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# 2021 Air Quality Annual Status Report (ASR)

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

Date: June, 2021

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## Executive Summary: Air Quality in Our Area

### Air Quality in Royal Borough of Windsor and Maidenhead

Air pollution is associated with a number of adverse health impacts. It is recognised as a contributing factor in the onset of heart disease and cancer. Additionally, air pollution particularly affects the most vulnerable in society: children, 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<sup>1,2</sup>.

The mortality burden of air pollution within the UK is equivalent to 28,000 to 36,000 deaths at typical ages<sup>3</sup>, with a total estimated healthcare cost to the NHS and social care of £157 million in 2017<sup>4</sup>.

The Council has declared five Air Quality Management Areas (AQMAs), for exceedance of the annual mean air quality objective (AQO) for nitrogen dioxide (NO<sub>2</sub>): in Windsor (2 areas), Maidenhead, Bray (near the M4) and Wraysbury (near the M25). Details of AQMAs can be viewed at: [https://uk-air.defra.gov.uk/aqma/local-authorities?la\\_id=315](https://uk-air.defra.gov.uk/aqma/local-authorities?la_id=315)

Air quality across the Borough is generally good and in recent years has markedly improved. Monitoring results in 2019 suggests that there are some localised, roadside exceedances of the annual mean objective of 40 µg/m<sup>3</sup> for nitrogen dioxide. However, when distance corrected to nearest relevant exposure (i.e. building façade of a residential property) all results are below the objective level. The monitoring results in 2020 show full compliance with the AQO in all areas with concentrations well below 36 µg/m<sup>3</sup>. The main contributing factor for the significant falls in NO<sub>2</sub> was the reduced road traffic due to lockdown restrictions.

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<sup>1</sup> Public Health England. Air Quality: A Briefing for Directors of Public Health, 2017

<sup>2</sup> Defra. Air quality and social deprivation in the UK: an environmental inequalities analysis, 2006

<sup>3</sup> Defra. Air quality appraisal: damage cost guidance, July 2020

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

The Imperial Road/ St Leonards Road Junction AQMA has recorded concentration below 10% of the objective (<36 µg/m<sup>3</sup>) for four consecutive years.

The Council has a programme of measures in place to reduce the impact of emissions on local air quality. These form an integral part of the Local Transport Plan (LTP) which informs the Highways Capital Programme with the Council's efforts to improve air quality. The LTP also implements a suite of 'soft' measures and smarter choices: influencing better travel choices, such as encouraging public transport use, walking and cycling that can all contribute to reduced road traffic emissions.

Active travel has become a more integral part of sustainable travel and improving the public health, not only through the reduction of vehicle trips and air pollution but in encouraging daily exercise. Developing walking and cycling strategies and appropriate infrastructure provision are therefore key to increasing active travel within the Borough.

## **Actions to Improve Air Quality**

The 2019 Clean Air Strategy<sup>5</sup> sets out the case for action, with goals even more ambitious than EU requirements to reduce exposure to harmful pollutants. The Road to Zero<sup>6</sup> sets out the approach to reduce exhaust emissions from road transport through a number of mechanisms; this is extremely important given that the majority of Air Quality Management Areas (AQMA) are designated due to elevated concentrations heavily influenced by transport emissions.

Whilst air quality has improved significantly in recent decades, and will continue to improve due to national policy decisions, there are some areas where local action is needed to improve air quality further.

### Maidenhead

The [Maidenhead Town Centre Area Action Plan](#) (AAP), a plan to rejuvenate Maidenhead town centre and the surrounding area includes schemes to reduce congestion and improve air quality.

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<sup>5</sup> Defra. Clean Air Strategy, 2019

<sup>6</sup> DfT. The Road to Zero: Next steps towards cleaner road transport and delivering our Industrial Strategy, July 2018

Maidenhead Station Access scheme, construction of a multi-modal transport interchange for Maidenhead station including facilities for buses, taxis, a new cycle parking hub. The access scheme is required to cater for the predicted increase in passengers and vehicles accessing the station as a result of electrification of the Great Western Main Line, the Elizabeth Line (formerly known as Crossrail) and the Western Rail Link to Heathrow. Improvements to the crossing between the station and town centre and associated changes to the layout of the A308 / Queen Street junction, as well as a new traffic signal scheme have been completed. A two-way traffic operation scheme on Broadway has been completed, this is allowing vehicles to turn left or right out of the Broadway (Nicholsons) car park and left or right onto Frascati Way. Drivers are now able to access the M4, A308 and A4 from the car park without having to travel through the town centre. Parking displaced from the rail station forecourt will be provided in the existing Stafferton Way multi-storey car park.

Stafferton Way Link Road has been completed for some time, connecting the A4 and A308. The link helps to reduce congestion in front of the rail station and at critical junctions along the A4.

### Bray

A scheme for the widening of the A308 between Holyport Road roundabout and Upper Bray Road has been completed for some time. This has improved traffic flow at the junction and reduced congestion at peak times.

The M4 Smart Motorway scheme includes the upgrade of the noise barriers. Increasing the height of the barriers should reduce the dispersion of pollutants from the M4 towards sensitive receptors.

### Windsor

Changes to the operation of the traffic signals at the Imperial Road/St Leonards Road and Clewer Hill Road / Winkfield Road junctions were completed in July 2016. The changes have reduced journey times and improved traffic flow at this bottleneck.

Other areas where improvements have been delivered include the Maidenhead Road/Stovell Road junction where traffic signals have been replaced with a roundabout to improve traffic flow and the Arthur Road/Alma Road junction where coaches are banned from turning right onto Arthur Road when leaving the coach park

## Conclusions and Priorities

### Monitoring Data

Annual mean values across the monitoring network have significantly decreased since 2015. The maximum NO<sub>2</sub> concentrations in 2019 within all five AQMAs when distance corrected to nearest relevant exposure (i.e. building façade of a residential property) was below 10% the annual mean objective (<36 µg/m<sup>3</sup>).

The monitoring results in 2020 show full compliance with the AQO in all areas with concentrations well below 36 µg/m<sup>3</sup>. The main contributing factor for the significant falls in NO<sub>2</sub> was the reduced road traffic due to lockdown restrictions.

The maximum NO<sub>2</sub> concentration in the Imperial Road/ St Leonards Road Junction AQMA has been below 10% of the objective (<36 µg/m<sup>3</sup>) for four consecutive years.

### Planned Measures

The regeneration of Maidenhead town centre and the arrival of the Elizabeth Line represent both a challenge and an opportunity in driving forward air quality improvements in the area.

The Royal Borough has appointed Countryside PLC as joint venture partner to help redevelop four major opportunity sites within the town centre, while other developers are independently progressing with plans for other sites within the town centre. All of these sites are being developed with low levels of on-site parking, and include residential and workplace travel plans designed to promote sustainable travel patterns. Opportunities are being taken to review the operation and layout of the town centre road network to reduce unnecessary through traffic and improve provision for active travel modes.

Maidenhead Station Access scheme including improved pedestrian/cycle links between the station and the town centre. The cycle hub opened June 2020 and the forecourt works are due to be completed in August 2021.

Maidenhead Missing Links scheme, construction of cycle route connecting North Maidenhead to major development sites in and around Maidenhead town centre and onwards to Maidenhead Station. The scheme will complete a new 'inner-ring' for pedestrians and cyclists and will feature new / enhanced crossings of Strand Water and the A4. Works are currently ongoing and are due to be complete in late 2021.

Maidenhead Housing Sites Enabling Works scheme, series of junction improvements around Maidenhead which are necessary to allow new residential and commercial development identified within the submitted Borough Local Plan to come forward. The scheme will deliver capacity improvements at six key junctions around Maidenhead, including: A308(M)/ A308 The Bingham's (Braywick Roundabout); A308/ Stafferton Way/ Rushington Avenue (Stafferton Roundabout); A4/ A308 Castle Hill (Castle Hill Roundabout); A4/ B4447 Cookham Road/ Market Street (Cookham Roundabout); A4/ B3024 Oldfield Road/ Lassell Gardens (Oldfield Junction); and, A4/ A4094 Ray Mead Road/ Guard Club Road (Ray Mead Roundabout). Works are currently ongoing and are due to be complete in late 2021.

The junction works above complement the Stafferton Way Link Road connecting the A4 and A308. The junction works will make this alternate route more convenient and desirable reducing congestion in front of the rail station and at critical junctions along the A4

Following the significant increase in walking and cycling across the UK during the pandemic the government has announced new funding for local authorities to make changes to their highways to encourage more people to choose alternatives to public transport. It is estimated that 14,000 trips previously done by public transport across the Royal Borough will need to be made by other means. The Council wishes to boost cycling as the best alternative to car use and public transport and is seeking to bring forward cycling schemes outlined in the Council's Cycling Action Plan. A bid was submitted in June 2020 to the Department for Transport.

The Council has since commenced work on the Local Cycling and Walking Improvement Plan, which promotes more sustainable modes of transport and travel.

A no-idling campaign with temporary signs 'No Idling' and 'Back to school, give our kids space' outside schools across the Borough was delivered in April and May 2021. The campaign helped schools manage traffic as they returned to school. The Council has received positive feedback from residents and local businesses and will consider to deliver the campaign again in the autumn 2021.

Windsor Visitor Economy scheme, public realm enhancements and pedestrianisation of Castle Hill in proximity of Windsor Castle, as well as a series of small-scale wayfinding interventions throughout the town. The purpose of the improvements is to improve the environment for pedestrians, with pedestrianisation and enhancement of the area outside Windsor Castle presenting both safety and air quality benefits. Furthermore, the wider

wayfinding interventions shall improve visitor routing along main routes within the town centre, primarily between key transport nodes and Windsor Castle. The works are due to be completed in late 2021.

## **Local Engagement and How to get involved**

Air quality and sustainable transport matters are debated at various public forums including: Access Advisory Forum; Cycle Forum; Local Access Forum; and Windsor Town Forum.

Public consultations and local residents' surveys are used to inform the Council's decisions and policies. Engaging with residents and local businesses on 'no-idling' campaigns.

In addition to commissioning its own residents' survey, the Council also takes part in the National Highways and Transport (NHT) annual benchmarking survey where residents can give their views on a wide range of transport issues. The results are used to inform future investment programmes.

Support is also provided to Neighbourhood Plan Groups to help develop traffic and transport aspects of their Neighbourhood Plans.

For further information email [customer.service@rbwm.gov.uk](mailto:customer.service@rbwm.gov.uk)



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# 1 Local Air Quality Management

This report provides an overview of air quality in the Royal Borough of Windsor and Maidenhead during 2020. It fulfils the requirements of Local Air Quality Management (LAQM) as set out in Part IV of the Environment Act (1995) and the relevant Policy and Technical Guidance documents.

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

## 2 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 12 months setting out measures it intends to put in place in pursuit of compliance with the objectives.

A summary of AQMAs declared by the Royal Borough of Windsor and Maidenhead can be found in Table 2.1. The table presents a description of the five AQMAs that are currently designated within the Royal Borough of Windsor and Maidenhead .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 designated AQMAs are as follows:

- NO<sub>2</sub> annual mean

**Table 2.1 – 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	Name and Date of AQAP Publication	Web Link to AQAP
Imperial Road/ St Leonards Road Junction	Declared March 2014	NO2 annual mean	An area encompassing the junction of Imperial Road and Leonards Road	NO	52.5	33.9	2015 - Update November 2020	<a href="https://uk-air.defra.gov.uk/aqma/local-authorities?la_id=315">https://uk-air.defra.gov.uk/aqma/local-authorities?la_id=315</a>
Windsor	Declared February 2015, Amended July 2009	NO2 annual mean	An enlarged area encompassing parts of west Windsor	NO	52	26.1	2009 - Update November 2020	<a href="https://uk-air.defra.gov.uk/aqma/local-authorities?la_id=315">https://uk-air.defra.gov.uk/aqma/local-authorities?la_id=315</a>
Maidenhead	Declared February 2015, Amended July 2009	NO2 annual mean	An enlarged area encompassing the town centre.	NO	51.7	30.5	2009 - Update November 2020	<a href="https://uk-air.defra.gov.uk/aqma/local-authorities?la_id=315">https://uk-air.defra.gov.uk/aqma/local-authorities?la_id=315</a>
Bray/M4	Declared July 2009	NO2 annual mean	An area encompassing part of Bray around the place where the M4 crosses over the A308 Windsor Road	YES	59.8	30.4	2015 - Update November 2020	<a href="https://uk-air.defra.gov.uk/aqma/local-authorities?la_id=315">https://uk-air.defra.gov.uk/aqma/local-authorities?la_id=315</a>

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	Name and Date of AQAP Publication	Web Link to AQAP
Wraysbury/M25	Declared March 2014	NO2 annual mean	The area runs along the B376 and intersects with the M25 near junction 13	YES	46.9	28.5	2015 - Update November 2020	<a href="https://uk-air.defra.gov.uk/aqma/local-authorities?la_id=315">https://uk-air.defra.gov.uk/aqma/local-authorities?la_id=315</a>

- Royal Borough of Windsor and Maidenhead confirm the information on UK-Air regarding their AQMA(s) is up to date.
- Royal Borough of Windsor and Maidenhead confirm that all current AQAPs have been submitted to Defra.

## **Progress and Impact of Measures to address Air Quality in the Royal Borough of Windsor and Maidenhead**

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

*The report is well structured, detailed, and provides the information specified in the Guidance. The following comments are designed to help inform future reports.*

- 1. Robust and accurate QA/QC procedures were applied. Calculations for bias adjustment and distance-correction factors were outlined in detail.*
- 2. The Council has carried out annualization however has not provided any example calculations. This must be provided in the report.*
- 3. The Council has included discussion and review of its AQMAs and monitoring strategy, informed due to the extensive monitoring network. The council is improving the air quality in the area noted by the consistently lower concentration observed. This demonstrates the Council's proactive and dedicated approach to improving air quality across the area.*
- 4. Comments from last year's ASR have been mentioned and addressed. This is welcomed, and we encourage this to continue in future ASRs.*
- 5. The latest AQAP is as of 2015 and this will no longer reflect the measures the council is currently put in place. The Council is encouraged to adopt a revised AQAP in the next reporting year.*
- 6. The Public Health Outcomes Frameworks was mentioned, and this is encouraged. The Council could consider referring specifically to indicator D01. Fraction of mortality attributable to particulate air pollution.*
- 7. Council have provided a clear map of the diffusion tube monitoring network; Council could provide discussion on the trend's graphs seen in the report.*
- 8. Overall the report is detailed, concise and mostly satisfies the criteria of relevant standards. The Council should continue their good work.*

The Royal Borough of Windsor and Maidenhead has taken forward a number of direct measures during the current reporting year of 2020 in pursuit of improving local air quality. Details of all measures completed, in progress or planned are set out below and in Table 2.2.



## **Windsor AQMA**

### **Redesign of Clarence Road roundabout**

New roundabout layout significantly improved congestion / air quality

### **Windsor Parking and Transport Strategy**

Car parking includes a ring of small-scale park and ride sites.

### **Heathrow Bus Funding Agreement**

Hybrid and low-emission buses are used on bus services to Heathrow Airport.

### **Supported bus services**

Supported bus services under RBWM contract require bus operators to use Euro V buses or better.

### **Arthur Road**

A signal-controlled roundabout has been replaced with a roundabout, other signals have been upgraded to MOVA operation, and coaches are banned from turning right onto Arthur Road when leaving the coach park.

### **Proposed Windsor 20mph**

A 20mph speed limit was proposed across a number of roads in and around central Windsor. However, following a low response to a public consultation it was decided that the scheme would not be progressed at this time.

### **Cycling**

Links between Dedworth and Windsor Town Centre have been improved, including the A308 / Barry Avenue cycle route.

### **Walking**

£1.56 million of Local Growth Deal funding has been secured from the Thames Valley Berkshire Local Enterprise Partnership for the 'Windsor Visitor Economy' scheme. The scheme comprises of public realm enhancements and pedestrianisation of Castle Hill in proximity of Windsor Castle, as well as a series of small-scale wayfinding interventions throughout the town. The purpose of the improvements is to improve the environment for pedestrians, with pedestrianisation and enhancement of the area outside Windsor Castle presenting both safety and air quality benefits. Furthermore, the wider wayfinding interventions shall improve visitor routing along main routes within the town centre,

primarily between key transport nodes and Windsor Castle. The works are due to be completed in late 2021.

## **Imperial Road/St Leonards Road Junction AQMA**

### **New traffic management schemes**

Changes to the operation of the traffic signals at the Imperial Road/St Leonards Road and Clewer Hill Road / Winkfield Road junctions were completed in July 2016. The changes have reduced journey times and improved traffic flow. Repositioning of induction loops to improve reliability of the signals was completed in 2019.

### **LEGOLAND travel plan and traffic signage**

The Borough has secured a travel plan to manage staff, hotel guest and day visitor travel to and from the resort. Improved traffic signage has been introduced to encourage visitors to use alternative routes that avoid congested junctions. The aim is to minimise the impact of visitor traffic on the Windsor AQMAs.

## **Wraysbury/M25 – Junction 13 AQMA**

### **Motorway Emissions - air quality barriers**

The current monitoring results within the AQMA are below objective level. Should future monitoring results indicate that air quality measures may be necessary the Council will engage with Highways England to explore possible schemes for the AQMA including the installation of air quality barriers.

