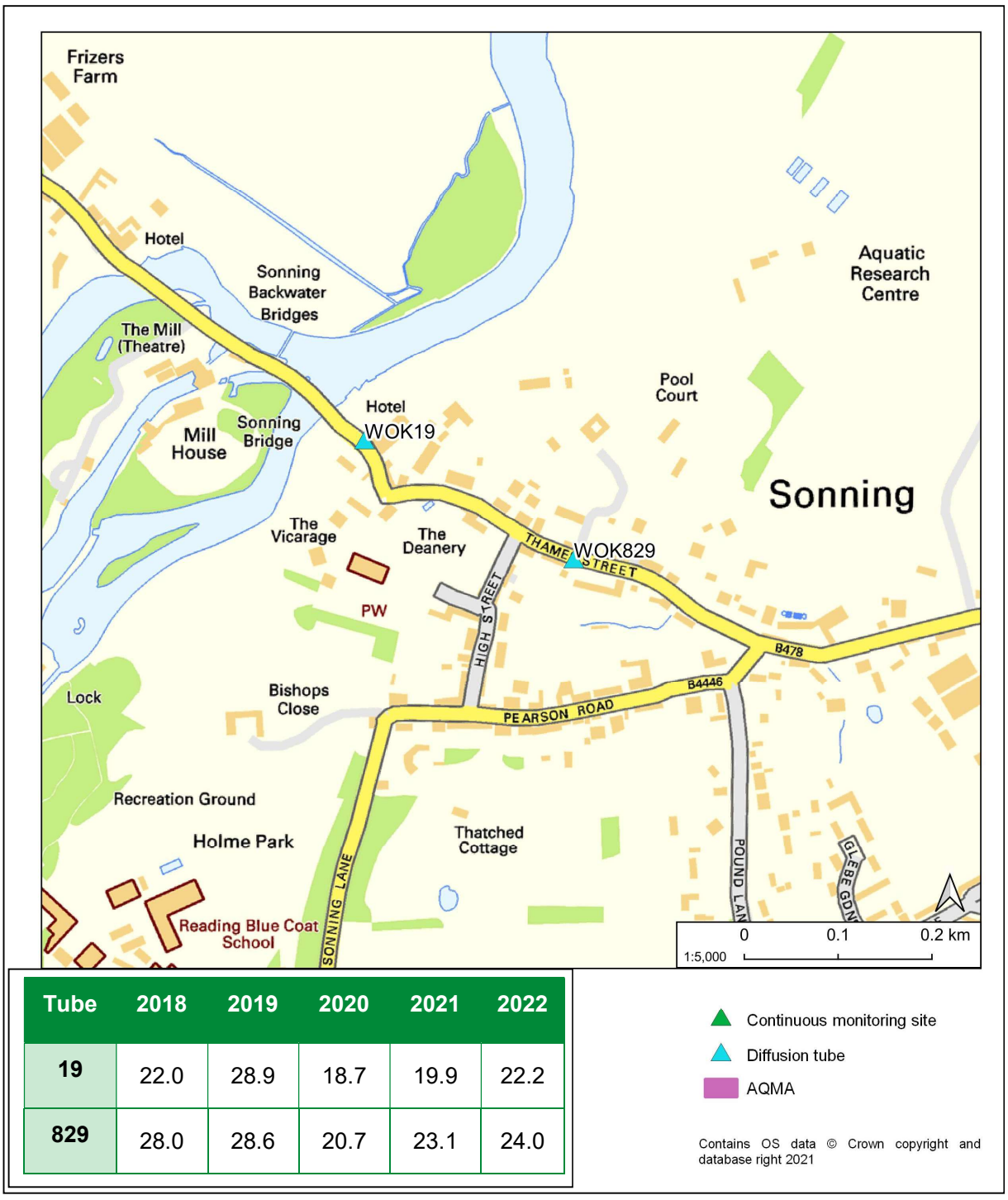
Figure D.7 – Map of Wokingham Town Centre AQMA Monitoring Locations



Tube	2018	2019	2020	2021	2022
CM2	32.9	33	22.3	24.2	27.1
895			13.5	16.4	16.6
805	24.0	25.0	17.1	18.3	18.5
893			18.5	20.4	20.4
803	27.0	30.7	19.5	22.0	18.4
896				14.9	16.6
872	33.0	32.4	23.0	25.5	26.4
894			13.3	14.4	14.9
874	25.0	28.9	20.0	21.7	22.4
52	26.0	30.3	21.4	22.8	23.2

Tube	2018	2019	2020	2021	2022
838	**41.0**	**41.8**	28.6	36.5	37.2
857	39.3	39.9	29.0	31.9	32.4
867	23.6	23.7	13.4	18.1	19.2
866	24.0	25.3	15.9	17.7	18.9
879	33.0	22.2	24.0	27.6	28.0
844	36.0	38.6	25.9	31.2	31.1

Figure D.8 – Map of Sonning Air Quality Monitoring Locations



Tube	2018	2019	2020	2021	2022
19	22.0	28.9	18.7	19.9	22.2
829	28.0	28.6	20.7	23.1	24.0

