WEST OXFORDSHIRE
DISTRICT COUNCIL

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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Report Reference Number	ASR 2021/1.2
Date	June 2021

Executive Summary: Air Quality in Our Area

Air Quality in West Oxfordshire District

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[1,2].

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

The monitoring reported within this 2021 Annual Status Report for West Oxfordshire District Council took place during the whole of 2020. It does not indicate any additional areas of general concern with regard to air quality, but our two designated Air Quality Management Areas (AQMAs) continue to experience elevated nitrogen dioxide levels. However, this year annual mean levels did not exceed the national objective of 40 µgm-3, which was set to protect health. This is most likely due to social restrictions placed on the UK as a result of the coronavirus pandemic which had the effect of reducing traffic volumes across much of the UK, particularly in the various national lockdowns during 2020 and into 2021.

Current AQMAs are located within the two largest towns within the District – Witney (Bridge Street and immediate area) and Chipping Norton (Horsefair and immediate area):

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

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

[3] Defra. Air quality appraisal: damage cost guidance, July 2020

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

- Chipping Norton's action plan can be found here: Link to Chipping Norton Air Quality Action Plan
- Bridge Street, Witney (air quality action plan pending)

There were no proposed industrial developments within the District during 2020 with significant air pollution implications. A new crematorium was opened at Tackley near Woodstock. Unusually, this is electric-fired whereas traditionally crematoria are gas-powered. It is subject to an environmental permit issued by this authority that sets emissions limits and emissions testing, derived from national legislation.

All residential development proposals were considered with regard to their potential to increase traffic pollution in the AQMAs and other areas. Of note this year is progress with bringing forward plans for the Eynsham strategic housing development area to the west of the town and plans for a Park and Ride facility on the A40 highway also to the west of Eynsham.

There is active liaison between West Oxfordshire District Council, 3 neighbouring District Councils, Oxford City and Oxfordshire County Council and this grouping has produced a useful additional resource describing air quality in our areas: Link to Oxfordshire Air Quality Website

The West Oxfordshire District Council centralised national AQMA page is located here.

Actions to Improve Air Quality

Activity within West Oxfordshire has been limited to monitoring and data collection and scrutiny of various large development schemes for their potential effects, beneficial or otherwise, on local air quality.

Traffic within the West Oxfordshire area is influenced by its proximity to the city of Oxford. The city of Oxford is working upon improving air quality in its area through the introduction of a low emission zone (LEZ) to encourage the uptake of cleaner, greener vehicles. The results of this work have the potential to reduce emissions in the outskirts and beyond if there is take up of cleaner vehicles by residents and businesses that also use them outside of Oxford. However, as public service operators upgrade their fleet, they sell their older vehicles to other operators who may use them in parts of Oxfordshire outside the LEZ, so any improvements outside the city centre may be realised relatively slowly.

Oxfordshire County Council is advancing proposals for a new Park and Ride Scheme at Eynsham, including A40 and other highway improvements. This comprises a park and ride scheme for 1000 cars to the north of the A40, located to the west of the A40/Cuckoo Lane junction at Eynsham with a new footway and cycle shared path located on the northern side of the A40, providing a cycle route from Witney to Oxford, plus other detailed traffic management changes. Construction is scheduled to begin in 2022.

As well as this scheme the County Council, which manages most of the road network in Oxfordshire, is promoting other schemes. An A40 long-term strategy transport package was approved by Oxfordshire County Council Cabinet in May 2016. Key measures seek to deliver improvements to the A40 corridor between Witney and Oxford:

- Further sections of A40 westbound bus lane to provide quicker return journeys to Eynsham park and ride and destinations served by the local bus network.
- Provision of continuous eastbound bus route over the A40 Dukes Cut canal and railway bridge on the approach to Wolvercote. Resolution of this pinch point would allow a continuous eastbound bus route from Carterton, Witney, and Eynsham Park and ride into Wolvercote roundabout, and high quality 3m wide shared cycle path separated from the general traffic lanes.
- Extending of the A40 Dual carriageway from Witney to Eynsham park and ride to increase capacity for all modes along the most heavily trafficked part of the route.
- A new shared cycle path along the B4044 from Eynsham to Botley, seeking to advance the Community Path scheme local group Bike Safe have developed.

Detailed environmental studies for the scheme are underway.

Further information on this and other transport projects can be found here:

Link to Details of Major Transport Projects in Oxfordshire

The DEFRA Air Quality Grant scheme has made an award to all the Oxfordshire Councils (including West Oxfordshire District Council) who have come together to develop a new public-facing air quality information website. As the application was successful work has now begun on developing this website and will continue during 2021.

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[5] sets out the case for action, with goals even more ambitious than EU requirements to reduce exposure to harmful pollutants. The Road to Zero[6] 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.

Conclusions and Priorities

This year was one of significantly reduced travel and thus traffic-derived pollution in West Oxfordshire. Nitrogen dioxide levels in Bridge Street, Witney dropped below the national air quality objective. The annual average results of 36.5 µgm-3 and 32.2 µgm-3 can be compared with last year when the levels were 41.9 µgm-3 and 44.84 µgm-3 respectively.

Similarly reductions have been noted in Chipping Norton. The highest recording tube in Horsefair, Chipping Norton remains high at 35.5 µgm-3 (compared to the previous year's 41.4 µgm-3) but the levels recorded by the other tubes in Chipping Norton are typical of busy roadsides around the whole of the UK.

During the year nitrogen dioxide levels appear to correspond with the imposition and relaxation of the various national lockdowns and travel restrictions due to Covid, providing further evidence that the elevated levels are due to volume of traffic.

Masked by this significant drop in nitrogen dioxide levels is a likely contribution from an increase in the proportion of newer, cleaner vehicles using the roads.

Challenges in addressing our two air quality management areas are anticipated due to the general desire to increase the residential availability around both Witney and Chipping Norton, which will create an additional traffic burden in the areas and it is important that the Oxfordshire County Council Transport Department are kept informed of proposed developments and that developers are aware of the need for appropriate mitigation in respect of associated pollution.

[5] Defra. Clean Air Strategy, 2019

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

Due to the cost of building an alternative route and no agreement regarding advancement of proposed housing and their associated road schemes, there is unfortunately no short-term solution envisaged to the problem of traffic congestion and associated vehicle emissions in Bridge Street Witney or at Horsefair in Chipping Norton at this time. Mitigation, provided through the land planning and development process, associated with proposed local developments and highways schemes such as the new park and ride scheme for Eynsham may provide funding that can be put towards an alternative route. We will continue to work with the County Council Transport Department to explore road traffic development options as well as traffic management options.

Over the next year we will continue the diffusion tube monitoring survey.

Local Engagement and How to get Involved

As the air pollution of concern in the District is related to traffic emissions, we can all do our bit to reduce emissions, by not using a car unless entirely necessary. Walking or cycling, or taking public transport or car sharing rather than driving an otherwise empty car, reduces our individual carbon footprint.

The solution to congestion-related pollution lies to a large extent in road traffic management and District authorities do not have the remit to manage this. Local interest groups can however lobby County Councils directly to influence the content of Local Transport Plans (LTP).

Any queries about Air Quality should be directed to the Environmental Protection team within West Oxfordshire District Council. This team can be contacted by e mail on: customer.services@westoxon.gov.uk

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1 Local Air Quality Management

This report provides an overview of air quality in the West Oxfordshire District 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 West Oxfordshire 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

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 West Oxfordshire District Council can be found in Table 2.1. The table presents a description of the two AQMAs that are currently designated within West Oxfordshire District. Appendix D: Map(s) of Monitoring Locations and AQMAs provides maps of AQMA(s) and also the air quality monitoring locations in relation to the AQMAs. The air quality objectives pertinent to the current AQMA designations are as follows:

- NO_2 annual mean

A summary of AQMAs declared by West Oxfordshire District Council can be found in Table 2.1. Further information related to declared AQMAs, including maps of AQMA boundaries are available online at:

Link to AQMAs Declared by West Oxfordshire District Council

There are 2 AQMAs in West Oxfordshire, located in the centre of Chipping Norton and Witney respectively. The location of each is illustrated below (Figures 2.1 and 2.2, with the AQMA area in red):

