2025 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: September 2025

Information	South Gloucestershire Council Details
Local Authority Officer	Sally Radwell (Environmental Health) Simon Guy (Transport Policy) Fionna Vosper & Joanna Goodred (Public Health)
Department	Department for Place
Address	South Gloucestershire Council Department for Place Environmental Protection PO Box 1954 Bristol BS37 0DD
Telephone	01454 868001
E-mail	environmental.protection@southglos.gov.uk
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Local Responsibilities and Commitment

This ASR was prepared by South Gloucestershire Council Environmental Protection Team with the support and agreement of the following officers and departments:

Transport Policy (Department for Place)

Public Health and Wellbeing (Department for People)

This ASR has been approved by:

Executive Director of Place (Nigel Riglar), Head of Environmental Health, Trading Standards and Licensing (Shaun Fudge) and Environmental Protection Team Leader (Allison Jay).

This ASR has been signed off by the Director of Public Health (Sarah Weld).

If you have any comments on this ASR, please contact the Environmental Protection Team at:

Address: South Gloucestershire Council, Department for Place, Environmental Protection, PO Box 1954, Bristol BS37 0DD

Telephone: 01454 868001

Email: environmental.protection@southglos.gov.uk

Executive Summary: Air Quality in Our Area

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.

Air pollution particularly affects the most vulnerable in society, children, the elderly, and those with existing heart and lung conditions. Low-income communities are also disproportionately impacted by poor air quality, exacerbating health and social inequalities.

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.

Air Quality in South Gloucestershire

South Gloucestershire lies to the north and east of Bristol with the River Severn to the west and the Cotswold escarpment to the east. The area is a diverse mix of urban and rural areas, which includes major residential, industrial and commercial developments. The major junction of the M4 and M5 motorways (the Almondsbury Interchange) is within South Gloucestershire.

The overall population in South Gloucestershire was recorded as 290,400 in the 2021 Census, which was an increase of 10.5% compared to the 2011 census (262,800)[1]. The latest population estimate for South Gloucestershire is 306,332, based on the 2024 Mid-Year population estimate from the Office of National Statistics (ONS)[2]. In the period from mid-2021 to mid-2024, the population estimate of South Gloucestershire increased by 5.3%. Over this period, South Gloucestershire was among the 20% fastest growing local authority districts in England and Wales population wise. Most of the population lives within the urban areas on the north and east fringes of Bristol and in the towns of Yate and Thornbury, while the remainder live in the villages and more rural areas of South Gloucestershire.

The main pollutant of concern locally is nitrogen dioxide (NO_2) from road traffic. Particulate matter (PM_{10} and $PM_{2.5}$) is also a concern with the main source being domestic wood and coal burning.

Air Quality Management Areas

There are two AQMAs currently declared in South Gloucestershire in relation to previous exceedances of the annual mean objective for nitrogen dioxide (40 µg/m^3):

- Kingswood – Warmley – from the Bristol/ South Gloucestershire boundary in Kingswood along the A420 to the junction with Goldney Avenue in Warmley.
- Staple Hill – in the centre around the Broad Street/ High Street/ Soundwell Road/ Victoria Street crossroads and the High Street/ Acacia Road/ Pendennis Road crossroads.

Details of the current AQMAs are included in Table 2.1 of this report and maps are available in Appendix D. Further information on the AQMAs is available on the Council website Air quality | BETA - South Gloucestershire Council (southglos.gov.uk) and on the Defra UK-AIR website Local Authority Details - Defra, UK.

The former Cribbs Causeway AQMA adjacent to the M5 Motorway Junction 17 roundabout was revoked in July 2020 as nitrogen dioxide concentrations within the AQMA had

[1] Census | BETA - South Gloucestershire Council (southglos.gov.uk)

[2] Population estimates for England and Wales - Office for National Statistics

consistently been below the annual mean objective since 2010. Further information about the AQMAs is provided in Section 2.1 of the report.

Trends in monitored pollutant concentrations

South Gloucestershire Council carried out automatic (continuous) monitoring at the following three sites during 2024 (the pollutant(s) monitored at each site are shown in brackets):

- Yate Station Road (NO_2 and PM_{10}) – a long standing site operational since 2000
- Stoke Gifford A4174 Ring Road near Coldharbour Lane and the University of West England (NO_2, PM_{10}, $PM_{2.5}$ and Ozone (O_3)) – began operating in August 2021
- Hambrook A4174 Ring Road (NO_2) – began operating in April 2022.

The key outcomes from the automatic monitoring in 2024 are:

- NO_2 concentrations were well below the annual mean objective of 40 µg/m^3 and there were no exceedances of the 1-hour objective of 200 µg/m^3 (18 exceedances are allowed annually) so the NO_2 objectives were met at all three automatic sites.
    - The 2024 annual mean NO_2 concentrations were lower in comparison to 2023, with a 7% decrease in the annual mean concentration at Yate (11.5 µg/m^3), a 6% decrease at Stoke Gifford A4174 (16.8µg/m^3) and a 10% decrease at Hambrook A4174 (20.2 µg/m^3). This is similar to the trend observed across the national automatic urban and rural monitoring network (AURN) roadside sites where the average 2024 NO_2 annual mean concentration decreased by 6% from 2023 levels[3].
    - The Yate annual mean shows a 39% decrease from the pre-pandemic 2019 annual mean of 19 µg/m^3, which also follows the similar trend across the national AURN roadside sites where the average 2024 NO_2 annual mean concentration was 34% lower than 2019 levels[4].
    - The long-term trend at Yate shows an overall continuing decline in annual mean NO_2 concentrations over the last decade with concentrations reducing by 52% from 24 µg/m^3 in 2014.

[3] Summary - GOV.UK

[4] Nitrogen dioxide (NO_2) - GOV.UK (www.gov.uk)

- PM_{10} concentrations were below the annual mean objective of 40 µg/m^3 and met the 24-hour mean objective (50 µg/m^3 not to be exceeded more than 35 times a year) at both the Yate and Stoke Gifford sites.
    - The annual mean PM_{10} concentration at Yate was 11.3 µg/m^3 (a 7.5% decrease from 2023 levels) and 16.9 µg/m^3 at Stoke Gifford (a 5.6% decrease compared to 2023).
    - The PM_{10} concentrations at Yate since 2020 have remained below the pre-pandemic annual mean of 13 µg/m^3 in 2019. This is similar to the trend in annual mean PM_{10} concentrations observed at the national AURN roadside sites[5], which have remained below pre-2020 levels and generally continued to fall.
    - The long-term trend in annual mean PM_{10} concentrations at Yate shows an overall decline since 2014, when the annual mean concentration was 15 µg/m^3, with a 25% reduction in PM_{10} levels during this period.
    - There were 6 exceedances of the 24-hour daily mean at Stoke Gifford, however 35 exceedances are allowed annually so the objective was met. This compares to 1 exceedance of the daily mean in 2023. There were no exceedances of the daily mean at Yate.
- $PM_{2.5}$ concentrations monitored at Stoke Gifford were below the annual mean limit of 20 µg/m^3 and the new annual mean concentration target of 10 µg/m^3 to be met by 2040 (and the interim target of 12 µg/m^3 by 2028) introduced under the Environment Act 2021.
    - The annual mean concentration in 2024 was 6.9 µg/m^3 at Stoke Gifford, which is a 9.2% decrease from the 2023 annual mean of 7.6 µg/m^3. This is larger decrease than the trend observed in annual mean $PM_{2.5}$ concentrations at the national AURN roadside sites[6], which showed a decrease of 3% compared to 2023.
- Ozone (O_3) concentrations monitored at Stoke Gifford were above the maximum running 8-hour mean objective of 100 µg/m^3 on 9 days during 2024, the same number

[5] Particulate matter (PM_{10}/$PM_{2.5}$) - GOV.UK (www.gov.uk)

[6] Summary - GOV.UK

of days as in 2023. However, the ozone objective (100 µg/m^3 not to be exceeded more than 10 times a year) has an allowance of 10 days so this objective was not exceeded in 2024. The responsibility for meeting this objective sits with national government because of the transboundary nature of ozone but it is useful to monitor ozone as reducing levels of NO_2 are invariably accompanied by an increase in ozone levels. This is of concern due to the health impacts of ozone[7] and because ozone is a greenhouse gas in the lower atmosphere.

There was also extensive monitoring of nitrogen dioxide at 101 non-automatic (passive) diffusion tube monitoring sites which formed a major part of the local air quality management (LAQM) network across South Gloucestershire in 2024.

The key outcomes from the diffusion tube monitoring are:

- NO_2 concentrations were below the annual mean objective of 40 µg/m^3 so there were no exceedances of the objective at any of the LAQM diffusion tube monitoring sites in South Gloucestershire, including in the Kingswood – Warmley and Staple Hill AQMAs.
- The 2024 annual mean NO_2 concentrations decreased by an average of 1.8% across the LAQM diffusion tube sites compared to 2023. This is a smaller reduction than the trend observed across the national automatic urban and rural monitoring network (AURN) roadside sites where the average 2024 NO_2 annual mean concentration decreased by 6% from 2023 levels. Overall since 2019, the NO_2 concentrations across the long-term sites reduced by 35% on average, which compares well to 34% reduction observed across the AURN roadside sites from 2019 levels[8].
- In the Kingswood – Warmley AQMA, annual mean NO_2 concentrations decreased by an average of 0.7% from 2023 to 2024 so remained relatively stable on average. There were no exceedances of the annual mean NO_2 objective or any “borderline” sites (within 10% of the annual mean objective, so greater than 36 µg/m^3) in this AQMA. From 2019 to 2024, the NO_2 concentrations reduced by an average of 37% in the AQMA.
- In the Staple Hill AQMA, the average annual mean NO_2 concentrations across the monitoring sites in the AQMA showed no change and remained stable from 2023 to

[7] Ozone (O_3) - GOV.UK (www.gov.uk)

[8] Nitrogen dioxide (NO_2) - GOV.UK (www.gov.uk)

2024. However, the overall long-term trend has been downward and from 2019 to 2024, the annual mean concentrations have reduced by an average of 34% in the AQMA. There were no exceedances of the annual mean NO_2 objective or any "borderline" sites in this AQMA.

- Across the rest of the district, there were no "borderline" monitoring sites with NO_2 concentrations greater than 36 µg/m^3. The highest 2024 annual mean NO_2 concentration measured at a South Gloucestershire LAQM diffusion tube site was 30.2 µg/m^3 at site 188 in Patchway on the A38 Gloucester Road near Hayes Way in the north Bristol fringe. However, the nearest house is set back further from the road at this site and as NO_2 levels fall off with increasing distance from the road, the concentration would be lower at the house façade.

The details of the monitoring sites and results are provided in Appendix A. The monitoring results and trends in the data are discussed further in Section 3.2 of the report and trend graphs are available in Appendix A. The monitoring data from the South Gloucestershire automatic sites is available to view on the Air Quality in the United Kingdom (ukairquality.net) website.

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.

South Gloucestershire Council works closely with other neighbouring authorities in the West of England (Bath and North East Somerset, Bristol City and North Somerset Councils), and with the West of England Combined Authority (WECA), to develop, implement and refine schemes with cross-boundary characteristics, particularly in key regional strategic work areas such as transport.

A key regional plan is the West of England Joint Local Transport Plan 4 (JLTP4) 2020 – 2036[9]. One of the five key objectives within the JLTP4 is to "Take action against climate change and address poor air quality" thereby placing a greater emphasis on air quality and climate change in strategic transport planning through to 2036.

[9] Joint Local Transport Plan - Combined Authority (westofengland-ca.gov.uk)

Within South Gloucestershire Council itself, the development of a council-wide approach to air quality has brought services which have an interest and/or impact on air quality, including Public Health, Environmental Health, Transport Policy, Environment and Climate Change, Spatial Planning, Development Control, Street Care and Highways and Strategic Communications, together into a Board. The Clean Air and Climate Change Board is co-chaired by the Executive Director for Place and the Director of Public Health. With the Board also covering Climate Change, this ensures there is a joined-up approach across the two work areas, which are closely interlinked with often the same sources and interventions and secures alignment with the Council's Climate Emergency Strategy and Action Plans[10].

The Clean Air and Climate Change Board has overseen the development of the South Gloucestershire Clean Air Strategy[11], which was approved by the Council in July 2020. Subsequently, a comprehensive, area-wide draft Clean Air Action Plan (CAAP) has been developed to implement the Clean Air Strategy's visions and priorities and to fulfil the Council's statutory local air quality management duties to update the 2012 Air Quality Action Plan for the Kingswood and Staple Hill AQMAs[12].

Public Consultation was undertaken on the draft Clean Air Action Plan between 6 December 2022 and 31 January 2023. The consultation sought the views of the public and businesses on a wide range of proposed actions designed to improve air quality within the AQMAs and across South Gloucestershire. Further information, including the draft Clean Air Action Plan itself and a consultation report summarising the responses, is available on the Clean Air Action Plan - South Gloucestershire Online Consultations (southglos.gov.uk) webpage. The feedback from the consultation has been considered and has helped shape the final Clean Air Action Plan. Work continues to finalise the draft CAAP with completion of the final CAAP and approval anticipated later in 2025.

During 2024, actions progressed in South Gloucestershire and across the wider West of England region aimed at reducing traffic congestion and improving air quality include:

[10] Climate and nature emergency in South Gloucestershire | BETA - South Gloucestershire Council (southglos.gov.uk)

[11] SGC Clean Air Strategy 2020-2024 (southglos.gov.uk)

[12] 2012 Air Quality Action Plan Kingswood and Staple Hill (southglos.gov.uk)

- MetroWest[13] – improved rail services and infrastructure being delivered in two phases by the West of England councils, working in partnership with Network Rail and Great Western Railway. In South Gloucestershire, Phase 1 enhanced local passenger train services on the Severn Beach line from 2021. Phase 2 has increased train services between Bristol Temple Meads and Gloucester via Yate to a half-hourly service from May 2023 and proposes to re-open the Henbury Line to an hourly spur passenger service. Plans for new rail stations are progressing with WECA funding. Planning permission for the new rail station at North Filton was granted in January 2023 and for Charfield[14] station in March 2023. Both stations are expected to open in 2027[15].
- The region continues to develop its bus services with the recent delivery of First/Department for Transport funded electric buses and associated charging infrastructure. By summer of 2026, more than 250 electric buses will be on the road and four of the regions five depots fully electrified, ensuring cleaner air, reduced carbon emissions and quieter streets[16].
- A38 and Bradley Stoke Way improvements – SGC are developing a scheme along the Thornbury to Bradley Stoke Way corridor to improve conditions for people walking, cycling, and travelling by bus to encourage mode shift to more sustainable forms of transport and improve air quality. Funding was released in 2024 to start construction, and it is expected that the scheme will be fully open by March 2027.
- A432 Yate to A4174 Ring Road Corridor - SGC are developing a similar scheme along this corridor to the above scheme, again to improve conditions for walking, cycling, and travelling by bus to encourage mode shift and improve air quality. Funding was also released in 2024 to start construction, and it is expected that the scheme will be fully open by March 2027.
- SGC has recently secured Green Recovery Funding to expand the rollout of rapid and fast electric vehicle charging points. The aim is to improve charging

[13] MetroWest - WEST (travelwest.info)

[14] Charfield train station | BETA - South Gloucestershire Council (southglos.gov.uk)

[15] MetroWest - West of England Combined Authority (westofengland-ca.gov.uk)

[16] £150 million investment in better buses for the West -

infrastructure coverage and support the transition to zero-emission vehicles across our communities. The focus over the next year will be on installing destination chargers in public car parks near high streets and railway stations to support visitors to these locations and more on-street residential charging hubs will be provided to support residents without off-street parking, to enable overnight charging for those without home charging options.

- SGC are developing plans with local communities for better active travel facilities in Yate and Thornbury (Have Your Say Today - Getting About In Thornbury - Commonplace). The aim is to make it easier, safer and more attractive to walk, wheel (using a mobility scooter, wheelchair or pushchair) or cycle, especially for local everyday journeys to school or the shops. When implemented, it is expected the measures will make the roads quieter and safer, improve air quality and encourage more people to get active, contributing to improved public health. The schemes are expected to be completed by March 2027.
- SGC continued developing measures to support active travel across the region. There were 29 applications to the Council's ongoing Active Travel Grant scheme, of which 16 organisations were successful. Most successful applicants used their grant for either a pool bicycle or e-bicycle. Participating organisations have reported back that the scheme has led to a reduction in vehicular journeys to and from their sites, reducing their vehicle emissions and carbon emissions.
- SGC also funded cycle training sessions at the University of the West of England (UWE) Frenchay campus. These were open to residents and those working in South Gloucestershire to improve their cycling skills and confidence to encourage more sustainable travel choices. The long-running initiative of free Dr Bike events also continued. Dr Bike, an experienced mechanic, carries out minor repairs and checks to ensure people's bicycles are safe and roadworthy, helping them to get cycling again.
- Kingswood Town Centre Regeneration[17] - WECA funding from the "Love our High Streets" programme enabled investigation into the redevelopment potential of Kingswood Town Centre. Initial proposals focused on the possibility of re-routing traffic and pedestrianising Regent Street, but detailed technical work uncovered

[17] Have Your Say Today - Kingswood Regeneration - Commonplace

significant challenges in being able to deliver a suitable diversion route for traffic to enable pedestrianisation, so pedestrianisation is not being pursued any further. Alternative measures continue to be developed to deliver improvements, in consultation with local residents and businesses. During 2024, walking route improvements[18] between Kingswood and Staple Hill were made which included widening pavements and installing a number of new pedestrian crossings.

- The Bristol Clean Air Zone was introduced in November 2022 and as a class D CAZ includes private cars. In the first 12 months of operation, annual NO_2 levels fell by almost 13% on average inside the zone and almost 10% outside of the zone, when compared to the previous 12 months[19]. The Bristol CAZ may have also had a beneficial impact on NO_2 concentrations in South Gloucestershire due to the volume of commuter traffic between Bristol and South Gloucestershire. Further information is available on Bristol's Clean Air Zone webpages and the Clean Air for Bristol website[20]. The Government's Vehicle Checker tool can be used to check whether there is a charge to drive any vehicle in any CAZ – Check your vehicle (GOV.UK).

Further information on actions to improve air quality is provided in Section 2.2 of the report. This section includes a summary of the A4174 Hambrook Air Quality Scheme that South Gloucestershire Council was legally directed to put in place to reduce roadside nitrogen dioxide levels on the A4174 Ring Road between the A4017 Bromley Heath and M32 Motorway Junction 1 roundabouts to meet the annual mean NO_2 concentration limit (40 $\mu g/m^3$) in the shortest time possible, as set out in the Air Quality Standards Regulations 2010[21].

It should be noted that the monitoring data for the Hambrook scheme is not reported in the SGC Air Quality Annual Status Reports (ASRs) as it does not come under our Local Air Quality Management (LAQM) duties. It is reported separately to the Government's Joint Air Quality Unit (JAQU). The JAQU assessment of the 2022 and 2023 monitoring data confirmed the 2022 data was not compliant with the annual mean limit of 40 $\mu g/m^3$ but that

[18] Keep in Touch with Latest News - Kingswood Walking and Cycling Improvements - Commonplace

[19] Air quality (bristol.gov.uk)

[20] Clean Air for Bristol | Clean air for everyone | Bristol Clean Air Zone

[21] UK Air Quality Limits - Defra, UK

the 2023 data was compliant. Two consecutive years of monitoring data showing roadside NO_2 concentrations comply with the NO_2 annual mean limit are required to be released from the legal direction. JAQU are currently assessing the 2024 monitoring data and the outcome of this assessment will be published on the scheme webpage - Hambrook lights – changes to traffic movements | BETA - South Gloucestershire Council (southglos.gov.uk).

Conclusions and Priorities

In 2024, there were no exceedences of the NO_2, PM_{10}, $PM_{2.5}$ and Ozone (O_3) pollutant objectives identified at any of the automatic and non-automatic (diffusion tube) monitoring sites in South Gloucestershire, including in the Kingswood – Warmley and Staple Hill AQMAs.

Monitored concentrations of NO_2, PM_{10}, $PM_{2.5}$ in 2024 all decreased at the automatic sites compared to 2023 levels. The long-term trends at the Yate automatic site show over the past decade, the PM_{10} annual mean concentrations have reduced by 25% and the NO_2 annual mean concentrations have reduced by 52%.

The 2024 annual mean NO_2 concentrations decreased by an average of 1.8% across the LAQM diffusion tube sites compared to 2023. Overall since 2019, the NO_2 concentrations across the long-term sites have reduced by 35% on average. Since 2019, the annual mean NO_2 concentrations have decreased by an average of 37% in the Kingswood – Warmley AQMA and by 34% in the Staple Hill AQMA.

The overall reducing trend in NO_2 concentrations since 2019 is likely to be due to the combination of the Covid-19 pandemic restrictions initially and ongoing change in travel behaviour since, along with a cleaner vehicle fleet as newer, cleaner vehicles replace older, more polluting vehicles. The Bristol Clean Air Zone may have also had a beneficial impact on NO_2 concentrations in South Gloucestershire since its introduction in November 2022 due to the volume of commuter traffic between Bristol and South Gloucestershire.

As of 2024, the Staple Hill AQMA has been compliant with the NO_2 annual mean objective of 40 $\mu g/m^3$ for 7 years (2018 – 2024 inclusive) and below the borderline level (not within 10% of the annual mean objective, so lower than 36 $\mu g/m^3$) for 5 years (2020 – 2024 inclusive). The duration of compliance supports the proposed revocation of the Staple Hill AQMA and ensures reasonable certainty there would not be further objective exceedances and that below borderline concentrations would be maintained to avoid revoking and having to declare the AQMA again.

Having considered the relevant Defra guidance and also as recommended in the Defra appraisal of SGC's 2024 Air Quality Annual Status Report, it is proposed to revoke the Staple Hill AQMA. Further information on the proposed revocation of the Staple Hill AQMA is provided in Appendix G of the report.

While the Kingswood – Warmley AQMA has been compliant with both the annual mean objective and borderline level for 5 years (2020 – 2024 inclusive), there are currently no plans to consider the revocation of this AQMA as there are major development proposals which could affect the area. The future status of the Kingswood – Warmley AQMA will be reviewed in subsequent annual status reports.

Continuing improvement in air quality beyond compliance across South Gloucestershire is of key importance as there is no clear evidence of a safe level of exposure to particulate matter (PM) or NO_2 below which there is no risk of adverse health impacts, so further reductions of particulate matter and NO_2 concentrations below current targets is likely to bring additional health benefits[22]. This emphasises the need for the new Clean Air Action Plan, which aims to improve air quality across the whole district as well as in any remaining and former AQMAs.

South Gloucestershire Council's priorities for the coming year are to:

- Finalise the Clean Air Action Plan and seek formal approval of the CAAP to enable implementation of the actions to improve air quality across South Gloucestershire as a whole.
- Proceed with the proposed revocation of the Staple Hill Air Quality Management Area following compliance with the annual mean NO_2 objective for seven years.
- Continue to monitor and assess the effectiveness of the JAQU scheme on the A4174 at Hambrook in achieving compliance with the annual mean NO_2 limit value and review as appropriate following any JAQU recommendations.

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

[22] Air Quality - A guide for directors of public health (defra.gov.uk)

- Significant continued pressure on local government funding, exacerbated by inflationary pressures, could impact the delivery of air quality improvements and also funding and resources to implement the final Clean Air Action Plan measures.
- Many organisations have continued to offer flexible working arrangements to their staff, including the ability to work from home for all or part of their contracted hours. This has helped reduce the pressures on the highway network, however, the acceleration in the popularity of home delivery services has increased the number of delivery vehicles on the road. Continuing uncertainties and changes in travel behaviour make future transport trends harder to predict and understand how air quality will be affected.
- The increasing adoption of electric vehicles remains constrained by high initial costs and the need for continued improvement in the reliability and accessibility of charging infrastructure[23]. These barriers will need to be overcome to ensure continued reductions in vehicle exhaust emissions and achieve the UK's net zero carbon emissions target by 2050.

How to get Involved

Some local engagement was carried out through the public consultation on our draft Clean Air Action Plan. One of the questions asked in the consultation survey was "How concerned are you about air quality in South Gloucestershire?". Just over half (55%) of the people who responded to this question said they were concerned about air quality. However, the number of people who responded was relatively small (115 people) considering the population of South Gloucestershire. Continuing to raise awareness and understanding of the impacts of air pollution on health is a key focus and measures to address this are included in the new Clean Air Action Plan.

What can you do to reduce air pollution?

There are many ways that everyone can help contribute towards improving air quality in South Gloucestershire. By making informed personal choices, particularly around how we travel and heat our homes, we can all reduce our personal contribution to air pollution and help improve air quality and improve our own health in the process.

[23] Electric vehicles and infrastructure - House of Commons Library (parliament.uk)

To reduce pollution when travelling:

- Swap some trips in the car for walking, cycling or taking a bus or train, where possible, as this not only reduces air pollution but also, if walking and cycling, improves your health and wellbeing.
- Consider sharing lifts which will save you money on fuel as well as reducing the number of cars on the road.
- Travel outside peak hours and/or work from home, if possible, to save time spent in traffic and use less fuel, reducing emissions while saving time and money.
- If you are thinking of changing your vehicle, try switching to a less polluting type of vehicle and opt for the cleanest vehicle you feasibly can. Electric vehicles have the lowest emissions and older diesels tend to have the highest emissions. You can check the emissions of a vehicle you are considering purchasing using the Government's Get vehicle information from DVLA - GOV.UK website.
- Visit the West [24] travel information website and the Better by Bike[25] website for live information on public transport, traffic reports, routes and journey planning for walkers and cyclists and other information that simplifies travel choices.

To help reduce pollution from domestic heating:

- From an air quality perspective, if a property does not already have a solid fuel burner, e.g. a stove or fireplace, the best option is not to install one. Even the cleanest wood burning appliance emits significantly more particulate matter pollution than a gas appliance.
- If you already own a stove or fireplace and choose to use it, make sure you use the right fuels in the right way to help reduce the amount of fine particulate matter the stove or open fire emits, and reduce the negative impacts on health. Further information is available on the Defra Burn Better, Breathe Better website. Some of South Gloucestershire is covered by a Smoke Control Area which allows only approved appliances and fuels to be used.

[24] Homepage - WEST (travelwest.info)

[25] Homepage - Better By Bike

- Consider installing “clean” renewable energy generation, for example, solar photovoltaics or an air source or ground source heat pump.

There are choices that we can all make to reduce air pollution. Relatively small changes all add up and can make a big difference overall if everyone contributes. Further information is available on our website – Air quality | BETA - South Gloucestershire Council (southglos.gov.uk)

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1 Local Air Quality Management

This report provides an overview of air quality in South Gloucestershire during 2024. 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 South Gloucestershire 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.

In 2010, three AQMAs were declared in the centres of both Kingswood and Staple Hill and at Cribbs Causeway adjacent to the M5 Junction 17 roundabout. The Kingswood and Staple Hill AQMAs were extended in 2012 following further assessment[26] and the Council produced an Air Quality Action Plan for the Kingswood and Staple Hill AQMAs[27] in 2012, focusing mainly on transport measures.

In December 2015, the Kingswood - Warmley AQMA was declared, extending the 2012 Kingswood AQMA along the A420 corridor east to Warmley. This followed a detailed assessment[28] in 2014 which had identified new locations on this corridor where the nitrogen dioxide annual mean objective was being exceeded.

A new Air Quality Action Plan, known as the South Gloucestershire Clean Air Action Plan (CAAP), is in the process of being finalised to replace the 2012 Air Quality Action Plan for Kingswood and Staple Hill. The draft Clean Air Action Plan has been produced to implement the visions and priorities contained within South Gloucestershire's Clean Air Strategy[29] and to fulfil the Council's statutory local air quality management duties to update the action plan for the AQMAs. The draft CAAP includes a broad range of actions to

[26] Further Assessment of Air Quality in the Cribbs Causeway, Staple Hill and Kingswood AQMAs

[27] 2012 Air Quality Action Plan Kingswood and Staple Hill (southglos.gov.uk)

[28] Detailed Assessment of Warmley A420 2014

[29] Clean Air Strategy 2020 – 2024 BETA - South Gloucestershire Council (southglos.gov.uk)

improve air quality both within the Kingswood – Warmley and Staple Hill AQMAs and across South Gloucestershire as a whole. Further information is provided in Section 2.2.

Since the declaration of the Cribbs Causeway AQMA, the nitrogen dioxide concentrations at the façade of the single residential property within the AQMA have been below the annual mean objective (40 µg/m^3). Following Defra's recommendation to revoke the AQMA and the subsequent consultation in 2019, the Cribbs Causeway AQMA was revoked by a legal order in July 2020.

A summary and description of the two AQMAs currently declared by South Gloucestershire Council can be found in Table 2.1. The air quality objective pertinent to the current AQMA designations is as follows:

- NO_2 annual mean

The levels of exceedance at the declaration of the AQMAs in 2010 and in 2024 are compared in Table 2.1, however the monitoring undertaken within the AQMAs has changed during this timeframe to reflect the extensions to the AQMAs and to better represent relevant exposure. Consequently, the monitoring locations in 2024 are not necessarily directly comparable to those in 2010 and comparison between the exceedance levels may not provide a true reflection of trends in NO_2 levels over that timeframe.

In 2020 and 2021, the reduced traffic levels as a result of the Covid-19 pandemic restrictions significantly impacted NO_2 concentrations to the extent that there were no exceedences or "borderline" concentrations within 10% of the objective (>36 µg/m^3) in either the Kingswood – Warmley or Staple Hill AQMAs. These years were consequently considered to not be representative of long-term trends in NO_2 concentrations. However, lower NO_2 concentrations than pre-pandemic have subsequently continued with the 2024 concentrations in both AQMAs remaining below the annual mean objective and borderline level.

Having considered the relevant guidance in the Defra LAQM Technical Guidance (LAQM.TG22)[30] and also as recommended in the Defra appraisal of SGC's 2024 Air Quality Annual Status Report (Section 2.2, point 1), we propose to revoke the Staple Hill AQMA as this AQMA has been compliant with the annual mean objective for 7 years (2018 – 2024 inclusive) and the borderline level for 5 years (2020 – 2024). Further

[30] LAQM-TG22-May-25-v2.0.pdf

information to support the proposed revocation of the Staple Hill AQMA is provided in Appendix G.

While the Kingswood – Warmley AQMA has been compliant with both the annual mean objective and borderline level for 5 years (2020 – 2024 inclusive), there are currently no plans to consider the revocation of this AQMA as there are major development proposals which could affect the area. The status of the Kingswood – Warmley AQMA will be reviewed to determine whether revocation of the AQMA could be considered appropriate in subsequent ASRs.

The trends in annual mean nitrogen dioxide concentrations in the Kingswood –Warmley and Staple Hill AQMAs are shown in Appendix A and discussed in Section 3.2.1.

Further information on the declared or revoked AQMAs, including maps, are available on the Council website Air quality | BETA - South Gloucestershire Council (southglos.gov.uk) and on the Defra UK-AIR website Local Authority Details - Defra, UK.

Alternatively, Appendix D provides maps of the current AQMAs and the revoked Cribbs Causeway AQMA and also maps of the air quality monitoring locations in relation to the AQMAs.

