2024 Air Quality Annual Status Report (ASR)

In fulfilment of Part IV of the Environment Act 1995 Local Air Quality Management, as amended by the Environment Act 2021

Date: June 2024

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Executive Summary: Air Quality in Our Area

Air Quality in Redditch Borough

Breathing in polluted air affects our health and costs the NHS and our society billions of pounds each year. Air pollution is recognised as a contributing factor in the onset of heart disease and cancer and can cause a range of health impacts, including effects on lung function, exacerbation of asthma, increases in hospital admissions and mortality. In the UK, it is estimated that the reduction in healthy life expectancy caused by air pollution is equivalent to 29,000 to 43,000 deaths a year[1].

Air pollution particularly affects the most vulnerable in society, children, the elderly, and those with existing heart and lung conditions. Additionally, people living in less affluent areas are most exposed to dangerous levels of air pollution[2].

Worcestershire Regulatory Services (WRS) have been responsible for managing (monitoring and reporting of) local air quality for the six Worcestershire District Councils since April 2011.

The Redditch area generally experiences good levels of air quality. There are currently no Air Quality Management Areas (AQMAs) in the Redditch Borough Council area, and none have been declared historically. Concentrations continue to fall well below the annual mean objective for nitrogen dioxide at measured locations.

Monitoring across the Redditch area focuses on nitrogen dioxide (NO_2) via a network of passive diffusion tubes. The tubes are located in the main urban centre of Redditch. No changes were made to monitoring locations for the 2023 monitoring year.

Monitoring results within the Redditch Borough area demonstrate that there were no exceedances of the NO_2 air quality objective of 40µg/m^3 in 2023. Results show there were no increases in NO_2 concentrations at all monitoring locations between 2022 and 2023.

The largest decrease of 3.6µg/m^3 was recorded at location OR2 (14 Other Road Redditch), with concentrations reducing from 33.1µg/m^3 in 2022 to 29.5µg/m^3 in 2023. This

[1] UK Health Security Agency. Chemical Hazards and Poisons Report, Issue 28, 2022.

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

represents a decrease of 12.2%. There is an average decrease of approximately 11.7% across all locations.

Surprisingly the highest concentration of NO_2 recorded in 2023 was also OR2 at 29.5µg/m^3 recorded at OR2, 14 Other Road. The lowest concentration was 9.8µg/m^3 recorded at STOR, 18 Washford Lane. All concentrations are therefore 26% or more below the annual mean objective of 40µg/m^3.

It should be noted that diffusion tubes OR4, OR5 and OR6 are a triplicate location (Misty Florist, Other Road); when averaged and bias adjusted the NO_2 concentration for this location is 28.0µg/m^3.

No annual means greater than 60µg/m^3 have been recorded indicating that it is extremely unlikely that there have been any exceedances of the 1-hour mean objective for NO_2 at any monitoring sites. The 60µg/m^3 value is a surrogate figure to indicate exceedances of the 1-hour objective based on annual average conditions. The concentrations recorded across the district in 2023 are all 50% or more below that value.

Table ES 1 provides a brief explanation of the key pollutants relevant to Local Air Quality Management and the kind of activities they might arise from.

Table ES 1 - Description of Key Pollutants

Pollutant	Description
Nitrogen Dioxide (NO_2)	Nitrogen dioxide is a gas which is generally emitted from high-temperature combustion processes such as road transport or energy generation.
Sulphur Dioxide (SO_2)	Sulphur dioxide (SO_2) is a corrosive gas which is predominantly produced from the combustion of coal or crude oil.
Particulate Matter (PM_{10} and $PM_{2.5}$)	Particulate matter is everything in the air that is not a gas. Particles can come from natural sources such as pollen, as well as human made sources such as smoke from fires, emissions from industry and dust from tyres and brakes. PM_{10} refers to particles under 10 micrometres. Fine particulate matter or $PM_{2.5}$ are particles under 2.5 micrometres.

Actions to Improve Air Quality

Whilst air quality has improved significantly in recent decades, there are some areas where local action is needed to protect people and the environment from the effects of air pollution.

The Environmental Improvement Plan[3] sets out actions that will drive continued improvements to air quality and to meet the new national interim and long-term targets for fine particulate matter ($PM_{2.5}$), the pollutant of most harmful to human health. The Air Quality Strategy[4] provides more information on local authorities' responsibilities to work towards these new targets and reduce fine particulate matter in their areas.

[3] Defra. Environmental Improvement Plan 2023, January 2023

[4] Defra. Air Quality Strategy – Framework for Local Authority Delivery, August 2023

The Road to Zero[5] details the Government's approach to reduce exhaust emissions from road transport through a number of mechanisms, in balance with the needs of the local community. This is extremely important given that cars are the most popular mode of personal travel, and the majority of Air Quality Management Areas (AQMAs) are designated due to elevated concentrations heavily influenced by transport emissions.

No AQMAs have been declared within the Redditch Borough area and therefore no specific action plan has been developed. Historically, the general actions to improve air quality detailed in the previous Worcestershire AQAP have applied across Worcestershire as a whole, including the Redditch area. Currently the action plan process is being updated across the relevant districts within Worcestershire that have AQMAs. Once this has been completed an Air Quality Strategy will be produced for all remaining districts which will include Redditch. Further information is provided below on this.

In addition, the following actions have also taken place.

Bromsgrove District Council and Redditch Borough Council Provision of Electric Vehicle Charging Infrastructure

The partnership councils are progressing a scheme to create a comprehensive network of EV Chargers across both Local Authority areas. Approximately 120 new chargers are set to be placed at 33 locations in the area, after Redditch Borough Council teamed up with Bromsgrove District Council to agree a long-term contract with EV infrastructure provider Zest.