Figure 2.1 Witney AQMA

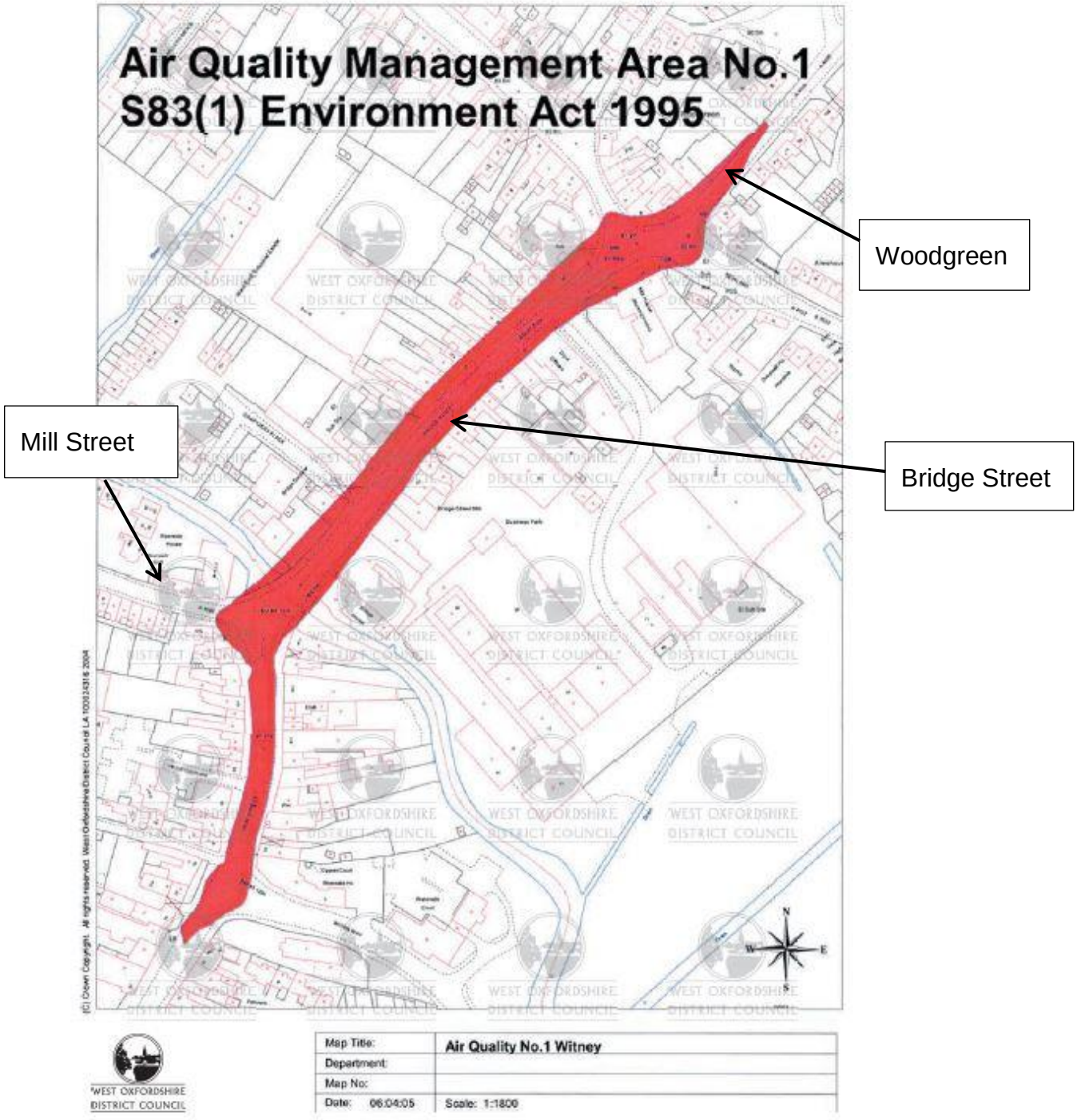


Figure 2.2 Chipping Norton AQMA

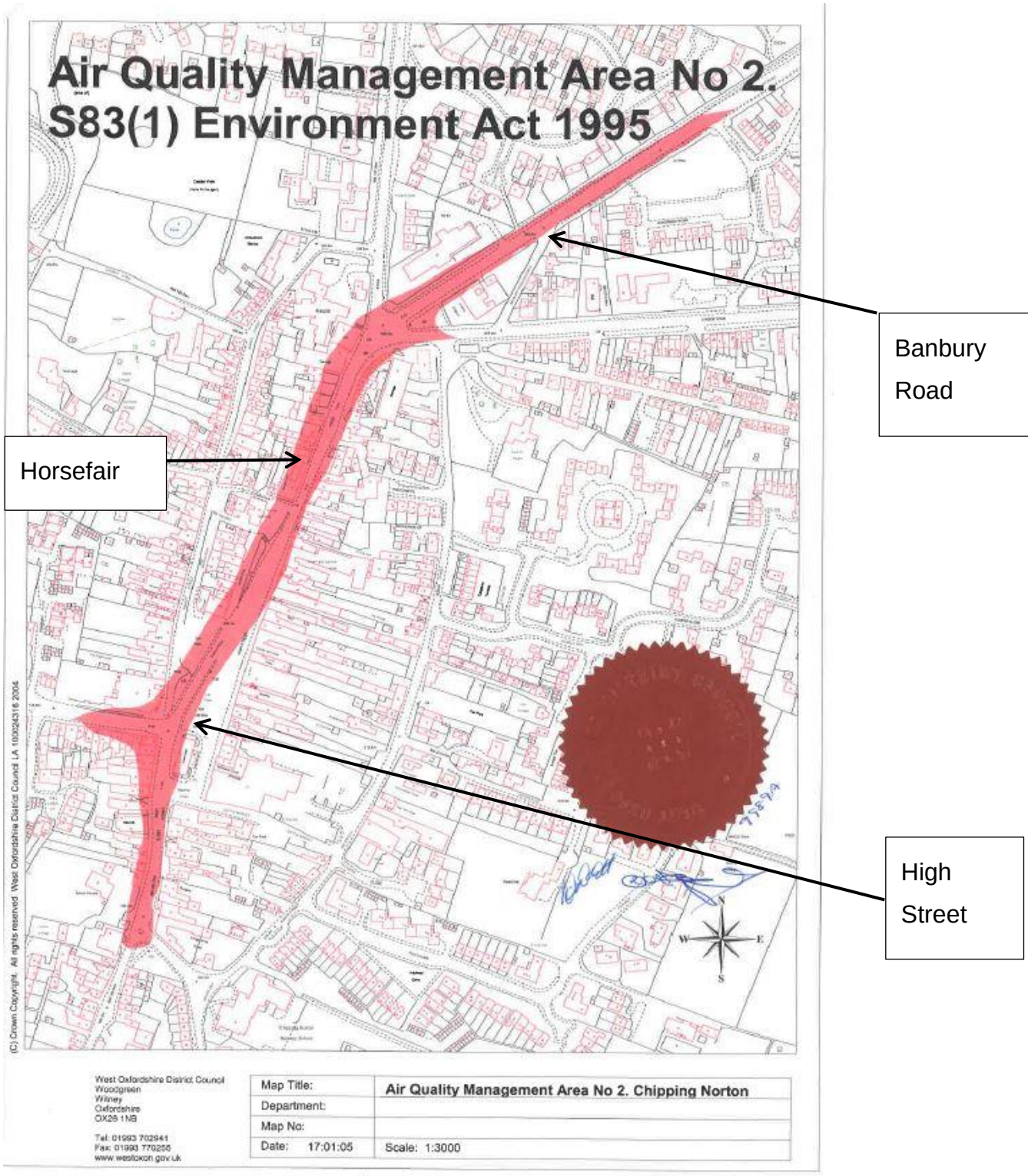


Table 2.1 – Declared Air Quality Management Areas

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
Witney	Declared 01/03/2005	NO2 Annual Mean	An area encompassing Bridge Street and part of High Street, Witney	No	48	36.8	Witney Air Quality Action Plan (pending) 2010	Link to Action Plan details
Chipping Norton	Declared 01/03/2005	NO2 Annual Mean	An area of the town centre encompassing Banbury Road, Horsefair and Market Place	No	49	35.5	Chipping Norton AQP (2008)	Link to Action Plan

Progress and Impact of Measures to address Air Quality in West Oxfordshire District

2.1.1 Past Year's Peer Review comments

Each year the Council's Air Quality Annual Status Report is submitted to central Government for peer review before publishing. Comments on presentation and treatment of data are considered and where appropriate incorporated into the following year's updated report. Comments arising from the 2020 report review included those shown in the table below along with the actions taken. Key findings of Defra's appraisal of last year's ASR are presented below together with actions taken to address these:

Comment	Action
The diffusion tube mapping demonstrates the monitoring network, however AQMA maps and maps of the monitoring locations are provided separately. It is recommended for future reports to include both of these features on same map to see locations of monitoring relative to the AQMAs.	Revised location plans have been included in Appendix D below.
The introduction of new diffusion tube locations for 2019 is welcomed and the network should continue to be reviewed to ensure the most relevant locations are monitored as required.	New monitoring sites have been set up for commencement in 2021.
Update AQAP	Not yet advanced. Dependent on progress of proposed strategic expansion of both Chipping Norton and Witney.

2.1.2 Measures to improve Air Quality

West Oxfordshire District Council with its partners 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 which has 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 scheme websites and links to these have been given within the table.

In addition, West Oxfordshire District Council expects a number of other measures that will positively affect air quality to be progressed over the course of the next reporting year. These are detailed in the following sections.

2.1.3 Forthcoming measures impacting air quality - Highways and Transport schemes

A40 Improvement scheme

Major highways schemes are planned for the A40 highway corridor. The improvements to the A40 will result in a new park and ride at Eynsham, an extension of the dual carriageway around Witney, new bus lanes and junction improvements.

Public transport services in West Oxfordshire will benefit from having new dedicated bus lanes connecting Eynsham with Oxford.

The key schemes within West Oxfordshire are:

- A40 dual carriageway extension: A scheme to upgrade the A40 between east of Witney to the Eynsham park and ride site into a dual carriageway.
- Eynsham park and ride: A new 850 space park and ride in Eynsham will provide easier access to improved and more reliable bus services into Oxford.
- A40 integrated bus lanes: A 6.5km proposed eastbound and westbound bus priority corridor along the A40 between Eynsham park and ride towards Duke’s Cut, with improved routes for pedestrians and cyclists.
- A40 Access to Witney: The A40 Access to Witney scheme proposes improvements to the existing B4022/ A40 junction at Shores Green.

The programme is £180m of investment in the A40 corridor and the funding for this has been secured. Main construction works will be phased and, subject to planning permission, are scheduled to start in mid-2022 with completion by the end of 2024.

Notification was received November 2020 concerning changes to the scheme, notably the change of the opening year from 2021 to 2024. This was in response to a Regulation 25 (of the Town and Country Planning (Environmental Impact Assessment) Regulations 2017) request from the planning authority, in turn a response to comments received after consulting on the earlier proposals.

Planning applications for the A40 Smart Corridor and Access to Witney are scheduled to be submitted in Autumn 2021.

Witney Active Travel Scheme

Residents of Witney were asked to offer their views on a new cycle scheme to help make the town a safer place to cycle and walk, to cut vehicle journeys and offer cleaner air. The Witney Active Travel Scheme will deliver sustainable cycle routes across central Witney and join-up with further future improvements to walking and cycling in western Witney. It will provide a continuous east-west route across the whole town, making it easier for people to travel by bike or on foot. Further detail of the proposals will be found in Table 2.2.

Funding has been secured via Department for Transport (the Covid pandemic response Active Travel Fund) and via Section 106 planning obligation funds, and public consultation closed in February 2021. The scheme is intended to enable and encourage as many trips as possible by low/no carbon modes to help the air quality across Witney.

Park and Charge: Electric Vehicles (EV) and EV Charging

Oxfordshire is proposing to install Electric Vehicle (EV) charging points in a range of public car parks in 2021 through the Park & Charge project. A consultation was undertaken in October 2020. In the West Oxfordshire District Council area it is proposed to open charging stations in Carterton, Chipping Norton, Eynsham, Witney and Woodstock.

Burford Speed limit reduction and HGV weight limit

Although recently enacted and not specifically an air quality improvement measure, speed limits on roads in and around the town of Burford have been reduced. In the centre of the town the limit is now 20mph. In some other areas of England it has been found that local reduction of limits to 20mph has slowed the progress of traffic through urban areas but it

has allowed traffic to flow better because lower speeds encourages motorists to give way to emerging traffic from side roads in particular. Better flowing traffic often leads to reduction in airborne pollution.

In a separate action, Oxfordshire County Council has made an experimental Order preventing goods vehicles that exceed 7.5 tonnes passing through Burford town centre. The order was made on 20 July 2020 and will operate for a maximum period of 18 months.

2.1.4 Forthcoming measures impacting air quality - Active housing developments

East Witney Strategic Development Area

Some 495 homes are planned in this area of land south east of Oxford Hill, Witney. A planning application was received during 2020 at this location and is under consideration. Air quality modelling accompanies this application albeit that no new measurement data has been provided.

North Witney Strategic Development Area

Some 1400 homes are planned. Initial proposals for 110 homes on land west of Hailey Road have been brought forward. A Secretary of State's decision dated 30 July 2020 has directed that the proposed development of 110 homes is "EIA development" within the meaning of the Town and Country (Environmental Impact Assessment) Regulations 2017.

2.1.5 Forthcoming measures impacting air quality - Planned housing developments

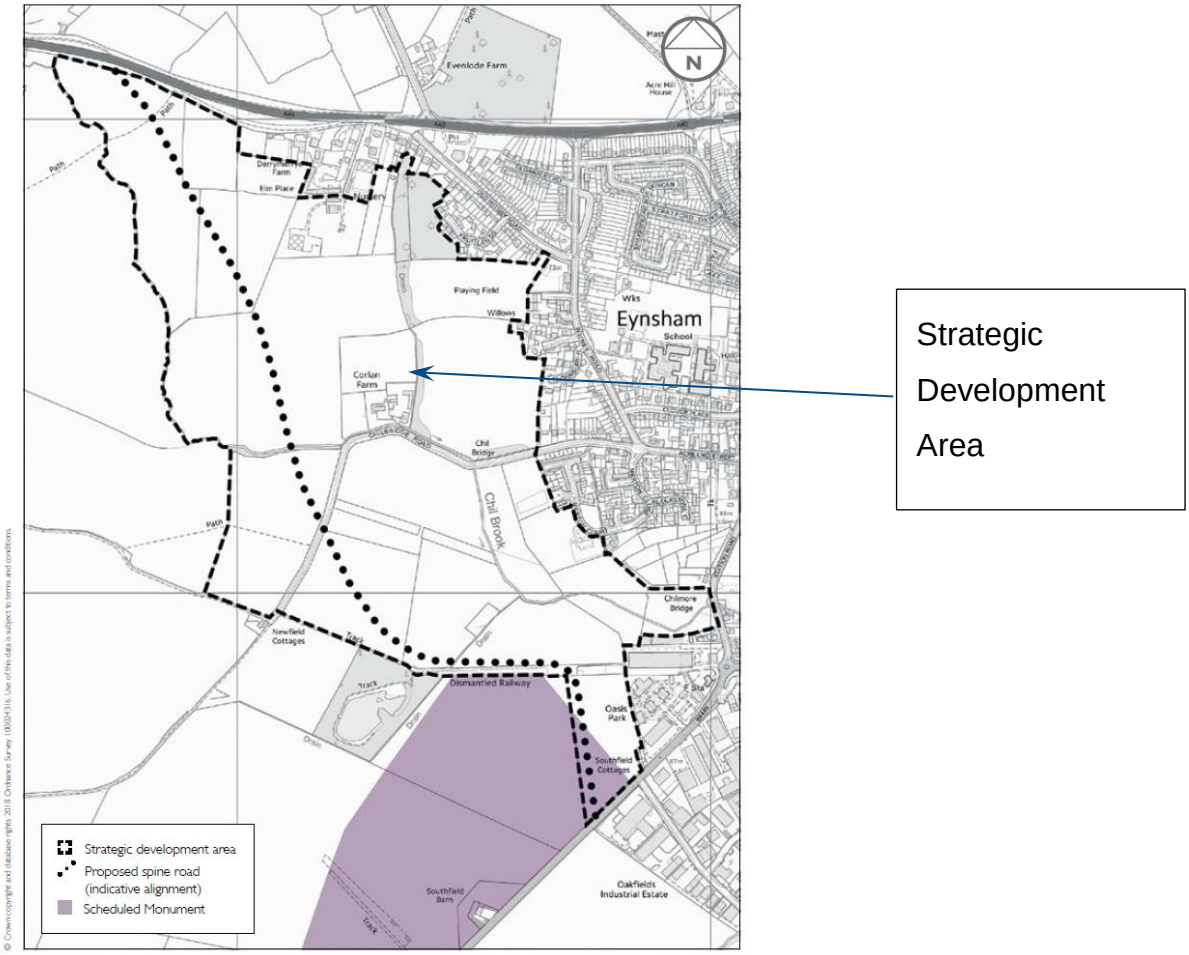
In addition to the above there are other major developments planned, which are in the process of being brought forward.

West Eynsham Strategic Development Area (SDA)

The West Eynsham SDA is located to the west of the existing settlement at Eynsham and will provide an urban extension of Eynsham, comprising around 1000 new homes by 2031. The location is shown in Figure 2.3. Some of these (450 homes) are to contribute to West Oxfordshire District's own housing needs whilst the balance is to meet the housing needs of Oxford City. The proposal forms District planning policy EW2. An additional point is the provision of a new western spine road funded by and provided as an integral part of the proposed development and to link the A40 and B4449 highways.

A draft masterplan for the first phase of the development has been published for consultation. A link is here: West Eynsham proposed phase-one

Figure 2.3 Location of West Eynsham SDA (from District Plan)



East Chipping Norton Strategic Development Area

The **East Chipping Norton** SDA is allocated for **development** under Policy CN1 of the West Oxfordshire Local Plan 2031 This comprises land east of Chipping Norton and comprises around 1200 homes.

No air quality information has been made available to this authority in 2020 in connection with these developments.

2.1.6 Council's Priorities

West Oxfordshire District Council's priorities for the coming year are to continue to measure air quality via its diffusion tube network across the District.

It will work with the A40 scheme partners to deliver the above schemes and in relation to air quality assist the project team as they monitor air quality to inform the planning application and for post-assessment of the scheme once constructed. Air quality will be reviewed as part of the Environmental Impact Assessment and submitted with the scheme's planning application.

Challenges

The principal challenges and barriers to implementation that West Oxfordshire District Council anticipates facing are financial constraints within Oxfordshire County Council that are hampering progress with re-consideration of traffic management options and the development of implementation plans, as well as the anticipated increase in the amount of traffic in the AQMAs in the future, due to proposed residential developments, which could potentially cause an increase in the pollution levels.

West Oxfordshire District Council anticipates that the action plan measures, combined with the improvement of the national fleet as it is replaced by newer low emissions vehicles, will achieve compliance with the national objective for nitrogen dioxide in Chipping Norton, Horsefair, but the timeframe for this is unknown.

Whilst the improvement of the national fleet as it is replaced by newer low emissions vehicles will help to contribute towards compliance in the Witney AQMA, West Oxfordshire District Council anticipates that further additional measures not yet prescribed will be required in subsequent years to achieve compliance and enable the revocation of this AQMA.

