

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 Worcester City

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 ages³, with a total estimated healthcare cost to the NHS and social care of £157 million in 2017⁴.

Worcestershire Regulatory Services (WRS) is a shared service formed from the Environmental Health and Licensing departments of the six Worcestershire District Councils. Responsibility for managing (monitoring and reporting of) local air quality transferred from the partnership councils to WRS in April 2011.

Three Air Quality Management Areas (AQMA) were declared by Worcester City Council in 2009 for exceedances of the annual average mean objective for nitrogen dioxide (NO₂):

- Dolday/Bridge Street AQMA declared 1st March 2009;
- Lowesmoor/Rainbow Hill AQMA declared 1st March 2009; and
- Newtown Road AQMA declared 1st March 2009.

The Newtown Road AQMA was revoked by the council on 30th July 2014.

A further AQMA was declared by the council for the St Johns area of Worcester for exceedance of the annual mean objective for NO₂ on 26th September 2014.

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

In 2017, a detailed assessment was undertaken of an area within London Road and Sidbury by Air Quality Consultants (AQC) on behalf of Worcester City Council. The AQC report concluded that an area at the western end of London Road should be declared as an AQMA. A copy of AQC (July 2017) 'Detailed Assessment of Air Quality along London Road, Worcester' (ref: J2829A/1/F1) is available to download from WRS website at <http://www.worcsreqservices.gov.uk/pollution/air-quality/local-air-quality-progress-reports.aspx>

Additionally, long term trend measurements and automatic analyser results up to 2018 within Foregate Street, The Butts and The Tything, Worcester indicated that requirement for a new AQMA declaration of this combined study area would likely be confirmed by detailed assessment.

On the 11th June 2019 Worcester City Council formally declared the Worcester City AQMA (Political Boundary of Worcester City) which encompasses the whole district area as an AQMA, for likely breach of the nitrogen dioxide annual mean.

Additionally, Worcester City Council AQMA Variation Order 2019 consolidates the existing 2009 and 2014 AQMAs, as detailed above, into the Worcester City AQMA (Political Boundary of Worcester City) as of 11th June 2019.

Details of declaration and plans of the AQMAs can be found on the following pages of WRS website: <http://www.worcsreqservices.gov.uk/pollution/air-quality/air-quality-management-areas.aspx>

Poor areas of air quality within Worcester typically coincide with the strategic road network in and around the city centre in proximity with sensitive residential receptors. These generally relate to The Butts / All Saints Road / Bridge Street strategic road one way system, The Tything (A38) to The Foregate Street corridor, Lowesmoor / Rainbow Hill / Astwood Road (B4850) corridor, St Johns Bull Ring (A44) and London Road (A44).

Like many parts of the UK, poor air quality in Worcester City is linked to areas with high volumes of traffic, congestion and 'street canyon' landscapes (where height of the building is greater than width of road). Worcestershire County Council has responsibility for strategic transport issues in the county and published the fourth Local Transport Plan (LTP4) in 2017. WRS continues to liaise with the County Council in the development of countywide plans to ensure that remediation of the AQMA remain a strategic transport priority.

WRS has good working relationship with the County Council's Strategic Transport Team and has also experienced closer working ties with the Director of Public Health (DoPH) and Sustainability departments within the County Council in the last 2 – 3 years.

A new Air Quality Partnership led by the DoPH, supported by WRS, and comprising members from public health, air quality, strategic planning, sustainability, highways and transport was set up in 2019. The group have discussed potential actions to improve air quality across the County and

work was continuing into 2020 to formalise an action plan for implementation. However due to the Covid-19 pandemic the work of the group was postponed indefinitely following the outbreak.

Monitoring data from 2020 does not represent a standard year with the emergence of the Covid-19 Pandemic and first lockdown in March and subsequent lockdowns that followed. With the number of vehicle journeys massively reduced much lower concentrations of nitrogen dioxide can be seen in all locations compared to previous years. On average the recorded concentrations in 2020 have decreased by 22.4% ($7\mu\text{g}/\text{m}^3$) when compared with 2019 results. The previous ASR 2020 highlighted that results in 2019 were less than anticipated (likely due to a low bias adjustment factor of 0.78) so when the latest 2020 results are compared to those of 2018 the average decrease can be seen to be even more significant with a 36.39% ($13.9\mu\text{g}/\text{m}^3$) reduction in concentrations over the 2 years.

In 2020 the highest concentration of NO_2 recorded across Worcester City was $35.9\mu\text{g}/\text{m}^3$ at BUT2. This location has recorded the highest concentration across the city for the last 5 years with a concentration of $42.1\mu\text{g}/\text{m}^3$ in 2019, which represents a decrease of 14.13% ($6.2\mu\text{g}/\text{m}^3$), and $52.4\mu\text{g}/\text{m}^3$ in 2018, which represents a decrease of 31.49% ($16.5\mu\text{g}/\text{m}^3$), when compared with 2020. No exceedances of the annual mean objective were recorded within Worcester City during 2020.

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 Strategy⁵ sets out the case for action, with goals even more ambitious than EU requirements to reduce exposure to harmful pollutants. The Road to Zero⁶ 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.

In 2013, WRS produced a countywide Air Quality Action Plan (AQAP) for Worcestershire which was adopted by Worcester City Council. WRS have produced two updates to the AQAP, the latest in September 2016. For details of all measures completed, in progress or planned, please refer to the 'Air Quality Action Plan Progress Report for Worcestershire April 2015-2016'. A copy of this,

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

the previous update, and the AQAP, is available to view or download at:

<http://www.worcsregservices.gov.uk/pollution/air-quality/air-quality-action-plan.aspx>

In 2014 WRS set up the Worcester Urban (Steering) Sub-Group to facilitate progressing the implementation of actions identified in the AQAP.

On 26th July 2017 Worcester City Council Environmental and Licensing Group voted to set up a Task and Finish Group to explore actions to improve air quality in the city. The group comprised council members from three political parties, council officers, representatives of the Director of Public Health and Worcestershire County Council Highways. WRS Technical Services officers provided technical advice and expertise on air pollution and potential measures to the group.

In 2018, WRS prepared a summary report of Worcester City Task & Finish Group work and recommendations for future air quality improvement measures. The final report was approved by Worcester City Council Environment and Licensing Committee in January 2019 which made the following 6 recommendations which have been adopted as prioritised measures with work continuing. Full details are provided in Table 2.2.

- 1) Consideration of air quality impacts (as a health & safety implication) in the development of every Council Policy, formal decision, and key project by the Council.
- 2) Feasibility of installing electric vehicle infrastructure for residential streets in the most appropriate locations for air quality.
- 3) Full consideration of air quality in proposals for car parking in the City Centre (as part of the Masterplan).
- 4) Investigation of feasibility for procurement and operation of ULEV pool cars for use by Council Officers.
- 5) Study of feasibility and potential impacts for proposing an emission standard for Taxi's licensed by the Council (Taxi Strategy Task and Finish Group).
- 6) Low Emission Strategy for adoption by the Council top include all the above recommendations.

Other key actions are: -

- **Declaration of Worcester City AQMA (Political Boundary), 11th June 2019.** Worcester City Council is currently working towards a new Air Quality Action Plan (AQAP) setting out measures to improve local air quality following declaration of the citywide AQMA in 2019. Unfortunately, this work was delayed in 2020 due to the COVID-19 outbreak and subsequent UK lockdowns. Traffic surveys are necessary to allow for source apportionment work to inform the AQAP. These were due to be carried out in Spring 2020 however with the traffic levels massively reduced for the duration of 2020 it was not possible for this work to be undertaken. It is likely that the process will be resumed later in 2021.

- **City Centre Masterplan adopted 16th July 2019.** The Masterplan document can be found via the following link:

<https://www.worcester.gov.uk/planning/city-centre-masterplan>

Actions within the plan potentially benefitting local air quality include:

- Development opportunities that include the replacement of numerous surface level car parks with multi storey car parking at strategic points; and
 - Development opportunities and public realm enhancements supporting more active movements around the city e.g. walking and cycling.
- **Railway Arches Development** - The Council are redeveloping the Victorian railway arches in the heart of the city. The development includes conversion of spaces into workshops and studios and pedestrian/cyclist access between Worcester Foregate Station and the river front. It is anticipated improved access will encourage additional uptake of active travel within the city centre and is due completion in 2022.

Worcestershire County Council Highways & Transport Improvements

- **Worcestershire Parkway Station SWST1** – Works completed in 2019 and the new station opened on 23rd February 2020, 3 weeks prior to the first lockdown. Initial indications were of high use exceeding that anticipated in the business plan, with the car park 75% full and strong ticket sales. However rail use has declined nationally because of the pandemic, long term trends are still to emerge, but the station is at the heart of the emerging proposals for Worcestershire Parkway Strategic Growth area arising from the review of South Worcestershire Development Plan.
- **Southern Link Road (A4440) Phase 4 (Ketch to Powick Hams) SWST5** –Work began in March 2019 on Phase 4 to complete dualling of carriageway between the Ketch and Powick roundabouts, capacity improvements to those junctions, an additional bridge over River Severn, and new foot/cycle bridges. Completion is now anticipated in spring 2022. Further information is available via the following link: -
[The A4440 Worcester Southern Link Road Improvements | Worcestershire County Council](#)
- **Worcester Western Link Road SWST12** – to develop a new link road connecting A4440 with B4204 Martley Road. A detailed Options Appraisal Report has been prepared for this scheme but was delayed due to COVID-19. The scheme is reliant on WCC working with the West of Worcester developers to ensure that access arrangements facilitate the opportunity to deliver the Link Road.

- **LTP4 Scheme W1 (Worcester Rainbow Hill/Astwood Road/Bilford Road/Blackpole Road Key Corridor of Improvement)** – An Options Appraisal Report is expected to be undertaken to identify a package of measures to improve the efficient and safe operation of this corridor.
- **LTP4 Scheme W4 Worcester East – West Axis Way Key Corridor Improvement** – This corridor improvement scheme is mostly completed except for St Johns District Centre with works continuing in 2021. Further information is available via the following link: -
<https://www.worcestershire.gov.uk/stjohnsimprovements>
- **Shrub Hill station** - As part of the Shrub Hill regeneration work to deliver the Shrub Hill Quarter, aspects of the vision have been submitted to the Towns Fund and works on the station itself may form part of a Levelling Up Fund bid. The bids include active travel links to the city centre, and link to the proposals within the North Cotswolds Link to enhance the rail service.
- **Active Travel Network** – Various active travel corridors outlined in LTP4 at varying stages of development. City Masterplan includes 5 Public Realm enhancements including active corridors and spaces, with ‘The Arches’ due for completion 2021/22. Active Travel funding secured from the (Emergency) Active Travel Fund for enhancements to the canal towpath between Diglis and Sixways including surfacing and passing places. Complemented by the active travel elements within the Towns Fund bid from Worcester City which provide additional links to the Ketch roundabout and onwards links to Powick.

The Kepax bridge scheme will provide an additional crossing over the River Severn to the north of the city at Ghulevelt Park linking to existing cycle routes (park/racecourse/Waterworks Roads/ Severn Path (subject to planning permission). This will increase connectivity between east and west banks of river and allows future expansion to walking and cycling routes. The Hams Way active travel bridge is now open connecting active travel networks in Worcester with further connections proposed for Malvern (subject to funding). The Broomhall Way active travel footbridge links St Peters/Worcester with the new community of Hopfields due for completion later in 2021. Crookbarrow Way active travel bridge is open and links St Peter’s north of the Broomhall Way bridge to Norton and onward to Worcestershire Parkway rail station and the proposed new settlement.

Conclusions and Priorities

Worcester City Council undertook non- automatic (passive) monitoring of NO₂ at 37 sites during 2020. No exceedance of the long-term objective for NO₂ was recorded in 2020, with all locations recording 10% or more below the air quality objective (AQO) for NO₂.

Monitoring data from 2020 does not represent a standard year with the emergence of the Covid-19 Pandemic and first lockdown in March and subsequent lockdowns that followed. With the number of vehicle journeys massively reduced much lower concentrations of nitrogen dioxide can be seen in all locations compared to previous years. On average the recorded concentrations in 2020 have decreased by 22.4% ($7\mu\text{g}/\text{m}^3$) when compared with 2019 results. Monitoring results demonstrate decreases in NO_2 at all monitored locations across the district between 2019 and 2020, consistent with trends across Worcestershire.

The principal challenges and barriers to implementation of improving measures that Worcester City anticipates facing are resourcing and funding sources for potential significant improving actions and measures, and delays to programs and work streams due to the COVID-19 outbreak and enforced lockdown.

The 2017 'UK plan for tackling roadside nitrogen dioxide' outlines Government's approach and preferred options for mitigation of national areas of poor air quality detailing 29 local authorities required to produce strategies to accelerate compliance with the air quality objectives in their areas. A further 33 local authorities have since been required to produce feasibility studies on accelerating compliance following a High Court order. In autumn budget 2017, the chancellor announced a £220 million Clean Air Fund to support those local authorities and the people and businesses affected by these local plans. Worcester City Council is not one of these named councils and therefore has not been prioritised for access to that funding.

The coronavirus COVID-19 and subsequent mitigation measures put in place by the UK government to combat the impact of the virus occurred during the reporting year 2020. The various lockdowns and required reallocation of resources has led to a temporary cessation of many local council activities and programs which impact on potential improvement measures, such as progressing new strategies and policies, strategic highway improvement works and implementation of new infrastructure. As a result, timelines for delivery of planned actions and measures are subject to delays and changes in some circumstances.

Local Engagement and How to get Involved

A new Air Quality Partnership led by the officers of the Director of Public Health (DoPH), and supported by WRS Land and Air Quality Team, was set up in 2019 to discuss potential actions to improve air quality across the County and determine an action plan for implementation. The group comprises officers from the County and District authorities from public health, air quality, strategic planning, sustainability, highways and transport disciplines, and also representatives from the NHS and Highways England. Further discussions and work to formalise an action plan were continuing in 2020 but were subsequently suspended indefinitely following the outbreak of the COVID-19 pandemic.

WRS is a member of Central England Environmental Protection Managers Group (CEEPG) which provides a strategic overview and direction for the delivery of Environmental Protection Services across the area of Central England covered by participating authorities. CEEPG responsibilities covers all environmental health matters regarding air quality, noise, contaminated land and LAPPC/IPPC including cooperation and coordination with the Environment Agency and Public Health England.

There are several ways members of the public can help to improve local air quality:

- **Walk or cycle, leave your car at home:** Leaving your car at home and walking or cycling instead will benefit in three ways - increased exercise, reduced pollution exposure and will reduce individual's pollution emissions.
- WCC have launched a car sharing website, **LiftShare**, to help people find others journeying to the same destinations to share journeys and costs, and reduce traffic and emissions. Visit this link for more information:

[Worcestershire Liftshare community - part of the Liftshare network](#)
- **Turn off your engine when stationary or parked**, do not 'idle', particularly outside sensitive receptors such as schools, hospitals, care homes and residential properties.
- General **travel planning** advice is available on WCC's website (including walking, cycling and bus maps and timetables) and Government website:
 - http://www.worcestershire.gov.uk/info/20007/travel_and_roads
 - <https://www.gov.uk/government/publications/smarter-choices-main-report-about-changing-the-way-we-travel>
- **Hold meetings by Conference Call** by phone or Skype rather than driving to meetings. This reduces fuel and other travel costs, vehicle maintenance and hire cost, increases productivity through reduction in hours lost through unnecessary travel.
- Facilitate **Flexible Working Arrangements** for non-front line staff to work remotely from home or nearer home facilities for one or more days a week thus removing or reducing any journey to work. This reduces congestion which has beneficial impacts for delivery times, reduced business costs and thus economic benefits. Additionally, provides social benefits through improved work life balance for employees, reduces local air quality and reduced emergency vehicle response times.
- **Switch Fleet to Low Emission Vehicles:** The government is providing £80m funding to encourage installation of EV charging points. Eligible businesses, charities, and public sector organisations with off street parking for staff or vehicles fleets can apply for vouchers to

redeem costs of electric vehicle charge-points. There is a limit of 1 voucher per applicant; however, applicants with a 'franchise' may apply for up to 20 franchisees. There is an approved charge points list and a list of authorised installers.

<https://www.gov.uk/government/collections/government-grants-for-low-emission-vehicles#workplace-charging-scheme>

- If you must drive follow fuel efficient driving advice, often known as 'Smarter Driving Tips', to save on fuel and reduce your emissions. Several websites promote such advice including:
 - <https://energysavingtrust.org.uk/advice/ecodriving/>
 - <https://www.theaa.com/driving-advice/fuels-environment/drive-smart>
 - <https://www.vehicle-certification-agency.gov.uk/fcb/smarter-driving-tips.asp>
- **Reduce air pollution from open fires and wood-burning stoves.** Advice is available from Defra on choosing the right stove, using the right fuels and maintenance enabling householders to reduce their impact on their health and air quality from open fires and wood burning stoves. Further information is available on the [Smokeless Zones](#) and [Public Advice](#) pages on WRS website.

Air pollution can affect all of us over our lifetime however certain groups will be more sensitive to the effects of air pollution. Vulnerable groups include adults and children with lung or heart conditions such as asthma, chronic bronchitis, emphysema and chronic obstructive lung disease (COPD)^{7,8}. Senior citizens are more likely to be affected by respiratory diseases and children are more likely to be affected by air pollution due to relatively higher breathing and metabolic rates as well as a developing lung and immune system.

Vulnerable individuals and groups can keep informed of:

- Current levels and forecasts of air pollution from Defra at <https://uk-air.defra.gov.uk/>.
- If you are sensitive to the effects of air pollution, it may be appropriate to limit the length of time spent in areas of local poor air quality – see advice from Defra at <https://uk-air.defra.gov.uk/air-pollution/daqj>.
- If you are on social media, sign up to the WRS Twitter feed @RegServs. WRS tweet when pollution is forecast by Defra to be moderate to very high.

⁷ <http://www.breathelondon.org/>

⁸ <https://www.londonair.org.uk/LondonAir/guide/MyActionsForMe.aspx>

Further information for the general public on reducing your family's exposure to poor air quality in Worcestershire and how individuals, business and schools can assist with reducing their impact on local air quality can currently be found at <http://www.worcsregservices.gov.uk/pollution/air-quality/public-advice.aspx> .

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1 Local Air Quality Management

This report provides an overview of air quality in Worcester City 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 Worcester City 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 Worcester City Council can be found in Table 2.1. The table presents a description of the AQMA that is currently designated within Worcester City. Appendix D: Map(s) of Monitoring Locations and AQMAs provides maps of the AQMA and the air quality monitoring locations in relation to the AQMA. The air quality objectives pertinent to the current AQMA designation is the NO₂ annual mean concentration.

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
Worcester City AQMA (Political Boundary)	11.06.2019	NO2 Annual Mean	AQMA encompasses whole district within political boundary of Worcester City	NO	55.03	35.9	Citywide AQMA Action Plan in progress - delayed due to Covid-19	Not yet published

Worcester City Council confirm the information on UK-Air regarding their AQMA(s) is up to date.