Table 2.1 – Declared Air Quality Management Areas

AQMA Name	Date of Declaration	Pollutants and Air Quality Objectives	One Line Description	Is air quality in the AQMA influenced by roads controlled by Highways England?	Level of Exceedance: Declaration	Level of Exceedance: Current Year	Number of Years Compliant with Air Quality Objective	Name and Date of AQAP Publication	Web Link to AQAP
AQMA 2 Kingswood – Warmley	Declared 14 April 2010 Amended 25 May 2012 Amended 16 December 2015	NO_2 Annual Mean	The area incorporates A420 road from South Gloucestershire /Bristol City Council boundary in Kingswood extending eastwards to junction of Goldney Avenue in Warmley; to the south along Hanham Road (up to and including The Folly); and to the south-east along Tower Road North to the junction of Crown Gardens; and includes any properties that lie within the outlined boundary.	NO	45.0 µg/m^3 (Site 68 at façade in Kingswood AQMA as declared in 2010. NB: no ground floor exposure)	25.3 µg/m^3 (Site 146ABC at façade in Kingswood – Warmley AQMA) 22.6 µg/m^3 (Site 68 at façade for comparison in former Kingswood AQMA. NB: no ground floor exposure)	5 years (however includes 2020 & 2021 Covid-19 Pandemic impacted years not typical of long-term trends)	Air Quality Action Plan for Kingswood and Staple Hill 2012 (Consultation undertaken on new draft Action Plan from 6 Dec 2022 - 31 Jan 2023)	Visit the 2012 Air Quality Action Plan for Kingswood and Staple Hill (Visit the Draft Clean Air Action Plan)

AQMA Name	Date of Declaration	Pollutants and Air Quality Objectives	One Line Description	Is air quality in the AQMA influenced by roads controlled by Highways England?	Level of Exceedance: Declaration	Level of Exceedance: Current Year	Number of Years Compliant with Air Quality Objective	Name and Date of AQAP Publication	Web Link to AQAP
AQMA 3 Staple Hill	Declared 14 April 2010 Amended 25 May 2012	NO_2 Annual Mean	The area incorporates the Broad Street (A4175), High Street (B4465), Victoria Street and Soundwell Road (A4017) crossroads; along Broad Street to the junction with York Road; High Street (up to and including nos. 40 and 49); Soundwell Road (up to and including no's 16a and 47); Victoria Street to the junction of Clarence Road; and includes any properties that lie within the outlined boundary.	NO	47.9 µg/m^3 (Site 73 in Staple Hill AQMA as declared in 2010. NB: not distance adjusted, no ground floor exposure) (For comparison with current year: 47.3 µg/m^3 Site 61 in Staple Hill AQMA as declared in 2010. NB: Not distance adjusted, no ground floor exposure)	26.1 µg/m^3 (Site 61 in Staple Hill AQMA. NB: Distance adjusted to façade 24.8 µg/m^3, no ground floor exposure) (Site 73 unable to compare as no longer operational)	7 years (however includes 2020 & 2021 Covid-19 Pandemic impacted years not typical of long term trends)	Air Quality Action Plan for Kingswood and Staple Hill 2012 (Consultation undertaken on new draft Action Plan from 6 Dec 2022 - 31 Jan 2023)	Visit the 2012 Air Quality Action Plan for Kingswood and Staple Hill (Visit the Draft Clean Air Action Plan)

☒ **South Gloucestershire Council confirm the information on UK-Air regarding their AQMAs is up to date.**

☒ **South Gloucestershire Council confirm that all current AQAPs have been submitted to Defra.**

2.2 Progress and Impact of Measures to address Air Quality in South Gloucestershire

Defra's appraisal of the 2024 ASR concluded the following:

(The Council's responses are shown in brackets where appropriate)

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

1. *The Council has two active AQMAs within its jurisdiction. Kingswood — Warmley AQMA has been compliant for 4 years and Staple Hill has been compliant with objectives for 6 years. Staple Hill AQMA could be considered for revocation.* (The 2023 ASR appraisal comments advised SGC "*ensure 2023 and 2024 monitoring data supports compliance before considering plans to revoke their AQMAs".* This precautionary approach was adopted in the 2024 ASR. This 2025 ASR has reviewed the 2024 monitoring data and the future status of the AQMAs and proposes the revocation of the Staple Hill AQMA.)
2. *The comments from the previous appraisal are included in the report and directly responded to. This is welcomed.*
3. *The Council discuss the development of their new air quality action plan. The Council is encouraged to continue their work and implement this plan so that new measures can be included in future ASRs.* (An update is provided in this report)
4. *The Council has both introduced and decommissioned diffusion tube sites in 2023. It is good practice to continually review monitoring sites within a network and change locations as necessary. The Council is encouraged to continue this practice.*
5. *The Council has provided detailed and thorough discussion throughout the report relating to action plan measures and monitoring data. This is very useful to understand air quality trends in the borough and the measures the council is taking to tackle air quality.*
6. *It is noted that there are a few instances in the report where pollutant names are not appropriately subscripted (i.e. NO2). The council should screen reports for such errors.* (These instances were corrected before the report was published on the SGC website).

South Gloucestershire Council has taken forward a number of measures during the current reporting year of 2024 in pursuit of improving air quality.

Details of the existing Air Quality Action Plan's 41 measures (completed, in progress or planned) are set out in Table 2.2. More detail on these measures can be found in the 2012 Air Quality Action Plan for Kingswood and Staple Hill[31]. Delivery against this Action Plan has largely been completed where possible. Where there have been, or continue to be, barriers restricting the implementation of the measure, these are also presented within Table 2.2. The top three key Action Plan measures considered to have most effectively contributed to reducing pollution are shown in the top three shaded rows of Table 2.2.

Looking forward, South Gloucestershire Council has prepared a comprehensive, area-wide draft Clean Air Action Plan to replace the 2012 Air Quality Action Plan, which will be the focus of our efforts in future years, once the plan is finalised and approved.

Public Consultation was undertaken on the draft Clean Air Action Plan between 6 December 2022 and 31 January 2023. The consultation sought the views of the public and businesses who may be affected by the actions and gather opinions on a wide range of proposed actions designed to improve air quality within the AQMAs and across South Gloucestershire. In total 1,285 copies of the Clean Air Action Plan were downloaded from the consultation webpage[32] and 119 survey responses were received. Further information, including a consultation report summarising the responses, is available on the Clean Air Action Plan - South Gloucestershire Online Consultations (southglos.gov.uk) webpage. The feedback from the consultation has been considered and has helped shape the final Clean Air Action Plan. Work continues to finalise the draft CAAP with completion of the final CAAP and approval anticipated later in 2025.

A key regional plan is the West of England Joint Local Transport Plan 4 (JLTP4) 2020 – 2036[33]. One of the five key objectives within the JLTP4 is to "Take action against climate change and address poor air quality" thereby placing a greater emphasis on air quality and climate change in strategic transport planning through to 2036.

[31] 2012 Air Quality Action Plan Kingswood and Staple Hill (southglos.gov.uk)

[32] Clean Air Action Plan - South Gloucestershire Online Consultations (southglos.gov.uk)

[33] Joint Local Transport Plan - Combined Authority (westofengland-ca.gov.uk)

During 2024, actions progressed in South Gloucestershire and across the wider West of England region aimed at reducing traffic congestion and improving air quality include:

- MetroWest[34]– improved rail services and infrastructure being delivered in two phases by the West of England councils, working in partnership with Network Rail and Great Western Railway.
    - Phase 1 includes the re-opening of the Portishead rail line and enhancement of local passenger train services on the Bath to Bristol lines and on the Severn Beach/Avonmouth line. The Severn Beach enhancements were delivered in 2021 and funded by WECA. Plans to re-open the Portishead line, with new stations at Pill and Portishead, have progressed into the detailed design phase. The project will provide an hourly direct link from Portishead to Bristol Temple Meads in 25 minutes.
    - Phase 2 proposes to re-open the Henbury Line to an hourly spur passenger service and increase train services between Bristol Temple Meads and Gloucester via Yate to a half-hourly service; the latter commenced in May 2023 with funding from WECA.
    - Plans for new rail stations are progressing with WECA funding. The Portway Park & Ride station opened in August 2023 and Ashley Down station opened to passengers in September 2024. The station is easily accessible to 15,000 people living in the Lockleaze, Horfield and Ashley Down areas of North Bristol.
    - Planning permission for the new rail station at North Filton on the Henbury line was granted in January 2023 and for Charfield[35] station, north of Yate on the Bristol to Gloucester line, in March 2023. Both stations are expected to open in 2027[36].
- The region continues to develop its bus services with the recent delivery of First/Department for Transport funded electric buses and associated charging infrastructure. By summer of 2026, more than 250 electric buses will be on the road

[34] MetroWest - WEST (travelwest.info)

[35] Charfield train station | BETA - South Gloucestershire Council (southglos.gov.uk)

[36] MetroWest - West of England Combined Authority (westofengland-ca.gov.uk)

and four of the regions five depots fully electrified. This will ensure a reduction in carbon emissions, cleaner air, quieter streets and provide a better experience for about three quarters of a million passengers each week from next year[37].

- A38 and Bradley Stoke Way improvements – SGC are developing a scheme along the Thornbury to Bradley Stoke Way corridor aimed at improving conditions for people walking, cycling, and travelling by bus. The aim is to encourage mode shift, reduce carbon emissions and consequently improve air quality. Measures include the provision of sections of bus lane and Local Transport Note (LTN) 1/20 standard cycling infrastructure[38]. In 2024, SGC submitted the final business case and funding was released to start construction of the project. It is expected that the scheme will be fully open by March 2027.
- A432 Yate to A4174 Ring Road Corridor - SGC are developing a similar scheme along this corridor to improve conditions for people walking, cycling, and travelling by bus to encourage mode shift, reduce carbon emissions and improve air quality. Measures include provision of sections of bus lane and LTN 1/20 standard cycling infrastructure. The Final Business Case was submitted in 2024, and funding was released to start construction of the project. It is expected that the scheme will be fully open by March 2027.
- SGC has recently secured Green Recovery Funding to expand the rollout of rapid and fast electric vehicle charging points. Over the next year, the focus will be on installing destination chargers in public car parks near high streets and railway stations to support visitors to these locations. More on-street residential charging hubs will be provided to support residents without off-street parking, to enable overnight charging for those without home charging options. The aim is to improve charging infrastructure coverage and support the transition to zero-emission vehicles across our communities.
- SGC are developing plans with local communities for better active travel facilities in Yate and Thornbury (Have Your Say Today - Getting About In Thornbury - Commonplace). The aim is to make it easier, safer and more attractive to walk, wheel (using a mobility scooter, wheelchair or pushchair) or cycle, especially for

[37] £150 million investment in better buses for the West -

[38] Cycle infrastructure design (LTN 1/20) - GOV.UK (www.gov.uk)

those local everyday journeys to school or the shops. When implemented, it is expected the measures will make the roads and streets quieter and safer, reduce harmful emissions and improve air quality, and encourage more people to get active, thus improving public health. The schemes are expected to be completed by March 2027.

- SGC continued developing measures to support active travel across the region. There were 29 applications to the Council's ongoing Active Travel Grant scheme, of which 16 organisations were successful. Most successful applicants used their grant for either a pool bicycle or e-bicycle. Participating organisations have reported back that the scheme has led to a reduction in vehicular journeys to and from their sites, reducing their vehicle emissions and carbon emissions.
- SGC also funded cycle training sessions at the University of the West of England (UWE) Frenchay campus. These were open to residents and those working in South Gloucestershire to improve their cycling skills and confidence to encourage more sustainable travel choices. The long-running initiative of free Dr Bike events also continued. Dr Bike, an experienced mechanic, carries out minor repairs and checks to ensure people's bicycles are safe and roadworthy, helping them to get cycling again.
- Kingswood Town Centre Regeneration[39] - WECA funding from the "Love our High Streets" programme enabled investigation into the redevelopment potential of Kingswood Town Centre. Initial proposals focused on the possibility of re-routing traffic and pedestrianising Regent Street. However, further detailed technical work uncovered significant challenges in being able to deliver a suitable diversion route for traffic to enable pedestrianisation, so the pedestrianisation proposal will not be further pursued. Alternative measures continue to be developed to deliver improvements, in consultation with local residents and businesses. During 2024, walking route improvements[40] between Kingswood and Staple Hill were made which included widening pavements and installing a number of new pedestrian crossings. Improvements in local air quality will remain a key consideration in future proposals.

[39] Have Your Say Today - Kingswood Regeneration - Commonplace

[40] Keep in Touch with Latest News - Kingswood Walking and Cycling Improvements - Commonplace

South Gloucestershire Council also continue to engage with Bristol City Council and Bath and North East Somerset Council on their Clean Air Plans, both of which include Clean Air Zones, through meetings organised by the West of England Combined Authority.

The Bath Clean Air Zone (CAZ) launched on 15 March 2021 and is a class C CAZ charging high-emission buses, coaches, taxis, private hire vehicles, heavy goods vehicles, vans and minibuses to travel through the zone but not private cars and motorbikes. Further information is available on Bath's Clean Air Zone website[41], including the CAZ monitoring reports.

The Bristol Clean Air Zone[42] launched on 28 November 2022 and, as a Class D CAZ, charges for non-compliant private cars, in addition to the vehicles listed above for the Class C CAZ. In the first 12 months of operation, annual NO_2 levels fell by almost 13% on average inside the CAZ and almost 10% outside the CAZ, when compared to the previous 12 months[43]. The introduction of the Bristol Clean Air Zone may have also had a beneficial impact on NO_2 concentrations in South Gloucestershire due to the volume of commuter traffic between Bristol and South Gloucestershire. Further information is available on Bristol's Clean Air Zone webpages and the Clean Air for Bristol website[44]. The Government's Vehicle Checker tool can be used to check whether there is a charge to drive any vehicle in any CAZ – Check your vehicle (GOV.UK).

A4174 Hambrook Air Quality Action

Following the Government's UK Air Quality Plan[45] for nitrogen dioxide published in July 2017, South Gloucestershire Council was mandated to undertake a Targeted Feasibility Study by the Government via a Ministerial Direction issued in March 2018. The study was required to identify actions that could be taken to reduce roadside nitrogen dioxide levels on the A4174 Ring Road between the A4017 Bromley Heath Road and M32 Motorway

[41] Bath's Clean Air Zone | Bath and North East Somerset Council (bathnes.gov.uk)

[42] Bristol's Clean Air Zone

[43] Air quality (bristol.gov.uk)

[44] Clean Air for Bristol | Clean air for everyone | Bristol Clean Air Zone

[45] Air quality plan for nitrogen dioxide (NO_2) in UK (2017) - GOV.UK (www.gov.uk)

Junction 1 roundabouts to meet the annual mean NO_2 concentration limit (40 µg/m^3) as set out in the Air Quality Standards Regulations 2010[46], in the shortest time possible.

The study concluded that it would be possible to bring forward compliance on this section of the A4174 if certain traffic management measures were put in place at the Hambrook junction. The outcome of the study was approved by the Joint Air Quality Unit (JAQU); a joint unit formed between Defra and the Department for Transport (DfT) to deliver the national nitrogen dioxide reduction strategies. The feasibility studies of all 33 mandated authorities in the "third wave" of Government air quality action were used to develop the supplement[47] to the 2017 UK Air Quality Plan and were also published separately by Defra[48].

The Council was subsequently legally directed through a further Ministerial Direction to implement the identified measures with full funding provided by JAQU. The following measures, also shown in Figure 2.1, were implemented at the A4174 Hambrook junction in August 2019:

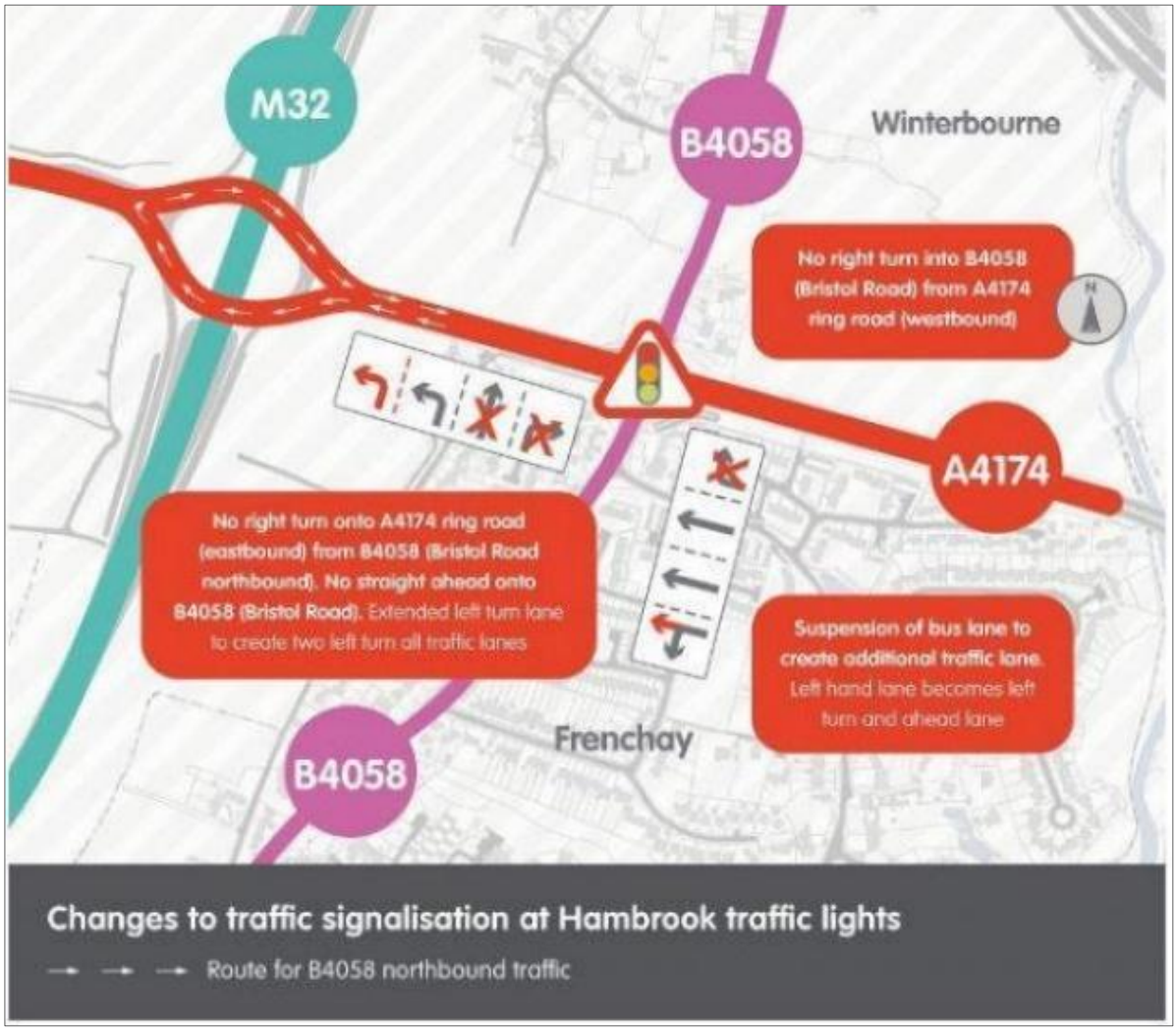
- Removal of the right turn onto the B4058 from the westbound carriageway of the A4174 ring road
- Removal of the straight on movement for the B4058 northbound from Frenchay
- Removal of the right turn from the B4058 from Frenchay onto the A4174
- Changing the westbound bus lane to an all-traffic lane on the A4174 through the junction to the M32 traffic signals.

[46] UK Air Quality Limits - Defra, UK

[47] Supplement to the UK plan for tackling roadside nitrogen dioxide concentrations (publishing.service.gov.uk)

[48] Supplement to the UK plan for tackling roadside nitrogen dioxide concentrations: local authorities feasibility studies - Defra, UK

Figure 2.1 – Traffic measures at A4174 Hambrook Junction



While the impacts of these changes result in slightly longer journey times for some routes, as drivers need to go around the M32 Junction 1 roundabout to access the B4058 northbound, and/or the ring road from Frenchay, reducing the time vehicles are stationary at the Hambrook traffic lights and allowing ring road traffic to flow more efficiently, should reduce emissions and improve air quality. Furthermore, changing the bus lane to an all-traffic lane improves the westbound capacity through the junction to the M32 junction.

Additional monitoring was set up at the roadside to monitor the impact of the traffic restrictions at the junction on NO_2 concentrations along the A4174 ring road between the M32 Junction 1 and Bromley Heath roundabouts. This is because the NO_2 annual mean limit value applies where there is public access (with some exceptions), so includes pedestrian and cycle paths. However, the national (UK) air quality objectives, which form the basis of the Local Air Quality Management framework, take “relevant exposure” into consideration with the objectives applying where the public are regularly present for the averaging period of the objective. Relevant exposure for the national annual mean NO_2

objective generally relates to long-term exposure, such as at the façades of residential properties and care homes but also schools and hospitals.

The Council has been monitoring nitrogen dioxide levels where people live near this junction for some years in line with LAQM requirements. These results show that the levels are below the national air quality objectives where people live. This is mainly because the houses are set back from the road and pollutant concentrations quickly drop off with increasing distance from the roadside.

Assessment of the effectiveness of the scheme was delayed as it took longer than expected to obtain the required data due to the Covid-19 pandemic. The monitoring data for 2020 and 2021 was not typical of normal conditions due to the reduced traffic levels, and therefore, was not considered to be representative of long-term trends in NO_2 concentrations. 2022 was the first year considered to be representative of the "new normal" conditions following the pandemic.

Subsequently, diverting traffic from the sudden closure of the A432 Badminton Road/ National Highways M4 Motorway overbridge[49] in July 2023 also impacted the surrounding road network, including the A4174 at Hambrook. The M4 overbridge was demolished in March 2025 and will be replaced with a new overbridge in early 2026.

The Joint Air Quality Unit assessment of the 2022 and 2023 monitoring data confirmed that while the 2022 data did not meet the annual mean limit of 40 µg/m^3, the 2023 data was compliant with the limit. Two consecutive years of monitoring data showing roadside NO_2 concentrations comply with the NO_2 annual mean limit are required in order to be released from the Ministerial Direction. JAQU are currently assessing the 2024 monitoring data and the results of this assessment are due later in 2025. The outcome of this assessment will be published and the next steps considered as appropriate.

Further information about the scheme is available on the following webpage; Hambrook lights traffic restrictions | BETA - South Gloucestershire Council and any updates will be published on this webpage.

[49] A432 Badminton Road bridge, crossing the M4 - National Highways

Air Quality and Public Health Progress

Work continued to align the air quality agenda and public health outcomes during 2024. This has been recognised in the April 2025 new Divisional Plan 2025 – 2028 for the South Gloucestershire Public Health & Wellbeing (PHWB) Division, which continues the provision of ongoing public health input into the council wide clean air programme as part of the Healthy Communities programme area 2025/2026 priorities.

The South Gloucestershire Population Health Intelligence Portal (PHIP)[50] is the home of the Joint Strategic Needs Assessment (JSNA). Further information on the PHIP is provided in Section 2.3. The JSNA continues to recognise the built and natural environment as a wider determinant of health and the influence it has on physical and mental health, and on health inequalities. The built and natural environment page was updated in 2024 and continues to include information on the impact that air quality has on health and wellbeing, with accompanying local indicator data. It also highlights the links between access to green space, housing, active travel and sustainable transport and the mutual benefits of these for both mental and physical health.

The South Gloucestershire Joint Health and Wellbeing Strategy 2021 – 2025[51] focuses on four “Strategic Objectives” for collective action. One of these is to “Maximise the potential of our built and natural environment to enable healthy lifestyles and prevent disease”. The Public Health division prepared a detailed report and presentation on this strategic objective for review and comment by the Health and Wellbeing Board in November 2024. The report evidenced the progress made towards the seven components of this objective, which includes work contributing to reducing air pollution and maximising use of active travel and community transport. The Board members welcomed both the report and presentation. A new draft South Gloucestershire Joint Health and Wellbeing Strategy 2025 – 2029 underwent an engagement process in March – April 2025 to gather feedback on the draft strategy and action plan. The new strategy aims to be rooted in an understanding of local data and insights set out in the Joint Strategic Needs Assessment and takes an evidence-based approach.

The continued commitment of resource from the Public Health team into built environment and air quality work, recognises the importance of this work in terms of public health. This

[50] Population Health Intelligence Portal | BETA - South Gloucestershire Council (southglos.gov.uk)

[51] Joint Health and Wellbeing Strategy 2021-25 | BETA - South Gloucestershire Council (southglos.gov.uk)

resource was continued through the Public Health and Wellbeing Division new service restructure which commenced in April 2025, where a continued focus on the built environment is included in the Healthy Communities programme priorities. This resource has included an air quality communications schedule in the Healthy Communities programme area, which includes the Clean Air Day and Clean Air Night campaigns. Members of the Public Health division also attend the Office for Health Improvement and Disparities (OHID) South West Built Environment network which aims to share developments across this field of work, including air quality.

A succession of Public Health Registrars have led on clean air work, including the 2020 – 2024 South Gloucestershire Clean Air Strategy and the 2022 Director of Public Health (DPH) Annual Report, which was entitled "Clean Air and Climate Change"[52]. The DPH report outlines the potential health and wellbeing impacts of clean air and climate change and recognises the commitment to strengthen the relationship between environmental health and public health to address air quality issues. More recently, a Public Health Registrar has begun a placement within the South Gloucestershire Transport Policy division. This will help to establish important links between the Public Health and Transport divisions with regards to active travel. The registrar placement will include an evidence review around both the health benefits of and inequalities in active travel. It is anticipated that this placement will offer useful crossovers between transport, public health, air quality and climate change.

The Clean Air and Climate Change Board, co-chaired by the Executive Director of Place and the Director of Public Health, continues to oversee the Clean Air Strategy and development of the Clean Air Action Plan and also covers the Council's work on Climate Change. This ensures a joined-up approach across the two work areas, which are closely interlinked with often the same sources and interventions and secures alignment with the Council's Climate Emergency Strategy and Action Plans[53].

The Public Health team, and other relevant teams, have also had input into the emerging new South Gloucestershire Council Local Plan[54]. The South Gloucestershire Local Plan

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[52] Director of Public Health report 2022 clean air and climate change

[53] Climate and nature emergency in South Gloucestershire | BETA - South Gloucestershire Council (southglos.gov.uk)

[54] South Gloucestershire New Local Plan | BETA - South Gloucestershire Council (southglos.gov.uk)

Regulation 19 Publication consultation ran until April 2025. A range of evidence and technical documents have been produced to inform and support the development of the new Local Plan for Regulation 19 consultation, including the Public Health and Wellbeing Infrastructure Deliver Plan Topic Paper, which was prepared by the Healthy Communities team within the Public Health division. The paper makes recommendations for the incorporation of healthy development principles, such as an improvement in air quality, when planning for large-scale new developments. It provides principles for consideration alongside local health evidence at both a local authority and ward level. The next stage will be the independent examination by a planning inspector around April 2026.

South Gloucestershire Council continues to work in close partnership with its neighbouring local authorities and the West of England Combined Authority to develop, implement and refine schemes with cross-boundary characteristics. The Council also continues to work with JAQU regarding the A4174 Hambrook Air Quality Scheme.

South Gloucestershire Council's priorities for the coming year are to:

- Produce the final Clean Air Action Plan, taking into consideration the outcome of the public consultation, and seek formal approval of the CAAP to enable implementation of the actions to improve air quality within the AQMAs and across South Gloucestershire as a whole.
- Proceed with the proposed revocation of the Staple Hill Air Quality Management Area following compliance with the annual mean NO_2 objective for seven years.
- Continue to monitor and assess the effectiveness of the JAQU scheme on the A4174 at Hambrook in achieving compliance with the annual mean NO_2 limit value and review as appropriate following any JAQU recommendations.

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

- Significant continued pressure on local government funding, exacerbated by inflationary pressures, could impact the delivery of air quality improvements and also funding and resources to implement the final Clean Air Action Plan measures.
- Many organisations have continued to offer flexible working arrangements to their staff, including the ability to work from home for all or part of their contracted hours. This has helped reduce the pressures on the highway network (with Tuesday, Wednesday and Thursdays typically now being the busiest days akin to pre-pandemic conditions). However, the acceleration in the popularity of home delivery

services has increased the number of delivery vehicles on the road. Continuing uncertainties and changes in travel behaviour make future transport trends harder to predict and understand how air quality will be affected.

- The increasing adoption of electric vehicles remains constrained by high initial costs and the need for continued improvement in the reliability and accessibility of charging infrastructure[55]. These barriers will need to be overcome to ensure continued reductions in vehicle exhaust emissions and achieve the UK's net zero carbon emissions target by 2050.

South Gloucestershire Council anticipates that the measures stated above and in Table 2.2 will help to contribute towards continued compliance in the Kingswood - Warmley AQMA and the Staple Hill AQMA, now proposed for revocation. The future status of the Kingswood – Warmley AQMA will be reviewed in subsequent ASRs.

The implementation of the new Clean Air Action Plan once finalised and approved, will contribute to maintaining compliance, and to improving air quality beyond compliance, in future years across South Gloucestershire.

Continuing improvement in air quality is of key importance as there is no clear evidence of a safe level of exposure to particulate matter (PM) or NO_2 below which there is no risk of adverse health impacts, so further reductions of PM and NO_2 concentrations below current targets are likely to bring additional health benefits[56].

[55] Electric vehicles and infrastructure - House of Commons Library (parliament.uk)

[56] Air Quality - A guide for directors of public health (defra.gov.uk)

Table 2.2 – Progress on Measures to Improve Air Quality

Measure No.	Measure Title	Category	Classification	Year Measure Introduced in AQAP	Estimated / Actual Completion Date	Organisations Involved	Funding Source	Funding Status	Estimated Cost of Measure	Measure Status	Reduction in Pollutant / Emission from Measure	Key Performance Indicator	Progress to Date	Comments / Barriers to Implementation
KS4	Bus partnership (Kingswood) Working with operators to address AQ issues	Vehicle Fleet Efficiency	Promoting Low Emission Public Transport	2013		South Gloucestershire Council in partnership with bus operators and neighbouring local authorities	OLEV Grant	Funded	£1 million - £10 million	Completed	No specific target emissions reduction	Number of buses replaced for lower emission vehicles	The £4.79m OLEV funding for bio-methane buses enabled the delivery of 98 buses and 2 re-fuelling stations in the area. The latest round of Clean Bus Technology Fund (CBTF) enabled 149 buses to be retrofitted with cleaner engines.	Ongoing measure. *Note: Progress to date also applies to the corresponding Bus Partnership Measure SS2 for Staple Hill AQMA.*
SL3	Review traffic signal numbers and operations (Staple Hill)	Traffic Management	UTC, Congestion management, traffic reduction	2012 - 13	2013/14	South Gloucestershire Council	Defra Air Quality Grant funding/ LTCP	Funded		Completed	No specific target emissions reduction	Improved traffic speeds and reduced congestion	Traffic signals reviewed and amended at the junction of A4175 Broad Street/A4017 Victoria Street in 2012. Upgrading of the traffic signals at the Pendennis Road and Acacia Road junction was completed in 2013, using Defra AQ Grant funding.	*Also note corresponding Review traffic signal numbers and operations measure KL4 for Kingswood AQMA where progress includes MOVA signalling system installation at 3 junctions in 2013/14 to improve traffic flow.*
SM6	Cycling infrastructure (Staple Hill)	Transport Planning and Infrastructure	Cycle network	2014 - 16		South Gloucestershire Council	DfT Grant funding	Partially Funded	£1 million - £10 million	Implementation	No specific target emissions reduction	Increases in numbers of cyclists.	Two grant funded cycle route lighting schemes were implemented nearby between 2014 and 2016. Priority routes in the area have been identified through the Local Cycling and Walking Infrastructure Plan (LCWIP) adopted by WECA in 2020.	Ongoing measure. Further progress on implementation of LCWIP routes subject to funding availability.
KS1	Travel Plan for Kingswood Civic Centre	Promoting Travel Alternatives	Workplace Travel Planning	2012		South Gloucestershire Council	Local Transport Capital Programme (LTCP)	Funded	£10k - 50k	Completed	No specific target emissions reduction	• Reduction in solo occupancy vehicles • Increased cycling levels • Increased walking levels	Action complete. Implementation of travel plan is continuous process.	
KS2	Parking review (Kingswood)	Traffic Management	Workplace Parking Levy, Parking Enforcement on highway	2015/16	2015/16	South Gloucestershire Council	LTCP	Funded	£10k - 50k	Completed	None, impact considered too small to be measurable	• Road safety benefits • Reduced congestion	Initial parking review implemented in 2015/16. Following 2nd review, three additional waiting restriction schemes delivered. An electric vehicle charging point with 2 vehicle capacity has been installed at Cecil Road car park in Kingswood.	
KS3	Ensure air quality is a priority in development of transport schemes (Kingswood)	Transport Planning and Infrastructure	Other	2013/14	2013	South Gloucestershire Council	LTCP	Funded		Completed	No specific target emissions reduction	Number of actions taken forward within Capital Programme	The prioritisation framework for the Local Transport Capital Programme (LTCP) was reviewed in 2013 and now includes an assessment of the contribution to meeting LTP carbon emissions/air quality goals.	
KS4	Bus partnership (Kingswood) Working with operators to address AQ issues	Vehicle Fleet Efficiency	Promoting Low Emission Public Transport	2013		South Gloucestershire Council in partnership with bus operators and neighbouring local authorities	OLEV Grant	Funded	£1 million - £10 million	Completed	No specific target emissions reduction	Number of buses replaced for lower emission vehicles	The £4.79m OLEV funding for bio-methane buses has enabled the delivery of 98 buses and 2 re-fuelling stations in the area. The latest round of Clean Bus Technology Fund (CBTF) enabled 149 buses to be retrofitted with cleaner engines.	