Progress on the development of the AQ Action Plan for Witney has been slower than expected as it is dependent on progress of the proposed strategic expansion of Witney.

West Oxfordshire District Council anticipates that the measures stated above and in Table 2.2 will help achieve compliance in Witney AQMA by reducing vehicle journeys into and through the centre of Witney by providing alternatives for travel.

Whilst the measures stated above and in Table 2.2 will help to contribute towards compliance, West Oxfordshire District Council anticipates that further additional measures not yet prescribed will be required in subsequent years to achieve compliance and enable the revocation of the AQMAs in both Chipping Norton and Witney.

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	Connecting Oxfordshire: Local Transport Plan 2015-2031	Policy Guidance and Development Control	Other policy	2015	2016	Oxfordshire County Council	Oxfordshire County Council	No	Fully funded	Not known	Implemented	Reduced traffic density	Public awareness Increasing awareness within health monitoring policy	Published Link to Oxfordshire Transport Policy & Strategy LTP4	None to date
2	Oxfordshire Active & Healthy Travel Strategy	Promoting Travel Alternatives	Intensive active travel campaign & infrastructure	2016	2016	Oxfordshire County Council and LA	Oxfordshire County Council	No	Fully funded	Not known	Implemented	Reduced traffic density	Reducing car use and thus emissions. Increased cycle network	Published Link to Oxfordshire Healthy Travel Strategy	None to date
3	Witney Active Travel Scheme	Transport Planning and Infrastructure	Cycle network	2020	Estimated 2021	Oxfordshire County Council and Oxfordshire Local Enterprise Partnership	Government Active Travel Fund, Oxfordshire Local Enterprise Partnership, S106 funding	No	Fully funded	Not known	Planning	Reduced vehicle emissions	Increased cycling	Consultation completed, response published Link to Witney Active Travel Scheme	None to date
4	New Park & Ride at A40 Cassington	Alternatives to private vehicle use	Bus based Park & Ride	2019 (planning application submitted)	Estimated 2024	Oxfordshire County Council and its partners	Department for Transport retained Local Growth Fund Housing Growth Deal Oxfordshire Local Enterprise Partnership S106 contributions	No	Fully funded	>£10m	Planning	New bus routes and journeys	Usage of facility	Consultation completed, awaiting detailed design Link to Park & Ride Scheme	None to date
5	A40 Highway improvement (ext of dual carriage way Witney-Eynsham Park& Ride and bus lane to Oxford)	Traffic Management	Strategic highway improvements, Re-prioritising road space away from cars, including Access management, Selective vehicle priority, bus priority, high vehicle occupancy lane	2016	Estimated 2024	Oxfordshire County Council and its partners	Department for Transport retained Local Growth Fund (LGF) Homes England Housing Infrastructure Fund (HIF) Oxfordshire Local Enterprise Partnership The Housing Growth Deal (HGD) various S106 developer contributions	No	Fully funded	>£10m	Planning	Reduced traffic density	Reduction in local concs NO2	Consultation stage Link to A40 highway improvement scheme	None to date
6	Oxfordshire Park & Charge - Electric vehicle charging points scheme	Promoting Low Emission Transport	Procuring alternative Refuelling infrastructure to promote Low Emission Vehicles, EV recharging, Gas fuel recharging	2020	Estimated late 2021	The Office for Zero Emission Vehicles and Innovate UK, and delivered by Oxfordshire County Council, SSE Enterprise, Zeta Specialist Lighting, Urban Integrated [ui!]uk, EZ Charge and University of Oxford	The Office for Zero Emission Vehicles and Innovate UK	No	Fully funded	£1m - £10m	Implementation	Increase in low emission vehicles	Uptake by EV users	Consultation complete Link to Park and Charge Oxfordshire	None to date
7	Oxfordshire Air Quality Information Website	Public Information	Via the Internet	2020	2021	Oxfordshire County Council and all District LAs	DEFRA AQ Grant and LAs	Yes	Fully funded	£100-500k	Implementation	Information on local air quality to impact lifestyle choice	“Hits” on website	Ongoing	Officer time constraints

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

2.1.7 General Approach

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

Other than the potential source from vehicles, no other significant source of PM2.5 has been identified within the District. Therefore the control at this stage is aligned with the measures designed to achieve a reduction in vehicular emissions.

Partnership working by the Oxfordshire Air Quality group has included liaison with Oxfordshire County transport and health committees to raise the profile of Air Quality.

2.1.8 Public Health Outcomes Framework

Public Health England publishes various information related to public health, in particular in relation to particulate matter.

The importance of the effect of air pollution on public health is reflected by the inclusion of an indicator of mortality associated with air pollution in the Public Health Outcomes Framework. This is a series of “indicators” prepared by Central Government as a measure of public health in various categories and across the regions of the UK. One category of data is “D01 - Fraction of mortality attributable to particulate air pollution” (2018)[7].

[7] Footnote Source: Background annual average PM2.5 concentrations for the year of interest are modelled on a 1km x 1km grid using an air dispersion model, and calibrated using measured concentrations taken from background sites in Defra’s Automatic Urban and Rural Network (http://uk-air.defra.gov.uk/interactive-map.) Data on primary emissions from different sources and a combination of measurement data for secondary inorganic aerosol and models for sources not included in the emission inventory (including re-suspension of dusts) are used to estimate the anthropogenic (human-made) component of these concentrations. By approximating LA boundaries to the 1km by 1km grid, and using census population data,

For Oxfordshire as a whole, the estimated Fraction of Mortality attributable to particulate air pollution is ranked relatively well, being 14 out of 19 areas in the South East of England. This equates to a percentage of 5.5% compared with the regional average of 5.6%.

For the West Oxfordshire District, the estimated Fraction of Mortality attributable to particulate air pollution is relatively low with the area ranked 55 out of 64 areas in the South East of England. This equates to a percentage of 5.2% compared with the regional average of 5.6%.

Public Health England Public Health Profiles data

PM2.5 is the pollutant which has a significant impact on public health and on which the Public Health Outcomes Framework (PHOF) indicator D01 is based. PM2.5 data is available for 2017 which indicated that for the PHOF indicator “Air pollution: fine particulate matter” (2017), West Oxfordshire District is ranked 58 out of 64 areas in the South East of England. This equates to annual mean concentrations of 8.9µg m^{-3} PM2.5 compared with the regional average of 9.8µg m^{-3} PM2.5.

population weighted background PM2.5 concentrations for each lower tier LA are calculated. This work is completed under contract to Defra, as a small extension of its obligations under the Ambient Air Quality Directive (2008/50/EC). Concentrations of anthropogenic, rather than total, PM2.5 are used as the basis for this indicator, as burden estimates based on total PM2.5 might give a misleading impression of the scale of the potential influence of policy interventions (COMEAP, 2012).

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

This section sets out the monitoring undertaken within 2021 by West Oxfordshire 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.

The 2020 monitoring year was largely one of consolidation not least because the Coronavirus pandemic limited both staff availability and mobility around the District. During April 2020, due to staff being redeployed on to emergency duties, NO_2 diffusion tubes were not placed during that month. Over the year there have been no new roads or major changes that have affected traffic flows.

However for the rest of the year we continued monitoring at 25 locations. Measured concentrations of NO_2 are generally much lower this year compared to previous years. Further information will be found below.

Summary of Monitoring Undertaken

3.1.1 Automatic Monitoring Sites

West Oxfordshire District Council has no automatic (continuous) monitoring sites within its area.

3.1.2 Non-Automatic Monitoring Sites

West Oxfordshire District Council undertook non- automatic (i.e. passive) monitoring of NO_2 by diffusion tube at 25 sites across the district during 2020. **Error! Reference source not found.** in Appendix A presents the details of the non-automatic sites. The sites all relate to traffic emissions. 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 “annualisation” will be found within Appendix C.

The survey focused upon locations where there is “relevant public exposure”, in accordance with Defra LAQM Technical Guidance Note TG(09) (Reference E). This year,

no new monitoring points were set up in the District, however for the 2021 monitoring year, when traffic levels are expected to return towards pre-Covid levels, one of the 2020 monitoring locations has been discontinued (location NAS8 Whitehill House Cottage, A40 Witney and replaced with a new location at the outskirts of Witney, effective from January 2021. Data from this will be collected throughout 2021 and reported in 2022.

Individual Pollutants

3.1.3 Nitrogen Dioxide (NO_2)

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.

As there were at least 9 months data for all but 1 monitoring site, annualisation was only required for the 1 site. This was at location NAS13 - 3 Hensington Road, Woodstock where the diffusion tube was reported missing on multiple occasions and thus monitoring data was only available from this site for part of the year. It is unclear why this should be happening although at the time of writing the situation has improved in the early months of 2021. Therefore annualisation was carried out on the 2020 data to provide an estimated annual exposure. Further details on Quality Assurance/Quality Control (QA/QC) for the diffusion tubes, including bias adjustments and any other adjustments applied (such as “annualisation” and/or distance correction), are included in Appendix C.

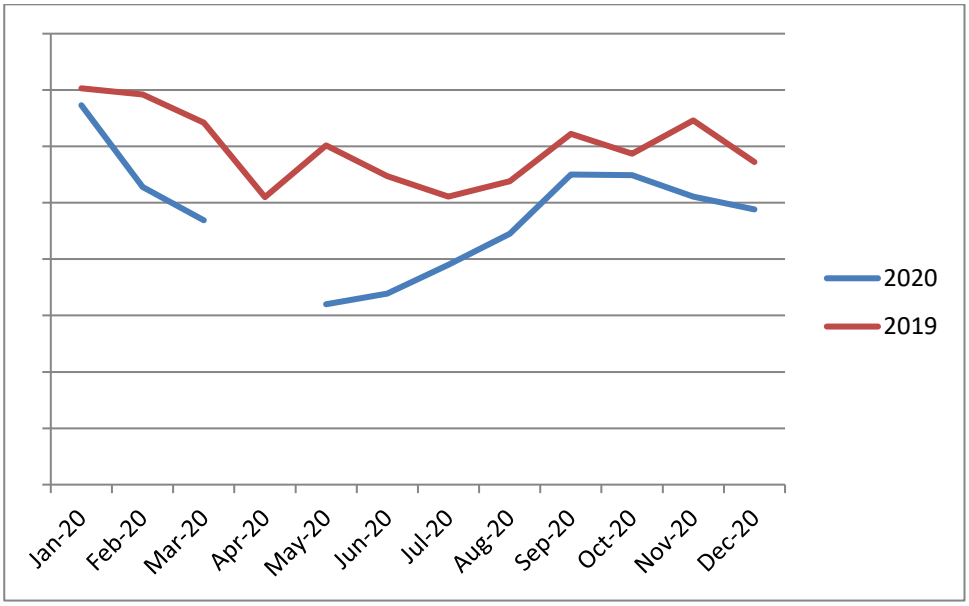
Table A.1 in Appendix A compares the ratified and adjusted monitored NO_2 annual mean concentrations for the past 5 years (where available), for comparison with the air quality objective of 40µg/m^3. Note that the concentration data presented represents the concentration at the location of the monitoring site, following the application of bias adjustment and annualisation, as required (i.e. the values are exclusive of any consideration to fall-off with distance adjustment).

For diffusion tubes, the full 2021 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

Overall NO_2 levels are somewhat lower across the District in comparison with past years. The results from the Covid lockdown periods in 2020 are not necessarily representative of

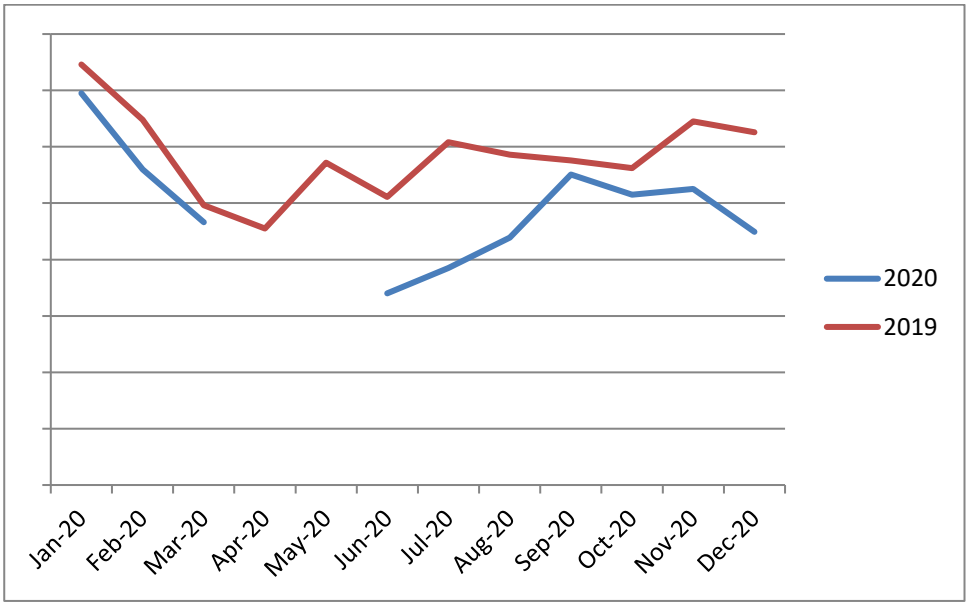
pollution levels that might have been experienced around the District had traffic levels been “typical” of other years. Figures 3.1 and 3.2 illustrate the effect on local NO_2 concentrations in both of the District’s AQMAs as the pandemic took hold. The graphs shown are a comparison of corresponding monthly NO_2 concentrations between the years 2019 and 2020. In the first month of 2020 concentrations of NO_2 are comparable to those of the previous year . As the Covid pandemic developed and social mixing were first voluntarily curtailed then enforced by lockdown in March it can be seen that the 2020 NO_2 measurements are somewhat lower during February to May 2020, recovering somewhat in the summer of 2020 before dropping back again as the less severe social restrictions of the “Tier” structure were gradually introduced from late autumn of 2020. At the lowest point measured NO_2 was around a third to a half of the 2019 levels. This readily demonstrates how elevated NO_2 at these locations is dominated by emissions generated from vehicular traffic.