Progress and Impact of Measures to address Air Quality in Worcester City

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

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

1. *The Council have included a detailed discussion of trends in NO₂ concentrations over time. Separating the discussion in terms of study areas within the Council boundaries is informative. This demonstrates the Councils commitment to understanding trends and patterns in local air quality.*
2. *The Council has highlighted an extensive range of measures and strategies to address air quality, and highways and transport improvements. We encourage the Councils dedication to improving air quality within its limits.*
3. *Bias adjustment and distance correction were both appropriately and accurately applied. Annualisation was deemed to be not required. All calculations were provided.*
4. *The report provides valuable information to the Public for those wanting to learn about air quality in their local area, and how they can contribute to improving air quality.*
5. *The Council has an extensive NO₂ monitoring strategy. Monitoring of other pollutants, while not compulsory, could be considered to better inform how to tackle PM_{2.5} pollution*
6. *A link to the Public Health Outcomes Frameworks could be provided in next year's ASR".*

Worcester City 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. 30 measures are included within Table 2.2, with the type of measure and the progress Worcester City 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 the existing Action Plan. Key measures that have been progressed since the previous 2020 ASR are:

- **Task and Finish Group (Air Quality)** - The final report was approved by Worcester City Council Environment and Licensing Committee in January 2019 and made 6 recommendations, listed below, which have been adopted as prioritised measures. An internal officer working group commenced in late 2019 to help progress the T&F recommendations. Full details are provided in Table 2.2.

- 1) **Consideration of air quality impacts (as a health & safety implication) in the development of every Council Policy, formal decision, and key project by the Council** - Air quality is a consideration as part of policy and formal report writing and represents an ongoing process.
- 2) **Feasibility of installing electric vehicle infrastructure for residential streets in the most appropriate locations for air quality** - Work nearing completion to map relevant factors (including areas of poor air quality, limited parking, existing charging, and land availability for new infrastructure). Report will then be produced identifying best locations to cater for need and explore options for implementation.
- 3) **Full consideration of air quality in proposals for car parking in the City Centre (as part of the Masterplan)** - Currently no changes in respect of car parking charges or physical infrastructure.
- 4) **Investigation of feasibility for procurement and operation of ULEV pool cars for use by Council Officers** - Initial study prior to COVID-19 indicated relatively low business mileage for officers - possibly linked to size of city and also various shared services – so maybe difficult to justify shift to ULEV pool cars. Working practices also changed significantly during COVID so will need to be reassessed once returned to 'new' normal. Number of EV vehicles within fleet has increased and trials continue on larger vehicles.
- 5) **Study of feasibility and potential impacts for proposing an emission standard for Taxi's licensed by the Council (Taxi Strategy Task and Finish Group)** - Initial study undertaken following creation of Taxi Strategy Task & Finish Group in 2019. More detailed understanding is required to allow for viable transition of taxi network to hybrid and electric vehicles. The DfT is due to review vehicle standards which is expected to direct licensing policies.
- 6) **Low Emission Strategy for adoption by the Council to include all the above recommendations** - An Environmental Sustainability Strategy is proposed off which the Low Emission Strategy could hang - the ESS is a considerable piece of work and is reliant on support from key partners. Options appraisal to be undertaken. Outline of purpose and scope of strategy to be determined.

Other key actions are: -

- **Declaration of Worcester City AQMA (Political Boundary), 11th June 2019.** Worcester City Council is currently working towards a new Air Quality Action Plan (AQAP) setting out measures to improve local air quality following declaration of the citywide AQMA in 2019. Unfortunately, this work was delayed in 2020 due to the COVID-19 outbreak and subsequent UK lockdowns. Traffic surveys are necessary to allow for source apportionment work to inform the AQAP. These were due to be carried out in Spring 2020 however with

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- **Southern Link Road (A4440) Phase 4 (Ketch to Powick Hams) SWST5** –Work began in March 2019 on Phase 4 to complete dualling of carriageway between the Ketch and Powick roundabouts, capacity improvements to those junctions, an additional bridge over River Severn, and new foot/cycle bridges. Completion is now anticipated in spring 2022. Further information is available via the following link: -
[The A4440 Worcester Southern Link Road Improvements | Worcestershire County Council](#)
- **Worcester Western Link Road SWST12** – to develop a new link road connecting A4440 with B4204 Martley Road. A detailed Options Appraisal Report has been prepared for this scheme but was delayed due to COVID-19. The scheme is reliant on WCC working with the West of Worcester developers to ensure that access arrangements facilitate the opportunity to deliver the Link Road.

- **LTP4 Scheme W1 (Worcester Rainbow Hill/Astwood Road/Bilford Road/Blackpole Road Key Corridor of Improvement)** – An Options Appraisal Report is expected to be undertaken to identify a package of measures to improve the efficient and safe operation of this corridor.
- **LTP4 Scheme W4 Worcester East – West Axis Way Key Corridor Improvement** – This corridor improvement scheme is mostly completed except for St Johns District Centre with works continuing in 2021. Further information is available via the following link: -
<https://www.worcestershire.gov.uk/stjohnsimprovements>
- **Shrub Hill station** - As part of the Shrub Hill regeneration work to deliver the Shrub Hill Quarter, aspects of the vision have been submitted to the Towns Fund and works on the station itself may form part of a Levelling Up Fund bid. The bids include active travel links to the city centre, and link to the proposals within the North Cotswolds Link Task force to enhance the rail service.
- **Active Travel Network** – Various active travel corridors outlined in LTP4 at varying stages of development. City Masterplan includes 5 Public Realm enhancements including active corridors and spaces, with ‘The Arches’ due completion 2021. Active Travel funding secured from the (Emergency) Active Travel Fund for enhancements to the canal towpath between Diglis and Sixways including surfacing and passing places. Complemented by the active travel elements within the Towns Fund bid from Worcester City which provide additional links to the Ketch roundabout and onwards links to Powick.

The Kepax bridge scheme will provide an additional crossing over the River Severn to the north of the city at Ghulevelt Park linking to existing cycle routes (park/racecourse/Waterworks Roads/ Severn Path (subject to planning permission). This will increase connectivity between east and west banks of river and allows future expansion to walking and cycling routes. The Hams Way active travel bridge is now open connecting active travel networks in Worcester with further connections proposed for Malvern (subject to funding). The Broomhall Way active travel footbridge links St Peters/Worcester with the new community of Hopfields due for completion later in 2021. Crookbarrow Way active travel bridge is open and links St Peter’s north of the Broomhall Way bridge to Norton and onward to Worcestershire Parkway rail station and the proposed new settlement.

Other actions that have either been completed or are ongoing are as follows:-

- **Freight Quality Partnership** - On-going work with satellite navigation companies to route HGVs around AQMAs.

- **Installing electric vehicle charging points** - Recommendations for the installation of EV Charging Points are routinely recommended by WRS to the planning authorities for planning applications meeting relevant criteria.
- **Greening Council and Business Fleets** - Worcestershire County Council Local Transport Plan (LTP4) was formally adopted in November 2017 and incorporates policy on alternative fuels and associated infrastructure:
http://www.worcestershire.gov.uk/downloads/file/9024/worcestershire_s_local_transport_plan_ltp_2018_-_2030
- **Travel Planning** - Personalised travel planning program planned as part of wider health improvement drives from the County Council who have developed a “one-stop-shop” online travel portal:
http://www.worcestershire.gov.uk/info/20007/travel_and_roads
- **Car Sharing** - A Liftshare scheme is currently in operation for Worcestershire
<https://liftshare.com/uk/community/worcestershire>
- **Air Quality Supplementary Planning Document (SPD)** - WRS officers drafted the SPD in 2017 and updated it in 2018 and 2020. The document includes guidance on requirements for air quality assessments, standard recommendations expected for air quality mitigation measures, and advice relating to good practice for new development. The document has been sent to the relevant planning authorities for consideration. WRS are hopeful of formal adoption by the City Council.

The principal challenges and barriers to implementation of improvement measures that Worcester City anticipates facing relate to resourcing and funding sources for relevant actions, and delays to programs due to COVID-19 outbreak and enforced lockdown.

In July 2017 Defra and DfT Joint Air Quality Unit (JAQU) published their detailed ‘UK plan for tackling roadside nitrogen dioxide’. Within this plan, and the previous 2015 plan, 5 authorities were mandated to implement a Clean Air Zone (CAZ) in addition to Greater London, and a further 23 local authorities were required to produce strategies to accelerate compliance with the air quality objectives in their areas following the governments preferred options for mitigation e.g. CAZ Framework.

A further 33 local authorities have since been required to produce feasibility studies on accelerating compliance following a High Court order. In the autumn budget 2017, the chancellor announced a £220 million Clean Air Fund to support those local authorities and the people and businesses affected by these local plans.

Worcester City Council is not one of these named councils and therefore has not been prioritised for access to that funding. There is no comparable funding for local authorities not named in those UK

plans that have similar, sometimes even worse, areas of poor air quality identified under the LAQM regime.

The coronavirus COVID-19 and subsequent mitigation measures put in place by the UK government to combat the impact of the virus occurred during the 2020 reporting year. The lockdown and required reallocation of resources has led to a temporary cessation of many local council activities and programs which impact on potential improving measures, such as progressing new strategies and policies, strategic highway improvement works and implementation of new infrastructure. As a result, timelines for delivery of planned actions and measures may be subject to delays or changes in some circumstances. Economic recovery from COVID-19 may also represent an additional factor when considering implementation of some relevant actions that may have the potential to impact further on local businesses already in a critical position.

Whilst the measures stated above and in Table 2.2 will help to contribute towards compliance, Worcester City Council anticipates that further additional measures not yet prescribed will be required in subsequent years to achieve compliance and enable the revocation of Worcester City AQMA (Political Boundary).

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
T&F 1	Consider AQ impacts in every Council Policy	Policy Guidance and Development Control	Other policy	2019		Worcester City Council	Worcester City Council (officer resource)	NO	Not Funded	< £10k	Implementation	0	Implementation of Policy	Air quality is a consideration as part of policy and formal report writing.	Represents an ongoing process
T&F 2	Electric Vehicle Infrastructure in Residential Streets	Promoting Low Emission Transport	Procuring alternative Refuelling infrastructure to promote Low Emission Vehicles, EV recharging, Gas fuel recharging	2019	2026	Worcester City Council, Worcestershire County Council	Possible funding streams available	NO	Partially Funded	£1 million - £10 million	Planning	0-8%	Implementation of EV charging points in local residential areas, uptake of ULEV	Work nearing completion to map relevant factors (including areas of poor air quality, limited parking, existing charging, and land availability for new infrastructure). Report will then be produced identifying best locations to cater for need and explore options for implementation.	22% of residents have no access to off road parking. Significant funding required to provide all with access to EV charge points
T&F 3	AQ in Car Parking (Masterplan) Proposals	Transport Planning and Infrastructure	Other	2019		Worcester City Council	Unknown at this time	NO	Not Funded		Planning	Unknown	Design and location of multi storeys to replace multiple single level car parking and limit AQ impact e.g. promote ULEV	AQ group formed to implement T&F measures in Nov 2019. Currently no changes in respect of car parking charges or physical infrastructure.	Long timeline of 20+ years for implementation of Masterplan strategy. Economic recovery from COVID-19 may cause delay in changes to parking strategy.
T&F 4	ULEV Pool Cars	Promoting Low Emission Transport	Other	2019		Worcester City Council	Not identified at this time	NO	Not Funded		Planning	<0.2ug/m3	Purchase and use of vehicles for staff journeys	Initial study prior to COVID-19 indicated relatively low business mileage for officers - possibly linked to size of city and various shared services -difficult to justify shift to ULEV pool cars. Working practices also changed significantly during COVID so will need to be reassessed once returned to 'new' normal. Number of EV vehicles within fleet has increased and trials continue on larger vehicles.	Assessed to be low demand - changes following COVID-19 also need to be examined.

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
T&F 5	Emissions Standard for Licensed Taxis	Promoting Low Emission Transport	Taxi Licensing conditions	2019		Worcester City Council, Worcestershire Regulatory Services	Not identified at this time	NO	Not Funded		Planning	0 - 9%	Introduction of emission standard, uptake of ULEV	Initial study undertaken following creation of Taxi Strategy Task & Finish Group in 2019. More detailed understanding is required to allow for viable transition of taxi network to hybrid and EV vehicles. DfT due to review vehicle standards which is expected to direct licensing policies.	Vast majority vehicles are currently either Euro 4 (petrol) or Euro 6 (diesel) standard - highest standard vehicles for emissions. Limited infrastructure at present to support EV network - EV vehicles are expensive and technology evolving.
T&F 6	Low Emission Strategy	Policy Guidance and Development Control	Low Emissions Strategy	2019		Worcester City Council, WRS	Officer Time	NO	Not Funded	< £10k	Dependent on availability of detail of other Task and Finish group measures	0	Completion of LES	An Environmental Sustainability Strategy is proposed off which the Low Emission Strategy could hang - the ESS is a considerable piece of work and is reliant on support from key partners. Options appraisal to be undertaken. Outline of purpose and scope of strategy to be determined.	Reliant on other ES strategy
NAWC1	Develop and implement Worcester City Centre Masterplan	Traffic Management	UTC, Congestion management, traffic reduction	2015	2032	Worcester City Council and others for the various measures	TBC as various measures progress	NO	Not Funded	> £10 million	Planning	Not quantifiable at this time	Masterplan - potentially reduced vehicle movements in some key areas through car parking provision strategy (e.g. uptake of EV), realm enhancements supporting walking and cycling.	Masterplan adopted 16th July 2019. Plan to be implemented over the next 20+ years.	Long time to implementation. Pre COVID-19 plans subject to delay.
5.2.10	Installing electric vehicle charging points	Promoting Low Emission Transport	Procuring alternative Refuelling infrastructure to promote Low Emission Vehicles, EV recharging, Gas fuel recharging	Sept 2013		Worcester City Council, Worcestershire County Council	Developers as part of planning and variable funding streams for other schemes	NO	Not Funded	£500k - £1 million	Implementation	0 to 37%	Increase in availability of EV charging points and corresponding increase in uptake of electric vehicles	Standard recommendation for installation of EV Charging Points on relevant planning consents is ongoing. Formalised in 'WRS Technical Guidance for Planning' but not adopted by BDC planning authority. Electrical charging points for taxi scheme being installed 2021. Virgin Media and OLEV funding for 3 charge points	Significant funding required for publicly available charge points.
5.2.1	Bus Quality Partnership	Promoting Low Emission Transport	Public Vehicle Procurement - Prioritising uptake of low emission vehicles	2013		Worcester City Council / Worcestershire County Council, local Bus Companies.	Unknown at this time	NO	Not Funded		Planning	0 to 23%	Replacement of lower Euro standard buses on key city centre routes.	Meetings with First Bus group July 2018	Worcester is non profitable area for bus companies proving barrier to LEV investment locally. Requires LA subsidisation and/or enforcement.
5.2.2	Freight Quality Partnership	Traffic Management	UTC, congestion management, traffic reduction	2013	2018	WCC	WCC	NO	Partially Funded	£50k - £100k	Completed	unknown	Fewer HGVs travelling through AQMA	On-going duty under Traffic Management	Can take time for information to filter down to users. HGVs may still need to travel through

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
															AQMAs on major arterial routes.
LRH7 / 5.1.1	Alteration to traffic light phasing - Lowesmoor Improvement scheme. Renewed enforcement of an existing TRO restricting all vehicles, with the exception of buses at certain times of day	Traffic Management	Strategic highway improvements and congestion reduction	Sept 2013		Worcestershire County Council	Worcestershire County Council	NO	Not Funded		Implementation	5 - 10%	Improved flow of traffic through Lowesmoor. Reduced congestion. Reduced volume of traffic.	Implemented January 2015. Potentially enforcement cameras to be added in future.	No date currently for enforcement cameras.
5.3.4	Promote flexible working arrangements	Promoting travel alternatives	Encourage/facilitate home-working	2013		Worcester City Council, Worcestershire County Council	Various	NO	Not Funded	£50k - £100k	Implementation	unknown	Increase in number of people able to work from home	County Council have pushed for maximum coverage of fibre optic broadband. Ongoing - 96% coverage as of December 2019.	Reliant on uptake from private sector companies
5.1.7	Signage to avoid AQMA	Traffic Management	Other	2013	2016	Worcestershire County Council	DfT	NO	Funded		Completed	Reduces Emissions - Not quantified at this time	Decrease in number of strategic journeys through AQMA	VMS around City completed 2016.	
5.1.4	Variable Message Systems	Traffic Management	Other	2013	2016	Worcestershire County Council	DfT	NO	Funded		Completed	Reduces Emissions - Not quantified at this time	Decrease in traffic movements through AQMA	VMS around City completed 2016.	
5.1.1	Major signalling infrastructure updates at St Johns, St Clements, Croft Road, Dolday, Sidbury, Commandery Road and London Road	Traffic Management	UTC, Congestion management, traffic reduction	2013	2022	National Productivity Investment Fund	National Productivity Investment Fund	NO	Funded		Implementation	Reduces Emissions - Not quantified at this time	Improve network efficiency and accessibility for all modes of transport	Completed with exception of St Johns centre. Funding secured	Delivery of St Johns scheme delayed by COVID-19
5.1.5 /LRH5	Loading and unloading restrictions during peak traffic times (Lowesmoor/ Rainbow Hill)	Traffic Management	Workplace Parking Levy, Parking Enforcement on highway	2013	2020	Worcester City Council	Worcester City Council	NO	Funded		Implementation	Reduces Emissions - Not quantified at this time	Reduced incidence of loading and unloading during peak times	TRO implemented and updated. MTE cameras purchased & ready for installation.	Bus Lane Enforcement (MTE) cameras to be installed within next few months
5.1.1/DD3	Alteration to phasing of traffic light systems/Junction review (Dolday)	Traffic Management	Strategic highway improvements, Re-prioritising road space away from cars, including Access management, Selective vehicle priority, bus priority, high vehicle occupancy lane	2013	2015	Worcestershire County Council	National Productivity Investment Fund	NO	Funded		Completed	1.2 - 6.8% (Dolday)	Improved Traffic Flow	Completed.	
5.5.1	Produce Air Quality Supplementary Planning Document	Policy Guidance and Development	Air quality planning and policy guidance	2013	2022	Worcestershire County Council Strategic Planner, WRS and South Worcestershire Councils	Worcestershire County Council Strategic Planner, WRS and South Worcestershire Councils (resource)	NO	Funded		Implementation	Reduces emissions from new Developments	Formal adoption and utilised by Worcester City Council planning authority	WRS 'Technical Guidance Note for Planning' published 2018. Initial discussions on AQ SPD for SWDP Jan 2020.	SPD work awaiting outcome of South Worcestershire Development Plan review due 2021. Work currently suspended due to COVID-19 impacts.

