Bromsgrove
District Council
www.bromsgrove.gov.uk

Worcestershire
Regulatory Services
Supporting and protecting you

2020 Air Quality Annual Status Report (ASR)

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

June 2020

Local Authority Officer	Stephen Williams
Department	Land and Air Quality Team
Address	Wyre Forest House, Finepoint Way, Kidderminster, Worcestershire, DY11 7WF
Telephone	01905 822799
E-mail	enquiries@worcsregservices.gov.uk
Report Reference number	BDC/ASR/2020
Date	June 2020

Executive Summary: Air Quality in Our Area

Air Quality in Bromsgrove District

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

The annual health cost to society of the impacts of particulate matter alone in the UK is estimated to be around £16 billion[3].

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.

There are currently three Air Quality Management Areas (AQMA's) within the Bromsgrove District declared for exceedances of the annual average mean objective for nitrogen dioxide (NO_2). The Kidderminster Road, Hagley AQMA was revoked in 2018 following a detailed review which identified no significant exceedances of the national objectives in over five years with measured concentrations being well below the objective.

The existing AQMAs are as follows:

- Lickey End, Bromsgrove AQMA declared 26th July 2001
- Redditch Road, Bromsgrove AMQA declared 17th February 2010
- Worcester Road, Bromsgrove AQMA declared 24th October 2011

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

Monitoring data shows that there is a decrease in NO_2 concentrations at all locations when comparing 2019 results with those from 2018, as is the trend across Worcestershire. This is likely to be influenced in part by the difference in the bias adjustment factors between 2018 and 2019. In 2018 the adjustment factor issued for for use was 0.89 compared to 0.78 in 2019.

[1] Environmental equity, air quality, socioeconomic status and respiratory health, 2010
[2] Air quality and social deprivation in the UK: an environmental inequalities analysis, 2006
[3] Defra. Abatement cost guidance for valuing changes in air quality, May 2013

In 2019 the highest concentrations of NO_2, and only measured exceedances in Bromsgrove District, were recorded within the Lickey End AQMA at location F1 with a value of 43.35µg/m^3 and 40.15µg/m^3 at LE4. It should be noted however that these locations do not represent relative exposure and when the fall off with distance calculator is utilised the value falls below the objective. Two new locations were established within the Lickey End AQMA at the start of 2019 to expand the monitoring network at relevant exposure. These were located at 288 Birmingham Road (LIK1), a property close to the Harvester PH and established location LE4, and 1 Old Birmingham Road (LIK2), in the general vicinity of F1. Concentrations of 26.86µg/m^3 were recorded at LIK1 and 26.22µg/m^3 at LIK2.

Concentrations within the Worcester Road and Redditch Road AQMAs were below the objective in 2019. The highest concentrations recorded within the Worcester Road AQMA were 37.98µg/m^3 at BC and 36.47µg/m^3 at BCX. No exceedances were recorded within the Redditch Road AQMA with a highest concentration of 27.58µg/m^3 at location 19.

No exceedances were recorded within the formerly revoked Kidderminster Road, Hagley AQMA with a highest concentration of 24.62µg/m^3 at RES2 within the boundary area. Following revocation of the AQMA four new monitoring locations were established to the south on Worcester Road, West Hagley, in May 2018. Following annualisation of 2018 data a concentration of 47.01µg/m^3 was recorded at location HAG3. There is a level of uncertainty associated with the result given that it was based upon only 7 months of monitoring data. 2019 provided a full calendar years worth of data within the area and a concentration of 33.7µg/m^3 was recorded at HAG3. All other concentrations were well below this value. Two new monitoring locations were established in the vicinity of HAG3 for the 2020 period to provide additional certainty to air quality concentrations going forward.

A new location was also established at the start of 2019 at Library Way off New Road, which backs onto the A38 in Rubery (RUB1). This site was chosen following local intelligence and to gain data as no monitoring had been undertaken in the area for several years. A concentration of 23.63µg/m^3 was recorded at RUB1. All other locations outside of the AQMAs recorded values well below the objective.

Monitoring results within the Bromsgrove District (BDC) area demonstrate a general downward trend in concentrations across the district in 2019 and over the 5 year period 2015 – 2019.

Actions to Improve Air Quality

In 2013, WRS produced a countywide Air Quality Action Plan (AQAP) for Worcestershire which was adopted on 13th November 2013. WRS have produced two updates to the countywide AQAP, the latest in September 2016. For details of all measures previously

completed, in progress or planned, please refer to the 'Air Quality Action Plan Progress Report for Worcestershire April 2015-2016'. A copy of this, the previous update and the AQAP is available to download via:

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

In 2014, WRS set up the Worcestershire Air Quality Steering Group and subsequent sub-groups to facilitate progressing implementation of prioritised actions identified in the AQAP. The Bromsgrove Urban (Steering) Sub-Group includes the Lickey End, Redditch Road, and Worcester Road AQMAs. A separate sub-group covered the Kidderminster Road, Hagley AQMA. The sub-groups comprise representatives of WRS, Worcestershire County Council, and local County and district Councilors.

Many of the prioritised actions contained within the AQAP relate to specific highways improvements or junction enhancements. Worcestershire County Council (WCC) has previously advised that none of these actions would be implemented in isolation but may be considered as part of wider schemes. A number of proposals for major highway development packages are set out in Local Transport Plan 4 (LTP4) relating to the Bromsgrove area.

WCC's LTP4 details the following schemes in relation to the Bromsgrove District highway improvements:-

- **Bromsgrove Route Enhancement Programme (BREP) Major Scheme**

  The Bromsgrove Route Enhancement Programme (BREP) is currently estimated to have a value of approximately £50 million. The scheme aims to support the sustainable growth of Bromsgrove by enhancing the A38 corridor from Lydiate Ash to Hanbury Turn and includes a series of junction/island enhancements where delay and congestion is currently experienced, and where conditions are predicted to deteriorate further without intervention.

  Worcestershire County Council held public information sessions in early 2020 and work to progress the outline business case continues for submission to the DfT in Autumn 2020, under the auspices of Midlands Connect. Some elements of the scheme are underway as part of Phase 1 (see below).

  Further details can be found on Worcestershire County Council's website via the following link:-

  http://www.worcestershire.gov.uk/info/20679/a38_bromsgrove_improvements/2163/bomsgrove_route_enhancement_programme_

- **Lickey End (M42 Junction 1) - Major Junction Enhancement Scheme**

  Lickey End (M42, Junction 1) is widely recognised as operating in excess of built capacity and so is now heavily congested at peak times. The junction is the focus for an Air Quality Management Area and offers a challenging environment for non-motorised users. This scheme is included as part of Phase 1 of BREP and provides preliminary highway improvements to enhance capacity at the Junction. Works are due to commence as of June/July 2020. Also included within the Phase 1 scheme is:-

  - A38/Barley Mow Lane capacity improvements (completed)
  - Improvements in capacity at M5 J4 (Lydiate Ash) – underway June/July 2020

  http://www.worcestershire.gov.uk/info/20679/a38_bromsgrove_improvements/2162/phase_1_a38_improvements

- **Bromsgrove Transport Strategy**

  This scheme is part of the Strategic Transport Assessment (STA) work which will identify infrastructure and services to support planned development growth. This is part of a collaborative process between Worcestershire County Council and Bromsgrove District Council.

  The scheme aims to provide a package of Public Realm Enhancements in Bromsgrove Town Centre and would be integrated with other schemes in the area (such as BREP/A38 and the Strategic Active Travel Investment Programme). The scheme is to provide a comprehensive multimodal review of network efficiency and infrastructure in order to identify where to focus investment to improve the operation of the local transport network. This would also include a review of Bromsgrove's highway network to explore options to improve and disperse traffic flow to increase efficiency and AQMA remediation at Worcester Road.

- **Bromsgrove – Strategic Active Travel Network Investment Programme (Including Catshill, Marlbrook and Lickey End)**

  The Active Travel Investment Programme is a systemic investment in walking and cycling links across the Bromsgrove area to create a safe, comprehensive, integrated network linking residential areas with key trip attractors, including schools, rail stations, town center's and employment locations. This includes surfacing, signage, lighting and public realm improvements to create an attractive and coherent network.

  The scheme has already delivered a large number of Active Travel improvements in Bromsgrove and work continues during 2020. It is anticipated that all schemes will be

completed by the end of 2020. A full list of updates can be accessed via the following link:- http://www.worcestershire.gov.uk/news/article/1817/bromsgrove_walking_and_cycling_scheme_latest_updates

In addition to the above schemes other actions have also been progressed including:-

- **Electric Vehicle Infrastructure Strategy** – The Bromsgrove Ultra Low-Emission Vehicles Strategy has been produced by officers of Bromsgrove District Council in 2019 as a framework for the development and growth of ULEV infrastructure and uptake within the district. The strategy can be viewed via:- https://www.bromsgrove.gov.uk/media/4929912/Bromsgrove-District-Council-Ultra-Low-Emissions-Vehicles-Strategy.pdf

- **Ultra Low Emission Taxi Infrastructure Scheme** - In 2018 Bromsgrove District Council officers made a bid for funds to help deliver infrastructure to support existing taxi drivers using electrical vehicles and encourage further uptake. The bid was approved in early 2019. The scheme is aiming to provide a number of electric vehicle charging points for taxis and private hire vehicels equating to a total of £300,000. A ULEV Strategy for the Bromsgrove District was produced in 2019 to provide a framework for implementation of this project.

  In 2020 Bromsgrove District Council appointed a company to install and operate 13 rapid chargers across the District for the next 10 years. The chargers will use 100% renewable energy purchased from UK sources. Sites are yet to be confirmed but are currently in the process of feasibility assessment and alternative options appraisal. The Council hope to have all the rapid chargers installed and operational by the end of 2020 but this may be delayed due to the impact of Covid19 restrictions and ensuring the health and safety of those involved.

- **All Electric Bus Town Scheme** – Worcestershire County Council submitted an Expression of Interest to the DfT All Electric Bus Town process (Phase 1) in June 2020. The bid is primarily to cover Bromsgrove but with ‘synergies’ with Redditch and the wider Worcestershire area. If the bid is shortlisted, the next stage (Phase 2), would be to develop a more detailed business case for the proposal.

Conclusions and Priorities

Currently three AQMAs are in place within the Bromsgrove District area. In 2019 exceedances of the annual mean objective for nitrogen dioxide where recorded within the Lickey End AQMA at two monitoring locations LE4 and F1. These locations are not representative of relevant exposure and when concentrations have been calculated back they fall below the annual objective. The two additional monitoring locations, LIK1 and LIK2, installed within the AQMA at the start of 2019 to offer more certainty at relevant exposure, recorded concentrations well below the objective.

No exceedances were recorded within the existing Worcester Road and Redditch Road AQMAs or the former Kidderminster Road, Hagley AQMA in 2019. One location established in May 2018 (HAG3 - located 1.1km away from the boundary of the former AQMA at Worcester Road, West Hagley) recorded a value of 47.0µg/m^3 following annualisation of the 7 months data capture. 2019 provided a full 12 months data capture at this location and recorded a concentration of 33.74µg/m^3. WRS will continue to monitor in 2020 and have also added two new locations in the vicinity to further ascertain air quality concentrations in this area.

No other exceedances were recorded within the district area. The large decreases in concentrations are likely to be at least in part due to the lower bias adjustments factor issued in 2019 of 0.78 compared to 0.89 in 2018 as well as reduction in emissions.

Monitoring, review and assessment of air quality will continue within the Bromsgrove District area at all existing and former AQMAs and other relevant areas. No changes to existing AQMAs are proposed at this stage.

Local Engagement and How to get Involved

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

- **Walk or cycle, leave you 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: https://liftshare.com/uk/community/worcestershire

- **Turn off your engine when stationary or parked,** don't '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 have to drive follow fuel efficient driving advice, often known as 'Smarter Driving Tips', to save on fuel and reduce your emissions. A number of websites promote such advice including:
    - http://www.energysavingtrust.org.uk/transport/driving-advice
    - 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)[4,5]. 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/daqi.
- 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.

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 ..