Figure 3.1 25 Bridge St, Witney Relative NO_2 concentrations 2019 and 2020



NB data unavailable for April 2020

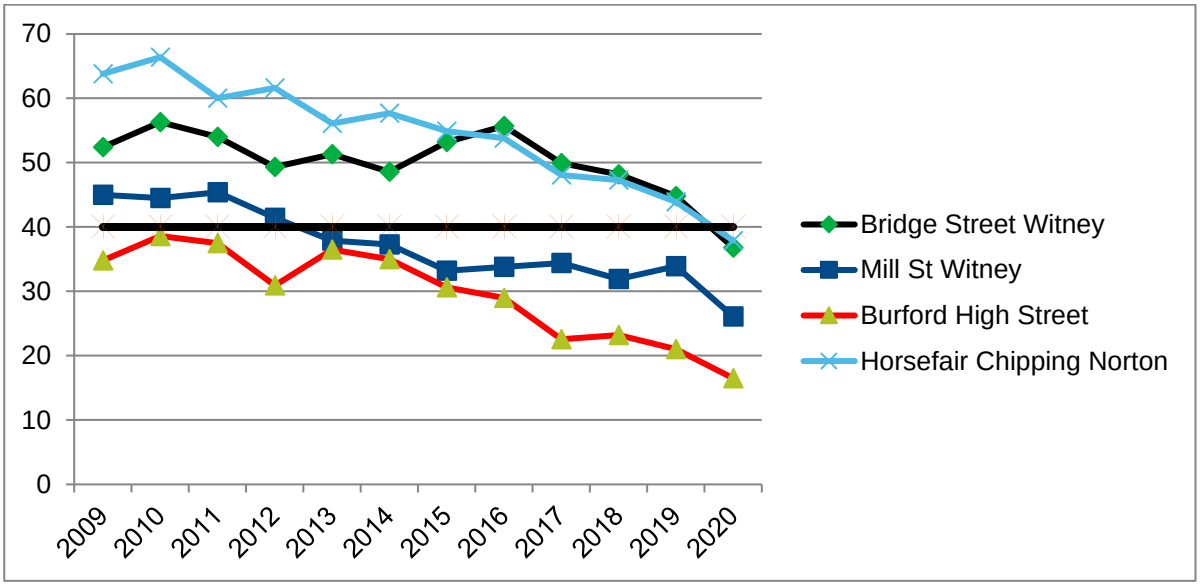
Figure 3.2 Horsefair, opposite 7 High St, Chipping Norton Relative NO_2 concentrations 2019 and 2020



NB data unavailable for April (staff unavailable) and May (tube missing) 2020

Similar annual trends can be observed across the District in comparison with past years. A comparison of NO_2 results from 4 key locations around the District since 2009 will be found in Figure 3.3.

Figure 3.3 Trend in NO2 Concentrations at selected locations



Corrected for bias but not distance corrected.

The horizontal line represents the national objective level for NO_2

It is possible to see a general falling of NO2 concentrations in all locations with of course the most dramatic drop during the most recent year of 2020, again due to traffic reductions

as a consequence of Covid. In particular, during 2020 annual concentrations fell below the national objective levels at all these locations. However there is no reason at this stage to assume these depressed concentrations will continue beyond the pandemic. Although there is much national debate about how travelling and commuting patterns will change post-pandemic there are indications from this data that as social and economic mobility increase so do traffic and thus NO_2 levels, so it is to be expected that both the District's AQMAs will be maintained for the foreseeable future. It is also noted that no annual means, and since January 2020 no monthly means greater than 60µg/m^3 were measured, which indicates that an exceedance of the 1-hour mean objective is unlikely at any sites for those months.

At Eynsham, two monitoring locations were set up in residential areas in 2019 (locations NAS 40/41). In 2020's annual report it was only possible to report a partial year's worth of data, however for 2021 there is now a full year's worth of data available for the Eynsham locations. Measured NO_2 concentrations at both sites is well below the national objective level. As significant development is expected in the Eynsham area in the coming years (see sections 2.2.3 and 2.2.5) these locations will be retained and can provide useful comparison data in the future.

3.1.4 Particulate Matter

Measurements of particulate matter were not made within the District.

The UK Government has produced a selection of statistics on annual emissions to air in the UK for the period 1970 to 2019. Whilst there has been a long-term decrease in the emissions of all of the air pollutants covered, burning of other solid fuels for domestic heating and industry has increased in recent years and this is having an adverse effect on the release of particulate matter. Decreases in emissions of particulates from many sources have been partially offset by increases in emissions from residential burning (domestic solid fuel heating; emissions of PM2.5 from this source increased by 28 per cent between 2009 and 2019). In fact domestic combustion using wood as a fuel accounted for 38 per cent of primary emissions of PM2.5 in 2019. This reflects the increasing popularity of solid fuel appliances in the home such as wood-burning stoves. Emissions of particulates from domestic burning is cumulatively now greater than that from road transport.

As a reflection of these concerns, new legislation has come into effect in England, controlling the sale of wood and coal for domestic heating. Under the Air Quality (Domestic

Solid Fuels Standards) (England) Regulations 2020, wet wood (that is, wood having a moisture content of more than 20%) cannot be sold in units of less than 2m^3. The same legislation outlaws sale of bags of coal for domestic fireplaces. This is intended to encourage use of approved kiln-dried logs which produce much less smoke and thus particulates.

Appendix A: Monitoring Results

Table A.1 – Details of Non-Automatic Monitoring Sites

Diffusion Tube ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA? Which AQMA?	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Tube Co-located with a Continuous Analyser?	Tube Height (m)
NAS1	25 Bridge Street, Witney	Roadside	435860	210285	NO2	Witney Bridge Street AQMA	0.0	1.6	No	2.3
NAS2	10 Bridge Street, Witney	Roadside	435821	210243	NO2	Witney Bridge Street AQMA	0.6	2.3	No	2.6
NAS3	20 Bridge Street, Witney	Roadside	435849	210280	NO2	Witney Bridge Street AQMA	0.0	2.2	No	2.3
NAS4	9 Mill Street, Witney	Roadside	435682	210195	NO2	None	0.9	1.4	No	2.7
NAS5	4A West End, Witney	Roadside	435897	210324	NO2	Witney Bridge Street AQMA	0	1.2	No	2.3
NAS6	Woodgreen Hill,Witney	Roadside	435940	210351	NO2	Witney Bridge Street AQMA	0.1	3.1	No	2.3
NAS7	Newland, Witney	Roadside	435946	210326	NO2	Witney Bridge Street AQMA	1.2	2.4	No	2.3
NAS8	A40 Whitehill House Cottage	Roadside	439304	210260	NO2	None	14.0	2.9	No	2.4
NAS9	A40 j/w Southleigh Turn	Roadside	440082	210435	NO2	None	>50	1.1	No	2.2
NAS10	Park Street, Bladon	Roadside	444812	214669	NO2	None	14.0	2.5	No	2.6
NAS11	Heath Lane, Bladon	Rural	445216	214389	NO2	None	10.5	1.1	No	2.2
NAS12	Grove Rd, Bladon	Roadside	444904	214946	NO2	None	8.9	2.0	No	2.3
NAS13	3 Hensington Road, Woodstock	Urban Background	444732	216696	NO2	None	0.2	1.7	No	2.2

Diffusion Tube ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA? Which AQMA?	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Tube Co-located with a Continuous Analyser?	Tube Height (m)
NAS14	High St, Woodstock (Chef Imperial)	Roadside	444324	216868	NO2	None	0.2	2.7	No	2.3
NAS15	Woodstock, Rosamund Drive.	Urban Background	444199	217343	NO2	None	6.8	1.8	No	2.3
NAS16	Withers Way, Chipping Norton	Urban Background	431203	226866	NO2	None	4.7	2.1	No	2.4
NAS17	West St , Chipping Norton	Roadside	431342	226950	NO2	Chipping Norton AQMA	0.4	1.8	No	2.7
NAS18, NAS19, NAS20	Nox Monitor Chipping Norton	Roadside	431430	227216	NO2	Chipping Norton AQMA	3.2	1.5	No	1.8
NAS21	7 Horsefair, Chipping Norton	Roadside	431458	227278	NO2	Chipping Norton AQMA	0.2	4.8	No	2.7
NAS22	Horsefair (opp No.7), Chipping Norton	Roadside	431458	227277	NO2	Chipping Norton AQMA	0.4	1.0	No	2.3
NAS23	Lower High Street, Burford	Roadside	425185	212435	NO2	None	0.7	2.0	No	2.3
NAS24	High Street (Near Barclays Bank),Burford	Roadside	425153	212178	NO2	None	0.4	1.8	No	2.2
NAS25	Carterton Garner Close	Urban Background	427412	208233	NO2	None	8.6	1.3	No	2.2
NAS40	Witney Road,Eynsham	Roadside	442753	209913	NO2	None	6.1	1.2	No	2.2
NAS41	Hanborough Road, Eynsham	Roadside	443658	210015	NO2	None	25.0	2.0	No	2.3

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— Annual Mean NO_2 Monitoring Results: Non-Automatic Monitoring (µg/m^3)

Diffusion Tube ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) [1]	Valid Data Capture 2020 (%) [2]	2016	2017	2018	2019	2020
NAS1	435860	210285	Roadside	100	92.0	**55.7**	**49.9**	**48.2**	**44.8**	36.8
NAS2	435821	210243	Roadside	100	92.0	-	**40.6**	**40.5**	37.1	27.5
NAS3	435849	210280	Roadside	100	92.0	**51.5**	**43.9**	**41.8**	**41.9**	32.2
NAS4	435682	210195	Roadside	100	92.0	33.8	34.4	31.9	33.9	26.2
NAS5	435897	210324	Roadside	100	92.0	-	33.9	35.5	33.1	25.9
NAS6	435940	210351	Roadside	100	92.0	-	33.9	34.4	35.5	26.6
NAS7	435946	210326	Roadside	100	92.0	-	35.8	34.5	34.3	27.0
NAS8	439304	210260	Roadside	100	84.3	-	-	-	31.4	23.9
NAS9	440082	210435	Roadside	100	92.0	-	-	-	18.7	14.9
NAS10	444812	214669	Roadside	100	92.0	32.0	28.9	27.5	27.0	19.7
NAS11	445216	214389	Rural	100	92.0	12.5	10.4	10.0	9.0	7.5
NAS12	444904	214946	Roadside	100	84.3	24.0	19.9	17.6	16.6	12.3
NAS13	444732	216696	Urban Background	92	33.8	-	-	-	22.3	19.2
NAS14	444324	216868	Roadside	100	92.0	-	-	-	14.5	10.4
NAS15	444199	217343	Urban Background	100	83.0	-	11.0	10.2	10.1	9.1
NAS16	431203	226866	Urban Background	100	92.0	11.0	9.0	9.0	8.6	7.0
NAS17	431342	226950	Roadside	100	84.3	28.8	25.3	23.6	21.5	17.7
NAS18, NAS19, NAS20	431430	227216	Roadside	100	92.0	37.5	31.3	31.7	29.0	22.1
NAS21	431458	227278	Roadside	100	92.0	23.8	20.5	21.7	19.8	16.4
NAS22	431458	227277	Roadside	100	83.0	**53.8**	**48.1**	**47.3**	**43.9**	37.8
NAS23	425185	212435	Roadside	100	92.0	36.0	31.9	29.0	28.2	21.3
NAS24	425153	212178	Roadside	100	92.0	29.0	22.5	23.2	21.0	16.5
NAS25	427412	208233	Urban Background	100	92.0	10.4	9.3	10.1	9.7	7.6
NAS40	442753	209913	Roadside	100	83.0	-	-	-	18.3	14.6
NAS41	443658	210015	Roadside	100	92.0	-	-	-	16.3	14.1

Notes:

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

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

NO_2 annual means exceeding 60µg/m^3, indicating a potential exceedance of the NO_2 1-hour mean objective are shown in **bold and underlined**.

Means for diffusion tubes have been corrected for bias. All means have been "annualised" as per LAQM.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%).