Measure No.	Measure Title	Category	Classification	Year Measure Introduced in AQAP	Estimated / Actual Completion Date	Organisations Involved	Funding Source	Funding Status	Estimated Cost of Measure	Measure Status	Reduction in Pollutant / Emission from Measure	Key Performance Indicator	Progress to Date	Comments / Barriers to Implementation
KS5	Review of Council Fleet to ensure lowest emission vehicles (Kingswood)	Vehicle Fleet Efficiency	Other	2016		South Gloucestershire Council	OLEV Grant	Partially Funded	£100k - £500k	Implementation	No specific target emissions reduction	Reduction in vehicle emissions	The Council has continued to introduce low or zero emission vehicles into its Fleet. All replacement vehicles introduced into the fleet meet or better the latest emission standards. The Council has also been successful in reducing its overall Fleet size. We have conducted base line assessments of CO_2 emissions across the fleet to assist in targeting future emissions reductions. The Council has also introduced further charging infrastructure to allow the introduction of more electric or hybrid vehicles.	
KS6	Promotion of more efficient use of taxi ranks and bus stops (Kingswood).	Vehicle Fleet Efficiency	Driver training and ECO driving aids	2013		South Gloucestershire Council in liaison with taxi operators and bus operators	Local Transport Capital Programme (LTCP)	Funded	£10k - 50k	Completed	No specific target emissions reduction	Number of bus/taxi operators signed up to programme	Bus lay-by and taxi bay on Regent Street altered to improve traffic flow in June 2013. First Bus regularly review vehicle timing points to remove excessive idling times. The Council continues to work with local bus and taxi operators to encourage the transition of fleets to low emission vehicles.	
KS7	Ensure adequate landscaping is considered within new planning applications and urban designs (Kingswood)	Policy Guidance and Development Control	Other policy	2013	2013	South Gloucestershire Council	Council Funds	Funded	£10k - 50k	Completed	No specific target emissions reduction	Number of new trees planted. NB: Data relating to the indicator for this measure is not currently available.	Policies CS2 and CS9 within the Councils adopted Core Strategy set out how Green Infrastructure and the natural environment is to be planned, delivered and managed within proposed development. Planting schemes using Council own funds have been completed.	
KS8	Promotion of VOSA Smoky Vehicle Hotline (Kingswood)	Public Information	Via the Internet	2013	2013	South Gloucestershire Council	n/a	Funded	< £10k	Completed	No specific target emissions reduction	Number of vehicles reported to VOSA (data not currently available).	Information was added to the Council's website. VOSA has since been replaced by the Driver and Vehicle Standards Agency (DVSA). An excessively smoky lorry or bus can be reported online- Report a smoky lorry or bus - GOV.UK.	
KM1	School travel planning (Kingswood)	Promoting Travel Alternatives	School Travel Plans	2013		South Gloucestershire Council in conjunction with local schools	DfT Grant Funding	Funded	£500k - £1 million	Implementation	No specific target emissions reduction	'Hands up' surveys within participating schools indicate mode share for pupils arriving at school.	A series of interventions undertaken with LSTF, STTY and Access West funding to promote sustainable travel in schools. The Road Safety Team works with schools to promote active travel across the region, including a school street scheme at Kings Oak Academy.	Further progress subject to funding availability.
KM2	Travel planning for Kingswood Town Centre (Kingswood)	Promoting Travel Alternatives	Intensive active travel campaign & infrastructure	2013		South Gloucestershire Council in conjunction with Kingswood Business Association DfT Grant Funding	DfT Grant Funding	Funded	£500k - £1 million	Implementation	No specific target emissions reduction	Measured by increased: • Cycling levels • Bus patronage • Walking levels	Measures to encourage sustainable travel were previously delivered through LSTF and STTY projects and Access West. In March 2020, the DfT confirmed funding to March 2021 (Access West Y4) to continue to work with Businesses, Schools and Communities to promote and support sustainable and active travel choices. Capability Funding followed Access West Y4 and was completed at the end of Q2 2022. This builds on the previous work completed by Access West.	Further progress subject to funding availability.

Measure No.	Measure Title	Category	Classification	Year Measure Introduced in AQAP	Estimated / Actual Completion Date	Organisations Involved	Funding Source	Funding Status	Estimated Cost of Measure	Measure Status	Reduction in Pollutant / Emission from Measure	Key Performance Indicator	Progress to Date	Comments / Barriers to Implementation
KM3	Review bus terminals and timing points (Kingswood)	Vehicle Fleet Efficiency	Promoting Low Emission Public Transport	2014/15	2014/15	South Gloucestershire Council in conjunction with bus operators	Undertaken by operators	Funded	< £10k	Implementation	No specific target emissions reduction	Reduction in number of buses idling at bus stops	Review of bus network to reduce number of services terminating in AQMA. Bus stop infrastructure and parking review schemes to improve traffic flow.	
KM4	Smarter Choices promotions/ roadshows (Kingswood)	Promoting Travel Alternatives	Intensive active travel campaign & infrastructure	2014		South Gloucestershire Council	DfT Grant Funding	Funded	£500k - £1 million	Implementation	No specific target emissions reduction	Measured by increased: • Cycling levels • Bus patronage • Walking levels Also measure by number of proactive events	The Access West project (finished March 2020) built on work delivered through LSTF and STTY, working with Businesses, Schools and Communities across South Gloucestershire to promote and support sustainable and active travel modes. Access West Year 4 ran through 2020. Large elements of the project had to be adapted quickly in response to Covid-19 restrictions and the impact on travel and engagement work. The Project continued to run the Wheels to Work Project and the Kingswood One Stop Shop was one of the key partners. The Communities Team also continued work by Southern Brooks in uploading the Discover Guide for Kingswood to the Around Your Way microsite for promoting the local area and encouraging active travel modes. The Capability Fund followed Access West Y4 and was completed at the end of Q2 2022. This continued the work of Access West providing support to encourage sustainable and active travel modes across South Gloucestershire.	
KM5	Cycling infrastructure (Kingswood)	Transport Planning and Infrastructure	Cycle network	2015		South Gloucestershire Council	LTCP and DfT Grant Funding	Partially Funded	£1 million - £10 million	Planning	No specific target emissions reduction	Increases in numbers of cyclists.	Priority routes in the area have been identified through the Local Cycling and Walking Infrastructure Plan (LCWIP) adopted by WECA in 2020.	Further progress subject to funding availability.
KL1	ECO Stars Fleet Recognition Scheme (Kingswood)	Vehicle Fleet Efficiency	Fleet efficiency and recognition schemes	n/a		South Gloucestershire Council	Unknown at Present	Not Funded		Planning	No specific target emissions reduction	Membership numbers.	Not currently feasible to implement due to resource availability. Progression of this action is unlikely but will be reviewed as part of AQAP review.	Resource availability currently prevents implementation.
KL2	Car club (Kingswood)	Alternatives to private vehicle use	Car Clubs	n/a		South Gloucestershire Council	Unknown at Present	Not Funded	£50k - £100k	Planning	No specific target emissions reduction	Car club membership	Discussions held in the past with car club operators failed to firm commitment. May be considered as part of the on-going regeneration of the Kingswood shopping area.	
KL3	Restrict traffic turning movements onto A420 (Kingswood)	Traffic Management	UTC, Congestion management, traffic reduction	n/a		South Gloucestershire Council	LTCP	Partially Funded		Aborted	No specific target emissions reduction	Reduction in volume of traffic travelling towards and along A420	Traffic modelling was undertaken to test options commissioned to assess impact of LTCP and developer proposals upon air quality, however no measures were identified that improved the flow of traffic.	

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KL4	Review traffic signal numbers and operations (Kingswood)	Traffic Management	UTC, Congestion management, traffic reduction	2014		South Gloucestershire Council	LTCP	Partially Funded		Planning	No specific target emissions reduction	Improved traffic speeds and reduced congestion	MOVA signalling system was installed at 3 junctions in the AQMA in 2013/14 to improve traffic flow. A review of mid-block pedestrian signals within the AQMA was undertaken in 2014 and recommended the removal of 1 or 2 pedestrian crossings from Kingswood High Street. The on-going regeneration of Kingswood may make some changes to traffic flow and access arrangements.	Implementation dependant on securing funding.
KL5	Review of delivery bays (Kingswood)	Freight and Delivery Management	Delivery and Service plans	2016/17	2016/17	South Gloucestershire Council	LTCP	Funded	£50k - £100k	Completed	No specific target emissions reduction	• Number of reported issues with delivery bays • Reduced congestion	Entry and exit kerbing into delivery bays on the High Street have been adjusted to allow easier access and reduce delays and traffic queues. A signing review of delivery bays was completed in 2016/17.	
KL6	Controlled deliveries/ collections (Kingswood)	Freight and Delivery Management	Freight Consolidation Centre	n/a		South Gloucestershire Council	Unknown at Present	Not Funded		Planning	No specific target emissions reduction	Number of delivery & collection agreements made with businesses	No further progress. The plans for Kingswood Town Centre will mean this will not be a standalone action and will be considered as part of the town centre regeneration work.	
KL7	Reclassify strategic routes and signing strategy (Kingswood)	Traffic Management	Other	n/a		South Gloucestershire Council	Unknown at Present	Not Funded		Planning	No specific target emissions reduction	Reduction in traffic volumes on and travelling towards A420	No further progress. The new Clean Air Action Plan does not propose to take the measure forward.	
KL8	Taxi ranks (Kingswood)	Promoting Low Emission Transport	Taxi emission incentives	n/a		South Gloucestershire Council in conjunction with taxi operators	Unknown at Present	Not Funded		Planning	No specific target emissions reduction	Production of review report	No further progress. The new Clean Air Action Plan proposes to undertake a review of Taxi Licensing Standards across our area.	
CR39/2013	Improved pedestrian crossing facilities at High St/ Alma Rd	Promoting Travel Alternatives	Promotion of walking	2015/16	2015/16	South Gloucestershire Council	LTCP	Funded	£100k - £500k	Completed	No specific target emissions reduction	Implement infrastructure improvements to promote walking	Scheme added to the Council's Local Transport Capital Programme using the scheme prioritisation framework (see Action KS3). Following design and public consultation the scheme was implemented in 2015/16.	
SS1	Ensure air quality is a priority in development of transport schemes (Staple Hill)	Transport Planning and Infrastructure	Other	2013	2013	South Gloucestershire Council	LTCP	Funded	< £10k	Completed	No specific target emissions reduction	Number of actions taken forward within Capital Programme	The prioritisation framework for the Local Transport Capital Programme (LTCP) was reviewed in 2013 and now includes an assessment of the contribution to meeting LTP carbon emissions/air quality goals.	
SS2	Bus partnership (Staple Hill) Working with operators to address AQ issues	Vehicle Fleet Efficiency	Promoting Low Emission Public Transport	2013		South Gloucestershire Council in partnership with bus operators	OLEV Grant	Funded	£1 million - £10 million	Completed	No specific target emissions reduction	Number of buses replaced for lower emission vehicles.	The £4.79m OLEV funding for bio-methane buses has enabled the delivery of 98 buses and 2 re-fuelling stations in the area. Clean Bus Technology Fund (CBTF) enabled 149 buses to be retrofitted with cleaner engines.	

Measure No.	Measure Title	Category	Classification	Year Measure Introduced in AQAP	Estimated / Actual Completion Date	Organisations Involved	Funding Source	Funding Status	Estimated Cost of Measure	Measure Status	Reduction in Pollutant / Emission from Measure	Key Performance Indicator	Progress to Date	Comments / Barriers to Implementation
SS3	Review of Council Fleet to ensure lowest emission vehicles (Staple Hill)	Vehicle Fleet Efficiency	Other	2016		South Gloucestershire Council	OLEV Grant	Partially Funded	£100k - £500k	Implementation	No specific target emissions reduction	Reduction in vehicle emissions	The Council has continued to introduce low or zero emission vehicles into its Fleet. All replacement vehicles introduced into the fleet meet or better the latest emission standards. The Council has also been successful in reducing its overall Fleet size. We have conducted base line assessments of CO_2 emissions across the fleet to assist in targeting future emissions reductions. The Council has also introduced further charging infrastructure to allow the introduction of more electric or hybrid vehicles.	
SS4	Promotion of more efficient use of taxi ranks and bus stops (Staple Hill)	Vehicle Fleet Efficiency	Driver training and ECO driving aids	2015		South Gloucestershire Council in liaison with taxi operators and bus operators	LTCP	Funded	< £10k	Implementation	No specific target emissions reduction	Number of bus/taxi operators signed up to programme	The parking review as part of SM4 is complete. First Bus regularly review vehicle timing points to remove excessive idling times. The Council continues to work with local bus and taxi operators to encourage the transition of fleets to low emission vehicles.	
SS5	Ensure adequate landscaping is considered within new planning applications and urban designs (Staple Hill)	Policy Guidance and Development Control	Other policy	2013	2013	South Gloucestershire Council	Council Funds	Funded	£10k - 50k	Completed	No specific target emissions reduction	Number of new trees planted. NB: Data relating to the indicator for this measure is not currently available.	Policies CS2 and CS9 within the Councils adopted Core Strategy set out how Green Infrastructure and the natural environment is to be planned, delivered and managed within proposed development. Planting schemes using Council own funds have been completed.	
SS6	Promotion of VOSA Smoky Vehicle Hotline (Staple Hill)	Public Information	Via the Internet	2013	2013	South Gloucestershire Council	n/a	Funded	< £10k	Completed	No specific target emissions reduction	Number of vehicles reported to VOSA (data not currently available).	Information was added to the Council's website. VOSA has since been replaced by the Driver and Vehicle Standards Agency (DVSA). An excessively smoky lorry or bus can be reported online- Report a smoky lorry or bus - GOV.UK.	
SM1	School travel planning (Staple Hill)	Promoting Travel Alternatives	School Travel Plans	2013		South Gloucestershire Council in conjunction with local schools	DfT Grant funding	Funded	£500k - £1 million	Implementation	No specific target emissions reduction	'Hands up' surveys within participating schools indicate mode share for pupils arriving at school.	A series of interventions undertaken annually with LSTF, STTY and Access West funding since 2013 to promote sustainable travel in schools.	Further progress subject to funding availability.
SM2	Travel planning for Staple Hill Town Centre	Promoting Travel Alternatives	Intensive active travel campaign & infrastructure	2014		South Gloucestershire Council in conjunction with Staple Hill Chamber of Trade	DfT Grant funding	Funded	£500k - £1 million	Implementation	No specific target emissions reduction	Measured by increased: • Cycling levels • Bus patronage • Walking levels	Measures to encourage sustainable travel were previously delivered through LSTF and STTY projects and Access West. In March 2020, the DfT confirmed funding to March 2021 (Access West Y4) to continue to work with Businesses, Schools and Communities to promote and support sustainable and active travel choices. The Capability Fund followed Access West Y4 and was completed at the end of Q2 in 2022. This has now been replaced by the Capability and Ambition Fund which supports a range of activities across South Gloucestershire.	Further progress subject to funding availability.

Measure No.	Measure Title	Category	Classification	Year Measure Introduced in AQAP	Estimated / Actual Completion Date	Organisations Involved	Funding Source	Funding Status	Estimated Cost of Measure	Measure Status	Reduction in Pollutant / Emission from Measure	Key Performance Indicator	Progress to Date	Comments / Barriers to Implementation
SM3	Relocation of bus stops on Soundwell Road (Staple Hill)	Traffic Management	UTC, Congestion management, traffic reduction	n/a		South Gloucestershire Council	LTCP	Partially Funded		Aborted	No specific target emissions reduction	Measured by relocation of bus stop	Bus stop locations reviewed when the shelters were replaced, but due to site constraints a better location could not be found. Action closed, as the bus stops are unable to be re-located.	
SM4	Parking Review (Staple Hill)	Traffic Management	Workplace Parking Levy, Parking Enforcement on highway	2014/15	2014/15	South Gloucestershire Council	LTCP	Funded	£50k - £100k	Completed	Impact of action considered too small to be measurable	Measured by: • Road safety benefits • Reduced congestion	A new electric vehicle charging point with 2 vehicle capacity has been installed at Haynes Lane car park in Staple Hill. A review of parking restrictions within Staple Hill was undertaken. The resulting scheme was delivered as part of the 2014/15 local transport capital programme. Any subsequent issues have been addressed in a further review which is also now complete.	
SM5	Smarter Choices promotions /roadshows (Staple Hill)	Promoting Travel Alternatives	Intensive active travel campaign & infrastructure	2014		South Gloucestershire Council	DfT Grant Funding	Funded	£500k - £1 million	Completed	No specific target emissions reduction	Measured by increased: • Cycling levels • Bus patronage • Walking levels Also measure by number of proactive events	The Access West project (finished March 2020) built on work delivered through LSTF and STTY, working with Businesses, Schools and Communities across South Gloucestershire to promote and support sustainable and active travel modes. Access West Year 4 ran through 2020. Large elements of the project had to be adapted quickly in response to Covid-19 restrictions and the impact on travel and engagement work. The Capability Fund followed Access West Y4 and was completed at the end of Q2 in 2022. This has now been replaced by the Capability and Ambition Fund which supports a range of activities across South Gloucestershire.	
SM6	Cycling infrastructure (Staple Hill)	Transport Planning and Infrastructure	Cycle network	2014 - 16		South Gloucestershire Council	DfT Grant funding	Partially Funded	£1 million - £10 million	Implementation	No specific target emissions reduction	Increases in numbers of cyclists.	Two grant funded cycle route lighting schemes were implemented nearby between 2014 and 2016. Priority routes in the area have been identified through the Local Cycling and Walking Infrastructure Plan (LCWIP) adopted by WECA in 2020.	Further progress subject to funding availability.
SL1	ECO Stars Fleet Recognition Scheme (Staple Hill)	Vehicle Fleet Efficiency	Fleet efficiency and recognition schemes	n/a		South Gloucestershire Council	Unknown at Present	Not Funded		Planning	No specific target emissions reduction	Membership numbers.	Not currently feasible to implement due to resource availability. Progression of this action is unlikely for the foreseeable future but will be reviewed as part of AQAP review.	Resource availability currently prevents implementation.
SL2	Car club (Staple Hill)	Alternatives to private vehicle use	Car Clubs	n/a	2025	South Gloucestershire Council	Unknown at Present	Not Funded	£50k - £100k	Planning	No specific target emissions reduction	Car club membership	SGC are supporting the operation of a car club in Staple Hill. Expected to be operational by March 2025	

Measure No.	Measure Title	Category	Classification	Year Measure Introduced in AQAP	Estimated / Actual Completion Date	Organisations Involved	Funding Source	Funding Status	Estimated Cost of Measure	Measure Status	Reduction in Pollutant / Emission from Measure	Key Performance Indicator	Progress to Date	Comments / Barriers to Implementation
SL3	Review traffic signal numbers and operations (Staple Hill)	Traffic Management	UTC, Congestion management, traffic reduction	2012 - 13	2013/14	South Gloucestershire Council	Defra Air Quality Grant funding/ LTCP	Funded		Completed	No specific target emissions reduction	Improved traffic speeds and reduced congestion	Traffic signals reviewed and amended at the junction of A4175 Broad Street/A4017 Victoria Street in 2012. Upgrading of the traffic signals at the Pendennis Road and Acacia Road junction was completed in 2013, using Defra AQ Grant funding.	
SL4	Review of delivery bays (Staple Hill)	Freight and Delivery Management	Delivery and Service plans	2013/14	2013/14	South Gloucestershire Council	LTCP	Funded		Completed	No specific target emissions reduction	Measured by • Number of reported issues with delivery bays • Reduced congestion	This action was programmed as part of the Local Transport capital programme. The parking review completed in 2013/14 under SM4 including the review of delivery bays.	
SL5	Restrict traffic turning movements at A4017 junction (Staple Hill)	Traffic Management	UTC, Congestion management, traffic reduction	n/a		South Gloucestershire Council	Unknown at Present	Not Funded		Planning	No specific target emissions reduction	Measured by reduction in traffic volumes at A4017 junction	No progress. The measure is not proposed to be taken forward in the new Clean Air Action Plan.	
SL6	Controlled deliveries/ collections (Staple Hill)	Freight and Delivery Management	Freight Consolidation Centre	n/a		South Gloucestershire Council	Unknown at Present	Not Funded		Planning	No specific target emissions reduction	Measured by number of delivery & collection agreements made with businesses	No progress. The measure is not proposed to be taken forward in the new Clean Air Action Plan.	
SL7	Reclassify strategic routes and signing strategy (Staple Hill)	Traffic Management	Other	n/a		South Gloucestershire Council	Unknown at Present	Not Funded		Planning	No specific target emissions reduction	Measured by reduction in traffic volumes on and travelling towards A4017.	No progress. The measure is not proposed to be taken forward in the new Clean Air Action Plan.	

Note:

The top three shaded rows show the top three key Action Plan measures considered to have most effectively contributed to reducing pollution.

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

As detailed in LAQM Policy Guidance (LAQM.PG22)[57] (Chapter 8) and the Air Quality Strategy[58], 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 with an aerodynamic diameter of 2.5 micrometres (µm) or less) has a significant impact on human health, including premature mortality, allergic reactions, and cardiovascular diseases. Short term exposure is known to exacerbate the impact of pre-existing cardiovascular and respiratory health conditions, whilst long term exposure is linked to cardiovascular and respiratory disease, cancer and dementia. There is no evidence of a safe limit for $PM_{2.5}$ exposure.

The inclusion of indicators related to $PM_{2.5}$ in the Public Health Outcomes Framework (PHOF)[59] recognises the significance of this pollutant and its health impacts.

The detail of one of these indicators (formerly known as D01) changed in May 2022. It was previously described as:

> *Fraction of all cause adult mortality attributable to anthropogenic (originating from human activity) particulate air pollution (measured as fine particulate matter $PM_{2.5}$).*

This has been amended to:

> *Fraction of all cause adult mortality attributable to particulate air pollution (concentrations of total $PM_{2.5}$) (new method).*

The previous indicator was based on estimates of mortality burden from modelled annual average concentrations of $PM_{2.5}$ originating from human activities in each local authority area. Modelled concentrations of the anthropogenic component of $PM_{2.5}$ (human-made only) are no longer used because of the uncertainty associated with the assignment to anthropogenic and non-anthropogenic sources, and because non-anthropogenic sources make only a small contribution to total concentrations.

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[57] LAQM-Policy-Guidance-2022.pdf (defra.gov.uk)

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

[59] Public Health Outcomes Framework | Fingertips | Department of Health and Social Care

The amended indicator has been based on recommendations made by the Committee on the Medical Effects of Air Pollutants (COMEAP) and total concentrations of $PM_{2.5}$ are now used as the basis for this indicator. The new indicator can be viewed as the mortality burden associated with long-term exposure to particulate air pollution at current levels, expressed as the percentage of annual deaths from all causes in those aged 30 and over.

The PHOF Indicator; Fraction of mortality attributable to particulate air pollution (new method) (2023)[60] for South Gloucestershire compared to the neighbouring West of England local authorities, the South West and England values are shown in Table 2.3. Due to indicator methodology, 2023 is the most recent data release for this indicator.

Table 2.3 – PHOF Indicator – Fraction of mortality attributable to particulate air pollution (new method) (2023)

Area	Value (%)
England	5.2
South West Region	4.3
South Gloucestershire	**4.7**
Bristol	4.7
North Somerset	4.1
Bath and North East Somerset	4.4

Furthermore, the total concentration of $PM_{2.5}$ has been added as an additional PHOF indicator:

Air Pollution: fine particulate matter (new method – concentrations of total $PM_{2.5}$).

The new PHOF indicator; Concentrations of total $PM_{2.5}$ (2023)[61] for South Gloucestershire, neighbouring local authorities, the South West and England are shown in Table 2.4. The indicator is based on population-weighted annual mean concentrations ($\mu g/m^3$).

[60] Fingertips | Department of Health and Social Care

[61] Fingertips | Department of Health and Social Care

Confidence intervals are not produced for this indicator as there is no accepted way of fully quantifying the uncertainty associated with modelled concentrations of $PM_{2.5,}$ therefore, there are limitations with comparing this data to other areas.

Table 2.4 – PHOF Indicator – Concentrations of total $PM_{2.5}$ (2023)

Area	Value ($\mu g/m^3$)
England	7.0
South West Region	5.7
South Gloucestershire	**6.3**
Bristol	6.3
North Somerset	5.4
Bath and North East Somerset	5.8

Population Health Intelligence Portal

The Population Health Intelligence Portal[62] is a one-stop shop for data and intelligence on the population of South Gloucestershire. The portal forms part of the South Gloucestershire Health and Wellbeing Board's Joint Strategic Needs Assessment (JSNA). Its purpose is to use data and intelligence to provide a current and comprehensive overview of the health and wellbeing of the South Gloucestershire population, framed in the context of health inequalities and local strategies. The portal utilises data from the Public Health Outcomes Framework, including the data on fine particulate matter detailed above. This ensures that this data is drawn to the attention of those using the portal and also provides a context in which the data can be used, to support a range of work both across and outside the council.

[62] Population Health Intelligence Portal | BETA - South Gloucestershire Council (southglos.gov.uk)

South Gloucestershire Council is taking the following measures to address $PM_{2.5}$:

- The progress made in implementing measures in the existing Air Quality Action Plan, as detailed in Section 2.2, will contribute to reducing emissions and concentrations of $PM_{2.5}$ as while the measures are primarily aimed at reducing nitrogen dioxide, road traffic is also a source of particulate matter so the implementation of measures will have co-benefits.
- Alongside measures to tackle nitrogen dioxide in the draft Clean Air Action Plan, reducing emissions and concentrations of $PM_{2.5}$ has been considered. The Council understands the potential co-benefits of action plan measures on multiple pollutants of concern and has followed appropriate guidance in developing the new CAAP to include measures that are likely to be beneficial in also reducing $PM_{2.5}$ levels.
- The wider regional transport initiatives, such as the MetroWest improvements to rail services, introduction of electric buses, improvements in EV charging provision, and facilitating active travel through the provision of walking and cycling infrastructure, will contribute to reducing emissions and concentrations of $PM_{2.5}$.
- Dust Management Plans (DMPs), which are usually incorporated into Construction Environmental Management Plans (CEMPs), are routinely conditioned on major development planning permissions to control and minimise the risk of construction dust impacts, and therefore $PM_{2.5}$ emissions, on nearby receptors.
- Regular inspections of industrial processes permitted by the Council where combustion and non-combustion processes could lead to anthropogenic emissions of $PM_{2.5}$.
- In May 2021, the Air Quality (Domestic Solid Fuels Standards) (England) Regulations 2020[63] came into force. These regulations were introduced to reduce particulate emissions from the residential burning of wood and other solid fuels in domestic heating appliances. The sale of traditional house (bituminous) coal for domestic burning has been illegal since 1 May 2023[64] and the burning of unseasoned “wet” wood has been limited, through tighter controls on the supply, distribution and sale of wood. Burning wet wood can result in at least twice the amount of smoke emissions

[63] The Air Quality (Domestic Solid Fuels Standards) (England) Regulations 2020 (legislation.gov.uk)

[64] Selling coal for domestic use in England - GOV.UK

produced than when seasoned or dry wood is burned. These regulations are being enforced by the Council as appropriate.

- Some of South Gloucestershire is covered by a Smoke Control Area[65] which allows only approved fuels and appliances to be used. The Defra Smoke Control Area Interactive Map[66] can be used to check if an address is within a smoke control area. Further expansion of the South Gloucestershire smoke control area is included as an action in the draft Clean Air Action Plan to better control particulate (and NO_x) emissions from open fires and wood-burning stoves.
- Amendments to the Clean Air Act 1993 made under the Environment Act 2021 came into force from 1 May 2022 which introduced civil financial penalties as a means of enforcement in Smoke Control Areas, thereby changing the offence from a criminal to a civil penalty. Effective enforcement in Smoke Control Areas is a key element of the Government's plan to reduce particulate pollution levels and the populations exposure to it. The Council's Environmental Health team will continue to investigate smoke complaints and will issue financial penalties, as appropriate, in line with the approved charging policy of £175 for a first offence and £300 for repeat offences for breaches in our Smoke Control Areas. A communications campaign to raise awareness and inform potentially affected residents of the changes to enforcement was carried out early in 2025. Information was provided to affected Town and Parish councils to disseminate across their communications channels, on the SGC website, across SGC's social media platforms and in newsletters.
- The Council will continue to promote initiatives such as the "Ready to burn" scheme, which aims to increase peoples understanding of the right fuels and the right way to use them, and also Defra's Burn Better, Breathe Better campaign, which is aims to encourage those who use a stove or open fire to take actions that will help reduce the amount of fine particulate matter their stove or open fire emits, thereby reducing the negative impacts on health. Further information is available on the following website Burn Better, Breathe Better: Reduce the negative impact your stove or open fire can have on your health - Defra, UK.

[65] Smoke control areas | South Gloucestershire Council (southglos.gov.uk)

[66] Smoke Control Area Interactive Map

$PM_{2.5}$ Targets

While the responsibility for meeting the $PM_{2.5}$ targets sits with national government, local authorities have a role to play in delivering reductions in $PM_{2.5}$. Although there is no $PM_{2.5}$ regulatory standard for local authorities, the pre-existing annual mean limit value of 20 $\mu g/m^3$ and the exposure reduction target of 20% reduction in concentrations at urban background locations between 2010 and 2020, are a guide. The Environment Act 2021 also introduced new $PM_{2.5}$ targets through The Environmental Targets (Fine Particulate Matter) (England) Regulations 2023. These are:

- Annual mean concentration target of 10 $\mu g/m^3$ to be met by 2040 (with an interim target of 12 $\mu g/m^3$ by 2028). This is to be assessed at national Automatic Urban and Rural Network (AURN) monitoring locations.
- A population exposure reduction target of 35% by 2040, compared to 2018 (with an interim target of 22% reduction in exposure compared to 2018, by 2028). This will be assessed by national modelling.