[4] http://www.breathelondon.org/

[5] https://www.londonair.org.uk/LondonAir/guide/MyActionsForMe.aspx

Table of Contents

Executive Summary: Air Quality in Our Area i

Air Quality in Bromsgrove District i

Actions to Improve Air Quality ii

Conclusions and Priorities vi

Local Engagement and How to get Involved vi

1 Local Air Quality Management 1

2 Actions to Improve Air Quality 2

2.1 Air Quality Management Areas 2

2.2 Progress and Impact of Measures to address Air Quality in Bromsgrove District 4

2.3 $PM_{2.5}$ – Local Authority Approach to Reducing Emissions and/or Concentrations 14

3 Air Quality Monitoring Data and Comparison with Air Quality Objectives and National Compliance 15

3.1 Summary of Monitoring Undertaken 15

3.1.1 Automatic Monitoring Sites 15

3.1.2 Non-Automatic Monitoring Sites 15

3.2 Individual Pollutants 15

3.2.1 Nitrogen Dioxide (NO_2) 15

Appendix A: Monitoring Results 23

Appendix B: Full Monthly Diffusion Tube Results for 2019 31

Appendix C: Supporting Technical Information / Air Quality Monitoring Data QA/QC 34

Appendix D: Map(s) of Monitoring Locations and AQMAs 36

Appendix E: Summary of Air Quality Objectives in England 42

Glossary of Terms 43

References 44

List of Tables

Table 2.1 – Declared Air Quality Management Areas 3

Table 2.2 – Progress on Measures to Improve Air Quality 10

Table A.1 – Details of Non-Automatic Monitoring Sites 23

Table B.1 - NO_2 Monthly Diffusion Tube Results - 2019 31

Table E.1 – Air Quality Objectives in England 42

List of Figures

Figure A.1 – Trends in Annual Mean NO_2 Concentrations 30

1 Local Air Quality Management

This report provides an overview of air quality in Bromsgrove District during 2019. 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 Bromsgrove District Council to improve air quality and any progress that has been made.

The statutory air quality objectives applicable to LAQM in England can be found in Table E.1 in Appendix E.

2 Actions to Improve Air Quality

2.1 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 must prepare an Air Quality Action Plan (AQAP) within 12-18 months setting out measures it intends to put in place in pursuit of compliance with the objectives.

A summary of AQMAs declared by Bromsgrove District Council can be found in Table 2.1. Further information relating to declared or revoked AQMAs, including maps of AQMA boundaries are available online at

http://www.worcsregservices.gov.uk/pollution/air-quality/air-quality-management-areas.aspx

Table 2.1 – Declared Air Quality Management Areas

AQMA Name	Date of Declaration	Pollutants and Air Quality Objectives	City / Town	One Line Description	Is air quality in the AQMA influenced by roads controlled by Highways England?	Level of Exceedance (maximum monitored/modelled concentration at a location of relevant exposure)		Action Plan		
						At Declaration	Now	Name	Date of Publication	Link
Lickey End, Bromsgrove AQMA	26th July 2001	NO2 Annual Mean	Bromsgrove	Residential properties along four roads emanating from the Junction 1 M42	YES	45.7 µg/m3	35.4 µg/m3	Air Quality Action Plan for Worcestershire	2013	Air Quality Action Plan for Worcestershire (2013) http://www.worcsregservices.gov.uk/pollution/air-quality/air-quality-action-plan.aspx
Redditch Road, Bromsgrove AQMA	17th Feb 2010	NO2 Annual Mean	Bromsgrove	Long stretch of the A38 including a number of residential properties	YES	45.6 µg/m3	35.07 µg/m3	Air Quality Action Plan for Worcestershire	2013	
Worcester Road, Bromsgrove AQMA	24th October 2011	NO2 Annual Mean	Bromsgrove	Comprises mainly the B4091 Worcester Road single carriageway southwest of the town centre	NO	56 µg/m3	37.98 µg/m3	Air Quality Action Plan for Worcestershire	2013	

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

2.2 Progress and Impact of Measures to address Air Quality in Bromsgrove District

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. Trends are clearly presented and discussed and a robust comparison with air quality objectives is provided.

2. The diffusion tube mapping is comprehensive and clearly demonstrates the monitoring network.

3. The continuing review of NO2 monitoring locations is supported and any updates should be reported on in the 2020 ASR.

4. The revocation of the Kidderminster Road, Hagley AQMA following sustained compliance and a detailed assessment is welcomed.

5. The council has outlined measures being taken to reduce emissions of PM2.5, however it has not linked to the Public Health Outcome Frameworks, which is encouraged for future reports.

6. Particular attention should be paid to sites where exceedances have occurred outside of existing AQMAs, with additional monitoring considered. Should exceedances persist a new AQMA or amendment to an existing AQMA may need to be considered.

7. QA/QC of the non-automatic network was considered to be thorough, with a national bias adjustment factor used. Annualisation was carried out for sites where data capture was below 75% and distance correction was applied to sites of exceedance that were not representative of relevant exposure.

8. Priorities for 2019 were identified, which is welcomed. Progress made on these priorities should be reported on in next year's ASR".

Bromsgrove District Council has taken forward a number of direct measures during the current reporting year of 2019 in pursuit of improving local air quality. Details of all measures completed, in progress or planned are set out in Table 2.2.

More detail on these measures can be found in their respective Action Plans. Key measures that have been progressed since the previous 2019 ASR are:

- **Bromsgrove Route Enhancement Programme (BREP) Major Scheme**

  The Bromsgrove Route Enhancement Programme (BREP) is currently estimated to have a value of approximately £50 million. The scheme aims to support the sustainable growth of Bromsgrove by enhancing the A38 corridor from Lydiate Ash to Hanbury Turn and includes a series of junction/island enhancements where delay and congestion is currently experienced, and where conditions are predicted to deteriorate further without intervention.

  Worcestershire County Council held public information sessions in early 2020 and work to progress the outline business case continues for submission to the DfT in Autumn 2020, under the auspices of Midlands Connect. Some elements of the scheme are underway as part of Phase 1 (see below).

  Further details can be found on Worcestershire County Council's website via the following link:-

  http://www.worcestershire.gov.uk/info/20679/a38_bromsgrove_improvements/2163/bomsgrove_route_enhancement_programme_

- **Lickey End (M42 Junction 1) - Major Junction Enhancement Scheme**

  Lickey End (M42, Junction 1) is widely recognised as operating in excess of built capacity and so is now heavily congested at peak times. The junction is the focus for an Air Quality Management Area and offers a challenging environment for non-motorised users. This scheme is included as part of Phase 1 of BREP and provides preliminary highway improvements to enhance capacity at the Junction. Works are due to commence as of June/July 2020. Also included within the Phase 1 scheme is:-

  - A38/Barley Mow Lane capacity improvements (completed)
  - Improvements in capacity at M5 J4 (Lydiate Ash) – underway June/July 2020

  http://www.worcestershire.gov.uk/info/20679/a38_bromsgrove_improvements/2162/phase_1_a38_improvements

- **Bromsgrove Transport Strategy**

  This scheme is part of the Strategic Transport Assessment (STA) work which will identify infrastructure and services to support planned development growth. This is part of a collaborative process between Worcestershire County Council and Bromsgrove District Council.

The scheme aims to provide a package of Public Realm Enhancements in Bromsgrove Town Centre and would be integrated with other schemes in the area (such as BREP/A38 and the Strategic Active Travel Investment Programme). The scheme is to provide a comprehensive multimodal review of network efficiency and infrastructure in order tp identify where to focus investment to improve the operation of the local transport network. This would also include a review of Bromsgrove's highway network to explore options to improve and disperse traffic flow to increase efficiency and AQMA remediation at Worcester Road.

- **Bromsgrove – Strategic Active Travel Network Investment Programme (Including Catshill, Marlbrook and Lickey End)**

  The Active Travel Investment Programme is a systemic investment in walking and cycling links across the Bromsgrove area to create a safe, comprehensive, integrated network linking residential areas with key trip attractors, including schools, rail stations, town center's and employment locations. This includes surfacing, signage, lighting and public realm improvements to create an attractive and coherent network. Approximately £3.4 million of funding has been secured for implementation of the scheme.

  The scheme has already delivered a large number of Active Travel improvements in Bromsgrove and work continues during 2020. It is anticipated that all schemes will be completed by the end of 2020. A full list of updates can be accessed via the following link:-
  http://www.worcestershire.gov.uk/news/article/1817/bromsgrove_walking_and_cycling_scheme_latest_updates

- **Electric Vehicle Infrastructure Strategy** – The Bromsgrove Ultra Low-Emission Vehicles Strategy has been produced by officers of Bromsgrove District Council in 2019 as a framework for the development and growth of ULEV infrastructure and uptake within the district. The strategy can be viewed via:-
  https://www.bromsgrove.gov.uk/media/4929912/Bromsgrove-District-Council-Ultra-Low-Emissions-Vehicles-Strategy.pdf

- **Ultra Low Emission Taxi Infrastructure Scheme** - In 2018 Bromsgrove District Council officers made a bid for funds to help deliver infrastructure to support existing taxi drivers using electrical vehicles and encourage further uptake. The bid was approved in early 2019. The scheme is aimed to provide a number of electric vehicle charging points for taxis and private hire vehicles equating to a total of £300,000. A

ULEV Strategy for the Bromsgrove District was produced in 2019 to provide a framework for implementation of this project.

In 2020 Bromsgrove District Council appointed a company to install and operate 13 rapid chargers across the District for the next 10 years. The chargers will use 100% renewable energy purchased from UK sources. Sites are yet to be confirmed but are currently in the process of feasibility assessment and alternative options appraisal. The Council hope to have all the rapid chargers installed and operational by the end of 2020 but this may be delayed due to the impact of Covid19 restrictions and ensuring the health and safety of those involved.

- **All Electric Bus Town Scheme** – Worcestershire County Council submitted an Expression of Interest to the DfT All Electric Bus Town process (Phase 1) in June 2020. The bid is primarily to cover Bromsgrove but with 'synergies' with Redditch and the wider Worcestershire area. If the bid is shortlisted, the next stage (Phase 2), would be to develop a more detailed business case for the proposal.

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 alterative 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. 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 were hopeful of formal adoption by the District Councils but this is still to take place.

The principal challenges and barriers to implementation that Bromsgrove District Council face are numerous. Some of these challenges relate to the specific site conditions at each AQMA. The Lickey End AQMA is located around the A38 where it meets Junction 1 of the M42. There are numerous properties within the vicinity of this major junction and arterial route. The Redditch Road AQMA relates to another stretch of the A38. The main measured exceedances of the objective have been recorded where properties are located very close to the carriageway. Exceedances were last recorded here in 2016 and were marginal. The area of the Worcester Road AQMA where regular exceedances of the objectives occur is best described as a 'street canyon', consisting of narrow streets with continuous buildings on either side and is a major route for traffic in and out of Bromsgrove. On average approximately 16000 vehicles use this route every day. Although the Kidderminster Road, Hagley AQMA has been revoked the area remains a major arterial route where congestion is still a significant issue. Approximately 36000 vehicles travel daily along this route on average. Securing funding for improvement schemes is a key factor. Ensuring uptake of greener methods of transport and changes in behaviour are also difficult to achieve without incentives or a lack of alternative options being in place.

Large scale residential development is also proposed within the Bromsgrove District and wider area in future years. As a consequence solving the problem of poor air quality at problem locations within the district is proving to be difficult. Even without further development, and increasing numbers of vehicles, the current road network is already stretched with significant congestion experienced on a daily basis.

A number of priority actions relevant to the three Bromsgrove AQMAs highlighted within the original action plan relate to specific highway actions. Historically the County Council have stated that these actions would not be considered for progression in isolation but may be considered as part of one of the larger schemes set out in LTP4. Now that more detail of the LTP4 scheme is known it seems unlikely that some of these actions will be considered further but a number of other carriageway improvements in these areas are proposed. It is anticipated that the Action Plan for the Bromsgrove District area will need to be updated in the future to reflect these changes and to consider other viable options. The original action

plan for Worcestershire was drafted in 2013 and since this time a number of changes have occurred locally and nationally.

Whilst the measures stated above and in Table 2.2 will help to contribute towards compliance, Bromsgrove District Council anticipates that further additional measures, not yet prescribed, will be required in subsequent years to achieve compliance and enable the revocation of all of the AQMAs. It is hoped that the successful bid for funds made by Bromsgrove District Council in relation to electrical vehicle charging for taxis and future installation of suitable infrastructure will be the catalyst that helps drive a move to more sustainable modes of transport across the region.

