



# 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 Three Rivers

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>.

Three Rivers is a sub-urban district of 88.8 square kilometres located in south-west Hertfordshire. It borders Watford and Hertsmere Boroughs to the east, Buckinghamshire Council (Chiltern and South Bucks Areas) to the west, St Albans City & District and Dacorum Borough to the north, and the London Boroughs of Hillingdon and Harrow are to the south.

The key road links through the District are the M1 and M25 motorways, which are likely significant sources of local air pollutant emissions. There are no significant pollutant sources within the district apart from road traffic emissions.

From 1<sup>st</sup> May 2019, TRDC delegated certain Environmental Health functions to Watford Borough Council (WBC) including local air quality management.

The latest monitoring data shows a general trend of decreasing concentrations of NO<sub>2</sub>. This is in line with the national trend. Defra recently reported that “between 2007 and 2019 inclusive, the annual mean NO<sub>2</sub> concentration at roadside sites reduced by an

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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

average of 1.8 µg/m<sup>3</sup> each year. This reduction was observed at most long-running monitoring sites across the UK; which could be a consequence of the large reduction in road transport emissions of NO<sub>2</sub> over the same period in the UK, as newer vehicles subject to stricter emissions standards enter the transport fleet”.

Concentrations of NO<sub>2</sub> have decreased in the Council's existing AQMA. There are no new major sources of emissions in the Borough. The Council has not introduced any new AQMAs, Action Plans or strategies. The Council will be drafting a new AQAP in January 2023.

## Actions to Improve Air Quality

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.

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 (AQMAs) are designated due to elevated concentrations heavily influenced by transport emissions.

TRDC developed an Air Quality Action Plan (AQAP) for the years 2015-2020 which highlighted the Council's commitment to continue to work towards improving air quality within the district. The measures in this AQAP aimed to encourage reductions in emissions from road traffic, industry and homes. There was also a commitment to keep the community and partners well informed about air quality and the actions to reduce pollution or minimise its effects on vulnerable people.

WBC has undertaken a review of the existing AQAP (2015-2020), this review is considered an interim measure. The review includes updates on the measures included in the existing plan and updates in relation to revoked AQMAs. This review has been

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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

undertaken to ensure that the existing plan reflects the current situation. WBC intends to make changes to the Council's monitoring network in January 2022. WBC will therefore draft a new AQAP in January 2023, once 12 months diffusion tube data has been collected.

## **Walking and Cycling**

TRDC has promoted its Cycling Strategy for nearly 40 years, introducing many new improvements to make cycling easier and to improve walking conditions, often in partnership with Hertfordshire County Council and other key organisations.

TRDC wants to enable and encourage people of all abilities to use their bike to get around - particularly people who do not usually cycle. TRDC also wants to make walking easier for everyone.

TRDC has published its local cycling and walking knowledge base on its website to help residents make more journeys by walking and cycling.

## **TRDC Cycling Strategy**

TRDC has developed and promoted its Cycling Strategy since 1981 with visible success in creating and improving the cycle routes it promotes across the district.

Recent projects have included upgrades to the Grand Union Canal towpath in partnership with other local authorities and the Canal and River Trust, and the South Way cycleway.

This towpath now provides a level traffic-free route connecting Croxley Green, West Watford, Hunton Bridge, Kings Langley and Nash Mills with 5 miles of wider, level, well-signed paths.

The South Way Cycleway connects the improved towpath with Abbots Langley, Leavesden and into Garston on a nearly traffic-free shared footway and bridleway.

## ***The Ebury Way – Traffic-free route from Rickmansworth to Watford***

The Ebury Way is an important local traffic-free path for cyclists, walkers, and horse-riders. It is heavily used by people travelling to school, work and for recreation.

It forms part of the largely traffic-free National Cycle Network created by Sustrans, the NCN Route 6 from London Paddington to Keswick, via *Watford, Luton, Milton Keynes,*

*Northampton, Market Harborough, Leicester, Derby, Nottingham, Worksop, Sheffield, Manchester, Blackburn, Preston, Lancaster, Kendal and Windermere.*

This path uses the old Ebury Railway embankment to cross the Colne, Chess and Gade rivers as well as the Grand Union Canal. Cycling is permitted along the whole length but horse-riders are restricted to the eastern part between Moor Lane Crossing and Rickmansworth.

### ***Grand Union Canal towpath – traffic-free route connecting six local settlements***

This key route for people cycling and walking connects many local settlements including Rickmansworth, Croxley Green, Watford, Hunton Bridge and Kings Langley. It is a shared surface, used by many people for a variety of waterside activities and managed by the Canal and River Trust (CRT).

The new wide level surface was delivered by TRDC and partners, with around 9 kilometres (about 5.5 miles) of Grand Union towpath upgraded since 2013. The Grand Union Canal towpath also runs southwards from Rickmansworth towards Harefield and on, into central London where it joins the Regents Canal running through the heart of the Capital.

Partners include the CRT and Hertfordshire County Council, which released planning obligation funding collected by the District Council - to improve local infrastructure in response to new property development.

### **Cycle parking in local town and village centres**

TRDC (together with Hertfordshire County Council) provides cycle stands around the District to help support people who want to cycle to local shops, workplaces and other services.

### **New and current schemes**

#### **Leavesden Cycle Hub**

TRDC in partnership with Watford Cycle Hub and One YMCA launched a brand new Cycle Hub in Leavesden in 2018; providing a new 'one-stop shop' for everything to do with bikes.

Located in the new Community building in Leavesden Country Park off College Road in Abbots Langley, Leavesden Cycle Hub offers a range of facilities including servicing and repairs, bike hire, bike registering, reconditioned bike sales and cycle tuition for children and adults.

### **New cycle parking**

New parking is being introduced around the District. Cycle stands have been installed outside stations and at busy shopping parades and town centres. Extra parking is now being built at Rickmansworth Station and is planned at other Stations that were identified in the Council's Strategic Review of Cycle Parking.

### **Improving connections**

TRDC is currently developing proposals to improve connections between:

- Abbots Langley and Bedmond - Proposed local route to make it easier to walk and bike, with a focus on school travel;
- Rickmansworth and Chorleywood - Proposed alternative routes to busy main road;
- Carpenders Park and Bushey High Street - Proposed links to existing Greenways Network;
- Kings Langley (Primrose Hill) and Apsley, on to Hemel Hempstead - Final link in Grand Union Canal towpath route, connecting local settlements.

### **Bikeability audits of local paths**

An audit classifying roads, paths and crossings in terms of the UK National Cycle Training Standard (Bikeability) Level needed to be able to ride in comparative safety.

### **Buses**

The Council supports the Intalink partnership.

In 2017, TRDC funded a new route and extra journeys to enable residents of South Oxhey to better access leisure facilities, shops and rail stations. TRDC continues to support the Dial-A-Ride (DAR) bus scheme to provide passenger transport (reducing private car use).

## **Electric Charging Points**

An electric vehicle charging point is installed at Community Way Car Park, off Barton Way, Croxley Green, WD3 3SU.

## **Stationary vehicle idling**

TRDCs climate change pledge commits the council to use all practical means to reduce the impact of council services on the environment.

The council is tackling the levels of air pollution created by road traffic by encouraging motorists, including the council's drivers, to stop vehicle idling. By reducing the idling of all road vehicle engines – including private cars, taxis, private hire vehicles, public sector vehicles, buses, coaches, vans, lorries, the Council believes that this will make a difference by cutting carbon emissions and reducing the impact on the environment.