Zest is backed by the government-sponsored Charging Infrastructure Investment Fund (CIIF) and will invest about £2.1m to provide the new infrastructure for the next 15 to 20 years after winning the contract. Zest will provide, operate, and maintain the chargers.

A rollout plan is now being developed, and the first of the new chargers are expected to be installed by August 2024. In this initial phase the contract will mostly add more chargers to more council-owned car parks, while also bringing chargers to the councils' main workplaces.

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

Air Quality Actions Plan and Air Quality Strategy

A new Air Quality Action Plan is required for Worcestershire in accordance with the Environment Act 2021 and revised guidance published in August 2022 (LAQM.TG22 and PG22). In 2020 the COVID19 pandemic, unfortunately, led to the suspension of previous district air quality working groups and public health action groups programmes. In September 2022, WRS began discussions with Worcestershire County Council colleagues with a view to form a new Steering Group and produce a new plan of actions to improve air quality across the County, to comply with recent legislative changes.

The Action Plan will incorporate an improving Air Quality Strategy applicable across the County including the Redditch Borough Council area and other districts that currently have no AQMAs in place, in accordance with the updated legislation and guidance.

Whilst Redditch has no AQMAs in place further work is necessary across the county to help inform the Air Quality Strategy and Action Plan process. The first step in action planning is to determine the contribution of sources of air pollution (source apportionment) to inform future actions. Some source apportionment has been undertaken across the county, but further work is required. The initial Steering Group work is focussed on actions informed by the most up to date source apportionment work in addition to countywide actions applicable to all districts.

The timeline for the various stages and delivery of a revised countywide AQAP, and establishment of a new countywide Air Quality Strategy, were set out in the ASR 2023. However, following the introduction of a new enforcement policy by Defra in June 2023, it has been necessary to amend the previously published framework to prioritise production of a standalone AQAP for each district with an existing AQMA.

As previously discussed, Redditch has no AQMAs therefore no Action Plan for the borough is required. It is anticipated the countywide Air Quality Strategy will be developed further in 2025 following the completion of these priority works (AQAPs).

The table below provides a revised summary of the program of works.

Time	Phase
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2025	Develop and publish draft of Worcestershire Air Quality Strategy

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£248,400 was awarded to WRS from the AQ Grant Scheme. An additional 10% of funds has been provided by each district council in Worcestershire, as per the match-funding requirement of the scheme, which equates to £27,600. Giving a grand total of £276,000 for the project.

The scheme has involved the installation and operation of 26 ‘low-cost Air Quality Monitors’ which measure NO_2, PM_{10}, and $PM_{2.5}$ across the county for a period of 3 years (with EA MCERTS standard accreditation as indicative ambient particulate matter devices). The results of monitoring will be used to inform decision making and requirements for further action as necessary.

In 2023 the experienced sensor provider Earthsense were appointed as successful suppliers following a rigorous procurement process. The sensors, known as ‘Zephyrs’ are provided, operated and serviced by Earthsense who also provide data access.

Appropriate monitoring locations were determined by WRS in collaboration with Public Health, Worcestershire County Council Street Lighting team and Earthsense taking into consideration requirements of Redditch Borough Council.

The locations have been chosen to maximise data capture within locations proximal to vulnerable communities and/or from a range of sources of air pollution including transport, solid fuel burning, industry and agriculture.

Two of the monitors have been deployed within the Redditch Borough Council area in January 2024, following completion of required structural assessments. These are located at:

- Meadowhill Road
- Rickyard Lane

Earthsense and WRS have designed a publicly accessible portal to the real time monitoring data which is set to launch in 2024.

Worcestershire County Council Highways Department have also progressed the following schemes within the Redditch Borough during 2023:

Redditch Town Centre Enhancements (phase 3)

This scheme involves meeting the national urban design objectives to create a place with its own identity, responding to and reinforcing locally distinctive patterns of development, landscape, and culture. To promote the continuity of street frontages and the enclosures of space by development which clearly defines private and public places. The project will aim to improve the quality of the space, making it more attractive, uncluttered, and safe as well as increasing the ease of movement through the area.

The proposals have been developed to encourage the town to prosper and compliment the key themes of Worcestershire's corporate plan with construction due to start in the summer of 2024.

Redditch improvements | Worcestershire County Council

Redditch Local Cycling and Walking Infrastructure Plan (LCWIP)

Secured funding from Active Travel England and are due to be completed in 2024.

Local cycling and walking infrastructure plans (LCWIPs) | Worcestershire County Council

Redditch Rail Quarter

The project will improve connectivity between the railway station, town centre, bus, taxi, and active travel options. This will in turn move people away from travelling by private car, improving congestion and air quality on key corridors. The scheme proposes the redevelopment of Redditch Station facilities, including a new station building, minor car park works and adjacent highway works. The scheme currently requires additional funding.

Redditch Railway Station | Worcestershire County Council

Conclusions and Priorities

There are currently no AQMAs declared in Redditch Borough Council. Concentrations at identified worst-case scenario locations have been recorded well below the objectives for nitrogen dioxide.

Redditch Borough Council has not identified any significant new sources of air pollution within the area for the reporting year of 2023. A number of planning applications for large developments have been made within the district during 2023. The proposals have been assessed as part of the planning process and are not expected to have a significant impact on local air quality when they are operational. Details of these applications are listed in Appendix C.

