



# 2022 Air Quality Annual Status Report (ASR)

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

Date: October 2022

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<b>Report Reference Number</b>	SC_ASR2022
<b>Date</b>	October 2022

# Executive Summary: Air Quality in Our Area

## Air Quality in Shropshire

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

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

Shropshire Council has two Air Quality Management Areas (AQMAs) in force; Bridgnorth Pound Street AQMA and Shrewsbury No 3 AQMA. Both AQMA's are declared for exceedances of the annual objective level (<40ug/m<sup>3</sup>) for Nitrogen Dioxide, NO<sub>2</sub>.

Bridgnorth Pound Street AQMA is still required as nitrogen dioxide levels exceed the annual average national objective level. 18 residential properties were found to be likely to be exposed to levels of NO<sub>2</sub> above the National Objective Level in previous years. Whilst the overall 5year trend within the AQMA appears to be a overall reduction in levels, 2021 concentrations are all increased upon 2019 and 2020. This is to be expected, with the dramatic changes in traffic seen through the pandemic, the rate to which concentrations return to pre-pandemic trend is yet to be identifiable.

Data from 2020 shows that the national objective level was met with the highest monitored NO<sub>2</sub> result being found to be 39.7 µg/m<sup>3</sup>, just 0.3 units below the objective level. This shows the scale of the challenge given significant vehicle reductions in 2020 due to local

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

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

<sup>3</sup> Defra. Air quality appraisal: damage cost guidance, July 2021

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

and national Covid restrictions and lockdown measures. The 2021 exceedances confirm that the AQMA is still required and monitoring will continue in this area. The 2022 AQAP Review project will look to provide detailed assessment for the AQMA and identify feasible interventions to reduce concentrations.

Shrewsbury No 3 AQMA, covering Shrewsbury Town Centre, is still required although there is only an exceedance of the national objective level at one monitoring location where there is relevant exposure on Castle Foregate. It is anticipated that there are only a few relevant receptors in the AQMA which are exposed to levels of nitrogen dioxide above the national objective level however the objective level has previously breached by a considerable amount, around 30%.

The highest NO<sub>2</sub> level to be recorded at a residential receptor was 52 µg/m<sup>3</sup> in 2019 on Castle Foregate opposite the train station. This was the lowest result ever recorded at this location. The previous lowest recorded result was 53.6 µg/m<sup>3</sup> in 2014. This is promising news and reinstates a slight downward trend previously bucked by the 2018 result for this location. Despite the welcome reduction in pollutant the AQMA is still very much required. In 2020 despite significant vehicle reductions in due to local and national Covid restrictions and lockdown measures the National Objective Level was only met by 0.1 unit showing the scale of the challenge in “normal” times. In 2021 this location, DF438, gave a concentration of 43.9 µg/m<sup>3</sup>, and calculates as 43.3 µg/m<sup>3</sup> as predicted concentration at the receptor. Whilst below 2019 levels, this, indicates the ongoing requirement for the AQMA and will be subject to further assessment within the 2022 AQAP review project. DF458 (Located away from receptors) shows further exceedances of the annual objective level, but indicates levels remain below the threshold of concern for predicted breaches of the 24-hr mean. Ongoing monitoring and assessment is clearly required.

Overall the monitoring data indicates downward trends within in the AQMAs, though within the 2019/2020 decrease has been exaggerated by the of Covid measures on road vehicle numbers.

Shropshire Council continues to consider air pollution throughout a number of services and departments with air quality measures found in many policies across the Council. Most recently, LTP4 is being produced and air quality is noted as one of 12 areas requiring attention. No *significant* new sources have been identified and confirmed. Ongoing attention is being paid to the potential Shrewsbury North West Relief Road (Shrewsbury NWRR). Detailed design and assessment has been carried out with a planning application

currently submitted: 21/00924/EIA. An air quality impact assessment has been submitted and audited in respect of human health impact. It has been found that the NWRR will promote better air quality in the hotspot pollution area in Shrewsbury while creating some increases in areas with headroom below the national objective levels. This balance is considered to be positive in respect of the LAQM regime and will be subject to further assessment within the 2022 AQAP review project. The Council is in the initial stages of identifying a further potential source of particulates, see Appendix C 'New or Changed Sources Identified Within Shropshire Council During 2021'.

In the past Shropshire Council has worked with partners such as the Environment Agency to gather data on poultry houses. This information is now up to date and no further information has been required. No additional intensive agriculture units have been granted planning permission which met the screening criteria for detailed assessment. Where applications look likely to meet the relevant criteria comments are provided at planning application stage to ensure that relevant detail is submitted with any planning application.

Highways England have previously been contacted over the A49 which runs through Bayston Hill. In 2017 and 2018 the annual average national objective level for NO<sub>2</sub> was exceeded at this location on the Highways England road network. In 2020, no exceedance was found with the same occurring in 2021. As such although discussions will continue to be held no projects are underway or required at this time as it is expected that road vehicle emissions will continue to improve over future years. One aspect that may buck this trend is vehicle movements to and from Bayston Hill quarry. Should these rise trends could be reversed. As the AQMAs in force in Shropshire Council's area are both primarily a result of vehicle emissions on Council managed roads there is no reason for other partners to be significantly involved at this time.

Shropshire Council have commissioned Bureau Veritas to undertake AQAP reviews for both AQMA's. It is envisaged that this process will take 12 months to complete and a revised AQAP adopted formally once the commissioned work has commenced. Details of Shropshire Council AQMAs can be found at [https://ukair.defra.gov.uk/aqma/local-authorities?la\\_id=442](https://ukair.defra.gov.uk/aqma/local-authorities?la_id=442).

## Actions to Improve Air Quality

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

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

In 2021, Shropshire Council did not undertake direct interventions which could be quantifiably measured, this is primarily due to resource challenges in wake of Covid-19 disruption. Substantial efforts were made to input into internal council policies and strategies, where there is significant potential for both long and short-term air-quality improvements. This included participation within the development of the Local Transport Plan (LTP4), and Hackney Carriage / Private Hire policy and the Local Cycling and Walking Infrastructure Plan (LCWIP). In light of previous ASR feedback, the Council commissioned and committed to reviews of Air Quality Action Plans (AQAP's) for both Shrewsbury and Bridgnorth air quality management areas (AQMA's). As part of project the Council has set-up a cross-departmental internal Air Quality Steering Group, with scope to invite external stakeholders at relevant stages of the process .

## Local Engagement and How to get Involved

Shropshire Council has engaged with local decision makers and the public through involvement in place shaping workstreams, e.g. Shrewsbury Big Town Plan (SBTP) and Oswestry Masterplan while also ensuring attendance at the LTP4 themed workshops on Air Quality and the Environment. Some of the above contain members from the local community, town council and/or BID groups as well as interested members of the community.

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

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

To reduce air pollution and contribute to clean air everyone living, working and visiting the area can contribute. Every individual and business can promote clean air and help make a difference by considering the following actions:

Avoid driving into congested areas: it is good for your health and your wealth.

By planning your journey to avoid congested areas you can make a positive difference. Parking on the edge of town is often cheaper than parking in town centres saving you money. Walking into town from edge of town carparks keeps you active and is good for your family's health. By not driving into congested, polluted areas you reduce your family's exposure to harmful air pollutants and stop your own vehicle emissions contributing to the problem. An alternative to walking and cycling is to use a Park and Ride or a bus service to get you the final mile.

- To help plan your journey find Shropshire Council car parks: <https://www.shropshire.gov.uk/parking/find-my-nearest-car-park/> .
- For Park and Ride information in Shropshire: <https://www.shropshire.gov.uk/public-transport/park-and-ride/> .

Consider your commute

If you regularly drive to work you may be able to save money by adopting the steps above. You could also reduce the amount of money you spend on fuel and parking by:

- using the Park and Ride service
- cycling or walking to work. By cycling or walking into work once a week you would reduce your emissions by 20%.
- Car share: this can be a very effective way of reducing numbers of vehicles on the road and saving money, the further your journey the more you stand to save. The more you share, the more you save.

Doing the school run - not the school sit

Travel to take children to school contributes to the congestion on our roads at a time of day when there are increased vehicle numbers due to people travelling to work. Where the school is within walking/cycling distance we would encourage this method of transport. Not only would this save money in fuel costs and improve air quality by reducing congestion it would also add active travel to your regular journeys helping to improve your family's health by introducing regular exercise. Getting children into the habit of walking can provide lifelong benefits to them and their families in turn.

### Consider your fuel

Electric vehicles are on the rise in the UK with some predictions suggesting 90% of registered vehicles in 2025 will be pure electric. In July 2021 more electric powered new vehicle registrations were made than registrations for diesel vehicles showing a shift toward cleaner more sustainable fuel.

With prices falling in line with vehicles powered by other fuels and ranges ever increasing electric powered vehicles could be the way for you and your family or business to make a difference and reduce air pollution and your individual carbon footprint.

## **Local Responsibilities and Commitment**

This ASR was prepared by the Environmental Protection Team, Public Health of Shropshire Council with the support and agreement of the following officers and departments:

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# 1 Local Air Quality Management

This report provides an overview of air quality in Shropshire during 2021. It fulfils the requirements of Local Air Quality Management (LAQM) as set out in Part IV of the Environment Act (1995) and the relevant Policy and Technical Guidance documents.

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

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

## 2 Actions to Improve Air Quality

### 2.1 Air Quality Management Areas

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

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

Table 2.1 – Declared Air Quality Management Areas

AQMA Name	Date of Declaration	Pollutants and Air Quality Objectives	One Line Description	Is air quality in the AQMA influenced by roads controlled by National Highways?	Level of Exceedance: Declaration	Level of Exceedance: Current Year	Name and Date of AQAP Publication	Web Link to AQAP
Shrewsbury No 3 AQMA	Declared 1/5/2003, Amended 1/3/2006	NO2 Annual Mean	The area comprising Frankwell, part of Bridge Street and Smithfield Road Castle Gates and adjacent land, extending to encompass most of the Town Centre including High Street, Wyle Cop, English Bridge and Coleham Head gyratory.	NO	86µg/m <sup>3</sup>	43.3µg/m <sup>3</sup>	Shrewsbury Air Quality Action Plan: 2008	<a href="https://www.shropshire.gov.uk/media/5218/shrewsbury-aqap-2008.pdf">https://www.shropshire.gov.uk/media/5218/shrewsbury-aqap-2008.pdf</a>
Bridgnorth Pound Street AQMA	Declared 1/4/2005	NO2 Annual Mean	An area encompassing Pound Street and the junction of Whitburn Street and Salop Street.	NO	54.1µg/m <sup>3</sup> (in 2010)	41.3µg/m <sup>3</sup>	Bridgnorth Air Quality Action Plan: 2008	<a href="https://www.shropshire.gov.uk/media/5215/bridgnorth-dc-action-plan-pdf.pdf">https://www.shropshire.gov.uk/media/5215/bridgnorth-dc-action-plan-pdf.pdf</a>

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

Shropshire Council confirm that all current AQAPs have been submitted to Defra

## 2.2 Progress and Impact of Measures to address Air Quality in Shropshire

Defra's appraisal of last year's ASR concluded the following points (*Italicised*), responses are provided below each point where required:

1. *Trends are presented and discussed, and a robust comparison to air quality objectives is provided.*

Shropshire Council have endeavoured to present trends to a similar standard in this ASR.

2. *The Council has taken the decision to add six new diffusion tube sites to their monitoring network in light of recent trends in monitoring results. This decision is supported as four of these are in the AQMA and will provide better understanding of the areas of concern within the AQMA.*

The Council has continued to review diffusion tube locations to better understand each AQMA and monitor for exceedances across the authority area.

3. *The Council has provided updated list of action plan measure and all the relevant fields have been completed with detailed comments. This is encouraging to see as it shows the Council's commitment to achieving the measures to improve air quality.*

Please see the below response for an update regarding Shropshire Councils action plan reviews.

4. *The AQAP for both AQMAs are out of date. The Council has commenced work on AQAP review and envisaged that the that this process will take 12 months to complete and a revised AQAP adopted formally once the commissioned work has commenced. Any progress should be reported in next year's report.*

The Council have commissioned external specialist consultants Bureau Veritas to undertake AQAP reviews for both AQMAs. The Council have formed a cross-departmental air quality steering group (AQSG) to review and inform this work, and several meetings were undertaken in 2021 prior to the commissioning of external consultants. It is anticipated that revised Action Plans should be in effect from early 2023, and progress shall be reported in next years ASR.

5. *It is suggested to add the name of AQMA on Table A.2.*

6. *The total number of monitoring sites is 63 and it is recommended to correct this on next year's reporting. The Council has reported having 69 monitoring sites, please note, the duplicate locations are counted as one.*

57 sites have been monitored in the 2021 period.

7. *Robust and accurate QA/QC procedures were applied. Calculations for bias adjustment, annualisation and distance correction were outlined in detail which enhances the reader's understanding.*
8. *The Council has responded to last year's appraisal comments and made changes to the report based on the comments. This is encouraging to see.*
9. *Overall, the report is detailed, concise and satisfies the criteria of relevant standards. The Council should continue their good and thorough work.*

Shropshire Council has continued efforts to implement measures during the current reporting year of 2021 in pursuit of improving local air quality. Details of all measures completed, in progress or planned are set out in Table 2.2. 12 measures are included within Table 2.2, with the type of measure and the progress Shropshire Council have made during the reporting year of 2021 presented. Where there have been, or continue to be, barriers restricting the implementation of the measure, these are also presented within Table 2.2.

More detail on these measures can be found in their respective Action Plans which can be found at: <https://www.shropshire.gov.uk/environmental-health/environmental-protection-and-prevention/air-quality/shropshire-council-air-quality-reports/>.

It should be stressed that the 2022 AQAP review project, will likely revise and identify and prioritise further measures and interventions, and therefore further detail/updates will be provided in 2022's ASR.

Key 2021 measures are:

- The Shrewsbury North West Relief Road has been subject to delays within the planning process whilst further information is sought, current expectations are that planning permission will be determined in late 2022. Reviews of the latest revisions continue to indicate that the impact on air quality impact on human health will be positive by reducing air pollution in hotspots, whilst levels may rise in others with headroom below National Objective Levels.