TRDC have started by making its staff and contractors aware of the implications of letting their vehicles idle unnecessarily. TRDC would also like other motorists to take note and switch their engines off once they reach their destinations.

## **Parking**

Through its Parking Management role, the Council keeps roads and pavements clear for people to walk and cycle by facilitating informal local parking using permeable, grass-topped surfacing, often in South Oxhey. The Council has consulted with thousands of people this year to shape new parking improvement schemes - making local roads safer for people walking and cycling, as well as to prioritise parking for local people, as well as visitors to key local facilities and businesses.

## **Free Air Pollution Alerts**

TRDC, along with ten other Hertfordshire and Bedfordshire Local Authorities has signed up to a notification service called 'Herts & Beds Air Pollution Alert System'. The system is provided by Ricardo Energy and Environment. The service provides a text or email alert straight to your mobile when levels of air pollution in your area increase to a moderate level or above.



This service sits alongside a website that provides 'at-a-glance' air quality information for Hertfordshire and Bedfordshire. Coloured markers on a map pinpoint exact areas and give an immediate pollution summary ranging from 1-10.

No comments had been received from Three Rivers District Council or Hertfordshire County Council at the time of writing. If received, comments will be added at a later date.

## Conclusions and Priorities

NO<sub>2</sub> concentrations decreased at all monitoring locations, including at High View in the Chorleywood AQMA. There were no exceedances of the air quality objective for NO<sub>2</sub>, with respect to annual mean concentrations.

The annual mean concentration at S6(NA) was 21.1 ug/m<sup>3</sup>.

In November 2020, WBC undertook a review of the Council's monitoring locations. WBC reviewed the existing locations, and traffic count data and congestion hotspot data that was available at the time (2016 counts). WBC requested more up to date traffic count data and congestion hotspot, this information has recently been provided. WBC will undertake a further review of this information.

WBC intends to make any changes to the monitoring network in January 2022. This will be a priority for 2021/2022.

## Local Engagement and How to get involved

It is important that members of the public appreciate the impact of their transport choices on air quality. The TRDC AQAP highlights that the District is developing strategies to develop Sustainable Travel and Better Buses to inform how it will support the County Council's bus services. TRDC has also supported Office for Low Emissions Vehicles (OLEV) initiatives to install electric vehicle charging points.

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# 1 Local Air Quality Management

This report provides an overview of air quality in Three Rivers during 2021. 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 Three Rivers District Council to improve air quality and any progress that has been made.

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

## 2 Actions to Improve Air Quality

### 2.1 Air Quality Management Areas

Air Quality Management Areas (AQMA) 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 AQMA declared by Three Rivers District Council can be found in Table 2.1. The table presents a description of the single AQMA that is currently designated within Three Rivers District Council. Appendix D: Map(s) of Monitoring Locations and AQMA provides a maps of the AQMA and also the air quality monitoring locations in relation to the AQMA. The air quality objectives pertinent to the current AQMA designation are as follows:

- NO<sub>2</sub> annual mean;
- PM<sub>10</sub> 24-hour mean.

**Table 2.1 – Declared Air Quality Management Areas**

<b>AQMA Name</b>	<b>Date of Declaration</b>	<b>Pollutants and Air Quality Objectives</b>	<b>One Line Description</b>	<b>Is air quality in the AQMA influenced by roads controlled by Highways England?</b>	<b>Level of Exceedance: Declaration</b>	<b>Level of Exceedance: Current Year</b>	<b>Name and Date of AQAP Publication</b>	<b>Web Link to AQAP</b>
Chorleywood NO <sub>2</sub> AQMA	Declared 01/04/2001	NO <sub>2</sub> Annual Mean	Along the M25 south of Junction 18 to just north of where the motorway crosses the River Chess	YES	>40	21.5	Three Rivers District Council Air Quality Action Plan, July 2013	<a href="https://www.airqualityengland.co.uk/local-authority/hnb-reports">https://www.airqualityengland.co.uk/local-authority/hnb-reports</a>
Chorleywood PM <sub>10</sub> AQMA	Declared 01/04/2001	PM <sub>10</sub> 24 Hour Mean	A slightly narrower area from just north of Junction 18, along the M25 to just north of where the motorway crosses the River Chess	YES	>50, exceeded more than 35 times in a year	PM <sub>10</sub> concentrations are no longer monitored at this location	Three Rivers District Council Air Quality Action Plan, July 2013	<a href="https://www.airqualityengland.co.uk/local-authority/hnb-reports">https://www.airqualityengland.co.uk/local-authority/hnb-reports</a>

☒ Three Rivers District Council confirm the information on UK-Air regarding their AQMA(s) is up to date.

☒ Three Rivers District Council confirm that all current AQAPs have been submitted to Defra.

## 2.2 Progress and Impact of Measures to address Air Quality in Three Rivers District Council

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

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

1. A detailed assessment was carried out on the Chorleywood AQMA in 2018 and it was concluded that the AQMA should remain. It is understood that WBC are undertaking a review of monitoring locations. As such, it is recommended that the Council relocate monitoring locations to areas in which the detailed assessment has predicted NO<sub>2</sub> to be close to the AQO.
2. The Council no longer monitor for PM<sub>10</sub> despite having an AQMA designated for this pollutant. The outcomes of the detailed assessment conducted in 2018 suggest that PM<sub>10</sub> concentrations are predicted to be close the AQOs. As such, it is recommended that the Council monitor for PM<sub>10</sub>. However if this is not possible (i.e. budget restrictions) the Council should provide justification for this.
3. The latest AQAP was published in 2015, therefore it has now exceeded the 5-year period recommended by Defra after which an updated plan should be released. The Council have stated that WBC are currently undertaking a review of the AQAP.
4. A map of the AQMA is provided, however it would be beneficial for the Council to also include the monitoring locations within this AQMA in the map.
5. As the AQMeshes are no longer operational, it is recommended for the Council to remove Figures D.7 and D.8 (that display the locations of the AQMeshes) as they are no longer applicable.

There is a minor inconsistency in the NO<sub>2</sub> concentration provided for S1 (NA), where Table A.3 states that the concentration at this site is 26.4 ug/m<sup>3</sup> whilst in Table B.1 it states that the concentration is 24.4 ug/m<sup>3</sup>. Can the Council please ensure this is corrected before the ASR is officially published.

The Council has addressed the matters raised following Defra's appraisal:

1. In the Council's review of monitoring locations, those areas in which the detailed assessment predicted NO<sub>2</sub> concentrations to be close to the AQO, have been considered.
2. Provision for the monitoring of PM<sub>10</sub> was not included in the budget provided.
3. An interim review of the AQAP has been completed. WBC will draft a new AQAP in January 2023.
4. The monitoring locations within the Chorleywood AQMA are now shown on the map.
5. Figures D.7 and D.8 were removed prior to the ASR being published.

The inconsistency in the NO<sub>2</sub> concentration provided for S1(NA) in Table A.3 and Table B.1 was corrected prior to the ASR being published.

Three Rivers District Council 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 in Table 2.2. Seven measures are included within Table 2.2, with the type of measure and the progress Three Rivers District Council have made during the reporting year of 2020 presented. Where there have been, or continue to be, barriers restricting the implementation of the measure, these are also presented within Table 2.2.