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
5.2.4	Railway Enhancements - new Worcestershire Parkway Station	Transport Planning and Infrastructure	Public transport improvements- interchanges stations and services	2013	2020	Worcestershire County Council, Worcestershire Local Enterprise Partnership	DfT, Worcestershire Local Enterprise Partnership	NO	Funded		Completed	Reduces Emissions - Not quantified at this time	Reduce commuter traffic destined for city central stations at Shrub Hill and Foregate Street	Works completed in 2019 and the new station opened on 23rd February 2020, 3 weeks prior to the first lockdown. Initial indications were of high use in excess of the business plan, with the car park 75% full and strong ticket sales. Station is at the heart of the emerging proposals for Worcestershire Parkway Strategic Growth area arising from the review of South Worcestershire Development Plan.	Rail use has declined nationally because of the pandemic, longer term trends are still to emerge
5.2.5	Greening Council Fleets	Promoting Low Emission Transport	Procuring alternative Refuelling infrastructure to promote Low Emission Vehicles, EV recharging, Gas fuel recharging	2013		Worcester City Council, Worcestershire County Council	Not identified at this time	NO	Not Funded	£100k - £500k	Planning	Reduces Emissions - Not quantified at this time	Increase in number of Council fleet and contractors' vehicles of higher Euro Standard or ULEV	T&F4 recommendation procurement ULEV pool cars (2019)	Initial study prior to COVID-19 indicated relatively low business mileage for officers to justify shift to ULEV pool cars. Working practices also changed significantly during COVID so will need to be reassessed once returned to 'new' normal

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
5.3.6	Improve cycling and walking routes in local areas	Promoting Travel Alternatives	Promotion of cycling	2013	Worcestershire County Council	Worcestershire County Council	Worcestershire Network Efficiency Programme, National Productivity Investment Fund	NO	Partially Funded	£1 million - £10 million	Implementation	Reduces emissions - see comments	Uptake in commuter journeys undertaken by cycle or walking	8 active corridors included in LTP4 at various stages of development. City Masterplan includes 5 Public Realm enhancements including active corridors and spaces. The Arches due for completion 2021. Funding secured (Emergency Active Travel Fund) for the canal towpath between Diglis and Sixways. Complemented by active travel elements from Towns Fund bid from Worcester City with links to the Ketch roundabout and onwards to Powick. Kepax bridge scheme will provide additional crossing over the River Severn to the north of the city at Ghulevelt Park linking to existing cycle routes (park/racecourse/Waterworks Roads/ Severn Path. Increases connectivity between east and west banks of river and allows future expansion to walking and cycling routes. Hams Way active travel bridge now open connecting to active travel network in Worcester with further connections proposed to Malvern (subject to funding). The Broomhall Way active travel footbridge links St Peters/Worcester with the new community of Hopfields due for completion later in 2021. Crookbarrow Way active travel bridge is open and links St Peter's north of the Broomhall Way bridge to Norton and onward to Worcestershire Parkway rail station and the proposed new settlement.	PHE Public Health Outcomes Framework (PHOF) data indicates levels of cycling and walking in Worcester is above regional and national data indicating limited potential for significant uptake and improvement. However, experience of Choose How You Move programs in Worcestershire indicates uptake of cycling and walking may continue following easing of COVID-19 lockdown measures. Kepax Bridge scheme subject to successful planning application due for determination July 2021. Other schemes subject to funding.
5.3.1	Travel Planning	Promoting Travel Alternatives	Personalised travel planning	2013		WCC	WCC	NO	Not Funded	On-going	Implementation	unknown	Increased uptake of alternative modes of transport	WCC is delivering PTP services on behalf of developers. Building on best practice developed by the Council this proven tool encourages modal shift in new developments towards more sustainable and space efficient forms of transport.	On-going
5.3.2	Car Sharing	Alternatives to private car use	Car and lift sharing schemes	2013		WCC	WCC	NO	Not Funded	£10k - 50k	Implementation	<1%	Increase in number of people car sharing	Liftshare website scheme launched Autumn 2015. Currently in operation	Following an initial surge in interest from public, use of service has slowed down
5.6.3	Air Quality Networks	Policy Guidance and Development Control	Regional Groups Co-ordinating programmes to develop Area wide Strategies to reduce emissions and improve air quality	2013		WRS CEEPG DEFRA	Officer time (WRS)	NO	Not Funded	< £10k	Implementation	0	Improved cross boundary working between local authorities in West Midlands	WRS are member of regional environmental protection managers group (CEEPG) and member of Defra LAQM Team Local Authority Advisory Group both formed in 2017.	Differing AQ issues, priorities, and resources in regional authorities. Largely on hold due to global Covid pandemic.
5.4.1	Smarter Driving Tips	Public Information	Via the Internet	2013		WRS & WCC	Officer time (WRS)	NO	Not Funded	£10k - 50k	Implementation	<0.2ug/m3	Increase in website hits	Advice page created for all groups affected by and impacting air quality and shared with County Public Health.	Created Mar 2017, Updated March 2019

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5.4.5	Raise the profile and increase awareness of air quality within the region	Other	Other	2013		WRS CEEPG MJAC DEFRA	Officer time (WRS)	NO	Not Funded	£10k - 50k	Implementation	0	Improved cross boundary knowledge sharing between local authorities in West Midlands	WRS held position of Air Quality technical coordinator for MJAC, member of CEEPG and member of Defra LAQM Team Local Authority Advisory Group both formed in 2017.	WRS was MJAC AQ Technical Coordinator 2014-17. MJAC/CEEPG Knowledge Hub group set up in 2017 delivered by joint working between WRS and Cannock Chase DC. Member of LA advisory group to Defra LAQM team following invitation 2017.
5.1.13	Alteration to Parking Provision	Traffic Management	UTC, Congestion management, traffic reduction	2013		Worcester City Council, Worcestershire County Council	Not identified at this time	NO	Not Funded	£1 million - £10 million	Planning	Reduces Emissions - Not quantified at this time	Reduced traffic movements and congestion in inner city	City Masterplan (adopted 2019) proposals to consolidate existing multiple single level surface car parking into fewer multi story car parks at strategic points - see T&F3 for further info.	Masterplan long lifetime of 20+ years. Congestion may increase in interim period between sale of existing car park land and implementation of replacement multi storey car parks
5.6.8	Forge closer links with local health agencies	Other	Other	2013		WRS WCC PHE	DoPH, Officer time (WRS)	NO	Not Funded	< £10k	Implementation	0	Increase participation of Public Health in Worcestershire Air Quality issues and action groups	County Air Quality Partnership set up May 2019 by DoPH supported by WRS	On hold due to global Covid pandemic
5.4.2	Provide link to real time air quality information	Public Information	Via the Internet	2013		WRS WCC PHE	Officer time (WRS)	NO	Not Funded	£10k - 50k	Implementation	0	Increase in WRS Twitter subscribers	System put in place at WRS to tweet alerts when Air pollution is moderate or worse in any given 5 day forecast on Defra Daily Air Quality Index and shared with County Public Health representative	Limited to Twitter users. Ongoing.
5.4.4	Make air quality information more available and accessible	Public Information	Via the Internet	2013		WRS	Officer time (WRS)	NO	Not Funded	£10k - 50k	Implementation	0	Website hits and enquiries for information	All existing LAQM reports and details of AQMAs are available to public on WRS website. WRS use Twitter account to release information.	Ongoing

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

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

There are currently no automatic PM_{2.5} monitoring stations in Worcestershire. The nearest AURN PM_{2.5} monitoring station is the Birmingham Acocks Green site approximately 25 miles to the north east of the Worcester City area. WRS has reviewed the Defra national background maps to determine projected PM_{2.5} concentrations with Worcester City for the 2020 calendar year. The average total PM_{2.5} at 32 locations (centre points of 1km x 1km grids) across Worcester City is 8.43µg/m³, with a minimum concentration of 7.92µg/m³ and a maximum concentration of 9.5µg/m³. This indicates that PM_{2.5} concentrations within Worcester City are well below the annual average EU limit value for PM_{2.5} of 25µg/m³ and the average is below World Health Organisation limits also. The whole district area of Worcester City is a Smoke Control Area.

WRS has reviewed the fraction of mortality attributable to particulate air pollution (indicator 3.01) as published by Public Health England (as raised in point 6 above of Defra's appraisal of last year's ASR). The fraction of mortality attributable to particulate emissions in Worcestershire in 2019 (the most recent year available) was 4.8%. This falls below the national figure for England (5.1% in 2019) and below the figure for the West Midlands region (5.3% in 2019). Recent trend data is not available for Worcestershire due to a lack of data points with valid values.

More information on the Public Health Outcomes Frameworks that examines indicators that help us understand trends in public health can be found at:

[Public Health Outcomes Framework - PHE](#)

As outlined in Policy Guidance LAQM.PG16, WRS have discussed the role of the DoPH, and the details of PM_{2.5} levels across the County, with the DoPH at Worcestershire County Council. In 2019 a new Air Quality Partnership led by the DoPH and supported by WRS Land and Air Quality Team was set up to discuss potential actions to improve air quality across the County and determine an action plan for implementation. The group comprised officers from the County and District authorities from public health, air quality, strategic planning, sustainability, highways and transport disciplines, and representatives from the NHS and Highways England. The group met initially in May 2019 to discuss terms and references and in September to discuss potential actions. The group is largely driven by DoPH so, due to Covid-19 taking priority in 2020, the business of the partnership has been postponed indefinitely.

No additional actions are currently planned by Worcester City Council in relation to the reduction of PM_{2.5} levels. However, it is anticipated that any potential actions to improve NO₂ levels will likely result in a linked improvement in PM_{2.5} levels.

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

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

Summary of Monitoring Undertaken

3.1.1 Automatic Monitoring Sites

Worcester City Council did not undertake any automatic (continuous) monitoring during 2020.

3.1.2 Non-Automatic Monitoring Sites

Worcester City Council undertook non-automatic (i.e. passive diffusion tubes) monitoring of NO₂ at 37 sites during 2020. Table A.1 in Appendix A presents the details of the non-automatic sites.

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

Individual Pollutants

The air quality monitoring results presented in this section are have been adjusted for bias, annualised (because the annual mean data capture was below 75% and greater than 25%). Distance correction has not been required. Further details on adjustments are provided in Appendix C.

3.1.3 Nitrogen Dioxide (NO₂)

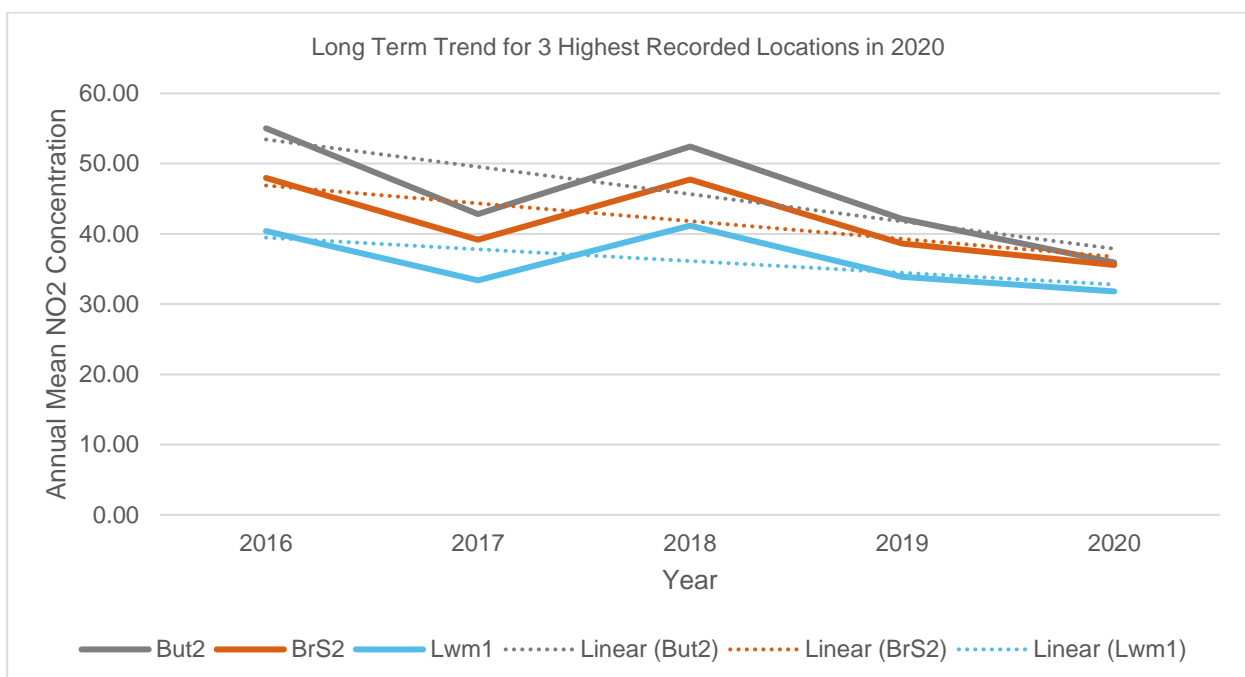
Table A.2 and Figures A.1 in Appendix A compare the ratified and adjusted monitored NO₂ annual mean concentrations for the past five years with the air quality objective of 40µg/m³. Note that the concentration data presented represents the concentration at the location of the monitoring site, following 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.

There have been no changes to the monitoring network across Worcester City during 2020.

Monitoring data from 2020 does not represent a standard year with the emergence of the Coronavirus Pandemic and first lockdown in March and subsequent lockdowns that followed. With the number of vehicle journeys massively reduced much lower concentrations of nitrogen dioxide can be seen in all locations compared to previous years. On average the recorded concentrations in 2020 have decreased by 22.4% ($7\mu\text{g}/\text{m}^3$) when compared with 2019 results. The previous ASR 2020 highlighted that results in 2019 were less than anticipated (likely due to the low bias adjustment factor of 0.78) so when the latest 2020 results are compared to those of 2018 the average decrease can be seen to be even more significant with a 36.39% ($13.9\mu\text{g}/\text{m}^3$) reduction in concentrations when comparing the 2 years.

In 2020 the highest concentration of NO_2 recorded across Worcester City was $35.9\mu\text{g}/\text{m}^3$ at BUT2. This location has recorded the highest concentration across the city for the last 5 years with a concentration of $42.1\mu\text{g}/\text{m}^3$ in 2019, which represents a decrease of 14.13% ($6.2\mu\text{g}/\text{m}^3$), and $52.4\mu\text{g}/\text{m}^3$ in 2018, which represents a decrease of 31.49% ($16.5\mu\text{g}/\text{m}^3$), when compared with 2020. The second highest concentration was $35.57\mu\text{g}/\text{m}^3$ recorded at BrS2 which represents a decrease of 7.9% ($3.05\mu\text{g}/\text{m}^3$) from 2019 and 31.49% ($12.16\mu\text{g}/\text{m}^3$) from 2018. The third highest concentration of $31.81\mu\text{g}/\text{m}^3$ at Lwm1 represents a decrease of 6.14% ($2.08\mu\text{g}/\text{m}^3$) from 2019 and 22.74% ($9.36\mu\text{g}/\text{m}^3$) from 2018. The long terms trends of these three highest measured locations during 2020 can be seen on the graph below. All further long term trends graphs for Worcester City, split into various relevant road corridors, are presented as part of Figure A.1.



No exceedances of the annual mean objective were recorded at any location within Worcester City during 2020. No concentrations were recorded within 10% of the objective with all results below $36\mu\text{g}/\text{m}^3$.

Monitoring results demonstrate a significant decrease in concentrations at all monitoring locations between 2019 and 2020. This is consistent with trends across Worcestershire and relates to the reduction in traffic due to the COVID-19 pandemic and various 'lockdowns' and changes in behaviour due to the unprecedented situation. The results are not representative of a standard year and should be treated with caution in terms of future decision making.

Monitoring results within the Worcester City area demonstrate a general downward trend in concentrations across the district in 2020 and over the 5-year period 2016 – 2020.

3.1.4 Particulate Matter (PM₁₀)

PM₁₀ has not been monitored in 2020.

3.1.5 Particulate Matter (PM_{2.5})

PM_{2.5} has not been monitored in 2020.

3.1.6 Sulphur Dioxide (SO₂)

SO₂ has not been monitored in 2020.

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)
LR1	London Road Lampost 6569 by Bargain Booze	Roadside	385636	254158	NO2	Yes - Worcester City AQMA - Political Boundary	2.9	1.6	No	2.1
LR2	London Road Lampost 6561 by Royal Court	Roadside	385428	254238	NO2	Yes - Worcester City AQMA - Political Boundary	3.0	1.5	No	2.2
LR3	London Road traffic sign 572 for A58(City)	Roadside	385357	254272	NO2	Yes - Worcester City AQMA - Political Boundary	0.5	1.8	No	2.3
LR5	London rd Bus stop SL6554 opp Bath rd	Roadside	385325	254329	NO2	Yes - Worcester City AQMA - Political Boundary	0.3	1.5	No	2.2
LR4	London Rd SL6565 adj no65	Roadside	385525	254219	NO2	Yes - Worcester City AQMA - Political Boundary	3.1	1.9	No	2.1
SidFG	Sidbury Street sign o/s Fisher German Agents	Roadside	385146	254474	NO2	Yes - Worcester City AQMA - Political Boundary	FF 3.94	2.3	No	2.2
But1	Magdala Court, The Butts	Roadside	384776	255107	NO2	Yes - Worcester City AQMA - Political Boundary	0.0	1.2	No	2.5
But2	Magdala Court, The Butts	Roadside	384724	255086	NO2	Yes - Worcester City AQMA - Political Boundary	0.0	1.7	No	2.4
Dd1	Dolday opposite bus station	Roadside	384652	254986	NO2	Yes - Worcester City AQMA - Political Boundary	N/A	2.2	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)
DDASH	Lampost opposite All Saints House	Roadside	384682	254924	NO2	Yes - Worcester City AQMA - Political Boundary	2.0	2.3	No	2.1
BrS	Bridge Street lamppost outside John Gwen House	Kerbside	384666	254818	NO2	Yes - Worcester City AQMA - Political Boundary	2.0	0.7	No	2.2
BrS2	Bridge Street sign opposite John Gwynne House	Roadside	384695	254840	NO2	Yes - Worcester City AQMA - Political Boundary	1.0	2.0	No	2.1
Tyn3	No 26 Upper Tything (Lp opp Kwik Fit)	Roadside	384679	255998	NO2	Yes - Worcester City AQMA - Political Boundary	0.1	2.0	No	2.2
Tyn2	Lamb & Flag PH Upper Tything (LP934)	Roadside	384767	255606	NO2	Yes - Worcester City AQMA - Political Boundary	FF 1.29	2.3	No	2.2
Tyn	925 - HAMMERCHILDS, Upper Tything	Roadside	384833	255461	NO2	Yes - Worcester City AQMA - Political Boundary	FF 1.29	1.6	No	2.2
Fos2	Hewitt Recruitment, 35 Foregate Street (downpipe)	Roadside	384866	255367	NO2	Yes - Worcester City AQMA - Political Boundary	FF 1.36	3.2	No	2.1
Fos3	Café Mela, 22 Foregate Street (downpipe)	Roadside	384899	255329	NO2	Yes - Worcester City AQMA - Political Boundary	FF 1.03	2.2	No	2.5
Fos	Foregate Street at junction with Shaw Street (Traffic lights)	Kerbside	384941	255140	NO2	Yes - Worcester City AQMA - Political Boundary	FF 1.19	1.0	No	2.5
Crs1	My Coffee, 29 The Cross (downpipe)	Roadside	384967	255012	NO2	Yes - Worcester City AQMA - Political Boundary	FF 1.33	3.4	No	2.2
Swth1	Scope Shop, St Swithins Street	Roadside	385013	254987	NO2	Yes - Worcester City AQMA - Political Boundary	FF 1.33	2.1	No	2.2
Lwm2	Lowesmoor 2 Town End. Adj private shop	Roadside	385164	255134	NO2	Yes - Worcester City AQMA -	FF 1	1.9	No	2.5