## **Bray/M4 AQMA**

### **Motorway Emissions**

The M4 Smart Motorway scheme includes the upgrade of the noise barriers. Increasing the height of the barriers should reduce the dispersion of pollutants from the M4 towards sensitive receptors.

### **Junction Improvements**

A scheme to widen the carriageway and extend the right-turning lane on the A308 between the Holyport Road roundabout and the Upper Bray Road junction has been completed. This helps to prevent right-tuning vehicles from blocking northbound traffic on the A308. In addition, the completed Stafferton Way Link Road helps to reduce the number of vehicles travelling to Maidenhead turning right into Upper Bray Road.

## Maidenhead AQMA

### Travel Plans

The Council requires all major new developments to deliver residential and / or workplace travel plans. This is helping to reduce car trips and encourage more sustainable travel patterns.

The following travel plans were received in 2019:

- 437- 441 St Leonards Road, Windsor
- Shorts Waste Transfer and Recycling Facility, St George's Lane, Ascot
- Water Oakley Farm, Windsor Road, Bray
- Braywick Court School, Hibbert Road, Bray
- Buildings 1 & 2, Windsor Dials, Windsor
- Units 1 to 3, Foundation Park, Canon Lane, Maidenhead
- Larchfield House, Maidenhead;
- Units 9 to 27, Cordwallis Industrial Estate, Maidenhead;
- Kings Chase, Maidenhead;
- Land at York Road, Maidenhead.

The Council is also exploring options with developers and providers for setting up a car club in the town centre to serve a number of major new developments in the area. Also, Maidenhead is part of the easitNETWORK, a project to support and encourage businesses in Maidenhead to adopt sustainable transport options with discounts on rail travel and other sustainable travel products and initiatives:

<https://www.easit.org.uk/easitmaidenhead>.

### 2016 Stafferton Way Link Road

Stafferton Way Link Road has been completed, connecting the A4 and A308 via Oldfield Road and Stafferton Way. The link helps to reduce congestion in front of the rail station and at critical junctions along the A4.

### Chapel Arches

Residential and workplace travel plans have been secured for the Chapel Arches development. Improvements have been secured for local walking and cycling routes as part of the Chapel Arches development. This includes a contra-flow cycle lane on the eastern section of High Street and a raised table to aid pedestrian crossing movements, as well as public realm improvements.

### **Maidenhead Station Access**

£3.75 million of Growth Deal funding has been secured from the Thames Valley Berkshire Local Enterprise Partnership for the 'Maidenhead Station Access' scheme. The scheme includes construction of a multi-modal transport interchange, including facilities for buses, taxis and passenger drop-off/pick-up. A new cycle parking hub with capacity for 300 bikes and improvements to the crossing between the station and town centre and associated changes to the layout of the A308 / Queen Street junction have been completed. Also a two-way traffic operation scheme on Broadway has been completed, this is allowing vehicles to turn left or right out of the Broadway (Nicholsons) car park and left or right onto Frascati Way. Drivers are now able to access the M4, A308 and A4 from the car park without having to travel through the town centre. Parking displaced from the rail station forecourt will be provided in a new facility on Stafferton Way. The scheme is due to be completed in August 2021.

### **Maidenhead Missing Links**

£2.42 million of Growth Deal funding has been secured from the Thames Valley Berkshire Local Enterprise Partnership for the 'Maidenhead Missing Links' scheme. This will connect North Maidenhead to major development sites in and around Maidenhead town centre and onwards to Maidenhead Station. The scheme will complete a new 'inner-ring' for pedestrians and cyclists and will feature new / enhanced crossings of Strand Water and the A4. The scheme is due to be completed in late 2021.

### **Maidenhead Housing Sites Enabling Works**

£4.21 million Local Growth Deal funding and £1.07 million Business Rates Retention Pilot funding has been secured from the Thames Valley Berkshire Local Enterprise Partnership for the 'Maidenhead Housing Sites Enabling Works'. This will deliver capacity improvements at six key junctions around Maidenhead:

- A308(M) / A308 / A330 / The Bingham;
- A4 / A308;
- A4 / B4447 / Market Street;
- A4 / B3028 / Lassell Gardens;
- A4 / A4094 / Guards Club Road;
- A308 / Stafferton Way / Rushington Avenue.

The improvements are needed to cope with additional traffic associated with the regeneration of the town centre and the development of the Maidenhead Golf Course site.

They will also enable commercial development to come forward in other parts of Maidenhead. The scheme is due to be completed in late 2021.

## Future Priorities

The Royal Borough of Windsor and Maidenhead's priorities for the coming year are:

- Due to COVID-19 and the need for social distancing, public transport capacity may be severely reduced. Following the significant increase in walking and cycling across the UK during the pandemic the government has announced new funding and mandated all local authorities to make rapid, meaningful changes to their highways to help encourage more people to choose alternatives to public transport.

It is estimated that 14,000 trips previously done by public transport across the Royal Borough will need to be made by other means. This includes an estimated 6000 trips to school and home for secondary school children. The Council wishes to boost cycling as the best alternative to car use and public transport and is seeking to bring forward cycling schemes outlined in the Council's Cycling Action Plan or highlighted by other tools such as the Department for Transport's Propensity to Cycle Tool. A bid was submitted in June 2020 to the Department for Transport and definitive plans are in the process of being agreed. The first tranche of measures include footway widening and 20mph schemes in Maidenhead, Windsor and Ascot. It is anticipated that the second tranche bid will be more far-reaching and take in a larger geographical area to improve the safety of the road network to accommodate more cycling to school along main routes and other streets;

- To complete the Maidenhead Station Access, scheme by 2021;
- To conclude the design and start construction on the Maidenhead Housing Sites Enabling Works scheme;
- A bid to the Office for Ultra Low Vehicles (OLEV) for grant funding was successful. This is now going through procurement and implementation to provide on-street electric vehicle charge points in residential areas with no off-street parking. Opportunities will be taken to incorporate environmental sensors within charge points to provide additional data on local air quality;
- To undertake a multi-modal corridor study along the A308 between Marlow and Staines-upon-Thames to identify key traffic and transport issues, assess options and develop a package of measures to improve connectivity by walking, cycling and

public transport and address congestion. This will form the basis for future funding bids to the Thames Valley Berkshire Local Enterprise Partnership and the Department for Transport (the A308 now forms part of the Major Roads Network);

- Cycle Schemes for 2020/21 include: Dedworth Road Cycle Route with a feasibility study for longer term route enhancements; a Wayfinding scheme for A308 - Windsor to Maidenhead Cycle Route and additional cycle parking. Complete design and start construction on the Maidenhead Missing Links cycle route scheme;
- Safety schemes for 2020/21 include a zebra crossing on Bray Road; raising an existing zebra crossing on A308 Marlow Road, Maidenhead; buildouts and safety measures on Courthouse Road and A308 Windsor Road / Holyport Road; new crossing on the Stafferton Link (near Forlease Road), Maidenhead;
- Air quality schemes for 2020/21 include Arthur Road/Vansittart Road traffic signals are due to be refurbished with MOVA upgrade, intelligent pedestrian detection and LED upgrade to help reduce queuing. There is also a 'No idling / switch off engines' initiative. This will entail signage at locations (to be confirmed) and a supporting publicity exercise.

The Royal Borough of Windsor and Maidenhead anticipates that the measures stated above and in Table 2.2 will achieve compliance in the Windsor and Maidenhead AQMAs. The results in 2019 and 2020 show that further measures to achieve compliance and enable the revocation of Wraysbury/M25 AQMA and Bray/M4 AQMA may not be required.

Table 2.2 – Progress on Measures to Improve Air Quality

Measure No.	Measure	Category	Classification	Year Measure Introduced	Estimated / Actual Completion Year	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	Awareness Campaigns Organise public events to increase knowledge and understanding of local air quality conditions.	Public Information	Via other mechanisms	2012	2026	RBWM Environmental Health	Council	NO	Funded	< £10k	Implementation			Cycle Forum Jul 2016 Windsor Town Forum Feb, Oct 2016, Nov 2019, Nov2020	Public meetings
2	Education Programmes 1. Road safety and cycle training with primary schools. 2. Deployment of Speed Indicator Device (SID) / Speed Limit Reminder (SLR)	Promoting Travel Alternatives	Promotion of cycling	2012	2032	RBWM Highways / Project Centre / Avanti Cycling Ltd / Department for Transport	Council/Central Government	NO	Funded	£10k - 50k	Implementation	3%	Reduction in car journeys Monitored via survey	Road Safety Education number of pupils 2018/19 Year 3 – 1,592 Year 4 – 1,485 Year 6 – 1,309 2019/20/21 RSE programme effected by Covid 19. Due to go back into schools in September 2021 Year 3 - 1502 Year 4 - 1224 to march 2020 Year 6 - 0 schools closed New parent talks given at 7 schools, addressing safe walking and cycling to school 2020 schools closed 2 schools booked for 2021. Effected by Covid 19. Bikeability programme – 819 pupils trained 790 attained Levels 1-3 Training and funding for 2019/20/21 effected by Covid 19. 2019/20 617 pupils trained 595 attained Levels 1-3 12 SIDs are regularly deployed at sites across the Borough	The 15% reduction in car journeys To deliver a 3% reduction in emission within AQMAs in combination with measure 3, 9, 11 and 13
3	Travel information & advice - Providing information on available travel options	Public Information	Via other mechanisms	2012	2032	RBWM Highways / Project Centre / Bucks County Council / transport operators	Council	NO	Funded	£10k - 50k	Implementation	3% reduction in emission in combination with measure 2, 9, 11 and 13	Number of local bus passenger journeys originating in the authority area undertaken each year	Funding support for Traveline South East public transport information service.  Bus operators provide printed at-stop information for commercial bus	2019/20, DfT indicates there are 1.4 million passenger journeys on local bus services in RBWM. That is a fall of 500,000 bus passenger

Measure No.	Measure	Category	Classification	Year Measure Introduced	Estimated / Actual Completion Year	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
														<p>services.</p> <p>RBWM provides at-stop information for supported bus services.</p> <p>Joint work with Bucks County Council on real-time passenger information.</p> <p>Real-time information screens have been provided at key bus stops and other locations, such as Maidenhead Library and St Mark's Hospital</p>	<p>journeys per year from a 2014-16 high of 1.9million (source: DfT Table BUS0109a)</p> <p>Information to help people plan journeys NHT indicator - RBWM below NHT average</p> <p>Updated passenger information boards ('where to catch your bus') were installed in December 2020 in town centres stops.</p>
4	Travel Plans - Promote and monitor travel plans for workplaces, hospitals and schools. Secure Travel Plans through the Planning process. Encourage development of travel plans on a voluntary basis. Produce guidance for all Travel Plans on the web	Promoting Travel Alternatives	Workplace Travel Planning	2012	2032	RBWM Highways / Project Centre	Developers & Council funding	NO	Funded	£10k - 50k	Implementation	3%	<p>Achieve 100% Schools Travel Plans</p> <p>&lt; 70% driving to work in year 1 &lt;60% by year 3 of the travel plan</p>	<p>easit MAIDENHEAD - offers travel incentives to participating organisations, including discounted rail fares, cycle hire, bike discounts, electric car discounts</p> <p>100% of state schools and 3 independent schools have travel plans.</p> <p>4 School Travel Plans were updated / approved in 2018/19</p> <p>7 new residential / workplace travel plans were approved in 2018/19</p> <p>RBWM encourage/facilitate home-working</p>	<p>Travel plans can achieve a reduction in car driver trips. Combining all travel plans a 3% reduction in emission reduction could be achieved</p>
5	Lift sharing - To develop an area-wide lift-sharing. Establishing self-contained lift-sharing schemes	Alternatives to private vehicle use	Car & lift sharing schemes	2014	2032	RBWM Highways / Project Centre.		NO	Not Funded		Implementation			<p>Info about national lift-share schemes is provided on the council's website.</p> <p>A local lift share scheme was set up in 2014.</p>	
6	E-services - Providing online services to	Promoting Travel Alternatives	Other	2012	2032	RBWM	Council	NO			Implementation			<p>a) Applications: library membership, school admissions,</p>	



Measure No.	Measure	Category	Classification	Year Measure Introduced	Estimated / Actual Completion Year	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
	reduce the need to travel													<p>planning applications, parking permits, home to school transport, and on-street EV charge points.</p> <p>b) Payments - Council invoices, Council tax, business rates, parking fines, housing benefit repayment.</p> <p>c) Reporting - Council complaints, highway maintenance, pollution, abandoned vehicles, rights of way, and benefit fraud.</p>	
7	Ticketing solutions - Promoting public transport	Promoting Travel Alternatives	Other	2012	2032	RBWM Highways / Project Centre	Council	NO			Implementation			<p>2 for 1 rail / entry ticket offer available for LEGOLAND</p> <p>Plus Bus tickets provide discounted bus travel in Maidenhead and Windsor for rail users.</p> <p>Smart cards and mobile ticketing offered by most local bus operators.</p>	Most operators now have mobile tickets but there no unified ticketing system within the borough.
8	Urban traffic control - Updating and extending the current UTC, in conjunction with better traffic surveys.	Traffic Management	UTC, Congestion management, traffic reduction	2012	2032	RBWM Highways / Project Centre.	Council	NO	Funded		Implementation	3%	Average journey time	<p>MOVA installed at key junctions to provide real-time response to changing traffic conditions.</p> <p>Variable Message Signs in Maidenhead provide advanced warning of planned road works and major events, and live information about incidents and emergency road works.</p> <p>Alternative routes signed to LEGOLAND to encourage motorists to avoid the most congested routes through Windsor.</p>	

Measure No.	Measure	Category	Classification	Year Measure Introduced	Estimated / Actual Completion Year	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
														Advisory HGV route signed in Maidenhead. Advisory coach route signed in Windsor. 30 mph speed limit extension on A308 Braywick Road	
9	Pedestrian and Cycling Facilities New/improved routes and crossing facilities	Transport Planning and Infrastructure	Cycle network	2012	2032	RBWM Highways / Project Centre	Council	NO	Funded		Implementation	3%	See measure 2	Cycling Action Plan adopted.  2019/20 20+ new cycle stands installed  West Windsor to Windsor – Cycle quiet route completed.  2018 /19 Cycling schemes: Thames Street, Windsor (cycle parking)  Secured £3.048 for Maidenhead Station Access scheme, which includes provision for a new 300 space cycle hub and improved pedestrian / cycle crossing between Maidenhead Station and the town centre, completed 2020  Secured £2.42 million for 'Maidenhead Missing Links' scheme, which will connect North Maidenhead to development sites in Maidenhead town centre and Maidenhead Station. Includes new / enhanced crossings of Strand Water and the A4. Part complete, full completion due Q4 2021.	Reduction of emission of 3% in conjunction with measure 2, 11 and 13
10	Junction Improvements - Modifying the layout of junctions experiencing chronic congestion	Traffic Management	UTC, Congestion management, traffic reduction	2015	2021	RBWM Highways / Project Centre	Council	NO	Funded	£1 million - £10 million	Completed	3%	Average journey time	2016 Trial new proposal for Imperial Rd/ St Leonards Rd Junction (AQMA)  2016 Consultation on Arthur Road	

Measure No.	Measure	Category	Classification	Year Measure Introduced	Estimated / Actual Completion Year	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
														corridor junctions (AQMA)  Right-turn lane extension A308/Upper Bray Road junction (AQMA)  2017/18 MOVA upgrade to Clarence Road / Alma Road and provision of pedestrian crossing facilities.  2017/18 Clarence Road / Victoria Street / St Leonards Road – raised table and upgraded signals / pedestrian crossing  2017/18 MOVA upgrade to signals at A308 / Queen Street & A308 /Broadway junctions  2018/19 New double mini-roundabout layout at Dedworth Rd / Parsonage La / Clarence Rd / Hatch La New arrangement with 4no. Zebra  2018/21 Secured £4.21 million for 'Maidenhead Housing Sites Enabling Works' to deliver capacity improvements at six key junctions on the A4 and A308 around Maidenhead. To be completed in 2021	
11	Safer routes to schools - Identify priorities through School Travel Plans and prioritise through capital projects working group	Promoting Travel Alternatives	Promotion of cycling	2014	2020	RBWM Highways / Project Centre	Council	NO	Funded	£100k - £500k	Completed	3%	See measure 2  Number of safer routes	A refuge island on A4 Bath Rd, Maidenhead was installed in November 2019. Funded from the 2019/20 Safer Routes to School budget.  2019/20 Courthouse Road / St Marks Road / St Marks Crescent – 3no. Raised Zebra	

Measure No.	Measure	Category	Classification	Year Measure Introduced	Estimated / Actual Completion Year	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
														crossings installed  Schemes delivered in 2016/17 include: Wraybury Primary School – completion of footway link from Hythe End along Staines Road  Previous schemes Holyport, St Edmund Campion and Queen Anne First School. Dedworth Road Study and School Cycle Paths	
12	Parking enforcement - Decriminalised parking enforcement	Traffic Management	Workplace Parking Levy, Parking Enforcement on highway												Completed in 2009
13	Pedestrian / Cycling Facilities - New/improved routes & crossing facilities	Transport Planning and Infrastructure	Cycle network	2016	2019	RBWM Highways / Project Centre	Council	NO			Completed			Cycling Action Plan adopted	
14	Supported bus services - Providing financial support to local bus services	Promoting Low Emission Transport	Public Vehicle Procurement - Prioritising uptake of low emission vehicles	2015	2032	RBWM Highways / Project Centre.	Council	NO	Funded		Implementation		See n 16	Retendered in 2017 - EURO V or better required.  Maidenhead network is partly commercially operated.  RBWM provides financial support for bus services cannot be provided commercially.	
15	Public transport infrastructure Improvements - Enhance accessibility and attractiveness of public transport and priority bus routes	Transport Planning and Infrastructure	Bus route improvements	2016	2020	RBWM Highways / Project Centre.	Council	NO	Funded		Implementation		Reduced traffic volume along A308	Improved public transport information, including real-time.  Ongoing programme to upgrade stops to provide raised kerbs to improve accessibility.  2019/20 St Leonards Road, Windsor – Bus stop accessibility upgrade – dropped kerbs and tactile paving. Bedford Lane, Sunningdale - New hardstanding at bus stop.	Satisfaction levels have fallen from 2018 to 2019, staying behind national averages and neighbouring local authorities  Bus network review completed in 2020. Findings will feed into the BSIP proposal in 2021 for improved bus serves through Enhanced Partnerships with operators.