Table 2.2 – Progress on Measures to Improve Air Quality

Measure No.	Measure	EU Category	EU Classification	Date Measure Introduced	Organisations involved	Funding Source	Key Performance Indicator	Reduction in Pollutant / Emission from Measure	Progress to Date	Estimated / Actual Completion Date	Comments / Barriers to implementation
LICKEY END BROMSGROVE AQMA PRIORITY ACTIONS											
BREP1	A38 Bromsgrove Route Enhancement Programme	Traffic Management	UTC, Congestion management, traffic reduction	2017	WCC	DFT WCC	Improved traffic flow and less queuing	Unknown at this stage	WCC included A38 major enhancement scheme as part of LTP4. Funding bids made and some sources of funding secured. Scheme consists of various phases of enhancements across the A38 corridor. Phase 1 is in the process of being delivered. Other phases of the scheme are being assessed and likely to go through planning process in 2020.	2020-2025	Funding secured for scheme. Final detailed design going through assessment and then subject to the formal planning process. Scheme to be rolled out in various phases.
5.1.1	Alteration to phasing of traffc light systems	Traffic Management	UTC, Congestion management, traffic reduction	2013	WCC	WCC	Improved traffic flow in the area	Unknown at this stage	Phase 1 of the A38 improvement scheme which specifically includes changes to the A38/M42 J1 (AQMA) is due to be delivered in 2020.	2020-2025	Phase 1 of the scheme currently being deliveries with various phases to follow.
LE4	Narrowing of two lanes into one causes bottleneck at top of A38 south	Traffic Management	UTC, Congestion management, traffic reduction	2013	WCC	DFT WCC	Improved traffic flow in the area	Unknown at this stage	Not included as Phase 1 of the A38 scheme but Scheme F proposes revision of road markings and road widening to provide one lane northbound and two lanes southbound to remove bottleneck.	2020-2025	Included in Scheme F of the A38 improvement package. Subject to formal planning and funding.
LE6	Traffic exiting Barnsley Hall Road right - no right turn restriction.	Traffic Management	UTC, Congestion management, traffic reduction	2013	WCC	WCC	Improved traffic flow in the area	Unknown at this stage	Not progressed. Not part of the A38 package of enhancements.	Unknown at this stage	Not part of the A38 package of enhancements.
LE7	Turn right into Harvester PH from A38 south . Action no right turn restriction.	Traffic Management	UTC, Congestion management, traffic reduction	2013	WCC	WCC	Improved traffic flow in the area	Unknown at this stage	Unknown if will be included as part of scheme	Unknown at this stage	Unknown if will be included as part of scheme
5.3.4	Promote Flexible Working arrangements	Promoting Travel Alternatives	Encourage / Facilitate home-working	2013	WCC BDC	Various	Increase in number of people able to work from home	Unknown at this stage	County Council have pushed for maximum coverage of fibre optic broadband	Ongoing (96% coverage by Dec 2019)	Reliant on uptake from private sector companies
REDDITCH ROAD BROMSGROVE AQMA PRIORITY ACTIONS											
5.1.1	Alteration to phasing of traffic light systems	Traffic Management	UTC, Congestion management, traffic reduction	2013	WCC	DFT WCC	Improved traffic flow in the area	Unknown at this stage	Improvements within the AQMA included within A38 enhancement package which includes 12 schemes along the A38 corridor.	Within lifetime of LTP4 (2018 - 2030)	Scheme B1 relates to AQMA. Subject to formal planning and funding.
RR7	Two in road bus stops on carriageway either side of central street canyon	Traffic Management	UTC, Congestion management, traffic reduction	2013	WCC	DFT WCC	Improved traffic flow in the area	Unknown at this stage	As Above	Within lifetime of LTP4 (2018 - 2030)	As above
5.3.4	Promote flexible working arrangements	Promoting Travel Alternatives	Encourage/facilitate home-working	2013	WCC BDC	Various	Increase in number of people able to work from home	Reduce emissions	County Council have pushed for maximum coverage of fibre optic broadband	Ongoing (96% coverage by Dec 2019)	Reliant on uptake from private sector companies

5.2.2	Freight Quality Partnership	Traffic Management	UTC, Congestion management, traffic reduction	2013	WCC	WCC	Fewer HGVs travelling through AQMA	up to 10%	Ongoing	On-going duty under Traffic Management	Can take time for information to filter down to users. HGVs may still need to travel through AQMAs on major arterial routes.
WORCESTER ROAD BROMSGROVE AQMA PRIORITY ACTIONS											
BR1	Bromsgrove Town Centre Network Review (Bromsgrove Transport Strategy)	Traffic Management	UTC, Congestion management, traffic reduction	2017	WCC	WCC	Improved traffic flow through Bromsgrove town centre and improved journey times	Unknown at this stage	Included as part of LTP4. Currently at plan and review stage.	Unknown at this stage	Any improvements subject to funding
5.3.8	Promote and support walking and cycling initiatives in Worcestershire	Traffic Management	Cycle network	2013	WCC DFT	WCC	Increased uptake of alternative modes of transport	Unknown at this stage	Scheme proposed within LTP4. £3.4million improvements for walking and cycling routes forming part of the wider transport and highways plan for the area and will include an additional six recognised walking and cycling pathways being introduced. The work will also include improving other recognised cycleways across Bromsgrove. Numerous parts of the scheme have been delivered with the remainder to be completed by end of 2020.	2020	Various parts of the scheme have already been delivered and others are ongoing but should be delivered by end of 2020..
5.3.1	Travel Planning	Promoting Travel Alternatives	Personalised travel planning	2013	WCC	WCC	Increased uptake of alternative modes of transport	Reduced emissions	Worcestershire County Council is delivering PTP services on behalf of developers.	On-going	PTP encourages modal shift in new developments towards more sustainable and space efficient forms of transport.
WR3	Zebra crossing at Hanover Street/Worcester Road junction causes congestion	Traffic Management	UTC, Congestion management, traffic reduction	2013	WCC	WCC	Improved traffic flow in the area	Unknown at this stage	Proposals for crossing to be upgraded to Puffin / Toucan crossing as part of improvements to walking and cycling.	2022	Various parts of the scheme have already been delivered and others are ongoing.
WR9	Local school traffic causes congestion exiting Shrubbery Road – requires junction review	Traffic Management	UTC, Congestion management, traffic reduction	2013	WCC	WCC	Improved traffic flow in the area	Unknown at this stage	County Council have included package of improvements within LTP4. WCC has commissioned a Strategic Transport Assessment (STA) to support the BDC local plan process and ultimately identify infrastructure schemes to support local plan growth.	Within lifetime of LTP4 (2018 - 2030)	Cost of scheme reliant on successful funding bids.
GENERIC ACTIONS APPLICABLE TO ALL AQMAS											
ULEVTIS	Ultra Low Emission Taxi Infrastructure Scheme	Promoting Low Emission Transport	Procuring alternative Refuelling infrastructure to promote Low Emission Vehicles, EV recharging, Gas fuel recharging	2019	BDC	ULEV taxi infrastructure grant	Increased uptake of electric taxis	Unquantified at this stage	BDC successful funding bid in 2018 for taxi electric vehicle charging points of £300,000. A ULEV Strategy for the Bromsgrove District was produced in 2019. Company appointed in 2020 to install/operate 13 rapid chargers for next 10 years. Potential sites currently being appraised.	2020/21	Aimed for completion in 2020 but Covid-19 situation may impact delivery.
5.2.2	Freight Quality Partnership	Traffic Management	UTC, Congestion management, traffic reduction	2013	WCC	WCC	Fewer HGVs travelling through AQMA	up to 10%	Ongoing	On-going duty under Traffic Management	Can take time for information to filter down to users. HGVs may still need to travel through AQMAs on major arterial routes.
5.2.5	Greening Council and Business Fleets	Promoting Low Emission Transport	Procuring alternative Refuelling infrastructure to promote Low Emission Vehicles, EV recharging, Gas fuel recharging	2013	BDC WCC	BDC WCC	Increase in number of Council fleet and contractors vehicles of higher Euro Standard and/or utilising alternative fuels	Reduced emissions	Ongoing	Unknown	Reliant on uptake from private sector companies

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	2013	BDC WCC WRS	Developers	Increase in availability of EV charging points and corresponding increase in use of electric vehicles	up to 20%	Recommendation for installation of EV Charging Points on relevant planning consents. Formalised in SPD but not adopted by BDC planning authority. Electrical charging points for taxi scheme being installed 2020/2021.	Ongoing	Taxi project delivery may be delayed due to Covid-19 situation.
5.3.2	Car Sharing	Alternatives to private car use	Car and lift sharing schemes	2013	WCC	Various	Increase in number of people car sharing	<1%	Liftshare Scheme launched in Autumn 2015	Liftshare website scheme launched Autumn 2015. Currently in operation	Following an initial surge in interest from public, use of service has slowed down
5.3.4	Promote flexible working arrangements	Promoting Travel Alternatives	Encourage/facilitate home-working	2013	WCC BDC	Various	Increase in number of people able to work from home	Reduce emissions	County Council have pushed for maximum coverage of fibre optic broadband	Ongoing (96% coverage by Dec 2019)	Reliant on uptake from private sector companies
5.5.1	Produce Air Quality Supplementary Planning Document	Policy Guidance and Development Control	Air Quality Planning and Policy Guidance	2013	WRS BDC	BDC	Formal adoption and use by BDC planning authority	Reduced emissions from new Develop-ments	SPD drafted by WRS and provided to Council late 2017. Not yet formally adopted by planning authority. Updated in 2018 to reflect new NPPF.	Not yet adopted	Conflicting views on SPD from 6 different local authorities hampering adoption of single document.
5.5.4	Encourage developers to provide sustainable transport facilities and links serving new developments	Promoting Travel Alternatives	Personalised travel planning	2013	BDC WCC WRS	WCC BDC	Increased uptake of alternative modes of transport	Reduced emissions	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. WRS make standard AQ mitigation measures on all relevant planning apps.	On-going	
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 BDC	Officer time (WRS)	Improved cross boundary working between local authorities in West Midlands	Reduce emissions	WRS are member of regional environmental protection managers group (CEEPG) and member of Defra LAQM Team Local Authority Advisory Group both formed in 2017.	On-going.	Differing AQ issues, priorities and resources in regional authorities
5.6.8	Forge closer links with local health agencies	Other	Other	2013	WRS WCC PHE	DoPH, Officer time (WRS)	Increase participation of Public Health in Worcestershire Air Quality issues and action groups	0	County Air Quality Partnership set up May 2019 by DoPH supported by WRS	On-going	
5.3.1	Travel Planning	Promoting Travel Alternatives	Personalised travel planning	2013	WCC	WCC	Increased uptake of alternative modes of transport	Reduced emissions	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	
5.3.6 (5.3.8 and 5.3.9)	Improve cycling and walking routes in local areas	Promoting Travel Alternatives	Promotion of cycling	2013	WCC BDC NPIF	WCC	Uptake in commuter journeys undertaken by cycle or walking	Reduce emissions	Scheme proposed within LTP4. £3.4million improvements for walking and cycling routes forming part of the wider transport and highways plan for the area and will include an additional six recognised walking and cycling pathways being introduced. The work will also include improving other recognised cycleways across Bromsgrove. Numerous parts of the scheme have been delivered with the remainder to be completed by end of 2020.	2020	Various parts of the scheme have already been delivered and others are ongoing to be completed by end of 2020..
5.4.4	Make air quality information more available and accessible	Public Information	Via the Internet	2013	WRS	Officer time (WRS)	Website hits and enquiries for information	0	All existing LAQM reports and details of AQMAs are available to public on WRS website. WRS use Twitter account to release information.	On-going	
5.4.2	Provide link to real time air quality information	Public Information	Via the Internet	2013	WRS WCC PHE	Officer time (WRS)	Increase in WRS Twitter subscribers	0	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	On-going	Limited to Twitter users

5.45	Raise the profile and increase awareness of air quality within the region	Other	Other	2013	WRS CEEPG MJAC DEFRA	Officer time (WRS)	Improved cross boundary knowledge sharing between local authorities in West Midlands	0	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.	Reduced AQ officers in regional authorities and resource
5.4.1	Smarter Driving Tips	Public Information	Via the Internet	2013	WRS & WCC	Officer time (WRS)	Increase in website hits	Reduce emissions	Advice page created for all groups affected by and impacting air quality and shared with County Public Health.	Created Mar 2017, Updated March 2019	Effectiveness depends on behavioural change
FORMER KIDDERMINSTER ROAD HAGLEY AQMA											
5.1.1/KR5	Alteration to phasing of traffic light systems/Junction review	Traffic Management	UTC, Congestion management, traffic reduction	2013	WCC	WCC	Improved traffic flow in the area	5%	Signals have been upgraded to latest MOVA technlogy.	Completed	n/a
5.1.4	Variable Message Systems	Traffic Management	UTC, Congestion management, traffic reduction	2013	WCC	WCC	Raise awareness of AQMAs	1%	North East Worcestershire Transport Telematics Investment Package outlined within LTP4 - VMS included as part of this	Within lifetime of LTP4 (2018 - 2030)	Scheme reliant on succesful funding bids
5.1.8	Introduction of signals at roundabout	Public Information	Other	2013	WCC	WCC	Improved traffic flow in the area	5%	Signals installed and various revissions made to junction marking	Completed	n/a
5.2.2	Freight Quality Partnership – work with satellite navigation companies to route HGVs around AQMAs	Freight and Delivery Management	Route Management Plans/ Strategic routing strategy for HGV's	2013	WCC	WCC	Fewer HGVs travelling through AQMA	5%	Information provided to SatNat technology providers on ongoing basis	Ongoing	n/a

2.3 $PM_{2.5}$ – 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.