- The Hackney Carriage and Private Hire Vehicle Policy was updated in 2019 provided for an incremental betterment for vehicles entering the fleet. The policy was due to have a 5-year lifespan, but Shropshire Council identified that revised priorities and outcomes have necessitated further update. Input has been provided to encourage proportionate betterments in the revised timespan (2023 to 2027), this includes incentivising the uptake of electric vehicles.
- The active phase of the DEFRA grant-funded 'low-cost sensor' project ceased in the 2021 year due to resource and financial constraints. The initial course of the project was disrupted by Covid-19 (see 2020 annual status report), and Lane Closure Trials were not enacted in the 2021 year. The Council continues to maintain two low-cost sensors, and has commissioned an external review of the low-cost sensory data for the 2020-2021 years which will be reported in due course.
- Linear Car Park Strategy continues to promote edge of town car parking reducing travel into town centres. A review of the strategy is proposed in 2022.
- Council CarClub: CarClub activity has reduced due to ongoing widespread homeworking across all council departments. As highlighted previously, although this may reduce impact of the car club scheme, greater benefit may be achieved by a reduced overall need to travel by any form to an office. In addition to homeworking, the CarClub fleet was relocated to Park & Ride Hubs in 2021 due to vandalism on council premises, this will be reviewed and reported on in future ASR's.
- Electric vehicle charging points: 24 on-street EV chargers were installed in Shropshire in 2021 as part of a pioneering on-street charging scheme trial - (See <https://newsroom.shropshire.gov.uk/2021/11/pioneering-vehicle-charging-scheme/> ). Once the trial period is complete the network will be assigned to Shropshire Council for direct ongoing control. A range of opportunities to expand EV charging infrastructure continues to be explored for the public, commercial and council fleets. Discussions have taken place with a provider to consider an electric forecourt as part of the Oswestry Innovation Park at Mile End. Discussions are taking place around fast charging facilities in two additional towns.
- Active Transport Manager appointed providing a dedicated resource to develop LCWIP over the next 12 months.
- Local Transport Plan 4 LTP4: Officers continue to input into the LTP4 development at advisory and board level. To date this has realised air quality as a priority workstream to be considered in the formation of the document. Officers



further ensured that air quality was a key criterion considered within the Health Impact Assessment (HIA) for LTP4

- **Levelling Up Fund (LUF) Bids:** Air quality interventions have been discussed and included in Levelling Up Fund bids submitted to Central Government for consideration. Should this be successful the implementation of a scheme to provide interventions in the Shrewsbury hotspot will be carried forward.
- **Place Shaping:** Support for inclusion of air quality consideration in any place shaping activity in Shrewsbury has been established through approval of assistance for actions the Shrewsbury Programme Board which has been created to consider the many workstreams being considered to transform Shrewsbury to meet its current and future challenges. Other input into place-shaping programmes includes:
  1. Inclusion of policies into the draft Shropshire Local Plan which strongly support the integration of electric vehicle charging infrastructure into new development.
  2. Continued input into the Shrewsbury Big Town Plan to ensure place shaping takes on board air quality challenges.
- **Adoption of former social-distancing measures:** Social Distancing measures were introduced into town centre locations as part of Covid response reduced motor vehicle movements through Shrewsbury town centre. The measures have been partly retained in order to continue a focus for social distancing when required and increase retail and public amenity space available – this in turn provides a benefit for air quality. Wyle Cop/High Street continue to be pedestrianised on weekends and other key dates and the air quality impact of this will be considered in upcoming ASR's and detailed assessment in the 2022 AQAP review project.
- **Planning application commentary** on all relevant applications to consider air quality impacts and ensure no development occurs that will have significant impacts.

Shropshire Council expects the following measures to be completed over the course of the next reporting year:

- It is expected that a decision on the planning application for the **Shrewsbury NWRR** will be made.
- Completion of **DEFRA air quality grant** with reporting to DEFRA of the final outcomes including details of any trials undertaken.

- Completed and adopted LCWIPs to provide focus and direction to creating improved infrastructure for cycling and walking.
- A decision from Central Government on recent Levelling Up Fund allocation is expected. Should this be positive air quality interventions may be started in time to be reported on in 2023 ASR.
- The LTP4 is expected to be formulated and adopted.
- Completion, reporting and implementation of an AQAP review (2022 AQAP review project) for both Shrewsbury and Bridgnorth AQMAs are expected in the next 12 months.
- Funding secured to carry out modelling air quality in AQMAs with the ability to interrogate the model to consider the impact of specific interventions and development proposals.
- Phase 2 of the Linear Car Park Strategy to be undertaken – residential parking permit schemes in edge of town locations.

Shropshire Council's priorities for the coming year are:

- Progression with AQAP review including models of Shrewsbury and Bridgnorth AQMAs to enable consideration of intervention impact allowing prioritisation of interventions in future years.
- Completion of trial lane closure on Castle Foregates in Shrewsbury to enable a potential future detailed design and learn about potential impact on air quality.
- Adoption of LTP4 with inclusion of air quality emphasis.
- Adoption of LCWIPs to allow funding streams for active transport to be realised.

Shropshire Council worked to implement these measures in partnership with the following stakeholders during 2021:

- Town Councils within the Unitary Authority
- Highways Agency;
- Local Businesses.

The principal challenges and barriers to implementation that Shropshire Council anticipates facing are:

1. Funding: funding streams to carry out required modelling work and intervention development have been difficult to attain, particularly with the current economic climate. Potential internal funding streams have been considered in Bridgnorth through CIL funding and work to attain this is continuing alongside the AQAP review workstream.
2. Resource: Staff turnover in 2021 meant air quality work was not directly resourced for several months. Prolonged levels of high-service demand across all function areas has meant slower progress than anticipated. It is intended that the out-sourcing of the 2022 AQAP review project will allow further progress in 2022.

Shropshire Council anticipates that the measures stated above and in Table 2.2 will achieve compliance in Shrewsbury No 3 AQMA based on information and assessments available to-date. This will be reviewed and assessed within the 2022 AQAP review project and it is anticipated that new measures shall be identified as part of this process.

Whilst the measures stated above and in Table 2.2 will help to contribute towards compliance, Shropshire Council anticipates that further additional measures not yet prescribed will be required in subsequent years to achieve compliance and enable the revocation of Bridgnorth AQMA. A detailed list of interventions will be produced through the 2022 AQAP review in the coming 12 months. Feasibility assessments of any potential interventions will then be necessary. Although not stipulated in any plans to date it is considered likely that providing a traffic light junction in the centre of the AQMA will require consideration and feasibility appraisal as a method of creating significant improvements in the area.

Table 2.2 – Progress on Measures to Improve Air Quality

Measure No.	Measure	Category	Classification	Year Measure Introduced	Estimated / Actual Completion Year	Organisations Involved	Funding Source	Defra AQ Grant Funding	Funding Status	Estimated Cost of Measure	Measure Status	Reduction in Pollutant / Emission from Measure	Key Performance Indicator	Progress to Date	Comments / Barriers to Implementation
1	Hackney Carriage and Private Hire Vehicle Policy	Promoting Low Emission Transport	Taxi Licensing conditions	2019	2027	Shropshire Council	Shropshire Council	NO	Funded	< £10k	Implementation	Reduced vehicle emissions	Progressive cleaner fleet in respect of tailpipe emissions	Policy subject to revision in 2021, with revised policy due to be implemented in 2022. Updated advice and consultee comments provided to Licencing Team. Consultation period finishes in Sept 22.	Access to second hand low emission vehicles. Financial burden on operators for fleet changes. COVID-19 Disruption.
2	Shrewsbury North West Relief Road (NWRR)	Transport Planning and Infrastructure	Other	2017	2025	Shropshire Council, DfT Large Local Majors Fund	Shropshire Council, DfT Large Local Majors Fund	NO	Funded	> £10 million	Planning	6.6µg/m3 at hotspot	A reduction in air pollution in Shrewsbury No 3 AQMA.	Awaiting further planning submissions. Further comments made on air quality impact by Regulatory Services.	Approval at planning process. Currently awaiting further planning scrutiny. More info at <a href="https://www.shropshire.gov.uk/roads-and-highways/shrewsbury-north-west-relief-road/">https://www.shropshire.gov.uk/roads-and-highways/shrewsbury-north-west-relief-road/</a> .
3	Shropshire Council Pool Car Scheme	Alternatives to private vehicle use	Car Clubs	2019	2021	Shropshire Council and Enterprise	Shropshire Council	NO	Funded	£10k - 50k	Implementation	Reduced vehicle emissions	Increased mileage year on year in carpool vehicles	Previously had 5 pool cars and added one hybrid vehicle in 2018 with 64,521 miles carried out in the fleet in 2018. Additional vehicles added in 2019 taking the number of available cars to 13 with over half being hybrids. Increased usage of the fleet with 130,378 miles of use in 2019. Reduced impact in 2020/21 due to Covid-19, Homeworking and relocation of fleet to Park & Ride Hubs	Ongoing funding and resource to run the scheme. Vandalism of vehicles at Council premises.

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
														due to vandalism on council premises.	
4	Inclusion of electric vehicle charging points in new developments	Promoting Low Emission Transport	Procuring alternative Refuelling infrastructure to promote Low Emission Vehicles, EV recharging, Gas fuel recharging	2018	2025	Shropshire Council	Shropshire Council	NO	Not Funded	< £10k	Implementation	Reduction in emissions, uptake of cleaner technologies	Planning conditions on planning application decisions which include provisions for electric vehicle charging points in new developments	Procedures in place and ongoing through time.	
5	Local Air Quality Grant project	Public Information	Via the Internet	2016	2022	Shropshire Council and DEFRA	Shropshire Council and DEFRA	YES	Funded	£100k - £500k	Completed	Awareness raising to reduce emissions through behavioural change	Completion of Key Milestones of the project reported back to DEFRA through grant requirements in quarterly reporting. Currently behind on some Key Milestones however moving forwards and resolving this going forward. DEFRA made aware through quarterly reports.	Active component of project completed in 2021. Low cost-sensors were reduced from 7 to 2 Units due to budgetary constraints. Final reporting due - delayed to workload pressures.	Covid-19 disruption. Financial pressure preventing continuation of the project beyond 'Covid-impacted' years (2019,2020). Resource pressure to maintain project.

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
6	Car Parking Strategy	Policy Guidance and Development Control	Other policy	2018	2021	Shropshire Council	Shropshire Council	NO	Partially Funded	£10k - 50k	Implementation	Reduce vehicle emissions	Stage 1 - implementation of linear car parking scheme County wide including procurement and installation of new payment meters. Implementation of Stage 2 - to bring residential parking schemes into place.	Stage 1 complete. Stage 2 did not progress in 2019. It is being considered for 2020. Covid-19 removed resource to move this forward. Consideration of Stage 2 in 2021-22	Resource to roll out Phase 2.
7	Electric Vehicle Charging Infrastructure Delivery	Promoting Low Emission Transport	Procuring alternative Refuelling infrastructure to promote Low Emission Vehicles, EV recharging, Gas fuel recharging	2018	2021	Shropshire Council, OLEV, BEIS	Shropshire Council, OLEV, BEIS	NO	Funded	£100k - £500k	Completed	Reduce vehicle emissions	Provision of EV charging across the county	24 EV charging points installed across 10 towns in the County	
8	Strategic Highway Network Electric Vehicle charging	Promoting Low Emission Transport	Procuring alternative Refuelling infrastructure to promote Low Emission Vehicles, EV recharging, Gas fuel recharging	2020	2021	Shropshire Council, Highways England	Shropshire Council, Highways England	NO	Funded	£10k - 50k	Completed	Reduce vehicle emissions	Provision of two rapid EV charging points serving the A49 route at Church Stretton and Ludlow	2 new rapid charging points in commissioned.	
9	Active Transport Manager appointment and creation of LCWIPS	Promoting Travel Alternatives	Promotion of cycling	2020	2022	Shropshire Council	Shropshire Council	NO	Funded	£50k - £100k	Planning	Reduce vehicle emissions	Active Transport Manager position created for 2 years to create LCWIPS	Appointment to the post.	
10	LTP4 production	Transport Planning and Infrastructure	Other	2021	2022	Shropshire Council	Shropshire Council	NO	Funded	£50k - £100k	Planning	Reduce vehicle emissions	Creation of LTP4 with inclusion of air quality focus adopted by Council	Process ongoing, delays due to revised travel plan guidance.	

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
11	Shrewsbury Programme Board support (Place Making)	Other	Other	2020	2021	Shropshire Council	Shropshire Council	NO	Not Funded	< £10k	Completed	Reduce vehicle emissions	Air Quality report taken to Shrewsbury Programme Board who supported the proposed actions including having air quality as a theme running through place shaping plans for Shrewsbury.	Report delivered to the board and all areas of support requested granted.	

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

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

Shropshire Council is taking the following measures to address PM<sub>2.5</sub>:

- Monitoring: two PM<sub>2.5</sub> monitors were previously found in Shrewsbury. These allowed Shropshire Council to monitor the pollutant concentrations over time and consider if there is a need for further actions. Monitoring showed that PM<sub>2.5</sub> levels are less than 10 µg/m<sup>3</sup> as an annual mean. Three years of continuous data concluded levels of PM<sub>2.5</sub>s were under 10 µg/m<sup>3</sup> with results in 2017 finding levels of 7.7 µg/m<sup>3</sup>. Monitors were discontinued to save resource in January 2018. DEFRA comments on previous ASRs endorsed the removal of monitors.
- No specific measures are being taken solely to address PM<sub>2.5</sub>s. Actions are being carried out to reduce air pollutants overall and reduce traffic numbers in congested areas. These measures will assist in reducing PM<sub>2.5</sub>s. For example, measures noted in Table 2.2 that look to reduce congestion will in turn reduce brake pad and tyre wear reducing PM<sub>2.5</sub> emissions in the area. Any initiatives that look to calm traffic are likely to have a similar impact.
- Shropshire Council remain vigilant for new and existing sources of PM<sub>2.5</sub> in our area.

In considering the need for additional actions relating to PM<sub>2.5</sub> it is noted that the latest Public Health Outcomes Framework (PHOF) Indicator number D01 - Fraction of mortality attributable to particulate air pollution (New Method) for Shropshire was noted to be 4.1% in 2020, down from 5.8%% in 2019. For more information visit:

[https://fingertips.phe.org.uk/profile/public-health-outcomes-framework/data#page/4/gid/1000043/pat/6/par/E12000005/ati/402/are/E06000051/iid/93861/age/230/sex/4/cat/-1/ctp/-1/yr/1/cid/4/tbm/1/page-options/ovw-do-0\\_ine-yo-1:2020:-1:-1\\_ine-ct-39\\_ine-pt-0\\_tre-do-0/fip/0](https://fingertips.phe.org.uk/profile/public-health-outcomes-framework/data#page/4/gid/1000043/pat/6/par/E12000005/ati/402/are/E06000051/iid/93861/age/230/sex/4/cat/-1/ctp/-1/yr/1/cid/4/tbm/1/page-options/ovw-do-0_ine-yo-1:2020:-1:-1_ine-ct-39_ine-pt-0_tre-do-0/fip/0)



In 2020, Shropshire Council's fraction of mortality attributable to particulate air pollution was the lowest in the West Midlands Region which had an average of 5.4%. The West Midlands region was slightly above the national average of 5.6%.

As the Shropshire Council PHOF indicator concerned with PM<sub>2.5</sub> shows that mortality due to PM<sub>2.5</sub> is significantly below the national and regional average it is not considered necessary for any specific actions to be carried out while there are other interventions taking place which will contribute to reducing anthropogenic PM<sub>2.5</sub>. These measures include traffic calming and actions to reduce congestion and improve the emissions of vehicles being used on the road network such as through use of Euro VI carpool vehicles instead of staff owned vehicle and improvement of vehicle emissions from the taxi fleet.

In addition to the measures above a review of relevant information has been carried out. The DEFRA background maps for PM<sub>2.5s</sub> in 2021 (Based on a 2018 Baseline) predict at worst levels of 8.5 µg/m<sup>3</sup> centred around grid square 374500, 292500 which is located just to the east of Bridgnorth\*.