Measure No.	Measure	Category	Classification	Year Measure Introduced	Estimated / Actual Completion Year	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
16	Quality bus partnership - Develop high quality, cross boundary bus services	Transport Planning and Infrastructure	Bus route improvements	2016	2032	RBWM Highways / Project Centre	Council	NO	Funded		Implementation	Borough wide – % target reduction low		Heathrow Partnership delivers enhanced bus services to and from the airport.	The first Berkshire LA Public Transport meeting was held in Feb 2020 to discuss local issues (RBWM, Wokingham, West Berkshire, Reading & Bracknell).
17	Park & Ride - Exploring opportunities for park and ride	Promoting Travel Alternatives	Other	2014	2016	RBWM Highways					Completed		See measure 9 and 2	Services from: Centrica, Windsor (Easter and summer); Home Park, Windsor; King Edward VII Car Park; Windsor; and LEGOLAND, Windsor	Centrica park and ride no longer operates due to high cost and limited demand.  There is no longer a dedicated Park & Ride service at LEGOLAND, although can still park and use a local bus service.
18	Inter-urban coach services	Transport Planning and Infrastructure	Bus route improvements	2014	2015	RBWM Highways		NO			Aborted			First Group introduced X9 service from Maidenhead to High Wycombe in 2014.	The service was subsequently withdrawn due to lack of use.
19	Rail partnerships - Working in partnership with Network Rail, Great Western Railway (GWR) and South Western Railway (SWR).	Transport Planning and Infrastructure	Public transport improvements- interchanges stations and services	2016	2021	RBWM Highways / Project Centre	Council	NO	Funded	£1 million - £10 million	Completed			Secured £3.048 million for Maidenhead Station Access scheme to fund new multi-modal interchange and improved ped/ cycle links to the town centre.  Working with GWR to secure funding for a scheme at Bourne End that would allow 2 trains per hour on the Marlow Branch Line	Maidenhead Station Access scheme will be completed in August 2021. Cycle hub opened June 2020.
20	Parking standards - Imposing strict maximum parking standards for new development as identified in the Borough's Parking Strategy	Traffic Management	Other	2019	2032	RBWM Highways / Project Centre.	Council	NO			Implementation			New town centre residential developments have very low levels of parking.  Travel Plans are required for all major new developments.  Electric vehicle charge points being sought for new development	A Parking Supplementary Planning Document is currently being prepared to replace the existing parking standards.
21	Public parking regimes -	Traffic Management	Other	2012	2032	RBWM Enforcement	Council	NO			Implementation			Stating parking charges and	

Measure No.	Measure	Category	Classification	Year Measure Introduced	Estimated / Actual Completion Year	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
	Setting parking charges and permitted length of stay													permitted length of stay in public car parks in town centre locations to favour short-stay parking for shoppers and visitors and encourage use of public transport.	
22 and 23	Improve efficiency of Council's own fleet	Vehicle Fleet Efficiency	Other	2018	2032	RBWM Highways / Project Centre.	Council	NO	Partially Funded		Implementation			Out of a fleet of 54 vehicles 87% are Euro V	23) Review of Council pool cars underway looking at electric / hybrid options
24	Hybrid and electrical vehicles. Promoting, where possible, the use of less and non-polluting vehicles	Vehicle Fleet Efficiency	Promoting Low Emission Public Transport	2018	2032	RBWM Highways / Project Centre.	Council	NO			Implementation			Buses on Heathrow routes are a mixture of hybrid and low-emission diesel buses	
25	Reduction of speed limits to 20mph zone	Traffic Management	Reduction of speed limits, 20mph zones	2016	2018	RBWM Highways	Council	NO			Aborted			Consulted on 20 mph speed limit across central Windsor	Decision taken not to progress scheme following public consultation
26	Electric vehicle charge points	Transport Planning and Infrastructure	Other	2018	2022	RBWM Highways / Project Centre.	OLEV	NO	Funded		Implementation			Trial of new smart, connected electric vehicle charge points in Alma Road, Windsor with data link and air quality / parking sensors, including stand-alone units and units integrated into street furniture. Also, residents offered the use of electric vehicles to trial living with an EV.	Looking to roll out on-street charge points to other residential areas with little / no off-street parking in 2020 - will make use of OLEV grant funding. To date no new charging points installed but RBWM are currently receiving information from residents on where they would like EV charge points: 51 applications received in 2019

## **PM<sub>2.5</sub> – Local Authority Approach to Reducing Emissions and/or Concentrations**

As detailed in Policy Guidance LAQM.PG16 (Chapter 7), local authorities are expected to work towards reducing emissions and/or concentrations of PM<sub>2.5</sub> (particulate matter with an aerodynamic diameter of 2.5µm or less). There is clear evidence that PM<sub>2.5</sub> has a significant impact on human health, including premature mortality, allergic reactions, and cardiovascular diseases.

The PM<sub>2.5</sub> annual mean for 2020 was estimated using the nationally derived correction factor (0.7) in accordance with Defra Technical Guidance LAQM.TG16. The PM<sub>10</sub> recorded annual mean concentration at MW1, Fracati Way site in 2020 is 18.8µg/m<sup>3</sup>.

The PM<sub>2.5</sub> estimated annual mean concentration at MW1 site is 13.2µg/m<sup>3</sup>

The Public Health Outcomes Framework local indicator D01 (Fraction of mortality attributable to particulate air pollution) for Windsor and Maidenhead in 2019 is 5.6%

The Royal Borough of Windsor and Maidenhead is taking the following existing measures in the Action Plans to address PM<sub>2.5</sub>:

- Promoting workplace, school and personalised travel planning (measure 4)
- Introduced MOVA at signal-controlled junctions (measure 8)
- Improving facilities for cycling and walking, including Maidenhead Missing Links (measures 9 and 11)
- Promoting bus services (measure 14, 15 and 16)
- Implementing a scheme for Maidenhead station interchange (measure 19)
- Trial of new, smart electric vehicle charge points (measure 26);
- Three designated Smoke Control Areas in West Windsor.

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

This section sets out the monitoring undertaken within 2020 by the Royal Borough Windsor and Maidenhead and how it compares with the relevant air quality objectives. In addition, monitoring results are presented for a five-year period between 2016 and 2020 to allow monitoring trends to be identified and discussed.

### Summary of Monitoring Undertaken

#### 3.1.1 Automatic Monitoring Sites

The Royal Borough Windsor and Maidenhead undertook automatic (continuous) monitoring at 3 sites during 2020. Table A.1 in Appendix A shows the details of the automatic monitoring sites. The [https://www.londonair.org.uk/london/asp/publicbulletin.asp?la\\_id=35](https://www.londonair.org.uk/london/asp/publicbulletin.asp?la_id=35) page presents automatic monitoring results for Royal Borough Windsor and Maidenhead, with automatic monitoring results also available through the UK-Air website.

Maps showing the location of the monitoring sites are provided in Appendix D. Further details on how the monitors are calibrated and how the data has been adjusted are included in Appendix C.

#### 3.1.2 Non-Automatic Monitoring Sites

Royal Borough Windsor and Maidenhead undertook non- automatic (i.e. passive) monitoring of NO<sub>2</sub> at 20 sites during 2020. 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.

### 3.1.3 Nitrogen Dioxide (NO<sub>2</sub>)

Table A.3 and Table A.4 in Appendix A compare the ratified and adjusted monitored NO<sub>2</sub> annual mean concentrations for the past five years with the air quality objective of 40µg/m<sup>3</sup>. 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 2020 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<sub>2</sub> hourly mean concentrations for the past five years with the air quality objective of 200µg/m<sup>3</sup>, not to be exceeded more than 18 times per year.

Over the past five years air quality in the Borough has significantly improved. Monitoring results in 2020 show no exceedances of the annual mean objective of 40 µg/m<sup>3</sup> for NO<sub>2</sub>, all concentrations are well below 36 µg/m<sup>3</sup>.

The maximum NO<sub>2</sub> concentrations in 2019 within all five AQMAs when distance corrected to nearest relevant exposure (i.e. building façade of a residential property) was below 10% the annual mean objective (<36 µg/m<sup>3</sup>).

The Imperial Road/ St Leonards Road Junction AQMA has recorded concentration below 36 µg/m<sup>3</sup> for four consecutive years. Following future trends over the next two year where concentration remain below 36 µg/m<sup>3</sup> the Council will consider the possible revocation of AQMAs.

### 3.1.4 Particulate Matter (PM<sub>10</sub>)

Table A.6 in Appendix A: Monitoring Results compares the ratified and adjusted monitored PM<sub>10</sub> annual mean concentrations for the past five years with the air quality objective of 40µg/m<sup>3</sup>.

Table A.7 in Appendix A compares the ratified continuous monitored PM<sub>10</sub> daily mean concentrations for the past five years with the air quality objective of 50µg/m<sup>3</sup>, not to be exceeded more than 35 times per year.

The air quality objectives for PM<sub>10</sub> were not exceeded in 2020

### 3.1.5 Particulate Matter (PM<sub>2.5</sub>)

The PM<sub>2.5</sub> annual mean for 2020 was estimated using the nationally derived correction factor (0.7) in accordance with Defra Technical Guidance LAQM.TG16. The PM<sub>10</sub> recorded annual mean concentration at MW1, Fracati Way site in 2020 is 18.8µg/m<sup>3</sup>.

The PM<sub>2.5</sub> estimated annual mean concentration at MW1 site is 13.2µg/m<sup>3</sup>

## 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) <sup>(1)</sup>	Distance to kerb of nearest road (m) <sup>(2)</sup>	Inlet Height (m)
MW1	Frascati Way	Roadside	488626	180994	NO <sub>2</sub>	Y	Chemiluminescent	5	2	1.7
MW1	Frascati Way	Roadside	488626	180994	PM <sub>10</sub>	Y	BAM	5	2	1.7
MW2	Clarence Road	Roadside	495664	176592	NO <sub>2</sub>	Y	Chemiluminescent	5	3	1.7
MW4	Aldebury Road	Background	488503	182710	NO <sub>2</sub>	N	Chemiluminescent	5	20	1.7

**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) <sup>(1)</sup>	Distance to kerb of nearest road (m) <sup>(2)</sup>	Tube Co-located with a Continuous Analyser?	Tube Height (m)
WM1	Longmead	Urban Background	494067	176764	NO <sub>2</sub>	No	5.0	1.0	No	3.0
WM2	Priors Way	Suburban	489807	178760	NO <sub>2</sub>	Yes - Bray/M4	10.0	2.0	No	2.0
WM5b	Queen Street	Roadside	488864	180951	NO <sub>2</sub>	Yes - Maidenehad	10.0	2.0	No	2.0
WM9a	Alma Road	Roadside	496237	176584	NO <sub>2</sub>	Yes - Windsor	7.0	2.0	No	2.0
WM10a	Imperial Road	Roadside	495606	176364	NO <sub>2</sub>	Yes - Windsor	8.0	2.0	No	2.0
WM11a	Straight Rd	Kerbside	498232	174916	NO <sub>2</sub>	No	3.5	0.5	No	2.0
WM11b	Straight Rd	Kerbside	498388	174797	NO <sub>2</sub>	No	11.0	1.0	No	1.5
WM13	Wraysbury Road 1	Roadside	502017	172541	NO <sub>2</sub>	Yes - Wraysbury/M25	5.0	2.0	No	2.0
WM13a	Wraysbury Road 2	Roadside	502108	172461	NO <sub>2</sub>	Yes - Wraysbury/M25	5.0	2.0	No	2.0
WM15	Wraysbury Road 3	Roadside	502259	172322	NO <sub>2</sub>	Yes - Wraysbury/M25	5.0	2.0	No	2.0
WM15a	Wraysbury Road 4	Roadside	502257	172333	NO <sub>2</sub>	Yes - Wraysbury/M25	2.0	5.0	No	2.0
WM15b	Wraysbury Road 5	Roadside	502300	172278	NO <sub>2</sub>	Yes - Wraysbury/M25	5.0	2.0	No	2.0

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) <sup>(1)</sup>	Distance to kerb of nearest road (m) <sup>(2)</sup>	Tube Co-located with a Continuous Analyser?	Tube Height (m)
WM18, WM19, WM20	Clarence Road 3	Roadside	495664	176592	NO <sub>2</sub>	Yes - Windsor	5.0	2.5	Yes	1.5
WM21, WM22, WM23	Frascati Way 3	Roadside	488626	180994	NO <sub>2</sub>	Yes - Maidenhead	5.0	2.0	Yes	1.5
WM28	Keate's Lane	Roadside	496604	177866	NO <sub>2</sub>	No	3.0	2.0	No	2.0
WM28a	Eton Wick Road	Roadside	496539	177826	NO <sub>2</sub>	No	3.0	2.0	No	2.0
WM29	M4 Windsor Road 1	Roadside	489975	178721	NO <sub>2</sub>	Yes - Bray/M4	10.0	2.0	No	2.0
WM29a	M4 Windsor Road 2	Roadside	489928	178754	NO <sub>2</sub>	Yes - Bray/M4	10.0	2.0	No	2.0
WM29b	M4 Windsor Road 3	Roadside	490060	178593	NO <sub>2</sub>	Yes - Bray/M4	10.0	2.0	No	2.0
WM30a	Queens Road	Kerbside	498549	177064	NO <sub>2</sub>	No	5.0	1.0	No	2.0
WM30b	High Street	Kerbside	498645	176990	NO <sub>2</sub>	No	5.0	1.0	No	2.0
WM30c	The Green	Kerbside	498725	177092	NO <sub>2</sub>	No	3.0	1.0	No	2.0
WM31	Arthur Road 1	Kerbside	495896	176939	NO <sub>2</sub>	Yes - Windsor	10.0	1.0	No	2.0

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) <sup>(1)</sup>	Distance to kerb of nearest road (m) <sup>(2)</sup>	Tube Co-located with a Continuous Analyser?	Tube Height (m)
WM32	Arthur Road 2	Kerbside	496082	176903	NO <sub>2</sub>	Yes - Windsor	2.5	1.0	No	2.0
WM33	Arthur Road 3	Kerbside	496312	176886	NO <sub>2</sub>	Yes - Windsor	0.0	1.0	No	2.0
WM34	Ludlow Road	Urban Background	488417	180554	NO <sub>2</sub>	No	5.0	1.0	No	2.5
WM01	Hythe End Road	Suburban	501366	172377	NO <sub>2</sub>	No	20.0	0.0	No	2.0
WM03	St Leonards Road 1	Kerbside	495331	175569	NO <sub>2</sub>	Yes - Imperial/St Leonards Road Junction	7.0	1.0	No	2.0
WM03a	St Leonards Road 2	Kerbside	495294	175556	NO <sub>2</sub>	Yes - Imperial/St Leonards Road Junction	7.0	1.0	No	2.0
WM03b	St Leonards Road 3	Kerbside	495314	175551	NO <sub>2</sub>	Yes - Imperial/St Leonards Road Junction	5.0	1.0	No	2.0
WM03c	St Leonards Road 4	Roadside	495413	175587	NO <sub>2</sub>	Yes - Imperial/St Leonards Road Junction	5.0	2.0	No	2.0
WM04	Osborne Road 1	Kerbside	496631	175927	NO <sub>2</sub>	No	3.0	1.0	No	2.0
WM04a	Osborne Road 1	Kerbside	496380	176035	NO <sub>2</sub>	No	3.0	1.0	No	2.0
WM013	Bridge Road 1	Roadside	489571	181334	NO <sub>2</sub>	Yes - Maidenhead	15.0	2.0	No	2.0
WM013a	Bridge Road 2	Roadside	489652	181323	NO <sub>2</sub>	Yes - Maidenhead	5.0	2.0	No	2.0

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) <sup>(1)</sup>	Distance to kerb of nearest road (m) <sup>(2)</sup>	Tube Co-located with a Continuous Analyser?	Tube Height (m)
WM014a	Stafferton Way	Roadside	489033	180622	NO <sub>2</sub>	Yes - Maidenhead	5.0	1.0	No	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<sub>2</sub> Monitoring Results: Automatic Monitoring (µg/m<sup>3</sup>)**

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) <sup>(1)</sup>	Valid Data Capture 2020 (%) <sup>(2)</sup>	2016	2017	2018	2019	2020
MW1	488626	180994	Roadside		99	<b>43</b>	38.2	36.4	35.1	24.7
MW2	495664	176592	Roadside		99	39	34.5	34.3	32.1	21.8
MW4	488503	182710	Urban Background		92	18	17.6	17.5	17.4	12.6

Annualisation has been conducted where data capture is <75% and >25% in line with LAQM.TG16.