WRS has reviewed the DEFRA national background maps to determine projected $PM_{2.5}$ concentrations within the Bromsgrove District area for the 2019 calendar year. The average total $PM_{2.5}$ at 218 locations (centre points of 1km x 1km grids) across the Bromsgrove District is 8.24µg/m^3, with a minimum concentration of 7.49µg/m^3 and a maximum concentration of 9.45µg/m^3. This indicates that $PM_{2.5}$ concentrations within the Bromsgrove District are well below the annual average EU limit value for $PM_{2.5}$ of 25µg/m^3.

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.

A new Air Quality Partnership led by the 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. The group met initially in May 2019 to discuss terms and references and in September to discuss potential actions. Further discussions and work to formalise an action plan are continuing in 2020.

In light of the above no additional actions are currently planned by Bromsgrove District Council in relation to the reduction of PM2.5 levels. However it is anticipated that any actions taken to improve NO_2 levels across the District 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

3.1 Summary of Monitoring Undertaken

3.1.1 Automatic Monitoring Sites

This section sets out what monitoring has taken place and how it compares with objectives.

Bromsgrove District Council did not undertake any automatic (continuous) monitoring during 2019.

3.1.2 Non-Automatic Monitoring Sites

Bromsgrove District Council undertook non- automatic (passive) monitoring of NO_2 at 39 sites during 2019. Table A.1 in Appendix A shows the details of the 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.

3.2 Individual Pollutants

The air quality monitoring results presented in this section are, where relevant, adjusted for bias[6], “annualisation” (where the data capture falls below 75%), and distance correction[7]. Further details on adjustments are provided in Appendix C.

3.2.1 Nitrogen Dioxide (NO_2)

Table A.2 in Appendix A compares the ratified and adjusted monitored NO_2 annual mean concentrations for the past 5 years with the air quality objective of 40µg/m^3. Note that the concentration data presented in Table A.2 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 2019 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.

In 2019 the highest concentrations of NO_2, and only measured exceedances in Bromsgrove District, were recorded within the Lickey End AQMA at location F1 with a value of 43.35µg/m^3

[6] https://laqm.defra.gov.uk/bias-adjustment-factors/bias-adjustment.html
[7] Fall-off with distance correction criteria is provided in paragraph 7.77, LAQM.TG(16)

and 40.15µg/m^3 at LE4. It should be noted however that these locations do not represent relative exposure and when the fall off with distance calculator is utilised the value falls below the objective. Two new locations were established within the Lickey End AQMA at the start of 2019 to expand the monitoring network at relevant exposure. These were located at 288 Birmingham Road (LIK1), a property close to the Harvester PH and established location LE4, and 1 Old Birmingham Road (LIK2), in the general vicinity of F1. Concentrations of 26.86µg/m^3 were recorded at LIK1 and 26.22µg/m^3 at LIK2.

Concentrations within the Worcester Road and Redditch Road AQMAs were below the objective in 2019. The highest concentrations recorded within the Worcester Road AQMA were 37.98µg/m^3 at BC and 36.47µg/m^3 at BCX. No exceedances were recorded within the Redditch Road AQMA with a highest concentration of 27.58µg/m^3 at location 19.

No exceedances were recorded within the formerly revoked Kidderminster Road, Hagley AQMA with a highest concentration of 24.62µg/m^3 at RES2. Following revocation of the AQMA four new monitoring locations were established to the south on Worcester Road, West Hagley, in May 2018. Following annualisation of 2018 data a concentration of 47.01µg/m^3 was recorded at location HAG3. There is an additional level of uncertainty associated with the result given that it was based upon only 7 months of monitoring data. 2019 represented a full calendar year of data within the area and a concentration of 33.7µg/m^3 was recorded at HAG3. All other concentrations were well below this value. Two new monitoring locations were established in the vicinity of HAG3 for the 2020 period to provide additional certainty to air quality concentrations going forward.

A new location was also established at the start of 2019 at Library Way off New Road, which backs onto the A38 in Rubery (RUB1). This site was chosen following local intelligence and to gain data as no monitoring had been undertaken in the area for several years. A concentration of 23.63µg/m^3 was recorded at RUB1. All other locations outside of the AQMAs recorded values well below the objective.

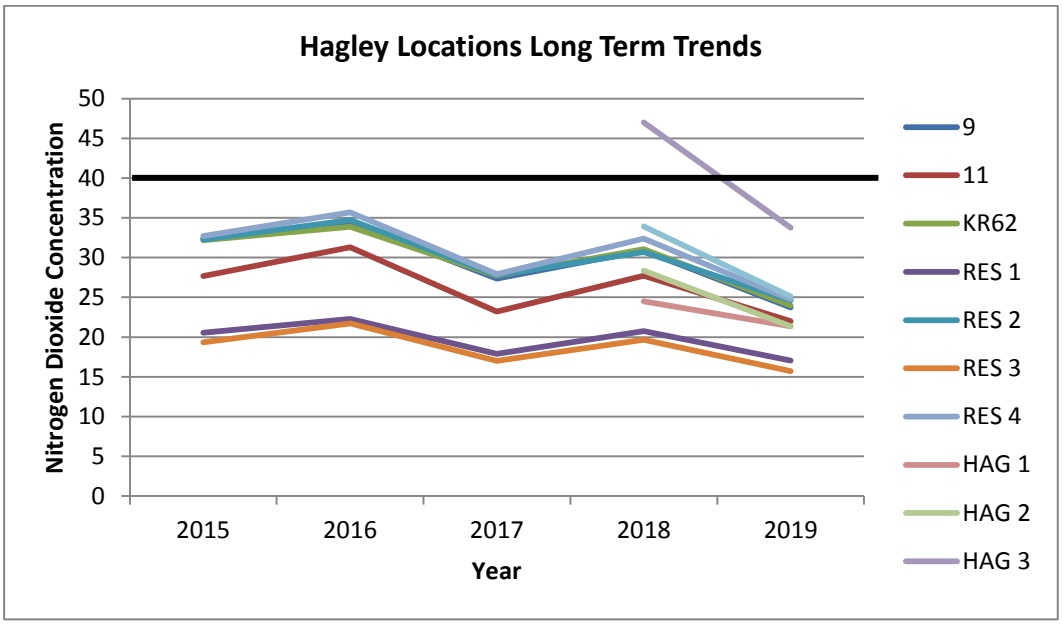
Monitoring results within the Bromsgrove District (BDC) area demonstrate a general downward trend in concentrations across the district in 2019 and over the 5 year period 2015 – 2019.

No concentrations exceed 60µg/m^3 which indicates the one-hour objective for nitrogen dioxide is not being breached. The highest concentration within the district was recorded as 43.35µg/m^3 at location F1 within the Lickey End AQMA, although as mentioned previously this location does not represent releative exposure. The highest concentration at relevant exposure was recorded as 37.98µg/m^3 at location BC within the Worcester Road AQMA.

Kidderminster Road, Hagely

The former Kidderminster Road, Hagley AQMA was revoked by Bromsgrove District Council in 2018 as concentrations of nitrogen dioxide had been recorded well below the objective for a period of five years or more. The report entitled '*Kidderminster Road, Hagley AQMA Revocation Screening Assessment – November 2017'* was submitted to Defra as an annex to the 2018 ASR. No exceedances of the annual mean objective have been recorded within the boundary of the former AQMA since before the revocation with the highest concentration recorded in 2019 being 24.62µg/m^3 at location KR62.

Following revocation of the AQMA four new monitoring locations were established on Worcester Road, West Hagley. Monitoring commenced in May 2018 and was annualised as required by DEFRAs TG.16 given there was less than 75% data capture for the calendar year. Three of these locations were recorded well below the objective however following annualisation a concentration of 47.01µg/m^3 was recorded at location HAG3. HAG3 is located on the façade of an end terrace property sited in close proximity to the highway approximately 1.1km to the southwest of the nearest boundary of the former AQMA. The terrace runs at an angle with the road with HAG3 representing the closest location. Given that only 7 months of data was collected in 2018 requiring annualisation there was a level of uncertainty associated with the final value. 2019 provided a full 12 months data capture at this location and recorded a concentration of 33.74µg/m^3 follow the bias-adjustment process. All othere concentrations in the Hagley area were well below this value. WRS will continue to monitor in 2020 and have also added two new locations in the vicinity of HAG3 to further investigate air quality concentrations in this area.



Lickey End, Bromsgrove AQMA

Two exceedences of the objective were recorded within the Lickey End AQMA in 2019 with a value of 40.15µg/m^3 at LE4 and 43.35µg/m^3 at F1. It should be noted however that neither of these locations represent relative exposure and are located some distance away from the nearest receptor. LE4 is located on the pavement outside of the Harvester Public House on the A38. F1 was formerly colocated with an automatic monitor that has since been removed. It is cited on the roundabout off the B4096 junction, near to a former residential property that is now part of a commercial car business. When these locations are worked back to the nearest point of relevant exposure the values fall well below the annual mean objective. LE4 records a value of 25.5µg/m^3 and F1 25.8µg/m^3 once calculated back to relevant exposure.

Below is a table comparing the concentration at the monitoring location with that at relevant exposure in the last 7 years. In order to undertake the fall-off with distance calculations distances have been taken from the relevant years air quality report. There are some minor variation in distances recorded year on year. The background concentration has been taken from the relevant report for each year.

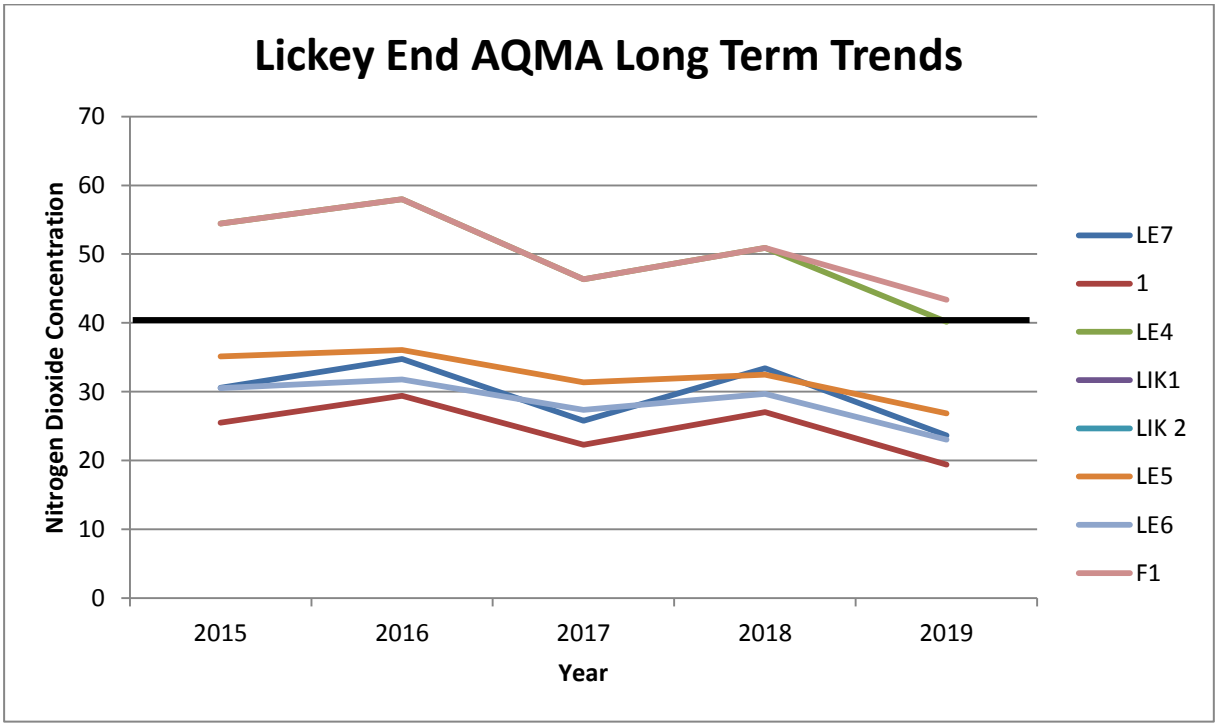
Concentration at Monitoring Location and Worked Back to Nearest Receptor

Site ID	LE4		F1	
	Monitoring Location	Nearest Receptor	Monitoring Location	Nearest Receptor
2013	**67**	**44.5**	**50.3**	34.3
2014	**51.26**	36.6	**59.5**	**41.3**
2015	**52.67**	36	**54.45**	37.1
2016	**56.51**	35.7	**57.99**	33.1
2017	**47.39**	30.8	**46.36**	27.7
2018	**48.38**	35.40	**50.93**	34.50
2019	**40.15**	26.5	**43.35**	25.8

When calculated back to relevant exposure the values fall below the annual mean concentration with exceedances in only 2014 for F1 and 2013 for LE4. The next highest value recorded within the AQMA in 2019 was 26.86µg/m^3 at both LE5 and LIK1. Although no exceedances of the objective have been recorded at relevant exposure, given the high concentrations recorded at LE4 and F1 historically, it is possible that exceedances are still