In addition an exert from the Public Health Profiles webpages published by PHE (available at

<https://fingertips.phe.org.uk/search/air%20pollution#page/0/gid/1/pat/6/par/E12000005/ati/102/iid/30101/age/230/sex/4/cid/4/tbm/1> ) suggests that Shropshire Council's area has an

average of 7.3 µg/m<sup>3</sup> of PM<sub>2.5</sub>. These data sources show the likelihood that PM<sub>2.5s</sub> are found at levels that meet the World Health Organisation target of below 10 µg/m<sup>3</sup>. No specific measures are required however as previously explained measures being carried out to reduce NO<sub>2</sub> in areas of concern and reduce emissions in general will help in reducing PM<sub>2.5s</sub> over time.

\* It should be noted that the projections in the 2018 LAQM background maps are based on assumptions which were current before the Covid-19 outbreak in the UK. In consequence these maps do not reflect short or longer term impacts on emissions in 2020 and beyond resulting from behavioural change during the national or local lockdowns.

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

This section sets out the monitoring undertaken within 2021 by Shropshire Council and how it compares with the relevant air quality objectives. In addition, monitoring results are presented for a five-year period between 2017 and 2021 to allow monitoring trends to be identified and discussed.

### 3.1 Summary of Monitoring Undertaken

#### 3.1.1 Automatic Monitoring Sites

Shropshire Council did not undertake automatic (continuous) monitoring during 2021. Table A.1 in Appendix A shows the details of the automatic monitoring sites. For detail of past monitoring locations please see previous annual reports available at:

<https://www.shropshire.gov.uk/environmental-health/environmental-protection-and-prevention/air-quality/shropshire-council-air-quality-reports/>.

#### 3.1.2 Non-Automatic Monitoring Sites

Shropshire Council undertook non-automatic (i.e. passive) monitoring of NO<sub>2</sub> at 57 sites during 2021. Table A.2 in Appendix A presents the details of the non-automatic sites.

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

### 3.2 Individual Pollutants

The air quality monitoring results presented in this section are, where relevant, adjusted for bias, annualisation (where the annual mean data capture is below 75% and greater than 25%), and distance correction. Further details on adjustments are provided in Appendix C.

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

Table A.3 and Table A.4 in Appendix A compare the ratified and adjusted monitored NO<sub>2</sub> annual mean concentrations for the past five years with the air quality objective of 40µg/m<sup>3</sup>. Note that the concentration data presented represents the concentration at the location of the monitoring site, following the application of bias adjustment and annualisation, as required (i.e. the values are exclusive of any consideration to fall-off with distance adjustment).

For diffusion tubes, the full 2021 dataset of monthly mean values is provided in Appendix B. Note that the concentration data presented in Table B.1 includes distance corrected values, only where relevant.

Table A.5 in Appendix A compares the ratified continuous monitored NO<sub>2</sub> hourly mean concentrations for the past five years with the air quality objective of 200µg/m<sup>3</sup>, not to be exceeded more than 18 times per year.

Data from Shropshire Councils monitoring indicates 6 exceedances of the annual mean objective level of (40ug/m<sup>3</sup>) in 2021. These were located within existing declared AQMAs with the highest exceedance recorded as 49.4ug/m<sup>3</sup> in Bridgnorth Pound Street AQMA.

Chart A - Trends of Highest exceedances within Shrewsbury No.3 AQMA demonstrates that exceedances in the Shrewsbury AQMA remain restricted to the Castle Foregate/Chester Street junction adjacent to Shrewsbury Railway Station, and it is therefore proposed to review the boundary of Shrewsbury No.3 AQMA in the current Air Quality Action Plan (AQAP) review. It has been determined to keep the diffusion tube network locations the same for the 2022 monitoring year, but additional/revised locations may be considered for 2023 monitoring year to corroborate/inform detailed assessments and monitoring arising from the current AQAP review project.

Chart B - Trends of monitoring locations at and surrounding Bridgnorth Pound Street AQMA within Appendix A: Monitoring Results shows sites within and in close proximity to Pound Street AQMA and 5 year data comparisons. As is to be expected all sites show increased annual averages compared to 2020 data. Pre-pandemic in 2019, DF71 exceeded at 49.1ug/m<sup>3</sup>, having only just exceeded in 2020, the 2021 data (43.2ug/m<sup>3</sup>) is indicative of a potential return to substantial exceedances seen before. Whilst the overall trend 2017 indicates a continuing decreasing trend, potentially attributable to vehicular fleet improvements, further monitoring is required to validate this. The 2022 AQAP review, and detailed assessment within, will look to model and assess this trend in addition to

identifying reduction actions. New locations (DF28 and DF83) confirm the central area of exceedance at the mini-roundabout junction, and alongside the northbound uphill carriageway of Pound Street. This will be utilised in the AQAP 2022 review.

Charts D and E show 5 year trends at Bayston Hill, Shrewsbury and Oswestry area monitoring locations. Both areas show stable concentrations below the annual objective level. Close attention shall be paid in future years to review the impact of post-pandemic travel on trends at these locations.

Chart F - Trend at monitoring location at Tern Hill, Market Drayton shows increased annual concentration in 2021 ( $45.9 \text{ ug/m}^3$ ) compared to 2019 and 2020. This is to be expected in line with national traffic trends post-pandemic. As the annual concentration is  $<60 \text{ ug/m}^3$ , it is not considered that the 24-hr objective is likely being exceeded and the site therefore remains as assessed in previous ASRs. Close attention will be retained in coming years to review any continued growth trends whereby the assessment of this site may require review.

### **3.2.2 Particulate Matter (PM<sub>10</sub>)**

Shropshire Council do not monitor for PM<sub>10</sub>.

### **3.2.3 Particulate Matter (PM<sub>2.5</sub>)**

Shropshire Council do not monitor for PM<sub>2.5</sub>.

### **3.2.4 Sulphur Dioxide (SO<sub>2</sub>)**

Shropshire Council do not monitor for SO<sub>2</sub>.

## Appendix A: Monitoring Results

### Table A.1 – Details of Automatic Monitoring Sites

Shropshire Council does not undertake continuous monitoring with DEFRA approved equipment.

Table A.2 – Details of Non-Automatic Monitoring Sites

Diffusion Tube ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA? Which AQMA?	Distance to Relevant Exposure (m) <sup>(1)</sup>	Distance to kerb of nearest road (m) <sup>(2)</sup>	Tube Co-located with a Continuous Analyser?	Tube Height (m)
DF13	Pound Street	Roadside	371345	293081	NO2	YES	0.1	0.8	No	2.0
DF20	Bryan & Knott Bridgnorth	Roadside	371580	293257	NO2	NO		3.8	No	2.0
DF27	Smithfield	Roadside	371397	293179	NO2	NO	0.1	3.3	No	2.0
DF28	50 Whitburn Street	Roadside	371321	293131	NO2	YES	0.2	1.7	No	2.0
DF29	Adj Rutters	Roadside	371297	293108	NO2	NO	1.0	3.3	No	2.0
DF58	8 Underhill Street	Roadside	371795	292947	NO2	NO	0.0	1.9	No	2.0
DF59	2A Underhill Street	Roadside	371799	293011	NO2	NO	0.0	1.6	No	2.0
DF62	2 Mill Street	Roadside	372031	292993	NO2	NO	0.0	1.0	No	2.0
DF65	49 Mill Street	Roadside	372026	293058	NO2	NO	0.0	2.1	No	2.0
DF71	6 Pound Street, (On Pelican Crossing)	Roadside	371346	293086	NO2	YES	0.3	1.1	No	2.0
DF72	Mini Roundabout - Listley Street (lamp column)	Roadside	371375	293066	NO2	YES	4.4	1.6	No	2.0
DF73	18 Pound Street (Downspout)	Roadside	371354	293089	NO2	YES	0.1	1.2	No	2.0

Diffusion Tube ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA? Which AQMA?	Distance to Relevant Exposure (m) <sup>(1)</sup>	Distance to kerb of nearest road (m) <sup>(2)</sup>	Tube Co-located with a Continuous Analyser?	Tube Height (m)
DF74	Lamp Column 48 - New Build	Roadside	371340	293125	NO2	YES	1.9	2.0	No	2.0
DF75	Lamp Column 9 - Steps of new build	Roadside	371345	293106	NO2	YES	1.1	3.0	No	2.0
DF76	Higgs/Stanton Ralph (Opp 45 Whitburn Street)	Roadside	371366	293146	NO2	YES	0.1	1.5	No	2.0
DF77	39/40 Whitburn Street Lamp Column	Roadside	371375	293161	NO2	YES	0.5	2.2	No	2.0
DF78	Pedestrian Crossing outside 42 Whitburn Street	Roadside	371360	293152	NO2	YES	0.2	1.7	No	2.0
DF79	Chill Salon Downspout between green and black door	Roadside	371346	293143	NO2	YES	0.1	1.5	No	2.0
DF80	48 Whitburn Street Downspout	Roadside	371334	293139	NO2	YES	0.1	1.8	No	2.0
DF81	Stretton House 3 Salop Street Downspout	Roadside	371288	293119	NO2	YES	0.1	1.2	No	2.0
DF82	Pedestrian Crossing outside 8 Salop Street	Roadside	371264	293120	NO2	YES	2.5	0.7	No	2.0
DF83	Downspout Of 2 Pound Street Bridgnorth	Roadside	371341	293096	NO2	YES	2.2	0.5	No	2.0

Diffusion Tube ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA? Which AQMA?	Distance to Relevant Exposure (m) <sup>(1)</sup>	Distance to kerb of nearest road (m) <sup>(2)</sup>	Tube Co-located with a Continuous Analyser?	Tube Height (m)
DF223	Tern Hill Barn	Roadside	363640	332232	NO2	NO	2.2	1.3	No	2.0
DF305	74 Castle Street	Roadside	328978	329879	NO2	NO	0.1	1.9	No	2.0
DF306	A483 (1)	Roadside	328922	325981	NO2	NO	0.0	1.4	No	2.0
DF314	Downspout on 10 Upper Church Street (Bookbinders)	Roadside	328866	329269	NO2	NO	0.1	1.3	No	2.0
DF400	A49 Bayston Hill opp 3 Fishes	Roadside	348726	308959	NO2	NO	0.0	1.4	No	2.0
DF403	Smithfield Road Corner Of Victoria Avenue	Roadside	348891	312721	NO2	YES	0.0	2.4	No	2.0
DF404	Town Walls, Opp Murivance	Roadside	348889	312326	NO2	YES	0.4	1.8	No	2.0
DF407	Dogpole (Car Entrance)	Roadside	349330	312503	NO2	YES	0.2	2.1	No	2.0
DF413	Ravens Meadow, outside 23 Meadow Terrace	Roadside	349283	312851	NO2	YES	1.7	0.7	No	2.0
DF420	Outside 25 Castle Street	Roadside	349396	312742	NO2	YES	1.0	3.0	No	2.0
DF428A	A Brittonia Inn (Post office lamppost)	Roadside	349445	313090	NO2	YES	0.5	2.0	No	2.0
DF429	6a Severn Steps adj Lamp Post	Roadside	349237	312900	NO2	YES	0.1	1.5	No	2.0



Diffusion Tube ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA? Which AQMA?	Distance to Relevant Exposure (m) <sup>(1)</sup>	Distance to kerb of nearest road (m) <sup>(2)</sup>	Tube Co-located with a Continuous Analyser?	Tube Height (m)
DF436, DF437	The Albert (duplicate)	Roadside	349283	312889	NO2	YES	0.0	2.8	No	2.0
DF438	Station Hotel 4 Castle Foregate (facade)	Roadside	349400	312954	NO2	YES	0.1	1.2	No	2.0
DF448	Dalton Drive (lamp Post)	Roadside	345769	313223	NO2	NO	0.1	2.8	No	2.0
DF449	2 Vaughan's Cottages (downpipe)	Roadside	346796	313509	NO2	NO	5.5	0.2	No	2.0
DF457, DF457A	B Ellesmere Road / Berwick Road (Traffic Signal)	Roadside	349235	313441	NO2	NO	1.2	0.9	No	2.0
DF458	Under Railway Bridge Over Castle Foregate	Roadside	349426	313028	NO2	YES	NA	2.0	No	2.0
DF459	Post in Car park outside Railway Station	Roadside	349424	312936	NO2	YES	NA	18.0	No	2.0
DF461	Junction Of Dogpole with High St/Wyle Cop	Roadside	349327	312389	NO2	YES	2.0	2.0	No	2.0
DF462	Welshpool Road	Roadside	345203	313427	NO2	NO	NA	1.7	No	2.0
DF468	Downpipe on Front of Number 3 Witchurch Road	Roadside	350376	314599	NO2	NO	0.0	7.3	No	2.0
DF474	Lamp Column, 2 Whiterock Cottages	Roadside	348647	308771	NO2	NO	0.9	1.7	No	2.0

Diffusion Tube ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA? Which AQMA?	Distance to Relevant Exposure (m) <sup>(1)</sup>	Distance to kerb of nearest road (m) <sup>(2)</sup>	Tube Co-located with a Continuous Analyser?	Tube Height (m)
DF476	Chester Street on Street parking bay height sensor Post	Roadside	349360	312962	NO2	YES	0.3	1.4	No	2.0
DF477	Bus stop Opp Community Church, Chester Street	Roadside	349299	313108	NO2	YES	1.0	2.1	No	2.0
DF480	lamp Post by takeaway near Britaninia Inn	Roadside	349466	313151	NO2	YES	0.5	2.6	No	2.0
DF482	Royal Mail lampcolumn by traffic lights	Roadside	349436	313064	NO2	YES	NA	1.0	No	2.0
DF485	Frankwell Terrace	Roadside	348815	312854	NO2	YES	1.4	2.6	No	2.0
DF487	English Bridge by St Julian Friars (No Entry Sign)	Roadside	349529	312328	NO2	YES	7.7	3.0	No	2.0
DF488	Lamppost Infront Of Hobbit House Berwick Road Shrewsbury Corner Of Ellsemere Rd and Berwick Rd	Roadside	349223	313449	NO2	NO	0.1	1.0	No	2.0
DF489	Bus Stop Outside 9 Berwick Road Shrewsbury	Roadside	349148	313444	NO2	NO	0.2	0.6	No	2.0

Diffusion Tube ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA? Which AQMA?	Distance to Relevant Exposure (m) <sup>(1)</sup>	Distance to kerb of nearest road (m) <sup>(2)</sup>	Tube Co-located with a Continuous Analyser?	Tube Height (m)
DF490	Lamppost Outside 41 Berwick Road Shrewsbury	Roadside	348964	313466	NO2	NO	10.0	0.2	No	2.0
DF501	Corner of 25 Chester Street / Cross Street	Roadside	349349	313071	NO2	YES		1.6	No	2.0
DF502, DF502A	Post outside Cambrian House	Roadside	349364	312998	NO2	YES			No	2.0
DF503	Downspout 68-69 Frankwell	Roadside	348611	312969	NO2	YES	0.0	0.7	No	2.0

**Notes:**

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

(2) N/A if not applicable.