Diffusion Tube ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA? Which AQMA?	Distance to Relevant Exposure (m) ⁽¹⁾	Distance to kerb of nearest road (m) ⁽²⁾	Tube Co-located with a Continuous Analyser?	Tube Height (m)
						Political Boundary				
Lwm1	Lowesmoor 1 Rainbow Hill End outside 4 Seasons	Roadside	385268	255191	NO2	Yes - Worcester City AQMA - Political Boundary	FF 1	1.4	No	2.6
BkC	Façade of Berkeley Court, Foregate Street, Worcester	Roadside	384948	255111	NO2	Yes - Worcester City AQMA - Political Boundary	0.2	4.1	No	2.5
RH	Rainbow Hill	Roadside	385420	255413	NO2	Yes - Worcester City AQMA - Political Boundary	7.8	1.5	No	2.4
GS	52 or 54 George Street	Roadside	385358	254969	NO2	Yes - Worcester City AQMA - Political Boundary	0.0	2.0	No	2.3
StJ1	Scott of Tatoo, 1A St. John's (downpipe)	Roadside	384137	254510	NO2	Yes - Worcester City AQMA - Political Boundary	FF 1.48	2.7	No	2.0
Brm	10 Bromyard Road (downpipe)	Roadside	383967	254481	NO2	Yes - Worcester City AQMA - Political Boundary	0.0	8.8	No	1.9
KCP	King Charles Place outside bakery Lampost 5372	Roadside	384016	254399	NO2	Yes - Worcester City AQMA - Political Boundary	FF 1.41	2.2	No	2.1
StJ2	The Fortune House, 65 St Johns	Roadside	384013	254356	NO2	Yes - Worcester City AQMA - Political Boundary	FF 1.53	2.2	No	2.0
StJ3	The Bell, 35 St Johns	Roadside	384046	254424	NO2	Yes - Worcester City AQMA - Political Boundary	FF 1.53	2.1	No	2.0
Mcl	McIntyre Road lamppost outside last house before cemetery	Suburban	383454	254606	NO2	Yes - Worcester City AQMA - Political Boundary	4.5	1.2	No	2.3
Ast4	246 Astwood Road	Roadside	386097	256565	NO2	Yes - Worcester City AQMA - Political Boundary	0.0	9.9	No	2.0

Diffusion Tube ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA? Which AQMA?	Distance to Relevant Exposure (m) ⁽¹⁾	Distance to kerb of nearest road (m) ⁽²⁾	Tube Co-located with a Continuous Analyser?	Tube Height (m)
AST1b	LP5129 outside 170/172 Astwood Road	Roadside	386022	256401	NO2	Yes - Worcester City AQMA - Political Boundary	5.5	3.5	No	2.1
Ast3	Astwood Road 3 Rainbow Hill	Roadside	385764	255968	NO2	Yes - Worcester City AQMA - Political Boundary	6.6	1.7	No	2.3
OAK	22 Oaklands on drainpipe	Roadside	387810	254993	NO2	Yes - Worcester City AQMA - Political Boundary	0.0	7.0	No	1.9
LRW	within vicinity of London Road Waitrose	Kerbside	386654	253761	NO2	Yes - Worcester City AQMA - Political Boundary	4.0	0.5	No	1.9
BG2	located on metal post adjacent to 17 Broomhall Green, Broomhall, Worcester, WR5 2PG	Roadside	386165	252146	NO2	Yes - Worcester City AQMA - Political Boundary	5.3	5.1	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 NO₂ Monitoring Results: Non-Automatic Monitoring (µg/m³)

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
LR1	385636	254158	Roadside	100	51.9	36.6	32.8	35.5	29.3	22.8
LR2	385428	254238	Roadside	83.3	42.3	47.2	35.0	39.8	34.5	25.1
LR3	385357	254272	Roadside	100	51.9	42.4	36.1	42.3	33.7	26.5
LR5	385325	254329	Roadside	100	51.9	46.0	35.4	44.1	35.0	27.5
LR4	385525	254219	Roadside	66.67	34.6	39.3	32.0	38.4	29.7	24.7
SidFG	385146	254474	Roadside	100	51.9	42.1	35.7	41.9	34.3	25.9
But1	384776	255107	Roadside	100	51.9	52.2	40.3	44.4	33.5	27.3
But2	384724	255086	Roadside	100	51.9	55.0	42.8	52.4	42.1	35.9
Dd1	384652	254986	Roadside	100	51.9	39.6	31.1	37.2	29.7	23.2
DDASH	384682	254924	Roadside	83.3	42.3	45.3	37.8	43.8	36.8	29.0
BrS	384666	254818	Kerbside	83.3	51.9	46.5	32.7	42.3	31.0	24.9
BrS2	384695	254840	Roadside	83.3	42.3	48.0	39.2	47.7	38.6	35.6
Tyn3	384679	255998	Roadside	100	51.9	37.9	30.2	37.9	29.5	23.4
Tyn2	384767	255606	Roadside	100	51.9	49.7	40.6	47.8	39.9	31.3
Tyn	384833	255461	Roadside	100	51.9	47.3	40.3	47.2	41.8	31.1
Fos2	384866	255367	Roadside	100	51.9	37.6	31.3	35.8	30.7	22.8
Fos3	384899	255329	Roadside	83.3	44.2	34.6	25.9	32.9	27.6	21.3
Fos	384941	255140	Kerbside	100	51.9	47.6	40.2	48.5	37.3	27.5
Crs1	384967	255012	Roadside	100	51.9	39.4	33.2	36.8	29.1	22.0
Swth1	385013	254987	Roadside	100	51.9	30.0	23.8	30.0	23.4	17.8
Lwm2	385164	255134	Roadside	100	51.9	34.9	28.9	35.9	29.5	23.1
Lwm1	385268	255191	Roadside	83.3	42.3	40.4	33.4	41.2	33.9	31.8
BkC	384948	255111	Roadside	100	51.9			46.9	38.4	29.4
RH	385420	255413	Roadside	100	51.9	32.9	29.5	34.3	30.1	21.6
GS	385358	254969	Roadside	83.3	42.3				36.3	29.4
StJ1	384137	254510	Roadside	100	51.9	44.2	36.0	42.7	36.0	22.7
Brm	383967	254481	Roadside	100	51.9	30.8	27.4	32.4	27.8	19.1
KCP	384016	254399	Roadside	100	51.9	35.7	27.6	33.3	27.9	22.0
StJ2	384013	254356	Roadside	100	51.9	30.1	22.1	30.3	23.5	17.5
StJ3	384046	254424	Roadside	100	51.9	34.5	27.9	34.3	27.9	19.9
Mcl	383454	254606	Suburban	100	51.9	14.5	11.6	14.3	11.9	10.1
Ast4	386097	256565	Roadside	100	51.9	26.4	21.3	25.3	21.6	16.9
AST1b	386022	256401	Roadside	100	51.9		27.3	34.2	28.9	23.9
Ast3	385764	255968	Roadside	100	51.9	49.2	39.1	50.6	40.0	31.3
OAK	387810	254993	Roadside	100	51.9		16.6	19.0	16.7	13.1
LRW	386654	253761	Kerbside	83.3	42.3	46.8	36.4	45.2	35.7	25.0
BG2	386165	252146	Roadside	100	51.9	37.0	21.3	27.4	22.8	16.8

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

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/m³.

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

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

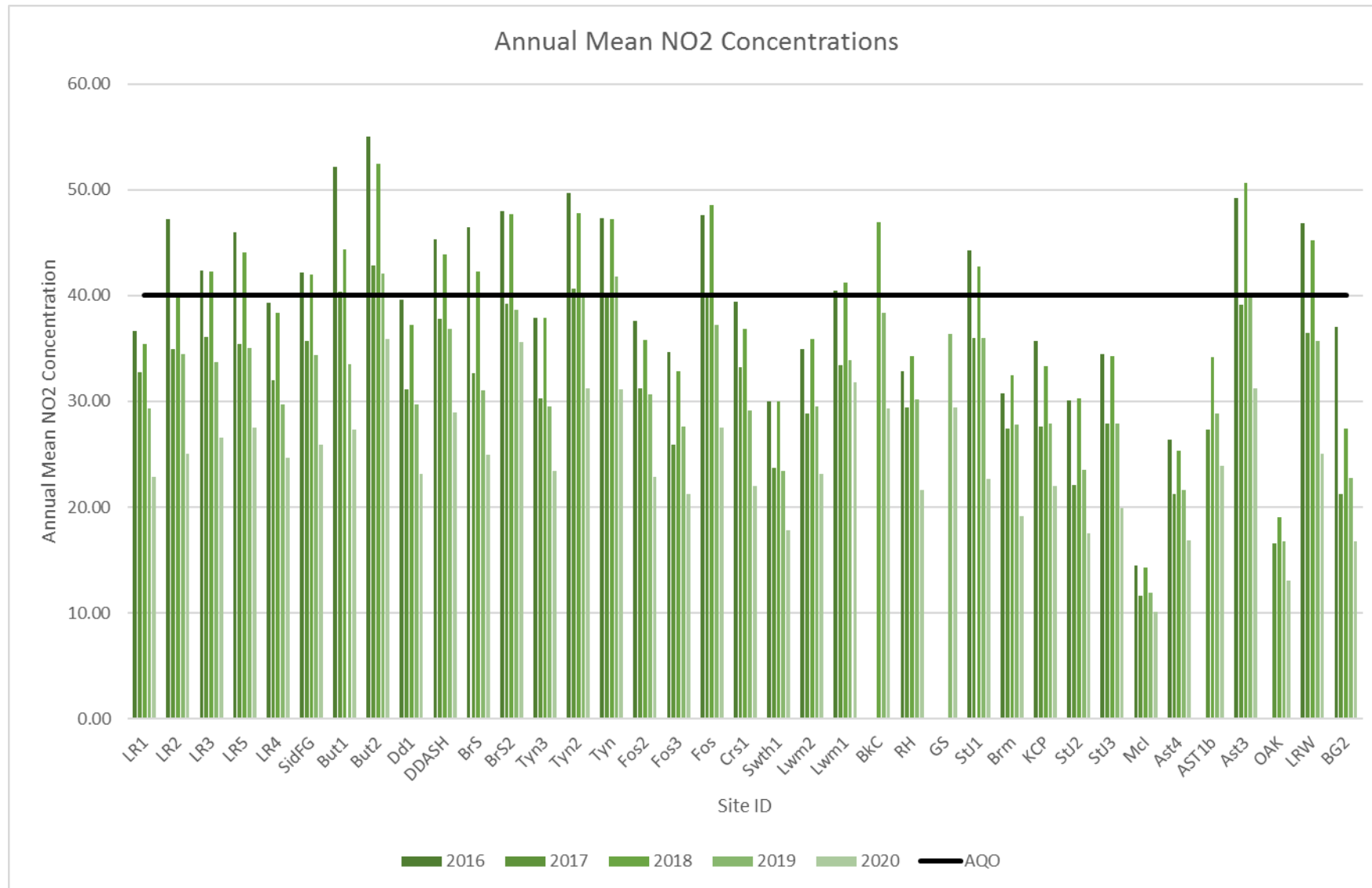
Means for diffusion tubes have been corrected for bias. All means have been "annualised" as per LAQM.TG16 if valid data capture for the full calendar year is less than 75%. See Appendix C for details.

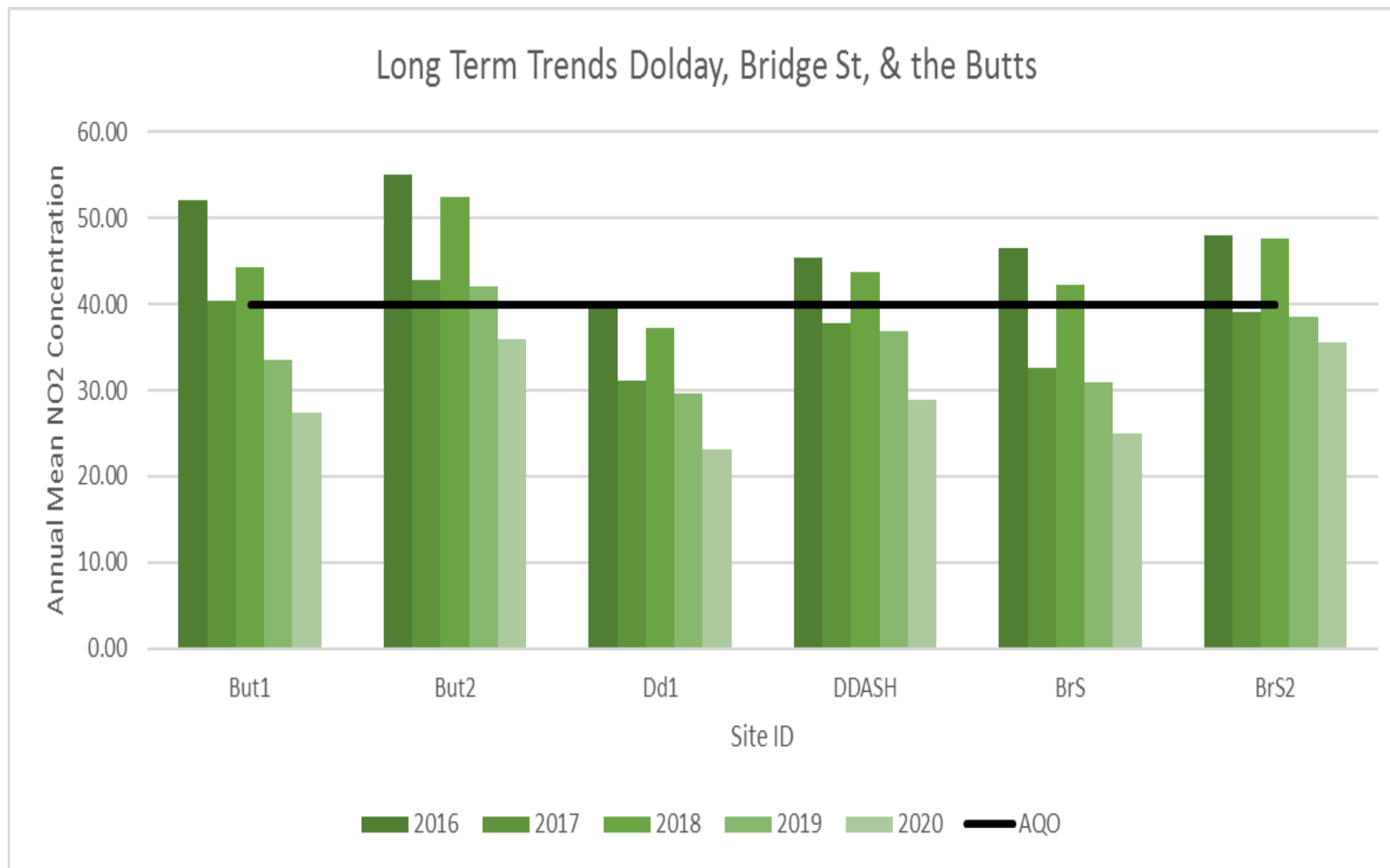
Concentrations are those at the location of monitoring and not those following any fall-off with distance adjustment.

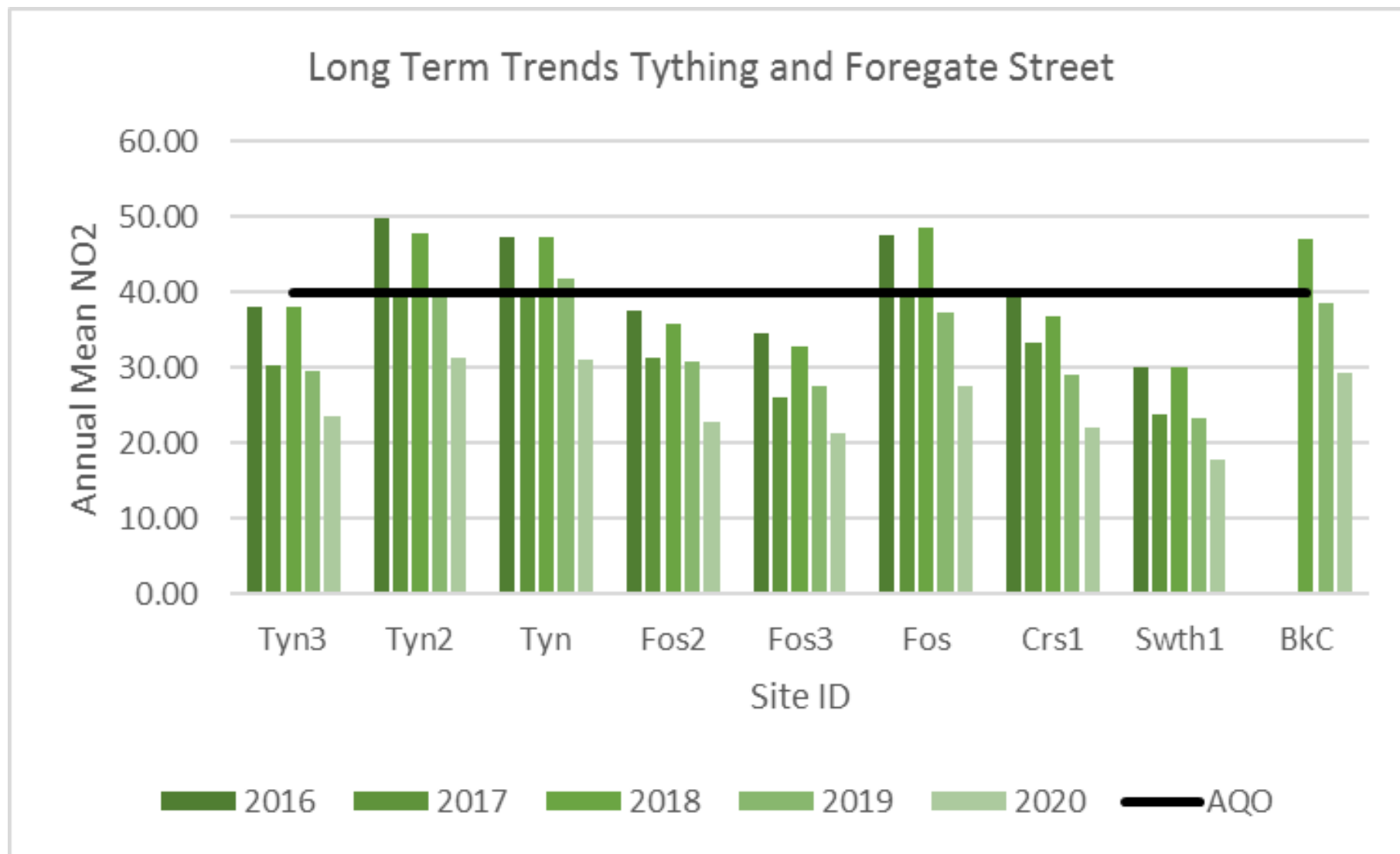
(1) Data capture for the monitoring period, in cases where monitoring was only carried out for part of the year.