The priorities for Redditch Borough Council are to continue to monitor nitrogen dioxide at key points across the area. A full rationalisation of all monitoring locations is programmed for Autumn 2024. Locations will be added and removed as deemed appropriate. WRS, on behalf of the Council, will continue to review and comment on planning applications where air quality is a relevant concern.

As referred to in the previous section a real-time air quality monitoring network has been set up. This has involved the installation and operation of 26 Zephyr Air Quality monitors' which measure NO_2, PM_{10} and $PM_{2.5}$, as well as other parameters, across the county. Two of the monitors deployed are within the Redditch Borough Council area and were installed in January 2024. This will provide important data in respect of PM_{10} and $PM_{2.5}$ for which monitoring across the county has been very limited previously, as well as NO_2. Real-time information will enable a better understanding of air quality in the borough to help inform decision making and requirements for further action as necessary.

As previously discussed, following the introduction of the Environment Act 2021 and revised guidance published in August 2022 (LAQM. TG22 and PG22) it has been necessary to amend the previously published framework to prioritise production of a standalone AQAP for each district with an existing AQMA. However, as there are no AQMAs within the Redditch Borough no Action Plan is necessary. It is anticipated the countywide Air Quality Strategy will be developed further in 2025 following the completion of these priority works (AQAPs).

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 instead of driving**: 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.
- **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 Worcestershire County Council's website (including walking, cycling and bus maps and timetables) and Government website:
    - Travel and Roads | Worcestershire County Council
    - Smarter choices: changing the way we travel – GOV.UK(www.gov.uk)
- **Hold meetings by Conference Call** by phone or video conference via Teams, Zoom, Skype or Facetime 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.
- If you must drive, follow fuel efficient driving advice, often known as **'Smarter Driving Tips'**, to save on fuel and reduce your emissions. Several websites promote such advice including:
    - Save money and emissions through ecodriving - Energy Saving Trust
    - How to drive economically - Eco-driving tips | AA (theaa.com)
    - Fuel Consumption & CO2 Databases | Vehicle Certification Agency (vehiclecertification-agency.gov.uk)
- **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). 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. 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 is available at Protecting Me and Others from Air Pollution | Worcestershire Regulatory Services (worcsregservices.gov.uk).

Local Responsibilities and Commitment

Following the pandemic good working relations have recommenced with the County Council's Strategic Transport team and developed closer working ties with Public Health, Planning and Sustainability colleagues within the County Council.

This ASR was prepared by the Worcestershire Regulatory Services Technical Services Department on behalf of Redditch Borough Council with the support and agreement of officers from the following organisations:

Worcestershire Regulatory Services

Redditch Borough Council

Worcestershire County Council

This ASR has been submitted to the Director of Public Health for comment. No comments have been received for inclusion in this report prior to the deadline for submission.

If you have any comments on this ASR, please send them to:

Technical Pollution Team

Worcestershire Regulatory Services

Wyre Forest House

Finepoint Way

Kidderminster

DY11 7WF

Telephone – 01905 822799

Email - wrsenquiries@worcsregservices.gov.uk

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1 Local Air Quality Management

This report provides an overview of air quality in Redditch Borough Council area during 2023. It fulfils the requirements of Local Air Quality Management (LAQM) as set out in Part IV of the Environment Act (1995), as amended by the Environment Act (2021), 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 order to achieve and maintain the objectives and the dates by which each measure will be carried out. This Annual Status Report (ASR) is an annual requirement showing the strategies employed by Redditch Borough 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 18 months. The AQAP should specify how air quality targets will be achieved and maintained and provide dates by which measures will be carried out.

Redditch Borough Council currently does not have any declared AQMAs. A local Air Quality Strategy is currently under development as part of the countywide action plan work.

Climate emergency and electric vehicle information is available on the Council's website via the following links: -

Climate emergency– redditchbc.gov.uk

Electric vehicles – redditchbc.gov.uk

2.2 Progress and Impact of Measures to address Air Quality in Redditch Borough Council

Defra's appraisal of last year's ASR concluded *"the report is well structured, detailed, and provides the information specified in the Guidance, The following comments are designed to help inform future reports:*

1. *The Action Plan, which will incorporate an improving Air Quality Strategy including the RBC area, needs to be drafted in 2023 according to Council's timeline and a full update on this Draft is expected in next year's ASR.*
2. *Increases in cost have put on hold the possibility of using vegetable derived diesel in fleet vehicles to reduce emissions. Should this change, the Council are encouraged to report on progress in this interesting plan.*
3. *Some on-going traffic management measures as well as future measures, such as the Electric Vehicle Charging Infrastructure, are well-considered. However, it would be easier to track them if they are consolidated into Table 2.2.*
4. *The monitoring network is still limited at only five sites. The Council is urged to expand their monitoring network in 2023 where possible. Although it is mentioned that the network will be expanded as necessary, more detailed information should have been provided.*
5. *Information on the two new low-cost real time sensors that will be placed in RBC has been provided. The sensors are to be introduced in the latter part of 2023. The data will only be considered as indicative to inform decision making for further action if necessary. This action is welcomed. An update on the commencing of the two new monitoring locations is expected in the next ASR.*
6. *No actions are planned to improve $PM_{2.5}$ concentrations. It is correctly anticipated that most actions that target NO_2 are likely to result in an improvement of $PM_{2.5}$ under specific conditions. It is very encouraging that a new AURN $PM_{2.5}$ monitoring station will be installed in Redditch.*
7. *All graphs are well presented and are clear to read. The Council has also provided a detailed discussion of the trends.*
8. *A local bias adjustment factor has been determined by the Worcestershire Regulation Service. It would be beneficial to include a screenshot of the tool so the factor can be verified, as well as a comparison to the national factor.*
9. *Overall, the report provides a good insight into the work that the Council are doing and all the current and future measures to improve local air quality.*

The above points are noted. In relation to point 2 the fleet replacement programme has not been reintroduced.