$PM_{2.5}$ monitoring started in August 2021 at the Stoke Gifford automatic monitoring site on the A4174 Ring Road near Coldharbour Lane and the University of the West of England (UWE). This site, which also monitors NO_2, PM_{10} and Ozone (O_3), was set up as part of the Council's "Umbrella" Network for the air quality use case, to provide reference standard pollutant measurements for comparison with data from a network of low-cost indicative sensors located along the A4174 Ring Road from the Bristol and Bath Science Park at Lyde Green to the UWE Frenchay campus. Further information regarding the Umbrella Network is available on the Council website at UMBRELLA network | BETA - South Gloucestershire Council (southglos.gov.uk).

The $PM_{2.5}$ monitoring results from the Stoke Gifford A4174 automatic monitoring site are provided in Table A.8 in Appendix A and discussed in Section 3.2.3. In summary, the $PM_{2.5}$ annual mean for 2024 was 6.9 $\mu g/m^3$ which is below the pre-existing limit and new target annual means.

To provide an indication of the long-term trends, the local $PM_{2.5}$ concentrations have also been estimated from the PM_{10} concentrations measured at the Yate automatic monitoring site, using the method specified in Technical Guidance LAQM TG16 Box 7.7 for 2010 to

2020, and from 2021, the concentrations have been estimated as per LAQM.TG22[67] using national roadside factor provided for each year. The estimated $PM_{2.5}$ values are compared to the monitored $PM_{2.5}$ concentrations at the nearest AURN monitoring station (Bristol St Paul's) and the results are presented in Table A.11 in Appendix A.

The estimated $PM_{2.5}$ concentration of 5.3 µg/m^3 in 2024 for the Yate automatic monitoring site is also below the pre-existing annual mean limit and the new target annual means. The estimated $PM_{2.5}$ concentration shows a greater reduction (45%) in concentrations between 2010 and 2020 than the pre-existing 20% reduction target. A greater reduction (41.8%) in estimated concentrations between 2018 to 2024 is also shown in a shorter time period than the new interim target of 22% reduction in exposure by 2028 (compared to 2018), and the long term target of 35% reduction in exposure (compared to 2018) by 2040 is also shown to have been achieved in 2024. The population exposure reduction targets will be formally assessed through national modelling.

[67] Estimating $PM_{2.5}$ from PM_{10} Measurements | LAQM (defra.gov.uk)

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

This section sets out the monitoring undertaken within 2024 by South Gloucestershire Council and how it compares with the relevant air quality objectives. In addition, monitoring results are presented for a five-year period between 2020 and 2024 to allow monitoring trends to be identified and discussed.

3.1 Summary of Monitoring Undertaken

3.1.1 Automatic Monitoring Sites

South Gloucestershire Council undertook automatic (continuous) monitoring at the following three sites during 2024 with the pollutant(s) monitored shown in brackets:

- Yate – Station Road (NO_2 and PM_{10})
- Stoke Gifford – A4174 Ring Road near Coldharbour Lane and the University of West England (NO_2, PM_{10}, $PM_{2.5}$ and Ozone (O_3))
- Hambrook – A4174 Ring Road near Old Gloucester Road (NO_2).

Table A.1 in Appendix A shows the details of the automatic monitoring sites. The website Air Quality in the United Kingdom (ukairquality.net) presents the automatic monitoring results for South Gloucestershire Council. The automatic monitoring results are also available through the UK-Air website[68], along with national network monitoring results and other local authority automatic monitoring results.

Maps showing the location of the monitoring sites are provided in Appendix D. Further details on how the monitors are calibrated and how the data has been adjusted are included in Appendix C.

[68] Home - Defra, UK-AIR

3.1.2 Non-Automatic Monitoring Sites

South Gloucestershire Council undertook non- automatic (i.e. passive) monitoring of NO_2 at 101 sites during 2024. Table A.2 in Appendix A presents the details of the non-automatic sites.

Triplicate monitoring (using three diffusion tubes) was undertaken at the three automatic monitoring sites in Yate (Site 4A, B & C), Stoke Gifford (192A, B & C) and at Hambrook (191A, B & C) for the co-location studies during 2024.

Triplicate diffusion tube monitoring continued in 2024 at site 146 in Kingswood - 34 Hill Street to provide additional robust monitoring at this site in light of the possible future revocation of the Kingswood – Warmley AQMA, as site 146 had previously been the single exceeding LAQM site in South Gloucestershire prior to the Covid-19 pandemic in 2018 and 2019.

Two new single tube sites were set up part-way through 2024 in:

- Little Stoke – Gipsy Patch Lane (site 203). This site was set up on nearby street furniture to replace site 136 at façade in the same location which could no longer continue due to building work at the property.
- Cribbs Causeway – Passage Road (site 204). This site was set up due to concerns regarding increased traffic pollution from new large-scale development in the vicinity.

One site (site 136) ceased operation in 2024 as explained above, however the annualised result for this site is presented in this report.

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.

The results of the Ozone monitoring at the Stoke Gifford A4174 Ring Road automatic monitoring site are reported separately in Appendix F as the Ozone objective is not included in the local air quality management regime due to the transboundary nature of this pollutant.

3.2.1 Nitrogen Dioxide (NO_2)

Table A.3 and Table A.4 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).

Automatic Monitoring Data

The NO_2 measurements are made using chemiluminescence analysers. The automatic monitoring results at the Yate, Stoke Gifford A4174 and Hambrook A4174 sites show the NO_2 concentrations were below the annual mean objective of 40 µg/m^3 in 2024 (Table A.3).

At Yate, the 2024 annual mean of 11.5 µg/m^3 was well below the objective and shows a 7% decrease from the 2023 annual mean of 12.4 µg/m^3. It also shows a 39% decrease from the pre-pandemic 2019 annual mean of 19 µg/m^3. This is similar to the trends observed across the national automatic urban and rural monitoring network (AURN) roadside sites where the average 2024 NO_2 annual mean concentration decreased by 6% from 2023 levels and was 34% lower than 2019 levels[69].

At the A4174 Ring Road automatic monitoring sites, the 2024 NO_2 annual mean at the Stoke Gifford site near Coldharbour Lane was 16.8 µg/m^3, which is a 6% decrease from the 2023 annual mean of 17.9 µg/m^3. At the Hambrook site, the annual mean was 20.2 µg/m^3, which shows a 10% reduction from the 2023 annual mean of 22.5 µg/m^3. The higher concentrations at these sites compared to Yate is due to the much higher traffic volumes on the A4174 Ring Road. Both these sites also show a similar trend in

[69] Nitrogen dioxide (NO_2) - GOV.UK (www.gov.uk)

decreasing annual mean concentrations from 2023 to 2024 to that observed across the AURN roadside sites.

The trends in the annual mean NO_2 concentrations at the automatic monitoring sites are presented in Figure A.1 (Appendix A). The long-term trend data for Yate shows an overall continuing decline in annual mean NO_2 concentrations since 2014 when the annual mean concentration was 24 µg/m^3, and a 52% reduction in NO_2 levels during this period.

Table A.5 in Appendix A compares the ratified continuous monitored NO_2 hourly mean concentrations for the past five years with the air quality objective of 200 µg/m^3, not to be exceeded more than 18 times per year.

In 2024, the maximum 1-hour mean at Yate was 87.6 µg/m^3 so the 1-hour mean objective was not exceeded. At the Stoke Gifford A4174 Ring Road site, the maximum 1-hour mean was 92.0 µg/m^3 and at the Hambrook A4174 site, the maximum 1-hour mean was 89.9 µg/m^3 so there were no exceedances of the 1-hour mean objective at either Ring Road site.

Non-Automatic (Diffusion tube) Monitoring Data

The NO_2 annual mean concentrations from the diffusion tube monitoring sites are provided in Table A.4 in Appendix A. The reported data has been bias adjusted and annualised.

The full 2024 dataset of monthly mean values for the diffusion tubes is provided in Appendix B. Note that the concentration data presented in Table B.1 includes distance corrected values, only where relevant.

Discussion of 2024 Diffusion Tube Monitoring Data

In 2024, there were no exceedences of the annual mean NO_2 objective (40 µg/m^3) at the diffusion tube monitoring sites in South Gloucestershire, including in the AQMAs. This has been the case since the Covid-19 pandemic in 2020.

In comparison, prior to 2020, there was an exceedance measured at one LAQM monitoring site in South Gloucestershire in both 2019 (42.3 µg/m^3) and 2018 (40.8 µg/m^3). The single exceeding site was located in the Kingswood – Warmley AQMA at site 146 Kingswood - 34 Hill Street and is at a façade with relevant residential exposure.

In the Staple Hill AQMA, the last exceedance was monitored at one site in 2017. However, relevant exposure was set back from the exceeding site (site 75) and the result at façade when adjusted for distance, was below the objective. A new site at façade (site 164) set up in 2017, which represented relevant exposure better than site 75, showed no exceedance.

These two sites ran concurrently until monitoring ceased at site 75 at the end of 2019 when site 164 effectively replaced it.

In the former Cribbs Causeway AQMA, the monitored concentration (15.8 µg/m^3) at the façade of the single residential property was well below the annual mean objective in 2024, demonstrating sustained compliance and justifying the revocation of the AQMA in July 2020.

As there were no exceedences of the annual mean objective of 40 µg/m^3 in 2024 at the LAQM diffusion tube monitoring sites, consequently there were no annual means greater than 60 µg/m^3, which indicates compliance with the 1-hour mean objective.

There were also no borderline exceedances (i.e. within 10% of the objective at 36 µg/m^3 or above) at any of the diffusion tube monitoring sites in 2024, including in either of the AQMAs.

In 2024, the highest annual mean NO_2 concentration measured at a South Gloucestershire LAQM diffusion tube site was 30.2 µg/m^3 at site 188 Patchway - 43 Gloucester Road near Hayes Way. This site is located in the north Bristol fringe and is outside the AQMAs.

Site 188 was previously the only borderline LAQM site in 2021 (38.8 µg/m^3) and 2022 (38.7 µg/m^3) but the annual mean NO_2 concentration decreased quite significantly to 30.1 µg/m^3 in 2023, although it remained the highest annual mean concentration monitored at an LAQM diffusion tube site in the district. However, as the façades of the nearest residential properties are set back further from the road at this site, the NO_2 concentrations would be lower following distance adjustment at the façades where there is relevant exposure.

Nevertheless, while the 2024 annual mean NO_2 concentration remained almost the same as in 2023, the site will continue to be closely observed, particularly as it is close to a major new development within the Cribbs Patchway new neighbourhood.

Trends in Annual Mean NO_2 Concentrations at Diffusion Tube Monitoring Sites

In 2024, the annual mean NO_2 concentrations across the LAQM diffusion tube monitoring sites were lower than in 2023 by an average of 1.8%. This is a smaller reduction than the trend observed across the national automatic urban and rural monitoring network (AURN) roadside sites where the average 2024 NO_2 annual mean concentration decreased by 6% from 2023 levels. The annual mean concentrations were slightly higher in 2024 than 2023 at 33% of the monitoring sites but at the majority (65%) of the sites, the annual means

were lower than in 2023. The annual mean concentrations remained the same at two sites.

There has been an overall downward trend since 2019, where the average annual mean NO_2 concentration across the long-term LAQM diffusion tube monitoring sites has reduced by 35%. This compares well to the 34% reduction observed across the AURN roadside sites from 2019[70].

The overall reducing trend in NO_2 concentrations since 2019 is likely to be due to the combination of the Covid-19 pandemic restrictions initially and ongoing change in travel behaviour since, along with a cleaner vehicle fleet as newer, cleaner vehicles, including electric vehicles, replace older, more polluting vehicles. The introduction of the Bristol Clean Air Zone in November 2022 may have also had an impact on NO_2 concentrations in South Gloucestershire due to the volume of commuter traffic between Bristol and South Gloucestershire. Pollutant concentrations can also vary from one year to the next due to the influence of meteorological conditions.

In the Kingswood – Warmley AQMA, the annual mean NO_2 concentrations decreased by an average of 0.7% from 2023 to 2024 at the monitoring sites in the AQMA so remained fairly stable on average. The 2024 annual mean concentrations at 9 of the 22 monitoring sites in the AQMA slightly increased from 2023 but decreased at the other 13 monitoring sites. However, the overall long-term trend is downward and from 2019 to 2024, the annual mean concentrations have reduced by an average of 37% in the AQMA.

Until 2020, site 146 on Hill Street in the Kingswood – Warmley AQMA had consistently exceeded the annual mean objective since 2014, and it remained as the only exceeding LAQM site in South Gloucestershire in 2018 and 2019. The pre-pandemic exceedances were likely due to the property façade being very close to the road (approximately 1.6m from the kerb) and that it is on an uphill section of the A420 main road, so vehicles have to work harder to travel up the hill and produce more emissions. In 2024, the highest annual mean concentration in the AQMA was monitored at this site (25.3 $\mu g/m^3$), but this shows a 5% decrease from the 2023 annual mean of 26.7 $\mu g/m^3$. In comparison to 2019 when site 146 last exceeded the objective with an annual mean concentration of 42.3 $\mu g/m^3$, there has been an overall decrease of 40% in NO_2 concentrations at this site.

[70] Nitrogen dioxide (NO_2) - GOV.UK (www.gov.uk)

While the Kingswood – Warmley AQMA has been compliant with both the annual mean objective and borderline level for 5 years (2020 – 2024 inclusive), there are currently no plans to consider the revocation of this AQMA as there are major development proposals which could affect the area. The future status of the Kingswood – Warmley AQMA will be reviewed in subsequent annual status reports.

In the Staple Hill AQMA, the average annual mean NO_2 concentrations across the monitoring sites in the AQMA showed no change and remained stable from 2023 to 2024. The 2024 annual mean concentrations at 6 of the 15 monitoring sites in the AQMA slightly increased from 2023 levels, but decreased at 8 of the other sites, and remained the same at one site. However, the overall long-term trend has been downward and from 2019 to 2024, the annual mean concentrations have reduced by an average of 34% in the AQMA.

The 2024 concentrations were well below the borderline level of 36 $\mu g/m^3$ at all the monitoring sites in the AQMA, with the highest concentration (26.1 $\mu g/m^3$) monitored at site 61 – 1 Broad Street. However, as this site is not at façade, adjusting for distance reduces this to 24.8 $\mu g/m^3$ at façade. This shows a marginal decrease from the 2023 annual mean of 26.2 $\mu g/m^3$ and distance adjusted result of 25 $\mu g/m^3$ at façade for this site. The highest monitored concentration at façade was 23.8 $\mu g/m^3$ at site 165 – 3 Soundwell Road.

The Staple Hill AQMA has been compliant with the annual mean objective for 7 years (2018 – 2024) and borderline level for 5 years (2020 – 2024). As discussed previously in Section 2.1, having considered the relevant guidance and also as recommended in the Defra appraisal of SGC's 2024 Air Quality Annual Status Report, it is proposed to revoke the Staple Hill AQMA. Further information to support the proposed revocation of the Staple Hill AQMA is provided in Appendix G.

The trends in annual mean nitrogen dioxide concentrations measured at the diffusion tube monitoring sites in both the Kingswood - Warmley and Staple Hill Air Quality Management Areas are shown in graphs in Appendix A. Aside from the significant decreases in concentrations in 2020 due to Covid-19 pandemic impacts, an overall downward trend can be seen in nitrogen dioxide concentrations in both AQMAs over the past decade. For ease of reference, the diffusion tube monitoring results for the Kingswood – Warmley and Staple Hill AQMAs can be found in Table A.9 and Table A.10 respectively in Appendix A.

3.2.2 Particulate Matter (PM_{10})

The PM_{10} measurements are made using BAM 1020 particulate monitors and the monitoring data has been adjusted to gravimetric equivalent, using the appropriate factor depending on instrument type, and annualised where relevant (see Appendix C).

Table A.6 in Appendix A: Monitoring Results compares the ratified and adjusted monitored PM_{10} annual mean concentrations for the past five years with the air quality objective of 40µg/m^3. In 2024, the PM_{10} concentrations measured at the Yate and Stoke Gifford A4174 automatic sites were below the annual mean objective.

The 2024 PM_{10} annual mean at the Yate site was 11.3 µg/m^3, which is a 7.5% decrease from the 2023 annual mean of 12.3 µg/m^3. Concentrations at this site since 2020 have remained below the pre-pandemic annual mean of 13 µg/m^3 in 2019. This is similar to the trend in annual mean PM_{10} concentrations observed at the national AURN roadside sites[71], which have remained below pre-2020 levels and generally continued to fall.

The trends in the annual mean PM_{10} concentrations at the automatic monitoring sites are presented in Figure A.2 (Appendix A: Monitoring Results). The long-term trend data for Yate shows an overall gradual decline in annual mean PM_{10} concentrations since 2014, when the annual mean concentration was 15 µg/m^3, and a 25% reduction in PM_{10} levels during this period.

At the Stoke Gifford A4174 site, the annual PM_{10} mean for 2024 was 16.9 µg/m^3, which is a 5.6% decrease from the 2023 annual mean of 17.9 µg/m^3. The annual mean concentrations at this site have continued to fall since 2022, showing a similar trend to that observed across the AURN roadside sites. The higher concentrations at this site than those monitored at Yate is likely to be due to the much greater volume of traffic on the A4174 Ring Road and the relative proximity of the M32 and M4 motorways.

Table A.7 in Appendix A compares the ratified continuous monitored PM_{10} daily mean concentrations for the past five years with the air quality objective of 50µg/m^3, not to be exceeded more than 35 times per year.

In 2024, at Yate, the maximum 24-hour mean was 32.5 µg/m^3 so the daily limit was not exceeded. At the Stoke Gifford A4174 site, the maximum 24-hour mean was 70.9 µg/m^3

[71] Particulate matter (PM_{10}/$PM_{2.5}$) - GOV.UK (www.gov.uk)

and there were 6 exceedances of the 24-hour daily mean. However there is an allowance of 35 days, so the objective was not exceeded.

3.2.3 Particulate Matter ($PM_{2.5}$)

South Gloucestershire Council started monitoring $PM_{2.5}$ from August 2021 at the Stoke Gifford A4174 Ring Road automatic monitoring site near Coldharbour Lane and the University of the West of England. The $PM_{2.5}$ measurements are made using a smart heated Beta Attenuation Monitor (BAM 1020) particulate monitor and do not require correction.

Table A.8 in Appendix A presents the ratified and adjusted monitored $PM_{2.5}$ annual mean concentrations for the past four years from the Stoke Gifford automatic monitoring site.

The $PM_{2.5}$ annual mean for 2024 was 6.9 µg/m^3 which is a 9.2% decrease from the 2023 annual mean of 7.6 µg/m^3. This is below the pre-existing annual mean limit of 20 µg/m^3 and the new annual mean concentration target of 10 µg/m^3 to be met by 2040 (and the interim target of 12 µg/m^3 by 2028) introduced by The Environmental Targets (Fine Particulate Matter) (England) Regulations 2023.

While these targets are not set as an LAQM standard because the responsibility for meeting $PM_{2.5}$ targets sits with national government, local authorities have a role to play in delivering reductions in $PM_{2.5}$ as discussed previously in Section 2.3.

The $PM_{2.5}$ concentrations have also been estimated from the PM_{10} concentrations measured at the Yate automatic monitoring site to provide an indication of local long-term trends in Section 2.3.

Appendix A: Monitoring Results

Table A.1 – Details of Automatic Monitoring Sites

Site ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA?	Which AQMA? (1)	Monitoring Technique	Distance to Relevant Exposure (m) (2)	Distance to kerb of nearest road (m) (1)	Inlet Height (m)
SG1	Yate Station Road	Roadside	370418	182525	NO_2 PM_{10}	No	N/A	Chemiluminescent Gravimetric (BAM 1020 Unheated)	N/A	6.0	1.6 1.8
SG2	Stoke Gifford A4174 Coldharbour Lane	Roadside	362384	178562	NO_2 PM_{10} $PM_{2.5}$ O_3	No	N/A	Chemiluminescent Gravimetric (BAM 1020 Smart Heated) Gravimetric (BAM 1020 Smart Heated) Absorption	N/A	10.2	2.7 2.9 2.9 2.7
SG3	Hambrook A4174 Old Gloucester Road	Roadside	363772	178501	NO_2	No	N/A	Chemiluminescent	N/A	6.3	1.5

Notes:

(1) N/A if not applicable

(2) 0m if the monitoring site is at a location of exposure (e.g. installed on the façade of a residential property)

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) (1)	Distance to kerb of nearest road (m) (2)	Tube Co-located with a Continuous Analyser?	Tube Height (m)
1	Yate - 88 Station Road The Candle	Roadside	370692	182499	NO_2	No	4.6	2.5	No	2.7
4A, 4B, 4C	Yate - Station Road Co-location	Roadside	370418	182525	NO_2	No		6.0	Yes	2.4
10	Filton - 152 Gloucester Road North Pizza Bello façade	Roadside	360266	179136	NO_2	No	0.0	3.5	No	2.3
11	Thornbury - 48 High Street	Kerbside	363654	189893	NO_2	No	2.8	0.6	No	2.5
12	Stoke Gifford - Church Road rear of Aviva	Roadside	362161	179570	NO_2	No		1.0	No	2.5
13	Filton - A4174 MOD roundabout	Roadside	361523	178732	NO_2	No		1.0	No	2.3
21	Downend - Boscombe Crescent St Augustine's Church	Urban Background	365673	177475	NO_2	No		1.5	No	2.5
27	Kingswood - 90 Regent Street Nat West	Roadside	364866	173835	NO_2	Yes (Kingswood - Warmley)	0.0	2.0	No	2.8
29	Staple Hill - 123 High Street Backhouse Bet	Roadside	364822	175932	NO_2	Yes (Staple Hill)	2.0	1.0	No	2.7
34	Bradley Stoke - 109 Ormonds Close (M4 East of Almondsbury Interchange)	Roadside	362395	182544	NO_2	No	11.0	24.8 (M4 33)	No	2.5
35	Bradley Stoke - Woodlands Lane (M4 East of Almondsbury Interchange)	Roadside	362118	183031	NO_2	No	9.8	3.3 (M4 22.5)	No	2.5

Diffusion Tube ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA? Which AQMA?	Distance to Relevant Exposure (m) [1]	Distance to kerb of nearest road (m) [2]	Tube Co-located with a Continuous Analyser?	Tube Height (m)
37	Almondsbury - Old Aust Road (M4 West of Almondsbury Interchange)	Roadside	361147	184846	NO_2	No		7 (M4)	No	2.3
38	Severn Beach - Ableton Lane Severn Beach Primary School façade	Urban Background	354282	184653	NO_2	No	0.0	49.0	No	2.3
44	Stoke Gifford - Hatchet Road	Roadside	362061	180025	NO_2	No	14.0	4.0	No	2.5
46	Winterbourne - High Street opp Winterbourne Academy	Roadside	364852	180758	NO_2	No	16.5	1.3	No	2.6
53	Hambrook - Bristol Road rear of 17 Fenbrook Close	Roadside	363907	178389	NO_2	No	16.0	6.5	No	1.9
54	Longwell Green - A431/Aldermoor Way	Roadside	365256	171656	NO_2	No		1.5	No	2.7
57	Coalpit Heath - 225 Badminton Road GT Plumbing & Heating	Roadside	367742	181160	NO_2	No	12.0	2.0	No	2.5
61	Staple Hill - 1 Broad Street William Hill	Roadside	364926	175926	NO_2	Yes (Staple Hill)	1.0	2.3	No	2.4
62	Staple Hill - 2 Broad Street 501 Bar	Roadside	364909	175908	NO_2	Yes (Staple Hill)	0.0	1.5	No	2.5
63	Patchway - 28 Park Leaze	Roadside	359487	182479	NO_2	No	8.0	1.5	No	2.5
67	Kingswood - 40 Regent Street former Hays Travel	Roadside	364671	173877	NO_2	Yes (Kingswood - Warmley)	0.0	2.5	No	2.8
68	Kingswood - 26-32 Regent Street Kelebek Furniture	Roadside	364631	173886	NO_2	Yes (Kingswood - Warmley)	0.0	2.5	No	2.5

Diffusion Tube ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA? Which AQMA?	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Tube Co-located with a Continuous Analyser?	Tube Height (m)
69	Kingswood - 12 Regent Street Domino's Pizza	Roadside	364597	173892	NO_2	Yes (Kingswood - Warmley)	0.0	2.5	No	2.6
70	Kingswood - Two Mile Hill Road Job Centre Plus	Roadside	364533	173896	NO_2	Yes (Kingswood - Warmley)	0.0	2.5	No	2.5
71	Staple Hill - 11 The Square Bunch Florist	Roadside	365075	175918	NO_2	Yes (Staple Hill)	0.5	6.5	No	2.6
72	Staple Hill - 25 Broad Street Prime Vapes	Roadside	364990	175920	NO_2	Yes (Staple Hill)	6.5	1.5	No	2.7
74	Staple Hill - 29-31 Soundwell Rd opp Page Comm Assoc	Kerbside	364885	175772	NO_2	Yes (Staple Hill)	4.0	0.4	No	2.5
76	Staple Hill - 84-86 High Street Staple Hill Oak Pub	Roadside	364722	175926	NO_2	Yes (Staple Hill)	0.0	2.0	No	2.6
83	Chipping Sodbury - 51A Broad Street façade	Roadside	372791	182241	NO_2	No	0.0	4.7	No	2.2
87	Cribbs Causeway - Blackhorse Hill Hollywood Cottage façade	Roadside	357739	181334	NO_2	No	0.0	13.0	No	1.7
92	Kingswood - Regent Street Entertainment & Sports Club	Roadside	364968	173836	NO_2	Yes (Kingswood - Warmley)	0.0	2.0	No	2.4
93	Kingswood - Hanham Road Exchange Court Flats	Roadside	364979	173801	NO_2	Yes (Kingswood - Warmley)	0.0	2.0	No	2.4
95	Kingswood - 45 High Street Adam Lee	Roadside	365078	173846	NO_2	Yes (Kingswood - Warmley)	0.0	2.7	No	2.7

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)
105	Staple Hill - 2 North Street	Roadside	364932	176147	NO_2	Yes (Staple Hill)	2.5	2.0	No	2.7
113	Patchway - 5 Falcon Close façade	Roadside	359112	181909	NO_2	No	0.0	7.5 (M5 45)	No	1.9
114	Pilning - 23 Keens Grove façade	Roadside	355263	185351	NO_2	No	0.0	7.0	No	2.3
115	Pilning - 2 Wick Road façade	Roadside	355212	185360	NO_2	No	0.0	8.5	No	2.3
117	Filton Northville - 29 Gloucester Rd Nth Rowe Vets	Roadside	359874	178259	NO_2	No	2.5	2.9	No	2.5
119	Filton - 137 Gloucester Rd Nth	Roadside	360263	179250	NO_2	No	0.5	3.6	No	2.5
122	Filton - 549 Filton Avenue	Roadside	360566	178229	NO_2	No	4.5	4.0	No	2.1
124	Filton - 702a Filton Ave Way Ahead	Roadside	360918	178905	NO_2	No	6.6	1.9	No	2.3
125	Filton - 71 Station Rd	Roadside	360891	179005	NO_2	No	5.4	0.5 (A4174 9.3)	No	2.4
128	Kingswood - 109 Downend Road	Roadside	364587	174431	NO_2	No	1.6	1.4	No	2.6
129	Cribbs Causeway – 1 Holly Cottages façade	Roadside	357508	181059	NO_2	No	0.0	18 (M5 44)	No	2.1
132	Hanham - 66 High St Sassy Hair Studio	Roadside	364178	172337	NO_2	No	0.6	2.7	No	2.5
133	Hambrook - 123 Old Gloucester Road façade	Roadside	363736	178507	NO_2	No	0.0	10.4 (A4174)	No	2.0

Diffusion Tube ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA? Which AQMA?	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Tube Co-located with a Continuous Analyser?	Tube Height (m)
134	Hambrook - Bristol Rd Old Bakery façade	Roadside	364048	178719	NO_2	No	0.0	2.2	No	1.9
135	Frenchay - Harford Drive Dyrham Flats	Roadside	364029	178413	NO_2	No	12.7	24.5 (A4174)	No	2.3
136	Little Stoke - 26 Gipsy Lane façade	Roadside	361242	180544	NO_2	No	0.0	12.0	No	2.8
137	Warmley - 35 High Street	Roadside	366984	173563	NO_2	Yes (Kingswood - Warmley)	0.0	1.9	No	2.5
138	Warmley - 18 High Street façade	Roadside	366941	173558	NO_2	Yes (Kingswood - Warmley)	0.0	2.0	No	2.4
139	Warmley - 14 High Street (former Webbs) façade	Roadside	366890	173560	NO_2	Yes (Kingswood - Warmley)	0.0	2.3	No	2.6
141	Warmley - 41 Deanery Road façade	Roadside	366705	173581	NO_2	Yes (Kingswood - Warmley)	0.0	7.7	No	2.7
142	Warmley - 33 Deanery Road Warmley Court façade	Roadside	366613	173597	NO_2	Yes (Kingswood - Warmley)	0.0	8.9 (A4174 18.2)	No	2.1
143	Warmley - 1 High Street Ideal Pharmacy façade	Roadside	366815	173574	NO_2	Yes (Kingswood - Warmley)	0.0	5.0	No	2.5
146A, 146B, 146C	Kingswood - 34 Hill St façade	Roadside	365910	173680	NO_2	Yes (Kingswood - Warmley)	0.0	1.6	No	2.2
147	Soundwell - 264 Soundwell Rd façade	Roadside	364586	174496	NO_2	No	0.0	2.6	No	2.3
148	Filton - 109 Gloucester Road North façade	Roadside	360077	178900	NO_2	No	0.0	10.2	No	1.9

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)
149	Filton - 707 Southmead Road façade	Roadside	360050	179021	NO_2	No	0.0	9.8	No	1.8
150	Soundwell - 296 Soundwell Road façade	Roadside	364528	174425	NO_2	No	0.0	4.3	No	1.7
151	Hambrook - Bristol Road Old Bakery FP Signpost	Roadside	364049	178726	NO_2	No	0.0	1.2	No	2.3
152	Bradley Stoke - 188 Oaktree Crescent	Roadside	360945	182831	NO_2	No	0.3	9.0	No	2.3
154	Bradley Stoke - 166 Ellan Hay Road façade	Roadside	363242	180724	NO_2	No	0.0	9.7	No	1.8
157	Hambrook - Bristol Road Poplars House Garage façade	Roadside	363999	178505	NO_2	No	14.5	20.2 (A4174 25.1)	No	1.9
158	Downend - 5 Wick Wick Close façade	Roadside	366157	178557	NO_2	No	0.0	20.2 (A4174)	No	2.1
159	Wickwar - 21 High Street façade	Roadside	372395	188581	NO_2	No	0.0	2.5	No	2.3
160	Staple Hill - 62 High Street	Roadside	364655	175931	NO_2	Yes (Staple Hill)	0.4	1.6	No	2.9
161	Staple Hill - 13 Victoria Street façade	Roadside	364906	176022	NO_2	Yes (Staple Hill)	0.0	4.4	No	2.0
162	Staple Hill - 28 Victoria Street façade	Roadside	364925	176062	NO_2	Yes (Staple Hill)	0.0	4.8	No	1.9
163	Staple Hill - 2 Victoria Street façade	Roadside	364918	175979	NO_2	Yes (Staple Hill)	0.0	4.8	No	1.9
164	Staple Hill - 102 High Street Jay Jays Hair façade	Roadside	364811	175919	NO_2	Yes (Staple Hill)	0.0	3.5	No	2.1