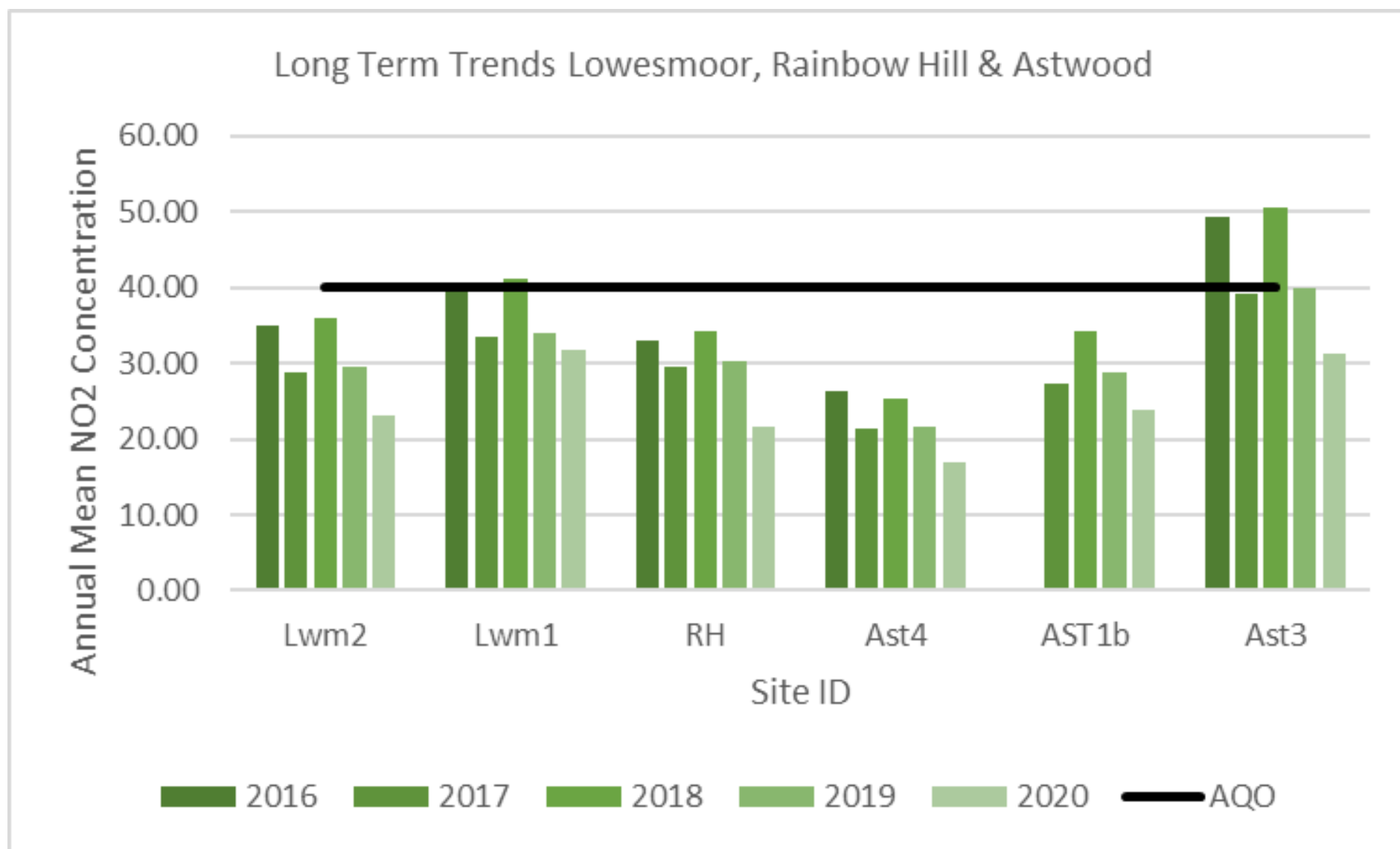
(2) Data capture for the full calendar year (e.g. if monitoring was carried out for 6 months, the maximum data capture for the full calendar year is 50%).

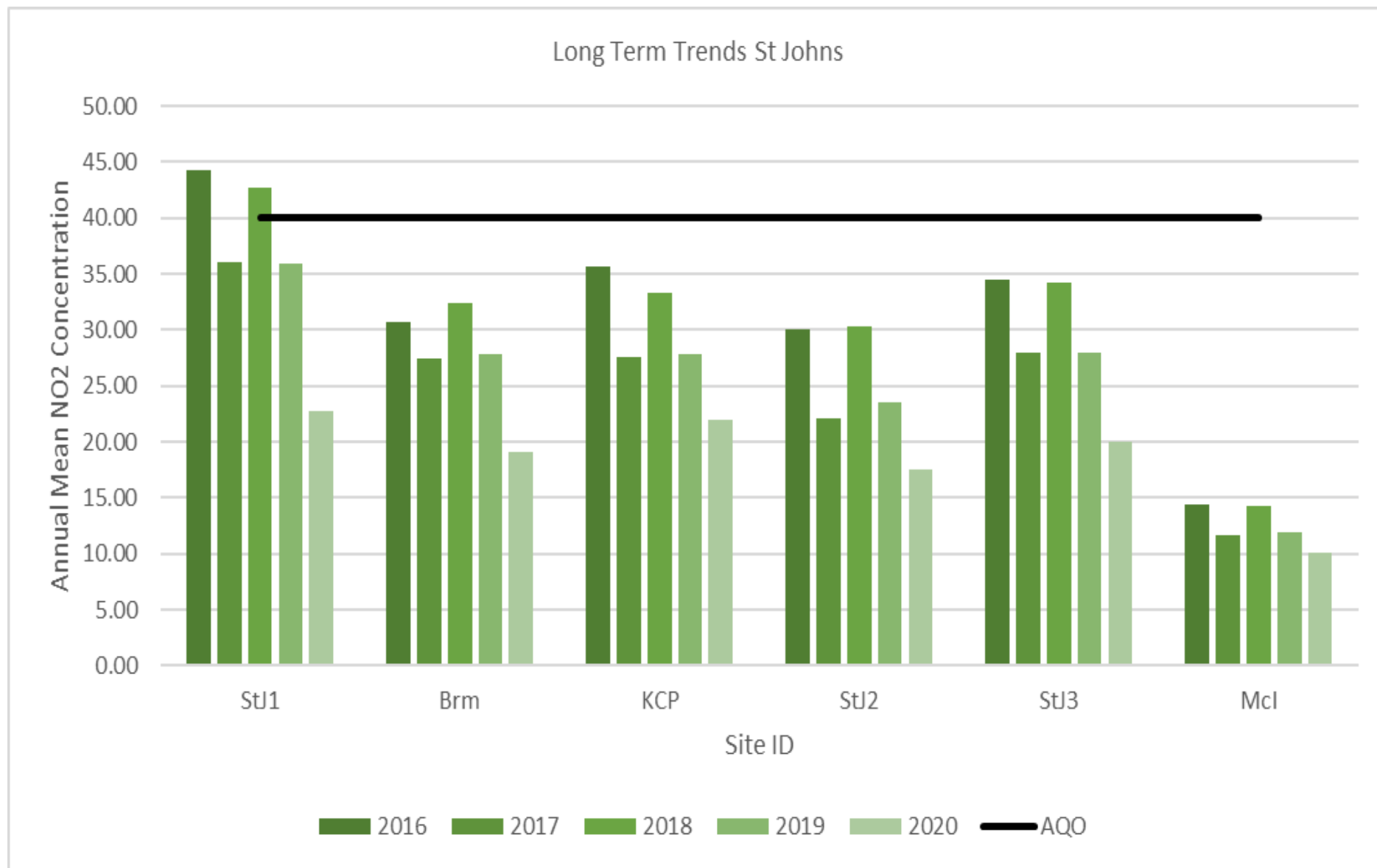
Figure A.1 – Trends in Annual Mean NO₂ Concentrations

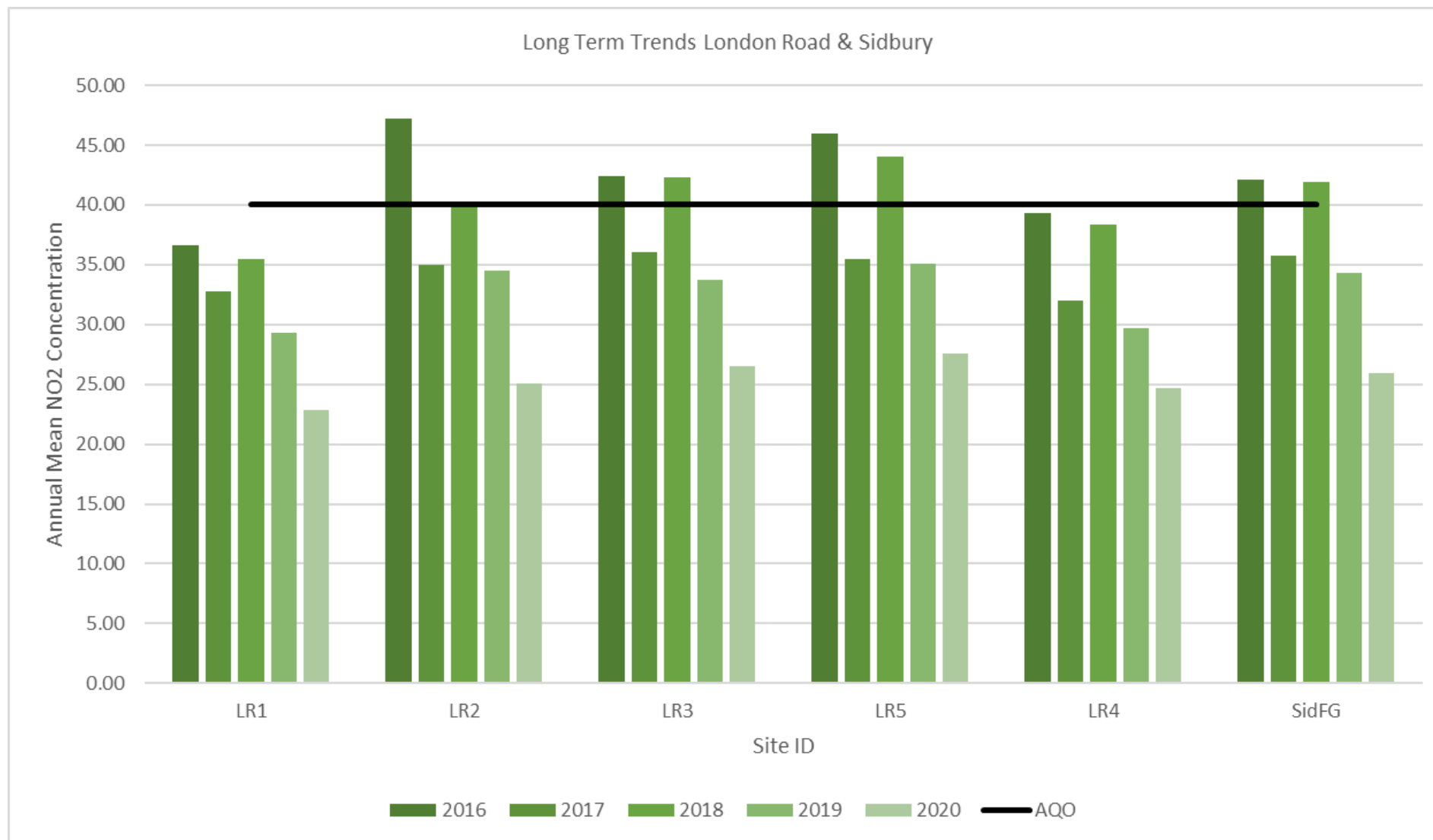


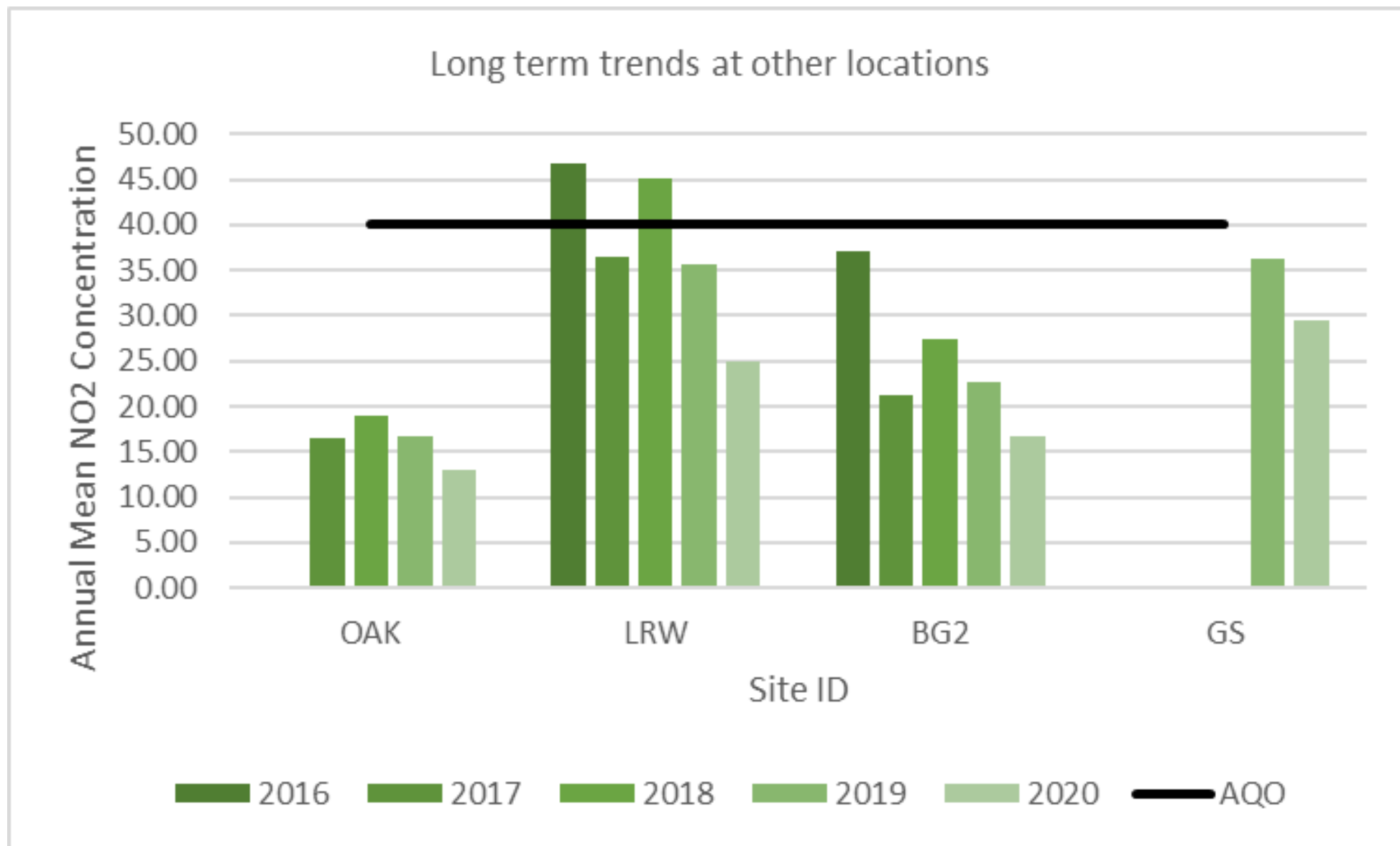












Appendix B: Full Monthly Diffusion Tube Results for 2020

Table B.1 – NO₂ 2020 Diffusion Tube Results (µg/m³)

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 (0.81)	Annual Mean: Distance Corrected to Nearest Exposure	Comment
LR1	385636	254158							19.9	26.0	30.1	32.1	34.0	35.0	29.5	22.8	-	
LR2	385428	254238							25.6		35.3	34.2	41.8	36.0	34.6	25.1	-	
LR3	385357	254272							22.5	32.6	36.3	38.0	36.6	39.8	34.3	26.5	-	
LR5	385325	254329							22.3	35.8	38.6	24.7	41.5	50.6	35.6	27.5	-	
LR4	385525	254219							20.1		33.2	33.2		37.1	30.9	24.7	-	
SidFG	385146	254474							25.9	32.5	34.3	35.8	37.5	34.8	33.5	25.9	-	
But1	384776	255107							26.5	35.5	37.4	35.9	38.8	37.9	35.3	27.3	-	
But2	384724	255086							33.0	45.9	52.0	47.7	49.8	50.2	46.4	35.9	-	
Dd1	384652	254986							19.0	31.4	34.3	31.3	31.4	32.3	29.9	23.2	-	
DDASH	384682	254924							24.9	33.8	38.3	38.2	37.2		34.5	29.0	-	
BrS	384666	254818							21.8	30.7	37.1	31.2	34.1	38.3	32.2	24.9	-	
BrS2	384695	254840							28.6		86.3	43.3	46.0	41.3	49.1	35.6	-	
Tyn3	384679	255998							17.2	29.2	30.0	30.5	36.4	38.4	30.3	23.4	-	
Tyn2	384767	255606							28.3	37.8	41.5	41.3	48.7	44.8	40.4	31.3	-	
Tyn	384833	255461							32.6	37.0	42.0	43.7	42.8	43.1	40.2	31.1	-	
Fos2	384866	255367							19.6	26.1	30.4	32.9	34.4	33.8	29.5	22.8	-	
Fos3	384899	255329							15.5	26.2		28.2	34.8	33.7	27.7	21.3	-	
Fos	384941	255140							26.0	35.7	40.8	37.9	34.0	39.0	35.6	27.5	-	
Crs1	384967	255012							19.9	25.9	30.0	29.2	30.7	35.1	28.5	22.0	-	

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 (0.81)	Annual Mean: Distance Corrected to Nearest Exposure	Comment
Swth1	385013	254987							14.5	22.5	24.5	23.4	23.6	29.3	23.0	17.8	-	
Lwm2	385164	255134							18.8	28.5	32.0	31.4	33.3	35.4	29.9	23.1	-	
Lwm1	385268	255191							30.7	38.4	41.4	39.5	39.1		37.8	31.8	-	
BkC	384948	255111							26.2	38.8	41.6	39.8	38.6	42.6	37.9	29.4	-	
RH	385420	255413							20.5	28.3	30.1	33.5	14.6	40.3	27.9	21.6	-	
GS	385358	254969							24.5	35.4	37.9	40.9	36.1		34.9	29.4	-	
StJ1	384137	254510							14.8	22.7	24.8	34.5	42.2	37.1	29.3	22.7	-	
Brm	383967	254481							11.8	18.7	22.1	26.6	35.5	33.6	24.7	19.1	-	
KCP	384016	254399							16.0	25.2	28.7	29.1	37.7	33.7	28.4	22.0	-	
StJ2	384013	254356							11.1	20.3	23.3	22.2	27.8	31.4	22.7	17.5	-	
StJ3	384046	254424							11.6	24.1	25.1	26.0	35.2	32.7	25.8	19.9	-	
Mcl	383454	254606							5.6	9.4	11.9	13.1	19.2	19.4	13.1	10.1	-	
Ast4	386097	256565							13.2	19.8	22.8	22.7	28.4	24.0	21.8	16.9	-	
AST1b	386022	256401							17.1	30.2	31.0	31.7	36.8	38.4	30.9	23.9	-	
Ast3	385764	255968							26.6	40.7	39.2	46.6	44.5	44.8	40.4	31.3	-	
OAK	387810	254993							10.1	14.1	15.7	17.3	22.7	21.6	16.9	13.1	-	
LRW	386654	253761							24.5		37.5	37.5	38.3	34.9	34.5	25.0	-	
BG2	386165	252146							12.7	20.7	23.6	19.6	28.2	25.2	21.7	16.8	-	

- All erroneous data has been removed from the NO₂ diffusion tube dataset presented in Table B.1.
- Annualisation has been conducted where data capture is <75% and >25% in line with LAQM.TG16.
- Local bias adjustment factor used.
- National bias adjustment factor used.
- Where applicable, data has been distance corrected for relevant exposure in the final column.
- Worcester City Council confirm that all 2020 diffusion tube data has been uploaded to the Diffusion Tube Data Entry System.