In relation to point 4, the monitoring network was not expanded in 2023. A full rationalisation of the whole monitoring network for Worcestershire was undertaken in Autumn 2022. No new areas of concern were identified in respect of the Redditch Borough and therefore no new locations were established. As is normal practice the monitoring network was reviewed in Autumn 2023 and will be again in 2024. If any new areas of concern are identified as part of this process monitoring locations will be created to explore this. It should be noted that historically monitoring has been undertaken across at least 34 locations within the borough. No exceedances of the annual objective have ever been identified at relevant exposure and therefore no declaration of any AQMAs have been required. Given the development of the borough as a new town in the late 1960s, with the design based on housing and industry clustered around 'bead-centres' linked by a new highway network, lots of issues associated with historic old towns have been avoided. In addition, two low-cost air quality sensors measuring NO_2, PM_{10} and $PM_{2.5}$ were introduced in the district at the start of 2024 as part of the Defra funded project and will provide additional coverage in real-time. An automatic monitor for $PM_{2.5}$ is also to be established in Chadwick Mews, Redditch as part of expansion of the AURN network.

In relation to point 8, a local bias adjustment factor has been calculated using the 'Diffusion Tube Data Processing Tool spreadsheet' which has been uploaded to the Defra LAQM portal. All calculations and data are presented within the relevant sections of the spreadsheet. The calculation details have also been provided in 'Table C.3 – Local Bias Adjustment Calculation' within the 2023 ASR. The factor has been derived from the automatic monitoring station installed at Wyre Forest House, Finepoint Way, Kidderminster which is the head office for WRS. The installation is collocated with three diffusion tubes and is largely run and managed for the purpose of undertaking a local bias adjustment factor for the county. WRS are responsible for maintaining the monitoring network across the six-district councils within Worcestershire and therefore the handling and processing of the diffusion tubes is the same for each area. A decision was made during the preparation of the 2023 ASR to utilise the local bias adjustment factor of 0.97 compared to the national bias adjustment factor of 0.83 as this represented a much more conservative value and therefore is more protective of public health. The same decision has been made in relation to the 2024 ASR as again the local bias adjustment factor is more conservative than the national factor.

No AQMAs have been declared within the Redditch Borough area and therefore no specific action plan is required at this time. A countywide Air Quality Strategy for improving air quality and public health and reducing impacts across Worcestershire is currently at an early stage of development. It is anticipated the strategy will progress following the finalisation of new action plans for the Worcestershire districts with AQMAs (see timeline below) and a draft will be published in 2025.

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Redditch improvements | Worcestershire County Council

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Local cycling and walking infrastructure plans (LCWIPs) | Worcestershire County Council

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Redditch Railway Station | Worcestershire County Council

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

As detailed in Policy Guidance LAQM.PG22 (Chapter 8) and the Air Quality Strategy[6], local authorities are expected to work towards reducing emissions and/or concentrations of fine particulate matter ($PM_{2.5}$)). There is clear evidence that $PM_{2.5}$ (particulate matter smaller 2.5 micrometres) has a significant impact on human health, including premature mortality, allergic reactions, and cardiovascular diseases.

There are currently no automatic $PM_{2.5}$ monitoring stations in Worcestershire that are recognised by Defra for measuring against ambient air quality directives. The nearest AURN $PM_{2.5}$ monitoring station is the Birmingham Ladywood site approximately 28km north of the Redditch Borough. As part of the Defra AURN expansion project, a $PM_{2.5}$ monitor is to be installed in Redditch in Chadwick Mews. Progress is ongoing, the site is currently being assessed to confirm its suitability.

WRS has reviewed the DEFRA national background maps to determine projected $PM_{2.5}$ concentrations within the Redditch Borough area for the 2023 calendar year. The average total $PM_{2.5}$ at the 54 locations (centre points of 1km x 1km grids) across the Redditch Borough is 7.62µg/m^3 with the lowest concentration being 7.00µg/m^3 and the highest concentration of 8.50µg/m^3. This indicates that $PM_{2.5}$ concentrations within the Redditch Borough are below the annual average EU limit for $PM_{2.5}$ of 25µg/m^3 and are below the proposed annual average limit value for $PM_{2.5}$ target of 10µg/m^3 across England by 2040.

The Air Quality Partnership led by the Director of Public Health at Worcestershire County Council and supported by WRS recommenced in 2022 following a hiatus due to the Covid-19 pandemic. WRS met with colleagues from Public Health numerous times to discuss the ongoing situation with air quality, relevant changes and workstreams going forward. The DoPH represents a key partner in the ongoing development of the Air Quality Strategy and Action Plan work and has several representatives sitting on the steering group.

WRS has reviewed the fraction of mortality attributable to particulate air pollution (indicator D01) published by Public Health England as part of the Public Health Outcomes Framework.

[6] Defra. Air Quality Strategy – Framework for Local Authority Delivery, August 2023

The fraction of mortality attributable to particulate emissions in the Redditch Borough in 2022 (the most recent year available) was 5.7%. This is below the national figure for England (5.8% in 2022) and the Redditch figure is the same as the West Midlands region figure (5.7% in 2022).