Appendix B: Full Monthly Diffusion Tube Results for 2020

Table B.1 – NO_2 2020 Diffusion Tube Results (µg/m^3)

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
NAS1	435860	210285	67.3	52.8	46.9		32.0	33.9	39.0	**44.5**	**55.0**	**54.9**	**51.1**	**48.8**	47.7	36.8	-	
NAS2	435821	210243	43.0	34.9	34.8		26.2	32.3	16.6	38.3	**40.1**	**40.1**	**42.5**	43.0	35.8	27.5	-	
NAS3	435849	210280	60.8	38.0	44.5		29.8	38.6	26.1	41.7	43.4	43.6	48.2	45.7	41.8	32.2	-	
NAS4	435682	210195	41.1	38.4	30.9		19.3	30.9	22.1	35.9	36.0	43.7	38.5	35.6	34.0	26.2	-	
NAS5	435897	210324	47.3	36.4	32.6		20.5	29.1	17.9	31.2	34.0	34.2	43.8	44.4	33.7	25.9	-	
NAS6	435940	210351	41.5	37.2	37.8		18.3	29.1	22.6	37.4	35.6	37.3	42.0	41.4	34.6	26.6	-	
NAS7	435946	210326	52.7	47.5	34.2		20.1	23.8	25.9	30.4	34.6	38.6	40.8	39.4	35.1	27.0	-	
NAS8	439304	210260	36.1	Missing	33.4		11.6	32.2	25.4	31.5	34.7	34.8	38.6	33.9	31.1	23.9	-	
NAS9	440082	210435	24.0	17.2	19.1		14.3	16.1	13.1	20.1	19.1	22.6	22.9	22.6	19.3	14.9	-	
NAS10	444812	214669	38.5	31.5	21.7		14.7	20.0	14.2	23.4	26.2	29.2	32.3	30.7	25.6	19.7	-	
NAS11	445216	214389	15.7	9.5	12.5		5.3	6.8	3.3	7.3	8.2	10.2	15.1	13.9	9.8	7.5	-	
NAS12	444904	214946	Missing	18.5	18.1		9.2	13.7	6.6	13.4	15.0	18.3	23.0	23.7	16.0	12.3	-	
NAS13	444732	216696	34.5	Missing	Missing		11.0	Missing	Missing	Missing	20.8	Missing		45.9	28.2	19.2	-	
NAS14	444324	216868	17.6	14.4	14.7		7.7	9.8	5.8	11.2	12.9	14.8	19.1	20.4	13.5	10.4	-	
NAS15	444199	217343	17.1	10.1	12.4		Missing	6.3	3.1	7.2	24.3	11.0	16.0	12.6	11.9	9.1	-	
NAS16	431203	226866	13.6	7.1	12.1		4.9	5.4	2.2	6.4	8.2	9.1	15.2	16.1	9.1	7.0	-	
NAS17	431342	226950	31.4	22.7	21.4		14.4	Missing	16.5	20.3	23.0	26.5	27.3	26.2	22.9	17.7	-	
NAS18	431430	227216	34.5	21.9	33.6		21.9	26.1	14.2	30.7	31.0	26.5	34.4	34.0	-	**-**	-	Triplicate Site with NAS18, NAS19 and NAS20 - Annual data provided for NAS20 only
NAS19	431430	227216	35.2	22.7	35.4		23.0	27.1	13.8	33.8	32.9	31.4	34.5	35.6	-	**-**	-	Triplicate Site with NAS18, NAS19 and NAS20 - Annual data provided for NAS20 only
NAS20	431430	227216	30.9	23.3	32.0		20.6	22.9	14.5	33.2	33.0	32.4	32.9	35.2	28.8	22.1	-	Triplicate Site with NAS18, NAS19 and NAS20 - Annual data provided for NAS20 only
NAS21	431458	227278	26.7	21.3	24.8		15.4	16.9	10.6	21.9	23.6	21.8	26.0	24.7	21.2	16.4	-	
NAS22	431458	227277	69.5	56.0	46.6		Missing	34.0	38.5	43.9	55.1	51.5	52.5	44.9	49.1	37.8	35.5	
NAS23	425185	212435	38.3	35.0	28.1		15.4	21.9	25.0	29.7	31.0	29.3	29.2	23.0	27.6	21.3	-	
NAS24	425153	212178	31.5	21.4	22.3		15.7	19.9	11.1	24.0	19.6	22.4	25.0	22.1	21.4	16.5	-	
NAS25	427412	208233	14.4	10.6	12.1		5.6	6.9	3.2	7.0	7.7	9.6	16.4	15.7	9.9	7.6		
NAS40	442753	209913	25.5	15.1	19.3		Missing	14.3	11.3	16.6	20.7	20.0	23.3	23.4	19.0	14.6		
NAS41	443658	210015	20.7	17.0	21.5		13.7	18.8	10.3	18.2	19.7	18.4	21.4	22.2	18.3	14.1		

Notes:

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

NO_2 annual means exceeding 60µg/m^3, indicating a potential exceedance of the NO_2 1-hour mean objective are shown in **bold and underlined**.

See Appendix C for details on bias adjustment and annualisation.

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

C.1 New or Changed Sources Identified Within West Oxfordshire District During 2020

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

C.2 Additional Air Quality Works Undertaken by West Oxfordshire District Council During 2020

West Oxfordshire District Council has not completed any additional works within the reporting year of 2020.

C.3 QA/QC of Diffusion Tube Monitoring

Supplier of Diffusion Tubes

The diffusion tubes (50% TEA in acetone) were supplied and analysed by Socotec Didcot laboratories.

Tube Manufacturing Fault

In March 2020 the Council was notified by the laboratory that that month's batch of tubes had been sent out by the laboratory with a manufacturing fault resulting in some atmospheric contamination of certain tubes that was only discovered sometime later. The results of the analysis indicate that the contamination ranges from no contamination to a positive bias of 0.5 micrograms of NO_2 on the tubes, equivalent to approximately 0 - 8 ug/m3 or 0 to 4 ppb positive bias on the result. Nevertheless, the results of these tubes have been included in this report because the month in question coincided with significant societal changes in England following the announcement of a national lockdown due to Covid and thus significant changes in traffic volumes on the highways that in themselves would result in unseasonably low pollution concentrations. The results from the Covid lockdown periods in 2020 are not necessarily representative of pollution levels that might have been experienced around the District had traffic levels been "typical" of other years.

Effects of Pandemic on Diffusion Tube Placement

It should be noted that the diffusion tubes were not placed around the District during April 2020. This was due to the Covid pandemic and specifically because of the availability of staff due to emergency duties. The monitoring was resumed the following month.

Diffusion Tube Annualisation

Where monitoring has been completed for less than 75% of the year, annualisation techniques can be used to estimate an annual average from a part year average. For annualisation to be completed there must be 3 months of monitoring data available. Monitoring at 1 site (NAS 13 - 3 Hensington Road, Woodstock) was carried out only part year as the tube placed monitoring location at NAS13 was repeatedly found to be missing through the year, meaning that data was only made available for 5 months of the year. In addition, the data at this location for November 2020 was rejected.

A measured mean concentration for the respective periods of exposure is available for each location. However it will be necessary to estimate the annual mean for these 2 locations, for comparison with the annual target concentration, because less than 75% availability for this area.

The procedure involves the following steps:

1. Identification of two to four nearby, long-term, continuous monitoring sites, ideally those forming part of the national network. The data capture for each of these sites should ideally be at least 85%. These sites should be background (Urban Background, Suburban or Rural) sites to avoid any very local effects that may occur at Urban Centre, Roadside or Kerbside sites, and should, wherever possible lie within a radius of about 50 miles. If no background sites are available, and the site to be annualised is itself an Urban Centre, Roadside or Kerbside site, then it is permissible to annualise using roadside or kerbside sites rather than background sites.

The nearest sites that have characteristics similar to the areas requiring normalisation are located in Swindon and Oxford (St Ebbes).

2. Obtain the annual means, ‘Am’, for the calendar year for these sites.

3. Work out the period means, ‘Pm’, for the period of interest, in this case Feb-April 2020, Jun-Aug and Oct-Nov 2020.

4. Calculate the ratio, ‘R’, of the annual mean to the period mean (‘Am/Pm’) for each of the sites.

5. Calculate the average of these ratios, ‘Ra’. This is then the annualisation factor.

6. Multiply the measured period mean concentration ‘M’ by this annualisation factor Ra to give the estimate of the annual mean for 2020.

The results of this process are shown in Table C.2.

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_x/NO_2 continuous analysers. Alternatively, the national database of diffusion tube co-location surveys provides bias factors for the relevant laboratory and preparation method.

National bias adjustment factors have been used from Defra database, available at:

Link to DEFRA National Bias Adjustment factors (see more below).

West Oxfordshire District Council has applied a national bias adjustment factor of 0.77 (based on 22 studies) to the 2020 monitoring data and this was applied to all diffusion tubes. A summary of bias adjustment factors used by West Oxfordshire District Council over the past five years is presented in Table C.1. An extract of the information supporting the choice of national factor selected is set out below:

National Diffusion Tube Bias Adjustment Factor Spreadsheet — Spreadsheet Version Number: 03/21

Follow the steps below **in the correct order** to show the results of **relevant** co-location studies
Data only apply to tubes exposed monthly and are not suitable for correcting individual short-term monitoring periods
Whenever presenting adjusted data, you should state the adjustment factor used and the version of the spreadsheet
This spreadsheet will be updated every few months: the factors may therefore be subject to change. This should not discourage their immediate use.

This spreadsheet will be updated at the end of June 2021
LAQM Helpdesk Website

The LAQM Helpdesk is operated on behalf of Defra and the Devolved Administrations by Bureau Veritas, in conjunction with contract partners AECOM and the National Physical Laboratory.

Spreadsheet maintained by the National Physical Laboratory. Original compiled by Air Quality Consultants Ltd.

Step 1:	Step 2:	Step 3:	Step 4:								
Select the Laboratory that Analyses Your Tubes from the Drop-Down List	Select a Preparation Method from the Drop-Down List	Select a Year from the Drop-Down List	Where there is only one study for a chosen combination, you should use the adjustment factor shown with caution. Where there is more than one study, use the overall factor[3] shown in blue at the foot of the final column.								
If a laboratory is not shown, we have no data for this laboratory.	If a preparation method is not shown, we have no data for this method at this laboratory.	If a year is not shown, we have no data[2]	If you have your own co-location study then see footnote[1]. If uncertain what to do then contact the Local Air Quality Management Helpdesk at LAQMHelpdesk@bureauveritas.com or 0800 0327953								
Analysed By[1]	Method (To undo your selection, choose (All) from the pop-up list)	Year[2] (To undo your selection, choose (All))	Site Type	Local Authority	Length of Study (months)	Diffusion Tube Mean Conc. (Dm) (µg/m³)	Automatic Monitor Mean Conc. (Cm) (µg/m³)	Bias (B)	Tube Precision[4]	Bias Adjustment Factor (A) (Cm/Dm)
SOCOTEC Didcot	50% TEA in acetone	2020	R	East Suffolk Council	12	30	25	19.6%	G	0.84
SOCOTEC Didcot	50% TEA in acetone	2020	UB	Canterbury City Council	10	13	10	28.1%	G	0.78
SOCOTEC Didcot	50% TEA in acetone	2020	R	Canterbury City Council	9	26	20	29.6%	G	0.77
SOCOTEC Didcot	50% TEA in acetone	2020	UB	Kingston upon Hull City Council	12	24	18	34.8%	G	0.74
SOCOTEC Didcot	50% TEA in acetone	2020	R	Ipswich Borough Council	12	27	21	28.5%	G	0.78
SOCOTEC Didcot	50% TEA in acetone	2020	R	Ipswich Borough Council	12	36	26	36.3%	G	0.73
SOCOTEC Didcot	50% TEA in acetone	2020	R	Thanet District Council	9	20	17	21.2%	G	0.83
SOCOTEC Didcot	50% TEA in acetone	2020	R	Medway Council	12	26	18	41.7%	G	0.71
SOCOTEC Didcot	50% TEA in acetone	2020	B	Medway Council	11	20	10	96.3%	G	0.51
SOCOTEC Didcot	50% TEA in acetone	2020	B	Gravesham Borough Council	12	23	22	5.6%	G	0.95
SOCOTEC Didcot	50% TEA in acetone	2020	B	Gravesham Borough Council	12	27	24	16.1%	G	0.86
SOCOTEC Didcot	50% TEA in acetone	2020	R	Monmouthshire County Concil	10	32	24	35.3%	G	0.74
SOCOTEC Didcot	50% TEA in acetone	2020	UI	North Lincolnshire Council	13	18	14	26.6%	G	0.79
SOCOTEC Didcot	50% TEA in acetone	2020	R	City of York Council	12	24	19	29.0%	G	0.78
SOCOTEC Didcot	50% TEA in acetone	2020	R	City of York Council	11	22	17	34.3%	G	0.74
SOCOTEC Didcot	50% TEA in acetone	2020	R	City of York Council	12	33	23	40.4%	G	0.71
SOCOTEC Didcot	50% TEA in acetone	2020	R	Cambridge City Council	10	30	20	47.6%	G	0.68
SOCOTEC Didcot	50% TEA in acetone	2020	R	Wrexham County Borough Council	9	17	13	26.6%	G	0.79
SOCOTEC Didcot	50% TEA in acetone	2020	KS	Marylebone Road Intercomparison	11	59	43	38.0%	G	0.72
Socotec Didcot	50% TEA in acetone	2020	R	Horsham District Council	10	23	23	2.2%	G	0.98
Socotec Didcot	50% TEA in acetone	2020	R	Horsham District Council	12	22	19	18.6%	G	0.84
Socotec Didcot	50% TEA in acetone	2020	R	Horsham District Council	9	25	18	42.0%	G	0.70
SOCOTEC Didcot	50% TEA in acetone	2020		Overall Factor[3] (22 studies)				Use		0.77

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	03/20	0.75
2018	National	03/19	0.76
2017	National	03/18	0.79
2016	National	03/17	0.78

NO_2 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_2 concentration at the nearest location relevant for exposure are estimated using the Diffusion Tube Data Processing Tool/NO_2 fall-off with distance calculator available on the LAQM Support website. Where appropriate, non-automatic annual mean NO_2 concentrations corrected for distance are presented in Table B.1.

Corrections for distance (to allow for the distance the diffusion tubes are from the roadside) have been made within this assessment. This is at one site (NAS22) where concentrations are not representative of actual exposure (because the receptor is set back from the roadway) and fall within 10% of the annual mean objective.

Distance correction has been made where appropriate using the DEFRA correction tool.