More detail on these measures can be found in their respective Action Plans - Three Rivers District Council Air Quality Action Plan. Key completed measures are:

- 2 x indicative PM<sub>2.5</sub> AQ Monitors (now removed);
- OLEV initiative;
- AirTEXT;
- LTP, Walking, Cycling and bus strategy;
- Improvement of bus network;
- Additional cycle routes;
- Alternative routes via green ways.



The principal challenges and barriers to implementation that Three Rivers District Council anticipates facing are restrictions relating to the COVID-19 pandemic and demands on officer time.

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	AirTEXT	Public Information	Via other mechanisms	2015	2018	TRDC	TRDC	NO	Funded	< £10k	Completed	Exposure of most vulnerable	Hits on Hertfordshire Air Quality Forecast website	Operational	TRDC has signed up to the Herts & Beds Pollution Alert System. The current three year contract is due to end in 2022.
2	2 x indicative PM2.5 AQ Monitors	Other	Other	2017	2017	TRDC	HCC	NO	Funded	£10k - 50k	Completed	Inform future projects id required	PM2.5 AQ Data	Equipment installed	The equipment was installed in 2017, monitoring ceased in the same year. The equipment was removed and placed in storage on 5th December 2019.
3	LTP, Walking, Cycling and bus strategy	Promoting Travel Alternatives	Intensive active travel campaign & infrastructure	2015	2020	TRDC/HCC	TRDC/HCC	NO	Funded	£100k - £500k	Completed	NO2/PM10/PM2.5	Decrease in private car use	Ongoing	Three new cycling/walking schemes were introduced in 2020/21.
4	Improvement of bus network	Transport Planning and Infrastructure	Bus route improvements	2015	2020	TRDC/HCC	TRDC/HCC	NO	Funded	£100k - £500k	Completed	NO2/PM10/PM2.5	Increased bus use	Ongoing	In 2017, TRDC funded a new route and extra journeys to enable residents of South Oxhey to better access leisure facilities, shops and rail stations. TRDC continues to support the Dial-A-Ride (DAR) bus scheme to provide passenger transport (reducing private car use).
5	OLEV initiative	Promoting Low Emission Transport	Procuring alternative Refuelling infrastructure to promote Low Emission Vehicles, EV recharging, Gas fuel recharging	2015	2020	TRDC/OLEV	OLEV	NO	Funded	£10k - 50k	Completed	NO2/PM10/PM2.5	Increased electric vehicle ownership	Ongoing	One charging point has been installed at the Community Way Car Park off Barton Way, Croxley Green.
6	Additional cycle routes	Transport Planning and Infrastructure	Cycle network	2015	2020	TRDC/HCC	TRDC/HCC	NO	Funded	£50k - £100k	Completed	NO2/PM10/PM2.5	Increase cycling	Ongoing	Three new cycling/walking schemes

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
															introduced in 2020/21.
7	Alternative routes via green ways	Transport Planning and Infrastructure	Other	2015	2020	TRDC/HCC	TRDC/HCC	NO	Funded	£50k - £100k	Completed	Reduce exposure	Use of greenways	Ongoing	No information provided

## 2.3 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.

Exposure to high concentrations of particulate matter can exacerbate lung and heart conditions, significantly affecting quality of life, increasing hospital admissions and deaths. Children, the elderly and those with pre-existing respiratory and cardiovascular disease, are known to be more susceptible to the health impacts from air pollution.

Inhalation of particulate matter can have adverse impacts on human health, the greatest impact is believed to be from long term exposure to PM<sub>2.5</sub>, which increase age-specific mortality risk, particularly from cardiovascular causes.

The following is taken from the Hertfordshire Local Authorities Report on Particulate Matter (PM<sub>2.5</sub>) in Ambient Air in 2019 for Hertfordshire County Council Public Health:

Poor air quality is considered to be the largest environmental risk to the public's health and contributes to:

- Cardiovascular disease;
- Lung cancer;
- Respiratory diseases;
- Increased chance of hospital admissions and visits to Emergency Departments.

There is growing evidence that air pollution is a significant contributor to preventable ill health and early death.

Whilst legal limits are in place, evidence suggests that health effects can still occur below these limits. This is recognised by the World Health Organisation, which sets lower pollutant exceedance thresholds than some EU limits adopted into UK legislation.

The only specific indicator for air pollution is included within the Public Health Outcomes Framework and relates to particulate matter (PM) with a diameter of 2.5um or smaller (Public Health Outcome Indicator (PHOI) 3.01).

PHOI 3.01 is 'the fraction of annual all-cause mortality attributable to long-term exposure to current levels of anthropogenic particulate pollution.' The indicator is based on an estimated amount of PM<sub>2.5</sub> derived by Defra modelling from local measurement, one site in Borehamwood, Hertfordshire and another in Sandy, Bedfordshire. That data is then adjusted by way of population to give a population weighted figure before its use in deriving the PHOI.

The PM<sub>2.5</sub> focussed PHOI reflects the adverse impact that this type of air pollution can have on public health as a result of the fine particles being carried deep into the lungs where they can cause inflammation and a worsening of heart and lung diseases.

However, it is important to recognise that the figures published for PHOI 3.01 are estimates and therefore cannot be used for performance monitoring; they can only provide an indication of the scale of the issue. Further information on the use of health related air quality data is available at

<https://www.hertshealthevidence.org/documents/thematic/airqualitydatafaq-briefing-2019-07.pdf>.

It is for this reason that this report no longer makes direct reference to the PHOI figures, but uses the population weighted Defra modelled PM<sub>2.5</sub> concentrations in their place.

The fraction of mortality attributable to particulate air pollution for Hertfordshire (2019) is 5.7%. The PHOF data is available at:

[https://fingertips.phe.org.uk/profile/public-health-outcomes-framework/data#page/3/gid/1000043/pat/6/par/E12000006/ati/202/are/E10000015/iid/30101/age/230/sex/4/cid/4/page-options/ovw-do-0\\_car-ao-1\\_car-do-0](https://fingertips.phe.org.uk/profile/public-health-outcomes-framework/data#page/3/gid/1000043/pat/6/par/E12000006/ati/202/are/E10000015/iid/30101/age/230/sex/4/cid/4/page-options/ovw-do-0_car-ao-1_car-do-0).

Three Rivers District Council is taking the following measures to address PM<sub>2.5</sub>:

An Officer of the Council attends the Hertfordshire and Bedfordshire Air Quality Forum.

The Council will ensure compliance with the Environmental Permitting Regulations and will promote the use of cleaner fuels in wood burning stoves to help reduce PM<sub>2.5</sub> concentrations.

The Air Quality (Domestic Solid Fuels Standards (England) Regulations 2020 are to be enforced by the relevant local authority. Hertfordshire County Council are the relevant local authority.

The Council will require that developers follow good construction practice to minimise fugitive dusts.

It is anticipated that:

- Measures to reduce emissions of NO<sub>x</sub> by encouraging a move away from internal combustion engine vehicles to ultra-low emission vehicles (ULEV) will reduce PM<sub>2.5</sub> emissions from exhausts;
- Measures to reduce road travel altogether will reduce PM<sub>2.5</sub> emissions from brake and tyre wear and dust re-suspension.

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

This section sets out the monitoring undertaken within 2020 by Three Rivers District Council 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.