Notes:

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

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

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 Worcester City Council During 2020

No new sources relating to air quality have been identified within the Worcester City area during the reporting year of 2020.

Additional Air Quality Works Undertaken by Worcester City Council During 2020

Worcester City Council has not completed any additional works within the reporting year of 2020.

QA/QC of Diffusion Tube Monitoring

Excluded Diffusion Tube Data

In 2020 Worcester City Council changed diffusion tube supplier part way through the calendar year. Additionally, there were several months where diffusion tubes were not exposed due to the impact of the Covid-19 pandemic.

Tubes were exposed as follows:

Months	Tubes Exposed?	Tube Supplier
Jan- Feb	Yes	Somerset Scientific Services
March – June	No	n/a
July – December	Yes	Gradko International Limited

Diffusion tube data for January to February 2020 has been omitted from diffusion tube data processing and reporting. Data capture for tubes supplied by Somerset Scientific Services during 2020 is less than 33% and as such it cannot be annualised in accordance with the methodology outlined in LAQM.TG.16 and subsequently cannot be bias-adjusted in accordance with the methodology for bias-adjusting data from two laboratories as outlined in LAQM.TG.16.

Clarification regarding this was sought from the LAQM Helpdesk which confirmed via email on 20th May 2021 that the January to February diffusion tube data for 2020 should be omitted from data processing and reporting as a result of insufficient data capture.

For information the raw diffusion tube data for January to February 2020 is provided below:

Diffusion Tube ID	Raw Nitrogen Dioxide Concentration ($\mu\text{g}/\text{m}^3$)	
	January 2020	February 2020
LR1	41.41	30.68
LR2	47.01	36.95
LR3	49.32	34.15
LR5	55.74	30.06
LR4	40.12	26.34
SidFG	45.55	35.64
But1	41.23	24.29
But2	57.57	30.25
Dd1	35.74	23.42
DDASH	52.27	32.11
BrS	40.61	21.68
BrS2	47.09	31.24
Tyn3	39.38	23.92
Tyn2	57.70	38.25
Tyn	54.74	38.62
Fos2	43.45	30.25
Fos3	32.91	24.91
Fos	42.22	30.93
Crs1	41.60	34.40
Swth1	32.53	17.90
Lwm2	37.47	27.95
Lwm1	51.36	43.65
BkC	53.07	41.97
RH	40.12	29.87
GS	55.25	40.48
StJ1	55.58	53.42
Brm	42.15	30.90
KCP	40.98	31.44
StJ2	32.85	20.75
StJ3	37.60	24.89
Mcl	15.77	7.18
Ast4	31.25	19.28
AST1b	41.04	30.79
Ast3		40.15
OAK	22.30	15.87
LRW	43.15	32.93
BG2	27.83	14.64

Tube data for July to December 2020 represents greater than 33% data capture for tubes supplied by a single laboratory and as such has been annualised and bias-adjusted in accordance with the methodologies prescribed by LAQM.TG.16.

The following UKAS accredited company provides Worcester City Council with nitrogen dioxide diffusion tubes and analysis:

Gradko International Ltd

St. Martins House

77 Wales Street

Winchester

SO23 0RH

01962 860 331

Diffusion@gradko.com

The 20% Triethanolamine (TEA) / De-ionised Water preparation method was used. Under the AIR NO₂ Proficiency Testing Scheme, Gradko International Ltd performed 75% satisfactory for January to February and September to October 2020. Results for May to June and July to August were not reported due to the pandemic. Tube precision was 'Good' throughout 2020. Monitoring has been completed in adherence with the 2020 Diffusion Tube Monitoring Calendar.

Diffusion Tube Annualisation

Annualisation was required for all non-automatic monitoring sites in Worcester City Council area as only six months monitoring data was gathered for 2020. Data from four AURN monitoring sites; West Bromwich Kendrick Park, Birmingham Ladywood, Leominster, and Leamington Spa, was used to provide location specific diffusion tube average annualisation factors to apply to the raw data annual mean giving an annualised annual mean for each location.

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/NO₂ continuous analysers. Alternatively, the national database of diffusion tube co-location surveys provides bias factors for the relevant laboratory and preparation method.

Worcester City Council have applied a national bias adjustment factor of 0.81 to the 2020 monitoring data. A summary of bias adjustment factors used by Worcester City Council over the

past five years is presented in The national factor bias adjustment factor used was taken from the 03/21 version of the national spreadsheet, derived from eighteen studies by Gradko International Ltd.

Table C.1.

The national factor bias adjustment factor used was taken from the 03/21 version of the national spreadsheet, derived from eighteen studies by Gradko International Ltd.

Table C.1 – Bias Adjustment Factor

Year	Local or National	If National, Version of National Spreadsheet	Adjustment Factor
2020	National	03/21	0.81
2019	National	03/20	0.78
2018	National	03/19	0.89
2017	National	09/18	0.77
2016	Local	-	0.89

NO₂ 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 NO₂ concentration at the nearest location relevant for exposure should be estimated using the Diffusion Tube Data Processing Tool/NO₂ fall-off with distance calculator available on the LAQM Support website. Where appropriate, non-automatic annual mean NO₂ concentrations corrected for distance are presented in Table B.1.

No diffusion tube NO₂ monitoring locations within the Worcester City Council area required distance correction during 2020.

QA/QC of Automatic Monitoring

No automatic monitoring was undertaken within the Worcester City district during 2020.

Table C.2 – Annualisation Summary (concentrations presented in $\mu\text{g}/\text{m}^3$)

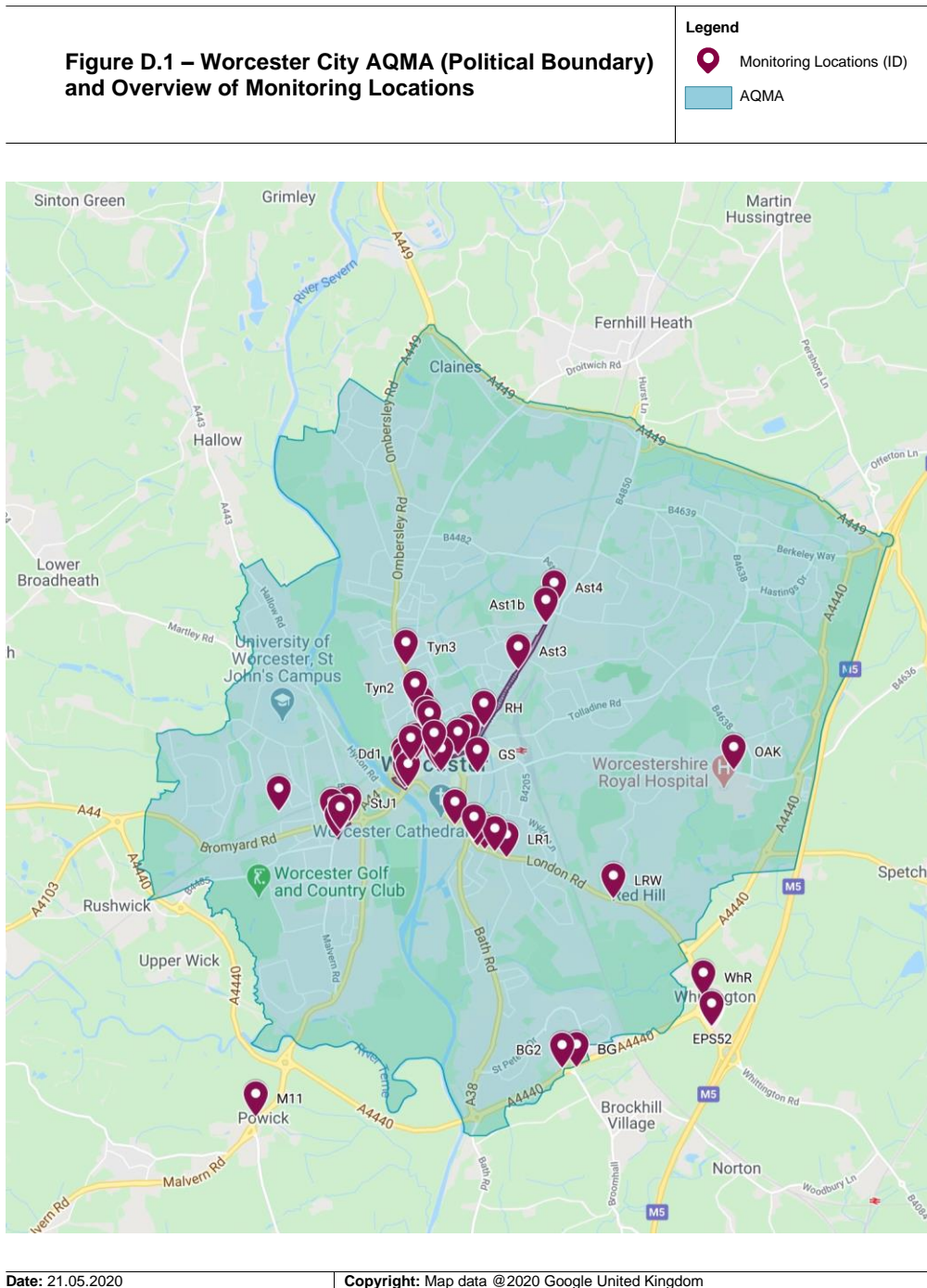
Site ID	Annualisation Factor West Bromwich Kendrick Park	Annualisation Factor Birmingham Ladywood	Annualisation Factor Leominster	Annualisation Factor Leamington Spa	Average Annualisation Factor	Raw Data Annual Mean	Annualised Annual Mean	Comments
LR1	0.9527	0.9260	1.0074	0.9352	0.9553	29.5	28.2	
LR2	0.9015	0.8657	0.9563	0.8551	0.8946	34.6	30.9	
LR3	0.9527	0.9260	1.0074	0.9352	0.9553	34.3	32.8	
LR5	0.9527	0.9260	1.0074	0.9352	0.9553	35.6	34.0	
LR4	0.9800	0.9508	1.0896	0.9213	0.9854	30.9	30.4	
SidF G	0.9527	0.9260	1.0074	0.9352	0.9553	33.5	32.0	
But1	0.9527	0.9260	1.0074	0.9352	0.9553	35.3	33.8	
But2	0.9527	0.9260	1.0074	0.9352	0.9553	46.4	44.4	
Dd1	0.9527	0.9260	1.0074	0.9352	0.9553	29.9	28.6	
DDAS H	1.0065	1.0134	1.1014	1.0326	1.0385	34.5	35.8	
BrS	0.9527	0.9260	1.0074	0.9352	0.9553	32.2	30.8	
BrS2	0.9015	0.8657	0.9563	0.8551	0.8946	49.1	43.9	
Tyn3	0.9527	0.9260	1.0074	0.9352	0.9553	30.3	28.9	
Tyn2	0.9527	0.9260	1.0074	0.9352	0.9553	40.4	38.6	

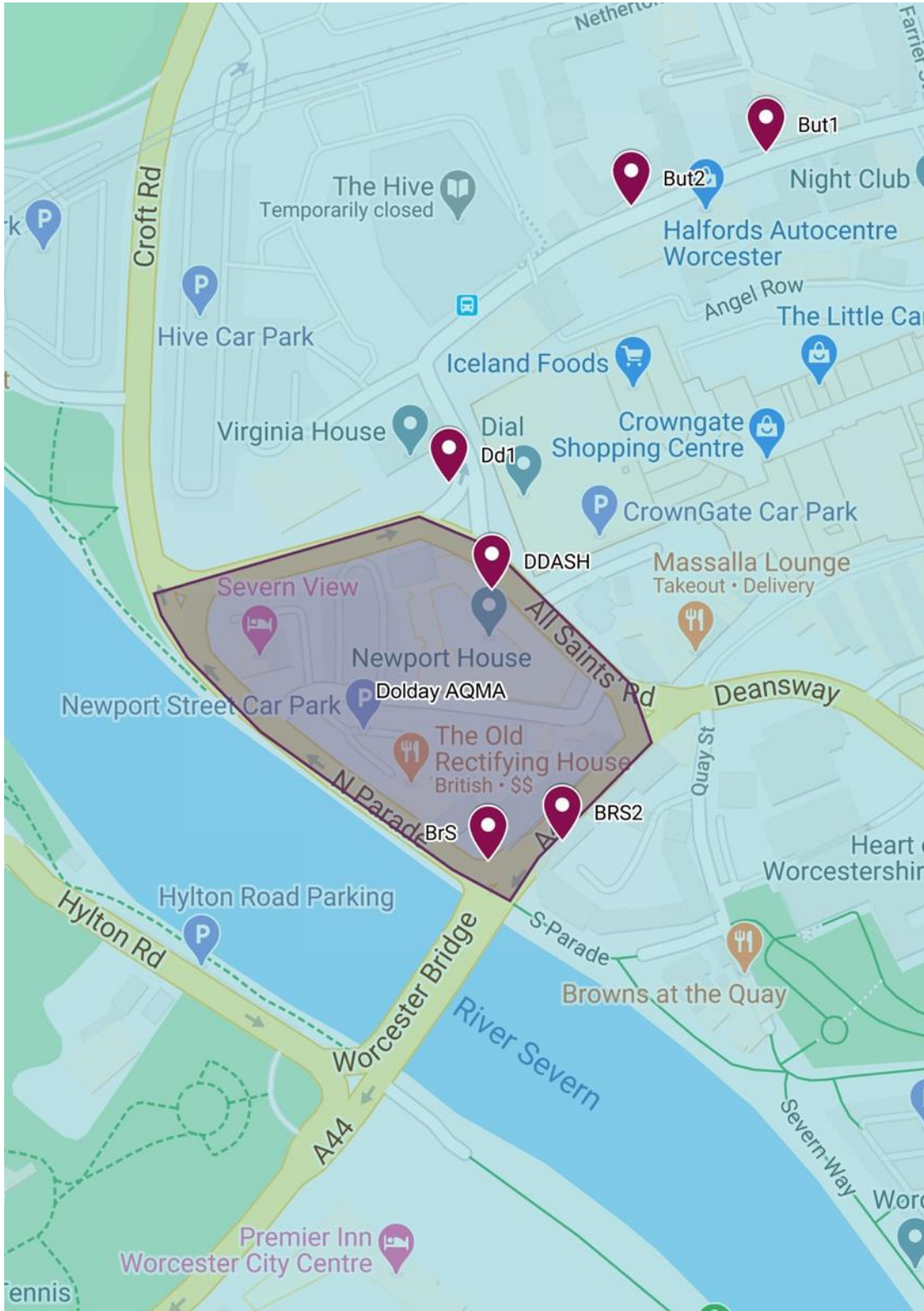
Site ID	Annualisation Factor West Bromwich Kendrick Park	Annualisation Factor Birmingham Ladywood	Annualisation Factor Leominster	Annualisation Factor Leamington Spa	Average Annualisation Factor	Raw Data Annual Mean	Annualised Annual Mean	Comments
Tyn	0.9527	0.9260	1.0074	0.9352	0.9553	40.2	38.4	
Fos2	0.9527	0.9260	1.0074	0.9352	0.9553	29.5	28.2	
Fos3	0.9558	0.9234	0.9942	0.9183	0.9479	27.7	26.2	
Fos	0.9527	0.9260	1.0074	0.9352	0.9553	35.6	34.0	
Crs1	0.9527	0.9260	1.0074	0.9352	0.9553	28.5	27.2	
Swth1	0.9527	0.9260	1.0074	0.9352	0.9553	23.0	21.9	
Lwm2	0.9527	0.9260	1.0074	0.9352	0.9553	29.9	28.6	
Lwm1	1.0065	1.0134	1.1014	1.0326	1.0385	37.8	39.3	
BkC	0.9527	0.9260	1.0074	0.9352	0.9553	37.9	36.2	
RH	0.9527	0.9260	1.0074	0.9352	0.9553	27.9	26.6	
GS	1.0065	1.0134	1.1014	1.0326	1.0385	34.9	36.3	
StJ1	0.9527	0.9260	1.0074	0.9352	0.9553	29.3	28.0	
Brm	0.9527	0.9260	1.0074	0.9352	0.9553	24.7	23.6	
KCP	0.9527	0.9260	1.0074	0.9352	0.9553	28.4	27.1	
StJ2	0.9527	0.9260	1.0074	0.9352	0.9553	22.7	21.7	
StJ3	0.9527	0.9260	1.0074	0.9352	0.9553	25.8	24.6	