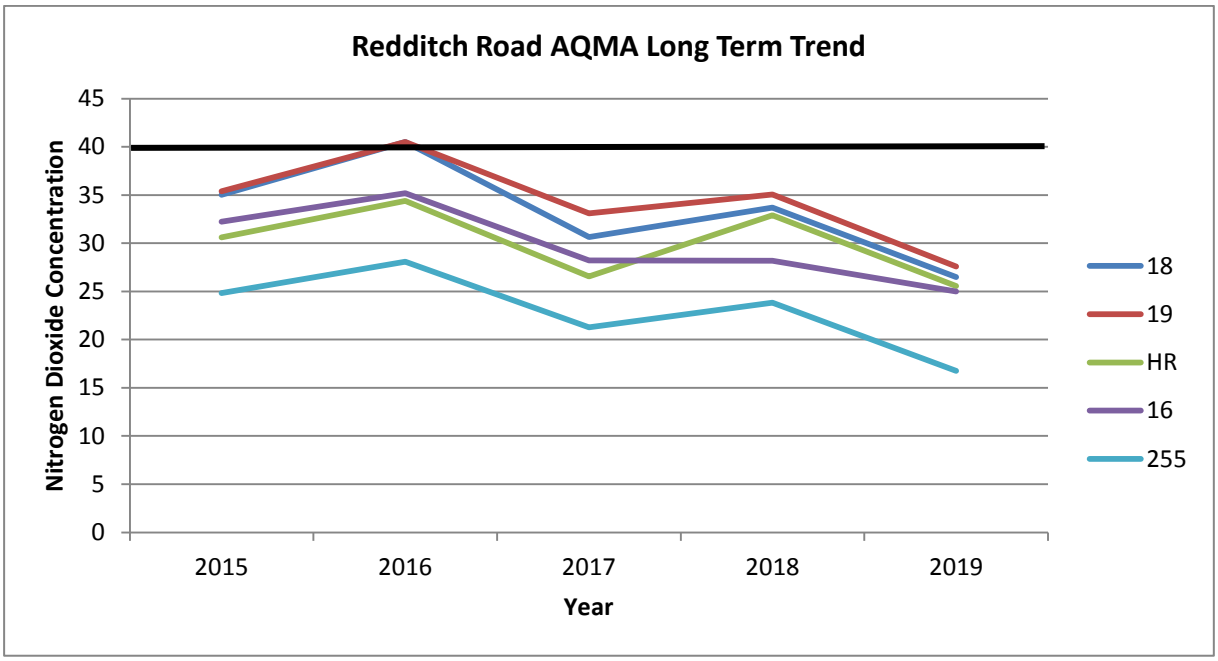
occuring at other points within the AQMA. As such two new monitoring locations were established within the Lickey End AQMA at the start of 2019, close to the areas of exceedance and to expand the network at relevant exposure. These were located at 288 Birmingham Road (LIK1), a property close to the Harvester PH and established location LE4, and 1 Old Birmingham Road (LIK2), in the general vicinity of F1. Concentrations of 26.86µg/m3 were recorded at LIK1 and 26.22µg/m3 at LIK2.

The AQMA is to remain in place and monitoring will continue in 2020.It is warranted that a detailled assessment of historical monitoring data is undertaken in the future to ascertain whether the AQMA should remain in place or whether revocation may be a possibility.



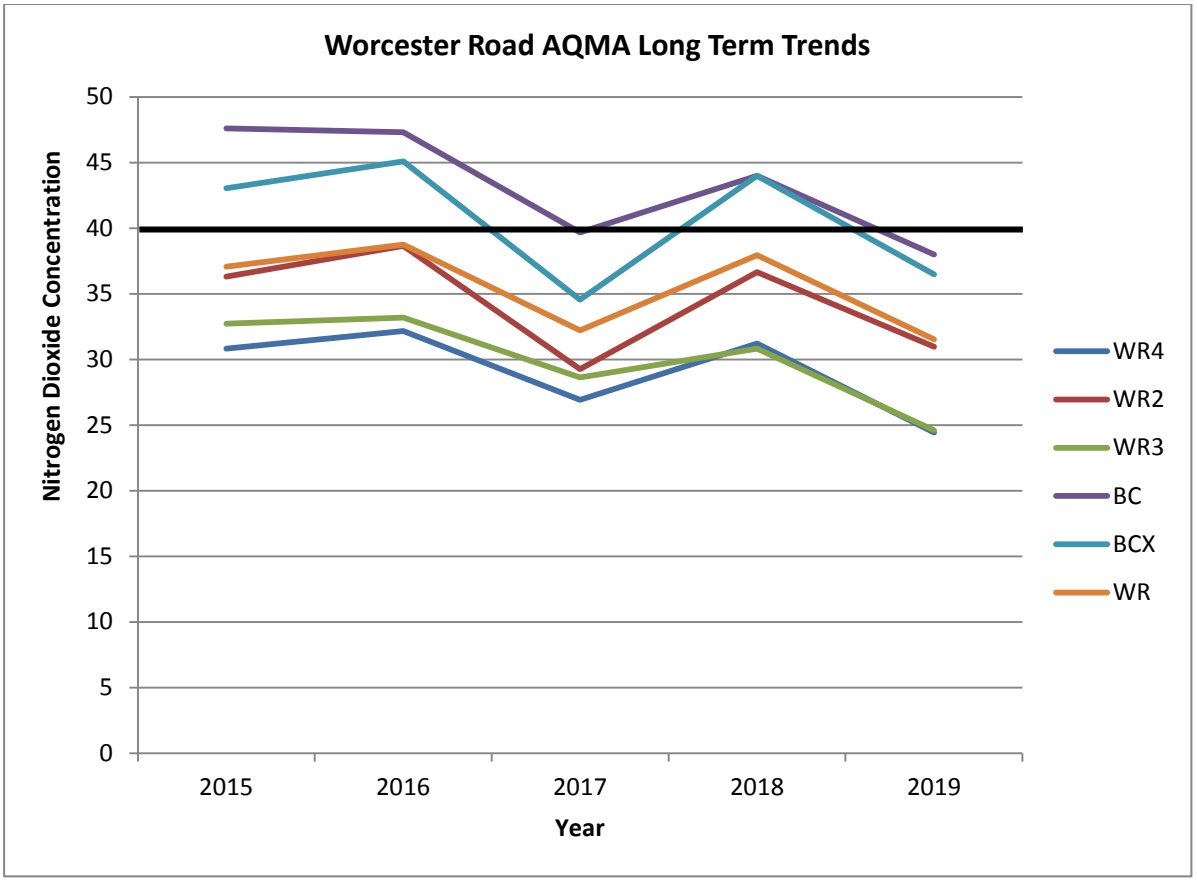
Redditch Road, Bromsgrove AQMA

No exceedances of the annual mean objective have been recorded within the Redditch Road AQMA in 2019. The highest concentrations recorded within the AQMA were 27.58µg/m^3 at location 19 and 26.48µg/m^3 at 18. Two minor exceedances of 40.5µg/m^3 were recorded within the AQMA at these locations in 2016. Both these locations represent residential property facades located in close proximity to the A38 highway. Prior to this the last exceedance in the AQMA was recorded in 2013. It is considered that the AQMA should remain in place and monitoring should continue at this time.If concentrations remain below the objective over a suitably determined time period a review should be undertaken to ascertain whether or not it is appropriate to revoke the AQMA in line with the relevant DEFRA guidance.



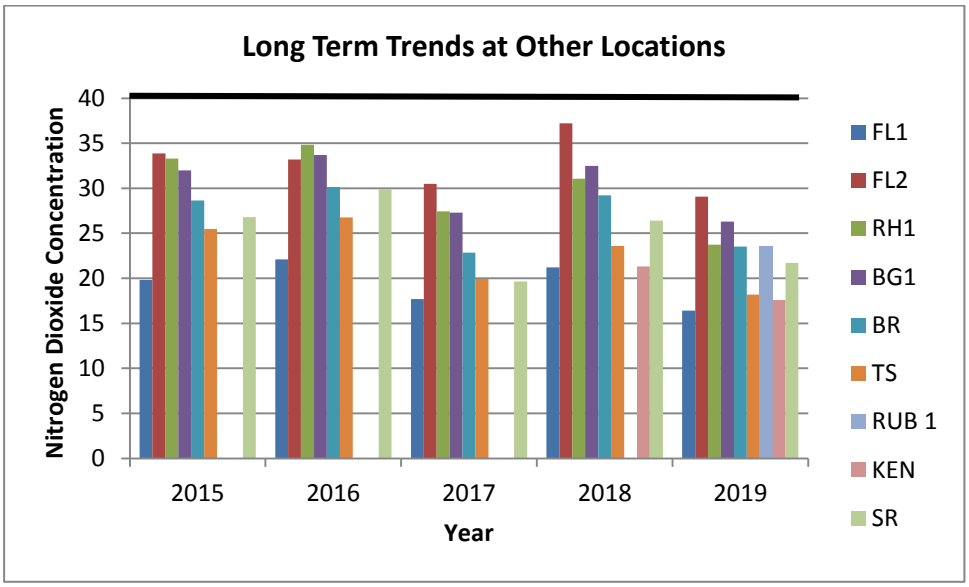
Worcester Road, Bromsgrove AQMA

No exceedances of the annual average objective for nitrogen dioxide were recorded within the AQMA in 2019. The highest concentrations recorded were 37.98µg/m^3 at BC and 36.47µg/m^3 at BCX. This is 5% or more below the objective. The next highest concentration recorded was WR and measured 31.54µg/m^3. Annual average concentrations have been exceeded at relevant exposure within the AQMA for three out of the last five years. No exceedances have occurred in years 2017 and 2019. The AQMA is to remain in place at this time and monitoring is to continue in 2020.



Monitoring in other areas

Outiside of the existing AQMAs and areas of concern discussed above no other exceedances have been monitored within the district in 2019.The monitored concentrations in 2019 are such that there is unlikely to be a breach of the hourly mean objective for NO_2 with the highest concentration of 43.35µg/m^3 being recorded at F1. This is well below the guideline concentration of 60µg/m^3 which is an indicative threshhold for when the one-hour objective for nitrogen dioxide may be breached.



Appendix A: Monitoring Results

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

Site ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA?	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Tube collocated with a Continuous Analyser?	Height (m)
FL1	2C Fox Lane behind Greyhound Pub (second house past pub)	Roadside	395079	269797	NO2	No	0m	6.96m	No	2.13m
FL2	Lampost next to new houses close to road on Fox Lane near to Rock Hill junction	Roadside	395118	269721	NO2	No	4.66m	1.36m	No	2.13m
RH1	8 Rockhill, Bromsgrove	Roadside	359243	269844	NO2	No	0m	6.25m	No	2.15m
WR4	188 Worcester Road, B'grove	Roadside	395312	269938	NO2	Yes	0m	7.50m	No	2.20m
WR2	159 Worcester Road, Bromsgrove	Roadside	395511	270180	NO2	Yes	0m	2.2m	No	2.21m
WR3	138 Worcester Road, Bromsgrove	Roadside	395501	270190	NO2	Yes	0m	4.42m	No	2.49m
BC	Ye Olde Black Cross, Worcester Road, Bromsgrove	Roadside	395685	270424	NO2	Yes	0m	2.1m	No	2.29m
BCX	16 Worcester Road, Bromsgrove	Roadside	395807	270549	NO2	Yes	0m	2.7m	No	5.31m
WR	10 Hanover Street, B61 7JH	Roadside	395702	270423	NO2	Yes	0m	6.4m	No	1.37m
BG1	Davenall House, Birmingham Road,	Roadside	396238	27118	NO2	No	N	2.59m	No	2.57m

	Bromsgrove									
BR	35 Birmingham Road, Bromsgrove	Roadside	396292	271210	NO2	No	0m	3.40m	No	2.17m
LE7	371 Birmingham Road, Lickey End	Urban Background	396916	273014	NO2	Yes	0m	15.9m	No	2.10m
1	3A Alcester Road, Lickey End.	Roadside	396999	272979	NO2	Yes	0m	11.70m	No	1.84m
LE4	outside Harvester (Forest inn) PH Birmingham Road, Lickey End	Roadside	396935	272949	NO2	Yes	11m	1.35m	No	2.13m
LIK1	288 Birmingham Road (next to Harvester)	Roadside	396939	272934	NO2	Yes	0m	10m	No	1,5m
LIK2	1 Old Birmingham Road Lickey End B60 1DD	Roadside	396995	273129	NO2	Yes	0m	5.5m	No	1.5m
LE5	5 Old Birmingham Road, Lickey End	Roadside	396999	273143	NO2	Yes	0m	6.53m	No	1.94m
LE6	308 Birmingham Road, Lickey End	Urban Background	396958	273157	NO2	Yes	0m	18.30m	No	2.13m
F1	Lickey End / Forrest Inn Island Lamppost 4957	Roadside	397010	273112	NO2	Yes	20m	2.31m	No	1.96m
TS	Smallholdings, Wildmoor Lane, Catshill	Rural	396613	275085	NO2	No	0m	51m	No	1.8m
RUB1	Library Way Way off New Road, LP at end of Library Way backs onto A38 B45 9JS	Roadside	398555	277200	NO2	no	12m	2m	No	1.6m
RES 1	26 Stourbridge Road, Hagley Downpipe Front of Property	Roadside	391445	281179	NO2	Yes	0m	15m	No	2.10m
RES 2	21 Birmingham Road, Hagley, DY9 9JZ	Roadside	391556	281042	NO2	Yes	0m	15m	No	2.20m