More information on the Public Health Outcomes Frameworks that examines indicators that help us understand trends in public health can be found at Public Health Outcomes Framework - OHID (phe.org.uk).

The successful bid for funding from the Defra Air Quality Grant Scheme 2022/23 to establish a real time monitoring network across Worcestershire will allow for particulate monitoring in the district for the first time. 2 low-cost real time air quality monitors were installed within the Redditch Borough Council area in January 2024.

There are currently no declared smoke control areas operating within the Redditch Borough.

More information, maps, and guides on the types of fuels that can be used can be found at:

Smoke Control Areas | Worcestershire Regulatory Services (worcsregservices.gov.uk)

WRS hold 28 records of complaints of nuisance from smoke, dust, or fumes in the Redditch Borough in 2023, outcomes consisted of warning letters and advice given.

In light of the above no additional actions are currently planned by Redditch Borough Council in relation to the reduction of $PM_{2.5}$ levels. However, it is anticipated that any actions taken to improve NO_2 levels across the region as part of the revised future AQAP will likely result in a linked improvement in PM2.5 levels. Once AQAP work has been completed the next step is to develop the local air quality strategy for all Worcestershire districts which will have due regard for the new responsibilities on the local authority in respect of $PM_{2.5}$ which are outlined within the revised national Air Quality Strategy.

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

This section sets out the monitoring undertaken within 2023 by Redditch Borough Council and how it compares with the relevant air quality objectives. In addition, monitoring results are presented for a five-year period between 2019 and 2023 to allow monitoring trends to be identified and discussed.

3.1 Summary of Monitoring Undertaken

3.1.1 Automatic Monitoring Sites

No automatic (continuous) monitoring was undertaken within the Redditch Borough Council area during 2023.

3.1.2 Non-Automatic Monitoring Sites

Redditch Borough Council undertook non- automatic (i.e. passive) monitoring of NO_2 at 5 sites during 2023. Table A. 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_2)

Table A.1 and Table A. in Appendix A compare the ratified and adjusted monitored NO_2 annual mean concentrations for the past five years with the air quality objective of 40µg/m^3. Note that the concentration data presented represents the concentration at the

location of the monitoring site, following the application of bias adjustment and annualisation, as required (i.e. the values are exclusive of any consideration to fall-off with distance adjustment).

For diffusion tubes, the full 2023 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.

Monitoring results within the Redditch Borough area demonstrate that there were no exceedances of the NO_2 air quality objective of 40µg/m^3 in 2023. Results show there were no increases in NO_2 concentrations at any monitoring locations between 2022 and 2023.

The largest decrease of 3.6µg/m^3 was recorded at location OR2 (14 Other Road Redditch), with concentrations reducing from 33.1µg/m^3 in 2022 to 29.5µg/m^3, in 2023. This represents a decrease of 12.2%. There is an average decrease of approximately 11.7% across all locations.

Surprisingly, the highest concentration of NO_2 recorded in 2023 was also the 29.5µg/m^3 at OR2. The lowest concentration was 9.8µg/m^3 recorded at STOR, 18 Washford Lane. All concentrations are therefore 26% or more below the annual mean objective of 40µg/m^3.

It should be noted that diffusion tubes OR4, OR5 and OR6 are a triplicate location (Misty Florist, Other Road); when averaged and bias adjusted the NO_2 concentration for this location is 28.0µg/m^3.

No annual means greater than 60µg/m^3 have been recorded indicating that it is extremely unlikely that there have been any exceedances of the 1-hour mean objective for NO_2 at any monitoring sites. The 60µg/m^3 value is a surrogate figure to indicate exceedances of the 1-hour objective based on annual average conditions. The concentrations recorded across the district in 2023 are all 50% or more below that value.

3.2.2 Particulate Matter (PM_{10})

PM_{10} has not been monitored within the Redditch Borough Council area during 2023.

3.2.3 Particulate Matter ($PM_{2.5}$)

$PM_{2.5}$ has not been monitored within the Redditch Borough Council area during 2023.

3.2.4 Sulphur Dioxide (SO_2)

SO_2 is not monitored within the Redditch Borough Council area.

Appendix A: Monitoring Results

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

Diffusion Tube ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA? Which AQMA?	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Tube Co-located with a Continuous Analyser?	Tube Height (m)
OR1	Other Road Street	Roadside	404599	267542	NO_2	NO	3.0	1.5	No	2.4
OR2 (26N)	14 Other Road	Roadside	404620	267495	NO_2	NO	0.0	3.0	No	2.1
OR4 (28N), OR5 (29N), OR6	Other Road Misty Florist	Roadside	404629	267467	NO_2	NO	0.0	4.0	No	2.0
SS	7 Summer Street	Suburban	404376	267242	NO_2	NO	0.0	2.6	No	2.0
STOR	Lampost 18 Washford Lane	Urban Background	406603	265783	NO_2	NO	14.6	0.8	NO	2.2

Notes:

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

(2) N/A if not applicable.