### 3.1 Summary of Monitoring Undertaken

#### 3.1.1 Non-Automatic Monitoring Sites

Three Rivers District Council undertook non- automatic (i.e. passive) monitoring of NO<sub>2</sub> at 7 sites during 2020. Table A.2 in Appendix A presents the details of the non-automatic sites.

The diffusion tubes that were supposed to be deployed in October were lost in the internal post.

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

### 3.2 Individual Pollutants

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

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

Table A.4 in Appendix A compares 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.

Figure A.1 presents trends in NO<sub>2</sub> annual mean concentrations at diffusion tube sites S1(NA) to S6(NB) between the years 2016 to 2020. There were no exceedances of the annual mean objective in 2020 and there is a general trend of reduction experienced across the sites.

Figure A.2 presents trends in NO<sub>2</sub> annual mean concentrations at diffusion tube location S6(NA) in the Chorleywood AQMA between the years 2016 to 2020. There were no exceedances of the annual mean objective in 2020 and there is a general trend of reduction experienced at this site.

The annual mean concentration at S6(NA) was 21.5 ug/m<sup>3</sup>.

NO<sub>2</sub> concentrations decreased at almost all monitoring locations, including at Hill View in the Chorleywood AQMA.

There were no exceedances of the air quality objective for NO<sub>2</sub>, with respect to annual mean concentrations.

There will be no changes to the existing AQMA or the declaration of a new AQMA.

There are no proposed changes to the monitoring network (other than those identified following the Council's review of monitoring locations).



## Appendix A: Monitoring Results

**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)
S1 (NA)	Watford Road	Kerbside	507134	195283	NO2	No	8.0	1.0	No	2.7
S2 (NA)	Chandlers Cross	Rural	506430	198590	NO2	No	97.0	17.0	No	2.5
S3 (NA)	The Retreat	Urban Background	508100	201800	NO2	No	7.0	4.0	No	2.5
S4 (NA), S5 (NA), S6 (NA)	M25 J18	Kerbside	504162	196286	NO2	Yes - Chorleywood AQMA	17.0	1.0	No	2.5
S7 (NA)	Fire Station	Other	505500	194400	NO2	No	30.0	10.0	No	2.5
S1 (NB), S2 (NB), S3 (NB)	Belfry House Uxbridge Road (Mill End 1)	Kerbside	505264	194251	NO2	No	7.0	1.5	No	3.1
S4 (NB), S5 (NB), S6 (NB)	A412 Long Lane (Mill End 2)	Kerbside	504104	193684	NO2	No	30.0	1.8	No	2.1

**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.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
S1 (NA)	507134	195283	Kerbside	90.4	90.4	25.9	27.3	27.6	26.4	17.4
S2 (NA)	506430	198590	Rural	90.4	90.4	26.1	24.6	26.5	21.2	16.5
S3 (NA)	508100	201800	Urban Background	90.4	90.4	30.1	27.1	27.7	25.1	17.5
S4 (NA), S5 (NA), S6 (NA)	504162	196286	Kerbside	90.4	90.4	34.5	34.1	30.5	33.4	21.5
S7 (NA)	505500	194400	Other	90.4	90.4	28.2	27.1	27.7	26.0	18.0
S1 (NB), S2 (NB), S3 (NB)	505264	194251	Kerbside	90.4	90.4		<b>48.5</b>	39.0	<b>41.0</b>	28.0
S4 (NB), S5 (NB), S6 (NB)	504104	193684	Kerbside	90.4	90.4		30.0	29.8	29.8	22.9

☒ 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 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**.

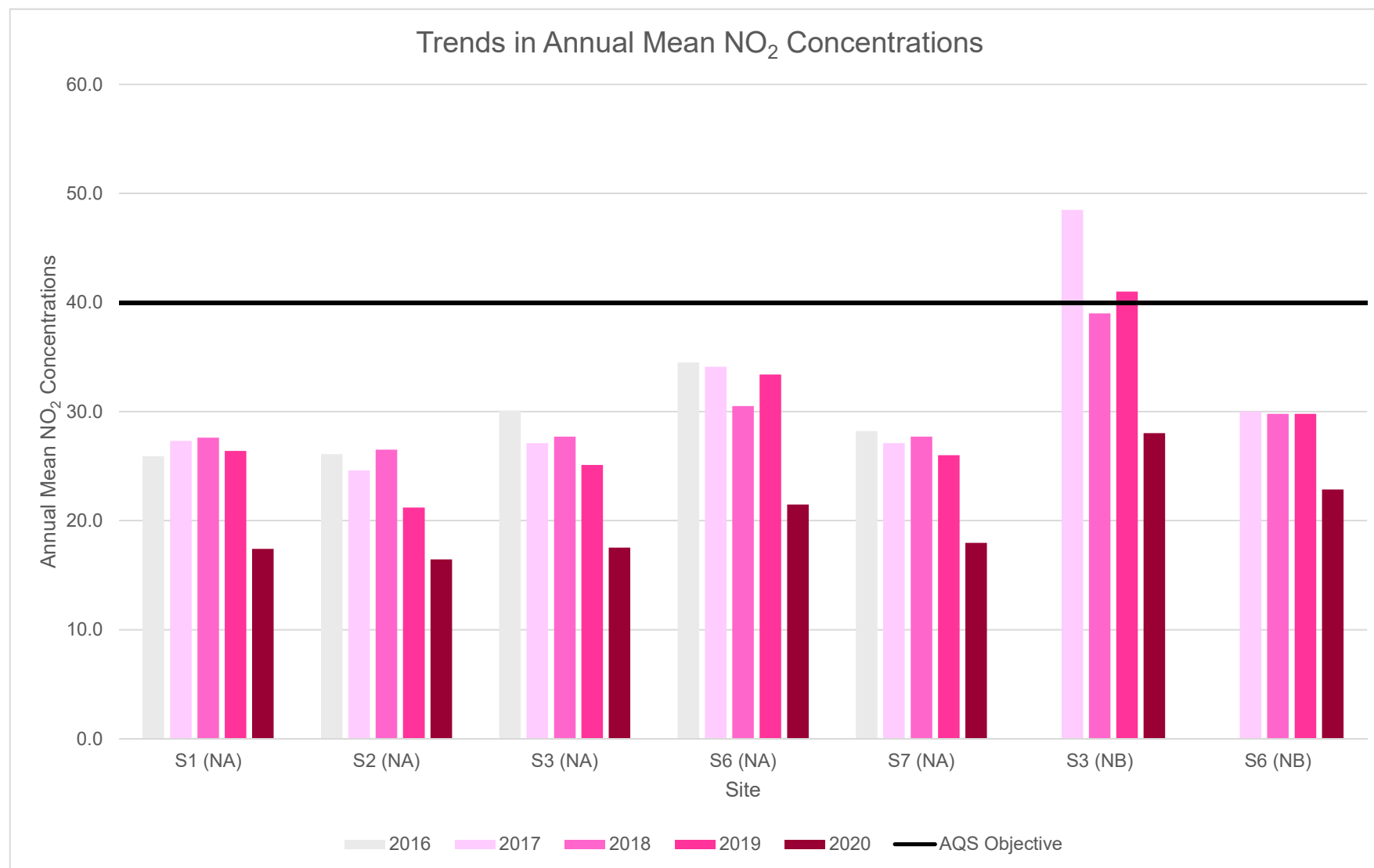
NO<sub>2</sub> annual means exceeding 60µg/m<sup>3</sup>, indicating a potential exceedance of the NO<sub>2</sub> 1-hour mean objective are shown in **bold and underlined**.