9	78 Kidderminster Road, Hagley	Roadside	391210	280668	NO2	Yes	0m	8.3m	No	1.98m
KR62	62 Kidderminster Road	Roadside	391182	280631	NO2	Yes	0m	7m	No	1.98m
RES 3	104 Kidderminster Road South, Hagley Downpipe Front of Property	Roadside	389827	279590	NO2	No	0m	14.3m	No	2.00m
HAG 4	On Lamppost 162 by Bus Stop opposite Shell Garage on Worcester Road, West Hagley	Roadside	389850	279588	NO2	No	1m	5.5m	No	2m
HAG 3	1 Cross Keys Mews , Worcester Road, West Hagley, DY9 0LG	Roadside	389909	279629	NO2	No	0m	3m	No	1.6m
RES 4	23 Worcester Road, Hagley DY9 0LF Downpipe Front of Property	Roadside	390025	27965	NO2	No	0m	14.5m	No	2.10m
HAG 2	69 Worcester Road, West Hagley, DY9 0LF	Roadside	390203	279945	NO2	No	0m	13m	No	1.8m
HAG 1	79 Worcester Road, Hagley, DY9 0LF	Roadside	390247	279996	NO2	No	0m	12m	No	1.9m
11	74 Worcester Lane, Hagley	Roadside	390295	280043	NO2	No	N	2.75m	No	1.88m
KEN	Lampost 3 o/s 12 & 14 Kendal Close	Urban Background	396683	270354	NO2	no	7m	1.7m	No	2.4m
SR	2 Stoke Road, Aston Fields, Bromsgrove	Roadside	396780	269450	NO2	No	0m	4.9m	No	1.88m
18	84 Redditch Road, Bunsford Hill	Roadside	395180	268549	NO2	Yes	0m	1.6m	No	2.01m
19	93 Redditch Road, Bunsford Hill	Roadside	395188	268564	NO2	Yes	0m	2.7m	No	1.93m
HR	52 Hanbury Road,	Roadside	394772	268441	NO2	No	0m	5m	No	2.20m

	Stoke Heath									
16	58 Redditch Road, Bromsgrove	Roadside	394701	268444	NO2	Yes	0m	2.3m	No	2.16m
255	255 Worcester Road (A38 Roundabout)	Roadside	394408	268417	NO2	No	0m	12m	No	2.31m

Notes:

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

(2) N/A if not applicable.

Table A.2 – Annual Mean NO_2 Monitoring Results

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2019 (%) (2)	NO_2 Annual Mean Concentration (µg/m^3) (3) (4)				
							2015	2016	2017	2018	2019
FL1	395079	269797	Roadside	Diffusion Tube	100	100	19.81	22.11	17.69	21.20	16.41
FL2	395118	269721	Roadside	Diffusion Tube	100	100	33.86	33.20	30.51	37.22	29.06
RH1	359243	269844	Roadside	Diffusion Tube	100	100	33.30	34.81	27.43	31.05	23.74
WR4	395312	269938	Roadside	Diffusion Tube	100	100	30.81	32.17	26.92	31.20	24.42
WR2	395511	270180	Roadside	Diffusion Tube	100	100	36.31	38.65	29.25	36.66	30.97
WR3	395501	270190	Roadside	Diffusion Tube	100	100	32.72	33.19	28.61	30.82	24.61
BC	395685	270424	Roadside	Diffusion Tube	100	100	**47.59**	**47.31**	39.68	**43.99**	37.98
BCX	395807	270549	Roadside	Diffusion Tube	100	100	**43.03**	**45.09**	34.54	**43.98**	36.47
WR	395702	270423	Roadside	Diffusion Tube	100	100	37.06	38.75	32.21	37.94	31.54
BG1	396238	27118	Roadside	Diffusion Tube	100	100	31.98	33.71	27.30	32.50	26.30
BR	396292	271210	Roadside	Diffusion Tube	100	100	28.63	30.15	22.84	29.21	23.51
LE7	396916	273014	Urban Background	Diffusion Tube	100	100	30.58	34.76	25.76	33.40	23.62
1	396999	272979	Roadside	Diffusion Tube	100	100	25.51	29.39	22.28	27.02	19.41
LE4	396935	272949	Roadside	Diffusion Tube	100	100	**54.45**	**57.99**	**46.36**	**50.93**	**40.15**
LIK1	396939	272934	Roadside	Diffusion Tube	100	100					26.86
LIK 2	396995	273129	Roadside	Diffusion Tube	100	100					26.22

LE5	396999	273143	Roadside	Diffusion Tube	100	100	35.15	36.07	31.36	32.49	26.86
LE6	396958	273157	Urban Background	Diffusion Tube	100	100	30.54	31.77	27.38	29.66	23.03
F1	397010	273112	Roadside	Diffusion Tube	100	100	**54.45**	**57.99**	**46.36**	**50.93**	**43.35**
TS	396613	275085	Rural	Diffusion Tube	100	100	25.47	26.76	19.93	23.60	18.19
RUB 1	398555	277200	Roadside	Diffusion Tube	100	100					23.63
RES 1	391445	281179	Roadside	Diffusion Tube	100	100	20.54	22.29	17.88	20.74	17.06
RES 2	391556	281042	Roadside	Diffusion Tube	100	100	32.26	34.72	27.81	30.68	24.62
9	391210	280668	Roadside	Diffusion Tube	100	100	32.44	34.49	27.36	30.91	23.74
KR62	391182	280631	Roadside	Diffusion Tube	100	100	32.17	33.86	27.70	31.05	23.98
RES 3	389827	279590	Roadside	Diffusion Tube	100	100	19.35	21.71	16.99	19.64	15.71
HAG 4	389850	279588	Roadside	Diffusion Tube	100	100				33.91	25.11
HAG 3	389909	279629	Roadside	Diffusion Tube	100	100				**47.01**	33.74
RES 4	390025	27965	Roadside	Diffusion Tube	100	100	32.70	35.67	27.92	32.40	24.72
HAG 2	390203	279945	Roadside	Diffusion Tube	100	100				28.35	21.36
HAG 1	390247	279996	Roadside	Diffusion Tube	100	100				24.48	21.33
11	390295	280043	Roadside	Diffusion Tube	100	100	27.68	31.28	23.22	27.70	22.00
KEN	396683	270354	Urban Background	Diffusion Tube	100	100				21.31	17.59
SR	396780	269450	Roadside	Diffusion Tube	100	100	26.80	29.90	19.64	26.41	21.72
18	395180	268549	Roadside	Diffusion Tube	100	100	35.03	**40.50**	30.65	33.70	26.48
19	395188	268564	Roadside	Diffusion Tube	100	100	35.40	**40.49**	33.10	35.07	27.58

HR	394772	268441	Roadside	Diffusion Tube	100	100	30.62	34.38	26.54	32.90	25.55
16	394701	268444	Roadside	Diffusion Tube	100	100	32.24	35.18	28.23	28.19	25.01
255	394408	268417	Roadside	Diffusion Tube	100	100	24.84	28.09	21.28	23.84	16.75

☒ **Diffusion tube data has been bias corrected**

☒ **Annualisation has been conducted where data capture is <75%**

☒ **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 adjustment**

Notes:

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

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

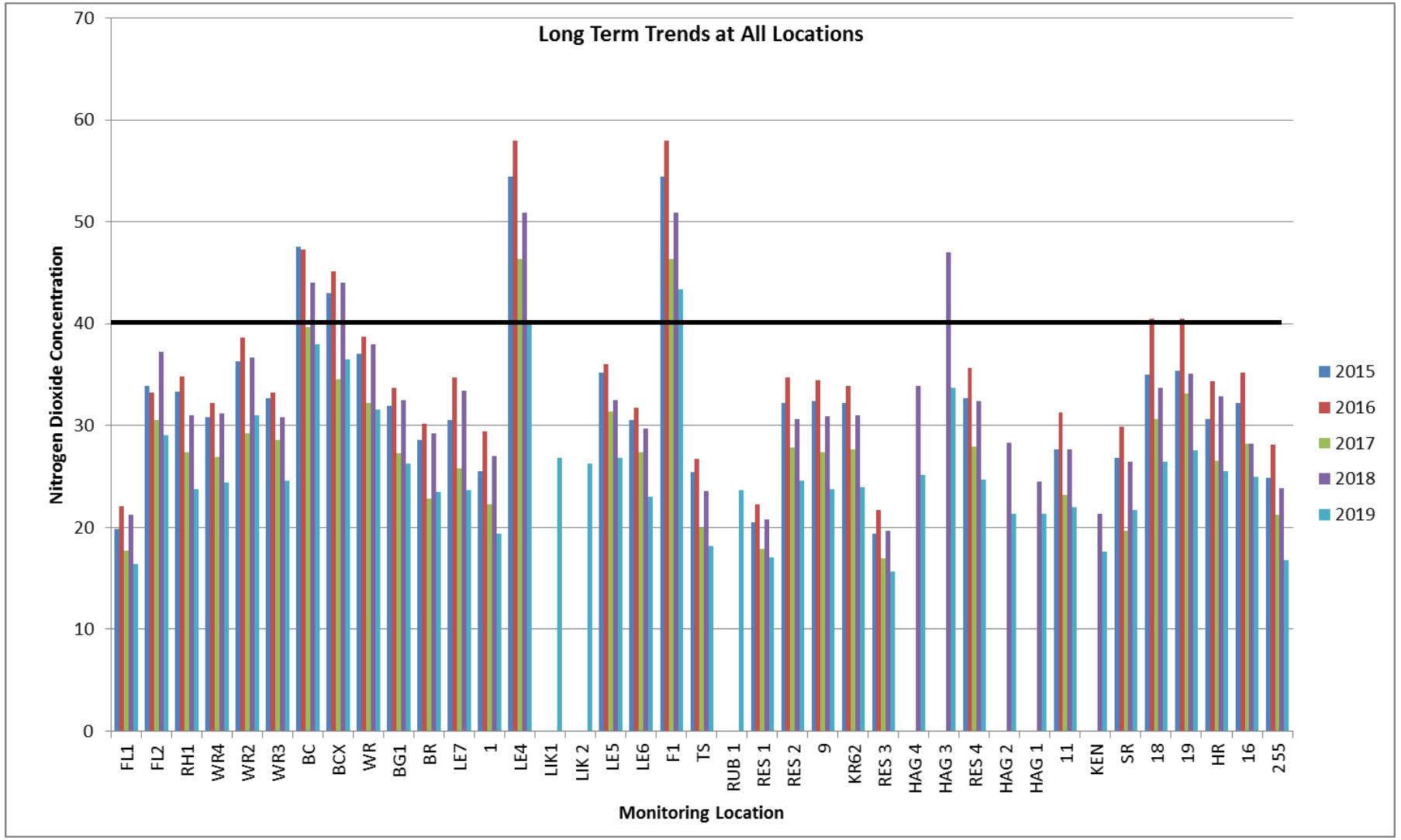
(1) Data capture for the monitoring period, in cases where monitoring was only carried out for part of the year.

(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%).

(3) Means for diffusion tubes have been corrected for bias. All means have been "annualised" as per Boxes 7.9 and 7.10 in LAQM.TG16 if valid data capture for the full calendar year is less than 75%. See Appendix C for details.