Table A.2 – Annual Mean NO_2 Monitoring Results: Non-Automatic Monitoring (µg/m^3)

Diffusion Tube ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2023 (%) (2)	2019	2020	2021	2022	2023
OR1	404599	267542	Roadside	74.17582418	74.2	29.4	26.1	26.3	28.6	26.6
OR2 (26N)	404620	267495	Roadside	82.96703297	83.0	31.8	24.4	28.8	33.1	29.5
OR4 (28N), OR5 (29N), OR6	404629	267467	Roadside	99.72527473	99.7	28.5	23.0	28.0	30.3	28.0
SS	404376	267242	Suburban	99.72527473	99.7	15.8	14.2	13.2	18.0	14.8
STOR	406603	265783	Urban Background	99.72527473	99.7	10.6	8.9	9.3	11.6	9.8

☒ **Annualisation has been conducted where data capture is <75% and >25% in line with LAQM.TG22.**

☒ **Diffusion tube data has been bias adjusted.**

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

Notes:

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

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

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

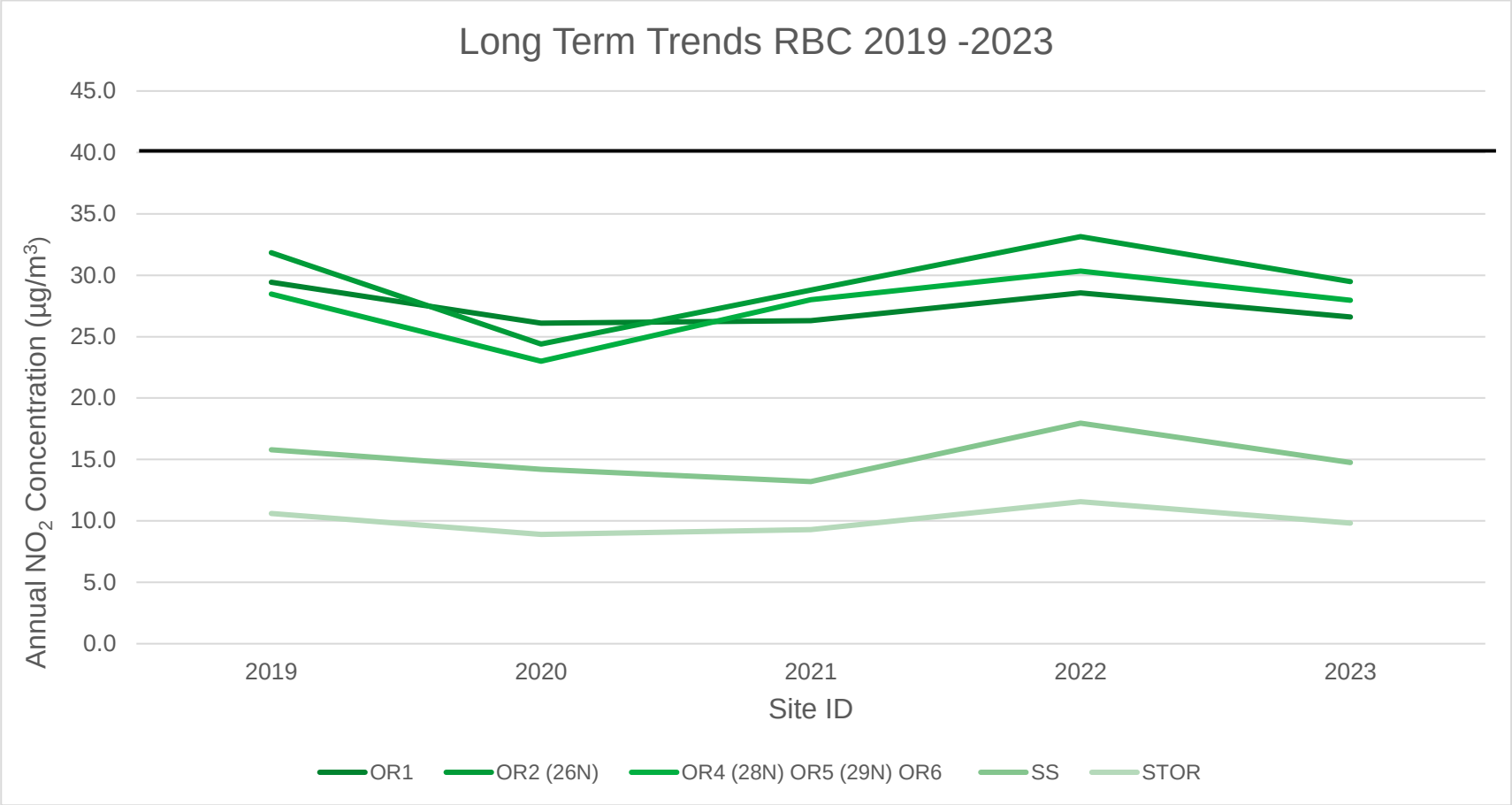
Means for diffusion tubes have been corrected for bias. All means have been "annualised" as per LAQM.TG22 if valid data capture for the full calendar year is less than 75%. See Appendix C for details.

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

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

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

Figure A.1 – Trends in Annual Mean NO_2 Concentrations



Appendix B: Full Monthly Diffusion Tube Results for 2023

Table B.1 – NO_2 2023 Diffusion Tube Results ($\mu g/m^3$)