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<sup>3</sup>.

Exceedances of the NO<sub>2</sub> annual mean objective of 40µg/m<sup>3</sup> are shown in **bold**.

All means have been “annualised” as per LAQM.TG16 if valid data capture for the full calendar year is less than 75% and more than 25%. 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<sub>2</sub> Monitoring Results: Non-Automatic Monitoring (µg/m<sup>3</sup>)

Diffusion Tube ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) <sup>(1)</sup>	Valid Data Capture 2020 (%) <sup>(2)</sup>	2016	2017	2018	2019	2020
WM1	494067	176764	Urban Background	N/A	100.0	18.5	16.8	17.9	18.0	12.4
WM2	489807	178760	Suburban	N/A	100.0	27.6	27.6	26.3	25.3	17.1
WM5b	488864	180951	Roadside	N/A	90.1				28.8	19.3
WM9a	496237	176584	Roadside	N/A	90.1				29.7	19.2
WM10a	495606	176364	Roadside	N/A	84.9				39.9	25.4
WM11a	498232	174916	Kerbside	N/A	100.0				37.4	27.4
WM11b	498388	174797	Kerbside	N/A	100.0				36.9	25.9
WM13	502017	172541	Roadside	N/A	100.0	37.1	32.8	39.2	32.9	26.2
WM13a	502108	172461	Roadside	N/A	100.0	39.7	33.7	36.8	36.5	25.7
WM15	502259	172322	Roadside	N/A	90.1	<b>44.7</b>	<b>42.9</b>	<b>41.6</b>	39.4	28.6
WM15a	502257	172333	Roadside	N/A	100.0	<b>42.7</b>	<b>40.2</b>	38.7	36.2	27.2
WM15b	502300	172278	Roadside	N/A	82.7	38.5	37.7	38.4	35.5	26.5

Diffusion Tube ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) <sup>(1)</sup>	Valid Data Capture 2020 (%) <sup>(2)</sup>	2016	2017	2018	2019	2020
WM18, WM19, WM20	495664	176592	Roadside	N/A	100.0	36.4	35.1	34.3	32.8	21.2
WM21, WM22, WM23	488626	180994	Roadside	N/A	100.0	<b>41.9</b>	39.0	37.9	35.6	25.2
WM28	496604	177866	Roadside	N/A	100.0	34.3	30.2	31.2	27.3	20.5
WM28a	496539	177826	Roadside	N/A	90.1	35.5	34.3	32.6	29.1	21.4
WM29	489975	178721	Roadside	N/A	100.0	<b>53.4</b>	<b>49.5</b>	<b>48.8</b>	<b>43.3</b>	30.6
WM29a	489928	178754	Roadside	N/A	100.0	<b>45.2</b>	39.8	<b>41.0</b>	36.9	26.4
WM29b	490060	178593	Roadside	N/A	100.0	<b>41.2</b>	35.3	37.3	32.0	22.9
WM30a	498549	177064	Kerbside	N/A	100.0			31.2	29.0	19.1
WM30b	498645	176990	Kerbside	N/A	82.4				32.1	22.4
WM30c	498725	177092	Kerbside	N/A	92.0				<b>43.0</b>	29.8
WM31	495896	176939	Kerbside	N/A	90.1	39.3	39.5	<b>44.8</b>	<b>40.9</b>	26.2
WM32	496082	176903	Kerbside	N/A	100.0	34.2	32.1	31.7	32.2	21.6
WM33	496312	176886	Kerbside	N/A	100.0	<b>40.6</b>	36.4	38.5	34.6	24.0

Diffusion Tube ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) <sup>(1)</sup>	Valid Data Capture 2020 (%) <sup>(2)</sup>	2016	2017	2018	2019	2020
WM34	488417	180554	Urban Background	N/A	100.0				19.1	13.7
WM01	501366	172377	Suburban	N/A	90.1	18.6	16.0	18.6	16.9	12.4
WM03	495331	175569	Kerbside	N/A	90.1	<b>40.3</b>	39.2	38.7	37.1	26.7
WM03a	495294	175556	Kerbside	N/A	100.0	<b>47.4</b>	<b>43.8</b>	<b>44.3</b>	<b>42.1</b>	30.9
WM03b	495314	175551	Kerbside	N/A	100.0	<b>48.8</b>	<b>48.7</b>	<b>46.7</b>	<b>47.4</b>	34.1
WM03c	495413	175587	Roadside	N/A	100.0	25.3	24.6		23.7	16.4
WM04	496631	175927	Kerbside	N/A	100.0	34.8	29.4	31.5	30.9	20.7
WM04a	496380	176035	Kerbside	N/A	100.0			34.8	31.5	20.9
WM013	489571	181334	Roadside	N/A	100.0	32.2	33.2	29.9	31.5	22.6
WM013a	489652	181323	Roadside	N/A	100.0	<b>44.0</b>	<b>41.4</b>	39.5	<b>41.1</b>	30.6
WM014a	489033	180622	Roadside	N/A	100.0	31.7	29.1	32.9	31.4	21.8

Annualisation has been conducted where data capture is <75% and >25% in line with LAQM.TG16.

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  $\mu\text{g}/\text{m}^3$ .

Exceedances of the  $\text{NO}_2$  annual mean objective of  $40\mu\text{g}/\text{m}^3$  are shown in **bold**.

$\text{NO}_2$  annual means exceeding  $60\mu\text{g}/\text{m}^3$ , indicating a potential exceedance of the  $\text{NO}_2$  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.TG16 if valid data capture for the full calendar year is less than 75% and more than 25%. 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%).

Figures A.1 to A.1.7 – Trends in Annual Mean NO<sub>2</sub> Concentrations

Figure A1 - NO<sub>2</sub> annual mean concentrations for sites MW1, MW2 and MW4 between years 2016 to 2020. There are no exceedances of the annual mean objective in 2020 and there is a general trend of reduction experienced across the sites.

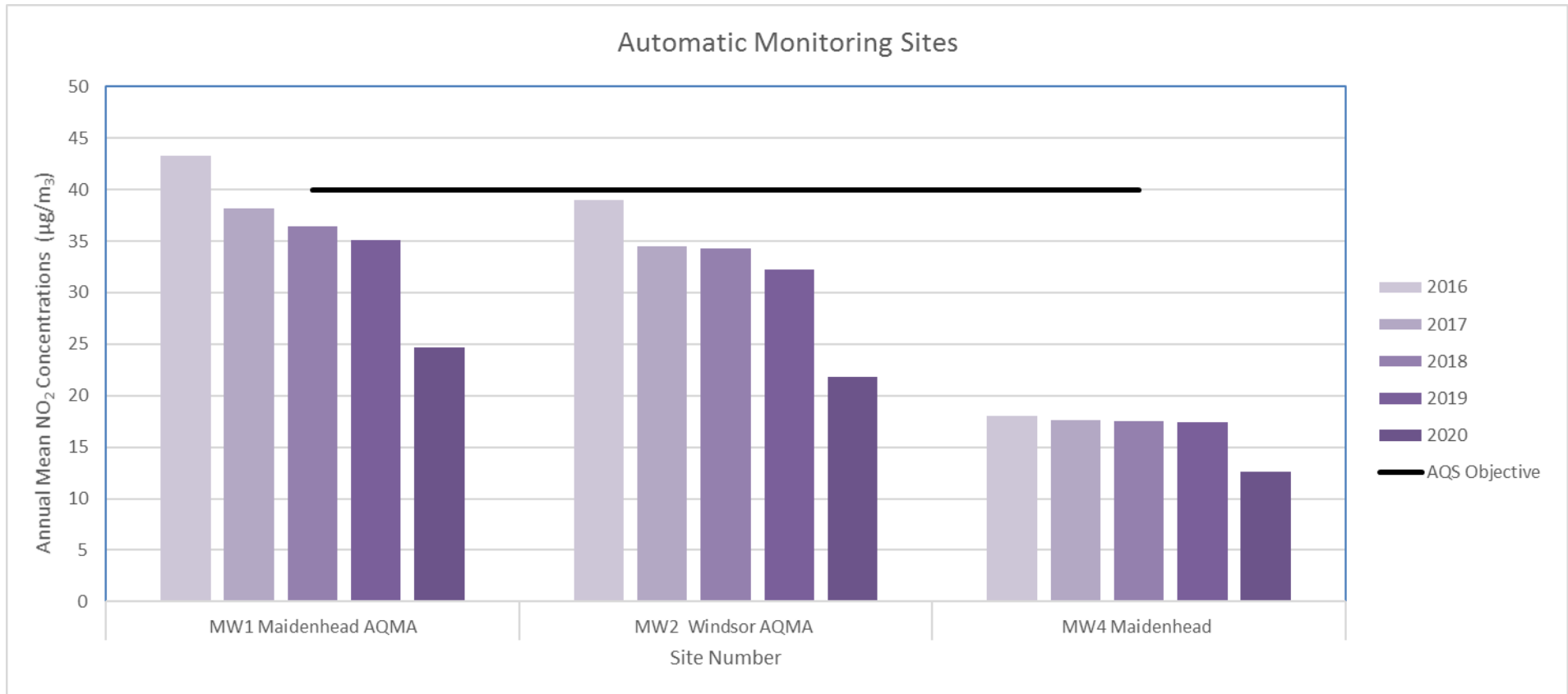


Figure A1.1 - NO<sub>2</sub> annual mean concentrations for diffusion tube sites in Maidenhead between years 2016 to 2020. There are no exceedances of the annual mean objective in 2020 and there is a general trend of reduction experienced across the sites.

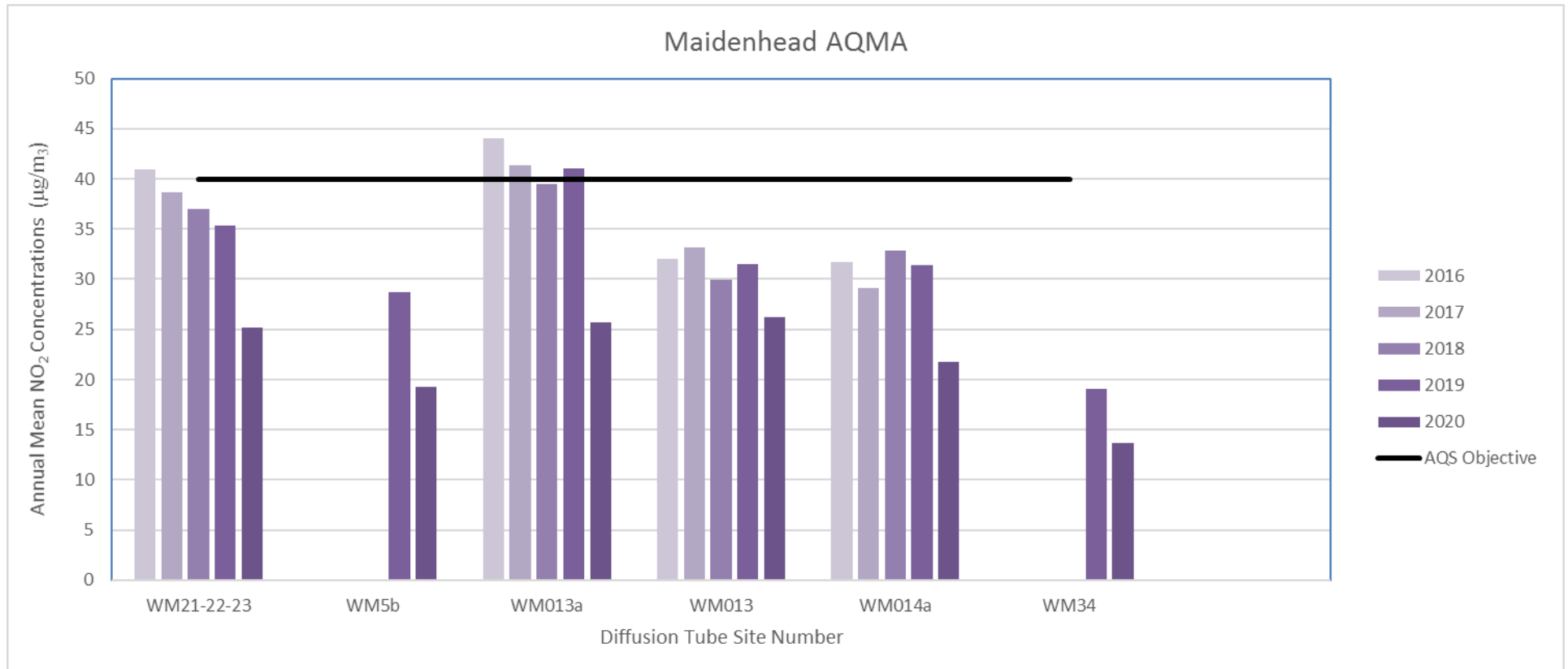


Figure A1.2 - NO<sub>2</sub> annual mean concentrations for diffusion tube sites in Bray AQMA between years 2016 to 2020. There are no exceedances of the annual mean objective in 2020 and there is a general trend of reduction experienced across the sites.

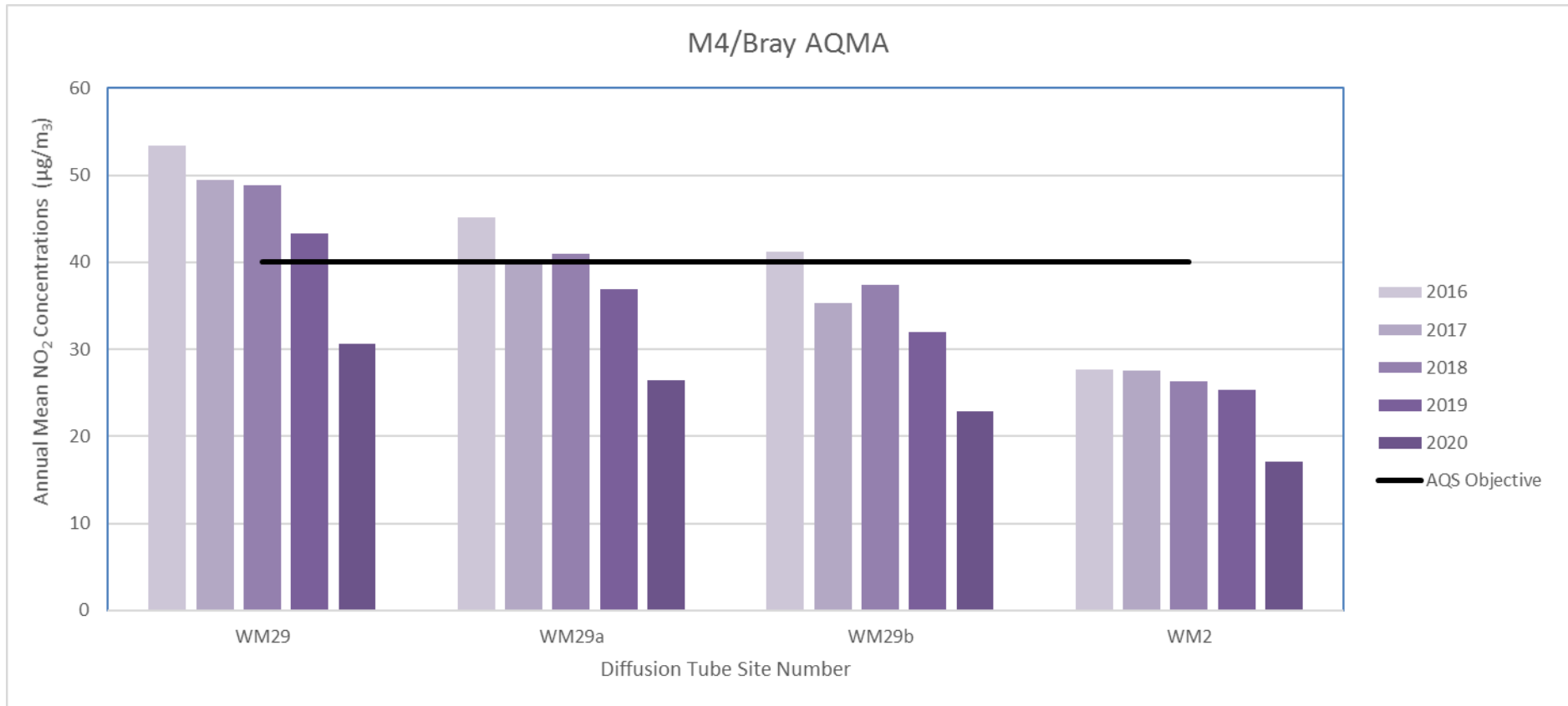


Figure A1.3 - NO<sub>2</sub> annual mean concentrations for diffusion tube sites in Windsor between years 2016 to 2020. There are no exceedances of the annual mean objective in 2020 and there is a general trend of reduction experienced across the sites.