**Table A.3 – Annual Mean NO<sub>2</sub> Monitoring Results: Automatic Monitoring (µg/m<sup>3</sup>)**

Shropshire Council do not undertake continuous monitoring of NO<sub>2</sub>.

Table A.4 – Annual Mean NO<sub>2</sub> Monitoring Results: Non-Automatic Monitoring (µg/m<sup>3</sup>)

Diffusion Tube ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) <sup>(1)</sup>	Valid Data Capture 2021 (%) <sup>(2)</sup>	2017	2018	2019	2020	2021
DF13	371345	293081	Roadside	100.0	100.0	<b>44.0</b>	<b>40.5</b>	35.6	30.3	33.1
DF20	371580	293257	Roadside	100.0	100.0	31.8	22.7	20.8	15.0	17.8
DF27	371397	293179	Roadside	92.0	92.0	28.2	26.0	25.8	19.7	23.6
DF28	371321	293131	Roadside	100.0	100.0					36.7
DF29	371297	293108	Roadside	100.0	100.0	29.4	28.9	28.5	21.6	23.9
DF58	371795	292947	Roadside	100.0	100.0	31.7	33.1	28.5	26.2	29.1
DF59	371799	293011	Roadside	100.0	100.0	34.2	29.6	28.5	23.4	24.0
DF62	372031	292993	Roadside	100.0	100.0	29.7	<b>40.2</b>		25.2	29.1
DF65	372026	293058	Roadside	100.0	100.0	34.2	33.4		24.6	28.3
DF71	371346	293086	Roadside	100.0	100.0	<b>58.5</b>	<b>50.9</b>	<b>49.1</b>	<b>40.8</b>	<b>43.2</b>
DF72	371375	293066	Roadside	100.0	100.0		30.0	28.2	22.4	23.8
DF73	371354	293089	Roadside	100.0	100.0		34.1	34.2	26.5	28.7
DF74	371340	293125	Roadside	92.3	92.3		30.9	29.4	22.7	25.2

Diffusion Tube ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) <sup>(1)</sup>	Valid Data Capture 2021 (%) <sup>(2)</sup>	2017	2018	2019	2020	2021
DF75	371345	293106	Roadside	100.0	100.0		30.9	27.6	22.4	24.1
DF76	371366	293146	Roadside	100.0	100.0		33.8	31.8	28.4	28.8
DF77	371375	293161	Roadside	100.0	100.0		<b>40.3</b>	38.7	30.4	29.9
DF78	371360	293152	Roadside	92.3	92.3		39.9	38.5	32.2	35.9
DF79	371346	293143	Roadside	100.0	100.0		<b>48.8</b>	<b>42.3</b>	35.3	36.9
DF80	371334	293139	Roadside	100.0	100.0		<b>50.3</b>	<b>43.6</b>	37.2	<b>40.3</b>
DF81	371288	293119	Roadside	100.0	100.0		28.8	26.7	20.1	23.3
DF82	371264	293120	Roadside	100.0	100.0		27.4	22.7	17.0	20.4
DF83	371341	293096	Roadside	100.0	100.0					<b>49.4</b>
DF223	363640	332232	Roadside	92.3	92.3	<b>50.4</b>	<b>53.6</b>	<b>42.8</b>	<b>43.1</b>	<b>45.9</b>
DF305	328978	329879	Roadside	100.0	100.0	28.3	29.0	27.2	19.9	20.0
DF306	328922	325981	Roadside	100.0	100.0	31.3	28.7	27.2	20.4	20.2
DF314	328866	329269	Roadside	100.0	100.0		38.1	33.9	27.2	25.9
DF400	348726	308959	Roadside	100.0	100.0	34.0	33.2	29.3	22.5	22.3

Diffusion Tube ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) <sup>(1)</sup>	Valid Data Capture 2021 (%) <sup>(2)</sup>	2017	2018	2019	2020	2021
DF403	348891	312721	Roadside	92.3	92.3	29.3	30.5	30.8	23.0	23.0
DF404	348889	312326	Roadside	100.0	100.0	15.8	16.9	18.2	12.0	12.0
DF407	349330	312503	Roadside	100.0	100.0	24.8	24.1	23.4	18.1	19.6
DF413	349283	312851	Roadside	100.0	100.0	28.6	29.5	26.3	21.2	22.7
DF420	349396	312742	Roadside	44.1	67.2	28.0	27.8	26.3	21.2	21.9
DF428A	349445	313090	Roadside	100.0	100.0		38.3	36.1	29.4	30.9
DF429	349237	312900	Roadside	92.3	92.3	28.2		28.8	21.8	22.7
DF436, DF437	349283	312889	Roadside	100.0	100.0	35.1	36.2	32.3	25.7	28.1
DF438	349400	312954	Roadside	100.0	100.0	<b>54.0</b>	<b>58.8</b>	<b>53.0</b>	<b>40.2</b>	<b>43.9</b>
DF448	345769	313223	Roadside	100.0	100.0	9.0	9.6	9.1	7.2	7.0
DF449	346796	313509	Roadside	100.0	100.0	20.4	20.1	17.2	13.5	14.7
DF457, DF457A	349235	313441	Roadside	100.0	100.0					27.8
DF458	349426	313028	Roadside	92.3	92.3	<b>53.6</b>	<b>55.0</b>	<b>48.6</b>	38.5	<b>42.2</b>
DF459	349424	312936	Roadside	100.0	100.0	38.6	<b>42.1</b>	35.6	26.6	29.2

Diffusion Tube ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) <sup>(1)</sup>	Valid Data Capture 2021 (%) <sup>(2)</sup>	2017	2018	2019	2020	2021
DF461	349327	312389	Roadside	100.0	100.0	30.5	30.9	26.2	18.7	20.1
DF462	345203	313427	Roadside	65.3	65.3	20.5	19.3	18.7	13.6	12.2
DF468	350376	314599	Roadside	100.0	100.0	20.6	21.8	20.9	27.5	17.7
DF474	348647	308771	Roadside	100.0	100.0	<b>46.3</b>	<b>46.4</b>	<b>42.1</b>	36.3	35.2
DF476	349360	312962	Roadside	100.0	100.0	31.2	33.1	29.1	22.5	24.4
DF477	349299	313108	Roadside	100.0	100.0	33.5	31.3	29.8	23.1	23.9
DF480	349466	313151	Roadside	100.0	100.0	32.7	31.8	31.6	24.8	27.9
DF482	349436	313064	Roadside	100.0	100.0	31.6	<b>45.7</b>	38.2	32.3	32.9
DF485	348815	312854	Roadside	100.0	100.0	28.4	30.9	26.1	20.3	22.4
DF487	349529	312328	Roadside	92.3	92.3		22.7	21.9	17.5	17.5
DF488	349223	313449	Roadside	100.0	100.0					22.9
DF489	349148	313444	Roadside	100.0	100.0					18.6
DF490	348964	313466	Roadside	100.0	100.0					13.3
DF501	349349	313071	Roadside	100.0	100.0		38.2	33.5	24.6	27.8



Diffusion Tube ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) <sup>(1)</sup>	Valid Data Capture 2021 (%) <sup>(2)</sup>	2017	2018	2019	2020	2021
DF502, DF502A	349364	312998	Roadside	59.8	100.0		31.2	26.3	18.4	22.1
DF503	348611	312969	Roadside	67.5	67.5					26.1

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

Diffusion tube data has been bias adjusted

Reported concentrations are those at the location of the monitoring site (bias adjusted and annualised, as required), i.e. prior to any fall-off with distance correction.

#### Notes:

The annual mean concentrations are presented as  $\mu\text{g}/\text{m}^3$ .

Exceedances of the NO<sub>2</sub> annual mean objective of  $40\mu\text{g}/\text{m}^3$  are shown in **bold**.

NO<sub>2</sub> annual means exceeding  $60\mu\text{g}/\text{m}^3$ , indicating a potential exceedance of the NO<sub>2</sub> 1-hour mean objective are shown in **bold and underlined**.

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

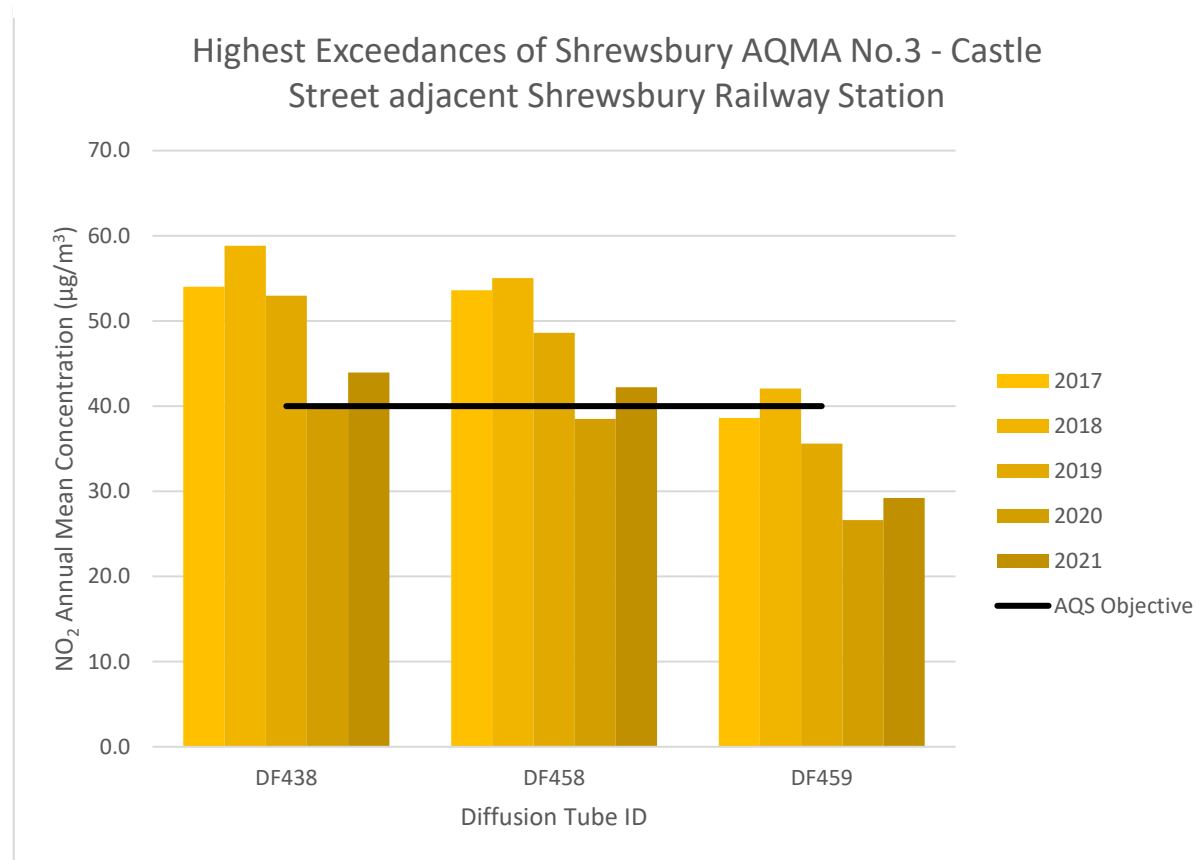
Concentrations are those at the location of monitoring and not those following any fall-off with distance adjustment.

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

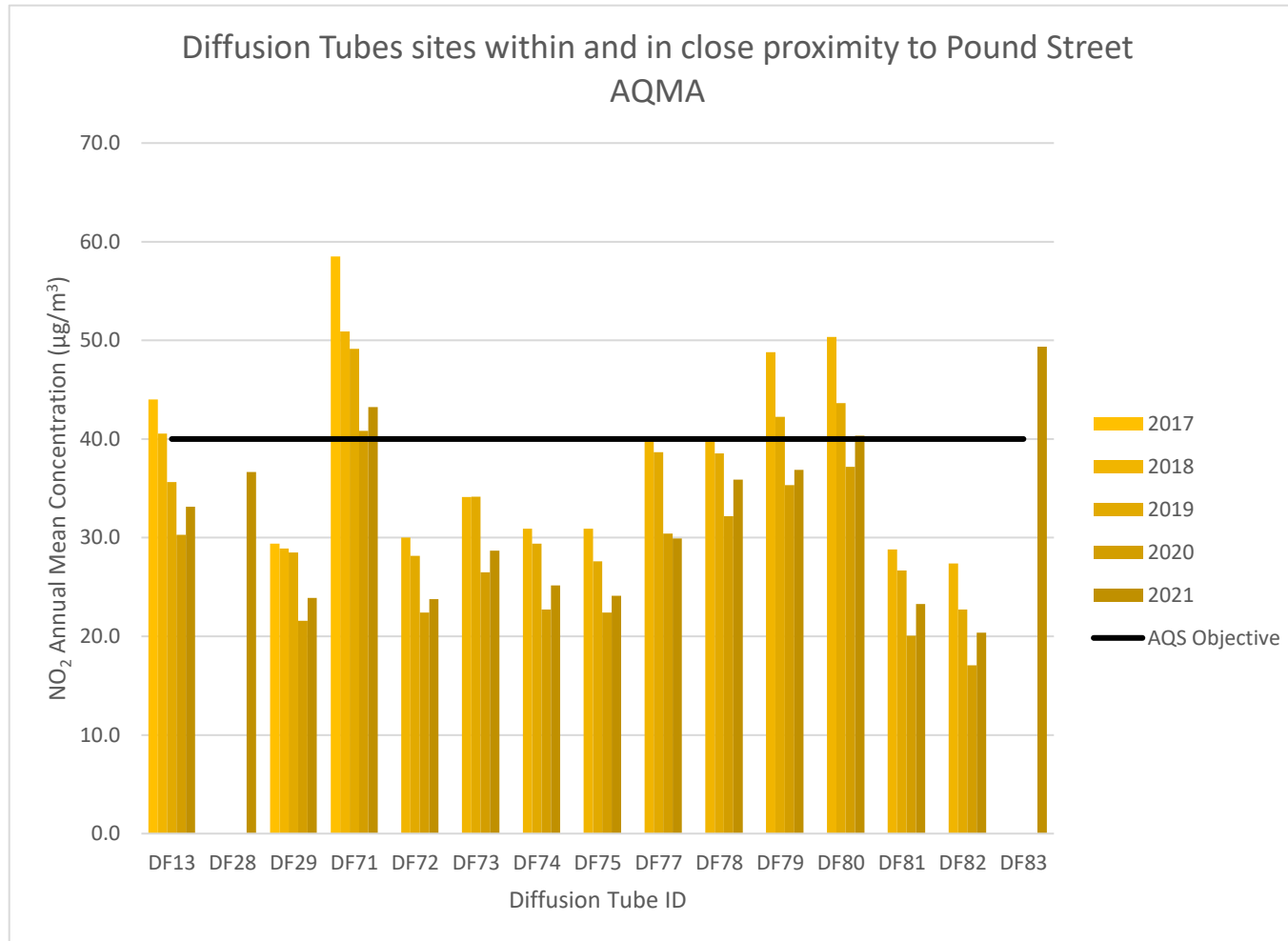
(2) Data capture for the full calendar year (e.g. if monitoring was carried out for 6 months, the maximum data capture for the full calendar year is 50%).