DT ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean: Raw Data	Annual Mean: Annualised and Bias Adjusted (0.96)	Annual Mean: Distance Corrected to Nearest Exposure	Comment
OR1	404599	267542	32.9	32.1	31.7	32.0	27.8	23.5	19.0	24.4				26.1	27.7	26.6	-	
OR2 (26N)	404620	267495	32.8	34.7	30.2	37.0	34.6	30.9	17.4		35.7		32.9	21.2	30.7	29.5	-	
OR4 (28N)	404629	267467	31.0	34.0	29.4	32.7	34.5	31.6	16.0	23.9	32.4	33.3	30.8	19.2	-	**-**	-	Triplicate Site with OR4 (28N), OR5 (29N) and OR6 - Annual data provided for OR6 only
OR5 (29N)	404629	267467	30.6	33.9	30.8	32.0	35.6	32.3	15.6		34.0	33.2		19.4	-	**-**	-	Triplicate Site with OR4 (28N), OR5 (29N) and OR6 - Annual data provided for OR6 only
OR6	404629	267467	30.8	31.6	29.1	33.1	35.5	32.8	16.1	24.9	32.9	31.8	29.9	19.2	29.1	28.0	-	Triplicate Site with OR4 (28N), OR5 (29N) and OR6 - Annual data provided for OR6 only
SS	404376	267242	20.1	20.8	17.1	15.5	13.8	11.8	8.9	11.7	14.4	17.3	21.5	11.6	15.4	14.8	-	
STOR	406603	265783	16.1	15.2	6.1	9.6	7.9	6.8	6.3	7.2	9.8	11.6	16.5	9.7	10.2	9.8	-	

☒ **All erroneous data has been removed from the NO_2 diffusion tube dataset presented in Table B.1.**

☒ **Annualisation has been conducted where data capture is <75% and >25% in line with LAQM.TG22.**

☒ **Local bias adjustment factor used.**

☐ **National bias adjustment factor used.**

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

☒ **Redditch Borough Council confirm that all 2023 diffusion tube data has been uploaded to the Diffusion Tube Data Entry System.**

Notes:

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

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

See Appendix C for details on bias adjustment and annualisation.

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

New or Changed Sources Identified Within Redditch Borough Council During 2023

Applications for several new developments have been identified within the Redditch Borough area. The proposals have been assessed as part of the planning process and are not expected to have a significant impact on local air quality should they become operational.

Details of applications for significant developments received by Redditch Brough Council in 2023 are as follows:

Planning Ref	Address	Proposal
23/00228/FUL	Unit 5B Woodside Farm Woodland Road Dodford	Proposal Full application (retrospective) for biomass boiler
23/00417/FUL	Street Record Astwood Lane Feckenham Redditch Worcestershire	Construction of a battery energy storage compound, fencing, CCTV, access and associated infrastructure
23/00192/FUL	Land At (OS 9911 5879) Earls Common Road Stock Green And Cable Connection To National Grid Electricity Distribution Feckenham Substation The	Construction of a Solar Farm and battery energy storage system (BESS) facility together with all associated works, equipment and necessary infrastructure (Land to the

	Saltway Feckenham Redditch.	east of Stock Green adjacent to Roundhill Wood (Wychavon District Council Ref: W/23/00270/FUL) and proposed grid connection to the existing National Grid Electricity Distribution Feckenham Substation (Redditch Borough Council)
23/01300/FUL	The Alexandra Hospital Woodrow Drive Redditch Worcestershire B98 7UB	Replacement of two existing generators within the existing generator house and replacement of the existing single flue with new duel flue and support

Additional Air Quality Works Undertaken by Redditch Borough Council During 2023

Redditch Borough Council has not completed any additional works within the reporting year of 2023.

QA/QC of Diffusion Tube Monitoring

The following UKAS accredited company provided Redditch Borough Council with nitrogen dioxide tubes and analysis in 2023:

Gradko International Limited
St. Martins House
77 Wales Street
Winchester
SO23 0RH
diffusion@gradko.com

The 20% Triethanolamine (TEA) / De-ionised Water preparation method is used.

Gradko International Limited participate in the AIR NO_2 Proficiency Testing Scheme (AIR-PT).

All monitoring undertaken has been completed in accordance with the 2023 Diffusion Tube Monitoring Calendar, i.e. on or within ± 2 days of the specified date.

Diffusion Tube Annualisation

Table C.1 – Annualisation Summary (concentrations presented in µg/m^3)

Site ID	Annualisation Factor Birmingham Ladywood	Annualisation Factor Leamington Spa	Annualisation Factor Leominster	Annualisation Factor West Bromwich Kendrick Park	Average Annualisation Factor	Raw Data Annual Mean	Annualised Annual Mean
OR1	1.1090	1.0792	1.0903	1.0981	1.0942	27.7	-

Diffusion Tube Bias Adjustment Factors

The diffusion tube data presented within the 2023 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.TG22 provides guidance with regard to the application of a bias adjustment factor to correct diffusion tube monitoring. Triplicate co-location studies can be used to determine a local bias factor based on the comparison of diffusion tube results with data taken from NO_x/NO_2 continuous analysers. Alternatively, the national database of diffusion tube co-location surveys provides bias factors for the relevant laboratory and preparation method.

Redditch Borough Council have applied a local bias adjustment factor of 0.96 to the 2023 monitoring data. A summary of bias adjustment factors used by Redditch Borough Council over the past five years is presented in Table C.2.

WRS has determined the appropriate local bias adjustment factor utilising the Diffusion Tube Data Processing Tool v4.0. The site used was the colocation study at Wyre Forest House, Kidderminster. The local bias adjustment factor has been used as it is more conservative compared with the national bias adjustment factor (0.84, Defra published National Diffusion Tube Bias Adjustment Spreadsheet Version 03/24), following consultation with Defra LAQM helpdesk and technical guidance.