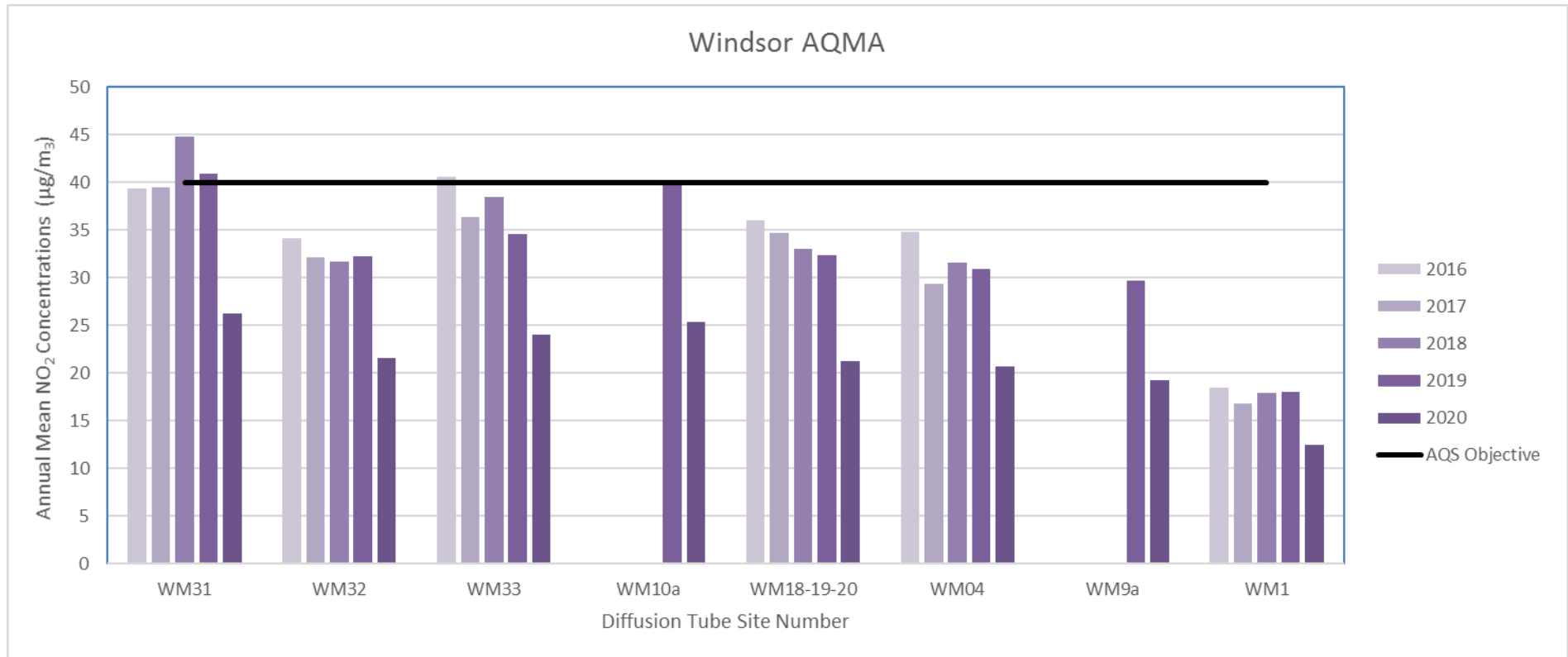




Figure A1.4 - NO<sub>2</sub> annual mean concentrations for diffusion tube sites at St Leonards Road in Windsor between years 2016 to 2020. There are no exceedances of the annual mean objective in 2020 and there is a general trend of reduction experienced across the sites.

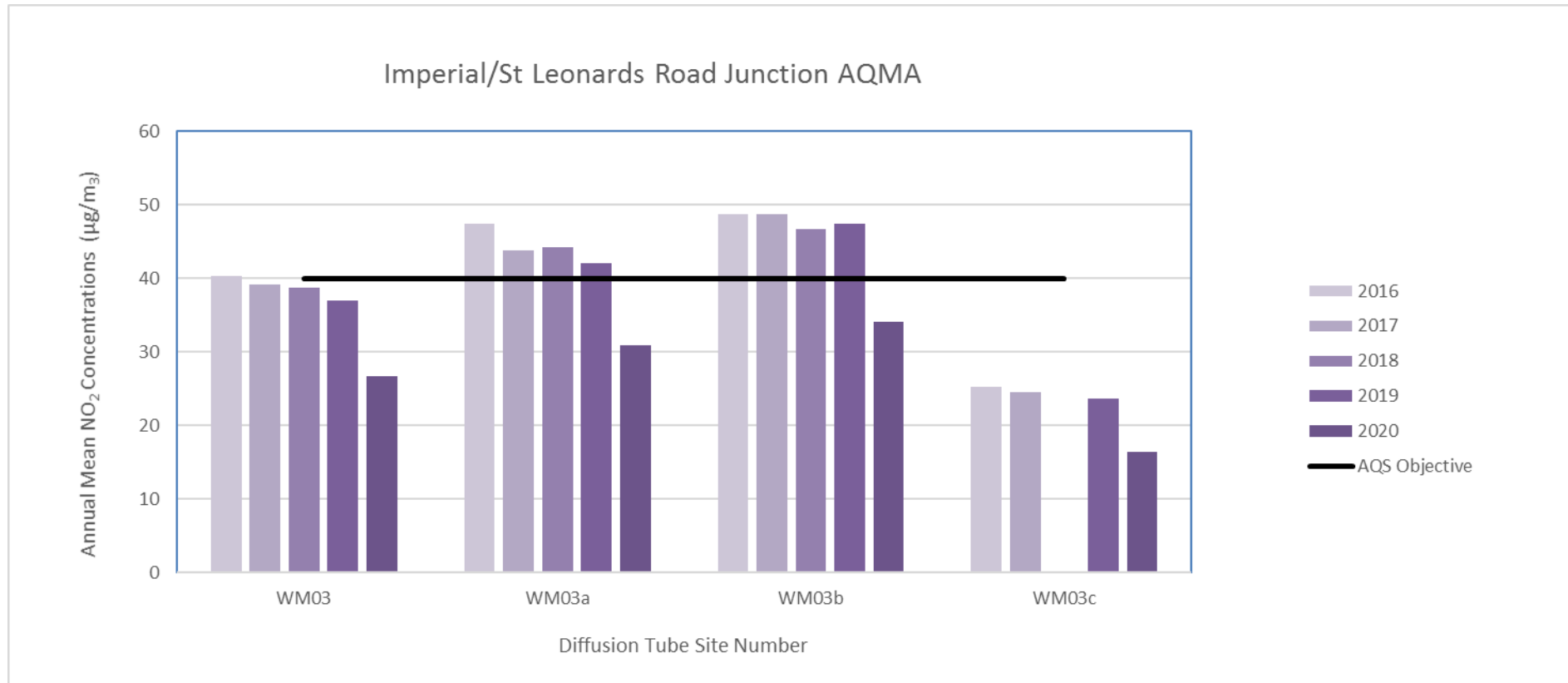


Figure A1.5 - NO<sub>2</sub> annual mean concentrations for diffusion tube sites at Wraysbury Road AQMA between years 2016 to 2020. There are no exceedances of the annual mean objective in 2020 and there is a general trend of reduction experienced across the sites.

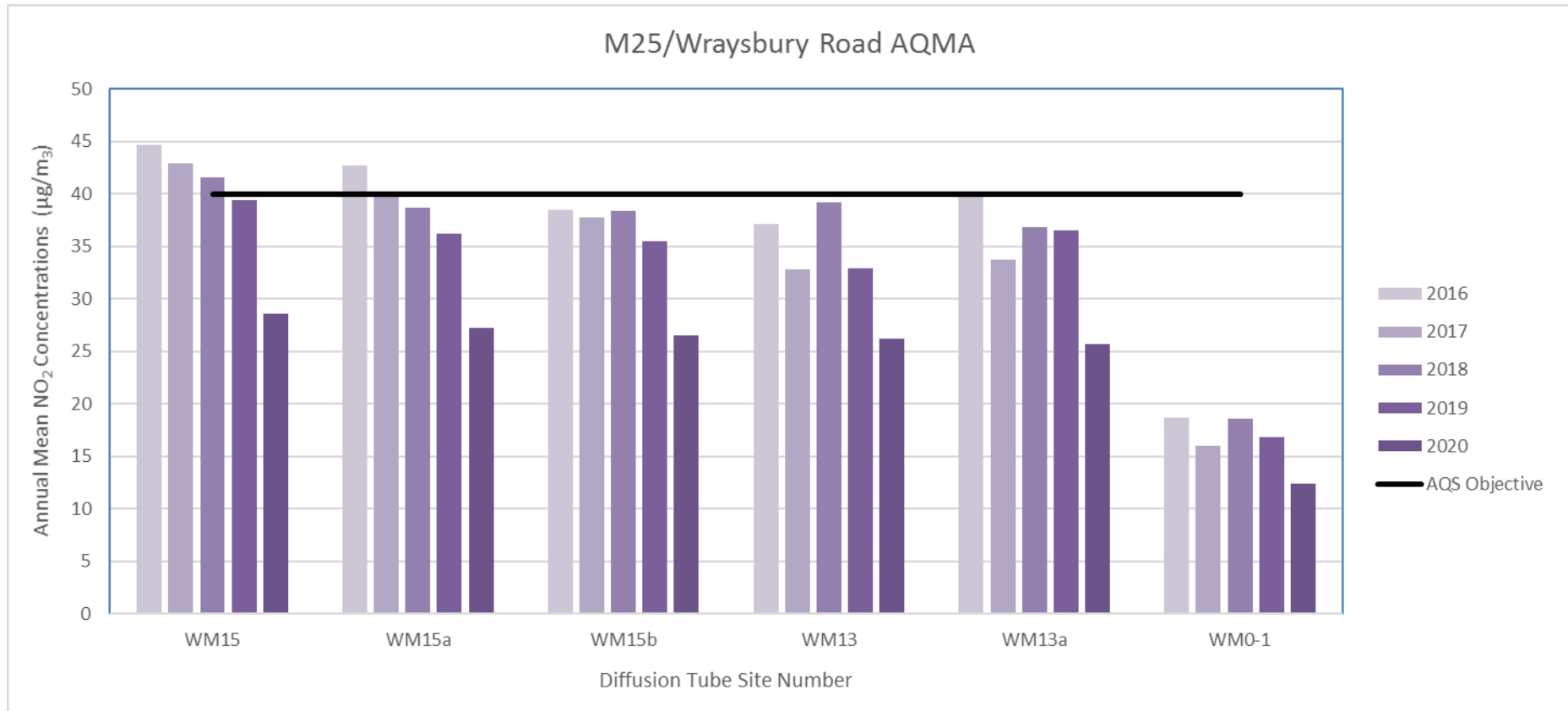


Figure A1.6 - NO<sub>2</sub> annual mean concentrations for diffusion tube sites in Datchet between years 2016 to 2020. There are no exceedances of the annual mean objective in 2020.

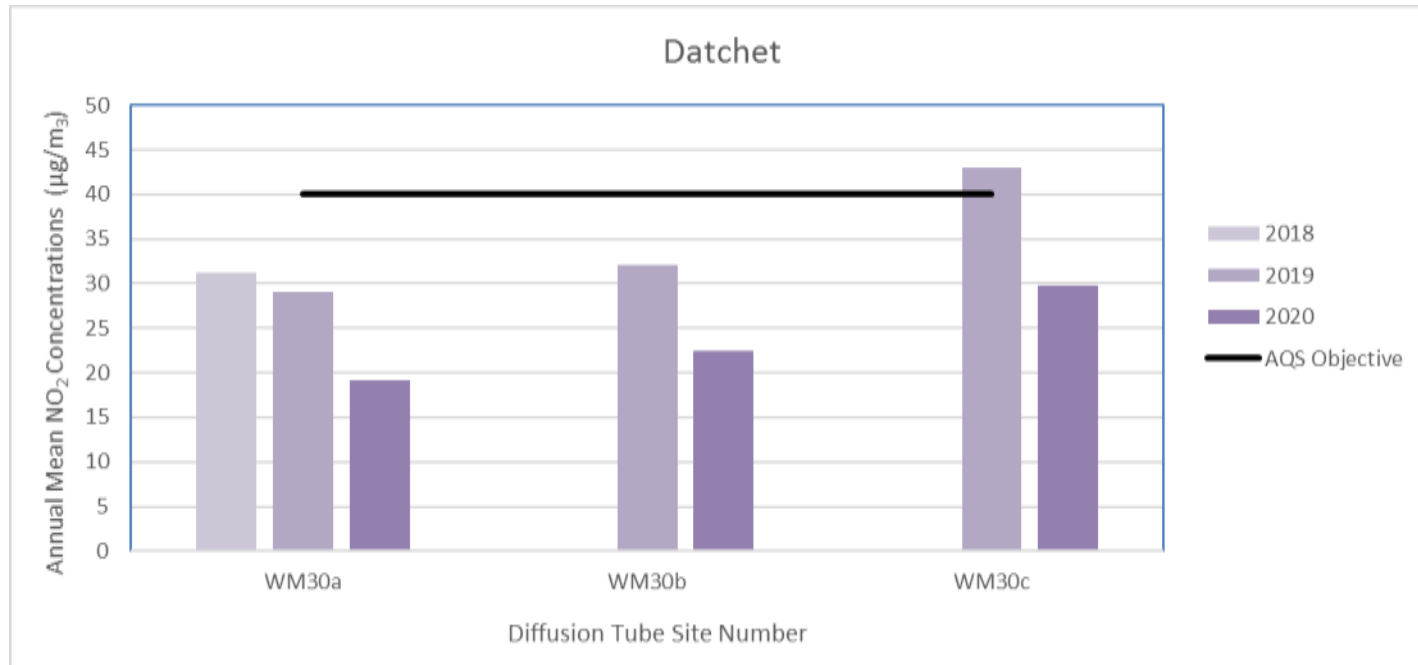


Figure A1.7 - NO<sub>2</sub> annual mean concentrations for diffusion tube sites in Eton between years 2016 to 2020. There are no exceedances of the annual mean objective in 2020 and there is a general trend of reduction experienced across the sites.

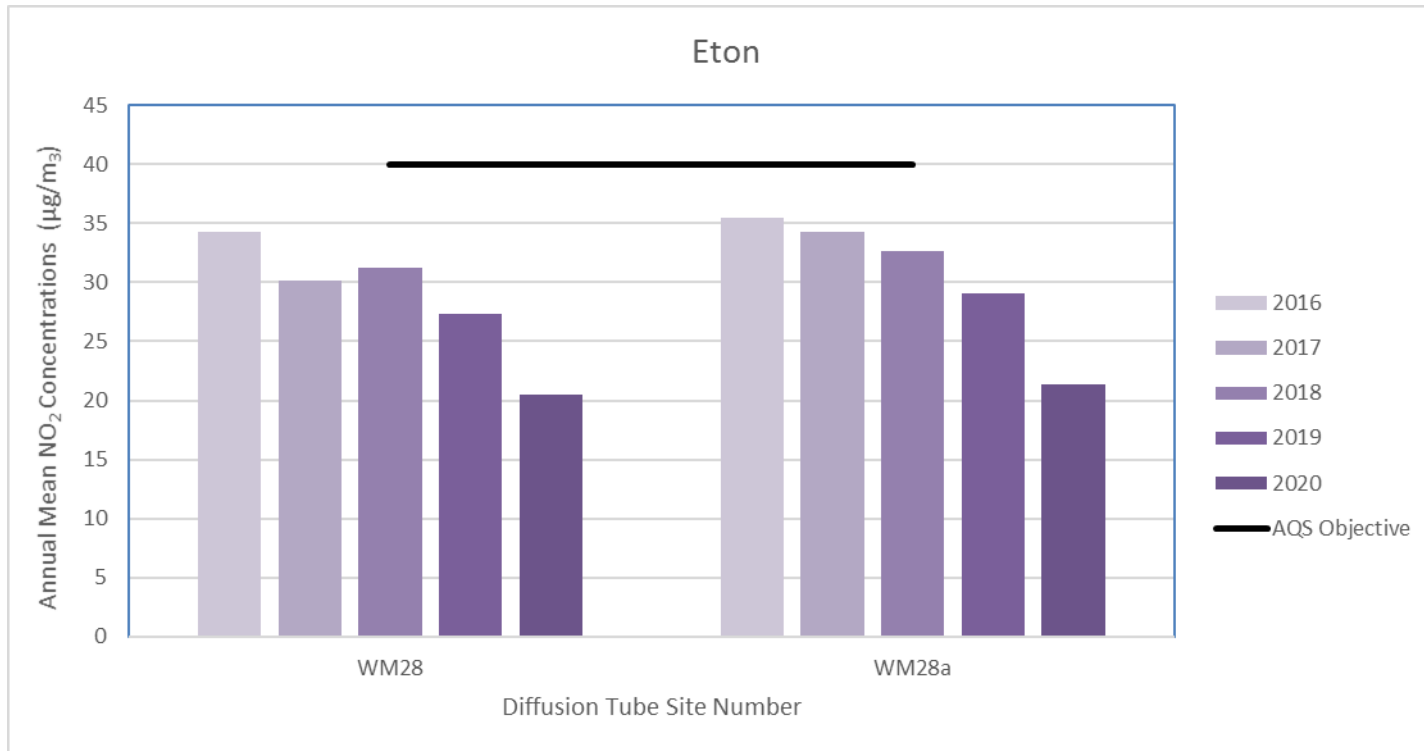


Table A.5 – 1-Hour Mean NO<sub>2</sub> Monitoring Results, Number of 1-Hour Means > 200µg/m<sup>3</sup>

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) <sup>(1)</sup>	Valid Data Capture 2020 (%) <sup>(2)</sup>	2016	2017	2018	2019	2020
MW1	488626	180994	Roadside		99	0	0	0	0	0
MW2	495664	176592	Roadside		99	0	3	0	0	1
MW4	488503	182710	Urban Background		92	0	0	0	0	0

**Notes:**

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

Exceedances of the NO<sub>2</sub> 1-hour mean objective (200µg/m<sup>3</sup> 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%).