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

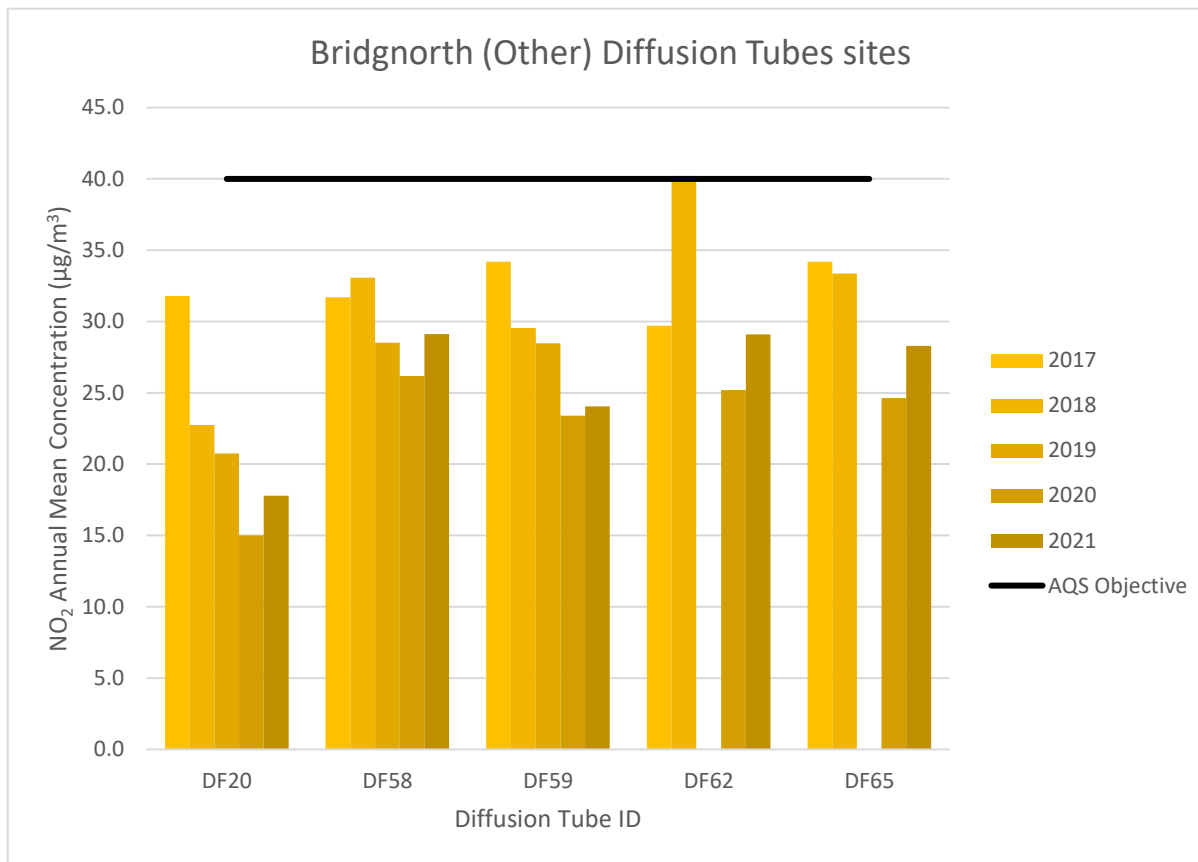
A - Trends of Highest exceedances within Shrewsbury No.3 AQMA



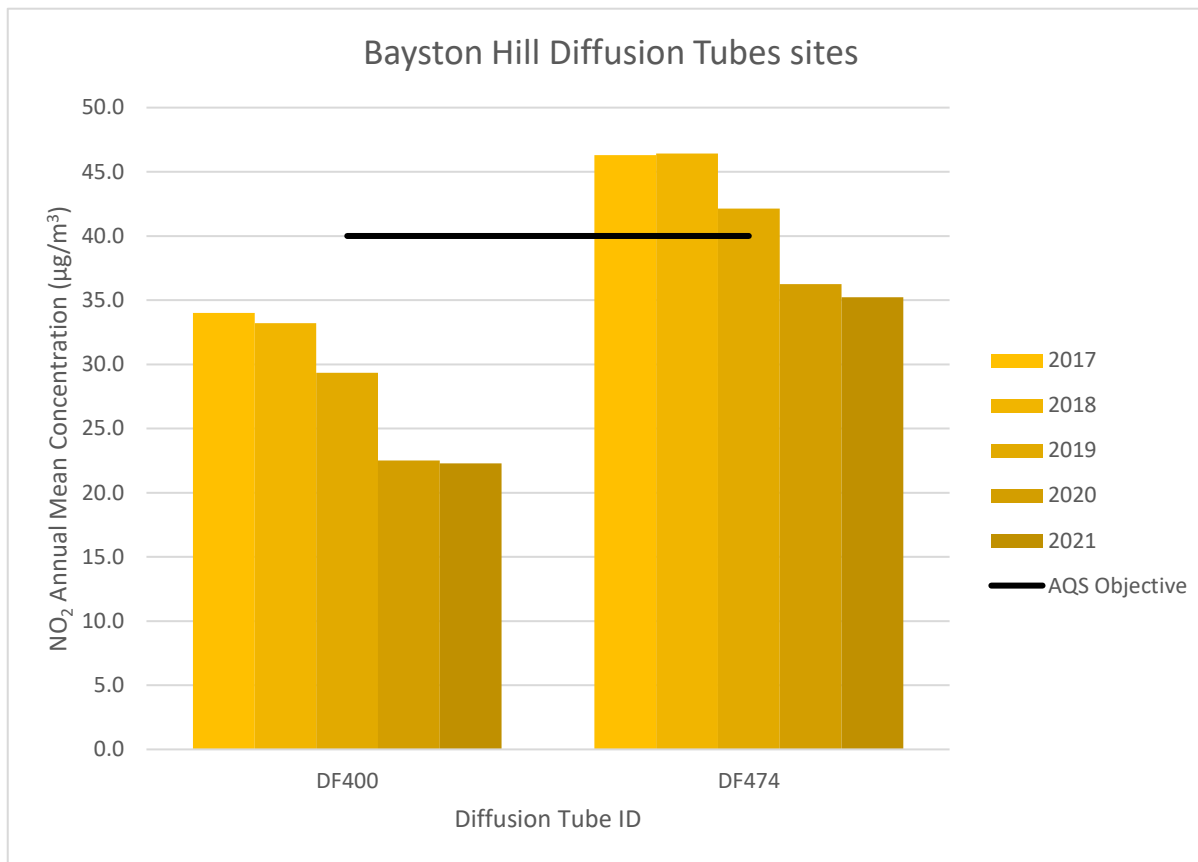
**B - Trends of monitoring locations at and surrounding Bridgnorth Pound Street AQMA**



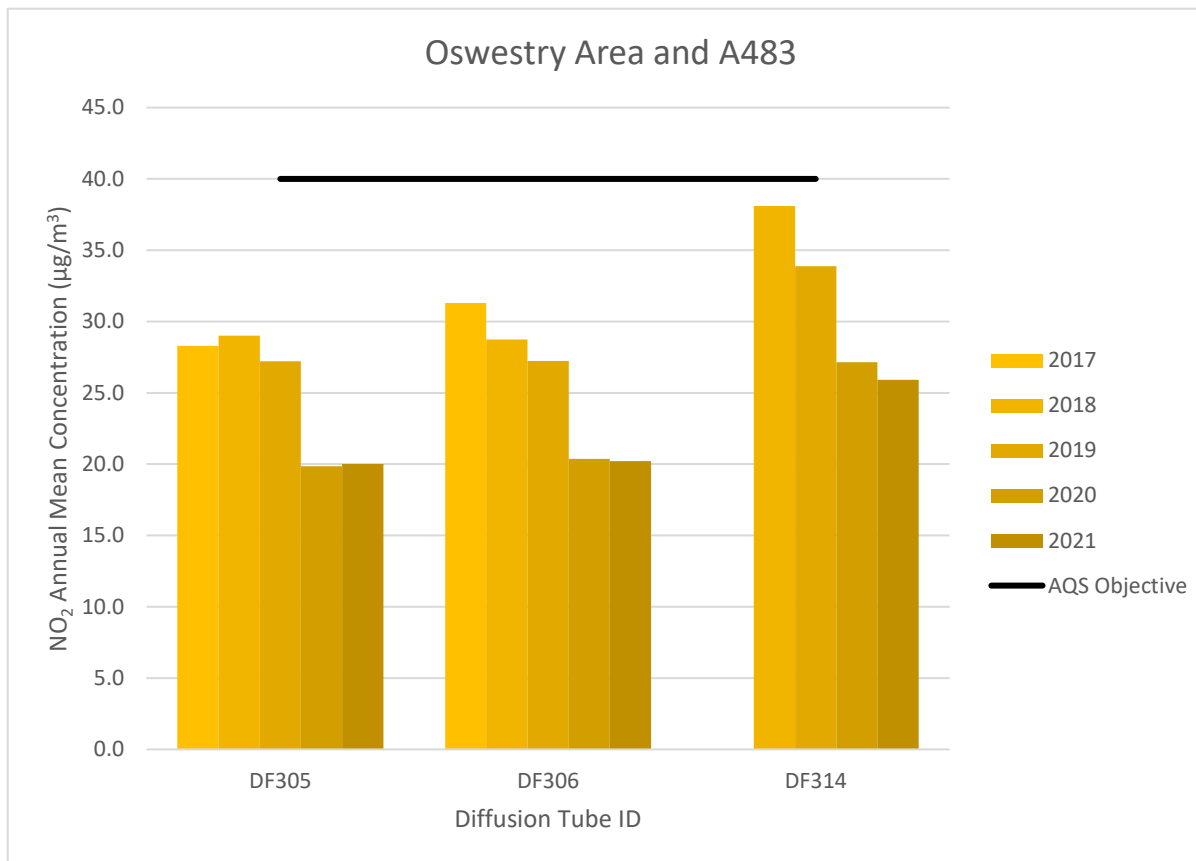
**C - Trends of monitoring locations in wider Bridgnorth area**



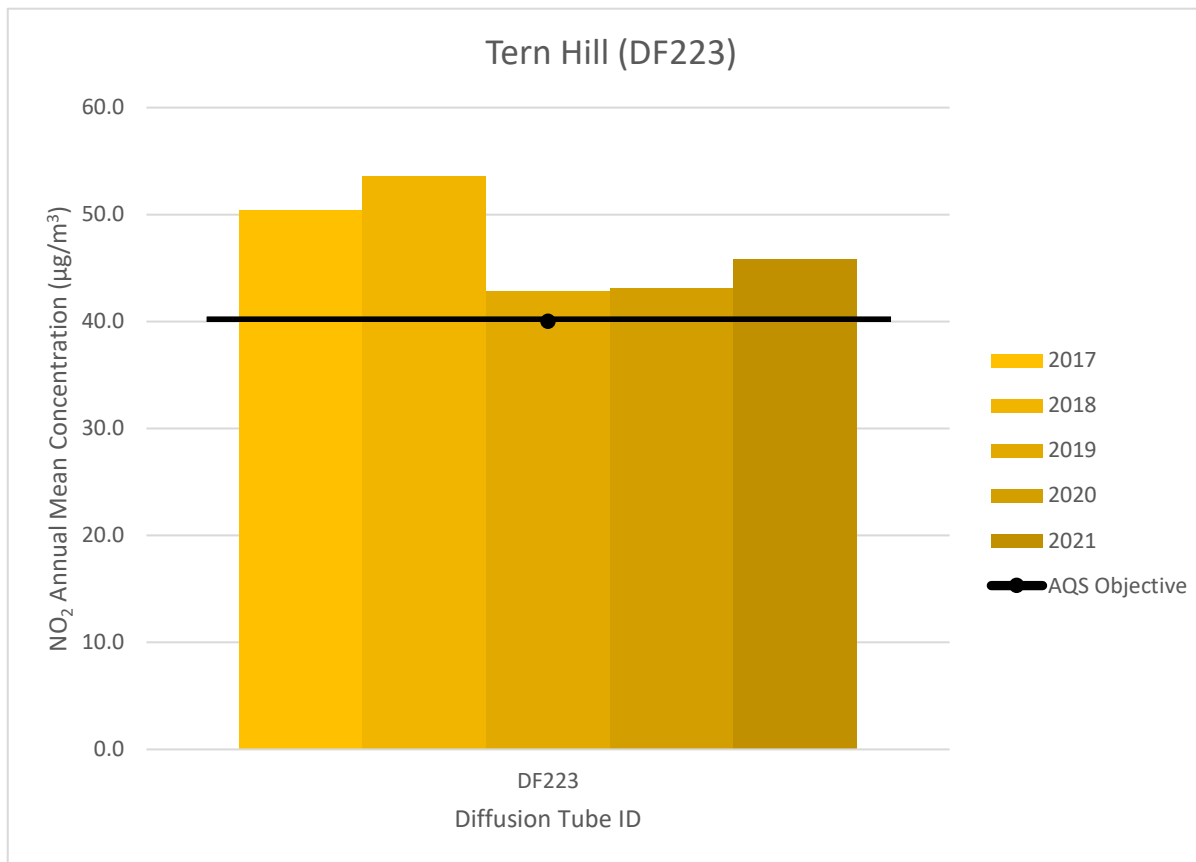
**D - Trends at monitoring locations at Bayston Hill, Shrewsbury**



**E - Trends at monitoring locations in Oswestry and surrounding area**



**F - Trend at monitoring location at Tern Hill, Market Drayton**



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

**Shropshire Council do not undertake 1-hour monitoring of NO<sub>2</sub>.**



**Figure A.2 – Trends in Number of NO<sub>2</sub> 1-Hour Means > 200µg/m<sup>3</sup>**

**Shropshire do not undertake 1-Hour NO<sub>2</sub> monitoring.**

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

**Shropshire do not undertake PM10 monitoring.**

**Figure A.3 – Trends in Annual Mean PM<sub>10</sub> Concentrations**

**Shropshire do not undertake PM<sub>10</sub> monitoring.**

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

**Shropshire do not undertake PM<sub>10</sub> monitoring.**

**Figure A.4 – Trends in Number of 24-Hour Mean PM<sub>10</sub> Results > 50µg/m<sup>3</sup>**

**Shropshire do not undertake PM<sub>10</sub> monitoring**

**Table A.8 – Annual Mean PM<sub>2.5</sub> Monitoring Results (µg/m<sup>3</sup>)**

**Shropshire do not undertake PM<sub>2.5</sub> monitoring**

**Figure A.5 – Trends in Annual Mean PM<sub>2.5</sub> Concentrations**

**Shropshire do not undertake PM<sub>10</sub> monitoring**

**Table A.9 – SO<sub>2</sub> 2021 Monitoring Results, Number of Relevant Instances**

**Shropshire do not undertake SO<sub>2</sub> monitoring.**



## Appendix B: Full Monthly Diffusion Tube Results for 2021

Table B.1 – NO<sub>2</sub> 2021 Diffusion Tube Results (µg/m<sup>3</sup>)