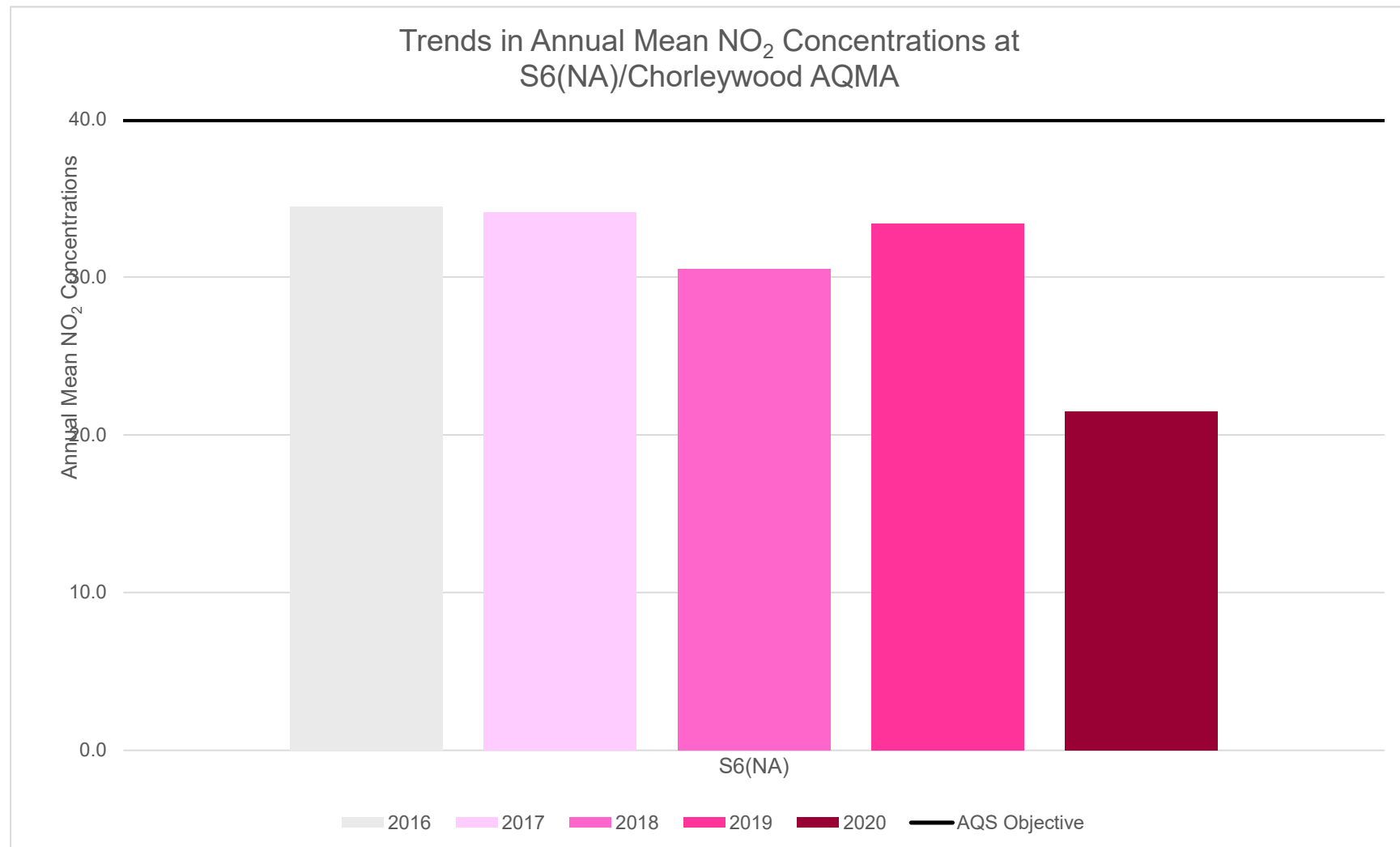
Means for diffusion tubes have been corrected for bias. All means have been “annualised” as per LAQM.TG16 if valid data capture for the full calendar year is less than 75%. See Appendix C for details.

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

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

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

**Figure A.1 – Trends in Annual Mean NO<sub>2</sub> Concentrations**

**Figure A.2 – Trends in Annual Mean NO<sub>2</sub> Concentrations at S6(NA)/Chorleywood AQMA**

## 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 (0.77)	Annual Mean: Distance Corrected to Nearest Exposure	Comment
S1 (NA)	507134	195283	35.0	32.0	23.6	16.7	11.9	17.2	11.4	21.3	19.7		32.7	27.1	22.6	17.4	-	
S2 (NA)	506430	198590	33.5	36.0	16.4	15.4	12.9	17.4	8.6	18.1	21.0		30.3	25.4	21.4	16.5	-	
S3 (NA)	508100	201800	32.1	25.5	22.7	15.1	16.9	16.1	15.3	22.2	25.5		30.5	28.4	22.8	17.5	-	
S4 (NA)	504162	196286	35.2	33.1	25.2	18.9	22.3	27.0	15.2	30.8	28.6		37.1	34.0	-	-	-	Triplicate Site with S4 (NA), S5 (NA) and S6 (NA) - Annual data provided for S6 (NA) only
S5 (NA)	504162	196286	44.3	28.7	25.8	20.1	19.2	25.9	14.8	29.1	27.5		40.4	32.7	-	-	-	Triplicate Site with S4 (NA), S5 (NA) and S6 (NA) - Annual data provided for S6 (NA) only
S6 (NA)	504162	196286	40.5	28.5	27.3	21.2	20.7	26.3	15.4	29.6	28.3		34.6	32.6	27.9	21.5	-	Triplicate Site with S4 (NA), S5 (NA) and S6 (NA) - Annual data provided for S6 (NA) only
S7 (NA)	505500	194400	33.3	21.0	20.0	22.5	19.5	20.6	10.0	23.5	23.7		32.4	30.0	23.3	18.0	-	
S1 (NB)	505264	194251	56.4	44.7	33.6	26.2	25.9	31.5	27.0	37.3	37.9		41.2	40.6	-	-	-	Triplicate Site with S1 (NB), S2 (NB) and S3 (NB) - Annual data provided for S3 (NB) only
S2 (NB)	505264	194251	58.1	47.8	36.1	27.7	27.1	34.0	28.8	37.4	39.5		44.9	40.7	-	-	-	Triplicate Site with S1 (NB), S2 (NB) and S3 (NB) - Annual data provided for S3 (NB) only
S3 (NB)	505264	194251	47.2	44.0	33.1	25.0	26.8	30.9	24.8	28.8	36.7		40.7	38.8	36.4	28.0	-	Triplicate Site with S1 (NB), S2 (NB) and S3 (NB) - Annual data provided for S3 (NB) only
S4 (NB)	504104	193684	43.4	23.2	27.6	22.2	19.8	28.8	17.9	29.0	30.5		41.8	35.6	-	-	-	Triplicate Site with S4 (NB), S5 (NB) and S6 (NB) - Annual data provided for S6 (NB) only
S5 (NB)	504104	193684	46.8	35.5	27.2	21.5	19.7	29.9	17.9	28.1	31.4		41.8	35.1	-	-	-	Triplicate Site with S4 (NB), S5 (NB) and S6 (NB) - Annual data provided for S6 (NB) only
S6 (NB)	504104	193684	46.7	32.6	27.6	21.4	19.0	28.2	18.0	28.5	30.7		39.1	33.3	29.7	22.9	-	Triplicate Site with S4 (NB), S5 (NB) and S6 (NB) - Annual data provided for S6 (NB) only

☒ 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.