**Table A.6 – Annual Mean PM<sub>10</sub> Monitoring Results (µg/m<sup>3</sup>)**

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) <sup>(1)</sup>	Valid Data Capture 2020 (%) <sup>(2)</sup>	2016	2017	2018	2019	2020
MW1	488626	180994	Roadside		98%	25	24	22.8	22.8	18.8

**Annualisation has been conducted where data capture is <75% and >25% in line with LAQM.TG16.**

**Notes:**

The annual mean concentrations are presented as µg/m<sup>3</sup>.

Exceedances of the PM<sub>10</sub> annual mean objective of 40µg/m<sup>3</sup> are shown in **bold**.

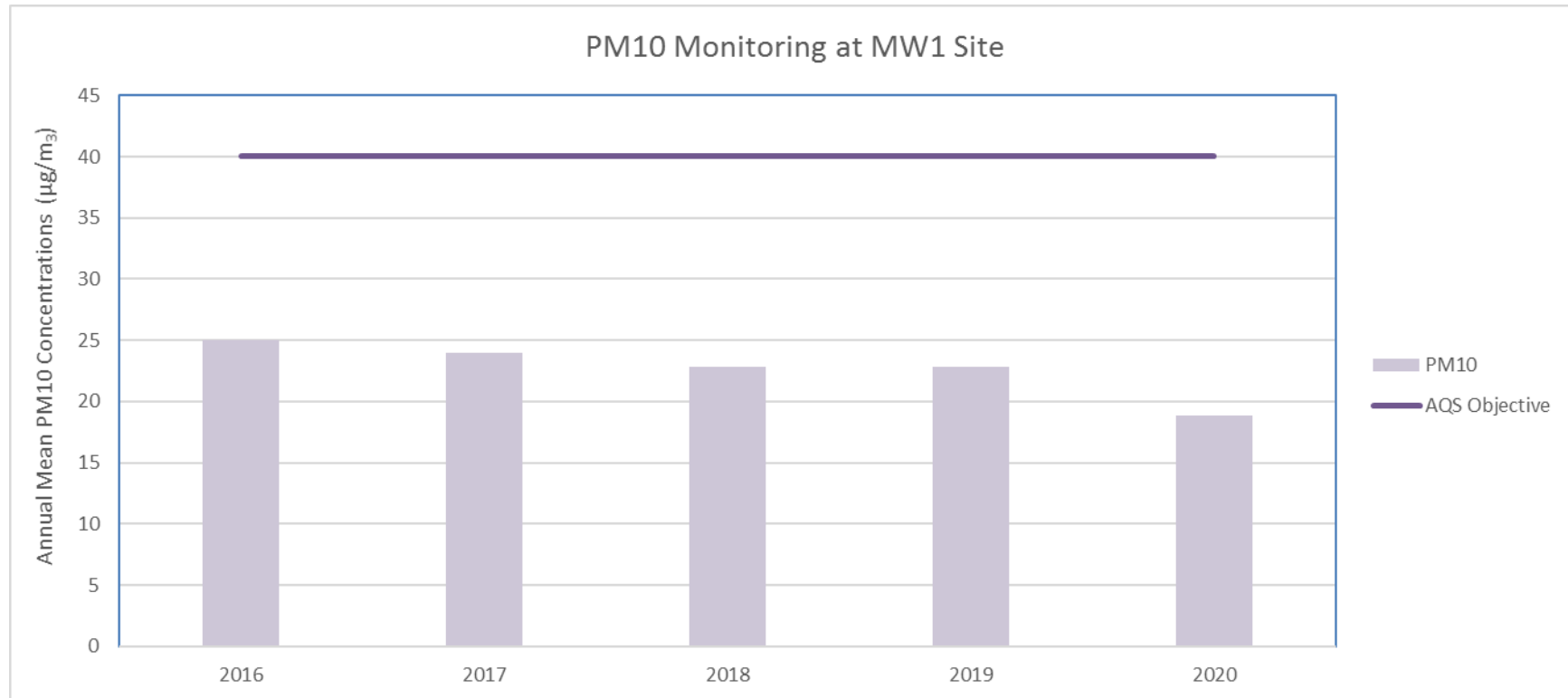
All means have been “annualised” as per LAQM.TG16 if valid data capture for the full calendar year is less than 75%. See Appendix C for details.

(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.2 – Trends in Annual Mean PM<sub>10</sub> Concentrations**

PM10 annual mean concentrations in Maidenhead between years 2016 to 2020. There are no exceedances of the annual mean objective in 2020 and there is a general trend of reduction experienced at the site



**Table A.7 – 24-Hour Mean PM<sub>10</sub> Monitoring Results, Number of PM<sub>10</sub> 24-Hour Means > 50µg/m<sup>3</sup>**

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) <sup>(1)</sup>	Valid Data Capture 2020 (%) <sup>(2)</sup>	2016	2017	2018	2019	2020
MW1	488626	180994	Roadside		98%	15	12	2	8	3

**Notes:**

Results are presented as the number of 24-hour periods where daily mean concentrations greater than 50µg/m<sup>3</sup> have been recorded.

Exceedances of the PM<sub>10</sub> 24-hour mean objective (50µg/m<sup>3</sup> not to be exceeded more than 35 times/year) are shown in **bold**.

If the period of valid data is less than 85%, the 90.4th percentile of 24-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 2020

Table B.1 – NO<sub>2</sub> 2020 Diffusion Tube Results (µg/m<sup>3</sup>)

DT ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Easting)	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
WM1	494067	176764	17.7	14.6	15.4	16.9	9.2	10.2	7.1	10.6	14.1	12.9	22.4	19.7	14.2	12.4	-	
WM2	489807	178760	28.2	22.2	20.0	18.9	11.6	13.0	11.8	17.6	17.8	18.6	29.3	26.7	19.6	17.1	-	
WM5 b	488864	180951	32.3	26.9	21.5	17.2	11.7	15.1	14.5	18.5	22.8		30.3	31.6	22.0	19.3	-	
WM9 a	496237	176584	27.7	24.3	23.5	22.6	13.4	16.8	13.9		25.2	21.7	30.0	22.3	21.9	19.2	-	
WM1 0a	495606	176364	37.6			26.7	15.9	28.8	20.8	34.7	33.5	27.4	41.3	23.9	29.0	25.4	-	
WM1 1a	498232	174916	39.0	35.0	28.1	28.2	23.3	25.1	24.2	32.2	37.8	32.0	37.6	34.7	31.4	27.4	-	
WM1 1b	498388	174797	35.1	31.4	28.7	24.0	22.4	24.0	22.7	28.7	35.4	31.1	38.1	33.7	29.6	25.9	-	
WM1 3	502017	172541	33.1	28.3	31.8	32.4	24.2	25.5	18.8	29.7	34.7	31.1	39.9	30.9	30.0	26.2	-	
WM1 3a	502108	172461	37.2	28.9	32.7	30.7	23.1	26.1	18.0	28.4	33.3	28.6	35.5	30.9	29.4	25.7	-	
WM1 5	502259	172322	42.4	41.5	33.4	25.0	23.2	25.2	28.9		35.6	36.5	36.0	33.0	32.8	28.6	-	
WM1 5a	502257	172333	40.2	40.8	32.5	23.2	20.8	22.0	29.6	28.1	33.3	33.2	36.7	32.9	31.1	27.2	-	
WM1 5b	502300	172278	39.3	34.9	30.5	22.9	19.6	20.7			30.1	33.1	41.4	30.4	30.3	26.5	-	
WM1 8	495664	176592	33.8	24.2	22.7	22.7	17.6	20.7	16.2	24.3	22.1	25.7	32.6	25.8	-	-	-	Triplicate Site with WM18, WM19 and WM20 - Annual data provided for WM20 only
WM1 9	495664	176592	34.3	27.8	24.2	23.3	16.6	22.6	16.3	25.2	24.7	25.0	33.7	23.6	-	-	-	Triplicate Site with WM18, WM19 and WM20 - Annual data provided for WM20 only
WM2 0	495664	176592	32.7	26.0	20.1	22.9	16.6	21.7	16.7	24.2	24.6	24.1	32.9	27.2	24.3	21.2	-	Triplicate Site with WM18, WM19 and WM20 - Annual data provided for WM20 only
WM2 1	488626	180994	39.4	35.5	28.4	20.8	19.3	24.3	21.8	29.4	28.7	31.2	37.1	30.1	-	-	-	Triplicate Site with WM21, WM22 and WM23 - Annual data provided for WM23 only
WM2 2	488626	180994	38.0	31.7	26.3	22.7	19.4	24.4	21.0	31.4	31.9	29.7	36.8	30.3	-	-	-	Triplicate Site with WM21, WM22 and WM23 - Annual data provided for WM23 only

DT ID	X OS Grid Ref (Easting )	Y OS Grid Ref (Easting )	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
WM2 3	488626	180994	39.0	34.6	28.9	22.8	18.2	24.6	21.1	27.2	32.3	32.6	38.2	30.3	28.9	25.2	-	Triplicate Site with WM21, WM22 and WM23 - Annual data provided for WM23 only
WM2 8	496604	177866	29.4	22.9	24.1	23.3	19.3	19.3	16.5	23.3	26.5	22.2	29.2	26.0	23.5	20.5	-	
WM2 8a	496539	177826	33.6	24.9	18.7	21.9	19.1	22.9	19.2		27.0	24.4	29.7	28.0	24.5	21.4	-	
WM2 9	489975	178721	47.2	37.1	31.6	32.0	27.0	32.1	28.3	39.1	35.8	29.3	45.3	34.9	35.0	30.6	-	
WM2 9a	489928	178754	39.3	28.0	28.0	25.6	21.5	30.0	24.3	34.5	34.9	31.6	35.7	29.4	30.2	26.4	-	
WM2 9b	490060	178593	33.6	26.6	24.3	26.6	18.1	21.3	18.1	27.0	30.1	23.8	35.9	29.8	26.3	22.9	-	
WM3 0a	498549	177064	29.7	21.5	17.3	24.1	15.8	16.0	13.5	22.4	25.5	20.1	31.1	25.7	21.9	19.1	-	
WM3 0b	498645	176990		34.6	28.0	24.9	16.8	19.4	17.9	26.8	28.2	26.5	33.1		25.6	22.4	-	
WM3 0c	498725	177092	43.7		34.1	32.5	24.9	25.4	29.1	36.3	39.3	35.4	40.9	33.1	34.1	29.8	-	
WM3 1	495896	176939	36.9	31.4	27.4	26.6	21.1	25.8	24.3	30.8	38.4	32.3	34.4		30.0	26.2	-	
WM3 2	496082	176903	38.4	29.1	20.9	21.2	14.1	20.8	17.4	23.0	24.4	25.4	32.8	29.8	24.8	21.6	-	
WM3 3	496312	176886	36.3	28.1	25.5	25.8	18.0	22.2	22.0	30.1	34.0	28.6	30.7	28.2	27.5	24.0	-	
WM3 4	488417	180554	24.9	19.9	15.9	16.6	9.6	9.9	7.5	12.2	15.9	13.7	23.9	18.1	15.7	13.7	-	
WM0 1	501366	172377	18.6	13.5	13.7	15.5		10.0	6.7	10.4	14.2	13.5	23.7	16.8	14.2	12.4	-	
WM0 3	495331	175569	35.0	35.2	30.8	24.5		25.0	25.9	31.2	33.9	29.0	34.4	31.3	30.6	26.7	-	
WM0 3a	495294	175556	44.9	37.4	35.3	29.2	22.9	28.9	28.1	36.3	40.3	39.2	44.1	38.2	35.4	30.9	-	
WM0 3b	495314	175551	52.7	48.1	36.9	26.6	28.0	33.6	34.1	42.2	41.7	39.7	44.8	39.9	39.0	34.1	-	
WM0 3c	495413	175587	22.5	21.7	20.9	16.8	11.4	14.9	15.8	17.8	17.6	20.4	26.1	19.3	18.8	16.4	-	
WM0 4	496631	175927	30.6	23.8	21.8	23.5	18.1	19.3	15.4	19.3	25.4	20.3	35.2	32.5	23.8	20.7	-	
WM0 4a	496380	176035	35.0	26.0	21.1	20.0	15.2	21.1	15.7	23.1	24.4	25.5	30.9	29.6	24.0	20.9	-	

DT ID	X OS Grid Ref (Easting )	Y OS Grid Ref (Easting )	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
WMO 13	489571	181334	37.3	35.6	28.5	21.2	15.4	20.4	16.6	21.3	26.0	25.2	33.0	29.5	25.8	22.6	-	
WMO 13a	489652	181323	51.4	48.6	35.3	22.9	22.5	31.0	27.5	32.4	36.0	39.0	36.4	37.6	35.0	30.6	-	
WMO 14a	489033	180622	35.3	25.4	24.6	20.6	17.4	22.6	18.2	24.0	27.3	24.6	33.0	26.3	24.9	21.8	-	

- All erroneous data has been removed from the NO<sub>2</sub> diffusion tube dataset presented in Table B.1.
- Annualisation has been conducted where data capture is <75% and >25% in line with LAQM.TG16.
- Local bias adjustment factor used.
- National bias adjustment factor used.
- Where applicable, data has been distance corrected for relevant exposure in the final column.
- The Royal Borough of Windsor and Maidenhead confirm that all 2020 diffusion tube data has been uploaded to the Diffusion Tube Data Entry System.

**Notes:**

Exceedances of the NO<sub>2</sub> annual mean objective of 40µg/m<sup>3</sup> are shown in **bold**.

NO<sub>2</sub> annual means exceeding 60µg/m<sup>3</sup>, indicating a potential exceedance of the NO<sub>2</sub> 1-hour mean objective are shown in **bold and underlined**.

See Appendix C for details on bias adjustment and annualisation.

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

### **New or Changed Sources Identified Within the Royal Borough of Windsor and Maidenhead During 2020**

The Royal Borough of Windsor and Maidenhead has not identified any new sources relating to air quality within the reporting year of 2020.

### **Additional Air Quality Works Undertaken by the Royal Borough of Windsor and Maidenhead During 2020**

The Royal Borough of Windsor and Maidenhead has not completed any additional works within the reporting year of 2020.

### **QA/QC of Diffusion Tube Monitoring**

Diffusion Tubes are supplied by Gradko International Ltd. The preparation method is TEA 50% acetone. Nitrogen dioxide is determined by U.V. Spectrophotometry.

The laboratory performance under the Workplace Analysis Scheme for Proficiency (WASP) for AIR NO<sub>2</sub> PT rounds AR36, 37, 39 and 40 covering January 2020 – November 2020, show a percentage of results submitted with satisfactory score of 100%

<http://laqm.defra.gov.uk/diffusion-tubes/qa-qc-framework.html>

The monitoring has been completed in adherence with Defra 2020 Diffusion Tube Monitoring Calendar.

### **Diffusion Tube Annualisation**

All diffusion tube monitoring locations within The Royal Borough of Windsor and Maidenhead recorded data capture greater than 75% during 2020 therefore it was not required to annualise any monitoring data. In addition, any sites with a data capture below 25% do not require annualisation.

## Diffusion Tube Bias Adjustment Factors

The diffusion tube data presented within the 2020 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.TG16 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<sub>x</sub>/NO<sub>2</sub> continuous analysers. Alternatively, the national database of diffusion tube co-location surveys provides bias factors for the relevant laboratory and preparation method.

The Royal Borough of Windsor and Maidenhead have applied a local bias adjustment factor of 0.87 to the 2020 monitoring data. Two co-location studies at sites MW1 and MW2 have been utilised to derive the local factor. The local factors data had good precision and accuracy, the calculations used to derive the local factor are in line with guidance provided within LAQM.TG16 Chapter 7: NO<sub>x</sub> and NO<sub>2</sub> Monitoring, NO<sub>2</sub> by Diffusion Tubes.

The local factor is derived by averaging the B values of the two studies: 17% for MW1 and 12% for MW2 = 14.5%. This is then expressed as a factor, 0.145. Next, 1.00 is added to this value = 1.14. The inverse is taken to give the bias adjustment factor:  $1/1.14 = 0.87$ .

A summary of bias adjustment factors used by The Royal Borough of Windsor and Maidenhead over the past five years is presented in Table C.1.

**Table C.1 – Bias Adjustment Factor**

Year	Local or National	If National, Version of National Spreadsheet	Adjustment Factor
2020	Local	-	0.87
2019	Local	-	0.94
2018	Local	-	0.95
2017	Local	-	1.00
2016	Local	-	1.07

## NO<sub>2</sub> Fall-off with Distance from the Road

Wherever possible, local authorities should ensure that monitoring locations are representative of exposure. However, where this is not possible, the NO<sub>2</sub> concentration at

the nearest location relevant for exposure should be estimated using the Diffusion Tube Data Processing Tool/NO<sub>2</sub> fall-off with distance calculator available on the LAQM Support website. Where appropriate, non-automatic annual mean NO<sub>2</sub> concentrations corrected for distance are presented in Table B.1.