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)
165	Staple Hill - 3 Soundwell Rd Chinese Kitchen façade	Roadside	364906	175864	NO_2	Yes (Staple Hill)	0.0	1.5	No	2.5
166	Kingswood - 12 Cecil Road	Roadside	364770	173695	NO_2	No	2.1	1.5	No	2.6
167	Kingswood - 7 Downend Road	Roadside	364652	173957	NO_2	No	2.9	2.3	No	2.4
168	Kingswood - 133 High Street façade	Roadside	365366	173805	NO_2	Yes (Kingswood - Warmley)	0.0	3.1	No	2.4
169	Warmley - 20 Deanery Road Warmley Community Centre façade	Roadside	366714	173560	NO_2	Yes (Kingswood - Warmley)	0.0	4.2	No	2.4
170	Patchway - 204 Gloucester Road front façade	Roadside	360606	181675	NO_2	No	0.0	10.5	No	2.3
172	Downend - 31 Badminton Road Jojo Aesthetics façade	Roadside	365153	176812	NO_2	No	0.0	5.4	No	2.2
173	Mangotsfield - 10 Cossham Street façade	Roadside	366459	176139	NO_2	No	0.0	2.4	No	2.3
174	Charfield - 25 Wotton Road façade	Roadside	372011	192189	NO_2	No	0.0	4.7	No	2.4
180	Wick - 70 High Street The Old Post Office façade	Roadside	370605	172681	NO_2	No	0.0	1.6	No	2.3
181	Warmley - 16 London Road façade	Roadside	367298	173452	NO_2	Yes (Kingswood - Warmley)	0.0	1.7	No	2.1
185	Staple Hill - High Street Pendennis Park Flats	Roadside	364634	175946	NO_2	Yes (Staple Hill)	1.4	4.0	No	2.4

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)
187	Thornbury - Rock Street Grace Lodge	Roadside	363785	189856	NO_2	No	2.5	1.4	No	2.5
188	Patchway - 43 Gloucester Road nr Hayes Way	Roadside	360450	181066	NO_2	No	2.3	3.6	No	2.8
189	Kingswood - 2 Hill St Premier Store	Roadside	365668	173738	NO_2	Yes (Kingswood - Warmley)	0.0	2.6	No	2.3
191A, 191B, 191C	Hambrook - A4174 Old Gloucester Road Co-location	Roadside	363773	178500	NO_2	No		6.7	Yes	2.1
192A, 192B, 192C	Stoke Gifford - A4174 Coldharbour Lane Co-location	Roadside	362384	178562	NO_2	No		10.2	Yes	2.6
193	Kingswood - 285 New Cheltenham Road	Roadside	365981	174370	NO_2	No	0.0	2.1	No	2.8
194	Kingswood - Kimberley Road nr Downend Rd Junction	Kerbside	364655	174020	NO_2	No	5.0	0.7	No	2.8
195	Kingswood - 7 Gilbert Road	Roadside	364874	174009	NO_2	No	2.0	1.6	No	2.8
196	Kingswood - 23 Hanham Road	Roadside	364991	173592	NO_2	No	3.4	1.5	No	2.8
197	Kingswood - 26 Moravian Road	Kerbside	364813	173730	NO_2	No	2.6	0.4	No	2.8
198	Kingswood - 17A Cecil Road nr Blackhorse Rd junction	Roadside	364538	173666	NO_2	No	0.0	2.1	No	2.8
199	Kingswood - Blackhorse Road Flat 6 Sunday House	Roadside	364510	173746	NO_2	No	0.0	1.2	No	2.8

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)
200	Kingswood - 3 Regent Street Zahringer Jewellers	Roadside	364583	173906	NO_2	Yes (Kingswood - Warmley)	2.4	2.2	No	2.4
201	Kingswood - 25 Regent Street Beauty Line façade	Roadside	364645	173895	NO_2	Yes (Kingswood - Warmley)	0.0	2.3	No	2.4
202	Kingswood - 123 Regent Street Cut & Run Barbers	Roadside	364952	173851	NO_2	Yes (Kingswood - Warmley)	0.0	3.4	No	2.4
203	Little Stoke - 26 Gipsy Lane	Roadside	361240	180548	NO_2	No	1.5	3.1	No	2.6
204	Cribbs Causeway - 334 Passage Road façade	Roadside	357036	180268	NO_2	No	0.0	22.5 (A4018)	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.

(3) Co-ordinates for sites 128, 147, 150, 194 and 195 are in South Gloucestershire – these sites are near the SGC/Bristol CC boundary.

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

Site ID	Site Name	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2024 (%) (2)	2020	2021	2022	2023	2024
SG1	Yate Station Road	370418	182525	Roadside	98.5	98.5	14	15	13	12.4	11.5
SG2	Stoke Gifford A4174 Coldharbour Lane	362384	178562	Roadside	99.3	99.3		21.4	21	17.9	16.8
SG3	Hambrook A4174 Old Gloucester Road	363772	178501	Roadside	99.4	99.4			29.6	22.5	20.2

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

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

☒ **Where exceedances of the NO_2 annual mean objective occur at locations not representative of relevant exposure, the fall-off with distance concentration has been calculated and reported concentration provided in brackets for 2024.**

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**.

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 at Automatic Monitoring Sites

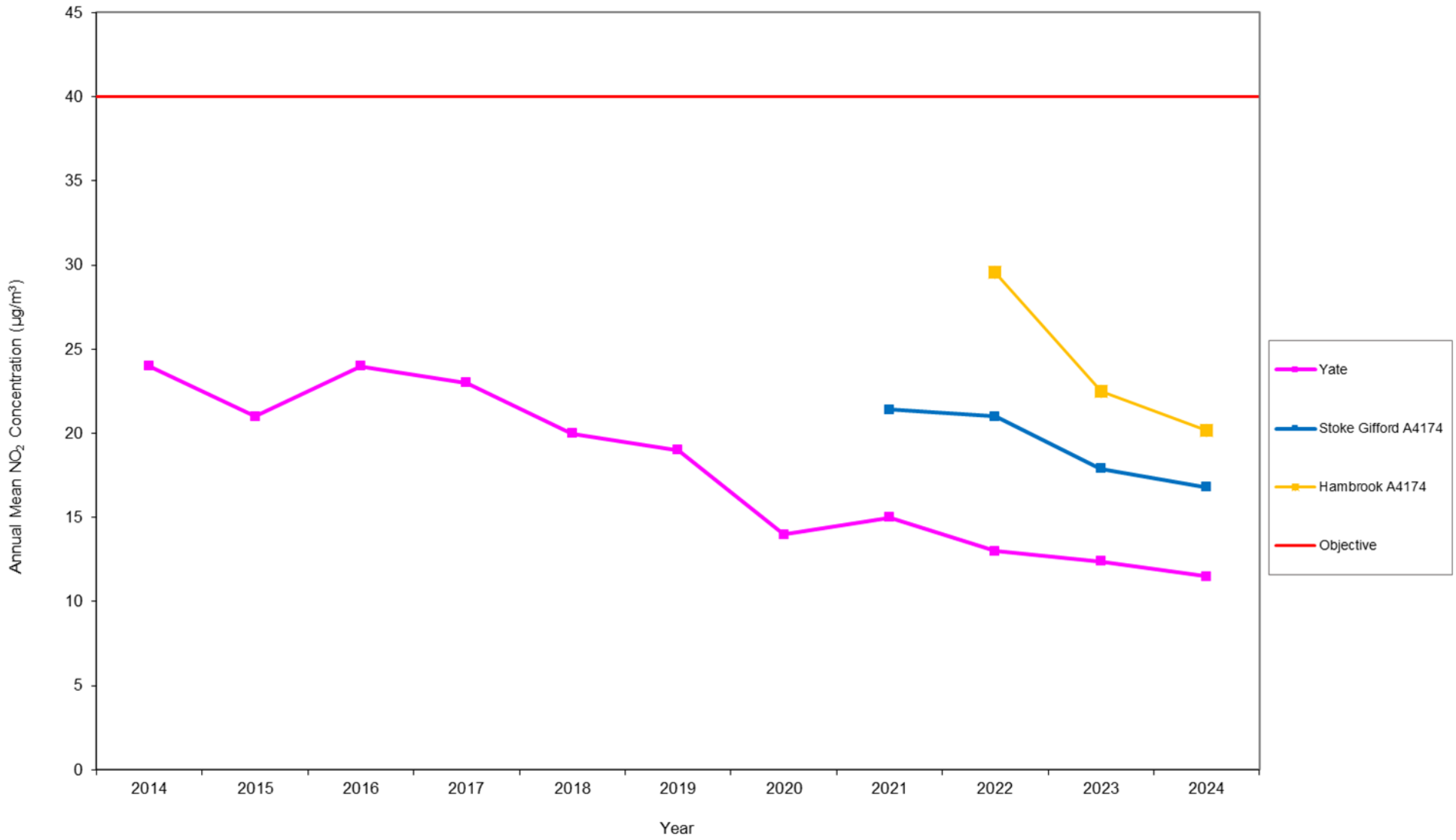


Table A.4 – Annual Mean NO_2 Monitoring Results: Non-Automatic Monitoring (µg/m^3)

Diffusion Tube ID	Site Name	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) [1]	Valid Data Capture 2024 (%) [2]	2020	2021	2022	2023	2024
1	Yate - 88 Station Road The Candle	370692	182499	Roadside	100.0	100.0	22.7	23.9	23.6	20.3	17.5
4A, 4B, 4C	Yate - Station Road Co-location	370418	182525	Roadside	100.0	100.0	15.9	16.8	17.0	14.1	13.6
10	Filton - 152 Gloucester Road North Pizza Bello façade	360266	179136	Roadside	100.0	100.0	30.0	28.0	27.7	21.8	21.0
11	Thornbury - 48 High Street	363654	189893	Kerbside	84.9	84.9	14.7	13.3	13.0	10.8	10.4
12	Stoke Gifford - Church Road rear of Aviva	362161	179570	Roadside	100.0	100.0	19.3	19.9	20.6	17.2	17.6
13	Filton - A4174 MOD roundabout	361523	178732	Roadside	100.0	100.0	25.2	27.4	27.4	21.2	20.4
21	Downend - Boscombe Crescent St Augustine's Church	365673	177475	Urban Background	83.0	83.0	11.6	12.4	13.4	9.2	9.4
27	Kingswood - 90 Regent Street Nat West	364866	173835	Roadside	100.0	100.0	19.7	20.7	20.3	17.1	18.0
29	Staple Hill - 123 High Street Backhouse Bet	364822	175932	Roadside	100.0	100.0	20.8	23.4	24.8	19.3	20.3
34	Bradley Stoke - 109 Ormonds Close (M4 East of Almondsbury Interchange)	362395	182544	Roadside	100.0	100.0	19.2	20.2	20.8	15.9	14.4
35	Bradley Stoke - Woodlands Lane (M4 East of Almondsbury Interchange)	362118	183031	Roadside	90.6	90.6	21.0	22.0	22.9	17.5	16.1
37	Almondsbury - Old Aust Road (M4 West of Almondsbury Interchange)	361147	184846	Roadside	100.0	100.0	21.8	24.7	26.9	18.9	16.7

Diffusion Tube ID	Site Name	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) [1]	Valid Data Capture 2024 (%) [2]	2020	2021	2022	2023	2024
38	Severn Beach - Ableton Lane Severn Beach Primary School façade	354282	184653	Urban Background	100.0	100.0	9.8	10.8	12.4	8.8	8.7
44	Stoke Gifford - Hatchet Road	362061	180025	Roadside	90.6	90.6	24.1	21.6	23.2	18.8	19.0
46	Winterbourne - High Street opp Winterbourne Academy	364852	180758	Roadside	90.6	90.6	18.9	20.8	21.4	18.1	17.4
53	Hambrook - Bristol Road rear of 17 Fenbrook Close	363907	178389	Roadside	100.0	100.0	19.7	21.8	22.5	16.8	15.4
54	Longwell Green - A431/Aldermoor Way	365256	171656	Roadside	100.0	100.0	22.7	23.6	23.4	19.3	18.7
57	Coalpit Heath - 225 Badminton Road GT Plumbing & Heating	367742	181160	Roadside	92.5	92.5	19.9	20.5	19.6	14.3	12.1
61	Staple Hill - 1 Broad Street William Hill	364926	175926	Roadside	100.0	100.0	29.3	30.9	31.9	26.2	26.1
62	Staple Hill - 2 Broad Street 501 Bar	364909	175908	Roadside	100.0	100.0	26.8	28.6	29.2	21.2	21.8
63	Patchway - 28 Park Leaze	359487	182479	Roadside	100.0	100.0	15.2	16.3	16.7	13.0	12.4
67	Kingswood - 40 Regent Street former Hays Travel	364671	173877	Roadside	100.0	100.0	25.8	25.8	26.3	22.0	23.4
68	Kingswood - 26-32 Regent Street Kelebek Furniture	364631	173886	Roadside	92.5	92.5	27.8	26.7	28.3	21.8	22.6
69	Kingswood - 12 Regent Street Domino's Pizza	364597	173892	Roadside	92.5	92.5	25.1	24.4	25.0	20.3	21.9
70	Kingswood - Two Mile Hill Road Job Centre Plus	364533	173896	Roadside	90.6	90.6	21.4	22.7	23.6	17.4	17.6

Diffusion Tube ID	Site Name	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) [1]	Valid Data Capture 2024 (%) [2]	2020	2021	2022	2023	2024
71	Staple Hill - 11 The Square Bunch Florist	365075	175918	Roadside	100.0	100.0	16.7	17.3	17.6	14.5	14.2
72	Staple Hill - 25 Broad Street Prime Vapes	364990	175920	Roadside	100.0	100.0	22.5	24.5	25.0	20.2	19.8
74	Staple Hill - 29-31 Soundwell Rd opp Page Comm Assoc	364885	175772	Kerbside	100.0	100.0	18.9	20.8	20.6	17.0	15.8
76	Staple Hill - 84-86 High Street Staple Hill Oak Pub	364722	175926	Roadside	100.0	100.0	24.0	24.1	23.8	20.2	22.6
83	Chipping Sodbury - 51A Broad Street façade	372791	182241	Roadside	92.5	92.5	15.7	16.8	17.3	14.7	14.0
87	Cribbs Causeway - Blackhorse Hill Hollywood Cottage façade	357739	181334	Roadside	100.0	100.0	19.3	20.7	22.6	17.3	15.8
92	Kingswood - Regent Street Entertainment & Sports Club	364968	173836	Roadside	100.0	100.0	22.7	22.9	21.2	17.7	18.6
93	Kingswood - Hanham Road Exchange Court Flats	364979	173801	Roadside	90.6	90.6	19.1	21.0	20.0	16.1	14.8
95	Kingswood - 45 High Street Adam Lee	365078	173846	Roadside	100.0	100.0	25.7	25.0	24.2	19.3	18.7
105	Staple Hill - 2 North Street	364932	176147	Roadside	84.9	84.9	19.5	20.6	19.6	16.1	14.0
113	Patchway - 5 Falcon Close façade	359112	181909	Roadside	100.0	100.0	19.6	21.3	21.6	16.6	16.7
114	Pilning - 23 Keens Grove façade	355263	185351	Roadside	100.0	100.0	18.7	20.6	20.0	16.5	15.7
115	Pilning - 2 Wick Road façade	355212	185360	Roadside	100.0	100.0	19.6	21.1	20.9	16.0	14.8
117	Filton Northville - 29 Gloucester Rd Nth Rowe Vets	359874	178259	Roadside	90.6	90.6	24.0	25.5	25.7	20.4	20.7

Diffusion Tube ID	Site Name	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) [1]	Valid Data Capture 2024 (%) [2]	2020	2021	2022	2023	2024
119	Filton - 137 Gloucester Rd Nth	360263	179250	Roadside	100.0	100.0	23.3	24.0	23.7	19.1	18.8
122	Filton - 549 Filton Avenue	360566	178229	Roadside	100.0	100.0	21.9	22.3	23.0	18.9	19.4
124	Filton - 702a Filton Ave Way Ahead	360918	178905	Roadside	90.6	90.6	23.4	24.7	24.4	21.1	19.7
125	Filton - 71 Station Rd	360891	179005	Roadside	100.0	100.0	20.7	22.0	22.3	17.8	17.1
128	Kingswood - 109 Downend Road	364587	174431	Roadside	100.0	100.0	23.9	23.2	24.2	20.3	19.6
129	Cribbs Causeway – 1 Holly Cottages façade	357508	181059	Roadside	100.0	100.0	19.6	21.3	21.4	17.3	16.4
132	Hanham - 66 High St Sassy Hair Studio	364178	172337	Roadside	100.0	100.0	17.0	20.0	20.2	15.5	15.2
133	Hambrook - 123 Old Gloucester Road façade	363736	178507	Roadside	100.0	100.0	21.4	22.5	22.0	17.1	16.2
134	Hambrook - Bristol Rd Old Bakery façade	364048	178719	Roadside	100.0	100.0	22.8	23.2	23.9	19.5	20.5
135	Frenchay - Harford Drive Dyrham Flats	364029	178413	Roadside	100.0	100.0	19.1	20.7	21.5	16.0	15.3
136	Little Stoke - 26 Gipsy Lane façade	361242	180544	Roadside	100.0	41.5	16.3	15.7	17.6	14.7	15.6
137	Warmley - 35 High Street	366984	173563	Roadside	100.0	100.0	26.1	29.4	27.7	23.1	22.0
138	Warmley - 18 High Street façade	366941	173558	Roadside	100.0	100.0	26.0	27.1	25.5	21.9	20.6
139	Warmley - 14 High Street (former Webbs) façade	366890	173560	Roadside	100.0	100.0	29.1	32.1	28.9	23.8	23.7

Diffusion Tube ID	Site Name	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) [1]	Valid Data Capture 2024 (%) [2]	2020	2021	2022	2023	2024
141	Warmley - 41 Deanery Road façade	366705	173581	Roadside	100.0	100.0	22.6	23.2	24.0	18.6	18.0
142	Warmley - 33 Deanery Road Warmley Court façade	366613	173597	Roadside	100.0	100.0	23.2	21.3	22.1	17.9	17.7
143	Warmley - 1 High Street Ideal Pharmacy façade	366815	173574	Roadside	100.0	100.0	17.1	19.0	18.9	15.1	14.6
146A, 146B, 146C	Kingswood - 34 Hill St façade	365910	173680	Roadside	100.0	100.0	35.9	34.1	32.8	26.7	25.3
147	Soundwell - 264 Soundwell Rd façade	364586	174496	Roadside	100.0	100.0	28.5	31.3	32.2	24.9	25.3
148	Filton - 109 Gloucester Road North façade	360077	178900	Roadside	100.0	100.0	17.9	19.6	19.6	16.5	15.8
149	Filton - 707 Southmead Road façade	360050	179021	Roadside	100.0	100.0	21.0	22.8	22.6	17.5	17.5
150	Soundwell - 296 Soundwell Road façade	364528	174425	Roadside	100.0	100.0	18.2	20.0	22.3	20.4	18.9
151	Hambrook - Bristol Road Old Bakery FP Signpost	364049	178726	Roadside	100.0	100.0	23.2	23.4	25.1	19.7	18.4
152	Bradley Stoke - 188 Oaktree Crescent	360945	182831	Roadside	90.6	90.6	21.8	22.5	22.6	17.2	16.4
154	Bradley Stoke - 166 Ellan Hay Road façade	363242	180724	Roadside	100.0	100.0	17.2	17.1	17.6	13.5	13.0
157	Hambrook - Bristol Road Poplars House Garage façade	363999	178505	Roadside	100.0	100.0	21.4	21.1	23.3	18.1	17.4
158	Downend - 5 Wick Wick Close façade	366157	178557	Roadside	100.0	100.0	17.3	19.4	20.5	15.4	15.9

Diffusion Tube ID	Site Name	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) [1]	Valid Data Capture 2024 (%) [2]	2020	2021	2022	2023	2024
159	Wickwar - 21 High Street façade	372395	188581	Roadside	100.0	100.0	19.8	22.6	22.9	19.9	18.9
160	Staple Hill - 62 High Street	364655	175931	Roadside	100.0	100.0	23.7	24.1	23.4	19.4	20.2
161	Staple Hill - 13 Victoria Street façade	364906	176022	Roadside	100.0	100.0	23.1	24.1	24.3	19.0	18.3
162	Staple Hill - 28 Victoria Street façade	364925	176062	Roadside	100.0	100.0	20.5	22.0	22.6	17.9	17.0
163	Staple Hill - 2 Victoria Street façade	364918	175979	Roadside	100.0	100.0	21.0	23.1	22.8	18.5	17.9
164	Staple Hill - 102 High Street Jay Jays Hair façade	364811	175919	Roadside	100.0	100.0	22.1	23.0	22.5	19.1	19.6
165	Staple Hill - 3 Soundwell Rd Chinese Kitchen façade	364906	175864	Roadside	100.0	100.0	28.7	31.2	29.9	22.8	23.8
166	Kingswood - 12 Cecil Road	364770	173695	Roadside	100.0	100.0	21.1	22.3	22.2	17.4	16.7
167	Kingswood - 7 Downend Road	364652	173957	Roadside	100.0	100.0	22.8	24.3	23.4	18.7	19.2
168	Kingswood - 133 High Street façade	365366	173805	Roadside	100.0	100.0	19.7	21.6	20.4	17.0	16.1
169	Warmley - 20 Deanery Road Warmley Community Centre façade	366714	173560	Roadside	100.0	100.0	24.1	24.3	24.1	21.2	18.8
170	Patchway - 204 Gloucester Road front façade	360606	181675	Roadside	100.0	100.0	18.6	20.2	20.3	16.2	15.3
172	Downend - 31 Badminton Road Jojo Aesthetics façade	365153	176812	Roadside	100.0	100.0	25.3	25.2	24.9	19.4	18.5
173	Mangotsfield - 10 Cossham Street façade	366459	176139	Roadside	100.0	100.0	19.3	20.7	20.5	16.3	15.4

Diffusion Tube ID	Site Name	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) [1]	Valid Data Capture 2024 (%) [2]	2020	2021	2022	2023	2024
174	Charfield - 25 Wotton Road façade	372011	192189	Roadside	100.0	100.0	13.0	14.5	15.0	12.5	11.7
180	Wick - 70 High Street The Old Post Office façade	370605	172681	Roadside	100.0	100.0	20.1	22.6	22.5	17.9	15.9
181	Warmley - 16 London Road façade	367298	173452	Roadside	90.6	90.6	19.5	20.8	21.2	17.6	16.5
185	Staple Hill - High Street Pendennis Park Flats	364634	175946	Roadside	100.0	100.0	22.7	23.3	24.0	19.0	19.0
187	Thornbury - Rock Street Grace Lodge	363785	189856	Roadside	100.0	100.0		20.0	22.4	17.1	16.8
188	Patchway - 43 Gloucester Road nr Hayes Way	360450	181066	Roadside	92.5	92.5		38.8	38.7	30.1	30.2
189	Kingswood - 2 Hill St Premier Store	365668	173738	Roadside	100.0	100.0			24.1	20.7	19.2
191A, 191B, 191C	Hambrook - A4174 Old Gloucester Road Co-location	363773	178500	Roadside	100.0	100.0			28.5	21.1	19.7
192A, 192B, 192C	Stoke Gifford - A4174 Coldharbour Lane Co-location	362384	178562	Roadside	100.0	100.0			21.1	16.7	16.1
193	Kingswood - 285 New Cheltenham Road	365981	174370	Roadside	100.0	100.0				16.2	17.9
194	Kingswood - Kimberley Road nr Downend Rd Junction	364655	174020	Kerbside	100.0	100.0				14.0	14.6
195	Kingswood - 7 Gilbert Road	364874	174009	Roadside	100.0	100.0				11.2	11.3
196	Kingswood - 23 Hanham Road	364991	173592	Roadside	100.0	100.0				15.3	15.7

Diffusion Tube ID	Site Name	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) [1]	Valid Data Capture 2024 (%) [2]	2020	2021	2022	2023	2024
197	Kingswood - 26 Moravian Road	364813	173730	Kerbside	100.0	100.0				12.6	15.6
198	Kingswood - 17A Cecil Road nr Blackhorse Rd junction	364538	173666	Roadside	100.0	100.0				12.7	13.7
199	Kingswood - Blackhorse Road Flat 6 Sunday House	364510	173746	Roadside	90.6	90.6				23.1	22.9
200	Kingswood - 3 Regent Street Zahringer Jewellers	364583	173906	Roadside	83.0	83.0				19.6	19.9
201	Kingswood - 25 Regent Street Beauty Line façade	364645	173895	Roadside	100.0	100.0				19.9	22.2
202	Kingswood - 123 Regent Street Cut & Run Barbers	364952	173851	Roadside	92.5	92.5				12.5	14.0
203	Little Stoke - 26 Gipsy Lane	361240	180548	Roadside	100.0	58.5					20.6
204	Cribbs Causeway - 334 Passage Road façade	357036	180268	Roadside	100.0	34.0					12.8

☒ **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%).

(3) Aside from the triplicate co-located sites 4, 191 and 192, sites 87 & 147 also operated as triplicate sites 2020 & 2021, Site 185 operated as triplicate site in 2020 and site 146 operated as a triplicate site in 2023 & 2024 so the triplicate average annual means are reported for the relevant years.

Table A.5 – 1-Hour Mean NO_2 Monitoring Results, Number of 1-Hour Means > 200µg/m^3

Site ID	Site Name	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2024 (%) (2)	2020	2021	2022	2023	2024
SG1	Yate Station Road	370418	182525	Roadside	98.5	98.5	0	0	0	0	0
SG2	Stoke Gifford A4174 Coldharbour Lane	362384	178562	Roadside	99.3	99.3		0 (90)	0	0	0
SG3	Hambrook A4174 Old Gloucester Road	363772	178501	Roadside	99.4	99.4			0 (103)	0	0

Notes:

Results are presented as the number of 1-hour periods where concentrations greater than 200µg/m^3 have been recorded.

Exceedances of the NO_2 1-hour mean objective (200µg/m^3 not to be exceeded more than 18 times/year) are shown in **bold**.

If the period of valid data is less than 85%, the 99.8th percentile of 1-hour means is provided in brackets.

(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%).

Table A.6 – Annual Mean PM_{10} Monitoring Results (µg/m^3)

Site ID	Site Name	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2024 (%) (2)	2020	2021	2022	2023	2024
SG1	Yate Station Road	370418	182525	Roadside	98.8	98.8	11	12	12	12.3	11.3
SG2	Stoke Gifford A4174 Coldharbour Lane	362384	178562	Roadside	97.8	97.8		15.5	20	17.9	16.9

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

Notes:

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

Exceedances of the PM_{10} annual mean objective of 40µg/m^3 are shown in **bold**.

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.

(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.2 – Trends in Annual Mean PM_{10} Concentrations

Table A.7 – 24-Hour Mean PM_{10} Monitoring Results, Number of PM_{10} 24-Hour Means > 50µg/m^3

Site ID	Site Name	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2024 (%) (2)	2020	2021	2022	2023	2024
SG1	Yate Station Road	370418	182525	Roadside	98.8	98.8	0	0	0	0	0
SG2	Stoke Gifford A4174 Coldharbour Lane	362384	178562	Roadside	97.8	97.8		0 (27)	3	1	6

Notes:

Results are presented as the number of 24-hour periods where daily mean concentrations greater than 50µg/m^3 have been recorded.

Exceedances of the PM_{10} 24-hour mean objective (50µg/m^3 not to be exceeded more than 35 times/year) are shown in **bold**.

If the period of valid data is less than 85%, the 90.4th percentile of 24-hour means is provided in brackets.

(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%).

Table A.8 – Annual Mean $PM_{2.5}$ Monitoring Results (µg/m^3)

Site ID	Site Name	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2024 (%) (2)	2020	2021	2022	2023	2024
SG2	Stoke Gifford A4174 Coldharbour Lane	362384	178562	Roadside	99.1	99.1		7.4	9	7.6	6.9

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

Notes:

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

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.

(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%).

Table A.9 – Kingswood – Warmley AQMA Annual Mean NO_2 Monitoring Results: Non-Automatic Monitoring (µg/m^3)

Diffusion Tube ID	Site Name	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) [1]	Valid Data Capture 2024 (%) [2]	2020	2021	2022	2023	2024
27	Kingswood - 90 Regent Street Nat West	364866	173835	Roadside	100.0	100.0	19.7	20.7	20.3	17.1	18.0
67	Kingswood - 40 Regent Street former Hays Travel	364671	173877	Roadside	100.0	100.0	25.8	25.8	26.3	22.0	23.4
68	Kingswood - 26-32 Regent Street Kelebek Furniture	364631	173886	Roadside	92.5	92.5	27.8	26.7	28.3	21.8	22.6
69	Kingswood - 12 Regent Street Domino's Pizza	364597	173892	Roadside	92.5	92.5	25.1	24.4	25.0	20.3	21.9
70	Kingswood - Two Mile Hill Road Job Centre Plus	364533	173896	Roadside	90.6	90.6	21.4	22.7	23.6	17.4	17.6
92	Kingswood - Regent Street Entertainment & Sports Club	364968	173836	Roadside	100.0	100.0	22.7	22.9	21.2	17.7	18.6
93	Kingswood - Hanham Road Exchange Court Flats	364979	173801	Roadside	90.6	90.6	19.1	21.0	20.0	16.1	14.8
95	Kingswood - 45 High Street Adam Lee	365078	173846	Roadside	100.0	100.0	25.7	25.0	24.2	19.3	18.7
137	Warmley - 35 High Street	366984	173563	Roadside	100.0	100.0	26.1	29.4	27.7	23.1	22.0
138	Warmley - 18 High Street façade	366941	173558	Roadside	100.0	100.0	26.0	27.1	25.5	21.9	20.6
139	Warmley - 14 High Street (former Webbs) façade	366890	173560	Roadside	100.0	100.0	29.1	32.1	28.9	23.8	23.7
141	Warmley - 41 Deanery Road façade	366705	173581	Roadside	100.0	100.0	22.6	23.2	24.0	18.6	18.0
142	Warmley - 33 Deanery Road Warmley Court façade	366613	173597	Roadside	100.0	100.0	23.2	21.3	22.1	17.9	17.7

Diffusion Tube ID	Site Name	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) [1]	Valid Data Capture 2024 (%) [2]	2020	2021	2022	2023	2024
143	Warmley - 1 High Street Ideal Pharmacy façade	366815	173574	Roadside	100.0	100.0	17.1	19.0	18.9	15.1	14.6
146A, 146B, 146C [3]	Kingswood - 34 Hill St façade	365910	173680	Roadside	100.0	100.0	35.9	34.1	32.8	26.7	25.3
168	Kingswood - 133 High Street façade	365366	173805	Roadside	100.0	100.0	19.7	21.6	20.4	17.0	16.1
169	Warmley - 20 Deanery Road Warmley Community Centre façade	366714	173560	Roadside	100.0	100.0	24.1	24.3	24.1	21.2	18.8
181	Warmley - 16 London Road façade	367298	173452	Roadside	90.6	90.6	19.5	20.8	21.2	17.6	16.5
189	Kingswood - 2 Hill St Premier Store	365668	173738	Roadside	100.0	100.0			24.1	20.7	19.2
200	Kingswood - 3 Regent Street Zahringer Jewellers	364583	173906	Roadside	83.0	83.0				19.6	19.9
201	Kingswood - 25 Regent Street Beauty Line façade	364645	173895	Roadside	100.0	100.0				19.9	22.2
202	Kingswood - 123 Regent Street Cut & Run Barbers	364952	173851	Roadside	92.5	92.5				12.5	14.0

☒ **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%).