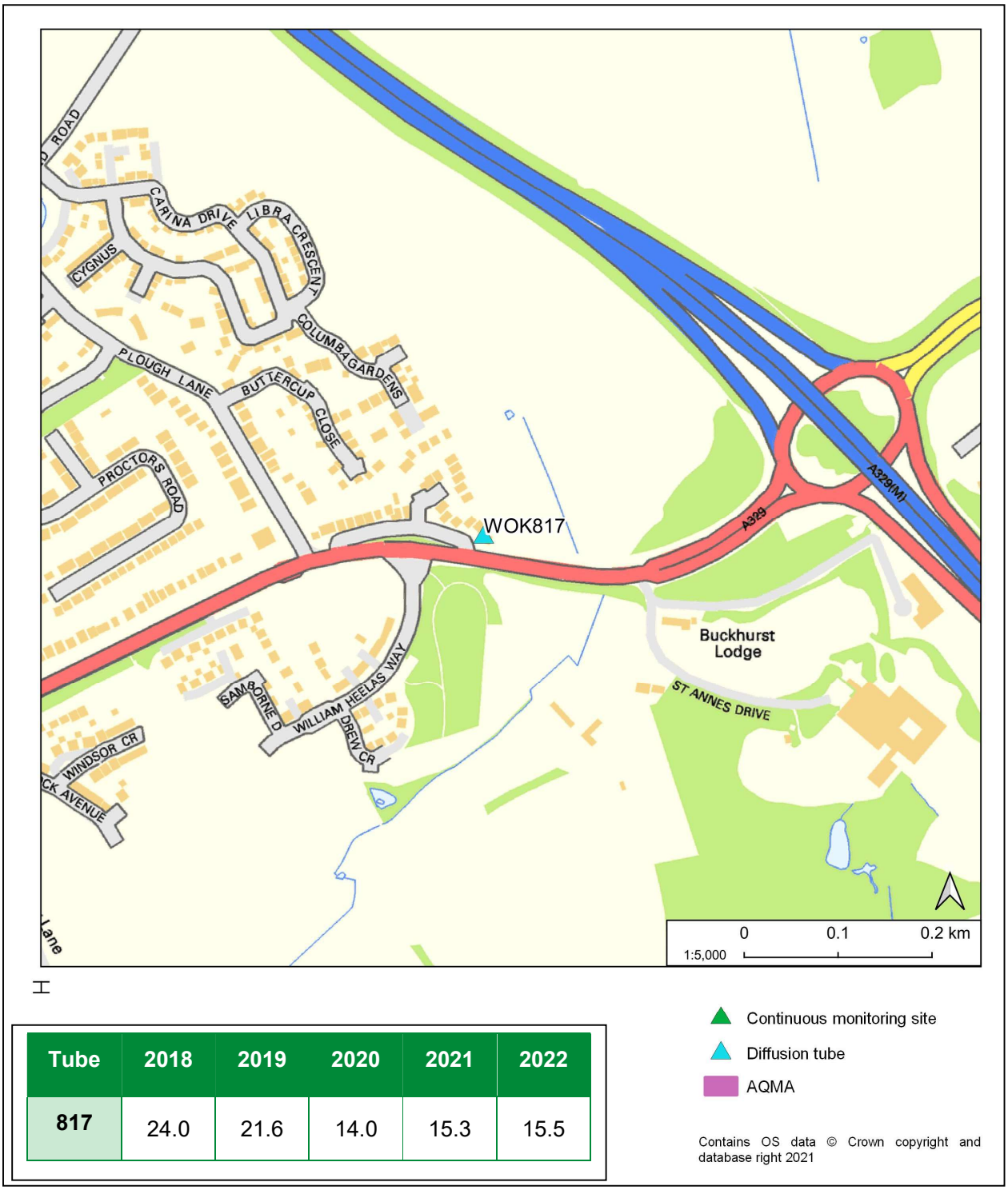
Figure D.9 – Map of (WOK 883) Evendons Primary School