DT ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northin g)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean: Raw Data	Annual Mean: Annualised and Bias Adjusted (0.84)	Annual Mean: Distance Corrected to Nearest Exposure	Comment
DF13	371345	293081	41.0	37.4	32.3	42.5	59.5	35.4	36.1	33.0	41.9	34.6	43.1	36.7	39.5	33.1	-	
DF20	371580	293257	21.7	22.0	12.5	18.3	16.2	13.8	14.6	21.1	29.1	25.8	29.5	29.4	21.2	17.8	-	
DF27	371397	293179	31.8	<0.59	85.0	26.2	21.3	21.1	20.9	13.8	20.1	20.0	23.6	24.8	28.0	23.6	-	
DF28	371321	293131	49.3	43.1	38.1	48.2	47.3	34.7	39.5	39.7	48.4	41.9	48.0	45.7	43.6	36.7	35.9	
DF29	371297	293108	32.4	32.5	20.5	34.7	29.8	23.9	27.1	21.8	34.5	19.4	32.4	32.4	28.4	23.9	-	
DF58	371795	292947	60.6	33.9	27.9	35.9	32.8	29.8	23.5	28.6	35.0	34.2	37.5	36.3	34.7	29.1	-	
DF59	371799	293011	32.3	31.7	23.5	27.6	26.5	20.7	32.8	21.8	31.3	28.9	34.5	31.8	28.6	24.0	-	
DF62	372031	292993	38.5	37.8	30.5	39.6	34.7	29.7	31.3	29.7	37.9	30.5	39.0	36.6	34.6	29.1	-	
DF65	372026	293058	33.8	32.5	33.2	39.8	28.2	29.5	34.2	31.7	36.7	31.5	41.0	32.2	33.7	28.3	-	
DF71	371346	293086	55.6	50.9	43.7	54.6	56.6	45.3	52.9	43.9	56.9	50.2	58.4	48.7	51.5	<b>43.2</b>	<b>41.3</b>	
DF72	371375	293066	32.3	31.1	22.5	30.0	27.4	25.2	26.3	26.3	32.2	26.8	30.8	28.6	28.3	23.8	-	
DF73	371354	293089	35.1	37.0	26.1	41.9	31.5	30.0	35.0	30.7	38.7	28.4	38.8	36.8	34.2	28.7	-	
DF74	371340	293125	33.2	33.4	25.5	37.0	30.9	25.4	30.3		34.1	27.0	20.9	31.9	30.0	25.2	-	
DF75	371345	293106	33.7	33.3	24.8	33.6	26.9	24.4	27.5	26.2	30.5	23.7	31.0	28.8	28.7	24.1	-	
DF76	371366	293146	39.2	37.2	27.8	34.0	36.8	27.4	33.8	29.4	36.6	32.4	39.8	37.4	34.3	28.8	-	
DF77	371375	293161	40.4	33.7	30.9	43.6	33.4	29.5	35.8	33.1	37.5	30.8	41.3	37.3	35.6	29.9	-	
DF78	371360	293152	42.5	39.6	33.9	47.0	39.8	<0.61	62.7	36.9	44.9	33.4	47.8	41.3	42.7	35.9	-	
DF79	371346	293143	46.9	44.3	37.3	52.1	46.9	37.0	42.6	39.5	48.3	38.6	52.1	41.3	43.9	36.9	36.4	

DT ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northin g)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean: Raw Data	Annual Mean: Annualised and Bias Adjusted (0.84)	Annual Mean: Distance Corrected to Nearest Exposure	Comment
DF80	371334	293139	47.3	46.7	42.5	60.0	47.9	44.6	48.4	43.0	51.7	41.1	55.4	47.6	48.0	<b>40.3</b>	39.9	
DF81	371288	293119	30.3	31.2	26.0	36.4	26.5	26.2	27.7	24.5	29.0	20.2	28.0	26.7	27.7	23.3	-	
DF82	371264	293120	26.4	25.4	22.1	31.6	22.2	19.2	24.9	21.6	27.0	18.9	27.0	24.9	24.3	20.4	-	
DF83	371341	293096	58.3	55.0	49.3	69.9	58.0	50.4	56.8	50.7	68.2	58.0	67.2	63.3	58.8	<b>49.4</b>	36.3	
DF22 3	363640	332232	56.7	64.2	34.3	66.7	56.6	50.0	57.3		62.7	55.1	48.4	48.4	54.6	<b>45.9</b>	37.2	
DF30 5	328978	329879	33.8	18.2	19.6	23.6	20.6	20.9	25.2	21.3	28.5	16.5	31.5	26.3	23.8	20.0	-	
DF30 6	328922	325981	27.9	27.1	20.0	20.9	23.4	18.2	23.4	23.5	24.4	29.8	27.2	23.0	24.1	20.2	-	
DF31 4	328866	329269	33.8	33.1	29.2	28.7	27.6	25.6	27.7	23.7	31.6	32.8	40.7	35.7	30.9	25.9	-	
DF40 0	348726	308959	29.9	29.3	22.5	28.1	20.7	23.5	28.1	24.7	29.4	26.9	29.3	25.9	26.5	22.3	-	
DF40 3	348891	312721	27.3	30.1	21.1	26.7	27.1	22.3	24.1	25.9	32.7	30.2		33.6	27.4	23.0	-	
DF40 4	348889	312326	20.0	17.0	11.1	16.6	11.2	12.1	11.6	12.5	14.1	11.5	16.5	16.8	14.2	12.0	-	
DF40 7	349330	312503	25.1	26.0	17.4	25.2	25.2	20.3	22.5	19.6	25.2	20.0	27.6	25.7	23.3	19.6	-	
DF41 3	349283	312851	29.2	25.4	21.9	27.2	27.9	25.2	25.3	23.3	31.0	27.7	29.9	30.5	27.0	22.7	-	
DF42 0	349396	312742	26.7	31.2	22.8	<0.43			25.5	23.0	29.3		31.2	29.6	27.4	21.9	-	
DF42 8A	349445	313090	39.5	46.9	20.0	38.8	41.8	31.4	32.1	34.7	42.9	41.2	35.5	36.9	36.8	30.9	-	
DF42 9	349237	312900	32.5	30.3	20.7	26.5	24.1	22.8	21.4	23.5	33.0	29.6		33.1	27.0	22.7	-	
DF43 6	349283	312889	35.5	35.9	26.0	34.6	25.8	30.4	32.7	29.8	37.1	34.2	35.3	41.6	-	-	-	Duplicate Site with DF436 and DF437 - Annual data provided for DF437 only
DF43 7	349283	312889	35.7	34.7	25.3	34.0	34.6	30.4	33.4	28.3	38.2	35.5	37.6	37.6	33.5	28.1	-	Duplicate Site with DF436 and DF437 - Annual data provided for DF437 only
DF43 8	349400	312954	47.4	53.5	49.6	64.2	57.1	49.6	58.9	48.6	51.9	48.7	47.7	50.8	52.3	<b>43.9</b>	<b>43.3</b>	
DF44 8	345769	313223	11.5	12.8	8.5	8.0	5.9	4.4	5.7	5.4	7.4	8.3	10.8	11.7	8.4	7.0	-	
DF44 9	346796	313509	19.7	21.6	13.1	20.3	18.2	14.7	15.9	14.1	19.2	15.3	20.1	18.3	17.5	14.7	-	

DT ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northin g)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean: Raw Data	Annual Mean: Annualised and Bias Adjusted (0.84)	Annual Mean: Distance Corrected to Nearest Exposure	Comment
DF457	349235	313441	35.6	35.0	36.0	40.2	35.2	30.0	36.5	33.2	37.8	33.9	40.4	33.2	-	-	-	Duplicate Site with DF457 and DF457A - Annual data provided for DF457A only
DF457A	349235	313441	32.6	35.1	27.3	32.9	29.7	25.2	20.3	30.2	38.1	29.7	33.5	31.4	33.0	27.8	-	Duplicate Site with DF457 and DF457A - Annual data provided for DF457A only
DF458	349426	313028	48.6	56.6	<0.63	56.5	54.0	46.3	49.5	46.7	56.3	52.8	49.3	36.4	50.3	<b>42.2</b>	-	
DF459	349424	312936	40.3	41.7	28.3	33.7	34.5	28.1	29.9	30.4	37.0	35.5	39.1	38.7	34.8	29.2	-	
DF461	349327	312389	22.5	27.1	18.6	26.2	22.4	19.6	22.5	20.6	28.3	24.0	28.4	26.3	23.9	20.1	-	
DF462	345203	313427	18.1	20.3	11.7	15.6	12.8	10.8	12.6	11.3					14.2	12.2	-	
DF468	350376	314599	26.3	27.6	14.5	22.4	20.0	17.6	17.0	18.0	24.4	20.2	20.5	24.3	21.0	17.7	-	
DF474	348647	308771	40.8	48.5	36.6	42.6	36.5	37.0	40.8	37.7	53.3	47.3	42.5	39.8	41.9	35.2	-	
DF476	349360	312962	31.4	30.5	24.2	29.6	28.8	26.1	27.1	24.8	32.2	29.5	31.4	33.0	29.0	24.4	-	
DF477	349299	313108	28.6	31.0	25.3	23.3	28.0	24.4	25.4	25.5	31.4	33.7	33.4	32.0	28.5	23.9	-	
DF480	349466	313151	35.7	41.5	24.1	33.5	34.2	29.0	27.3	31.7	38.5	37.2	30.8	35.4	33.2	27.9	-	
DF482	349436	313064	42.7	49.1	34.6	40.3	43.2	32.5	32.6	35.0	43.8	38.2	38.6	40.0	39.2	32.9	-	
DF485	348815	312854	24.2	24.4	21.2	32.4	26.8	24.3	29.7	26.3	30.5	23.3	29.8	27.8	26.7	22.4	-	
DF487	349529	312328	22.7	23.0	16.4	26.0	18.8	19.1	19.6	18.8	22.9	16.9		24.5	20.8	17.5	-	
DF488	349223	313449	28.9	33.3	20.1	27.7	26.9	21.2	31.7	24.6	30.7	25.6	24.5	32.5	27.3	22.9	-	
DF489	349148	313444	24.8	28.2	17.2	22.9	19.7	16.8	17.7	18.8	25.3	22.5	24.2	27.5	22.1	18.6	-	
DF490	348964	313466	19.2	19.6	11.9	16.4	15.9	6.0	13.6	14.5	18.6	15.0	19.0	19.6	15.8	13.3	-	
DF501	349349	313071	35.5	39.2	19.7	36.2	34.8	27.2	29.9	29.8	36.7	33.5	34.6	39.8	33.1	27.8	-	
DF502	349364	312998	29.0	32.9	16.6	30.7	27.7	22.9	23.2	24.9	31.1	23.4	22.5	29.6	-	-	-	Duplicate Site with DF502 and DF502A - Annual data provided for DF502A only
DF502A	349364	312998					28.6	24.9	23.2		31.1	23.4	22.5	29.6	26.3	22.1	-	Duplicate Site with DF502 and DF502A - Annual data provided for DF502A only
DF503	348611	312969					25.1	18.6	29.2	28.6	33.4	26.3	29.6	31.8	27.8	26.1	-	

- All erroneous data has been removed from the NO<sub>2</sub> diffusion tube dataset presented in Table B.1 (confirm by selecting in box).
- Annualisation has been conducted where data capture is <75% and >25% in line with LAQM.TG16 (confirm by selecting in box).
- Local bias adjustment factor used (confirm by selecting in box).
- National bias adjustment factor used (confirm by selecting in box).
- Where applicable, data has been distance corrected for relevant exposure in the final column (confirm by selecting in box).
- Shropshire Council confirm that all 2021 diffusion tube data has been uploaded to the Diffusion Tube Data Entry System (confirm by selecting in box).

**Notes:**

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

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

See Appendix C for details on bias adjustment and annualisation.

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

### **New or Changed Sources Identified Within Shropshire Council During 2021**

Upon review of its area Shropshire Council has identified a potential fugitive source of particulate matter in the Coton Hill area of Shrewsbury. The site is formed of an aggregate holding and transfer facility where locally quarried aggregates are transferred to freight trains via mechanical loading vehicles. Aggregates are delivered to site by HGV and stockpiled on site for several days preceding a train-loading event. Shropshire Council have identified the potential for particulates during handling of aggregates and note the site is surrounded on all sides by neighbouring residential use, with the closest residential receptor within 24m of the site boundary. The site has longstanding planning permission and does not fall within the environmental permitting regime. The Council is aware that the throughput of the site may be due to increase and are in initial discussions with the site operator to understand current controls, monitoring arrangements and future plans for the site. Further updates and details of any detailed monitoring or screening shall be reported in future ASR's.

### **Additional Air Quality Works Undertaken by Shropshire Council During 2021**

Shropshire Council has not completed any additional works within the reporting year of 2021.

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

The supplier used for NO<sub>2</sub> diffusion tubes in 2021 was Gradko International Ltd. Tubes were prepared using the 20% TEA in water method. The diffusion tube monitoring was carried out in line with the DEFRA 2021 Diffusion Tube Monitoring Calendar. Gradko carry out analysis using Ultraviolet/visible spectroscopy under a UKAS accredited method. AIR-

PT results for 2020 showed 75% of results were satisfactory in Round 36 and 40 which were the only rounds carried out in 2020 due to rounds 37 and 39 being cancelled due to pandemic. Previous Rounds 31, 33 and 34 found 100% satisfactory results. The average over this 5 round period is 90% which is not considered substantially below 95% stated as the figure in the AIR-PT document as the standard to be aimed for

([https://laqm.defra.gov.uk/documents/LAQM%20NO2%20Performance%20data\\_Up%20to%20March%202021\\_v2.pdf](https://laqm.defra.gov.uk/documents/LAQM%20NO2%20Performance%20data_Up%20to%20March%202021_v2.pdf)). Round 43 (Jan – to March 2021) is listed as 25%. Further rounds will need to be assessed for satisfactory results, over the rolling 5 round period.

The Gradko 20% TEA in water precision results for 2020 found that there was good precision on 34 out of 34 tested occasions, 100% of occasions. This is a very high proportion of good results. Given this the diffusion tubes are considered to be reasonably precise. For confirmation visit:

[https://laqm.defra.gov.uk/documents/LAQM%20NO2%20Performance%20data\\_Up%20to%20March%202021\\_v2.pdf](https://laqm.defra.gov.uk/documents/LAQM%20NO2%20Performance%20data_Up%20to%20March%202021_v2.pdf)

As a result, it is considered that the QA/QC element for these monitors is satisfied.

### **Diffusion Tube Annualisation**

Three diffusion tube locations captured less than 75% data but more than 33% data over the 2021 period. These diffusion tubes were DF420, DF462, DF503. Annualisation was undertaken using AURN monitor information from monitors within reasonable distance from Shropshire Council as no monitors exist within the County. For this reason, the Telford and Walsall AURN monitors were used. They were chosen due to proximity and a knowledge of their setting. Annualisation was carried out within the Diffusion Tube Data Processing Tool in line with guidance. DF503 was installed in May 2021.