No diffusion tube NO<sub>2</sub> monitoring locations within the Royal Borough of Windsor and Maidenhead required distance correction during 2020.

## **QA/QC of Automatic Monitoring**

Automatic Monitoring sites MW1, MW2 and MW4 are part of the London Air Quality Network (LAQN) which is operated and managed by the Environmental Research Group (ERG) at Imperial College London. ERG is also responsible for data management and ratification process. QA/QC audits are completed by the National Physical Laboratory (NPL). Data have traceability to national standards and operational procedures defined for LAQN. Audit and servicing of the sites is completed six monthly. The monitoring data presented within the ASR is fully ratified. Live and historic data is available through the London Air Quality website.

Local Site Operator (LSO) duties for all automatic monitoring sites are completed by the Council's Environmental Protection Officer, calibration of the sites is done every 2-3 weeks.

### **PM<sub>10</sub> and PM<sub>2.5</sub> Monitoring Adjustment**

The type of PM<sub>10</sub> monitor utilised within the Royal Borough of Windsor and Maidenhead do not required the application of a correction factor.

### **Automatic Monitoring Annualisation**

All automatic monitoring locations within the Royal Borough of Windsor and Maidenhead recorded data capture of greater than 75% therefore it was not required to annualise any monitoring data. In addition, any sites with a data capture below 25% do not require annualisation.

### **NO<sub>2</sub> Fall-off with Distance from the Road**

Wherever possible, local authorities should ensure that monitoring locations are representative of exposure. However, where this is not possible, the NO<sub>2</sub> concentration at

the nearest location relevant for exposure should be estimated using the NO<sub>2</sub> fall-off with distance calculator available on the LAQM Support website. Where appropriate, non-automatic annual mean NO<sub>2</sub> concentrations corrected for distance are presented in Table B.1.

No automatic NO<sub>2</sub> monitoring locations within the Royal Borough of Windsor and Maidenhead required distance correction during 2020.

Table C.2 – Local Bias Adjustment Calculation

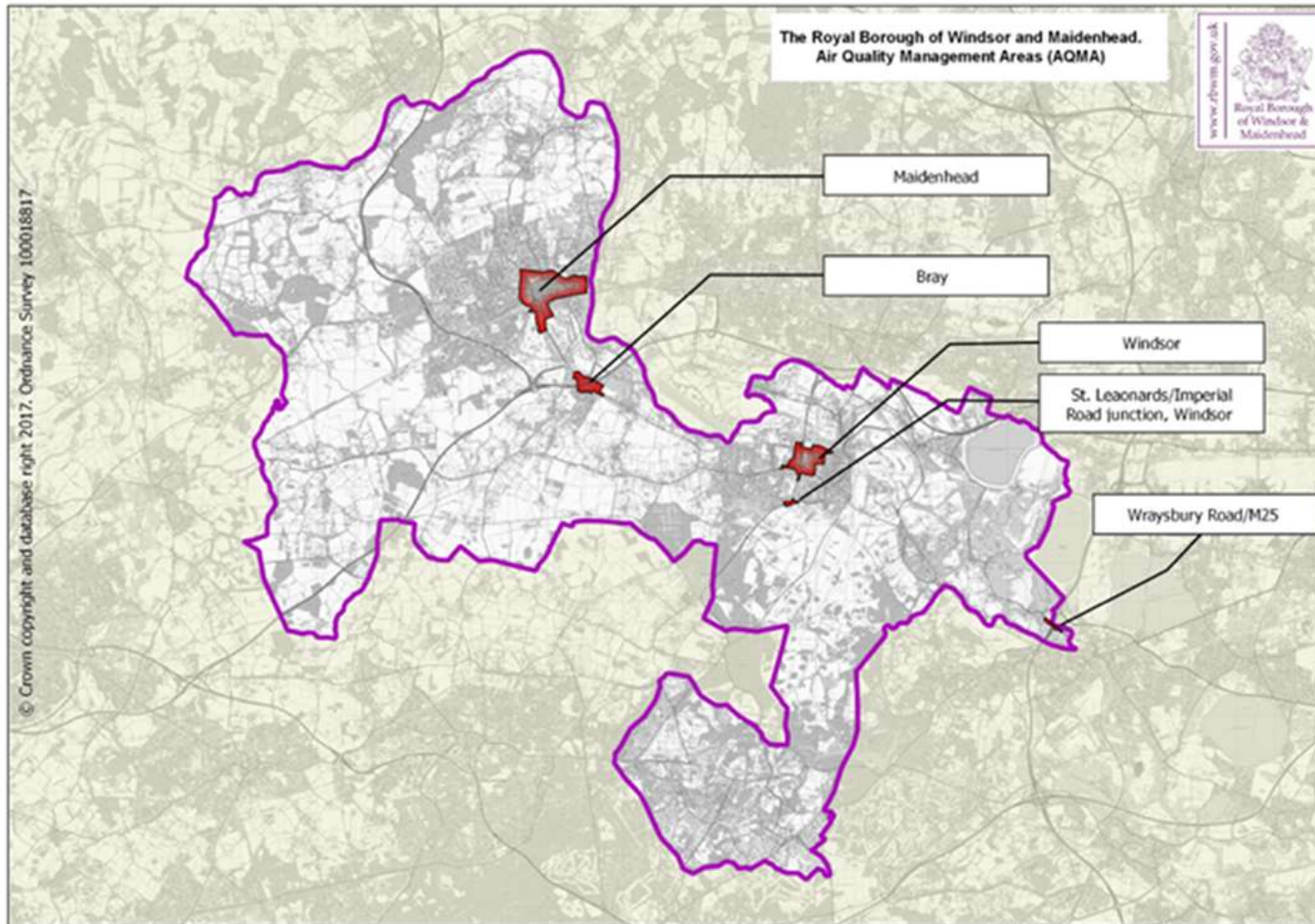
	Local Bias Adjustment Input 1	Local Bias Adjustment Input 2	Local Bias Adjustment Input 3	Local Bias Adjustment Input 4	Local Bias Adjustment Input 5
<b>Periods used to calculate bias</b>	12	12			
<b>Bias Factor A</b>	0.85 (0.81 - 0.9)	0.89 (0.84 - 0.96)			
<b>Bias Factor B</b>	17% (11% - 24%)	12% (4% - 19%)			
<b>Diffusion Tube Mean (<math>\mu\text{g}/\text{m}^3</math>)</b>	28.9	24.3			
<b>Mean CV (Precision)</b>	3.7%	4.2%			
<b>Automatic Mean (<math>\mu\text{g}/\text{m}^3</math>)</b>	24.6	21.8			
<b>Data Capture</b>	99%	99%			
<b>Adjusted Tube Mean (<math>\mu\text{g}/\text{m}^3</math>)</b>	25 (23 - 26)	22 (20 - 23)			

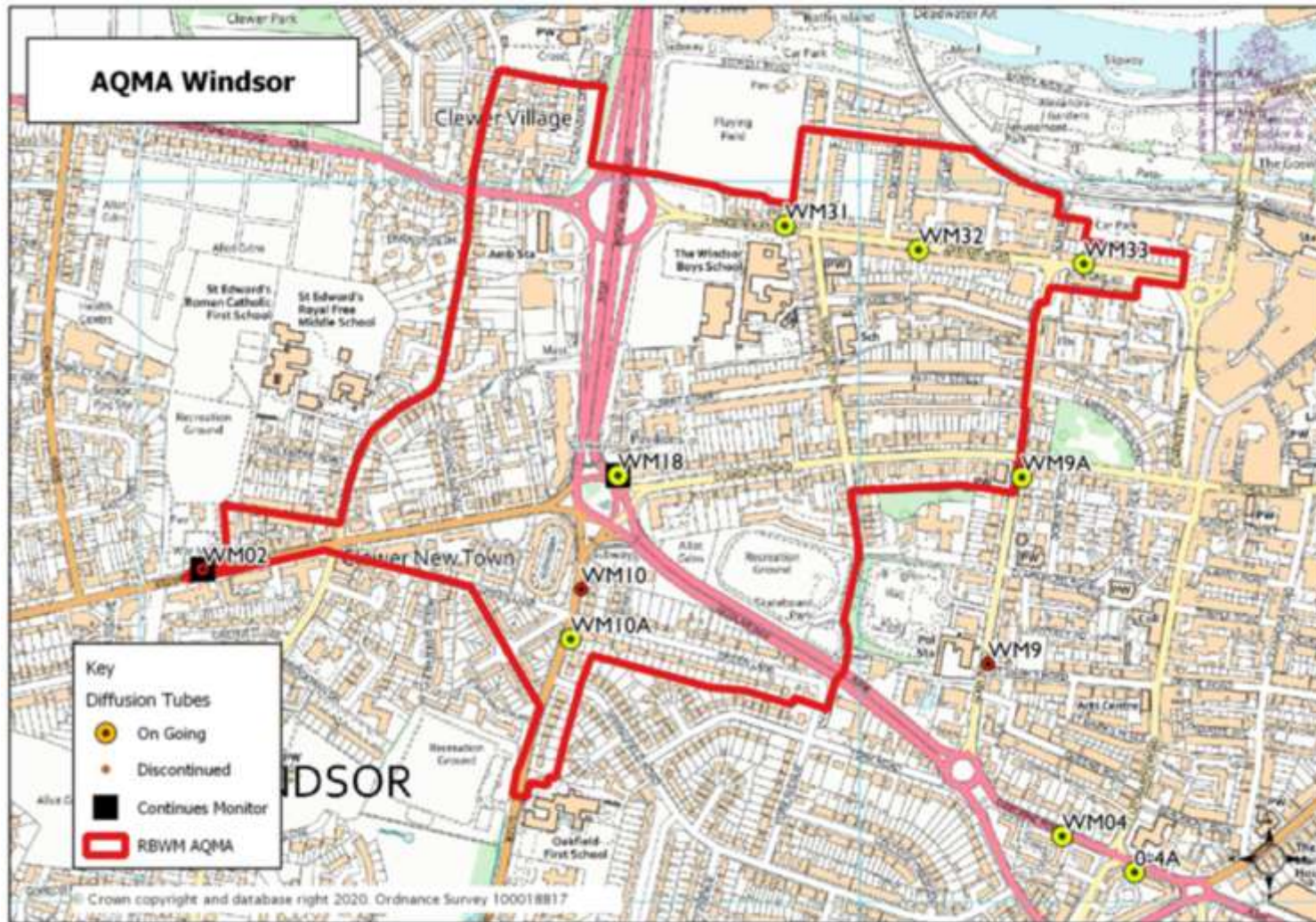
**Notes:**

A combined local bias adjustment factor of 0.87 has been used to bias adjust the 2020 diffusion tube results.

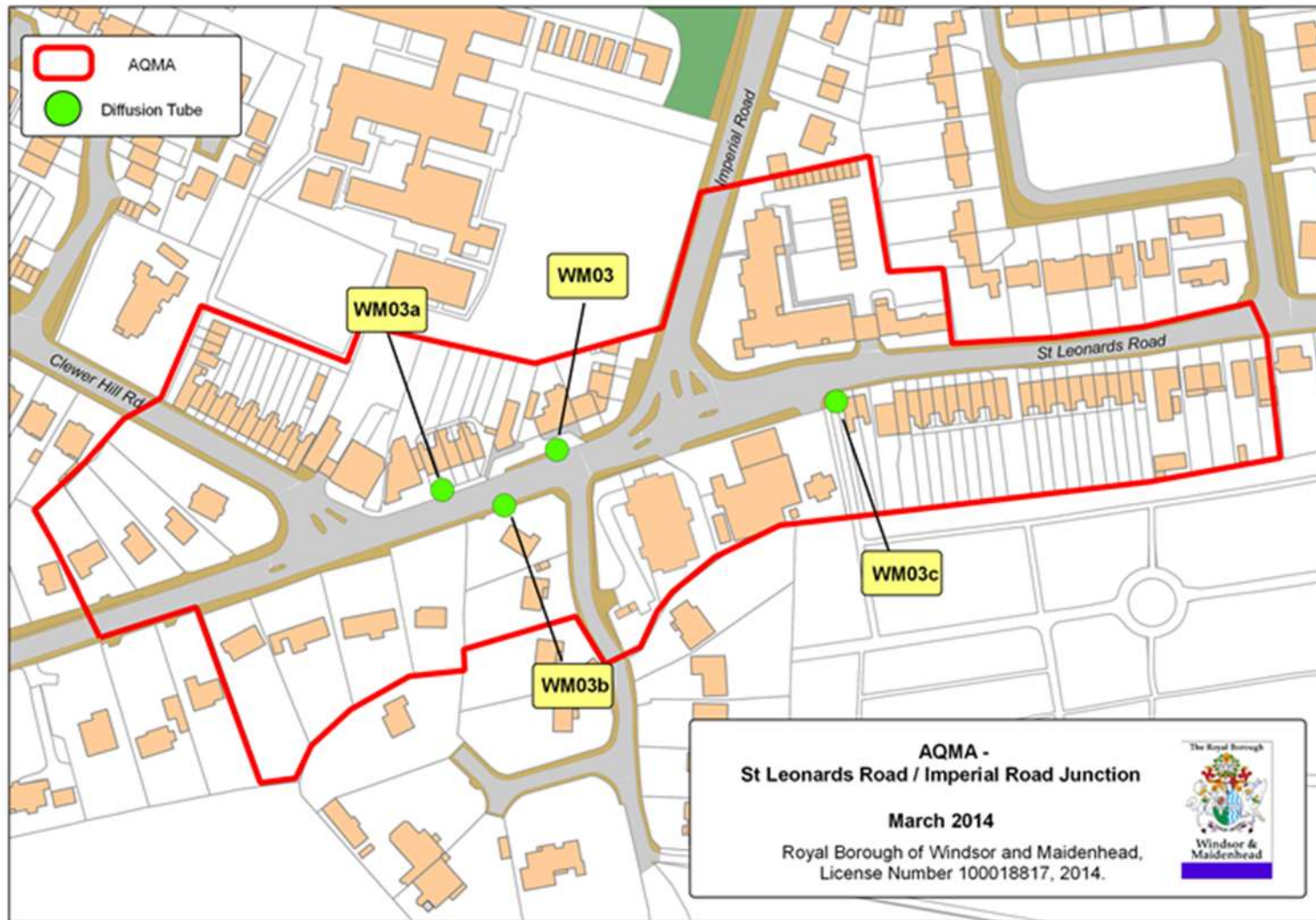


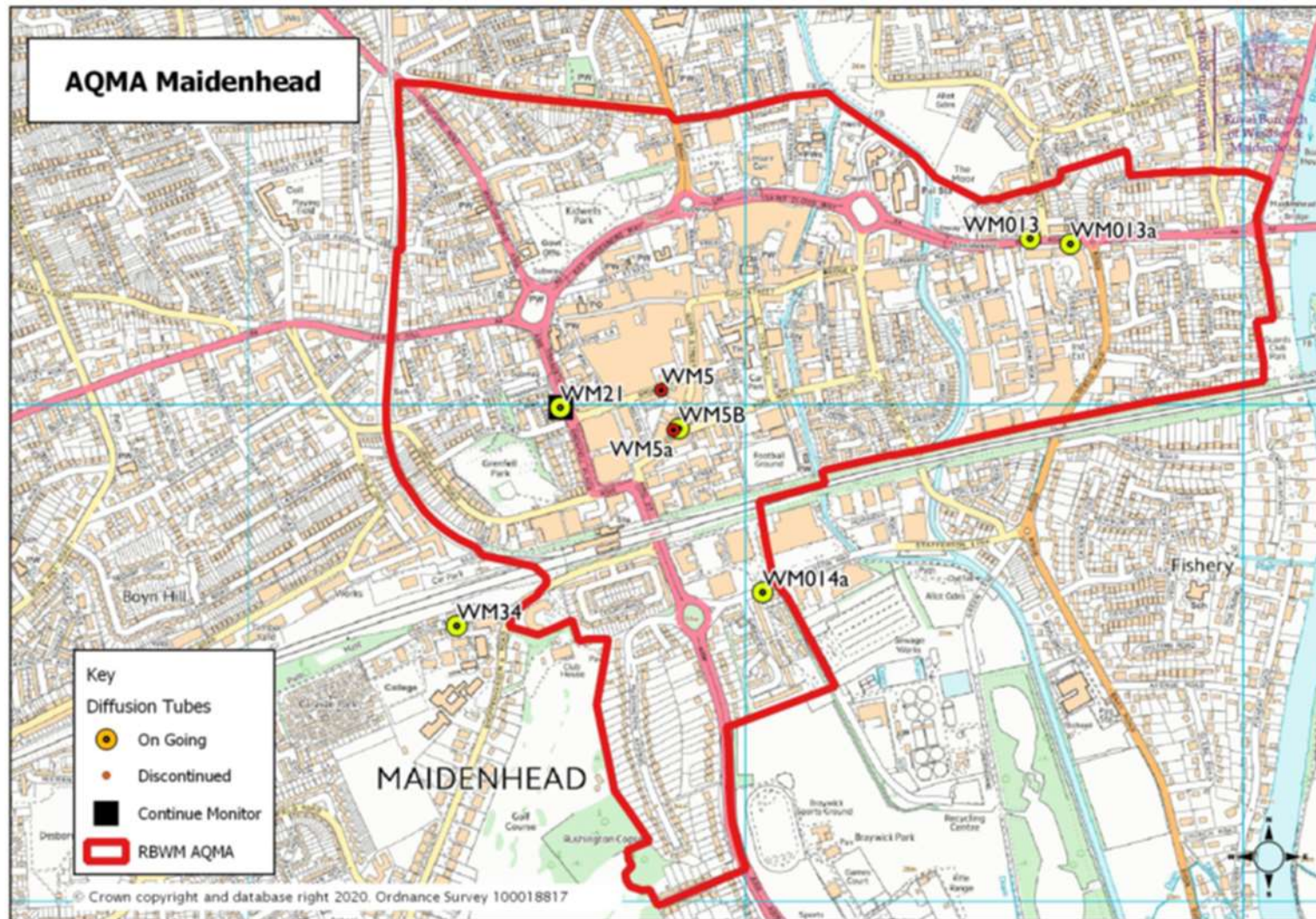
## Appendix D: Map(s) of Monitoring Locations and AQMAs