(3) Site 146 operated as triplicate site (146ABC) in 2023 & 2024 so triplicate average annual means are reported for these years. The site operated as single tube site in all other years.

Figure A.3 – Trends in Annual Mean NO_2 Concentrations in Kingswood Section of Kingswood – Warmley AQMA

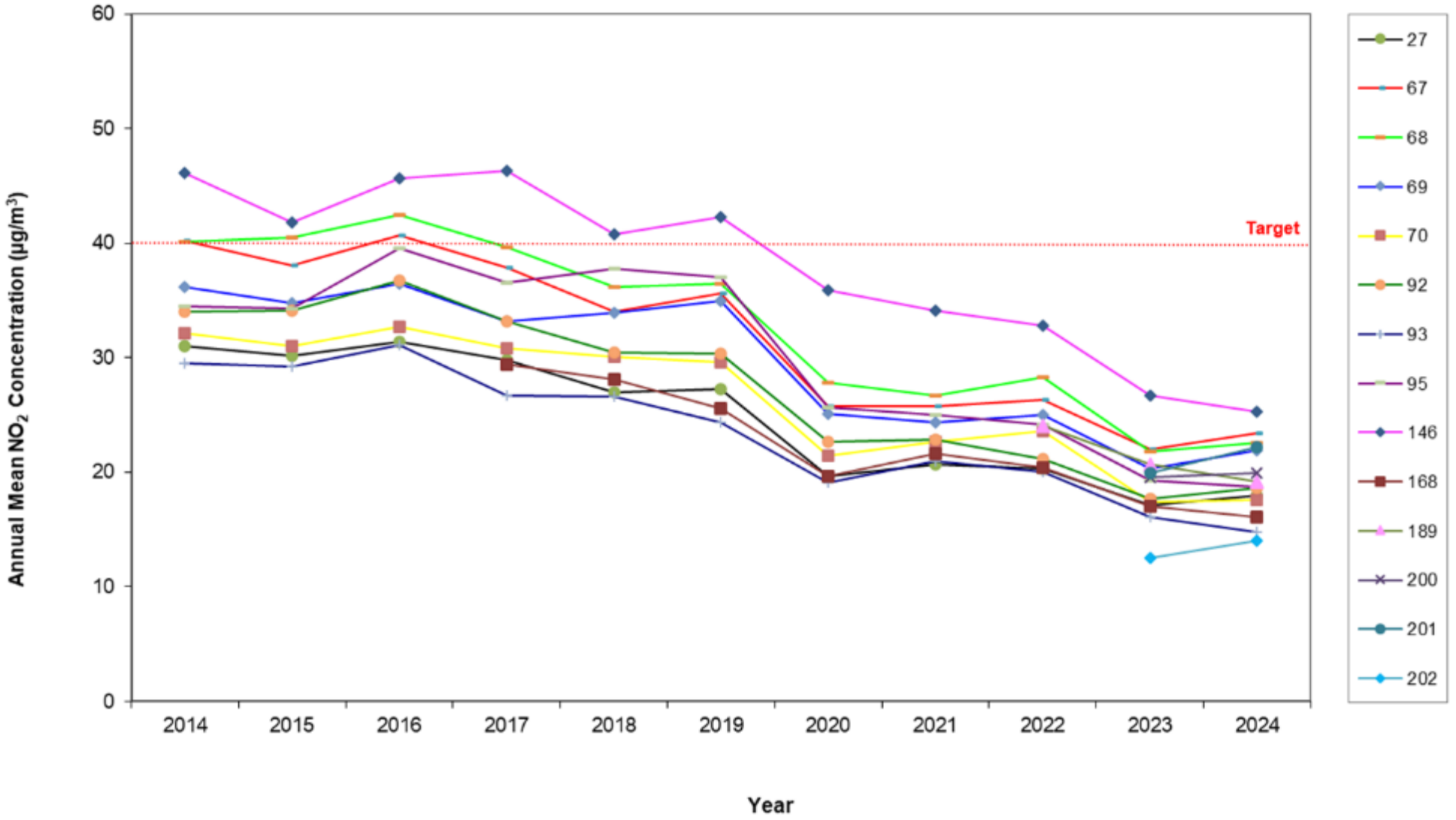


Figure A.4 – Trends in Annual Mean NO_2 Concentrations in Warmley Section of Kingswood – Warmley AQMA

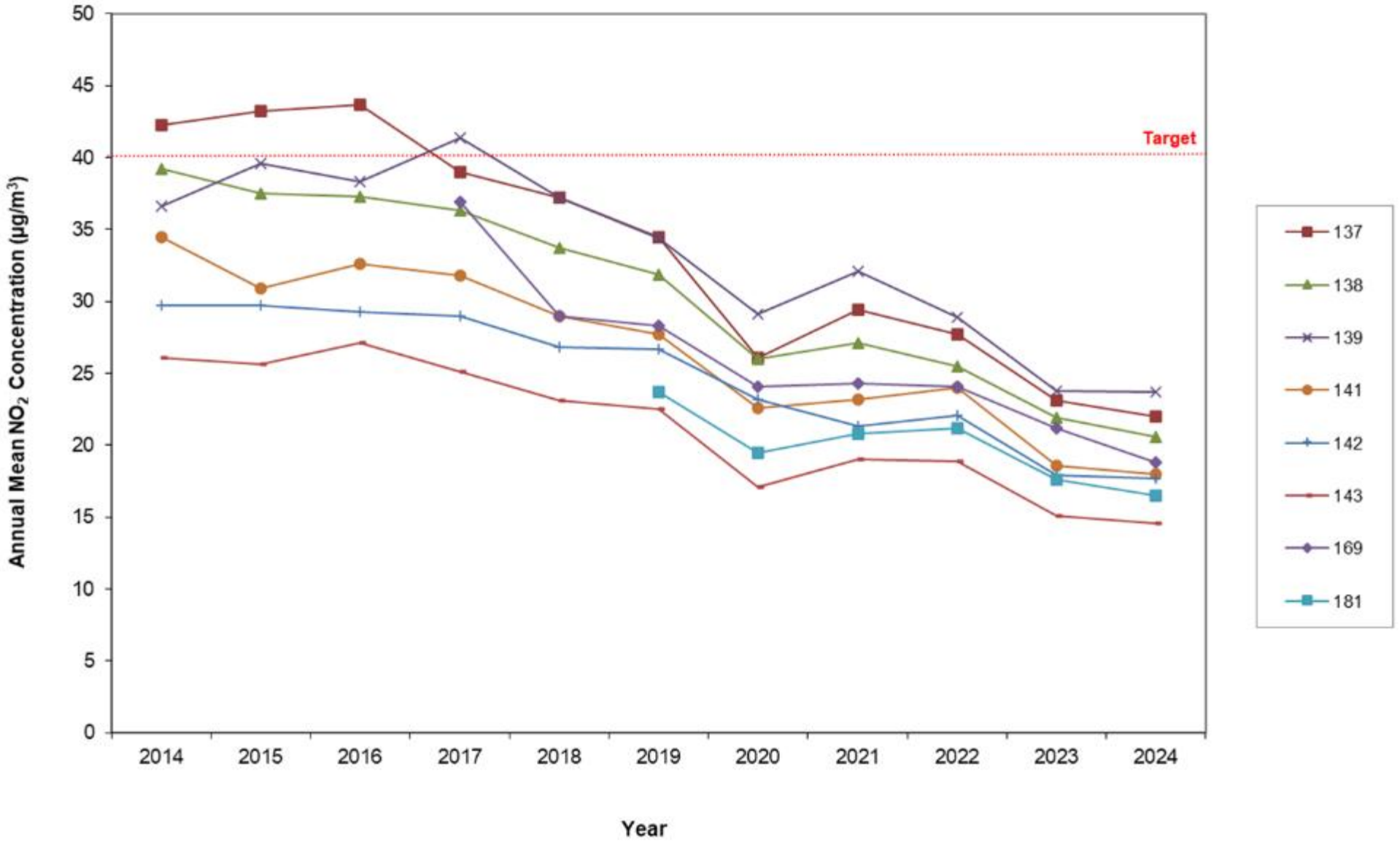


Table A.10 – Staple Hill AQMA Annual Mean NO_2 Monitoring Results: Non-Automatic Monitoring (µg/m^3)

Diffusion Tube ID	Site Name	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) [1]	Valid Data Capture 2024 (%) [2]	2020	2021	2022	2023	2024
29	Staple Hill - 123 High Street Backhouse Bet	364822	175932	Roadside	100.0	100.0	20.8	23.4	24.8	19.3	20.3
61	Staple Hill - 1 Broad Street William Hill	364926	175926	Roadside	100.0	100.0	29.3	30.9	31.9	26.2	26.1
62	Staple Hill - 2 Broad Street 501 Bar	364909	175908	Roadside	100.0	100.0	26.8	28.6	29.2	21.2	21.8
71	Staple Hill - 11 The Square Bunch Florist	365075	175918	Roadside	100.0	100.0	16.7	17.3	17.6	14.5	14.2
72	Staple Hill - 25 Broad Street Prime Vapes	364990	175920	Roadside	100.0	100.0	22.5	24.5	25.0	20.2	19.8
74	Staple Hill - 29-31 Soundwell Rd opp Page Comm Assoc	364885	175772	Kerbside	100.0	100.0	18.9	20.8	20.6	17.0	15.8
76	Staple Hill - 84-86 High Street Staple Hill Oak Pub	364722	175926	Roadside	100.0	100.0	24.0	24.1	23.8	20.2	22.6
105	Staple Hill - 2 North Street	364932	176147	Roadside	84.9	84.9	19.5	20.6	19.6	16.1	14.0
160	Staple Hill - 62 High Street	364655	175931	Roadside	100.0	100.0	23.7	24.1	23.4	19.4	20.2
161	Staple Hill - 13 Victoria Street façade	364906	176022	Roadside	100.0	100.0	23.1	24.1	24.3	19.0	18.3
162	Staple Hill - 28 Victoria Street façade	364925	176062	Roadside	100.0	100.0	20.5	22.0	22.6	17.9	17.0
163	Staple Hill - 2 Victoria Street façade	364918	175979	Roadside	100.0	100.0	21.0	23.1	22.8	18.5	17.9
164	Staple Hill - 102 High Street Jay Jays Hair façade	364811	175919	Roadside	100.0	100.0	22.1	23.0	22.5	19.1	19.6

Diffusion Tube ID	Site Name	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2024 (%) (2)	2020	2021	2022	2023	2024
165	Staple Hill - 3 Soundwell Rd Chinese Kitchen façade	364906	175864	Roadside	100.0	100.0	28.7	31.2	29.9	22.8	23.8
185 (3)	Staple Hill - High Street Pendennis Park Flats	364634	175946	Roadside	100.0	100.0	22.7	23.3	24.0	19.0	19.0

☒ **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%).

(3) Site 185 operated as triplicate site (185ABC) in 2020 so triplicate average annual mean is reported for 2020. The site operated as single tube site in all other years.

Figure A.5 – Trends in Annual Mean NO_2 Concentrations in Staple Hill AQMA

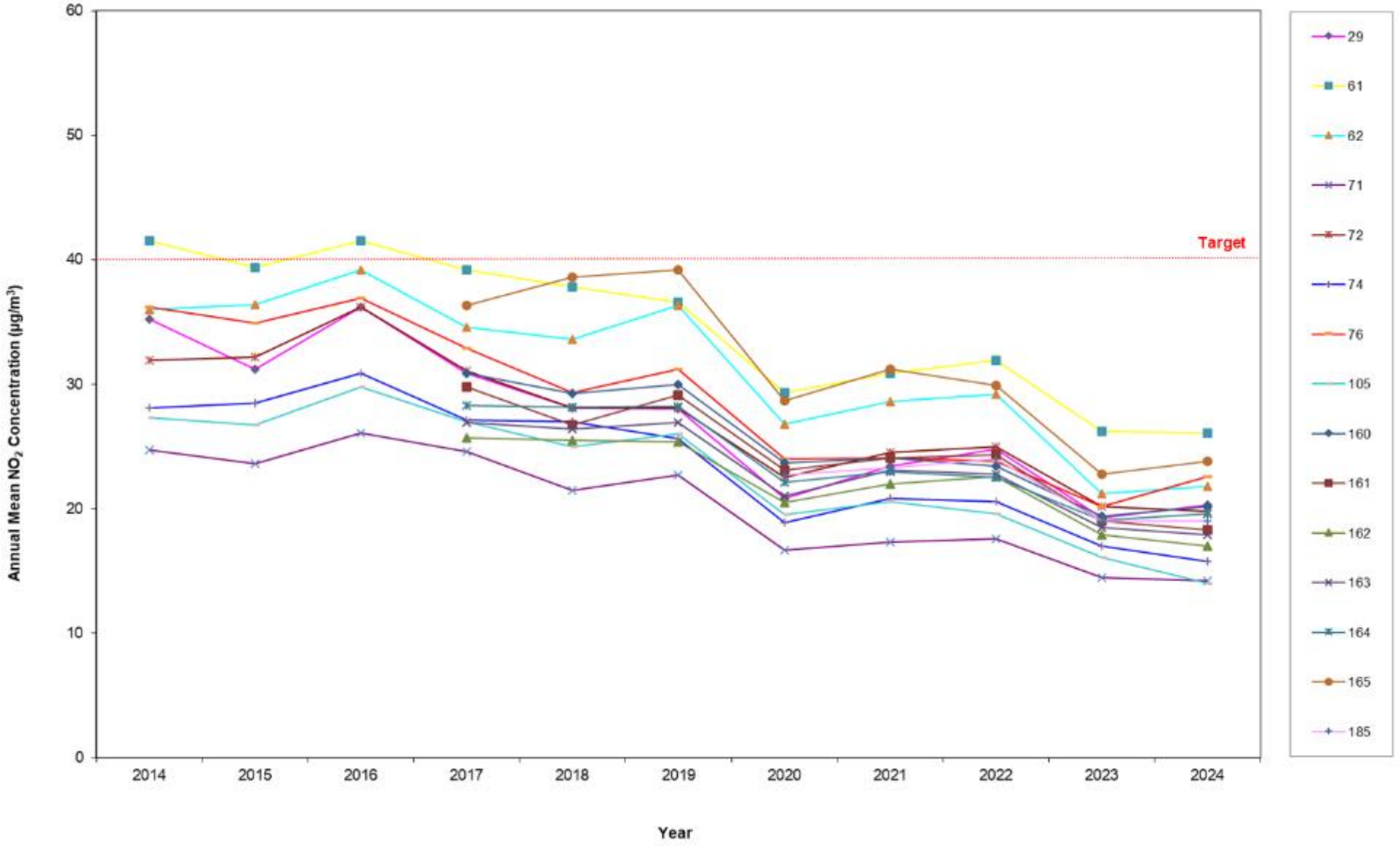


Table A.11 – Estimation of $PM_{2.5}$ concentrations from PM_{10} Automatic Monitoring at Yate and % Reductions

Year	Yate PM_{10} Annual Means ($\mu g/m^3$)	Yate Estimated $PM_{2.5}$ Annual Means (1) (2) (3) (4) (5) ($\mu g/m^3$)	Bristol St. Pauls (AURN) Monitored $PM_{2.5}$ Annual Means (6) ($\mu g/m^3$)
2010	20	14	14
2011	18	12.6	15
2012	16	11.2	13
2013	15	10.5	13
2014	15	10.5	13
2015	15	10.5	10
2016	14	9.8	12
2017	14	9.8	10
2018	13	9.1	12
2019	13	9.1	11
2020	11	7.7	10
2021	12	6.3	8
2022	12	5.6	8
2023	12.3	6.4	8
2024	11.3	5.3	7
% $PM_{2.5}$ Reduction 2010 -2020 (7)		**45%**	**28.6%**
% $PM_{2.5}$ Reduction 2018 -2024 (8)		**41.8%**	**41.7%**

Notes:

(1) 2010 to 2020 $PM_{2.5}$ concentrations estimated as per LAQM.TG16 Box 7.7 (PM_{10} x 0.7)

(2) 2021 $PM_{2.5}$ concentrations estimated as per LAQM.TG22[72] using 2021 national roadside factor of 5.7 (PM_{10} annual mean concentration – national factor = estimated $PM_{2.5}$ annual mean concentration).

(3) 2022 $PM_{2.5}$ concentrations estimated as per LAQM.TG22 using 2022 national roadside factor of 6.4.

(4) 2023 $PM_{2.5}$ concentrations estimated as per LAQM.TG22 using 2023 national roadside factor of 5.9.

(5) 2024 $PM_{2.5}$ concentrations estimated as per LAQM.TG22 using 2024 national roadside factor of 6.0.

(6) Data obtained from UK-AIR Data Archive[73]

(7) Target of 20% reduction in concentrations (at urban background) between 2010 and 2020.

(8) Target of 35% reduction in exposure compared to 2018 by 2040 (interim target of 22% reduction in exposure compared to 2018 by 2028).

[72] Estimating $PM_{2.5}$ from PM_{10} Measurements | LAQM (defra.gov.uk)

[73] Annual and Exceedance Statistics - Defra, UK

Appendix B: Full Monthly Diffusion Tube Results for 2024

Table B.1 – NO_2 2024 Diffusion Tube Results (µg/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 (0.81)	Annual Mean: Distance Corrected to Nearest Exposure	Comment
1	370692	182499	25.5	22.2	19.8	21.5	17.8	17.6	15.5	18.5	24.3	21.2	26.7	28.7	21.6	17.5		
4A	370418	182525	22.6	19.4	18.5	13.4	13.7	10.8	12.8	13.2	12.7	19.7	24.7	19.8	-	-	-	Triplicate Site with 4A, 4B and 4C - Annual data provided for 4C only
4B	370418	182525	21.1	17.5	18.3	11.5	13.0	10.9	13.8	14.1	14.9	17.8	25.0	21.5	-	-	-	Triplicate Site with 4A, 4B and 4C - Annual data provided for 4C only
4C	370418	182525	22.2	19.9	18.2	11.4	13.5	12.4	13.8	13.1	13.9	19.4	23.5	20.0	16.7	13.6	-	Triplicate Site with 4A, 4B and 4C - Annual data provided for 4C only
10	360266	179136	25.9	29.5	26.9	21.9	26.0	21.0	24.1	22.5	26.2	31.6	33.6	22.5	26.0	21.0	-	
11	363654	189893		15.9	13.9		9.6	8.0	9.8	9.3	11.3	16.5	19.7	14.3	12.8	10.4	-	
12	362161	179570	25.3	23.4	21.2	20.3	18.5	17.6	15.7	17.8	24.7	26.8	28.6	20.2	21.7	17.6	-	
13	361523	178732	29.3	28.4	23.3	19.0	27.0	20.0	16.6	17.8	29.7	31.8	35.9	22.7	25.1	20.4	-	
21	365673	177475	17.1	13.3	11.8	7.6			5.9	7.2	10.2	11.9	15.1	16.1	11.6	9.4	-	
27	364866	173835	29.0	21.7	21.0	14.2	18.6	15.6	19.3	19.1	24.0	27.2	31.2	25.8	22.2	18.0	-	
29	364822	175932	30.9	24.0	22.8	19.0	22.3	18.4	19.2	19.6	35.2	30.0	25.8	34.1	25.1	20.3	-	
34	362395	182544	25.3	21.4	17.1	14.3	10.2	12.7	11.3	14.7	19.2	21.6	26.0	19.0	17.7	14.4	-	
35	362118	183031	26.2	22.7	19.4	16.4	20.0	13.6	17.7	12.9	23.9		27.3	18.9	19.9	16.1	-	
37	361147	184846	26.0	13.4	26.0	17.5	29.0	13.8	14.0	16.1	16.3	28.9	27.9	18.8	20.6	16.7	-	
38	354282	184653	14.0	14.5	11.4	8.3	9.3	6.4	8.1	9.1	8.7	12.9	15.4	10.3	10.7	8.7	-	
44	362061	180025	28.2	27.8	22.1	19.3	18.8	19.6	19.7		23.1	29.1	29.8	20.9	23.5	19.0	-	
46	364852	180758	22.3	25.3	21.0	17.2	16.5	15.5	17.3		24.6	25.7	28.5	22.1	21.5	17.4	-	

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 (0.81)	Annual Mean: Distance Corrected to Nearest Exposure	Comment
53	363907	178389	26.5	21.4	18.4	16.0	19.5	13.4	13.0	13.3	21.6	21.8	25.4	18.1	19.0	15.4	-	
54	365256	171656	29.2	22.3	22.0	16.8	20.7	17.0	18.2	19.8	27.7	27.8	32.2	24.2	23.1	18.7	-	
57	367742	181160		18.6	15.3	10.9	11.5	10.1	11.2	12.4	13.8	17.9	21.6	21.3	15.0	12.1	-	
61	364926	175926	38.7	36.6	34.2	30.4	25.5	28.0	28.4	24.8	34.7	35.7	27.4	42.0	32.2	26.1	-	
62	364909	175908	30.0	26.2	27.3	23.1	23.7	19.7	22.7	20.2	25.8	36.2	35.5	32.4	26.9	21.8	-	
63	359487	182479	18.5	15.7	15.4	10.6	12.6	11.8	19.9	12.0	14.6	16.3	19.7	16.5	15.3	12.4	-	
67	364671	173877	29.7	30.5	29.3	23.0	24.8	26.2	26.9	23.4	26.0	38.4	37.3	30.9	28.9	23.4	-	
68	364631	173886		31.1	23.3	21.3	24.4	25.8	23.6	22.8	27.6	37.2	39.7	29.8	27.9	22.6	-	
69	364597	173892		31.9	21.8	19.6	23.4	22.8	21.9	19.3	32.5	31.6	35.8	36.9	27.0	21.9	-	
70	364533	173896	25.4	22.4	21.5	13.2		15.7	15.7	15.1	22.3	27.5	27.1	33.0	21.7	17.6	-	
71	365075	175918	22.5	17.2	17.6	14.7	15.0	10.7	11.8	13.5	19.6	19.3	26.3	22.1	17.5	14.2	-	
72	364990	175920	30.1	24.7	22.7	20.3	19.6	20.2	19.4	19.6	28.5	26.1	31.0	30.3	24.4	19.8	-	
74	364885	175772	28.3	18.5	17.3	17.1	17.1	14.1	12.2	14.5	22.3	20.4	27.4	24.1	19.4	15.8	-	
76	364722	175926	29.3	27.9	25.5	19.0	19.9	21.0	24.2	22.9	28.7	31.5	39.0	45.1	27.8	22.6	-	
83	372791	182241	20.9	17.6	18.7	13.6	16.4	12.3		14.3	17.2	15.9	24.6	18.9	17.3	14.0	-	
87	357739	181334	21.1	25.1	21.9	15.3	17.5	11.9	15.6	17.6	16.3	26.8	26.2	18.9	19.5	15.8	-	
92	364968	173836	25.2	26.8	21.6	18.1	20.7	20.0	22.3	21.2	22.1	24.6	29.1	23.6	22.9	18.6	-	
93	364979	173801	22.8	15.4	19.5	13.4	17.2	14.3	13.0	13.6	20.6	24.7	26.9		18.3	14.8	-	
95	365078	173846	28.2	20.3	17.5	18.9	21.5	19.6	22.3	16.4	26.0	28.8	30.6	27.3	23.1	18.7	-	
105	364932	176147		21.5	18.1	14.4	13.6	12.1	13.4	12.7		18.9	25.7	21.8	17.2	14.0	-	
113	359112	181909	22.9	19.7	16.7	15.8	21.1	20.1	21.6	19.4	24.9	22.1	24.1	19.3	20.6	16.7	-	

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 (0.81)	Annual Mean: Distance Corrected to Nearest Exposure	Comment
114	355263	185351	25.7	20.3	17.1	15.2	18.8	16.1	16.8	16.4	20.6	20.8	24.8	19.2	19.3	15.7	-	
115	355212	185360	23.5	23.6	20.1	14.7	15.8	14.8	14.1	16.6	16.1	23.4	21.2	16.0	18.3	14.8	-	
117	359874	178259	29.4	27.7	24.5	25.0	24.6	21.1	19.8		28.5	25.7	32.2	22.7	25.6	20.7	-	
119	360263	179250	27.1	26.8	23.3	20.0	23.0	17.1	19.8	20.3	24.1	28.1	29.6	19.3	23.2	18.8	-	
122	360566	178229	26.1	29.0	25.4	25.2	18.6	15.6	18.1	20.3	25.6	27.7	34.3	21.6	24.0	19.4	-	
124	360918	178905	29.8		26.1	20.5	23.4	16.2	16.3	21.4	27.5	30.7	32.5	23.4	24.3	19.7	-	
125	360891	179005	27.0	27.8	23.5	14.2	16.8	12.3	16.0	17.1	21.6	25.6	31.4	20.6	21.2	17.1	-	
128	364587	174431	29.4	25.1	20.4	20.9	21.3	19.8	19.8	19.4	26.3	26.4	31.5	30.1	24.2	19.6	-	
129	357508	181059	25.3	21.5	21.0	16.3	18.7	16.2	16.9	16.2	22.8	23.4	26.9	18.1	20.3	16.4	-	
132	364178	172337	21.5	19.4	18.4	14.9	17.2	14.9	12.3	14.4	20.8	21.6	28.1	21.1	18.7	15.2	-	
133	363736	178507	21.9	16.7	18.6	16.9	22.9	20.2	14.2	15.7	27.0	23.8	25.1	17.6	20.1	16.2	-	
134	364048	178719	30.3	26.7	24.5	22.6	23.4	23.0	22.6	20.1	27.3	30.2	29.1	23.5	25.3	20.5	-	
135	364029	178413	25.3	17.3	16.4	16.2	19.5	16.5	11.1	13.9	24.2	21.6	25.2	19.0	18.8	15.3	-	
136	361242	180544	23.8	23.7	20.5	15.0	17.6								20.1	15.6	-	
137	366984	173563	31.4	28.4	25.3	23.8	25.3	21.2	19.6	21.7	29.8	35.9	39.7	24.5	27.2	22.0	-	
138	366941	173558	30.3	31.4	25.8	19.3	22.2	20.0	23.5	21.9	24.6	31.8	32.1	22.8	25.5	20.6	-	
139	366890	173560	33.1	32.9	27.2	37.0	25.1	24.5	25.5	25.6	29.2	30.9	31.3	28.7	29.2	23.7	-	
141	366705	173581	27.4	24.9	22.9	15.7	19.9	17.2	22.5	17.9	25.0	24.4	27.7	20.7	22.2	18.0	-	
142	366613	173597	26.3	24.2	21.6	20.9	17.7	17.2	18.3	18.9	26.0	21.5	26.3	23.7	21.9	17.7	-	
143	366815	173574	21.5	21.5	18.9	15.2	16.2	13.5	14.8	14.1	18.7	20.9	24.3	17.0	18.1	14.6	-	
146A	365910	173680	35.7	37.6	28.4	26.7	30.1	26.9	29.1	30.3		34.0	36.8	32.8	-	-	-	Triplicate Site with 146A, 146B and 146C - Annual data provided for 146C only

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 (0.81)	Annual Mean: Distance Corrected to Nearest Exposure	Comment
146B	365910	173680	34.9	35.3	31.1	25.3	31.2	25.6	28.9	27.3		35.6	37.4	31.8	-	-	-	Triplicate Site with 146A, 146B and 146C - Annual data provided for 146C only
146C	365910	173680	32.4	38.2	32.1	25.1	31.1	26.0	28.3	25.7	30.1	35.6	38.2	27.7	31.2	25.3	-	Triplicate Site with 146A, 146B and 146C - Annual data provided for 146C only
147	364586	174496	33.2	30.8	28.6	28.1	28.6	28.7	30.3	25.1	32.2	34.1	36.3	38.8	31.2	25.3	-	
148	360077	178900	25.4	20.5	17.6	15.6	19.0	13.3	15.0	15.0	21.6	24.1	27.6	19.3	19.5	15.8	-	
149	360050	179021	25.5	24.1	20.4	18.6	20.5	16.1	16.6	16.4	24.1	27.2	29.8	20.6	21.7	17.5	-	
150	364528	174425	28.9	21.9	20.6	18.9	20.7	18.5	18.0	18.4	25.5	27.0	30.9	30.1	23.3	18.9	-	
151	364049	178726	29.4	24.3	24.0	19.4	15.9	18.5	21.8	21.7	18.3	24.8	31.0	22.7	22.7	18.4	-	
152	360945	182831	28.6	22.0	18.6	16.0	16.9	13.2	14.8		23.0	22.3	27.0	20.3	20.2	16.4	-	
154	363242	180724	23.3	19.7	16.8	9.5	11.5	12.2	12.5	13.5	14.6	19.6	22.8	16.6	16.1	13.0	-	
157	363999	178505	25.3	26.5	21.1	16.4	18.2	19.6	20.3	17.0	20.8	23.8	27.6	21.2	21.5	17.4	-	
158	366157	178557	24.7	33.7	17.0	14.3	16.8	13.2	11.7	12.7	22.9	22.9	23.4	21.8	19.6	15.9	-	
159	372395	188581	30.2	21.7	21.3	20.2	23.2	17.8	16.3	15.7	23.7	28.8	34.6	26.3	23.3	18.9	-	
160	364655	175931	29.3	26.9	22.6	18.1	21.4	22.0	20.1	20.3	25.0	27.9	31.6	34.1	24.9	20.2	-	
161	364906	176022	28.8	25.4	24.8	21.3	14.9	18.5	21.2	17.1	23.7	22.8	27.4	25.3	22.6	18.3	-	
162	364925	176062	32.3	23.6	22.4	18.0	13.8	12.1	13.7	15.5	20.2	23.9	28.4	27.6	21.0	17.0	-	
163	364918	175979	29.6	24.2	21.7	20.2	17.9	14.5	19.6	18.8	20.5	23.1	28.5	26.5	22.1	17.9	-	
164	364811	175919	27.7	24.9	23.4	17.0	19.2	16.1	20.3	19.9	25.6	29.8	33.4	33.0	24.2	19.6	-	
165	364906	175864	34.6	27.5	29.3	23.9	28.0	19.9	19.7	21.6	35.9	41.7	35.5	34.9	29.4	23.8	-	
166	364770	173695	23.3	21.1	20.9	15.6	17.9	15.2	17.5	16.6	19.9	23.1	29.6	27.2	20.7	16.7	-	
167	364652	173957	26.2	27.2	22.5	20.8	18.7	18.0	20.7	20.0	26.8	27.1	31.1	25.1	23.7	19.2	-	
168	365366	173805	25.7	19.2	18.3	16.0	19.0	12.6	13.4	15.6	24.0	23.9	30.3	20.4	19.9	16.1	-	