☒ National bias adjustment factor used.

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

☒ Three Rivers District Council 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 Three Rivers District Council During 2020**

Three Rivers District Council has not identified any new sources relating to air quality within the reporting year of 2020.

### **Additional Air Quality Works Undertaken by Three Rivers District Council During 2020**

Three Rivers District Council has not completed any additional works within the reporting year of 2020.

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

Diffusion tubes were supplied by SOCOTEC in 2020. The method of preparation used was 50% TEA (triethanolamine) in acetone.

SOCOTEC are UKAS accredited. Diffusion Tubes were analysed in accordance with SOCOTEC's standard operating procedure ANU/SOP/1015. This method meets the guidelines set out in DEFRA's 'Diffusion Tubes For Ambient NO<sub>2</sub> Monitoring: Practical Guidance.'

SOCOTEC participate in the AIR PT intercomparison scheme for comparing spiked Nitrogen Dioxide diffusion tubes. SOCOTEC currently holds the highest rank of a satisfactory laboratory.

In the most recent round (AIR PT AR040 September – October 2020), 100% of results submitted were determined to be satisfactory.

SOCOTEC were considered to have good diffusion tube precision in 2020.

Monitoring was completed in adherence with the 2020 Diffusion Tube Monitoring Calendar.



## Diffusion Tube Annualisation

All diffusion tube monitoring locations within Three Rivers District Council recorded data capture of 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.

## 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.

Three Rivers District Council have applied a national bias adjustment factor of 0.77 to the 2020 monitoring data. A summary of bias adjustment factors used by Three Rivers District Council over the past five years is presented in Table C.1.

The national bias adjustment factor was taken from spreadsheet version no. 03/21. Twenty-two studies are applicable to the factor.

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

Year	Local or National	If National, Version of National Spreadsheet	Adjustment Factor
2020	National	03/21	0.77
2019	National	Not recorded	0.75
2018	National	Not recorded	0.76
2017	National	03/18	0.77
2016	National	Not recorded	0.77

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

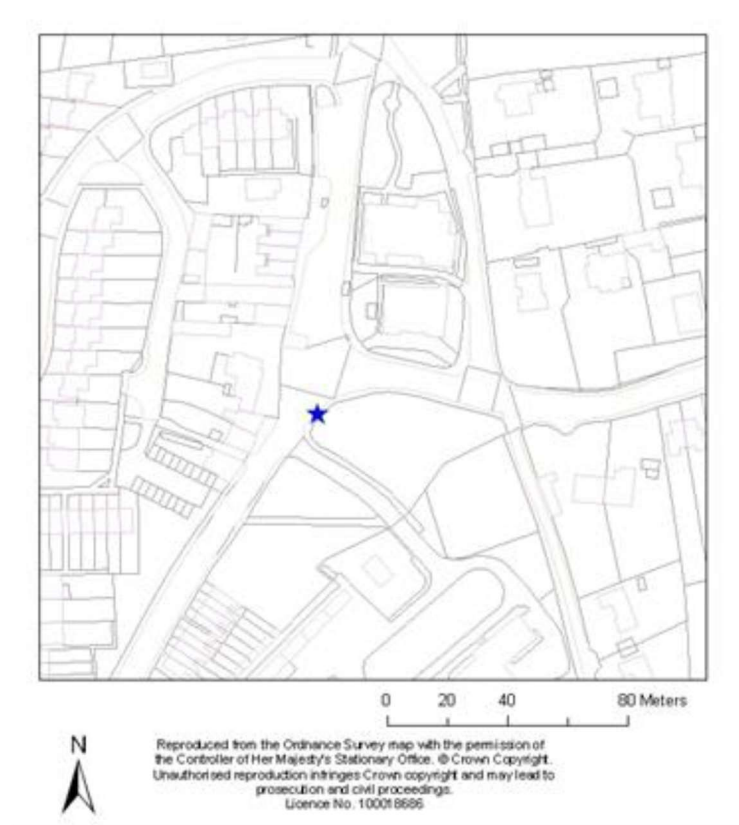
Wherever possible, local authorities should ensure that monitoring locations are representative of exposure. However, where this is not possible, the NO<sub>2</sub> concentration at the nearest location relevant for exposure should be estimated using the Diffusion Tube

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.

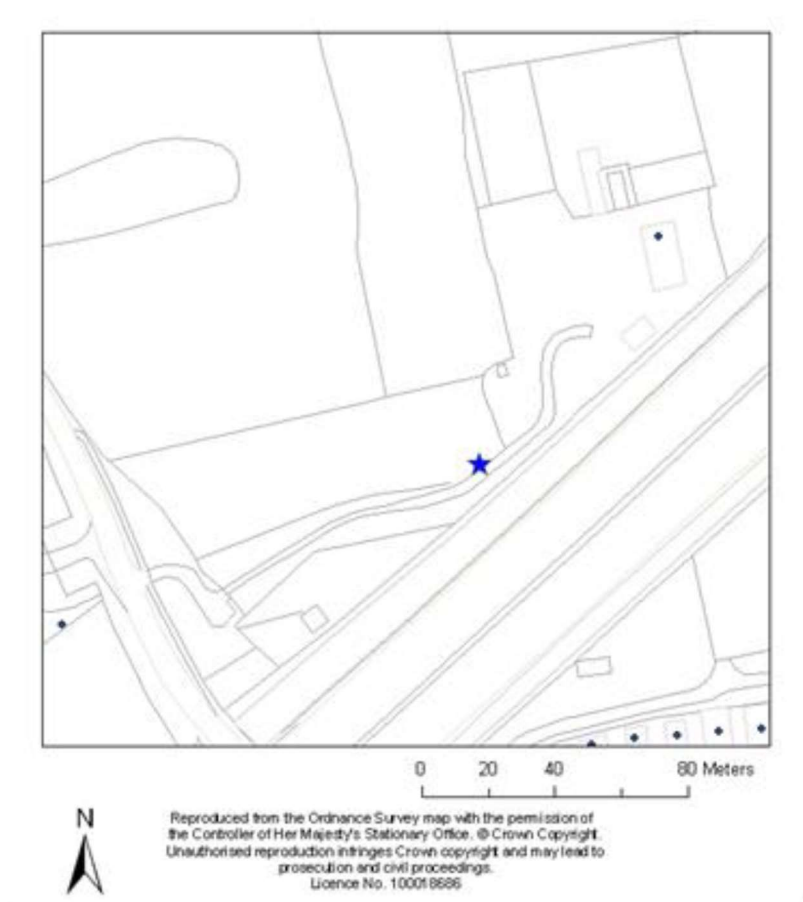
No diffusion tube NO<sub>2</sub> monitoring locations within Three Rivers District Council required distance correction during 2020.