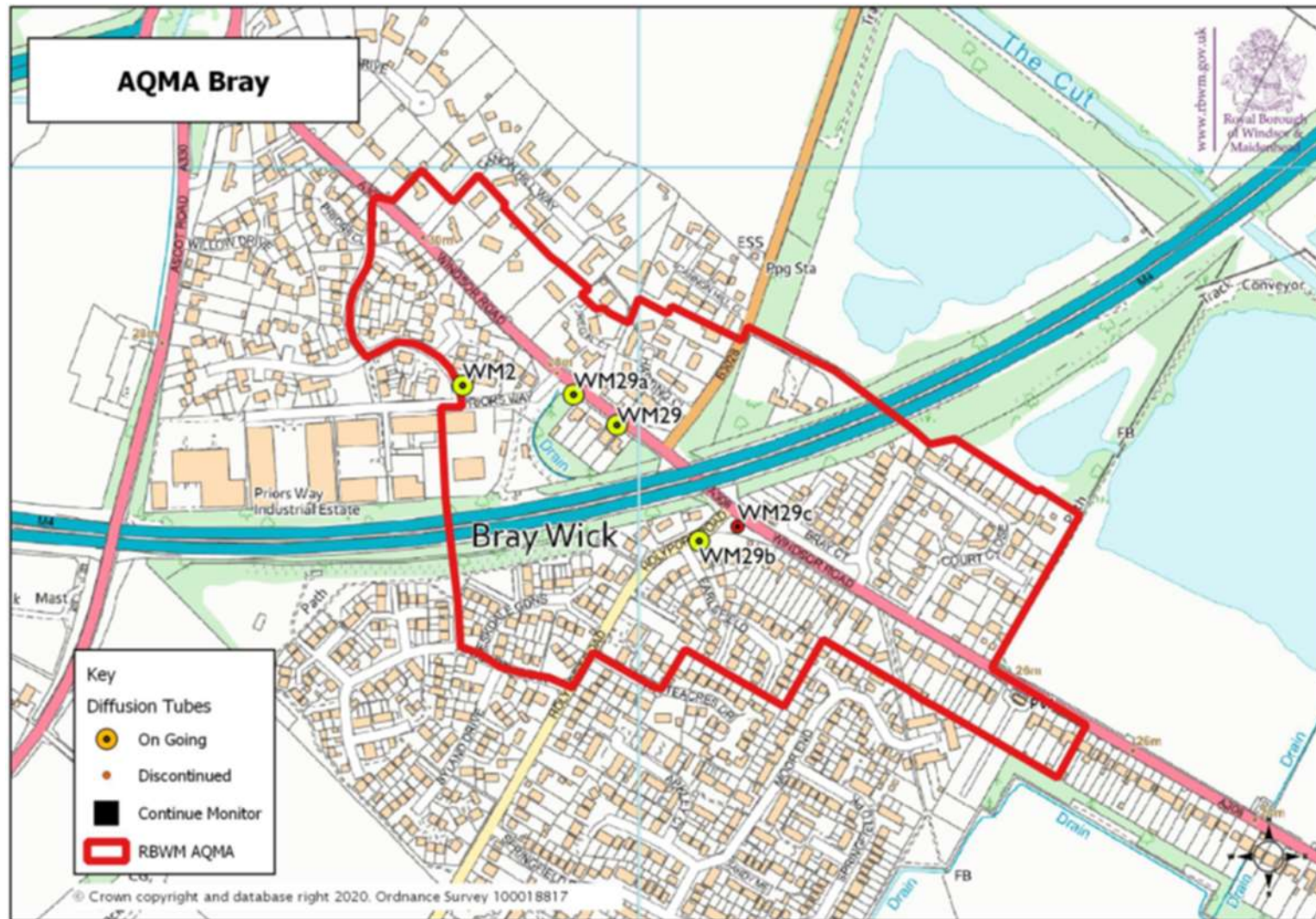


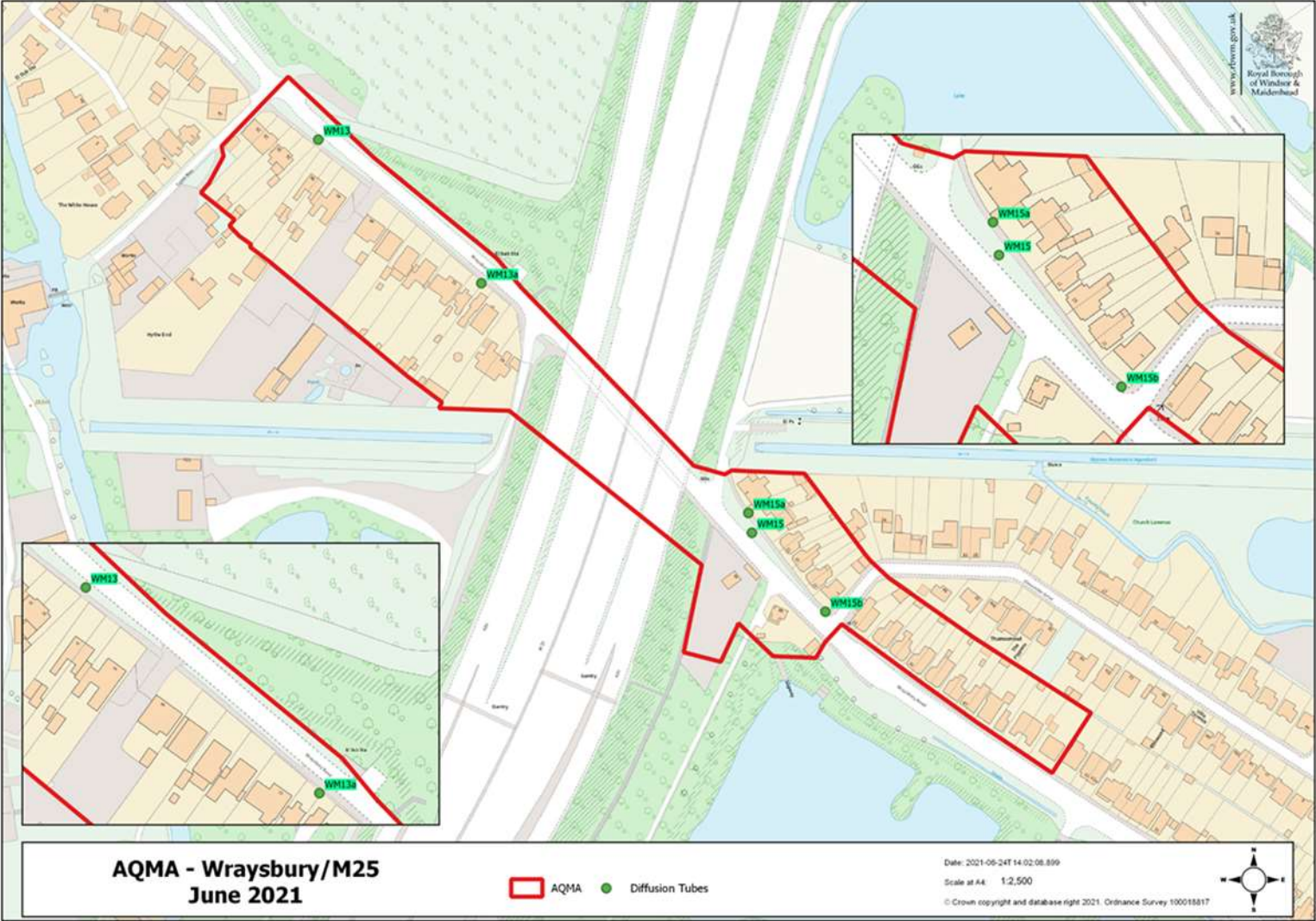












## Appendix E: Summary of Air Quality Objectives in England

Table E.1 – Air Quality Objectives in England<sup>7</sup>

Pollutant	Air Quality Objective: Concentration	Air Quality Objective: Measured as
Nitrogen Dioxide (NO <sub>2</sub> )	200µg/m <sup>3</sup> not to be exceeded more than 18 times a year	1-hour mean
Nitrogen Dioxide (NO <sub>2</sub> )	40µg/m <sup>3</sup>	Annual mean
Particulate Matter (PM <sub>10</sub> )	50µg/m <sup>3</sup> , not to be exceeded more than 35 times a year	24-hour mean
Particulate Matter (PM <sub>10</sub> )	40µg/m <sup>3</sup>	Annual mean
Sulphur Dioxide (SO <sub>2</sub> )	350µg/m <sup>3</sup> , not to be exceeded more than 24 times a year	1-hour mean
Sulphur Dioxide (SO <sub>2</sub> )	125µg/m <sup>3</sup> , not to be exceeded more than 3 times a year	24-hour mean
Sulphur Dioxide (SO <sub>2</sub> )	266µg/m <sup>3</sup> , not to be exceeded more than 35 times a year	15-minute mean

<sup>7</sup> The units are in microgrammes of pollutant per cubic metre of air (µg/m<sup>3</sup>).



## Appendix F: Impact of COVID-19 upon LAQM

COVID-19 has had a significant impact on society. Inevitably, COVID-19 has also had an impact on the environment, with implications to air quality at local, regional and national scales.

COVID-19 has presented various challenges for Local Authorities with respect to undertaking their statutory LAQM duties in the 2021 reporting year. Recognising this, Defra provided various advice updates throughout 2020 to English authorities, particularly concerning the potential disruption to air quality monitoring programmes, implementation of Air Quality Action Plans (AQAPs) and LAQM statutory reporting requirements. Defra has also issued supplementary guidance for LAQM reporting in 2021 to assist local authorities in preparing their 2021 ASR. Where applicable, this advice has been followed.

Despite the challenges that the pandemic has given rise to, the events of 2020 have also provided Local Authorities with an opportunity to quantify the air quality impacts associated with wide-scale and extreme intervention, most notably in relation to emissions of air pollutants arising from road traffic. The vast majority (>95%) of AQMAs declared within the UK are related to road traffic emissions, where attainment of the annual mean objective for nitrogen dioxide (NO<sub>2</sub>) is considered unlikely. On 23rd March 2020, the UK Government released official guidance advising all members of public to stay at home, with work-related travel only permitted when absolutely necessary. During this initial national lockdown (and to a lesser extent other national and regional lockdowns that followed), marked reductions in vehicle traffic were observed; Department for Transport (DfT) data<sup>8</sup> suggests reductions in vehicle traffic of up to 70% were experienced across the UK by mid-April, relative to pre COVID-19 levels.

This reduction in travel in turn gave rise to a change of air pollutant emissions associated with road traffic, i.e. nitrous oxides (NO<sub>x</sub>), and exhaust and non-exhaust particulates (PM). The Air Quality Expert Group (AQEG)<sup>9</sup> has estimated that during the initial lockdown period in 2020, within urbanised areas of the UK reductions in NO<sub>2</sub> annual mean

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<sup>8</sup> Prime Minister's Office, COVID-19 briefing on the 31<sup>st</sup> of May 2020

<sup>9</sup> Air Quality Expert Group, Estimation of changes in air pollution emissions, concentrations and exposure during the COVID-19 outbreak in the UK, June 2020



concentrations were between 20 and 30% relative to pre-pandemic levels, which represents an absolute reduction of between 10 to 20 $\mu\text{g}/\text{m}^3$  if expressed relative to annual mean averages. During this period, changes in PM<sub>2.5</sub> concentrations were less marked than those of NO<sub>2</sub>. PM<sub>2.5</sub> concentrations are affected by both local sources and the transport of pollution from wider regions, often from well beyond the UK. Through analysis of AURN monitoring data for 2018-2020, AQEG have detailed that PM<sub>2.5</sub> concentrations during the initial lockdown period are of the order 2 to 5 $\mu\text{g}/\text{m}^3$  lower relative to those that would be expected under business-as-usual conditions.

As restrictions are gradually lifted, the challenge is to understand how these air quality improvements can benefit the long-term health of the population.

## **Impacts of COVID-19 on Air Quality within the Royal Borough of Windsor and Maidenhead**

The impact of COVID-19 to monitored concentrations experienced at roadside diffusion tube monitoring sites within the AQMAs between April and June 2020 was a reduction of NO<sub>2</sub> concentrations of between 30 and 40%. This equated to a 20 to 25% reduction in annual mean concentration relative to 2019.

## **Opportunities Presented by COVID-19 upon LAQM within the Royal Borough of Windsor and Maidenhead**

Following the significant increase in walking and cycling across the UK during the pandemic the government has announced new funding and mandated all local authorities to make rapid, meaningful changes to their highways to help encourage more people to choose alternatives to public transport.

It is estimated that 14,000 trips previously done by public transport across the Royal Borough will need to be made by other means. This includes an estimated 6000 trips to school and home for secondary school children. The Council is seeking to bring forward cycling schemes outlined in the Council's Cycling Action Plan. A bid was submitted in June 2020 to the Department for Transport and definitive plans are in the process of being agreed. The first tranche of measures include footway widening and 20mph schemes in Maidenhead, Windsor and Ascot. It is anticipated that the second tranche bid will be more far-reaching and take in a larger geographical area to improve the safety of the road network to accommodate more cycling to school along main routes and other streets.

## **Challenges and Constraints Imposed by COVID-19 upon LAQM within the Royal Borough of Windsor and Maidenhead**

No challenges or constraints relating to LAQM have arisen during 2020 as a consequence of COVID-19 within the Royal Borough of Windsor and Maidenhead.

**Table F 1 – Impact Matrix**

Category	Impact Rating: None	Impact Rating: Small	Impact Rating: Medium	Impact Rating: High
Automatic Monitoring – Data Capture (%)	More than 75% data capture	50 to 75% data capture	25 to 50% data capture	Less than 25% data capture
Automatic Monitoring – QA/QC Regime	Adherence to requirements as defined in LAQM.TG16	Routine calibrations taken place frequently but not to normal regime. Audits undertaken alongside service and maintenance programmes	Routine calibrations taken place infrequently and service and maintenance regimes adhered to. No audit achieved	Routine calibrations not undertaken within extended period (e.g. 3 to 4 months). Interruption to service and maintenance regime and no audit achieved
Passive Monitoring – Data Capture (%)	More than 75% data capture	50 to 75% data capture	25 to 50% data capture	Less than 25% data capture
Passive Monitoring – Bias Adjustment Factor	Bias adjustment undertaken as normal	<25% impact on normal number of available bias adjustment colocation studies (2020 vs 2019)	25-50% impact on normal number of available bias adjustment studies (2020 vs 2019)	>50% impact on normal number of available bias adjustment studies (2020 vs 2019) and/or applied bias adjustment factor studies not considered representative of local regime
Passive Monitoring – Adherence to Changeover Dates	Defra diffusion tube exposure calendar adhered to	Tubes left out for two exposure periods	Tubes left out for three exposure periods	Tubes left out for more than three exposure periods
Passive Monitoring – Storage of Tubes	Tubes stored in accordance with laboratory guidance and analysed promptly.	Tubes stored for longer than normal but adhering to laboratory guidance	Tubes unable to be stored according to be laboratory guidance but analysed prior to expiry date	Tubes stored for so long that they were unable to be analysed prior to expiry date. Data unable to be used
AQAP – Measure Implementation	Unaffected	Short delay (<6 months) in development of a new AQAP, but is on-going	Long delay (>6 months) in development of a new AQAP, but is on-going	No progression in development of a new AQAP
AQAP – New AQAP Development	Unaffected	Short delay (<6 months) in development of a new AQAP, but is on-going	Long delay (>6 months) in development of a new AQAP, but is on-going	No progression in development of a new AQAP

## Glossary of Terms

Abbreviation	Description
ADMS	Atmospheric Dispersion Modelling System - Air quality modelling tool
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
AQO	Air Quality Objective
ASR	Air quality Annual Status Report
Defra	Department for Environment, Food and Rural Affairs
EU	European Union
BAM	Beta Attenuation Mass – PM10 monitor
LAQM	Local Air Quality Management
LTP	Local Transport Plan
µg/m <sup>3</sup>	Microgram per cubic metre
NO <sub>2</sub>	Nitrogen Dioxide
NO <sub>x</sub>	Nitrogen Oxides
PM <sub>10</sub>	Airborne particulate matter with an aerodynamic diameter of 10µm (micrometres or microns) or less
PM <sub>2.5</sub>	Airborne particulate matter with an aerodynamic diameter of 2.5µm or less
QA/QC	Quality Assurance and Quality Control
RBWM	Royal Borough of Windsor & Maidenhead

## References

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