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

Figure A.1 – Trends in Annual Mean NO_2 Concentrations



Appendix B: Full Monthly Diffusion Tube Results for 2019

Table B.1 - NO_2 Monthly Diffusion Tube Results - 2019

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	NO_2 Mean Concentrations (µg/m^3)														
			Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean		
															Raw Data	Bias Adjusted (0.78) and Annualised (1)	Distance Corrected to Nearest Exposure (2)
FL1	395079	269797	18.50	25.09		24.01	18.15	17.30	15.98	11.94	25.38	22.87	31.15		21.04	16.41	
FL2	395118	269721	46.58	43.94	33.04	21.53		34.11	35.42	32.38	50.59	35.90	34.19	42.02	37.25	29.06	23.4
RH1	359243	269844	37.24	32.30	29.92	29.25	27.13	24.80	24.97	21.75	34.28	35.34	36.73	31.56	30.44	23.74	
WR4	395312	269938	39.78	33.05	35.02	33.31	25.23	25.83	25.54	22.47	35.48	31.64	36.11	32.24	31.31	24.42	
WR2	395511	270180	42.44	41.27	34.97			33.69			44.39	39.13	45.01	36.79	39.71	30.97	
WR3	395501	270190	39.19	30.33	36.29	28.92	29.07	26.31	26.34	21.90	39.79	30.26	40.51	29.67	31.55	24.61	
BC	395685	270424	59.35	51.37	51.95	39.23	46.67	39.25	44.46	40.85	56.17	51.86	53.69	49.39	48.69	37.98	
BCX	395807	270549	47.35	52.81	42.04	56.92	43.38	38.22	38.39	32.02	56.24	49.44	55.55	48.76	46.76	36.47	
WR	395702	270423	44.99	44.48	39.66	46.33	37.94	39.61	33.97	29.04	46.07	39.49	39.27	44.30	40.43	31.54	
BG1	396238	27118		36.78	31.78	37.99	30.67	30.72	28.27	21.70	41.06	35.39	42.65	33.90	33.72	26.30	
BR	396292	271210	37.77	32.30	27.03	29.80	26.23	23.04	23.09	20.82	35.13	31.79	44.51	30.17	30.14	23.51	
LE7	396916	273014		36.74	23.99	41.82	29.22		21.10	17.02	33.01	29.33	45.86	24.71	30.28	23.62	
1	396999	272979	34.94	23.92	26.50	25.63	24.78	19.90	20.36	15.43	30.40	24.05	31.32	21.32	24.88	19.41	
LE4	396935	272949	64.62		56.44	43.62	55.24	46.62	42.72	39.62	61.54	54.52	51.78	49.42	51.47	**40.15**	26.5
LIK1	396939	272934	46.53	36.36	36.95	31.11	35.70	29.15	29.26	26.16	42.83	34.62	34.70	29.93	34.44	26.86	
LIK 2	396995	273129	41.92	37.75	36.09	27.94	26.48	28.30	28.69	26.58	39.30	33.69	39.43	37.28	33.62	26.22	

LE5	396999	273143	43.98	36.90	38.20	28.34	29.87	28.79	29.12	27.76	41.63	33.49	37.41	37.77	34.44	26.86	
LE6	396958	273157	39.37	35.67	33.44	24.35	25.58	25.40	25.73	25.39	36.54	19.64	30.92	32.25	29.52	23.03	
F1	397010	273112	56.04	62.69	54.00	67.01	48.41	50.43	48.42	50.15	64.72	54.22	53.64	57.26	55.58	**43.35**	25.8
TS	396613	275085	28.02	29.37	17.71	32.24	19.05	20.08	16.22	15.84	27.08	27.59			23.32	18.19	
RUB 1	398555	277200	39.37	28.98	31.46	32.69	28.17	21.41	25.49	21.08	36.19	32.97	39.60	26.16	30.30	23.63	
RES 1	391445	281179	27.55	28.46	19.69	22.04	17.75	18.69	15.65	15.69	23.83	22.82	28.90	21.37	21.87	17.06	
RES 2	391556	281042	40.43	32.36	35.10	32.86	30.87	26.67	28.88	22.93	35.76	29.69	35.49	27.85	31.57	24.62	
9	391210	280668	37.24	31.45	31.86		30.97	29.82	27.47	19.38	34.49	29.43	35.21	27.41	30.43	23.74	
KR62	391182	280631	36.83	35.35	37.54	28.39	29.47	28.42	28.03	19.03	34.07	29.79	31.83	30.12	30.74	23.98	
RES 3	389827	279590	23.05	24.67	17.45	27.73	15.96	18.15	13.96	12.91	20.93	20.15	28.05	18.71	20.14	15.71	
HAG 4	389850	279588	37.24	32.68	30.21	41.14		28.73	26.24	21.59	36.47	32.72	36.67	30.41	32.19	25.11	20.0
HAG 3	389909	279629	50.74	43.78	40.52	49.77	40.74	43.42	43.38	32.48	46.07	42.88	45.18	39.99	43.25	33.74	
RES 4	390025	27965	43.27	30.33	29.35	36.92	31.11	27.03	26.76	21.85	34.00	30.10	40.84	28.72	31.69	24.72	
HAG 2	390203	279945	31.33	28.83	28.75	32.80	26.96	23.35	20.83	16.92	30.47	29.08	32.22	27.12	27.39	21.36	
HAG 1	390247	279996	34.17	30.54	29.08	31.23	24.61	20.26	22.76	20.51		27.13	34.87	25.72	27.35	21.33	
11	390295	280043	35.11	32.46	24.52	32.97	24.68	23.16	20.83	18.67	30.75	29.90	38.76	26.59	28.20	22.00	
KEN	396683	270354	34.93	25.12	23.86	18.48	17.50	17.97	16.15	17.30	23.18	21.97	31.25	22.89	22.55	17.59	17.1
SR	396780	269450	39.55	30.16	27.68	28.89	26.09	24.86	22.22		28.26	26.60	35.09	16.82	27.84	21.72	
18	395180	268549	47.96	40.95	34.53	39.79	27.64	28.61	25.17	23.28	28.25	35.79	44.93	30.46	33.95	26.48	
19	395188	268564	44.94	39.85	35.50	36.46	32.42	32.23	28.41	27.47	33.93	35.79	43.94	33.40	35.36	27.58	
HR	394772	268441	44.34	33.61		35.49	31.75	26.31	28.27	25.49	31.58	31.01	43.30	29.07	32.75	25.55	
16	394701	268444	42.39	38.75	28.54	31.98	26.58	27.88	26.53	26.82	30.79	30.60	40.15	33.70	32.06	25.01	
255	394408	268417	33.63	27.56	23.51	10.18	19.43	19.54	17.68	18.39	21.66			23.24	21.48	16.75	

☐ **Local bias adjustment factor used**

☒ **National bias adjustment factor used**

☒ **Annualisation has been conducted where data capture is <75%**

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

Notes:

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

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

(1) See Appendix C for details on bias adjustment and annualisation.

(2) Distance corrected to nearest relevant public exposure.

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

QA/QC Data

Factor from Local Co-location Studies (if available)

No local co-location studies for nitrogen dioxide have been undertaken in 2019.

Diffusion Tube Bias Adjustment Factors

The following UKAS accredited company provides Bromsgrove District Council with nitrogen dioxide diffusion tubes and analysis:

Somerset Scientific Services,
Unit 2A,
Westpark 26
Chelston
Wellington
Somerset

TA21 9AD

01823 355906

sssmailbox@somerset.gov.uk

The 20% Triethanolamine (TEA) / De-ionised Water preparation method is used. The bias adjustment factor applied to the results in 2019 was 0.78 (Spreadsheet Version No. 03/20) which were derived from the national studies.

QA/QC of Automatic Monitoring

No Automatic Monitoring Data is available for 2019.

QA/QC of Diffusion Tube Monitoring

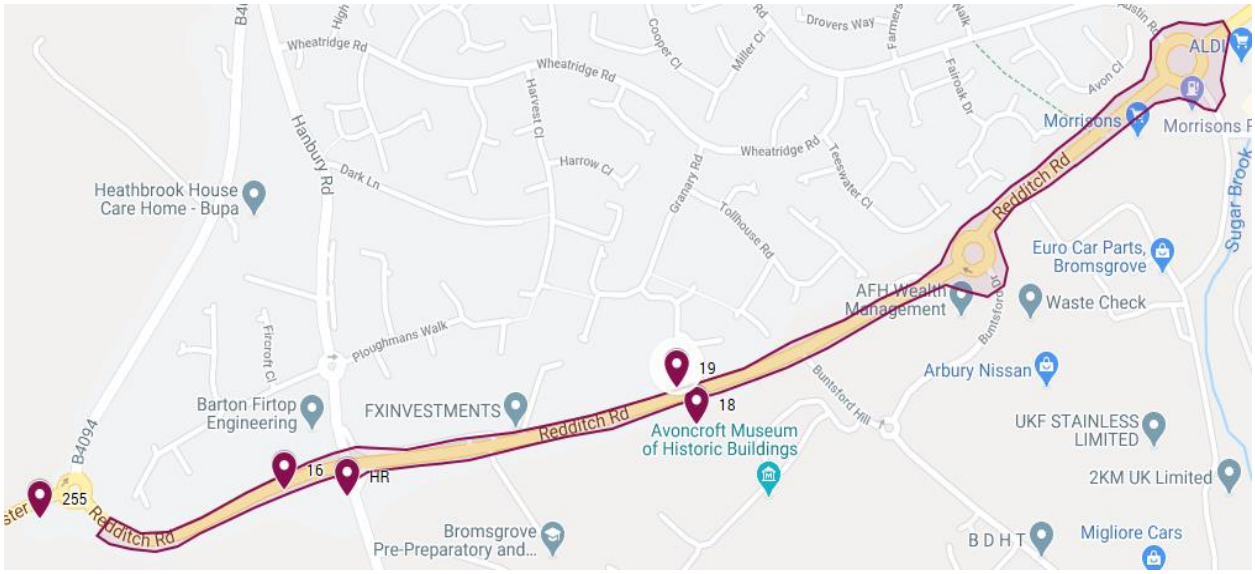
Under the AIR NO_2 Proficiency Testing Scheme Somerset Scientific Services performed 100% satisfactory for the period January to November 2019. Tube precision was ‘Good’ throughout 2019.

Fall-off with Distance Calculations

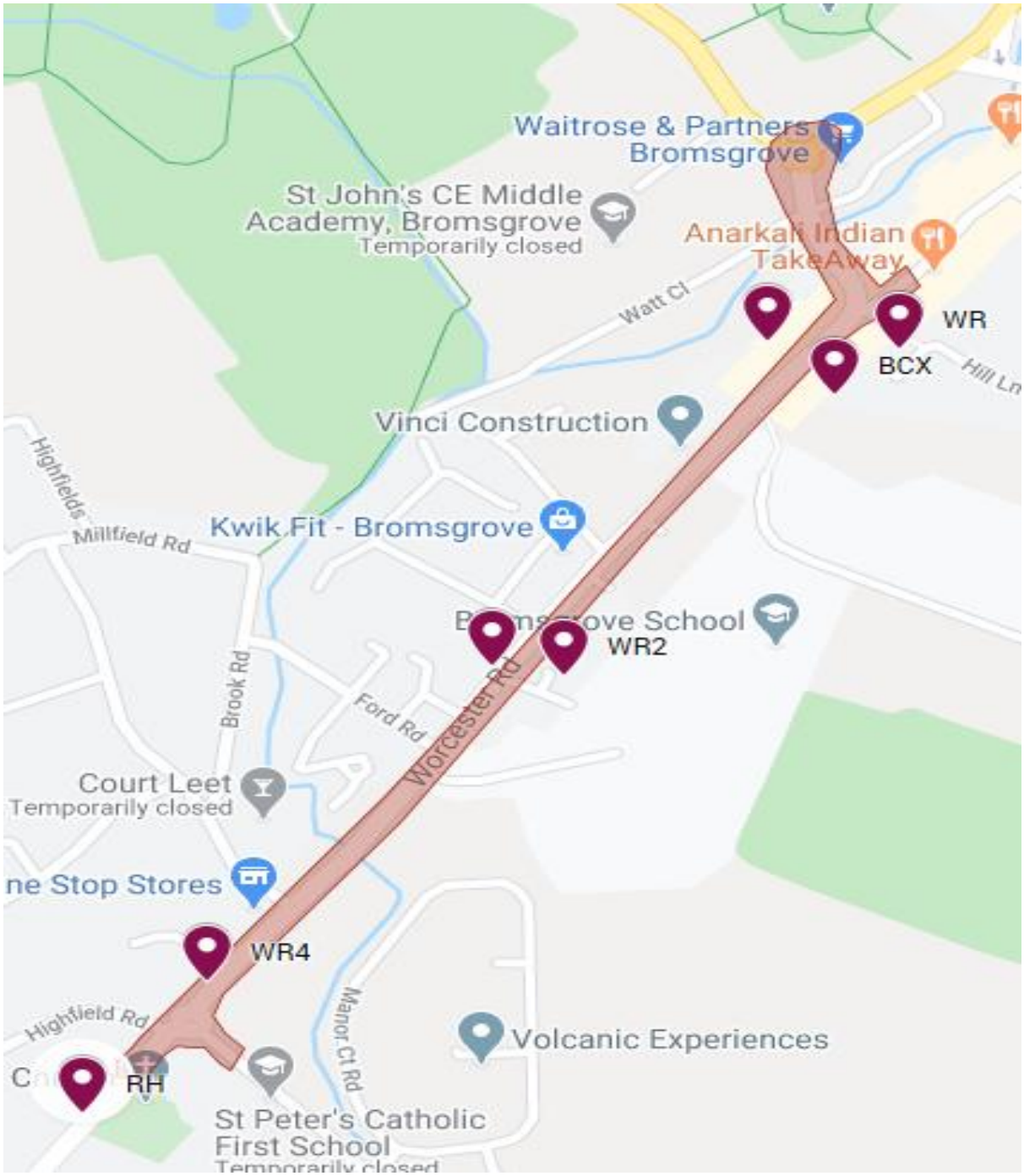
Site Name/ID	Distance (m)		NO_2 Annual Mean Concentration ($\mu g/m^3$)		
	Monitoring Site to Kerb	Receptor to Kerb	Background	Monitored at Site	Predicted at Receptor
FL2	1.4	6.0	11.5	29.1	23.4
LE4	1.4	12.4	11.5	40.2	26.5
F1	2.3	22.3	11.5	43.4	25.8
HAG4	1.0	6.5	11.5	25.1	20.0
KEN	7.0	8.7	11.5	17.6	17.1