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

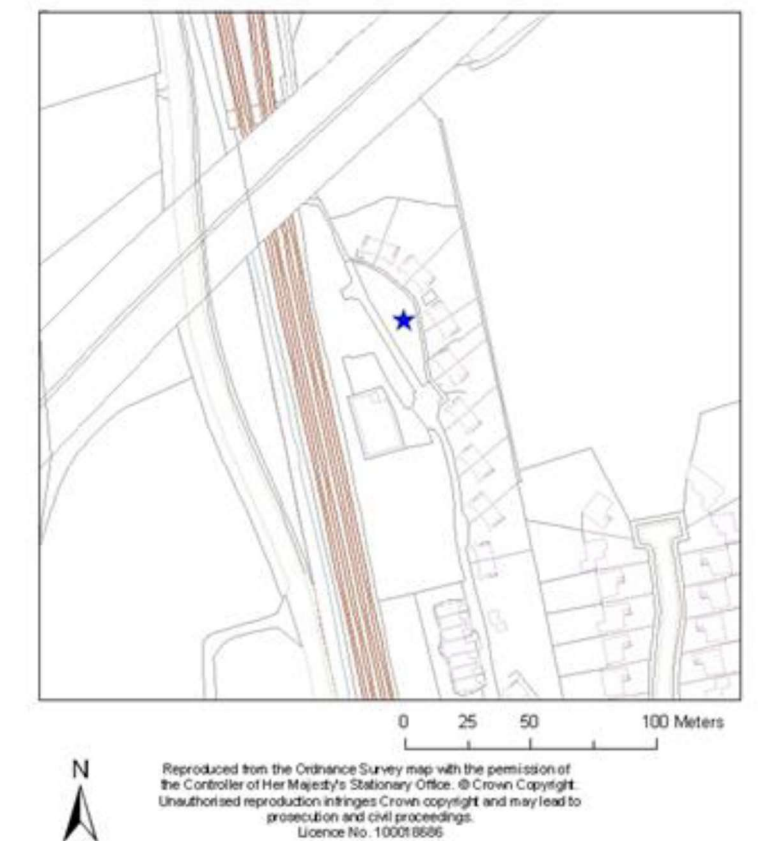
Figure D.1 - Map of Watford Road, Croxley Green DT site (NA) S1



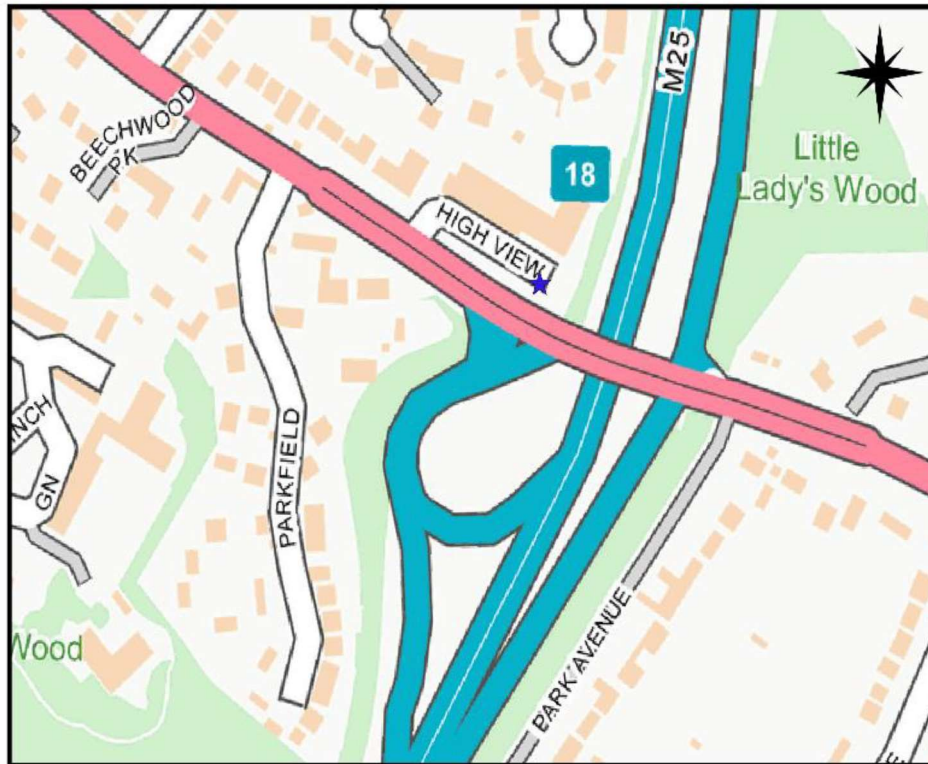
**Figure D.2 - Map of Glen View, Chandlers Cross DT site (NA) S2**



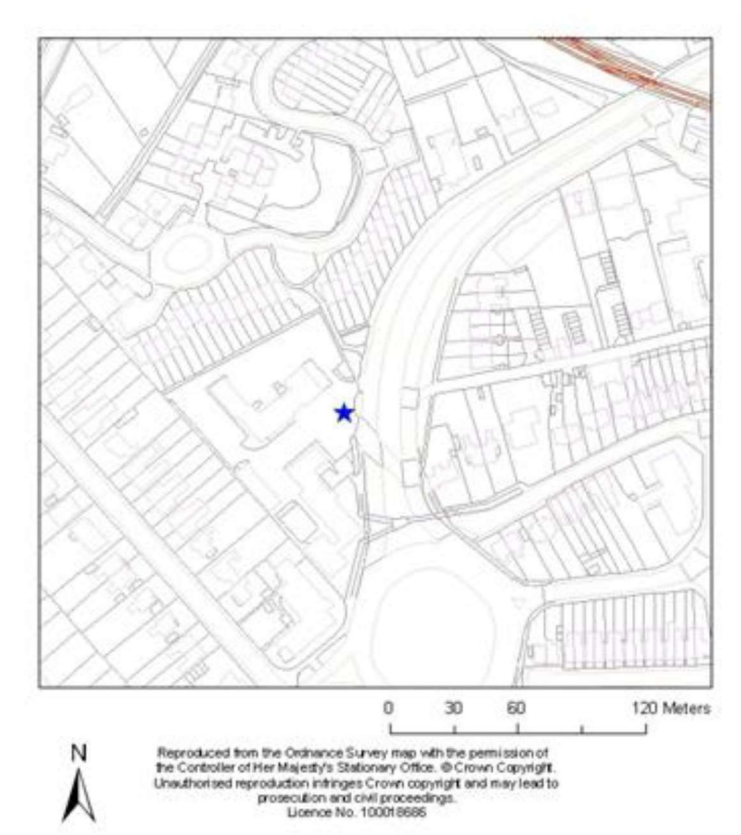
**Figure D.3 - Map of The Retreat, Abbots Langley diffusion tube (DT) site (NA) S3**