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 (0.81)	Annual Mean: Distance Corrected to Nearest Exposure	Comment
169	366714	173560	26.9	26.9	22.8	22.6	20.8	21.4	17.9	21.7	23.5	24.2	26.9	23.5	23.3	18.8	-	
170	360606	181675	25.9	19.6	17.8	15.4	17.5	14.1	13.3	14.4	19.8	24.0	26.7	18.2	18.9	15.3	-	
172	365153	176812	24.9	26.2	20.9	18.0	19.5	20.2	20.1	18.9	24.1	23.5	28.3	30.1	22.9	18.5	-	
173	366459	176139	25.3	22.3	20.6	14.7	17.5	11.2	14.3	12.5	18.3	21.1	26.1	23.9	19.0	15.4	-	
174	372011	192189	18.6	14.2	12.3	13.2	13.0	10.7	11.6	12.2	15.4	14.8	19.7	18.1	14.5	11.7	-	
180	370605	172681	25.2	19.4	19.4	12.2	20.9	15.8	16.2	12.2	21.2	27.6	29.7	15.5	19.6	15.9	-	
181	367298	173452	26.0		20.6	18.9	17.6	17.0	18.6	16.7	21.5	20.9	26.6	19.4	20.3	16.5	-	
185	364634	175946	24.6	21.3	23.5	17.7	20.4	16.8	18.2	18.5	25.7	27.0	34.6	33.3	23.5	19.0	-	
187	363785	189856	25.6	21.7	21.0	20.4	20.4	14.8	15.5	14.8	21.8	27.1	28.5	17.9	20.8	16.8	-	
188	360450	181066		42.0	36.4	33.9	40.4	29.9	38.9	33.1	39.5	39.2	41.9	34.4	37.2	30.2	-	
189	365668	173738	27.4	27.2	23.4	17.4	22.1	18.5	23.8	23.2	21.8	26.9	29.6	22.5	23.6	19.2	-	
191A	363773	178500	28.6	21.8	22.5	25.0	25.4	20.5	17.4	17.6	29.3	28.4	31.6		-	-	-	Triplicate Site with 191A, 191B and 191C - Annual data provided for 191C only
191B	363773	178500	27.8	24.9	23.5	27.4	27.8	20.1	17.8	16.6	31.4	27.3	31.6	23.3	-	-	-	Triplicate Site with 191A, 191B and 191C - Annual data provided for 191C only
191C	363773	178500	27.7	21.7	21.0	21.9	23.8	21.4	15.0	16.7	29.6	28.5	30.2	24.4	24.3	19.7	-	Triplicate Site with 191A, 191B and 191C - Annual data provided for 191C only
192A	362384	178562	27.6	21.7	19.4	17.6	18.5	16.9	14.3	15.9	23.7	23.5	28.7	20.1	-	-	-	Triplicate Site with 192A, 192B and 192C - Annual data provided for 192C only
192B	362384	178562	23.0	20.9	16.7	16.6	19.4	15.9	14.5	19.2	21.7	20.8	27.3	17.4	-	-	-	Triplicate Site with 192A, 192B and 192C - Annual data provided for 192C only
192C	362384	178562	26.4	19.9	17.3	16.2	16.4	15.3	12.7	14.6	23.4	22.8	27.6	20.5	19.9	16.1	-	Triplicate Site with 192A, 192B and 192C - Annual data provided for 192C only
193	365981	174370	28.5	23.8	20.9	18.3	19.5	16.3	14.5	16.0	24.1	25.1	28.8	29.0	22.1	17.9	-	
194	364655	174020	25.3	20.2	18.1	14.0	14.6	13.9	14.1	9.0	16.4	20.2	25.1	25.4	18.0	14.6	-	

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 (0.81)	Annual Mean: Distance Corrected to Nearest Exposure	Comment
195	364874	174009	16.6	15.8	13.2	11.7	10.5	8.9	9.8	10.1	14.2	14.7	21.4	21.1	14.0	11.3	-	
196	364991	173592	24.9	19.4	19.2	15.2	17.0	12.5	13.5	13.6	20.7	21.7	29.3	25.6	19.4	15.7	-	
197	364813	173730	21.9	16.7	16.9	14.3	15.5	13.0	14.2	15.6	19.0	25.9	31.1	27.1	19.3	15.6	-	
198	364538	173666	20.0	15.4	16.9	21.8	14.2	11.0	11.8	11.0	15.2	19.7	24.5	21.5	16.9	13.7	-	
199	364510	173746	34.8	28.3	26.9	24.4	26.0	26.7	26.1	22.4	31.7	29.1	34.4		28.2	22.9	-	
200	364583	173906	28.6	23.3	23.4	19.3		20.8	19.7	19.5	26.3	30.8		34.2	24.6	19.9	-	
201	364645	173895	27.6	32.0	21.7	22.2	25.2	26.7	20.9	20.4	31.0	32.5	37.7	30.4	27.4	22.2	-	
202	364952	173851	21.3	22.1	17.6		14.0	12.9	12.4	14.0	14.9	19.8	22.8	18.8	17.3	14.0	-	
203	361240	180548						18.0	20.2	20.9	27.8	27.0	33.8	24.7	24.6	20.6	-	
204	357036	180268									20.1	17.4	22.7	17.4	19.4	12.8	-	

☒ **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.**

☒ **South Gloucestershire Council confirm that all 2024 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 South Gloucestershire During 2024

South Gloucestershire Council has not identified any new sources relating to air quality that have not been otherwise assessed through the planning process within the reporting year of 2024.

However, there are major development proposals in the East fringe near the Kingswood – Warmley AQMA which will require review to ensure the AQMA is not affected.

Additional Air Quality Works Undertaken by South Gloucestershire During 2024

During 2024, South Gloucestershire Council additionally continued the monitoring, reporting and management of the JAQU Air Quality scheme implemented on the A4174 at Hambrook. Further details about this scheme are provided in Section 2.2.

Ozone monitoring was also undertaken, in addition to LAQM pollutants NO_2, PM_{10} and $PM_{2.5}$, at the Stoke Gifford A4174 automatic site, with the results reported in Appendix F.

QA/QC of Diffusion Tube Monitoring

The diffusion tubes have been prepared and analysed by Somerset County Council Scientific Services since 2019, following a change from Gradko for the years 2017 and 2018. Somerset County Council Scientific Services also previously prepared and analysed the diffusion tubes for the period 2012 – 2016. The tubes are prepared by the laboratory using 20% triethanolamine (TEA) in water and the method follows the Diffusion Tubes for Ambient NO_2 Monitoring: Practical Guidance document[74].

While the laboratory is not UKAS accredited, it participates in the AIR NO_2 Proficiency Testing (PT) scheme. The latest available AIR PT report (released April 2025) includes the

[74] Practical Guidance: NO_2 Diffusion Tubes for LAQM | LAQM (defra.gov.uk)

four AIR PT testing rounds (AR062, AR063, AR065 & AR066) during 2024 and indicates the laboratory performance was satisfactory (100%)[75]. Laboratory performance in AIR PT is also assessed by the National Physical Laboratory (NPL), alongside the laboratory's data from the monthly NPL Field Intercomparison Exercise carried out at the continuous monitoring station in Marylebone Road, central London.

The diffusion tube Precision Summary Results[76] also show Somerset County Council Scientific Services to have good tube precision (the ability for a measurement to be consistently reproduced) in 2024.

The tube changing frequency was completed in adherence with the Diffusion Tube Monitoring Calendar of suggested exposure periods for 2024[77] and was carried out by South Gloucestershire Council officers.

Diffusion Tube Annualisation

In 2024, three diffusion tube sites (136, 203 and 204) had data capture less than 75% (but greater than 25%) because of sites either discontinuing (site 136) or commencing (sites 203 and 204) part way through the year. The annualised means were estimated using the Diffusion Tube Data Processing Tool with 2024 data from four AURN monitoring sites within 50 miles from South Gloucestershire: Bristol St. Pauls, Cardiff Centre, Newport and Swindon Walcot. The calculated annualisation factors and annualised means for these sites are shown in Table C.1.

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

Site ID	Annualisation Factor Bristol St Paul's	Annualisation Factor Cardiff Centre	Annualisation Factor Newport	Annualisation Factor Swindon Walcot	Average Annualisation Factor	Raw Data Annual Mean	Annualised Annual Mean
136	0.9358	0.9383	0.9681	0.9816	0.9560	20.1	19.2
203	1.0509	1.0478	1.0239	1.0136	1.0340	24.6	25.5
204	0.8253	0.8196	0.8135	0.7873	0.8114	19.4	15.8

[75] QA QC Framework | LAQM (defra.gov.uk)

[76] Precision and Accuracy | LAQM (defra.gov.uk)

[77] NO_2 Diffusion Tube Monitoring Calendar | LAQM (defra.gov.uk)

Diffusion Tube Bias Adjustment Factors

The diffusion tube data presented within the 2025 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.

National Bias Adjustment Factor

During 2024, the Council operated co-location studies at Yate, Stoke Gifford A4174 and Hambrook A4174 automatic monitoring sites. These three studies were included in the national database of co-location surveys for 2024[78]. The national bias adjustment factor (BAF) for 2024 was 0.81 (spreadsheet versions 03/25) for Somerset County Council Scientific Services (4 studies). The subsequently released BAFs (spreadsheet versions 04/25 & 06/25) remained at 0.81 as no further studies were added.

Local Bias Adjustment Factor

The Diffusion Tube Precision and Accuracy Bias spreadsheet[79] was used to compare the triplicate co-located diffusion tube data with the automatic monitoring data at the Yate, Stoke Gifford and Hambrook sites and calculate local bias adjustment factors of 0.70 (Yate), 0.86 (Stoke Gifford) and 0.84 (Hambrook) for 2024, as shown in Figure C.1, Figure C.2 and Figure C.3 respectively. The Local Bias Adjustment calculations are also shown in Table C.2.

The data capture was above 90% for all measurement periods at the Yate, Stoke Gifford and Hambrook sites. The precision of the co-located triplicate tubes was classed as good for all periods at all three sites.

The three local BAFs were combined using the methodology in LAQM.TG22 Chapter 7, paragraph 7.224 (p143) to calculate the South Gloucestershire 2024 Local BAF of 0.79.

[78] National Bias Adjustment Factors | LAQM (defra.gov.uk)

[79] Local Bias Adjustment Factors | LAQM (defra.gov.uk)

Figure C.1 – 2024 Yate Co-location Study Precision and Accuracy

Checking Precision and Accuracy of Triplicate Tubes

AEA Energy & Environment
From the AEA group

Diffusion Tubes Measurements

Period	Start Date dd/mm/yyyy	End Date dd/mm/yyyy	Tube 1 µgm⁻³	Tube 2 µgm⁻³	Tube 3 µgm⁻³	Triplicate Mean	Standard Deviation	Coefficient of Variation (CV)	95% CI of mean
1	02/01/2024	29/01/2024	22.6	21.1	22.2	22	0.8	3	1.9
2	29/01/2024	04/03/2024	19.4	17.5	19.9	19	1.2	7	3.1
3	04/03/2024	02/04/2024	18.5	18.3	18.2	18	0.1	1	0.4
4	02/04/2024	29/04/2024	13.4	11.5	11.4	12	1.1	9	2.8
5	29/04/2024	03/06/2024	13.7	13.0	13.5	13	0.3	3	0.9
6	03/06/2024	01/07/2024	10.8	10.9	12.4	11	0.9	8	2.2
7	01/07/2024	29/07/2024	12.8	13.8	13.8	13	0.6	5	1.5
8	29/07/2024	02/09/2024	13.2	14.1	13.1	13	0.6	4	1.4
9	02/09/2024	30/09/2024	12.7	14.9	13.9	14	1.1	8	2.7
10	30/09/2024	04/11/2024	19.7	17.8	19.4	19	1.0	5	2.4
11	04/11/2024	02/12/2024	24.7	25.0	23.5	24	0.8	3	1.9
12	02/12/2024	06/01/2025	19.8	21.5	20.0	20	0.9	4	2.2
13									

It is necessary to have results for at least two tubes in order to calculate the precision of the measurements

Automatic Method		Data Quality Check	
Period Mean	Data Capture (% DC)	Tubes Precision Check	Automatic Monitor Data
18.0	99.4	Good	Good
15.3	98.8	Good	Good
13.2	98.3	Good	Good
9.9	98.3	Good	Good
10.2	96.1	Good	Good
8.1	98.7	Good	Good
7.9	98.1	Good	Good
8.0	97.9	Good	Good
9.6	98.4	Good	Good
11.8	99.2	Good	Good
16.6	99.0	Good	Good
11.7	98.8	Good	Good
Overall survey -->		Good precision	Good Overall

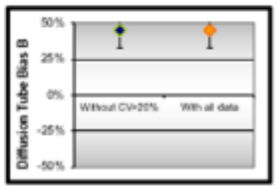
(Check average CV & DC from Accuracy calculations)

Site Name/ ID: Yate Station Road Co-location

Precision: 12 out of 12 periods have a CV smaller than 20%

Accuracy (with 95% confidence interval)
without periods with CV larger than 20%
Bias calculated using 12 periods of data
Bias factor A: 0.7 (0.64 - 0.76)
Bias B: 43% (31% - 55%)
Diffusion Tubes Mean: 17 µgm⁻³
Mean CV (Precision): 5
Automatic Mean: 12 µgm⁻³
Data Capture for periods used: 98%
Adjusted Tubes Mean: 12 (11 - 13) µgm⁻³

Accuracy (with 95% confidence interval)
WITH ALL DATA
Bias calculated using 12 periods of data
Bias factor A: 0.7 (0.64 - 0.76)
Bias B: 43% (31% - 55%)
Diffusion Tubes Mean: 17 µgm⁻³
Mean CV (Precision): 5
Automatic Mean: 12 µgm⁻³
Data Capture for periods used: 98%
Adjusted Tubes Mean: 12 (11 - 13) µgm⁻³



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Version 04 - February 2011

Figure C.2 – 2024 Stoke Gifford Co-location Study Precision and Accuracy

Checking Precision and Accuracy of Triplicate Tubes

AEA Energy & Environment
From the AEA group

Diffusion Tubes Measurements

Period	Start Date dd/mm/yyyy	End Date dd/mm/yyyy	Tube 1 µgm⁻³	Tube 2 µgm⁻³	Tube 3 µgm⁻³	Triplicate Mean	Standard Deviation	Coefficient of Variation (CV)	95% CI of mean
1	03/01/2024	30/01/2024	27.6	23.0	26.4	26	2.4	9	5.9
2	30/01/2024	05/03/2024	21.7	20.9	19.9	21	0.9	4	2.2
3	05/03/2024	03/04/2024	19.4	16.7	17.3	18	1.4	8	3.6
4	03/04/2024	30/04/2024	17.6	16.6	16.2	17	0.7	4	1.8
5	30/04/2024	04/06/2024	18.5	19.4	16.4	18	1.6	9	3.9
6	04/06/2024	02/07/2024	16.9	15.9	15.3	16	0.8	5	2.0
7	02/07/2024	30/07/2024	14.3	14.5	12.7	14	1.0	7	2.4
8	30/07/2024	03/09/2024	15.9	19.2	14.6	17	2.4	15	6.0
9	03/09/2024	01/10/2024	23.7	21.7	23.4	23	1.1	5	2.7
10	01/10/2024	05/11/2024	23.5	20.8	22.8	22	1.4	6	3.4
11	05/11/2024	03/12/2024	28.7	27.3	27.6	28	0.8	3	1.9
12	03/12/2024	08/01/2025	20.1	17.4	20.5	19	1.7	9	4.2
13									

It is necessary to have results for at least two tubes in order to calculate the precision of the measurements

Automatic Method		Data Quality Check	
Period Mean	Data Capture (% DC)	Tubes Precision Check	Automatic Monitor Data
22.7	95.7	Good	Good
17.1	99.8	Good	Good
15.1	99.7	Good	Good
15.1	99.7	Good	Good
16.9	99.8	Good	Good
16.5	99.7	Good	Good
12.3	99.7	Good	Good
11.4	99.8	Good	Good
18.4	95.8	Good	Good
19.3	99.8	Good	Good
23.4	99.7	Good	Good
17.6	99.7	Good	Good
Overall survey -->		Good precision	Good Overall

(Check average CV & DC from Accuracy calculations)

Site Name/ ID: Stoke Giff A4174 CH Lane Co-loc

Precision: 12 out of 12 periods have a CV smaller than 20%

Accuracy (with 95% confidence interval)
without periods with CV larger than 20%
Bias calculated using 12 periods of data
Bias factor A: 0.86 (0.81 - 0.92)
Bias B: 16% (8% - 23%)
Diffusion Tubes Mean: 20 µgm⁻³
Mean CV (Precision): 7
Automatic Mean: 17 µgm⁻³
Data Capture for periods used: 99%
Adjusted Tubes Mean: 17 (16 - 18) µgm⁻³

Accuracy (with 95% confidence interval)
WITH ALL DATA
Bias calculated using 12 periods of data
Bias factor A: 0.86 (0.81 - 0.92)
Bias B: 16% (8% - 23%)
Diffusion Tubes Mean: 20 µgm⁻³
Mean CV (Precision): 7
Automatic Mean: 17 µgm⁻³
Data Capture for periods used: 99%
Adjusted Tubes Mean: 17 (16 - 18) µgm⁻³

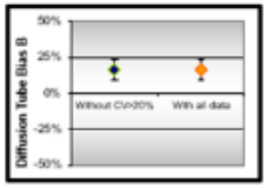

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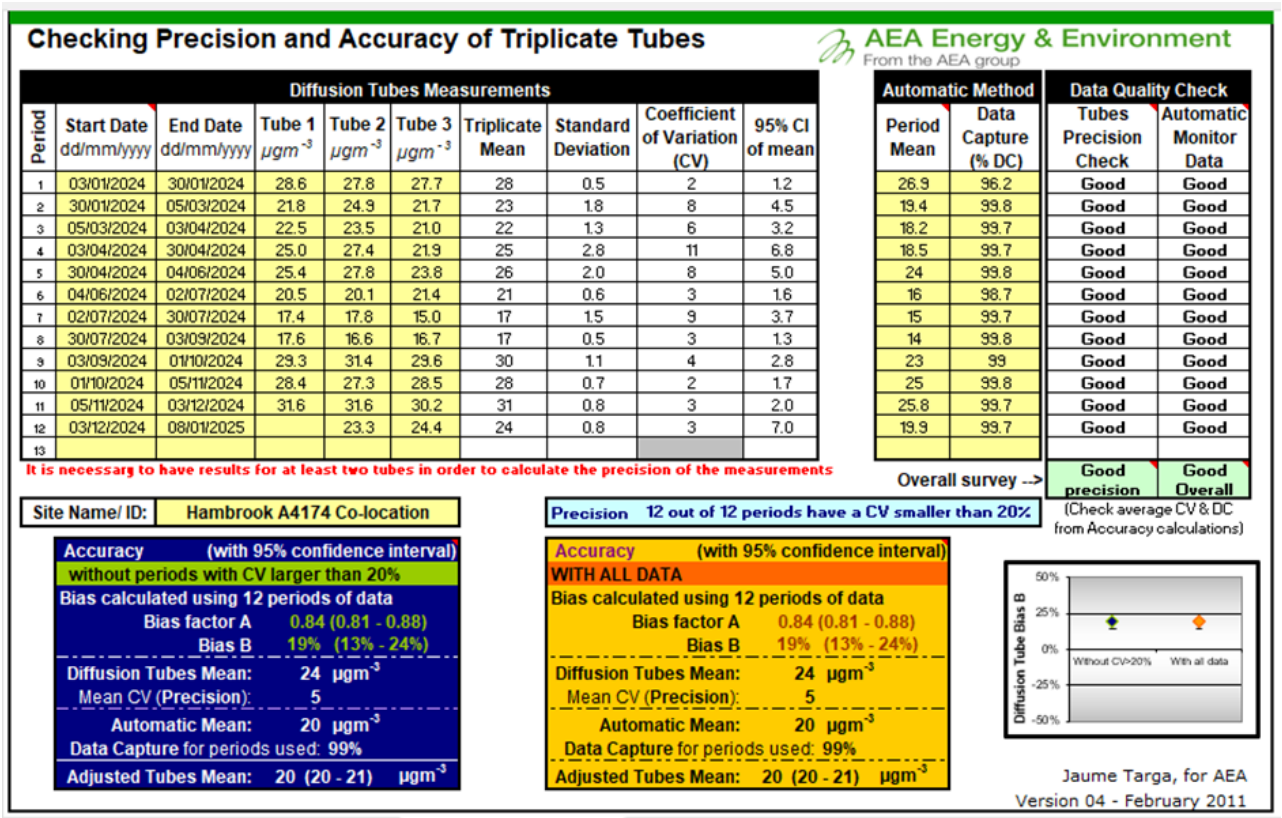
Figure C.3 – 2024 Hambrook Co-location Study Precision and Accuracy



Checking Precision and Accuracy of Triplicate Tubes

AEA Energy & Environment
From the AEA group

Diffusion Tubes Measurements

Period	Start Date dd/mm/yyyy	End Date dd/mm/yyyy	Tube 1 µgm⁻³	Tube 2 µgm⁻³	Tube 3 µgm⁻³	Triplicate Mean	Standard Deviation	Coefficient of Variation (CV)	95% CI of mean
1	03/01/2024	30/01/2024	28.6	27.8	27.7	28	0.5	2	1.2
2	30/01/2024	05/03/2024	21.8	24.9	21.7	23	1.8	8	4.5
3	05/03/2024	03/04/2024	22.5	23.5	21.0	22	1.3	6	3.2
4	03/04/2024	30/04/2024	25.0	27.4	21.9	25	2.8	11	6.8
5	30/04/2024	04/06/2024	25.4	27.8	23.8	26	2.0	8	5.0
6	04/06/2024	02/07/2024	20.5	20.1	21.4	21	0.6	3	1.6
7	02/07/2024	30/07/2024	17.4	17.8	15.0	17	1.5	9	3.7
8	30/07/2024	03/09/2024	17.6	16.6	16.7	17	0.5	3	1.3
9	03/09/2024	01/10/2024	29.3	31.4	29.6	30	1.1	4	2.8
10	01/10/2024	05/11/2024	28.4	27.3	28.5	28	0.7	2	1.7
11	05/11/2024	03/12/2024	31.6	31.6	30.2	31	0.8	3	2.0
12	03/12/2024	08/01/2025		23.3	24.4	24	0.8	3	7.0
13									

It is necessary to have results for at least two tubes in order to calculate the precision of the measurements

Automatic Method		Data Quality Check	
Period Mean	Data Capture (% DC)	Tubes Precision Check	Automatic Monitor Data
26.9	96.2	Good	Good
19.4	99.8	Good	Good
18.2	99.7	Good	Good
18.5	99.7	Good	Good
24	99.8	Good	Good
16	98.7	Good	Good
15	99.7	Good	Good
14	99.8	Good	Good
23	99	Good	Good
25	99.8	Good	Good
25.8	99.7	Good	Good
19.9	99.7	Good	Good
Overall survey -->		Good precision	Good Overall

(Check average CV & DC from Accuracy calculations)

Site Name/ ID: Hambrook A4174 Co-location

Precision 12 out of 12 periods have a CV smaller than 20%

Accuracy (with 95% confidence interval)
without periods with CV larger than 20%
Bias calculated using 12 periods of data
Bias factor A 0.84 (0.81 - 0.88)
Bias B 19% (13% - 24%)
Diffusion Tubes Mean: 24 µgm⁻³
Mean CV (Precision): 5
Automatic Mean: 20 µgm⁻³
Data Capture for periods used: 99%
Adjusted Tubes Mean: 20 (20 - 21) µgm⁻³

Accuracy (with 95% confidence interval)
WITH ALL DATA
Bias calculated using 12 periods of data
Bias factor A 0.84 (0.81 - 0.88)
Bias B 19% (13% - 24%)
Diffusion Tubes Mean: 24 µgm⁻³
Mean CV (Precision): 5
Automatic Mean: 20 µgm⁻³
Data Capture for periods used: 99%
Adjusted Tubes Mean: 20 (20 - 21) µgm⁻³

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Table C.2 – Local Bias Adjustment Calculation

	Local Bias Adjustment Input 1 SG1 Yate Station Rd	Local Bias Adjustment Input 2 SG2 Stoke Gifford A4174	Local Bias Adjustment Input 3 SG3 Hambrook A4174
Periods used to calculate bias	12	12	12
Bias Factor A	0.7 (0.64 - 0.76)	0.86 (0.81 - 0.92)	0.84 (0.81 - 0.88)
Bias Factor B	43% (31% - 55%)	16% (8% - 23%)	19% (13% - 24%)
Diffusion Tube Mean (µg/m³)	17	20	24
Mean CV (Precision)	5%	7%	5%
Automatic Mean (µg/m³)	12	17	20
Data Capture	98%	99%	99%
Adjusted Tube Mean (µg/m³)	12 (11 – 13)	17 (16 – 18)	20 (20 – 21)

Notes: A combined local bias adjustment factor of 0.79 was calculated using the methodology in LAQM.TG22 (Chapter 7, p143), however it was not used to bias adjust the 2024 diffusion tube results and is shown for information only.

Discussion of Choice of Factor to use

South Gloucestershire Council have applied a national bias adjustment factor of 0.81 (spreadsheet version 03/25) to the 2024 monitoring data following consideration of the guidance on the choice of bias adjustment factor in LAQM.TG22 Box 7.13. The national factor is more conservative as it is slightly higher in value than the local factor (0.79) and also slightly more robust with an additional fourth co-location study to the three South Gloucestershire colocation studies submitted, representing a slightly wider range of monitoring locations.

The subsequently updated national BAF (spreadsheet versions 04/25 & 06/25) for Somerset County Council remained at 0.81 as no further co-location studies were added. The National BAF spreadsheet version 03/25 is referenced as both the LAQM data and JAQU data for the Hambrook scheme was processed using this issue of the BAF, with the JAQU Hambrook data submitted for State Assessment before the April spreadsheet version was released.

A summary of bias adjustment factors used by South Gloucestershire Council over the past five years is presented in Table C.3.

Table C.3 – Bias Adjustment Factor

Monitoring Year	Local or National	If National, Version of National Spreadsheet	Adjustment Factor
2024	National	03/25	0.81
2023	National	03/24	0.79
2022	National	06/23	0.85
2021	National	06/22	0.86
2020	National	06/21	0.85

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.

Distance correction should be considered at any monitoring site where the annual mean concentration is greater than 36 µg/m^3 and the monitoring site is not located at a point of

relevant exposure (taking the limitations of the calculator into account). No diffusion tube NO_2 monitoring locations within South Gloucestershire required distance correction during 2024 as no annual mean concentrations greater than 36 µg/m^3 were recorded. However, the monitoring result at site 61 (Staple Hill – 1 Broad Street) was distance adjusted so that the result at façade could be reported in Table 2.1 because the highest monitored concentration within the Staple Hill AQMA was recorded at this site (26.1 µg/m^3) in 2024. It should be noted though that there is no relevant exposure at ground floor at this site. The NO_2 Fall-off with Distance Calculator[80] was used for the distance adjustment and the input data and result from the calculator is shown in Table C.4.

Table C.4 – Non-Automatic NO_2 Fall off With Distance Calculations (concentrations presented in µg/m^3)

Site ID	Distance (m): Monitoring Site to Kerb	Distance (m): Receptor to Kerb	Monitored Concentration (Annualised and Bias Adjusted	Background Concentration	Concentration Predicted at Receptor	Comments
61	2.3	3.3	26.1	10.8	24.8	None

QA/QC of Automatic Monitoring

The automatic monitoring sites follow the QA/QC programme outlined below:

- Regular checks on the data to ensure analysers and communications are operating correctly and faults are reported as soon as possible by Air Quality Data Management (AQDM) under contract to South Gloucestershire Council
- Monthly Local Site Operator (LSO) duties, including site inspections and calibration checks on the analysers using certified traceable standard gases, by Bristol City Council (BCC) at Yate and Enviro Technology Services at Stoke Gifford and Hambrook, under contract to South Gloucestershire Council
- Ad-hoc site inspections to check equipment operational status, site safety and security and investigate equipment malfunction as necessary by SGC Environmental Protection Officers

[80] NO_2 Fall Off With Distance Calculator | LAQM (defra.gov.uk)

- Planned six monthly servicing and re-calibration of the analysers and repairs as necessary by Enviro Technology Services under contract to South Gloucestershire Council.

Calibration methods

Calibration procedures are carried out monthly. The methodology for the calibration procedure, which includes a two point zero/span calibration check, is derived from the manufacturers' instruction handbooks and from the AURN Site Operator's Manual as follows:

- Pre-calibration check - the site condition and status of the analyser is recorded prior to the zero/span check being conducted
- Zero check – the response of the analyser to the absence of the gas being monitored
- Span check – the response of the analyser to the presence of the gas of a known concentration
- Post calibration check - the site condition and status of the analyser on completion of all checks.

The two point calibration is conducted on the NO_x analysers using a zero air scrubber and a reference nitric oxide (NO) mixture at a concentration of approximately 470 ppb. The contents of the portable scrubber used for zero air generation (hopcalite, activated charcoal, purafil and drierite) are changed when necessary or at least every six months.

Equipment Servicing and Maintenance

The automatic analysers and associated equipment are serviced and re-calibrated at six monthly intervals following manufacturers' instructions by the equipment suppliers, Enviro Technology Services. For the NO_x analysers, this includes multi-point recalibrations as detailed above and a check on the efficiency of the molybdenum converter. The service contract also covers unscheduled site visits and repairs, for example in the event of equipment failure, within a specified period of time to minimise data loss.

The results of all service, maintenance and calibrations checks are held and used in the data scaling and ratification process by AQDM.

Data Processing, Validation and Ratification

Since 2022, Air Quality Data Management (AQDM) have been collecting and managing the automatic monitoring data on behalf of the Council as SGC no longer directly collects the data. AQDM undertake the subsequent validation, scaling and ratification of the data in accordance with LAQM.TG22.

Data validation involves continually screening algorithmically and manually for anomalies. This includes visual examination of the data to check for any spurious or unusual measurements, such as large spikes, 'flat lines' and excessive negative data. Suspicious data is "flagged" for further investigation. The data is scaled against the monthly and full six monthly calibration data.

During data ratification, all the information relating to the dataset and monitoring location is critically reviewed and any initial spurious data that was flagged is re-examined and appropriately edited. The original raw dataset is kept for reference. The monitoring data is compared to trends at nearby AURN sites throughout the whole process. The ratified data is the final data presented in this report. The Automatic Monitoring Data Processing Tool was also used to check the data. This flagged up a small percentage of negative particulate matter hourly mean concentrations (0.06% of PM_{10} data and 1.08% of $PM_{2.5}$ data) at the Stoke Gifford A4174 site. This is likely due to instrument noise around zero and is not considered to be significant or affect the ratified data validity.

The real-time automatic monitoring data for South Gloucestershire is available on the Air Quality in the United Kingdom (ukairquality.net) website. Historic data for the automatic monitoring stations that have ceased operation; Filton (NO_2 and PM_{10}), Kingswood (NO_2 and PM_{10}) and Badminton (O_3), is also available on this website.

PM_{10} and $PM_{2.5}$ Monitoring Adjustment

The PM_{10} data measured by the unheated Beta Attenuation Monitor (BAM) at the Yate automatic monitoring site have been adjusted to gravimetric equivalent by using a factor of 0.833. The PM_{10} measurements are made using a smart heated BAM 1020 at the Stoke Gifford A4174 automatic monitoring site so have been adjusted to gravimetric equivalent using a factor of 0.96618.

The $PM_{2.5}$ measurements are made at the Stoke Gifford A4174 automatic monitoring site using a smart heated BAM 1020 and do not require the application of a correction factor.