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

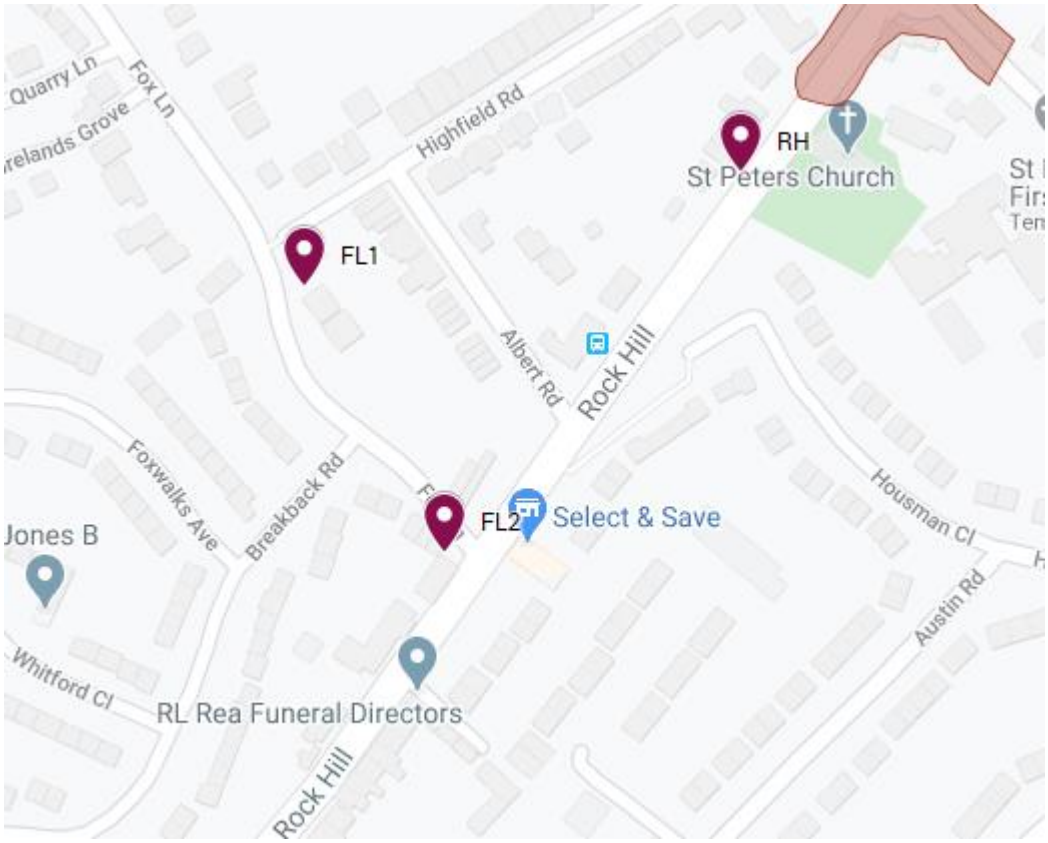
Lickey End AQMA and Monitoring Locations



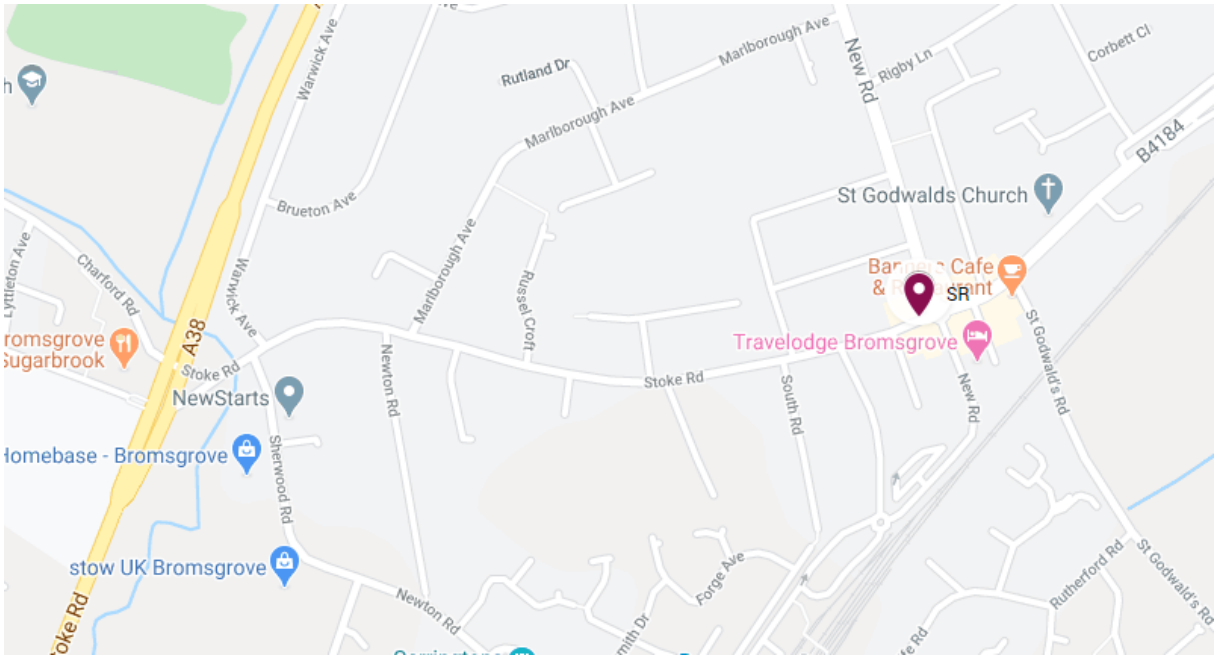
Redditch Road AQMA and Monitoring Locations



Worcester Road AQMA and Monitoring Locations



Rock Hill, Bromsgrove Monitoring Locations (FL1, FL2, RH)

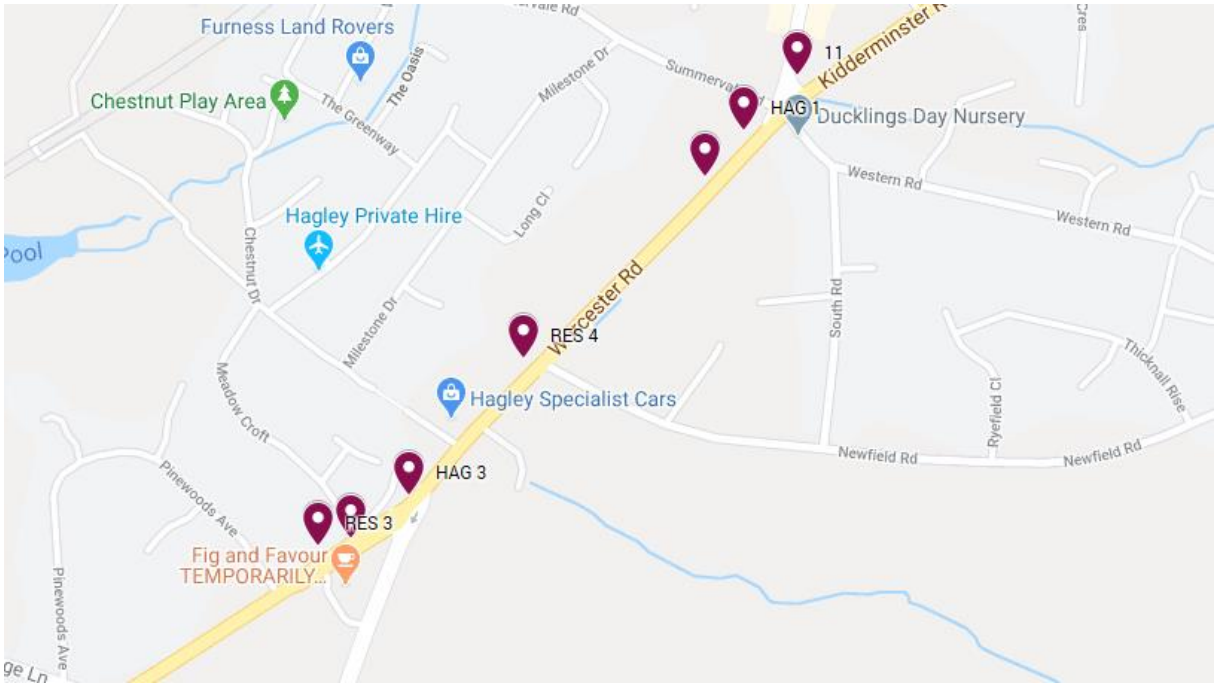


Aston Fields, Bromsgrove Monitoring Location (SR)

Bromsgrove Monitoring Locations (BR, BG1, KEN)

Wildmoor, Bromsgrove Monitoring Location (TS)

Monitoring Locations Former Hagley AQMA



West Hagley Monitoring Locations

Rubery Monitoring Location (RUB1)

Appendix E: Summary of Air Quality Objectives in England

Table E.1 – Air Quality Objectives in England

Pollutant	Air Quality Objective[8]	
	Concentration	Measured as
Nitrogen Dioxide (NO_2)	200 µg/m^3 not to be exceeded more than 18 times a year	1-hour mean
	40 µg/m^3	Annual mean
Particulate Matter (PM_{10})	50 µg/m^3, not to be exceeded more than 35 times a year	24-hour mean
	40 µg/m^3	Annual mean
Sulphur Dioxide (SO_2)	350 µg/m^3, not to be exceeded more than 24 times a year	1-hour mean
	125 µg/m^3, not to be exceeded more than 3 times a year	24-hour mean
	266 µg/m^3, not to be exceeded more than 35 times a year	15-minute mean

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

Glossary of Terms

Abbreviation	Description
AQAP	Air Quality Action Plan - A detailed description of measures, outcomes, achievement dates and implementation methods, showing how the local authority intends to achieve air quality limit values'
AQMA	Air Quality Management Area – An area where air pollutant concentrations exceed / are likely to exceed the relevant air quality objectives. AQMAs are declared for specific pollutants and objectives
ASR	Air quality Annual Status Report
BDC	Bromsgrove District Council
Defra	Department for Environment, Food and Rural Affairs
DMRB	Design Manual for Roads and Bridges – Air quality screening tool produced by Highways England
EU	European Union
FDMS	Filter Dynamics Measurement System
LAQM	Local Air Quality Management
NO_2	Nitrogen Dioxide
NO_x	Nitrogen Oxides
PM_{10}	Airborne particulate matter with an aerodynamic diameter of 10µm (micrometres or microns) or less
$PM_{2.5}$	Airborne particulate matter with an aerodynamic diameter of 2.5µm or less
QA/QC	Quality Assurance and Quality Control
SO_2	Sulphur Dioxide
WCC	Worcestershire County Council
WRS	Worcestershire Regulatory Services

References

1. DEFRA (2016) 'Local Air Quality Management Policy Guidance LAQM PG.(16)'

2. DEFRA (2016) 'Local Air Quality Management Technical Guidance LAQM TG.(16)'

3. DEFRA (2020) 'National Diffusion Tube Bias Adjustment Factor Spreadsheet v.03/20

4. Worcestershire Regulatory Services (2013) 'Air Quality Action Plan for Worcestershire'

5. Worcestershire Regulatory Services (2015) 'Air Quality Action Plan Progress Report for Worcestershire April 2013-April 2015'

6. Worcestershire Regulatory Services (2016) 'Air Quality Action Plan Progress Report for Worcestershire April 2015 – March 2016'

7. Worcestershire Regulatory Services (2017) 'Kidderminster Road, Hagley AQMA Revocation Screening Assessment'

8. Worcestershire Regulatory Services (2018) 'Annual Status Report – Bromsgrove District Council'

9. Worcestershire Regulatory Services (2019) 'Annual Status Report – Bromsgrove District Council'

10. Worcestershire Regulatory Services Website http://www.worcsregservices.gov.uk/pollution/air-quality/