Tube	2018	2019	2020	2021	2022
883	27.0	29.1	19.6	22.4	22.2

Figure D.10 – Map of (WOK 825) 54 High St Wargrave

Tube	2018	2019	2020	2021	2022
825	30.0	31.1	21.3	23.2	23.8

Figure D.11 – Map of (WOK 817) 298 London Road



Tube	2018	2019	2020	2021	2022
817	24.0	21.6	14.0	15.3	15.5

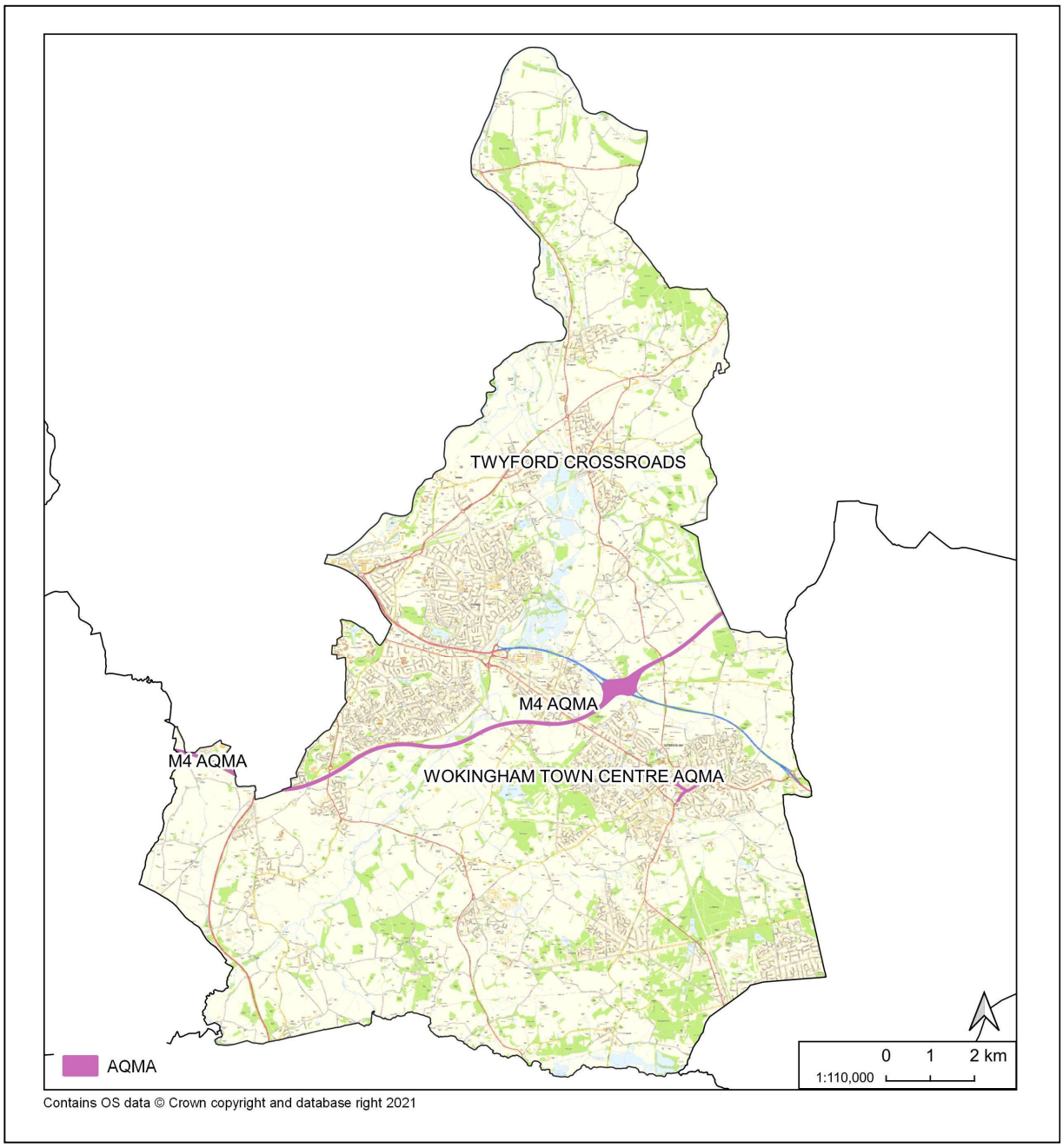
Figure D.12 – Map of (WOK509) Henley Bridge

Tube	2018	2019	2020	2021	2022
509	21.0	23.9	16.4	16.7	17.8

Figure D.13 – Map of (WOK505) Church Road

Tube	2018	2019	2020	2021	2022
505	29.0	36.5	31.0	29.2	28.9

Figure D.14 – Map of Wokingham Borough Council



Appendix E: Summary of Air Quality Objectives in England

Table E.1 – Air Quality Objectives in England[10]

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

[10] 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	Annual Status Report
Defra	Department for Environment, Food and Rural Affairs
Diffusion Tube	Plastic tube which measure NO_2
DMRB	Design Manual for Roads and Bridges – Air quality screening tool produced by National Highways
EU	European Union
FDMS	Filter Dynamics Measurement System
LAQM	Local Air Quality Management
NO_2	Nitrogen Dioxide
NO_x	Nitrogen Oxides
PM_{10}	Airborne particulate matter with an aerodynamic diameter of 10µm or less
$PM_{2.5}$	Airborne particulate matter with an aerodynamic diameter of 2.5µm or less
QA/QC	Quality Assurance and Quality Control
SO_2	Sulphur Dioxide

References

- Local Air Quality Management Technical Guidance LAQM.TG22. August 2022. Published by Defra in partnership with the Scottish Government, Welsh Assembly Government and Department of the Environment Northern Ireland.
- Local Air Quality Management Policy Guidance LAQM.PG22. August 2022. Published by Defra in partnership with the Scottish Government, Welsh Assembly Government and Department of the Environment Northern Ireland.