**Figure D.4 - Map of Junction 18 (M25) Chorleywood DT sites (NA) S4, S5 & S6**



**Figure D.5 - Map of Rectory Road, Rickmansworth DT site (NA) S7**

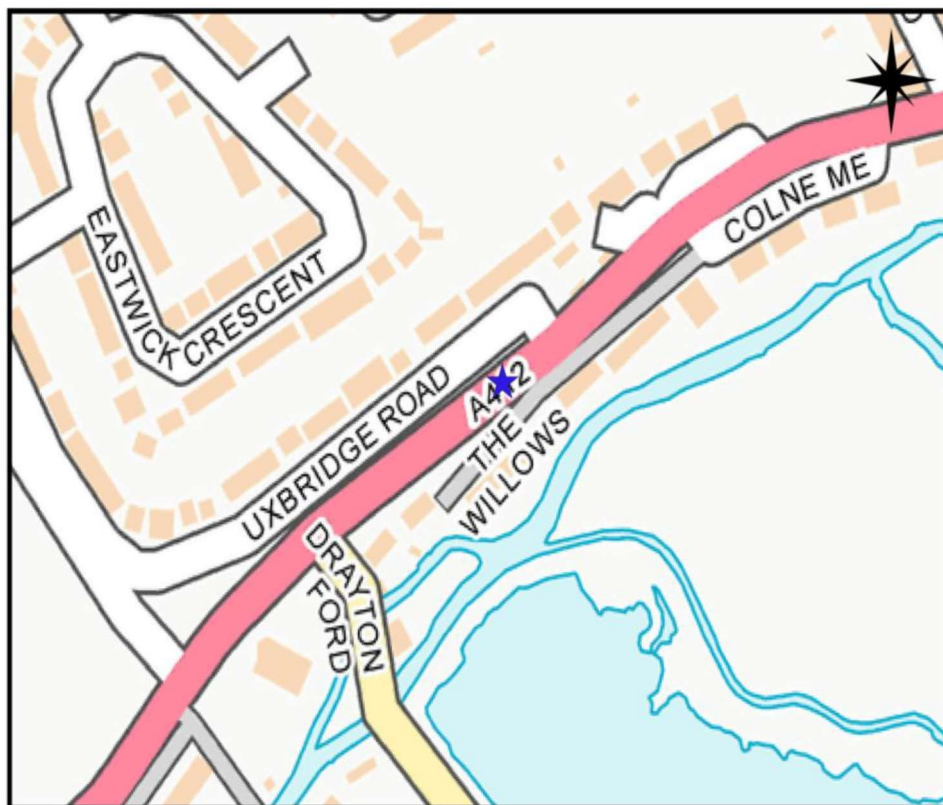




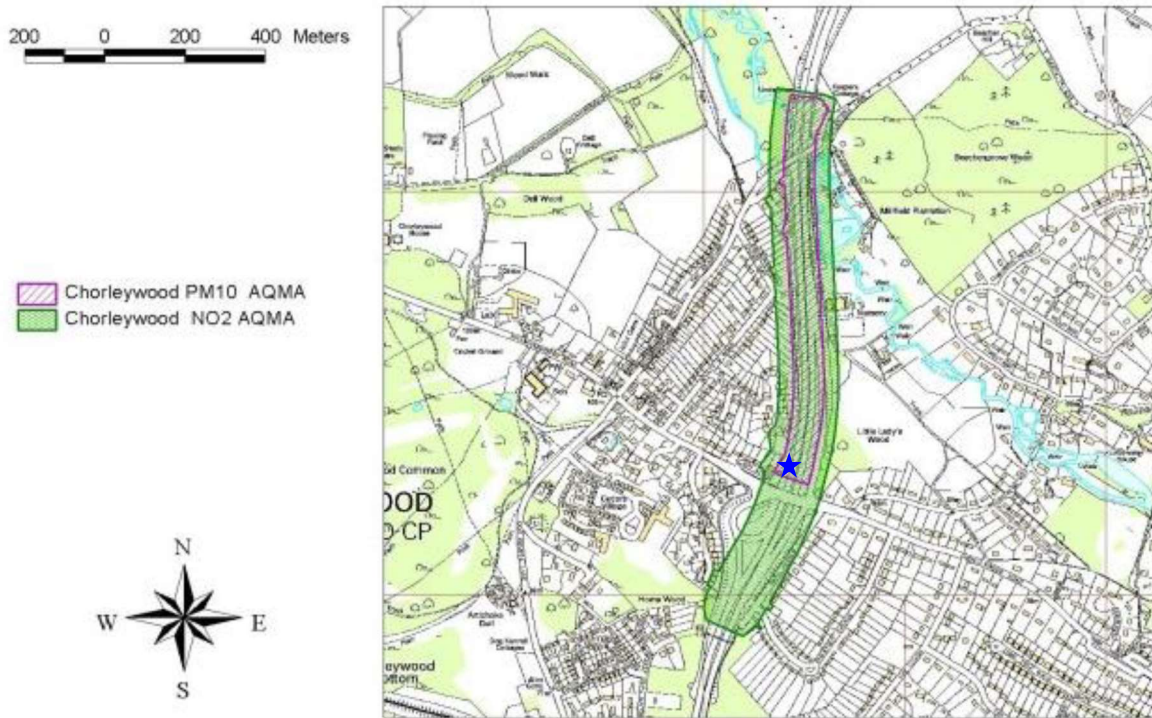
**Figure D.6 - Map of Uxbridge Road, Belfry House DT Triplicate site (NB) S1-S3**



**Figure D.7 - Map of A412 Long Lane (Mill End 2) DT Triplicate site (NB) S4-S6**



**Figure D.8 - Air Quality Management Areas Chorleywood NO<sub>2</sub> and PM<sub>10</sub>**



## 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

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<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 concentrations were between 20 and 30% relative to pre-pandemic levels, which

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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

represents an absolute reduction of between 10 to 20µg/m<sup>3</sup> 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 5µg/m<sup>3</sup> 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 Three Rivers

- Reductions of NO<sub>2</sub> concentrations of between 27.5 and 43.0% were experienced at roadside diffusion tube monitoring sites within the Chorleywood AQMA between April and June 2020. This equated to a 35.6% reduction in annual mean concentration relative to 2019.

\*The only diffusion tube data available for April to June 2019 was from tubes that were deployed from 21/05/2019-05/07/2019. This data was not collected in adherence with the 2019 Diffusion Tube Monitoring Calendar. The data does not cover the whole period. The data was not included in the 2020 ASR. Therefore, no reliance should be placed on these figures.

To help with social distancing, on street parking restrictions were put in place along part of High Street, Rickmansworth.

## Opportunities Presented by COVID-19 upon LAQM within Three Rivers District Council

No LAQM related opportunities have arisen as a consequence of COVID-19 within Three Rivers District Council.

## **Challenges and Constraints Imposed by COVID-19 upon LAQM within Three Rivers District Council**

No challenges or constraints relating to LAQM have arisen during 2020 as a consequence of COVID-19 within Three Rivers District Council.

Table F 1 – Impact Matrix

Category	Impact Rating: None	Impact Rating: Small	Impact Rating: Medium	Impact Rating: Large
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
AQAP	Air Quality Action Plan - A detailed description of measures, outcomes, achievement dates and implementation methods, showing how the local authority intends to achieve air quality limit values'
AQMA	Air Quality Management Area – An area where air pollutant concentrations exceed / are likely to exceed the relevant air quality objectives. AQMAs are declared for specific pollutants and objectives
ASR	Annual Status Report
Defra	Department for Environment, Food and Rural Affairs
DMRB	Design Manual for Roads and Bridges – Air quality screening tool produced by Highways England
EU	European Union
FDMS	Filter Dynamics Measurement System
LAQM	Local Air Quality Management
NO <sub>2</sub>	Nitrogen Dioxide
NO <sub>x</sub>	Nitrogen Oxides
PM <sub>10</sub>	Airborne particulate matter with an aerodynamic diameter of 10µm 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

## References

Carr, D. (2021) Hertfordshire Local Authorities Report on Particulate Matter (PM<sub>2.5</sub>) in Ambient Air in 2019 for Hertfordshire County Council Public Health. Available from: <https://www.airqualityengland.co.uk/local-authority/hnb-reports>.

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