Table C.2 – Annualisation Summary (concentrations presented in µg/m^3)

Site ID	Annualisation Factor Swindon Walcot AURN	Annualisation Factor Oxford St Ebbes	Annualisation Factor Site 3 Name	Annualisation Factor Site 4 Name	Average Annualisation Factor	Raw Data Annual Mean	Annualised Annual Mean	Comments
NAS13	0.8806	0.8844			0.8825	28.2	24.9	

Table C.3 – NO_2 Fall off With Distance Calculations (concentrations presented in µg/m^3)

Site ID	Distance (m): Monitoring Site to Kerb	Distance (m): Receptor to Kerb	Monitored Concentration (Annualised and Bias Adjusted	Background Concentration	Concentration Predicted at Receptor	Comments
NAS22	1.0	1.4	37.8	6.1	35.5	

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

Figure D.1 – Map of Witney AQMA with diffusion tube monitoring locations

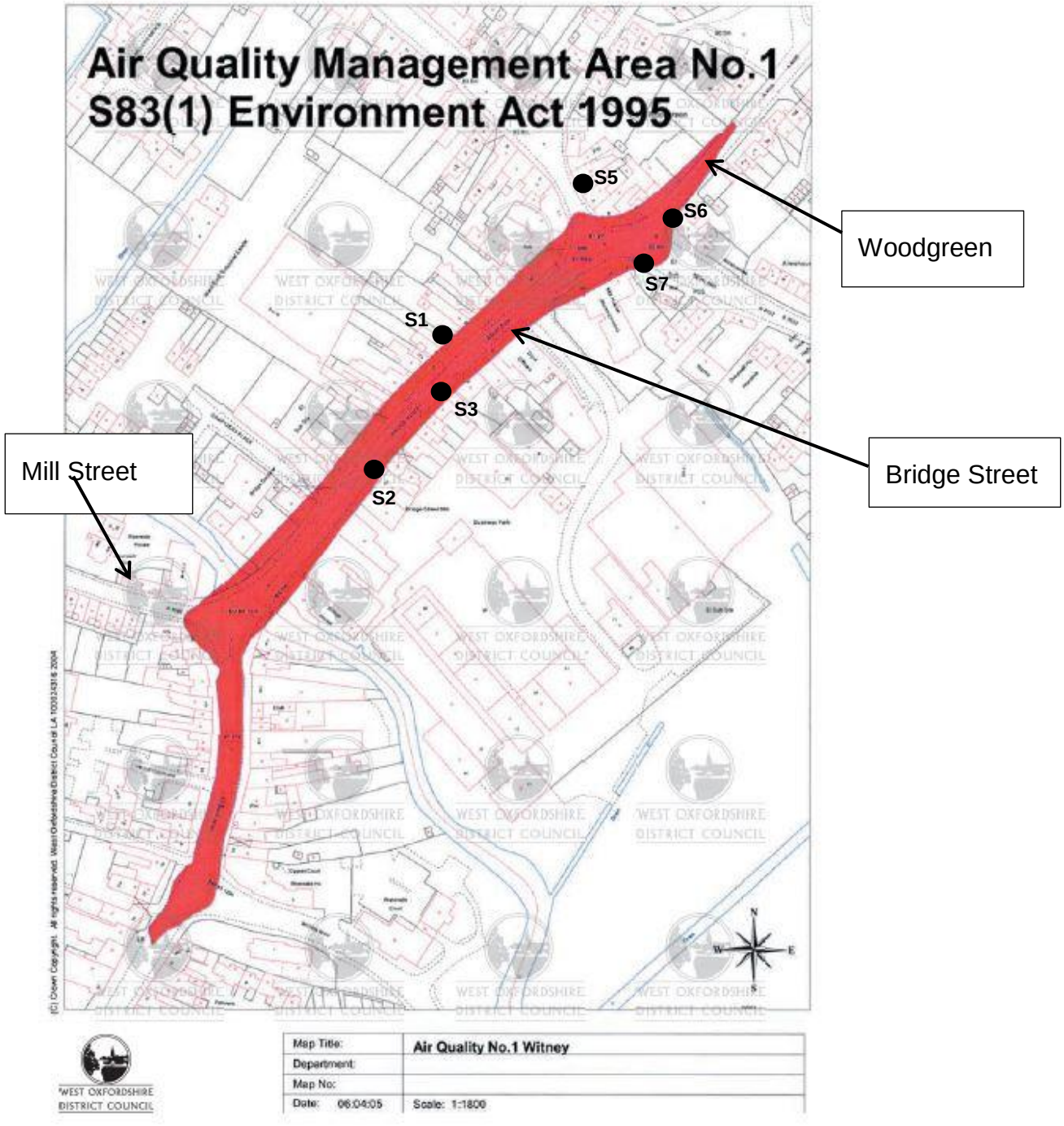


Figure D2 Map of Chipping Norton AQMA with diffusion tube monitoring locations

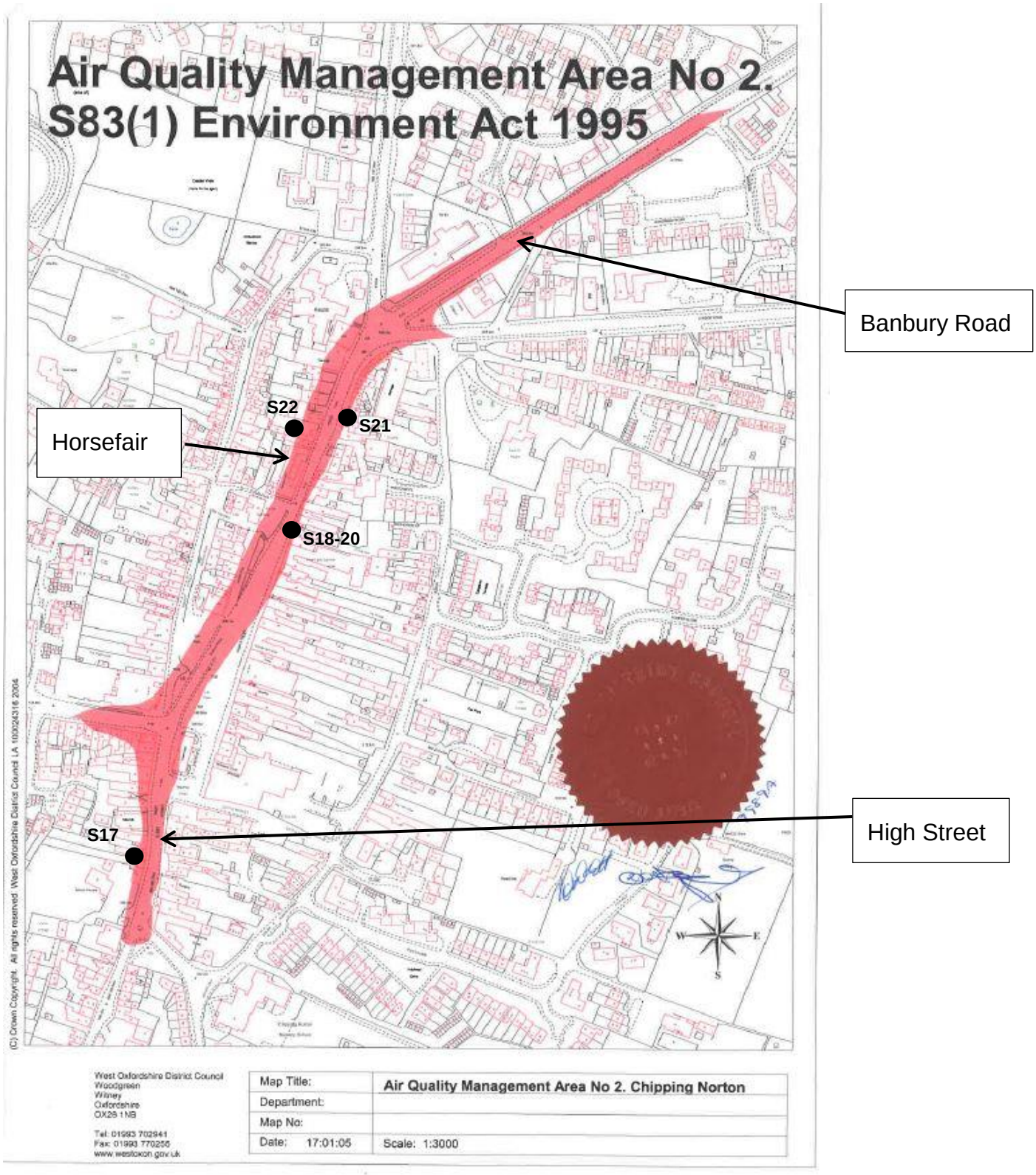


Figure D3 Bladon

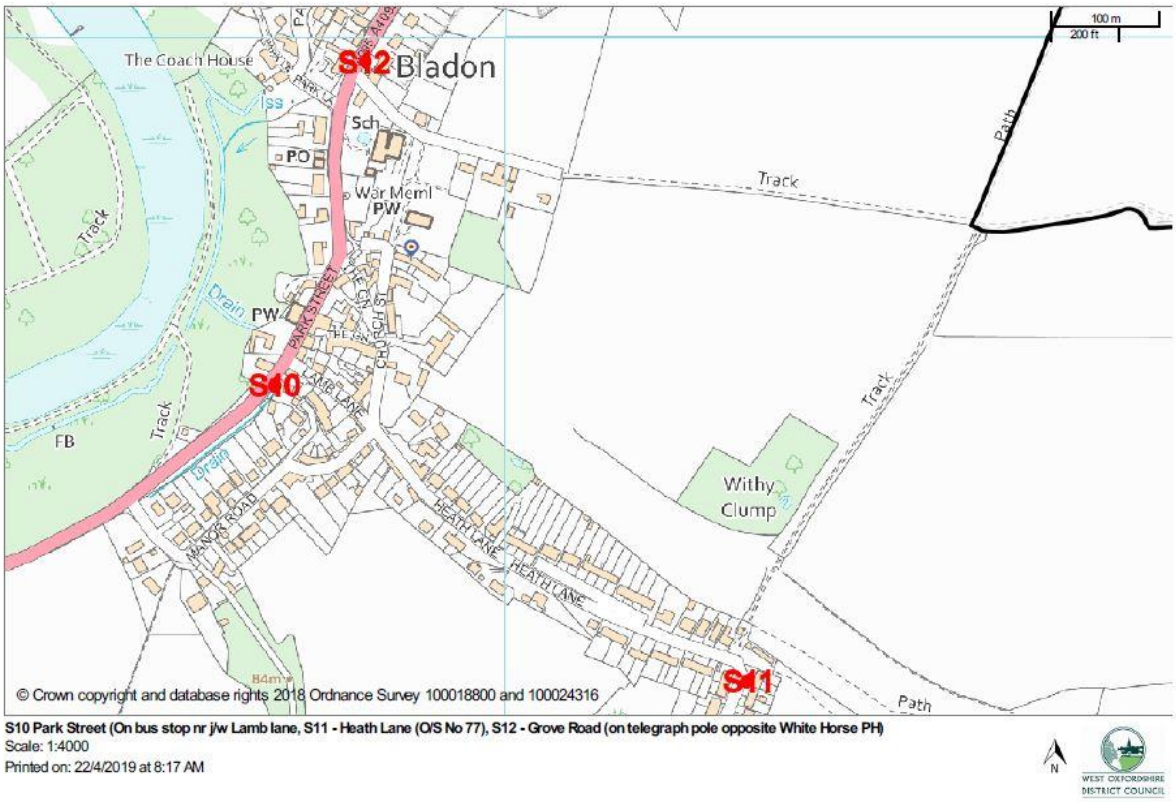


Figure D4 Burford

S23 - Lower High Street (On lamp post O/S No 8), S24 - High Street (On No Entry sin O/S No 99)
Scale: 1:1250
Printed on: 22/4/2019 at 9:01 AM

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WEST OXFORDSHIRE DISTRICT COUNCIL