### **Diffusion Tube Bias Adjustment Factors**

The diffusion tube data presented within the 2022 ASR have been corrected for bias using an adjustment factor. Bias represents the overall tendency of the diffusion tubes to under or over-read relative to the reference chemiluminescence analyser. LAQM.TG16 provides guidance with regard to the application of a bias adjustment factor to correct diffusion tube monitoring. Triplicate co-location studies can be used to determine a local bias factor based on the comparison of diffusion tube results with data taken from NO<sub>x</sub>/NO<sub>2</sub> continuous analysers. Alternatively, the national database of diffusion tube co-location surveys provides bias factors for the relevant laboratory and preparation method.

Shropshire Council have applied a national bias adjustment factor of 0.84 to the 2021 monitoring data utilising version 03/22 of the spreadsheet at the time that the data was processed. A summary of bias adjustment factors used by Shropshire Council over the past five years is presented in Table C.1.

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

Monitoring Year	Local or National	If National, Version of National Spreadsheet	Adjustment Factor
2021	National	03/22	0.84
2020	National	06/21	0.81
2019	National	03/20	0.93
2018	National	06/19	0.92
2017	National	03/18	0.89

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

Wherever possible, monitoring locations are representative of exposure. However, where this is not possible, the NO<sub>2</sub> concentration at the nearest location relevant for exposure has been estimated using the Diffusion Tube Data Processing Tool/NO<sub>2</sub> fall-off with distance calculator available on the LAQM Support website. Where appropriate, non-automatic annual mean NO<sub>2</sub> concentrations corrected for distance are presented in Table B.1.

Eight monitoring locations were noted in the Diffusion Tube Data Processing Tool as necessary for fall-off-with-distance calculation. Details are provided below:

- DF28, DF71, DF79 and DF80, DF83 – these locations are within the Bridgnorth AQMA and are found on street furniture close to receptors where location on receptors are not possible.
- DF223 is located on the only piece of street furniture available to place a monitor. No locations on the receptor façade are available. This year results show after fall-off with distance calculations the result was more than 10% below the national objective level and no further attention is required at this stage.
- DF438 is within the Shrewsbury No 3 AQMA. It is the current hotspot for localised pollution in the area. The diffusion tube is located on a down spout that stands proud of the receptor façade hence the need for calculations.

- DF458 is situated underneath the railway bridges at Shrewsbury train station. There is no relevant receptor for the annual mean objective. The monitoring location is there to consider short term exposure which needs no further consideration given the results obtained.

## QA/QC of Automatic Monitoring

Shropshire does not undertake automatic monitoring.

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

Shropshire Council does not undertake PM<sub>10</sub> and PM<sub>2.5</sub> monitoring.

## Automatic Monitoring Annualisation

Shropshire Council does not undertake automatic monitoring.

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

Wherever possible, monitoring locations are representative of exposure. However, where this is not possible, the NO<sub>2</sub> concentration at the nearest location relevant for exposure has been estimated using the NO<sub>2</sub> fall-off with distance calculator available on the LAQM Support website. Where appropriate, non-automatic annual mean NO<sub>2</sub> concentrations corrected for distance are presented in Table B.1.

No automatic NO<sub>2</sub> monitoring locations within Shropshire Council required distance correction during 2021.



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

Diffu sion Tube ID	Annualisation Factor Telford Hollinswood AURN	Annualisation Factor Walsall Woodlands AURN	Annualisation Factor Site 3 Name	Annualisation Factor Site 4 Name	Average Annualisation Factor	Raw Data Simple Annual Mean ( $\mu\text{g}/\text{m}^3$ )	Annualised Data Simple Annual Mean ( $\mu\text{g}/\text{m}^3$ )	Comments
DF42 0	0.9609	0.9435			0.9522	27.4	26.1	
DF46 2	1.0190	1.0290			1.0240	14.2	14.5	
DF50 3	1.1227	1.1067			1.1147	27.8	31.0	

**Table C.3 – Local Bias Adjustment Calculation**

A National Bias adjustment calculation was used.

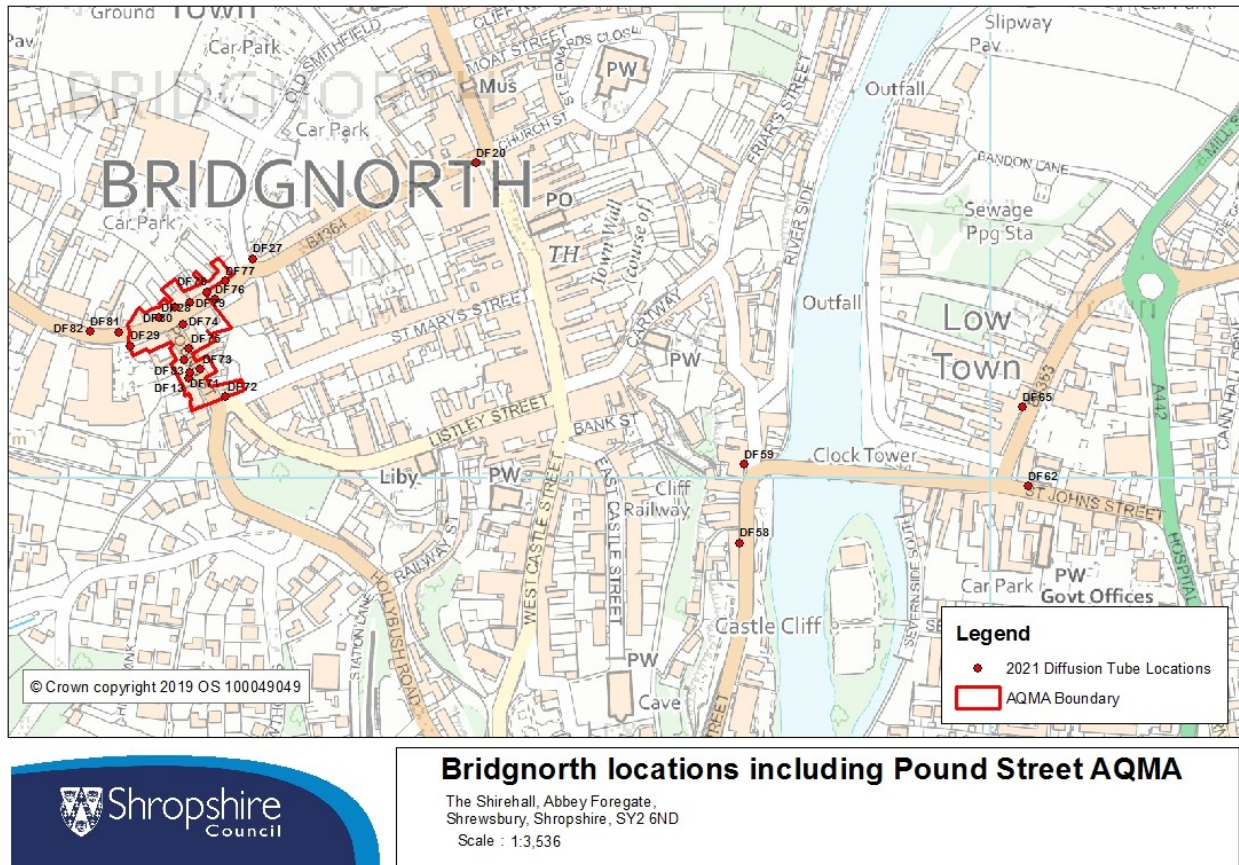
Table C.4 – NO<sub>2</sub> Fall off With Distance Calculations (concentrations presented in µg/m<sup>3</sup>)

Site ID	Distance (m): Monitoring Site to Kerb	Distance (m): Receptor to Kerb	Monitored Concentration (Annualised and Bias Adjusted)	Background Concentration	Concentration Predicted at Receptor	Comments
DF28	1.7	1.9	36.7	4.8	35.9	<i>Warning: Background NO<sub>2</sub> concentrations &lt;5µg/m<sup>3</sup> or &gt;50µg/m<sup>3</sup> are rare in the UK - this calculation will still work, but please check your data.</i>
DF71	1.1	1.4	43.2	4.8	<b>41.3</b>	<i>Predicted concentration at Receptor above AQS objective. Warning: Background NO<sub>2</sub> concentrations &lt;5µg/m<sup>3</sup> or &gt;50µg/m<sup>3</sup> are rare in the UK - this calculation will still work, but please check your data.</i>
DF79	1.5	1.6	36.9	4.8	36.4	<i>Predicted concentration at Receptor within 10% the AQS objective. Warning: Background NO<sub>2</sub> concentrations &lt;5µg/m<sup>3</sup> or &gt;50µg/m<sup>3</sup> are rare in the UK - this calculation will still work, but please check your data.</i>
DF80	1.8	1.9	40.3	4.809175	39.9	<i>Predicted concentration at Receptor within 10% the AQS objective. Warning: Background NO<sub>2</sub> concentrations &lt;5µg/m<sup>3</sup> or &gt;50µg/m<sup>3</sup> are rare in the UK - this calculation will still work, but please check your data.</i>
DF83	0.5	2.7	49.4	5.438644	36.3	<i>Predicted concentration at Receptor within 10% the AQS objective.</i>

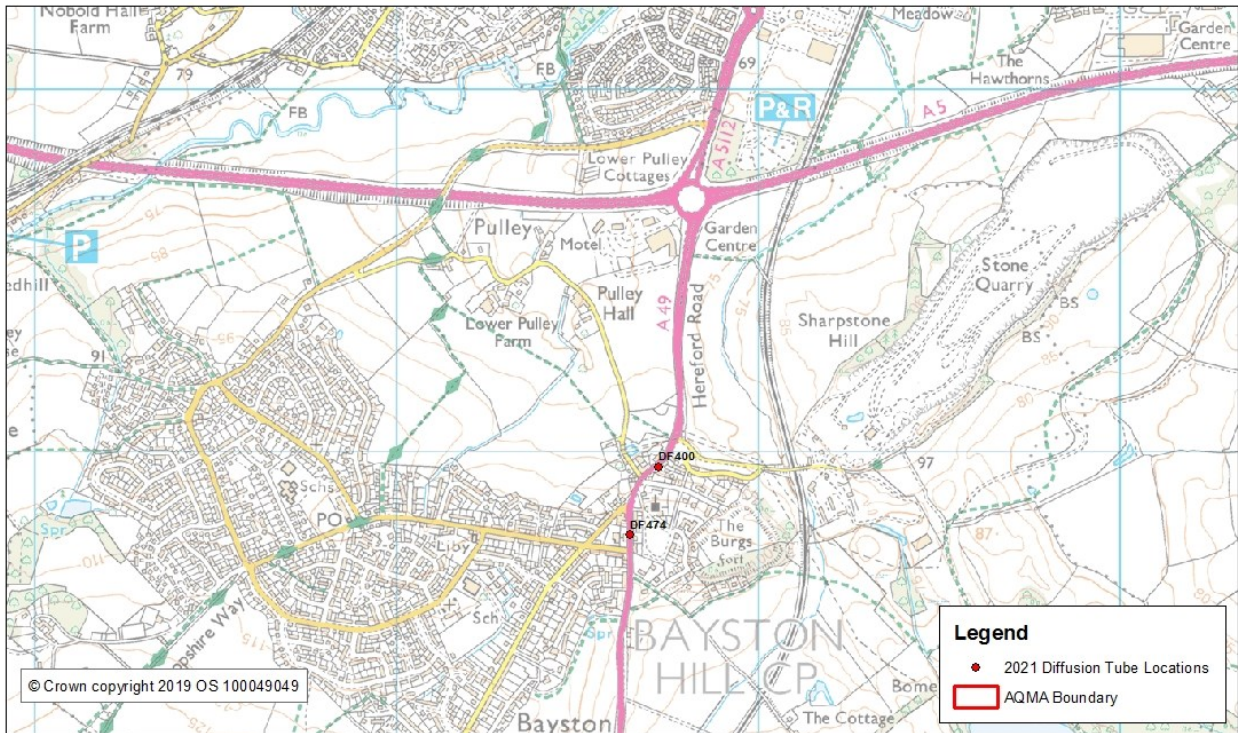
Site ID	Distance (m): Monitoring Site to Kerb	Distance (m): Receptor to Kerb	Monitored Concentration (Annualised and Bias Adjusted)	Background Concentration	Concentration Predicted at Receptor	Comments
DF223	1.3	3.4	45.9	4.7	37.2	<i>Predicted concentration at Receptor within 10% the AQS objective. Warning: Background NO2 concentrations &lt;5µg/m3 or &gt;50µg/m3 are rare in the UK - this calculation will still work, but please check your data.</i>
DF438	1.2	1.3	43.9	7.4	<b>43.3</b>	<i>Predicted concentration at Receptor above AQS objective.</i>
DF458	2.0		42.2	7.4	-	<i>Warning: Receptor to kerb must be between 0.1m and 50m to calculate concentration. Please check distances and update STEP 2 - Diffusion Tube Inputs tab Columns Distance to Relevant Exposure and Distance to Kerb of Nearest Road</i>