Table C.2 – Bias Adjustment Factor

Monitoring Year	Local or National	If National, Version of National Spreadsheet	Adjustment Factor
2023	Local	-	0.96
2022	Local	-	0.97
2021	National	03/22	0.84
2020	National	03/21	0.81
2019	National	03/20	0.78

Table C.3 – Local Bias Adjustment Calculation

	Local Bias Adjustment Input 1	Local Bias Adjustment Input 2	Local Bias Adjustment Input 3	Local Bias Adjustment Input 4	Local Bias Adjustment Input 5
Periods used to calculate bias	12				
Bias Factor A	0.96 (0.92 – 1.02)				
Bias Factor B	4% (-2% - 9%)				
Diffusion Tube Mean (µg/m^3)	12.4				
Mean CV (Precision)	1.9%				
Automatic Mean (µg/m^3)	11.9				
Data Capture	99%				
Adjusted Tube Mean (µg/m^3)	12 (11 – 13)				

Notes:

A single local bias adjustment factor has been used to bias adjust the 2023 diffusion tube results.

NO_2 Fall-off with Distance from the Road

Wherever possible, monitoring locations are representative of exposure. However, where this is not possible, the NO_2 concentration at the nearest location relevant for exposure has been estimated using the Diffusion Tube Data Processing Tool/NO_2 fall-off with distance calculator available on the LAQM Support website. Where appropriate, non-automatic annual mean NO_2 concentrations corrected for distance are presented in Table B.1.

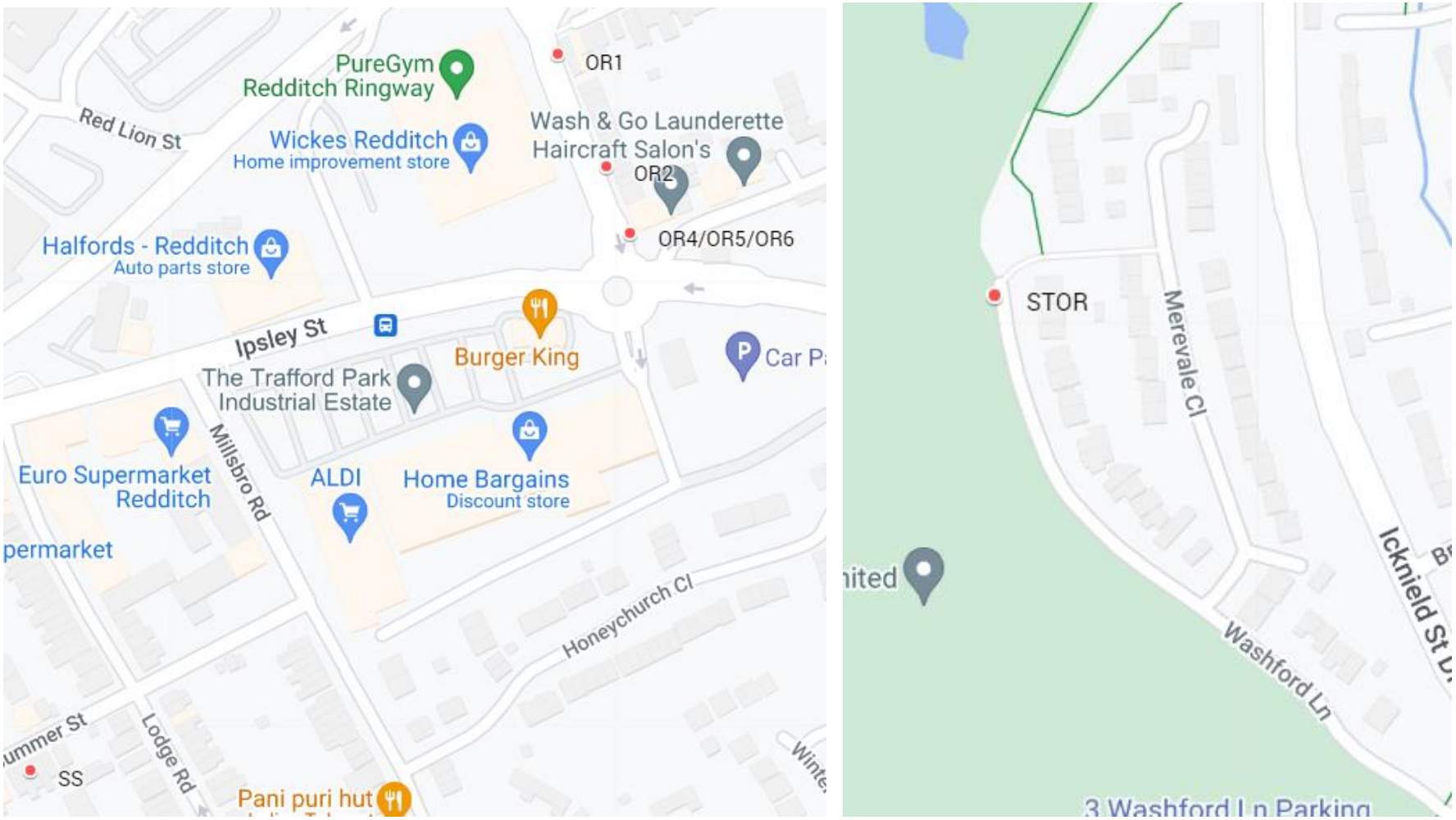
No diffusion tube NO_2 monitoring locations within the Redditch Borough Council area required distance correction during 2023.

QA/QC of Automatic Monitoring

No automatic monitoring has been undertaken.

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

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



Appendix E: Summary of Air Quality Objectives in England

Table E.1 – Air Quality Objectives in England[7]

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

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

References

- Local Air Quality Management Technical Guidance LAQM.TG22. August 2022. Published by Defra in partnership with the Scottish Government, Welsh Assembly Government and Department of the Environment Northern Ireland.
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- Breathe London (2023) Current air quality.
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