Figure D5 Carterton

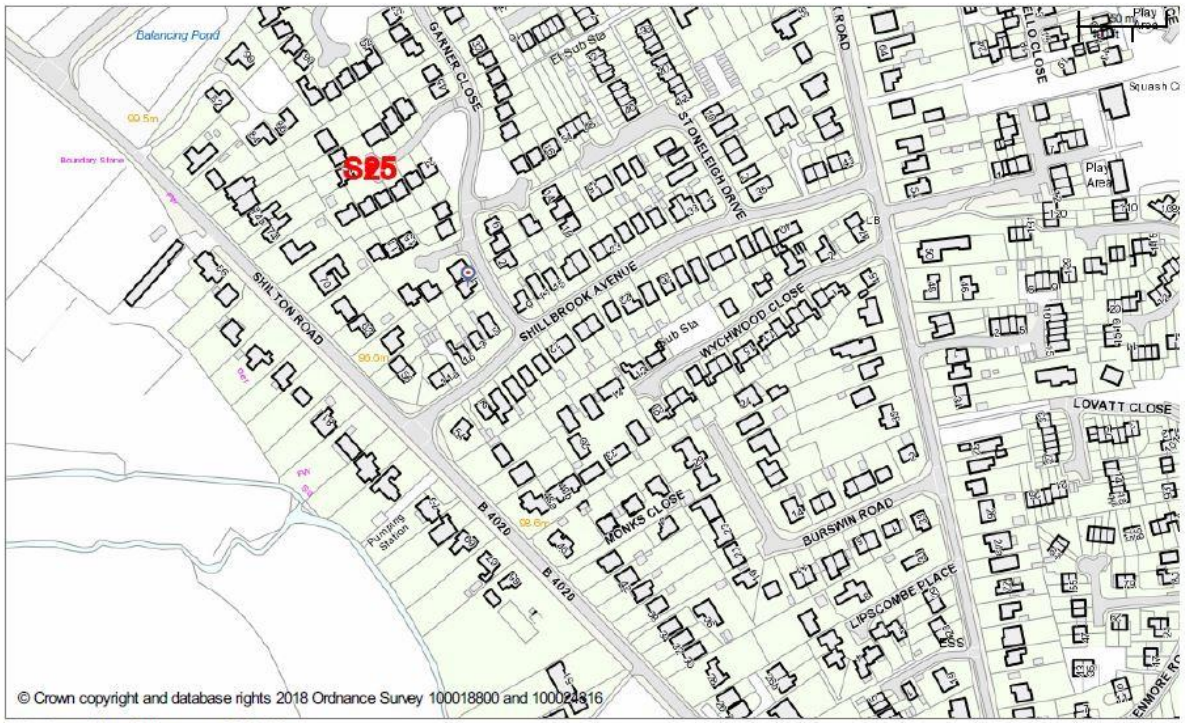
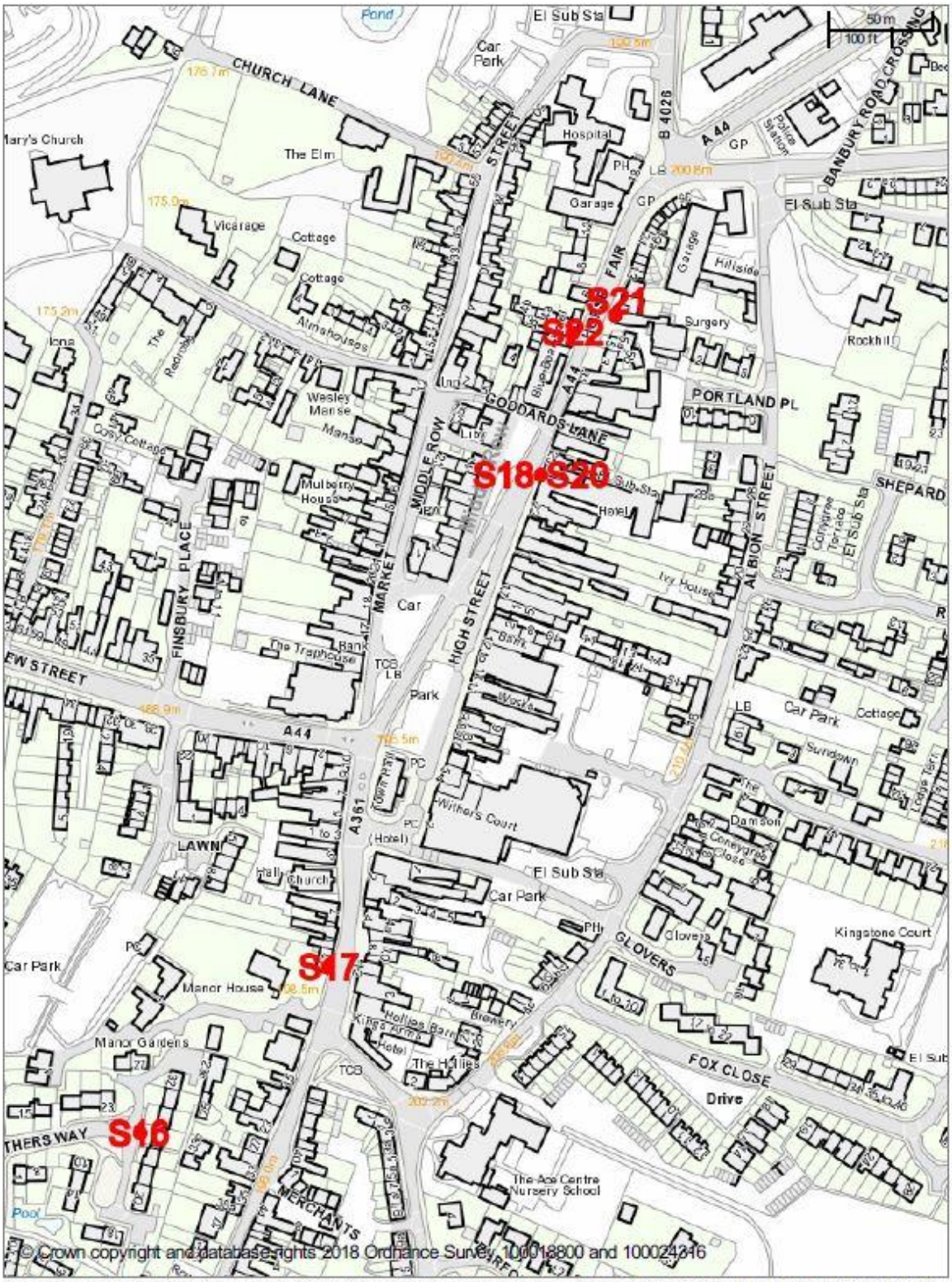


Figure D6 Chipping Norton



S16 - Withers Way (O/S 26), S17 - West Street (On Bus Stop O/S Coca), S18 - S20 High Street (Inside Analyser Machine Cage), S21 - Horsefair (On drainpipe of No 7), S22Opposite No 7 Horsefair on R/Bout sign)

Scale: 1:2500

Printed on: 22/4/2019 at 8:53 AM

Figure D7 Eynsham

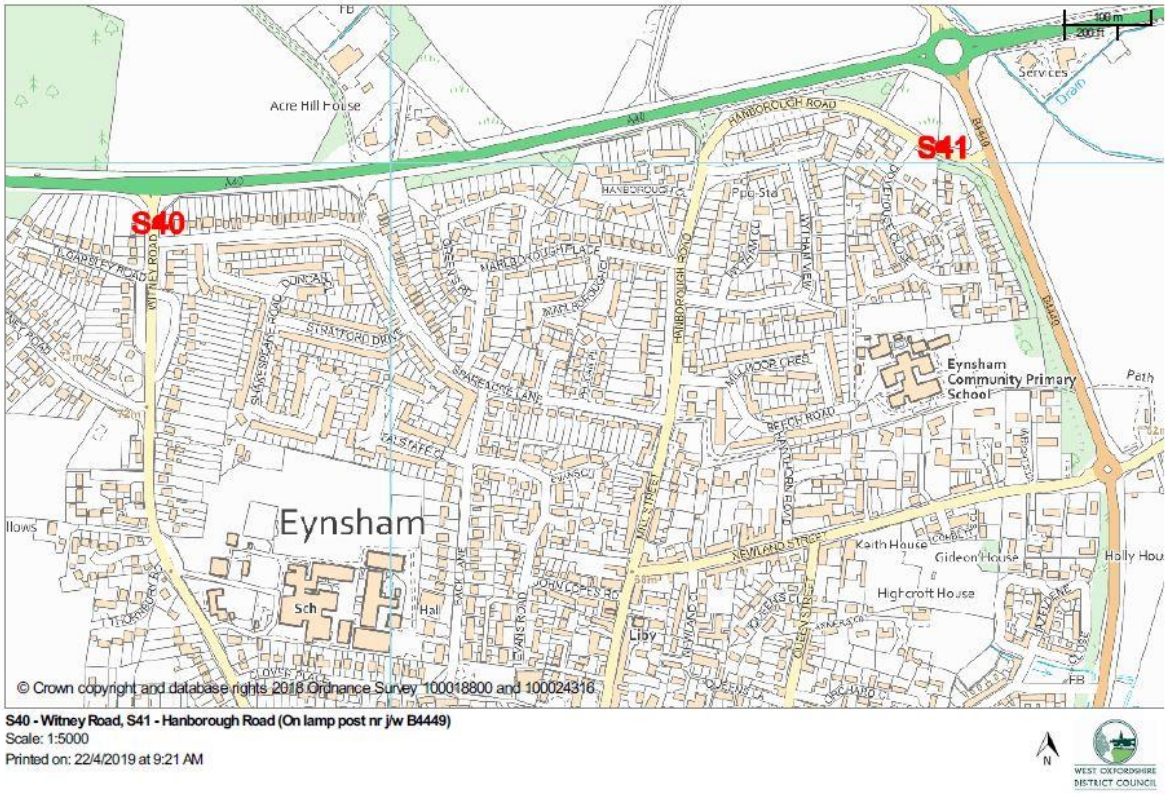


Figure D8 Witney (including AQMA)

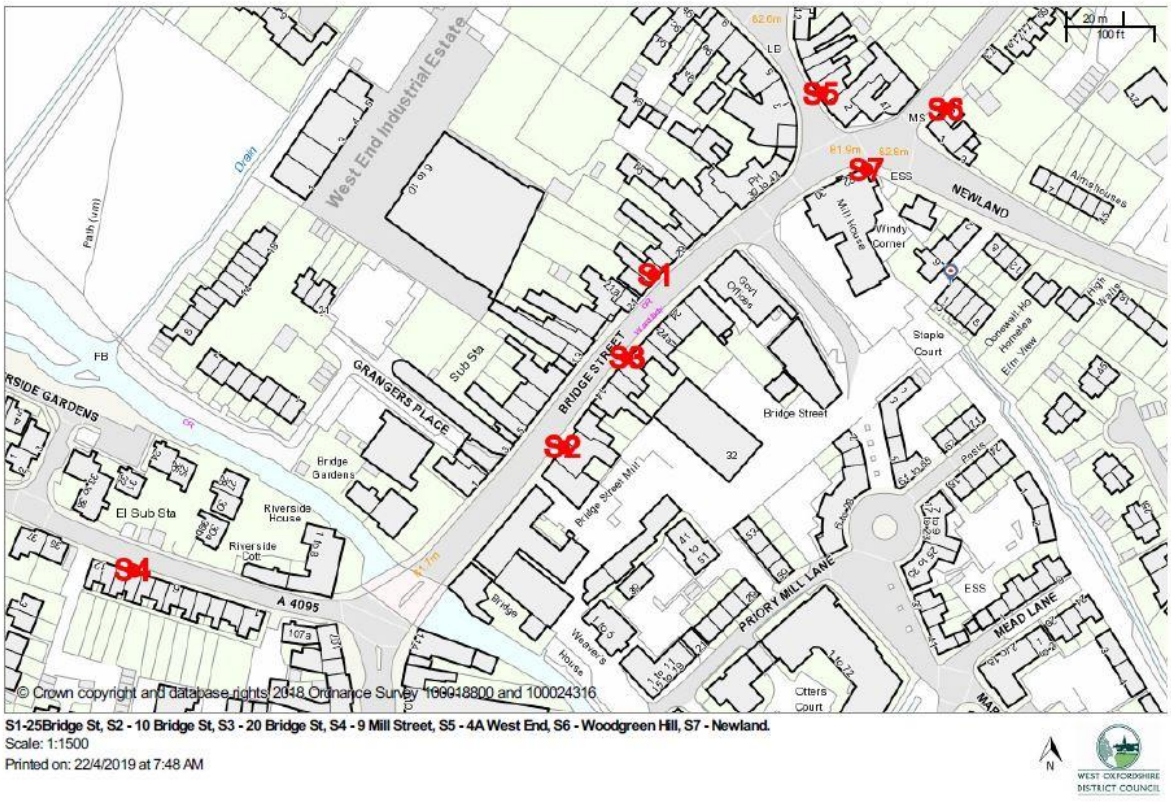
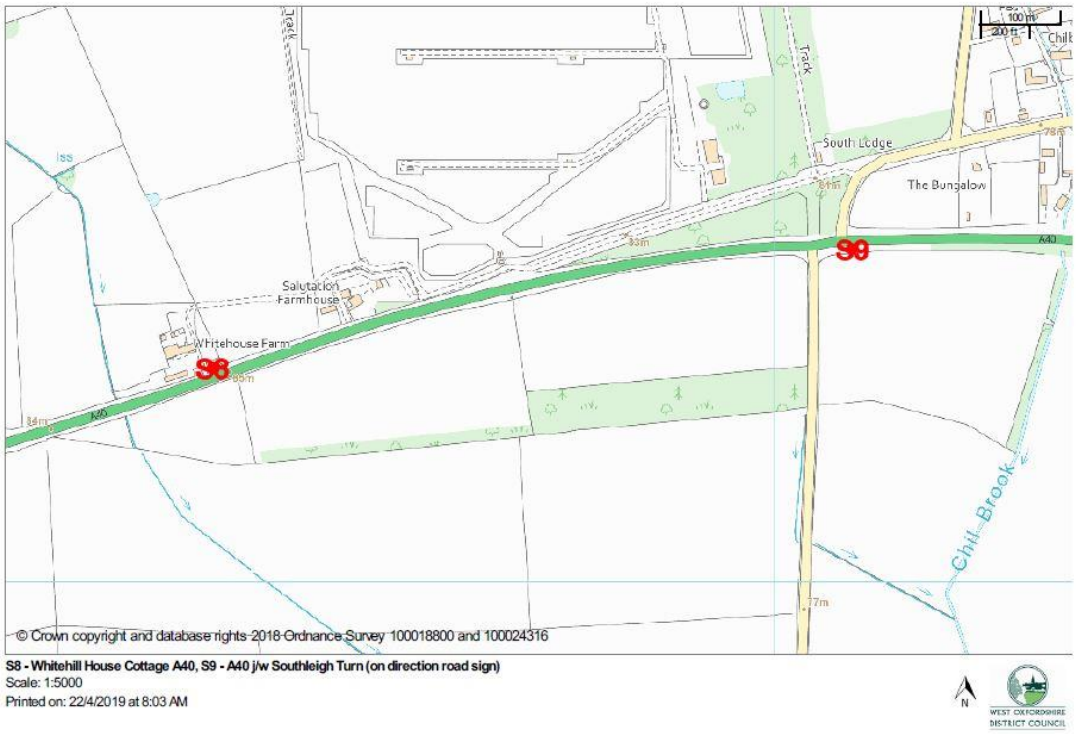
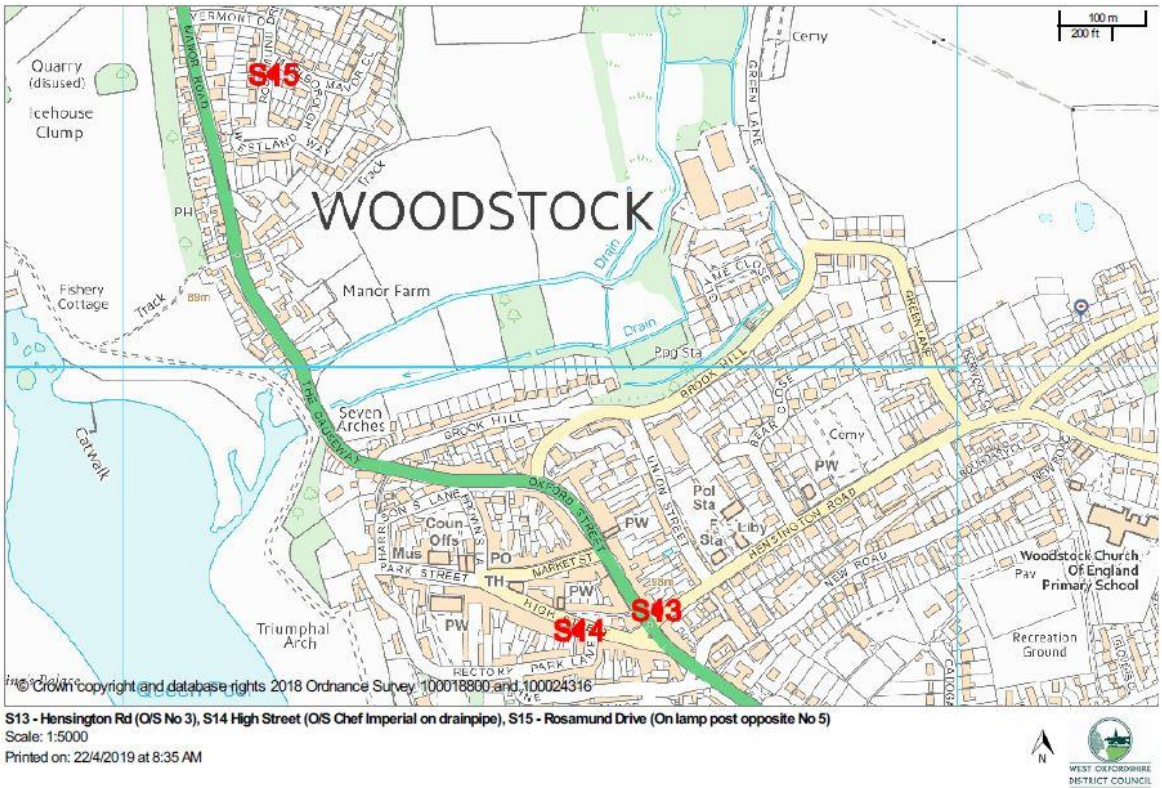