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

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



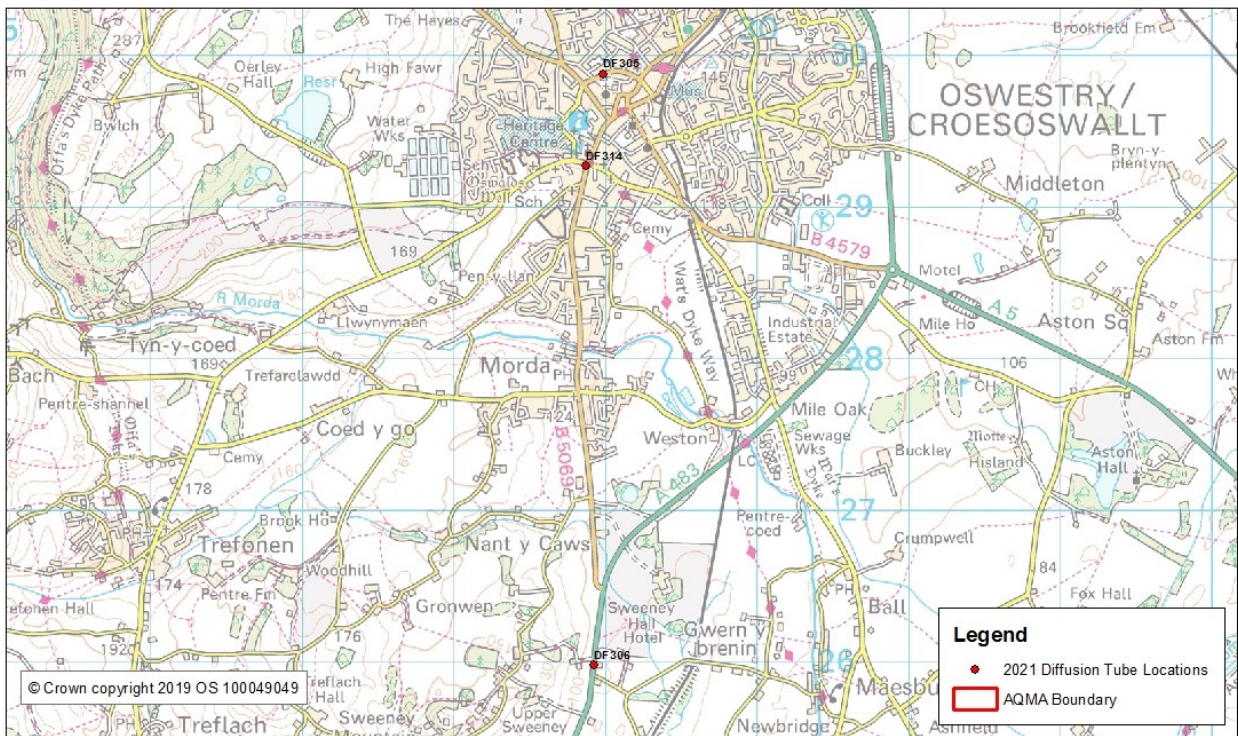




### Bayston Hill A49 Locations - Shrewsbury

The Shirehall, Abbey Foregate,  
Shrewsbury, Shropshire, SY2 6ND

Scale : 1:11,948

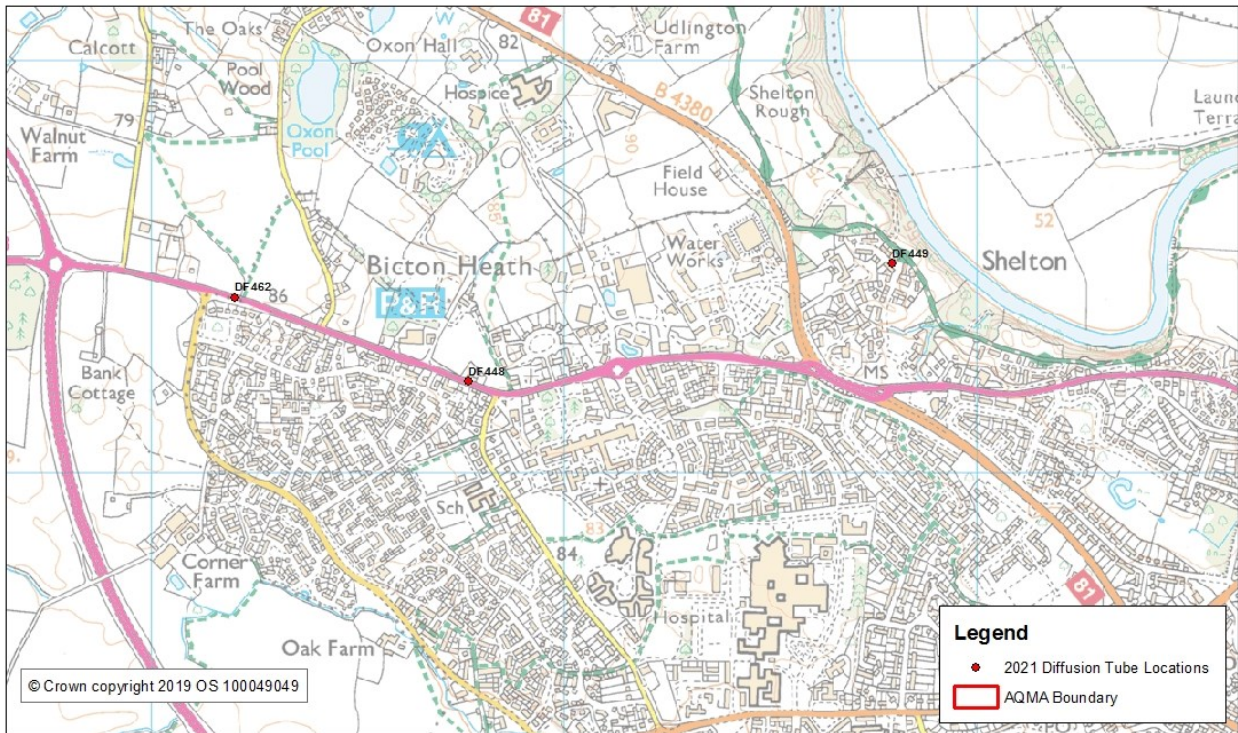


### Oswestry Centre and A483 Locations

The Shirehall, Abbey Foregate,  
Shrewsbury, Shropshire, SY2 6ND

Scale : 1:28,562

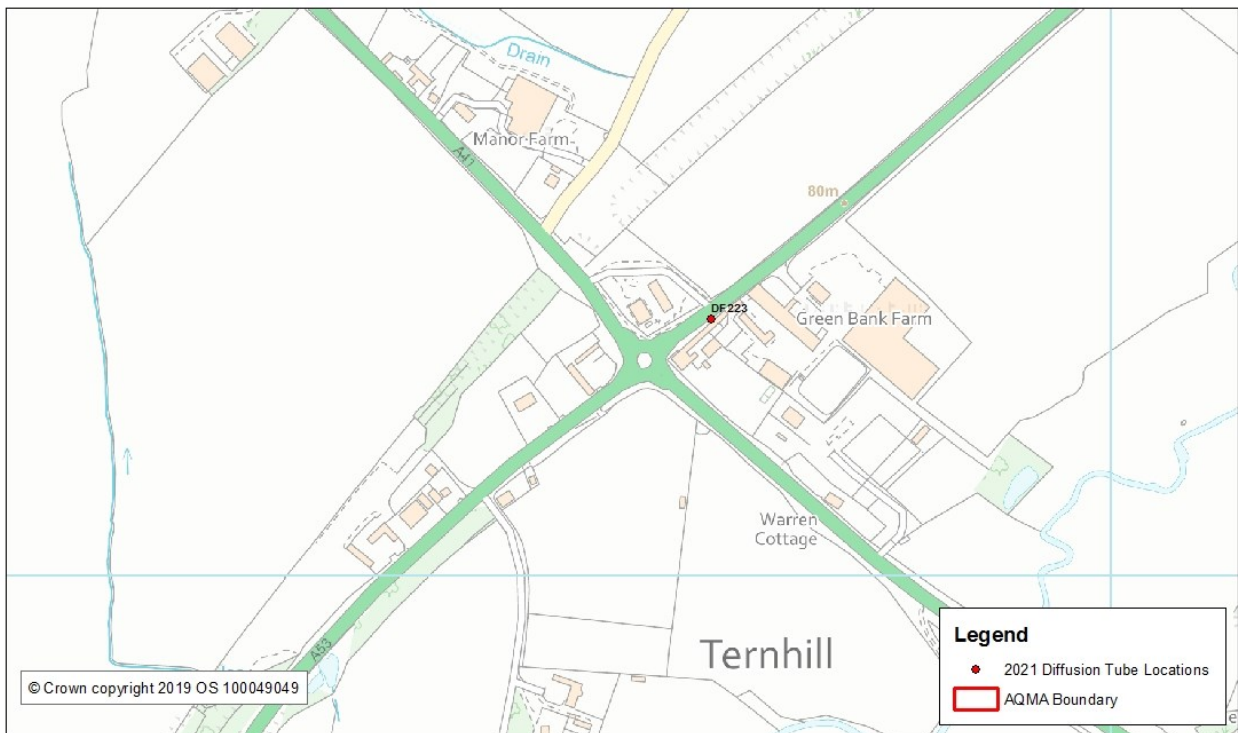




**Welshpool Road and Shelton Locations - Shrewsbury**

The Shirehall, Abbey Foregate  
Shrewsbury, Shropshire, SY2 6ND

Scale : 1:10,478

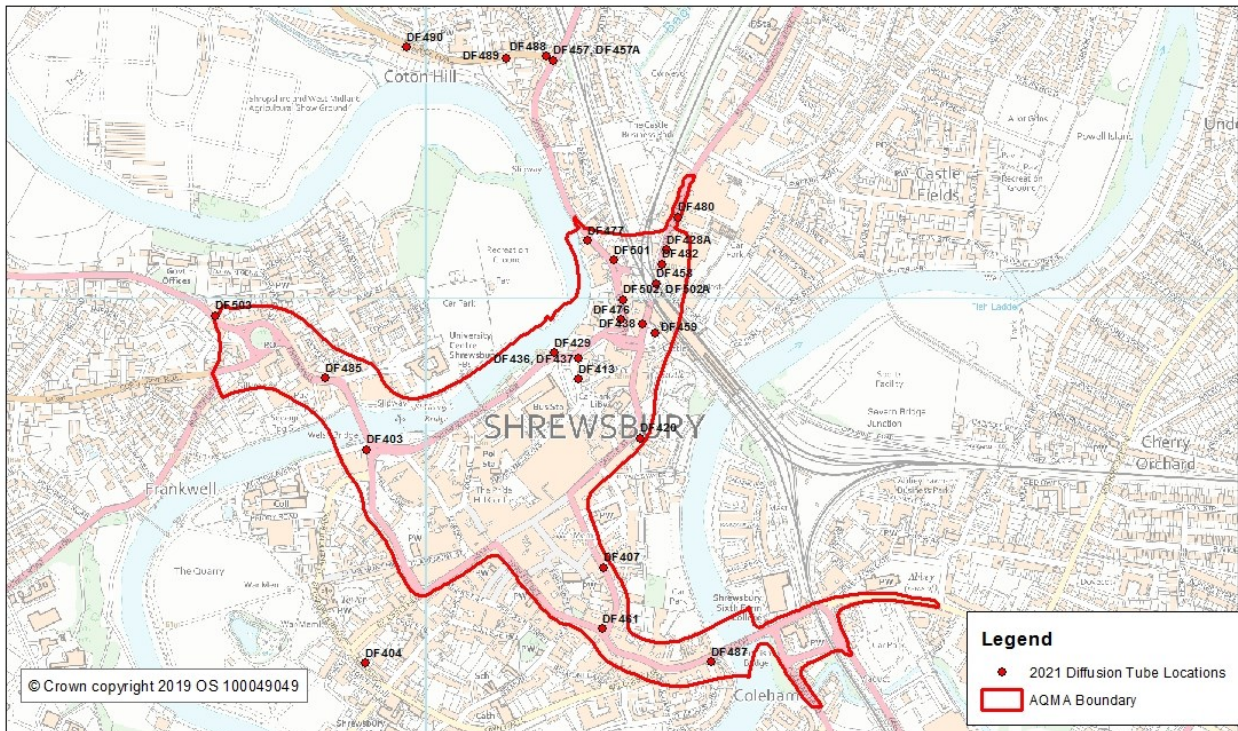


**Tern Hill Location**

The Shirehall, Abbey Foregate,  
Shrewsbury, Shropshire, SY2 6ND

Scale : 1:3,909

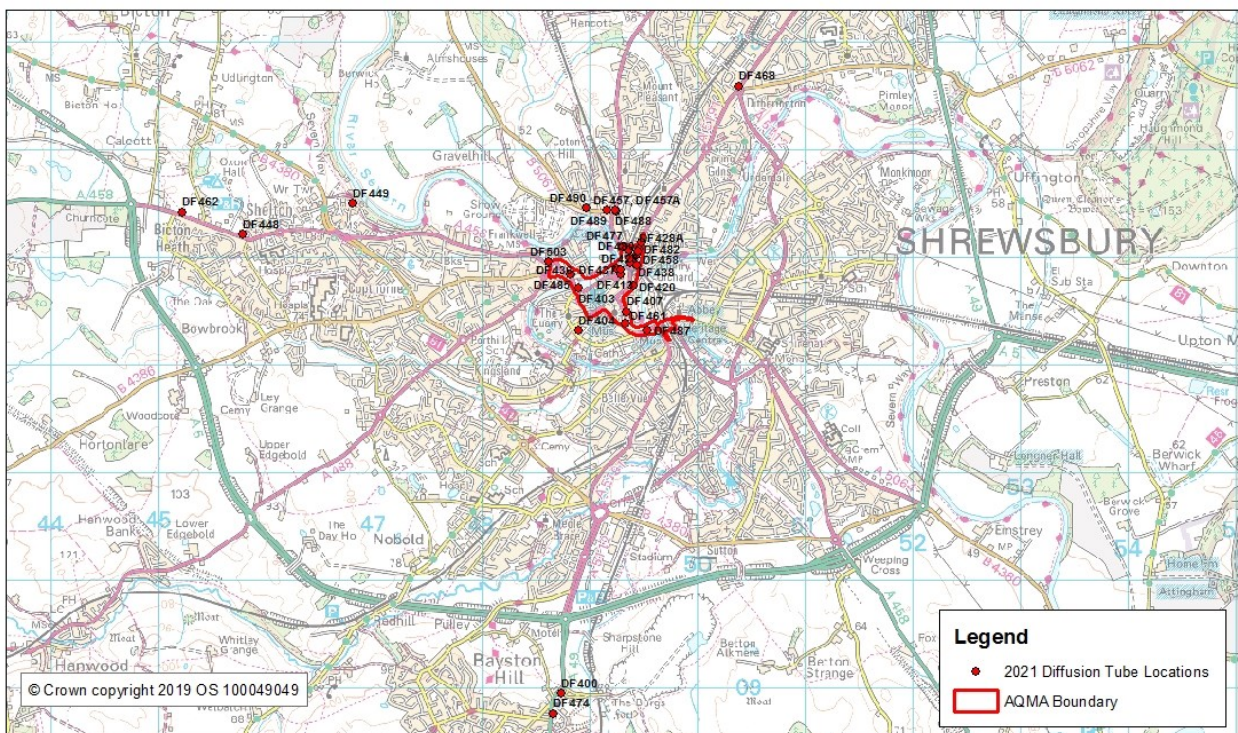




**Shrewsbury Central Locations  
including Shrewsbury No.3 AQMA**

The Shirehall, Abbey Foregate,  
Shrewsbury, Shropshire, SY2 6ND

Scale : 1:8,000



**Shrewsbury and Bayston Hill locations  
including Shrewsbury No.3 AQMA**

The Shirehall, Abbey Foregate,  
Shrewsbury, Shropshire, SY2 6ND

Scale : 1:40,239



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

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

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

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

## Glossary of Terms

Abbreviation	Description
AQAP	Air Quality Action Plan - A detailed description of measures, outcomes, achievement dates and implementation methods, showing how the local authority intends to achieve air quality limit values'
AQMA	Air Quality Management Area – An area where air pollutant concentrations exceed / are likely to exceed the relevant air quality objectives. AQMAs are declared for specific pollutants and objectives
ASR	Annual Status Report
Defra	Department for Environment, Food and Rural Affairs
DMRB	Design Manual for Roads and Bridges – Air quality screening tool produced by National Highways
EU	European Union
FDMS	Filter Dynamics Measurement System
LAQM	Local Air Quality Management
NO <sub>2</sub>	Nitrogen Dioxide
NO <sub>x</sub>	Nitrogen Oxides
PM <sub>10</sub>	Airborne particulate matter with an aerodynamic diameter of 10µm or less
PM <sub>2.5</sub>	Airborne particulate matter with an aerodynamic diameter of 2.5µm or less
QA/QC	Quality Assurance and Quality Control
SO <sub>2</sub>	Sulphur Dioxide

## References

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