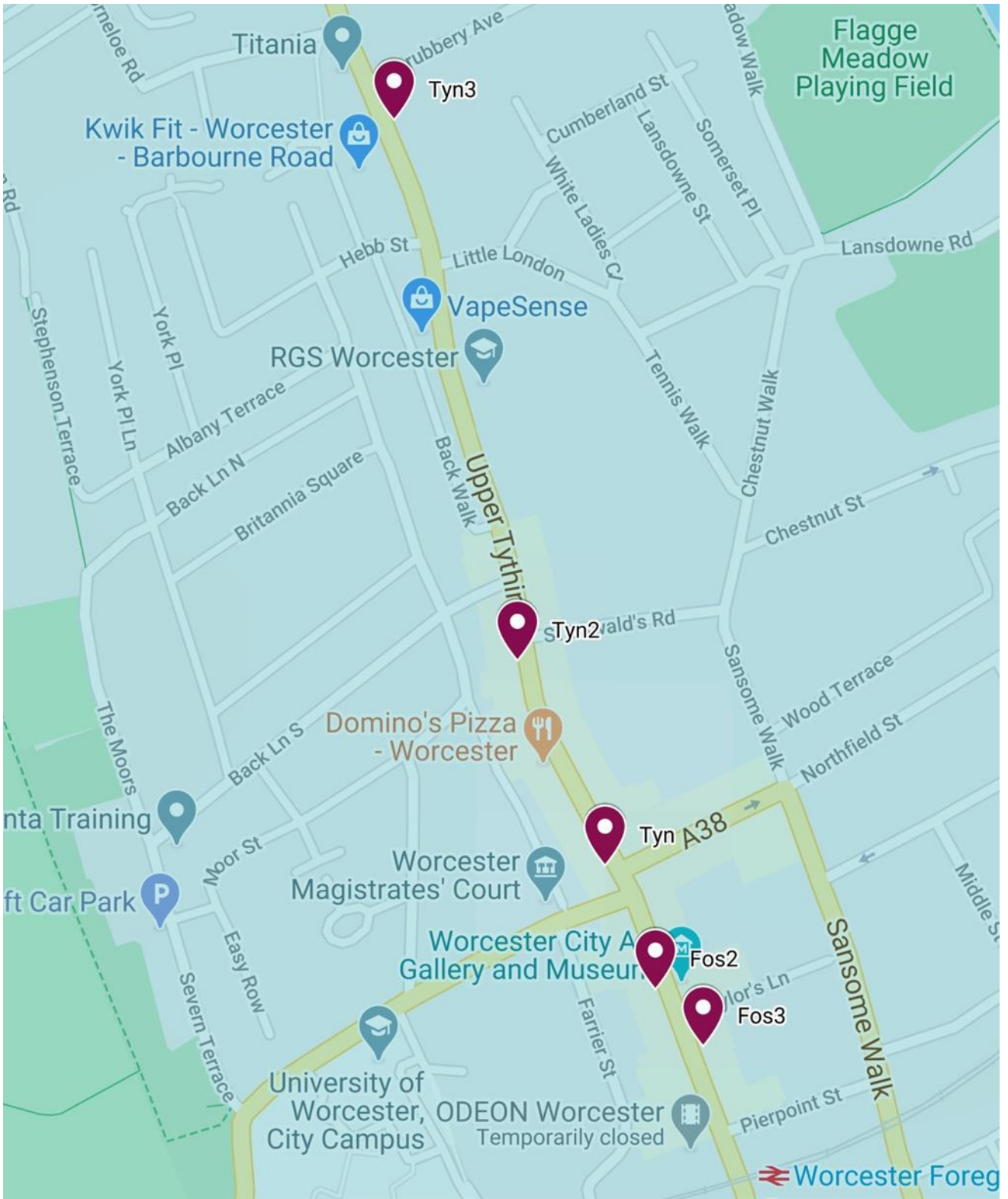
Site ID	Annualisation Factor West Bromwich Kendrick Park	Annualisation Factor Birmingham Ladywood	Annualisation Factor Leominster	Annualisation Factor Leamington Spa	Average Annualisation Factor	Raw Data Annual Mean	Annualised Annual Mean	Comments
Mcl	0.9527	0.9260	1.0074	0.9352	0.9553	13.1	12.5	
Ast4	0.9527	0.9260	1.0074	0.9352	0.9553	21.8	20.8	
AST1 b	0.9527	0.9260	1.0074	0.9352	0.9553	30.9	29.5	
Ast3	0.9527	0.9260	1.0074	0.9352	0.9553	40.4	38.6	
OAK	0.9527	0.9260	1.0074	0.9352	0.9553	16.9	16.2	
LRW	0.9015	0.8657	0.9563	0.8551	0.8946	34.5	30.9	
BG2	0.9527	0.9260	1.0074	0.9352	0.9553	21.7	20.7	

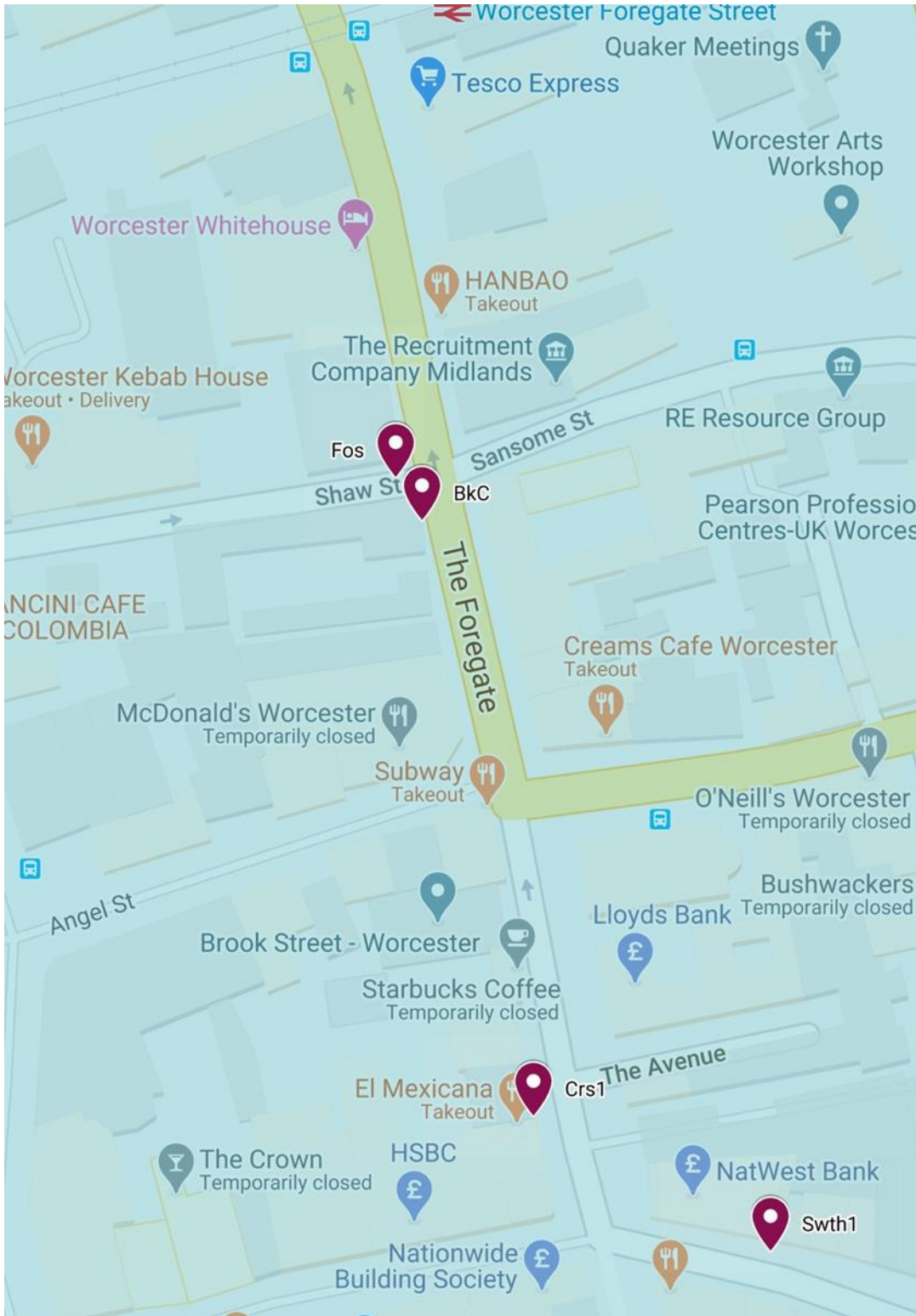
Appendix D: Map(s) of Monitoring Locations and AQMAs

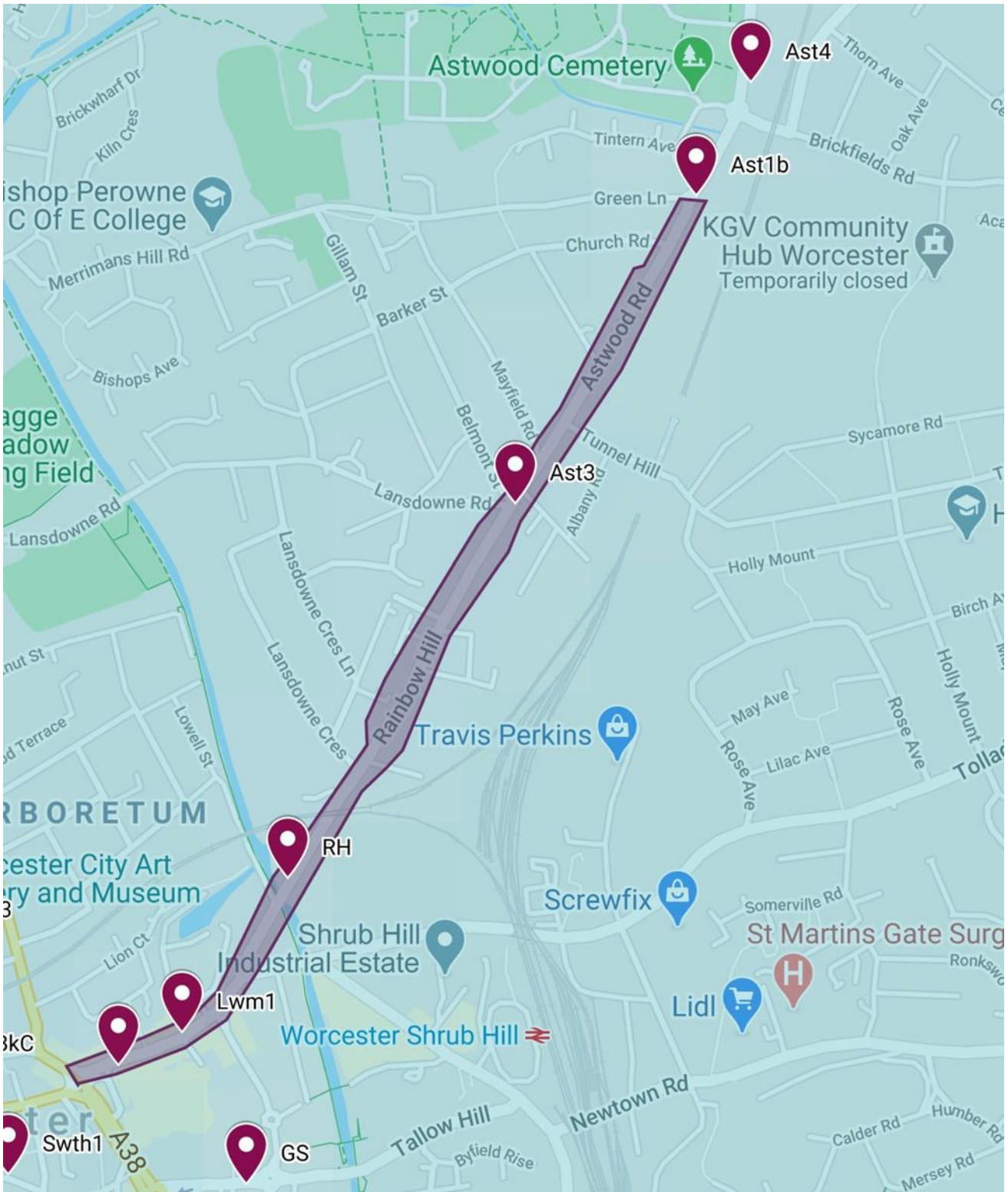
Figure D.1 – Map of Non-Automatic Monitoring Site