Figure D9 A40 East of Witney



S8 - Whitehill House Cottage A40, S9 - A40 j/w Southleigh Turn (on direction road sign)
Scale: 1:5000
Printed on: 22/4/2019 at 8:03 AM

Figure D10 Woodstock



S13 - Hensington Rd (O/S No 3), S14 High Street (O/S Chef Imperial on drainpipe), S15 - Rosamund Drive (On lamp post opposite No 5)
Scale: 1:5000
Printed on: 22/4/2019 at 8:35 AM

Appendix E: Summary of Air Quality Objectives in England

Table E.1 – Air Quality Objectives in England[8]

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

[8] The units are in microgrammes of pollutant per cubic metre of air (µg/m^3).

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_2) 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[9] 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_x), and exhaust and non-exhaust particulates (PM). The Air Quality Expert Group (AQEG)[10] has estimated that during the initial lockdown period in 2020, within urbanised areas of the UK reductions in NO_2 annual mean concentrations were between 20 and 30% relative to pre-pandemic levels, which

[9] Prime Minister's Office, COVID-19 briefing on the 31st of May 2020

[10] 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^3 if expressed relative to annual mean averages. During this period, changes in $PM_{2.5}$ concentrations were less marked than those of NO_2. $PM_{2.5}$ 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 $PM_{2.5}$ concentrations during the initial lockdown period are of the order 2 to 5µg/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 West Oxfordshire District

The reduction in NO_2 concentrations compared to pre-pandemic levels and their subsequent recovery as 2020 progressed are covered in Chapter 3 above. In both of our AQMAs the reduction in raw NO_2 concentrations in May 2020 was as much as 50% at Bridge Street, Witney. By September when many restrictions on social movement had been lifted NO_2 levels returned to near pre-pandemic levels. This is further evidence, if it were needed, that reducing traffic volumes in our streets has a positive impact on air quality.

Opportunities Presented by COVID-19 upon LAQM within West Oxfordshire District

In Witney the County Council issued a traffic order closing the High Street to most car traffic. This was introduced in June 2020 as a public safety measure under COVID-19 Regulations, in particular for the benefit of pedestrians and cyclists. It temporarily prohibited through traffic using High Street between Witan Way and Corn Street, and Welch Way as far as Woodford Way.

Challenges and Constraints Imposed by COVID-19 upon LAQM within West Oxfordshire District

The main challenges and constraints that have been experienced in relation to local air quality management within 2020 that can be attributed to the pandemic were in relation to staff availability. At the initial stages of the pandemic, staff were diverted to emergency duties and unavailable for tube placement and collection. However, this affected just one month and usual service was resumed after April.

Appendix G Additional Monitoring Data

Additional information provided by third parties in relation to District air quality

There are several major developments planned for the West Oxfordshire area. This includes housing and major road schemes and a Park and Ride scheme for the west of Eynsham. All of these have generated environmental assessments during 2019/20 which have included the assessment of the impact of each scheme on local air quality. This work has been carried out by third parties to support the developments. These are summarised in turn here.

Oxfordshire Garden Village – Salt Cross development

A major housing development is planned for the north west of Eynsham (District planning policy EW1). The Development description is as follows:

"Outline planning application, with means of access (from Lower Road, Cuckoo Lane and the A40), for a mixed-use Garden Village, comprising dwellings (Class C2 and C3), retail, food and drink (Use Classes A1-A5), health and community facilities (Use Classes D1-D2), hotel (C1), employment use (Use Classes B1, B2 and B8 with supporting uses and amenities),education provision (Use Class D1), an Energy Smart Hub and EV charging hub (Sui Generis), Burial Ground (Sui Generis), public open space with sports pitches and ancillary facilities, landscaping and associated infrastructure and works including pedestrian and cycle routes and enabling demolition."

The Development was named as one of the first 14 Government supported Garden Villages across England and is identified in the new West Oxfordshire District Council (WODC) Local Plan (adopted 2018) as a Strategic Location for Growth (SLG).

An Environmental Impact Assessment (EIA) was carried out by Stantec UK Ltd (Stantec) on behalf of Grosvenor Developments Ltd (the applicant) in relation to the outline planning application for a proposed mixed-use development known as Oxfordshire Garden Village (OGV).

As part of this, air quality was considered. To provide additional, pre-development data, Stantec set up monitoring sites of their own Stantec undertook NO_2 diffusion tube monitoring at eleven locations in the study area during 2019. Of these eleven locations, 3 were within the West Oxfordshire District and the remainder within adjoining authority

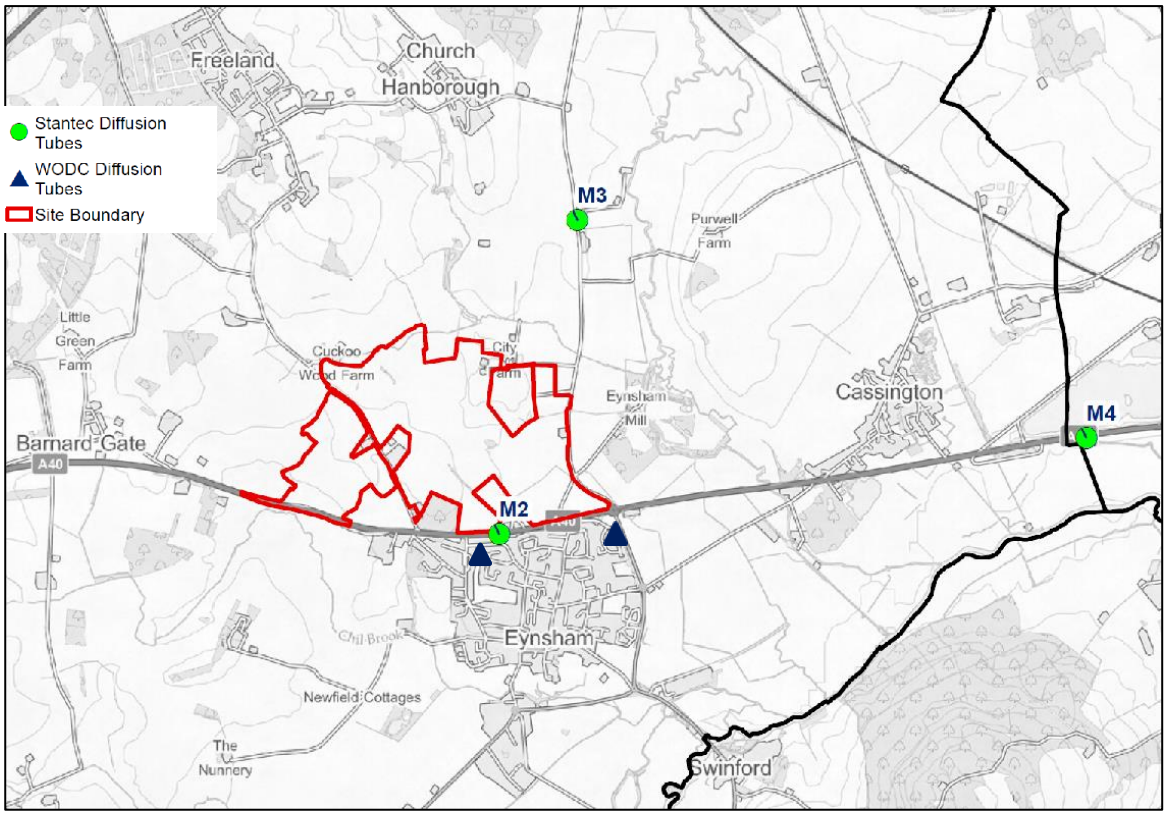
areas. Measured mean annual NO_2 concentrations after bias adjustment for those tubes set up within/close to the District are shown in Table G1. This data is unverified by Wet Oxfordshire District Council.

Table G1 Third Party NO_2 Monitoring

No	Location	In district?	Annual Mean NO2 (ug/m3)
M2	A40, north of Spareacre Road	Y	33.6
M3	Lane, NE of proposed development	Y	17.5
M4	A40, east of Cassington	N (on border with neighbouring authority)	17.5

Results from the monitoring survey show that there were no exceedances of the annual mean NO_2 NAQO in close proximity to the Site.

Location of Stantec Monitoring Sites



The above information was extracted from the Environmental Statement prepared to support the planning application for this development.

Park and Ride Scheme at Eynsham, including A40 and other highway improvements.

A new A40 corridor strategy is concerned with improvements to the A40 highway towards Oxford and includes a new park and ride at Eynsham. The County Council is the lead planning authority for the above scheme. A planning application has been submitted for the scheme.

Notification was received Nov 2020 concerning changes to the scheme, notably the change of the opening year from 2021 to 2024. This was in response to a Regulation 25 (of the Town and Country Planning (Environmental Impact Assessment) Regulations 2017) request from the planning authority in response to comments received to consultation on the earlier proposals.

The original Environmental Statement (ES) included at Chapter 5 an air quality assessment. This described some NO_2 monitoring carried out in 2017/18. A NO_2 diffusion tube survey was conducted over 9 months in 2017/18 to understand the baseline around the proposed development. Locations chosen included a point on the A40 at Barnard Gate, 3 locations at Eynsham, and one outside the District at the A40 Northern By-pass, Oxford. The annual mean concentrations at sites closest to Eynsham were in the range of 12-21ug/m^3, and thus well below the annual mean air quality objective of 40ug/m^3.

The 2019 AQ assessment modelled concentrations at the baseline year of 2017 and the (then assumed) opening year of 2021, with and without the P+R scheme. The modelled concentrations at the receptors around Eynsham were below the objective level in 2017 and the highest predicted increase with the development compared with no development (location R01 (Cassington, A40 junction with Eynsham Road in the ES) was a predicted as 20.5ug/m3 - a change of +0.4ug/m3 which was classed as “imperceptible”.

The ES concluded that (section 5.6.4) NO2 concentrations in the 2021 opening year would be well below the annual mean air quality objective value. The revised comments in 2020 in response to the Reg 25 request (report: AECOM,A40 Park & Ride and Bus Lane Scheme, Environmental Statement Addendum, Nov 2020) noted that because of the expected improvement in vehicle emissions standards generally and only small changes in traffic flow expected, there would be low risk of any exceedances from the change in

opening year to 2024. Therefore the updated ES concluded that there are no material changes expected to the conclusions concerning air quality impacts from road traffic emissions s reported in 2019 ES due to the change in opening year.

The ES also predicted no significant effects on the Oxford Meadows SAC.

According to Chapter 15 of the ES the potential for cumulative effects was considered for each environmental topic. ES Section 15.3.9 states that the assessment of cumulative effects includes, amongst certain others, air quality. This assessment of cumulative effects is based on quantitative traffic data that inherently considers cumulative developments. Chapter 15 of the ES lists developments (land allocations with valid applications, table 15.6) considered as potentially generating cumulative effects with the proposed scheme. The Garden Village and West Eynsham Strategic area are listed.

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_2	Nitrogen Dioxide
NO_x	Nitrogen Oxides
PM_{10}	Airborne particulate matter with an aerodynamic diameter of 10µm or less
$PM_{2.5}$	Airborne particulate matter with an aerodynamic diameter of 2.5µm or less
QA/QC	Quality Assurance and Quality Control
SO_2	Sulphur Dioxide

References

- Local Air Quality Management Technical Guidance LAQM.TG16. April 2021. Published by Defra in partnership with the Scottish Government, Welsh Assembly Government and Department of the Environment Northern Ireland.
- Local Air Quality Management Policy Guidance LAQM.PG16. May 2016. Published by Defra in partnership with the Scottish Government, Welsh Assembly Government and Department of the Environment Northern Ireland.