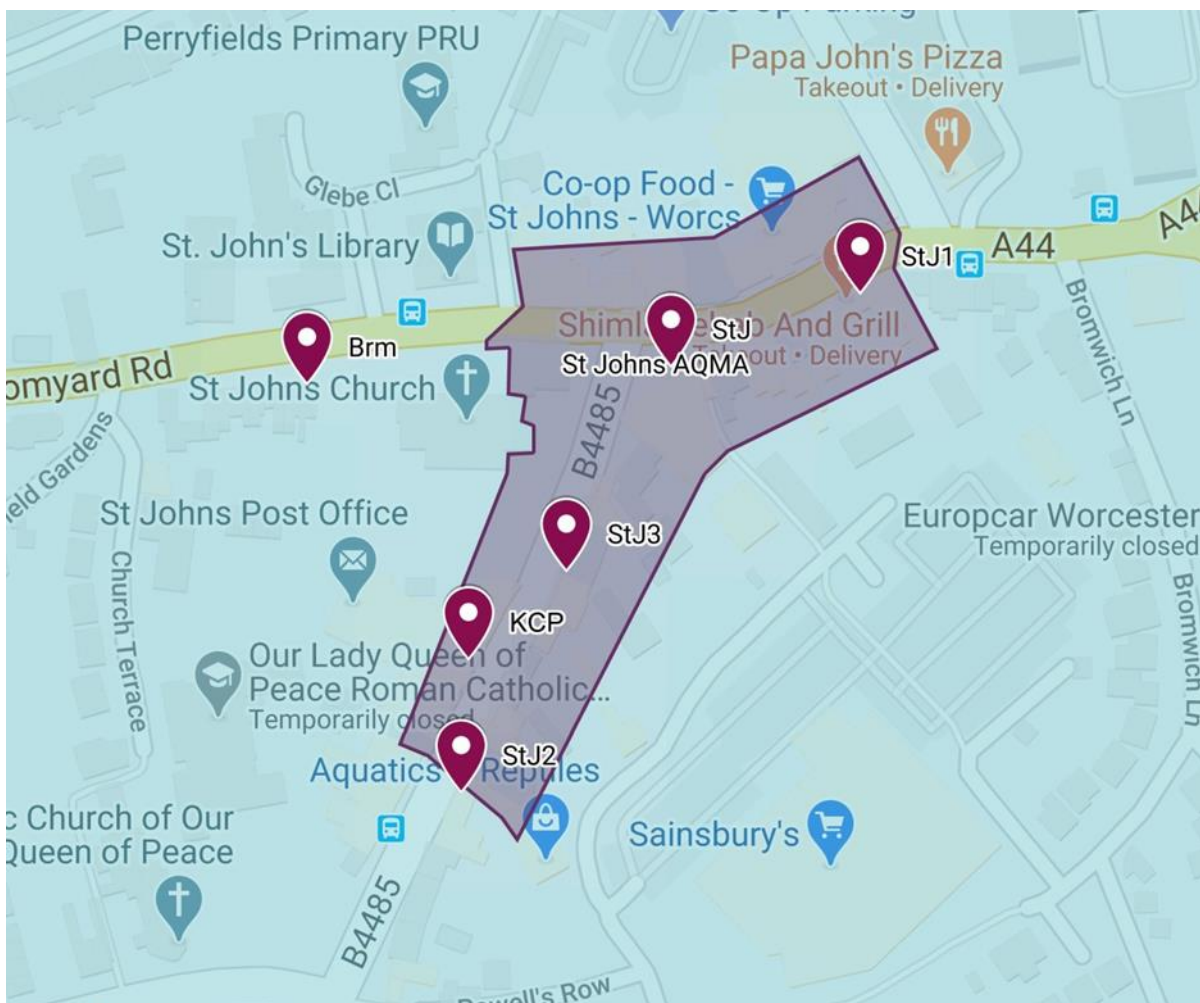


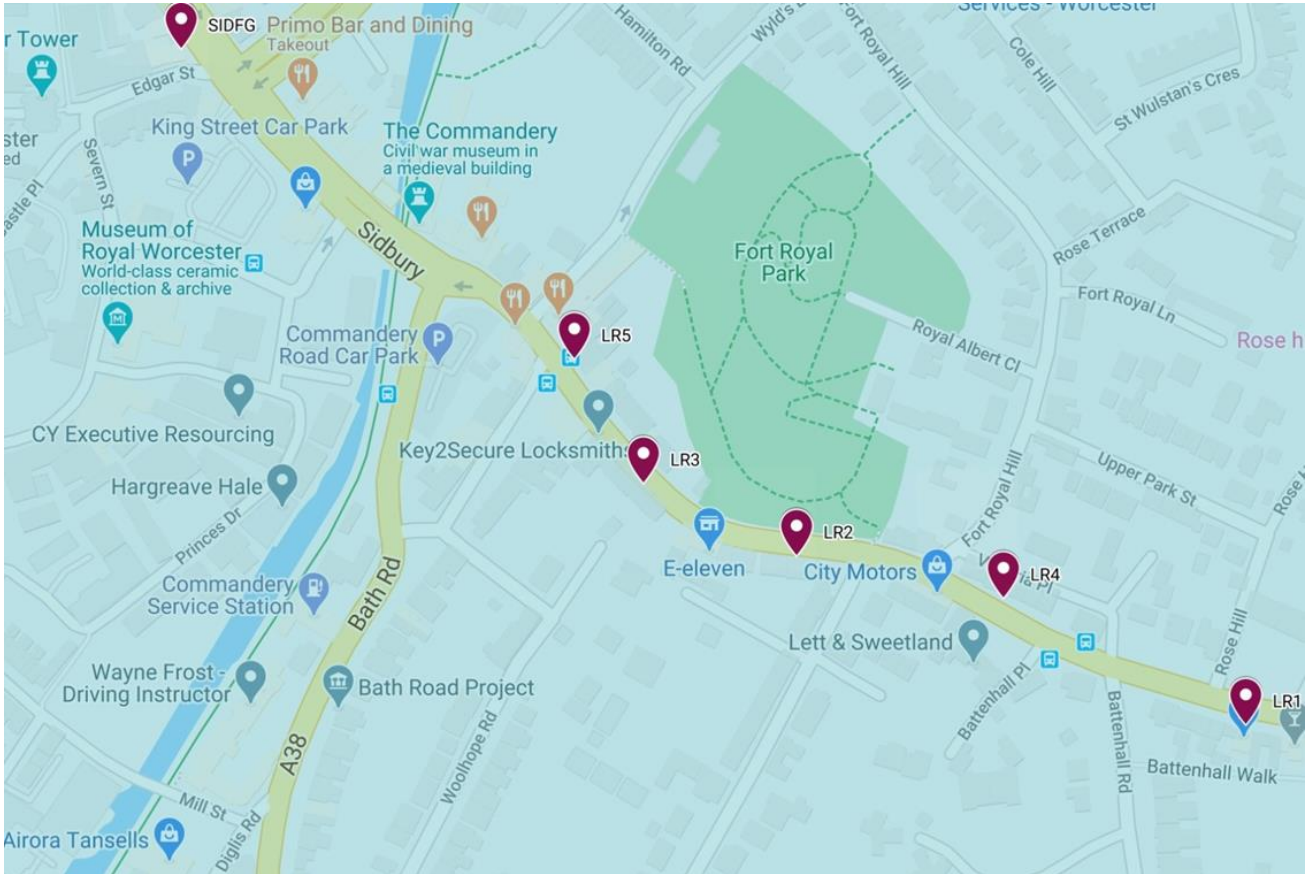


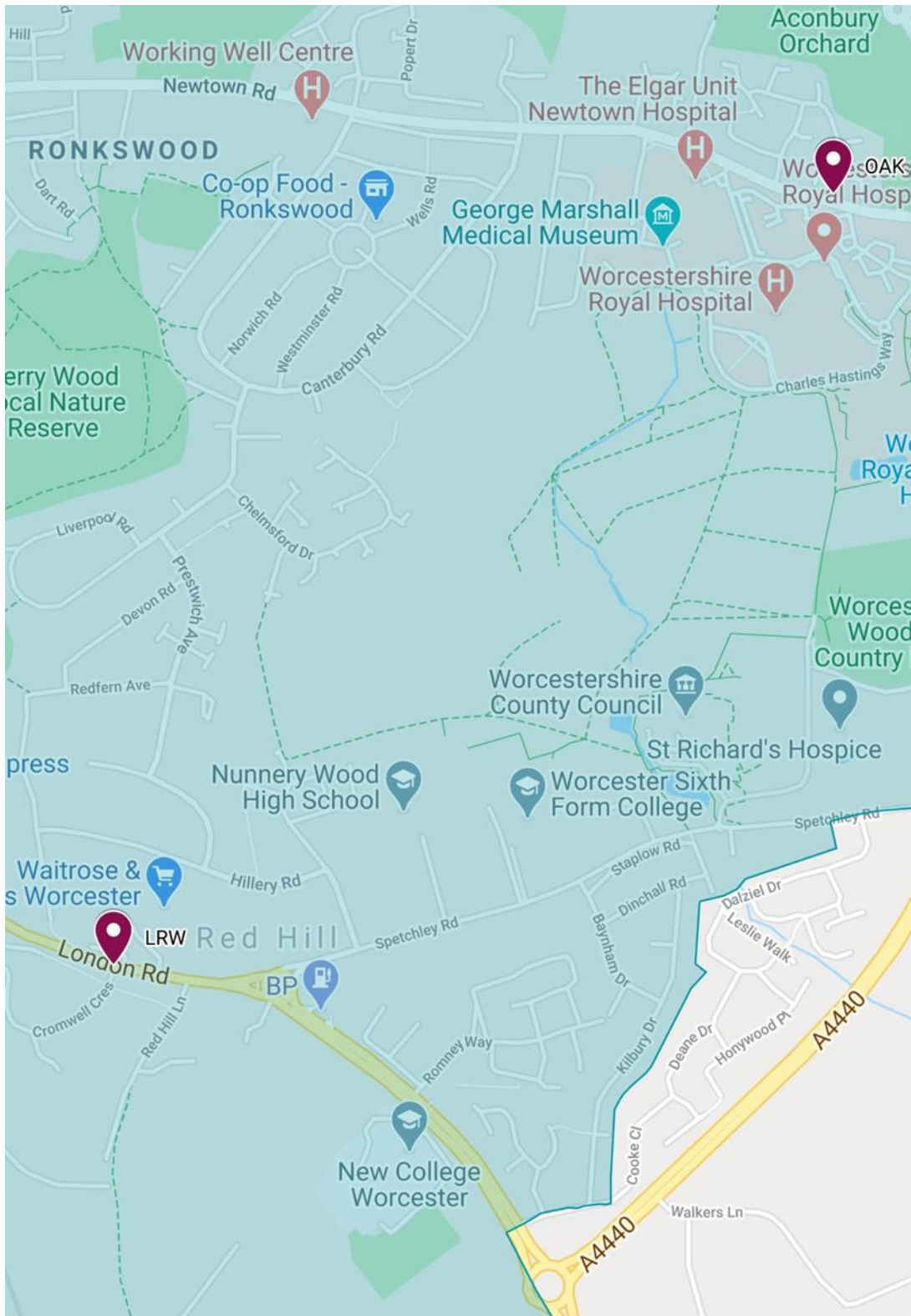


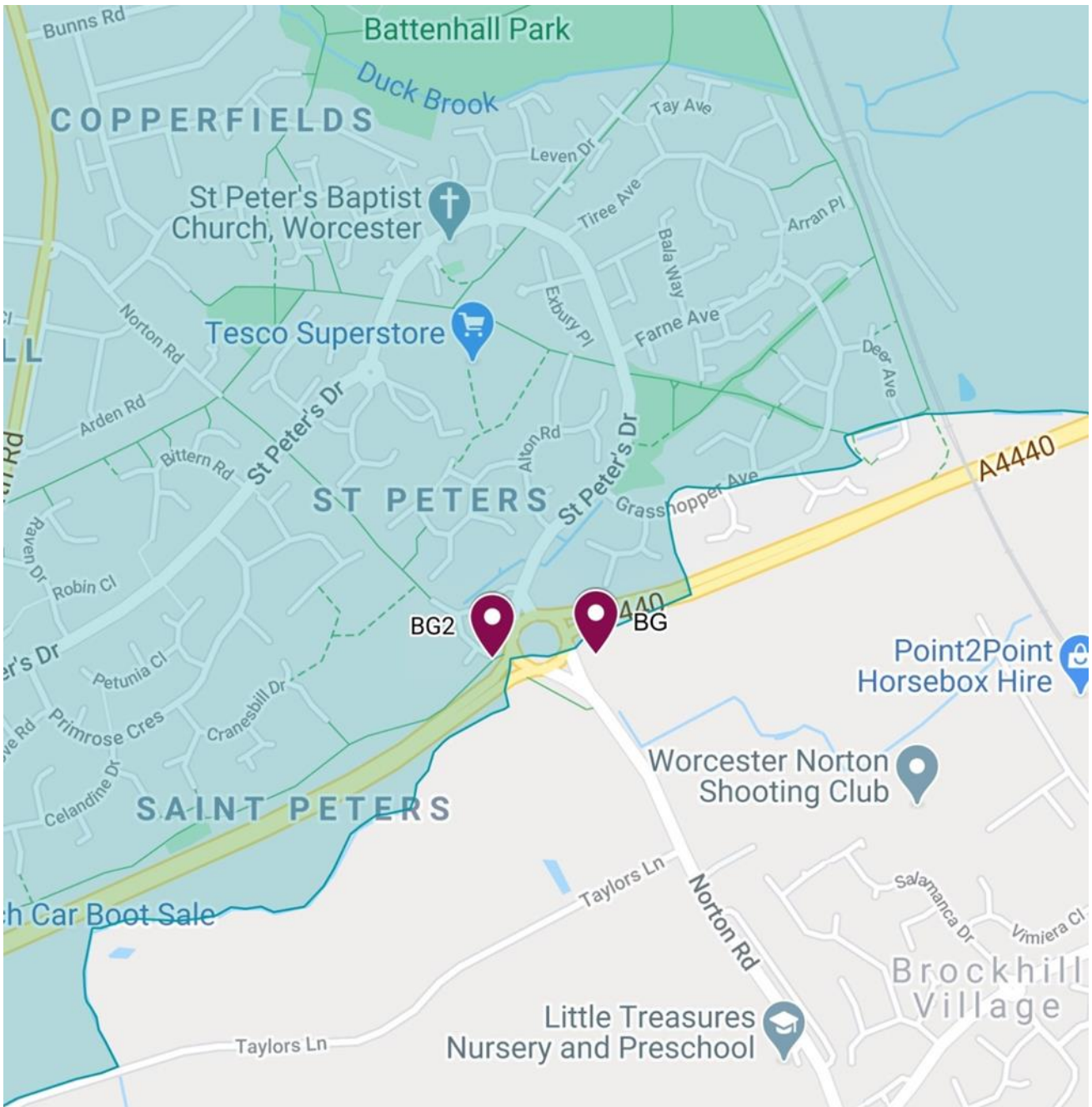












Appendix E: Summary of Air Quality Objectives in England

Table E.1 – Air Quality Objectives in England⁹

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

⁹ The units are in microgrammes of pollutant per cubic metre of air (µg/m³).

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 (NO₂) 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) data¹⁰ 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)¹¹ has estimated that during the initial lockdown period in 2020, within urbanised areas of the UK reductions in NO₂ annual mean concentrations were between 20 and 30% relative to pre-pandemic levels, which represents an absolute reduction of between 10 to 20µg/m³ if expressed relative to annual mean averages. During this period, changes in PM_{2.5} concentrations were less marked than those of NO₂. 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}

¹⁰ Prime Minister's Office, COVID-19 briefing on the 31st of May 2020

¹¹ Air Quality Expert Group, Estimation of changes in air pollution emissions, concentrations and exposure during the COVID-19 outbreak in the UK, June 2020

concentrations during the initial lockdown period are of the order 2 to $5\mu\text{g}/\text{m}^3$ lower relative to those that would be expected under business-as-usual conditions.

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

Impacts of COVID-19 on Air Quality within Worcester City

Nitrogen Dioxide concentrations in the Worcester City Council area, including the AQMAs, are largely linked to road traffic. During the Covid-19 pandemic Worcestershire County Council has collated travel and traffic data for the County. This data has been compared with normal baseline data to give an indication of the impact of Covid-19 lockdowns and restrictions on traffic flows and travel behaviours. Data was gathered from County and DfT sources and included nine live traffic monitors in the Worcester City area and nine further monitors across the County.

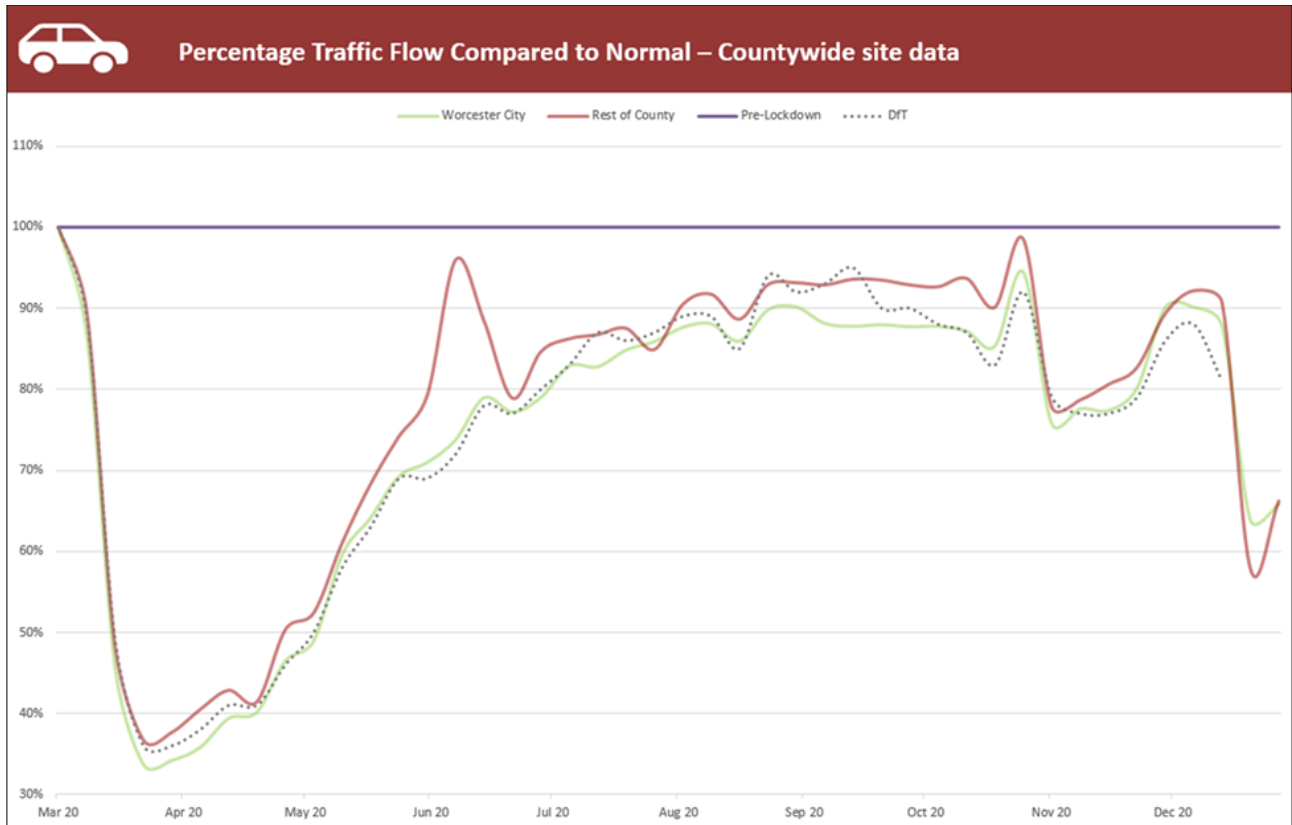
Countywide traffic data shows that changes in traffic flows and patterns largely followed the trends seen nationally. Traffic volumes across the County dropped to as low as 34% of normal baseline conditions during the March/April 2020 lockdown and as low as 63% of normal baseline conditions during December 2020 (Figure F.1 below).

Due to a combination of Covid-19 restrictions and a change of laboratory diffusion tube data for January to June 2020 is not available for the Worcester City area and as such it is not possible to comment on any monthly changes in nitrogen dioxide concentrations for the first six months of 2020; including any changes experienced as a result of reductions in traffic associated with the first national lockdown.

A comparison of annual mean nitrogen dioxide concentrations across Worcester City between 2019 and 2020 shows a general decrease at all locations. On average the recorded concentrations in 2020 have decreased by 22.4% ($7\mu\text{g}/\text{m}^3$) when compared with 2019 results. The previous ASR 2020 highlighted that results in 2019 were less than anticipated (likely due to a low bias adjustment factor of 0.78) so when the latest 2020 results are compared to those of 2018 the average decrease can be seen to be even more significant with a 36.39% ($13.9\mu\text{g}/\text{m}^3$) reduction in concentrations over the 2 years. The largest reduction can be seen at StJ1 with a reduction of 36.9% when comparing 2019 concentrations to those in 2020. With the lowest reduction of 6.14% at LWM1.

In 2020 the highest concentration of NO_2 recorded across Worcester City was $35.9\mu\text{g}/\text{m}^3$ at BUT2. This location has recorded the highest concentration across the city for the last 5 years with a concentration of $42.1\mu\text{g}/\text{m}^3$ in 2019, which represents a decrease of 14.13% ($6.2\mu\text{g}/\text{m}^3$), and $52.4\mu\text{g}/\text{m}^3$ in 2018, which represents a decrease of 31.49% ($16.5\mu\text{g}/\text{m}^3$), when compared with 2020. No exceedances of the annual mean objective were recorded within Worcester City during 2020.

Whilst Covid-19 restrictions and subsequent reductions in traffic volumes will have influenced nitrogen dioxide concentrations, there is a general downward trend in annual mean nitrogen dioxide concentrations over the period 2016 to 2019 and as such it is not possible to quantify the impact of traffic changes as a result of Covid-19 restrictions on nitrogen dioxide concentrations locally with the data available.



Opportunities Presented by COVID-19 upon LAQM within Worcester City

No LAQM specific related opportunities have arisen as a consequence of Covid-19 within the area.

Challenges and Constraints Imposed by COVID-19 upon LAQM within Worcester City

The following challenges and constraints imposed by Covid-19 impacted the LAQM work of the Council:

- Passive monitoring Data Capture – diffusion tubes were not exposed for the month’s March 2020 to June 2020 due to a combination of laboratory closures and a Council decision not to deploy officers to change tubes due to Covid-19 restrictions. This has affected data

capture during 2020, resulting in data from all monitoring sites having to be annualised.

Small/Medium impact

- Defra Diffusion Tube Exposure Calendar - during months where diffusion tubes were exposed the calendar was adhered to. **No impact**
- Diffusion Tube Storage - during months where diffusion tubes were sent for analysis they were stored and analysed in accordance with laboratory guidance. **No impact**
- Diffusion tube bias-adjustment - in 2019 diffusion tubes were supplied and analysed by Somerset Scientific Services and the national bias-adjustment factor for that laboratory used. The 2019 bias-adjustment factor for Somerset Scientific Services was based on 2 studies. Between July and December 2020 diffusion tubes were supplied and analysed by Gradko International Limited and the national bias-adjustment factor for Gradko used. The 2020 bias-adjustment factor for Gradko is based on 18 studies. **No impact**
- The work of the Worcestershire Air Quality Partnership was due to continue in 2020 however at the time of report writing the work of the group has been postponed indefinitely due to the Covid-19 pandemic. **Small/Medium impact.**
- Following declaration of the citywide AQMA a new Action Plan to consider all relevant measures to improve air quality is due to be produced. A Source Apportionment study was to be undertaken in order to feed into the relevant action plan identifying where these actions should be targeted due to make up of the fleet and relevant vehicle movements. Traffic counts were due to be carried out in Spring 2020 however due to the emergence of the COVID-19 pandemic and subsequent lockdown these works were suspended. Traffic Volumes did not return to 'normal' during the whole of 2020 and therefore could not be completed. **Large impact.**
- Staff redeployment away from LAQM duties to COVID-19 related duties. **Medium impact.**

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
AQC	Air Quality Consultants
AQO	Air Quality Objective
ASR	Air quality Annual Status Report
CAZ	Clean Air Zone
CBTF	Clean Bus Technology Fund
CEEPG	Central England Environmental Protection Managers Group
CNG	Compressed Natural Gas
COPD	Chronic Obstructive Lung Disease
COVID-19	Coronavirus disease 2019 is an infectious disease caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2).
DCMS	Department of Digital Culture Media and Sport
Defra	Department for Environment, Food and Rural Affairs
DfT	Department for Transport
DoPH	Director of Public Health, Worcestershire County Council
EU	European Union
EV	Electric Vehicle
HGV	Heavy Goods Vehicle
IPPC	Integrated Pollution Prevention and Control
JAQU	Defra and DfT Joint Air Quality Unit
LA	Local Authority
LAPPC	Local Authority Pollution prevention and Control
LAQAG	Local Authority Air Quality Advisory Group to Defra
LAQM	Local Air Quality Management

LAQM.PG(16)	Defra 2016 Local Air Quality Management Policy Guidance
LAQM.TG(16)	Defra 2016 Local Air Quality Management Technical Guidance
LES	Low Emissions Strategy
LEV	Low Emission Vehicle
LTP4	Worcestershire County Council's fourth edition of the Local Transport Plan for the county
µg/m ³	Micrograms per metre cubed
MJAC	Midland Joint Advisory Council
MTE	Moving Traffic Enforcement
NHS	National Health Service
NO ₂	Nitrogen Dioxide
NO _x	Nitrogen Oxides
OLEV	Office of Low Emission Vehicles
PHE	Public Health England
PM ₁₀	Airborne particulate matter with an aerodynamic diameter of 10µm (micrometres or microns) or less
PM _{2.5}	Airborne particulate matter with an aerodynamic diameter of 2.5µm or less
PTP	Personalised Travel Planning
QA/QC	Quality Assurance and Quality Control
SPD	Supplementary Planning Document
TBC	To Be Confirmed
T&F	Task and Finish (Air Quality) Group
TRO	Traffic Regulation Order
UKAS	UK Accreditation Service
ULEV	Ultra Low Emission Vehicle
UTC	Urban Traffic Control
VMS	Variable Messaging System
WFH	Working from home
WRS	Worcestershire Regulatory Services

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- WRS (2020) 'Air Quality Annual Status Report'