Automatic Monitoring Annualisation

All automatic monitoring locations within South Gloucestershire recorded data capture greater than 75% in respect of all monitored pollutants in 2024, therefore annualisation was not required.

NO_2 Fall-off with Distance from the Road

Wherever possible, monitoring locations are representative of exposure but where this is not possible, distance correction to a point of relevant exposure should be considered at any automatic monitoring site where the NO_2 annual mean concentration is greater than 40µg/m^3. However, the 2024 NO_2 annual mean concentrations were all below 40µg/m^3 at the automatic NO_2 monitoring locations within South Gloucestershire and also, there is no relevant exposure in relation to the Yate, Stoke Gifford A4174 or Hambrook A4174 automatic monitoring sites, therefore, distance adjustment of the automatic NO_2 data was not appropriate or possible.

Appendix D: Maps of Monitoring Locations and AQMAs

Figure D.1 – Staple Hill AQMA (Amended 2012)

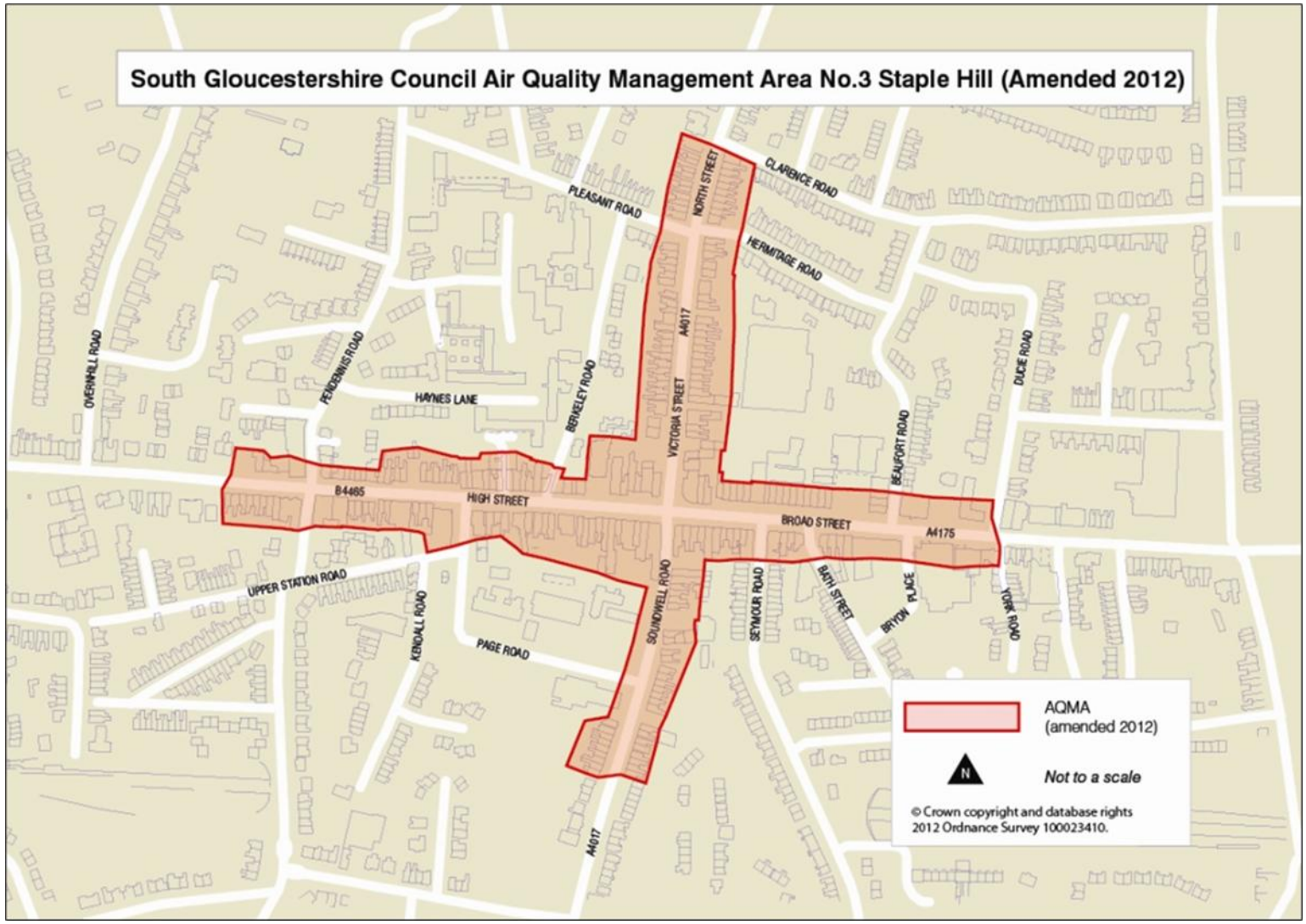


Figure D.2 – Kingswood – Warmley AQMA (Amended 2015)

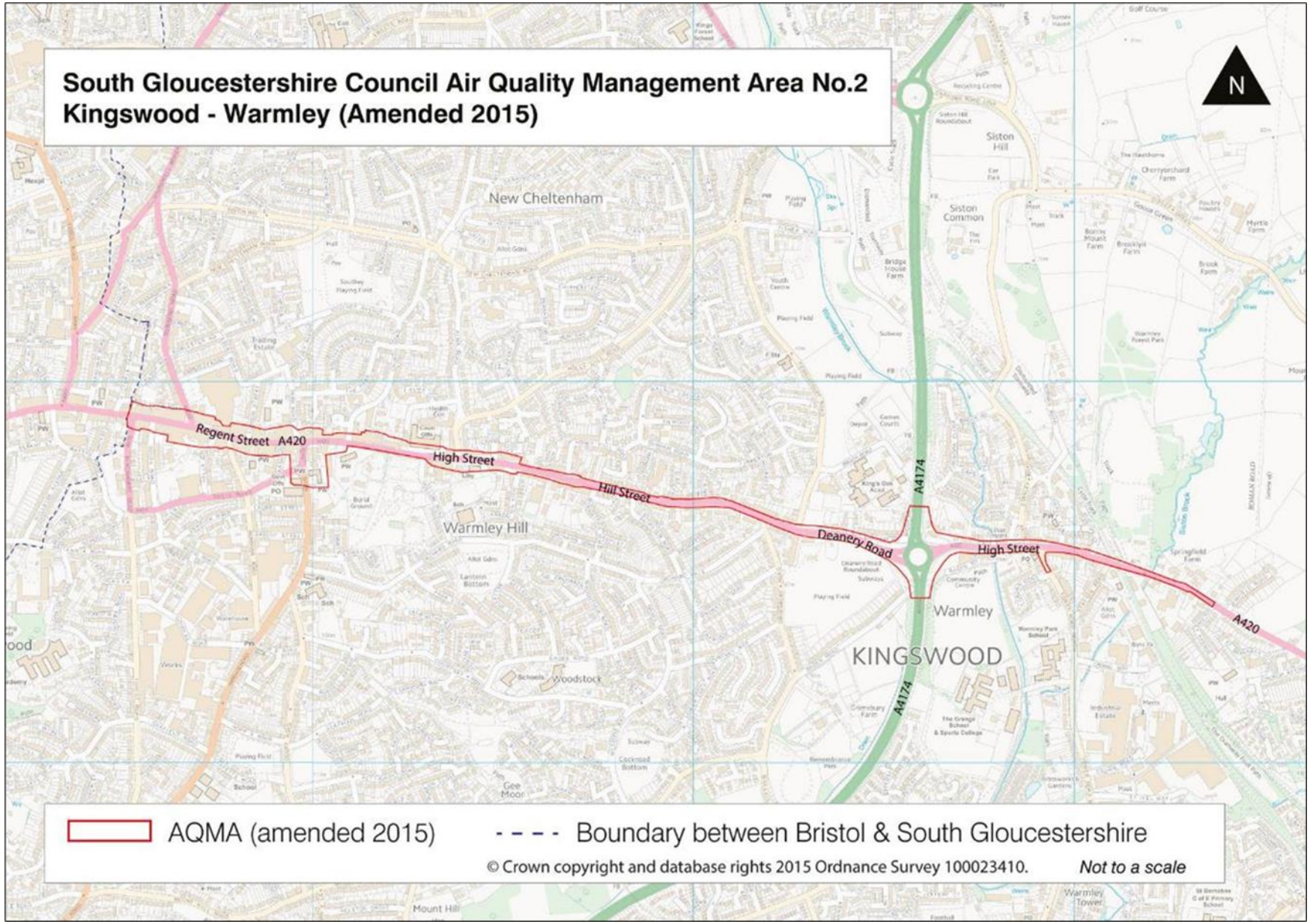


Figure D.3 – Cribbs Causeway AQMA (Revoked 2020)

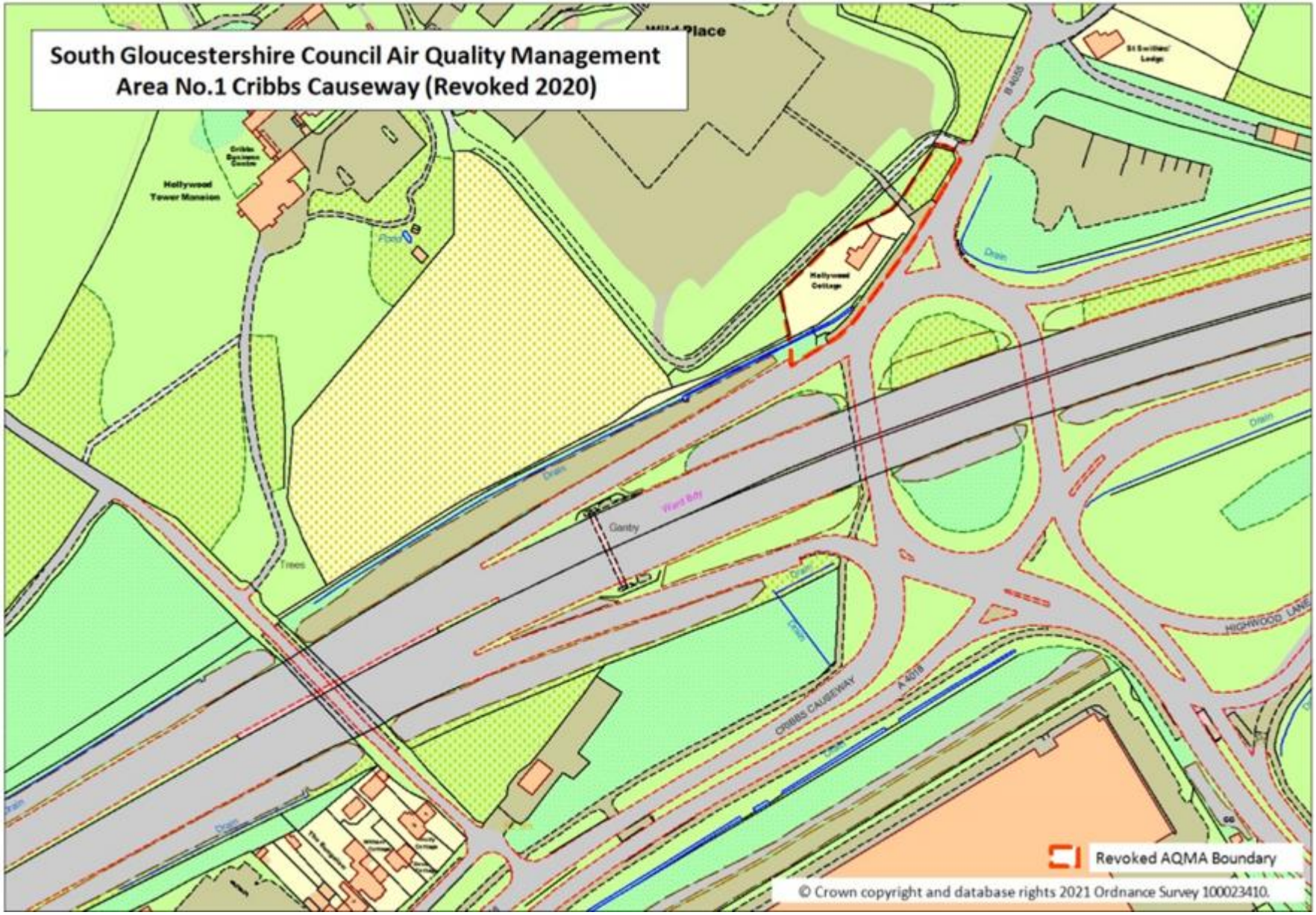


Figure D.4 – Automatic Monitoring Sites in South Gloucestershire

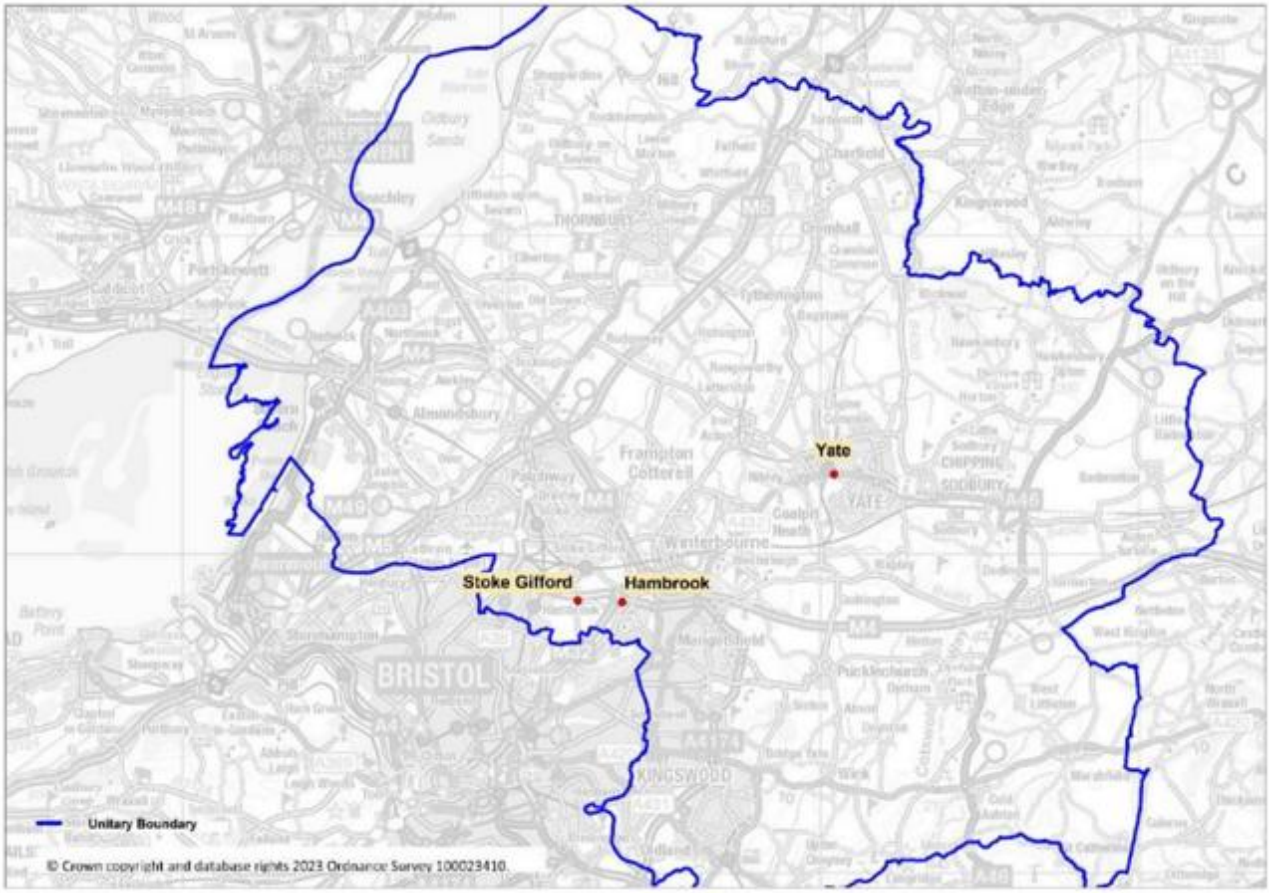


Figure D.5 – Automatic Monitoring Site Yate - Station Road

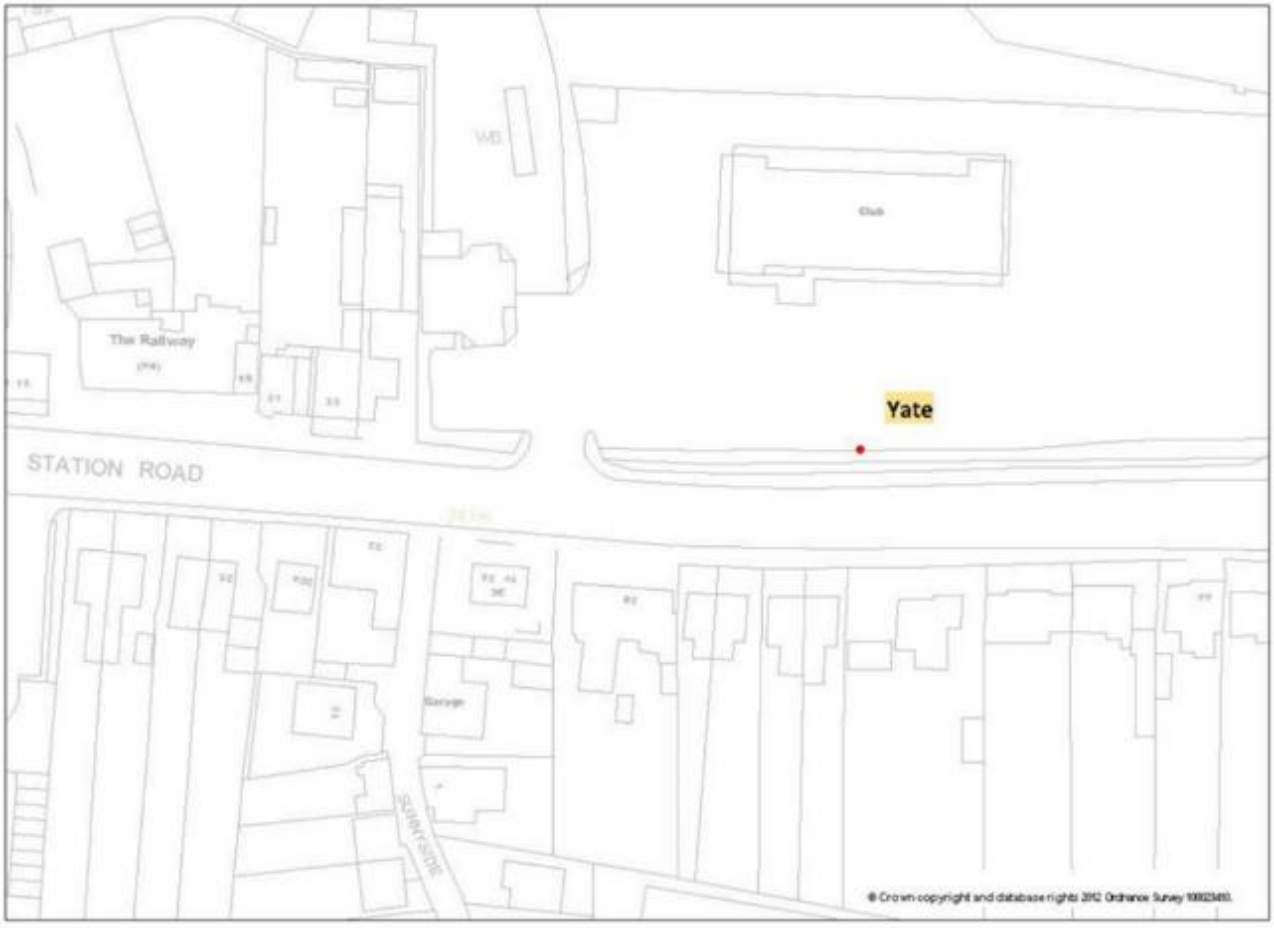


Figure D.6 – Automatic Monitoring Site Stoke Gifford A4174 Ring Road

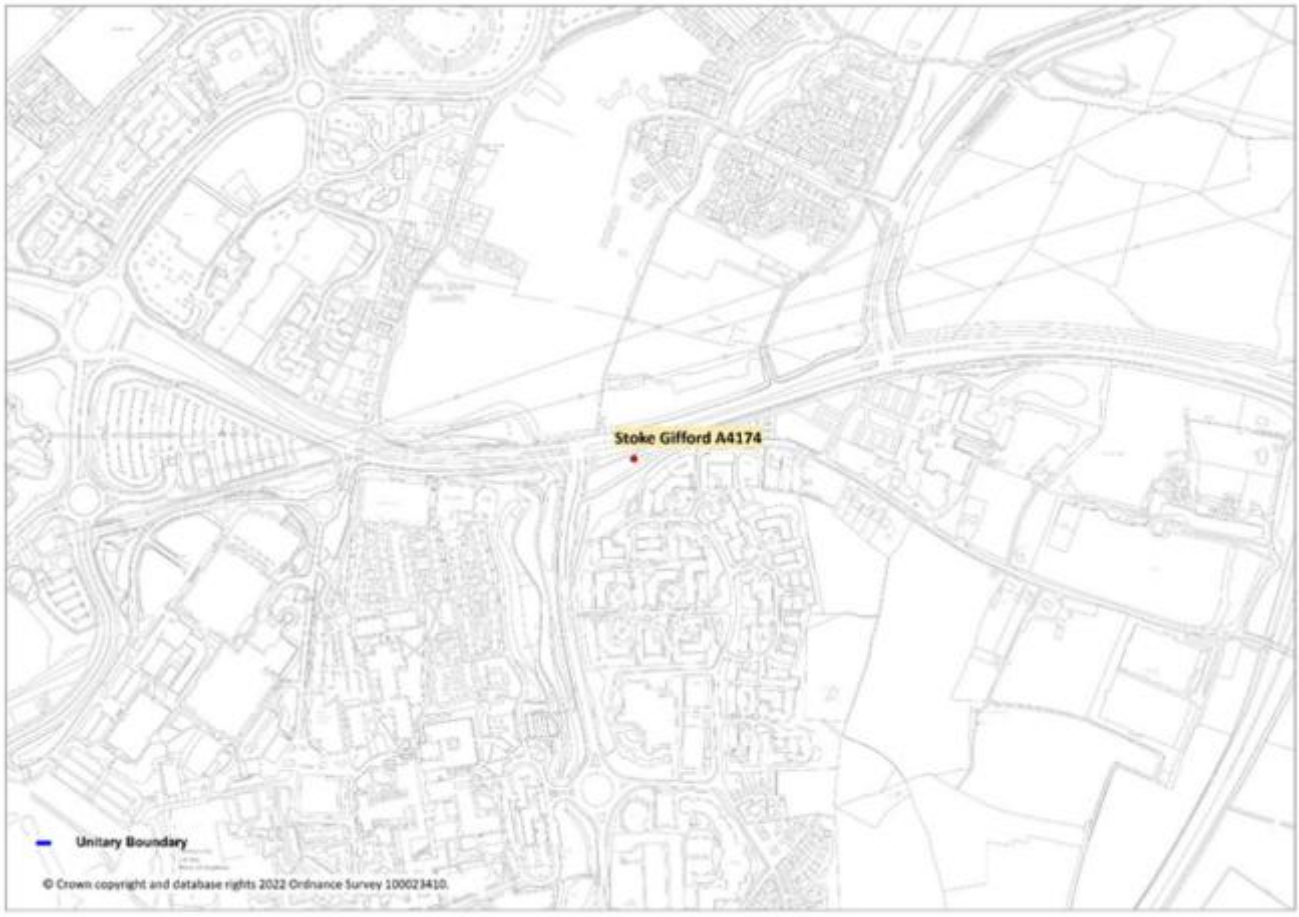


Figure D.7 – Automatic Monitoring Site Hambrook A4174 Ring Road

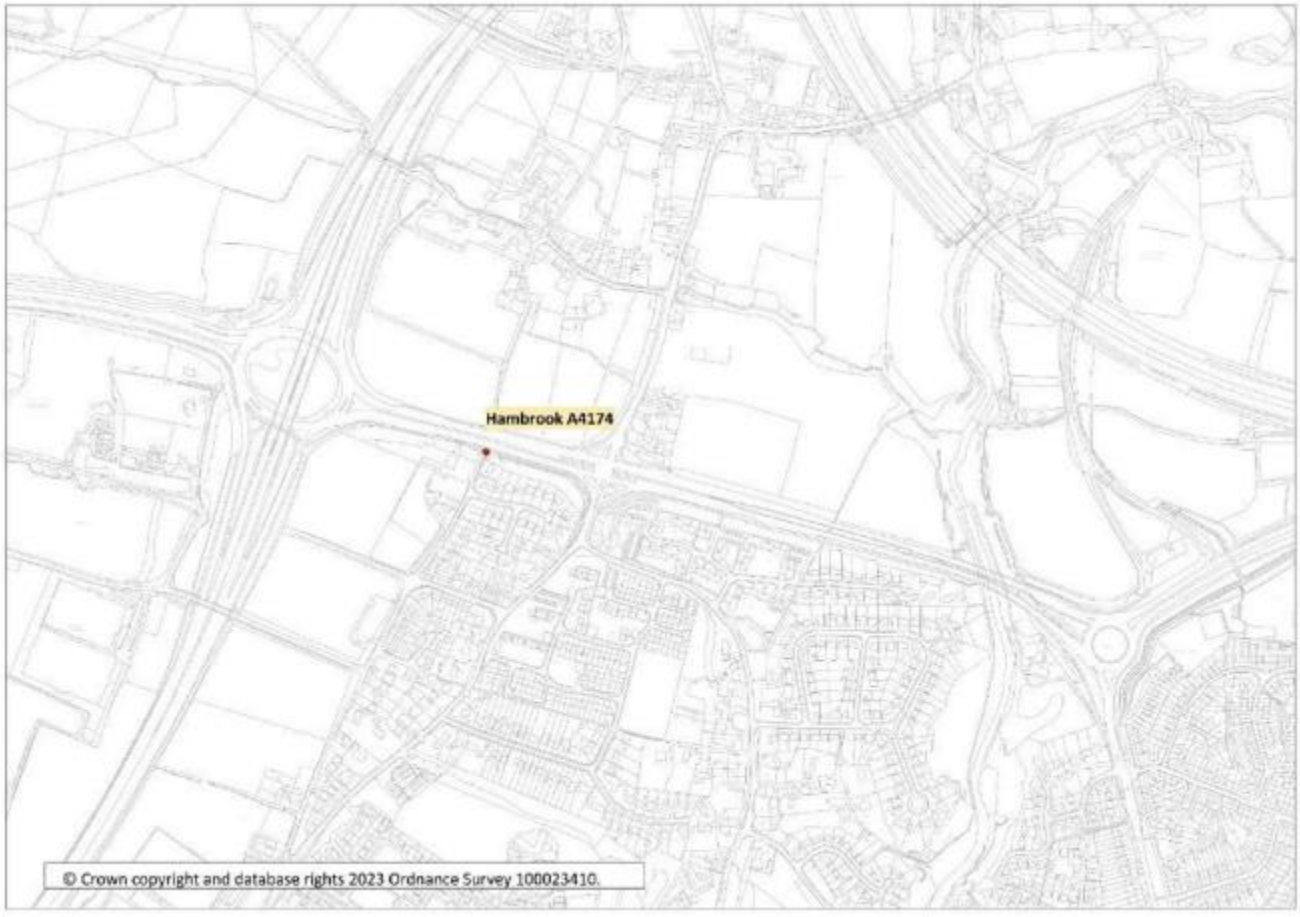


Figure D.8 – All Diffusion Tube Sites showing locations of following Figures

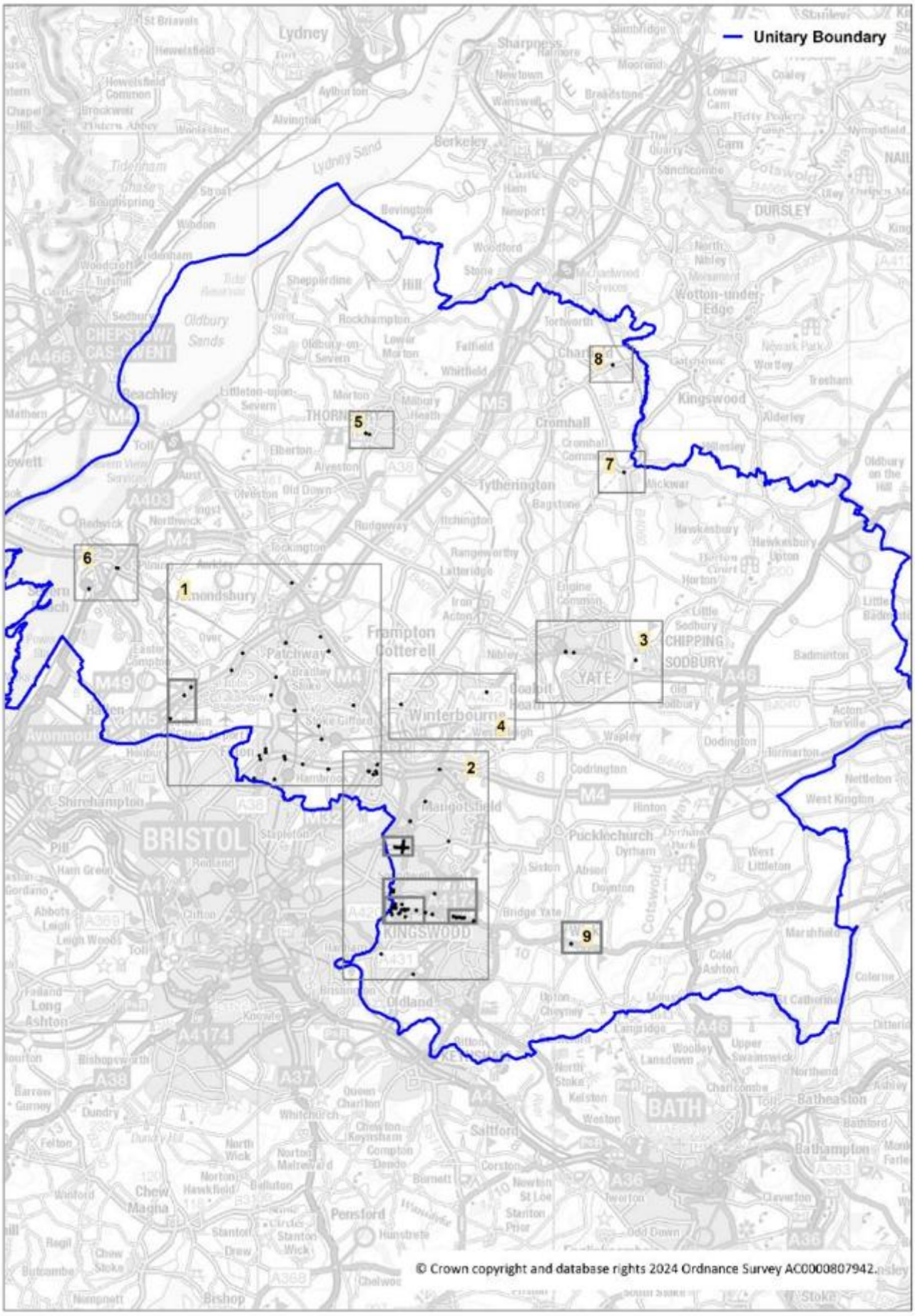


Figure D.9 – Diffusion Tube Sites in Bristol North (Box 1 Figure D.8)

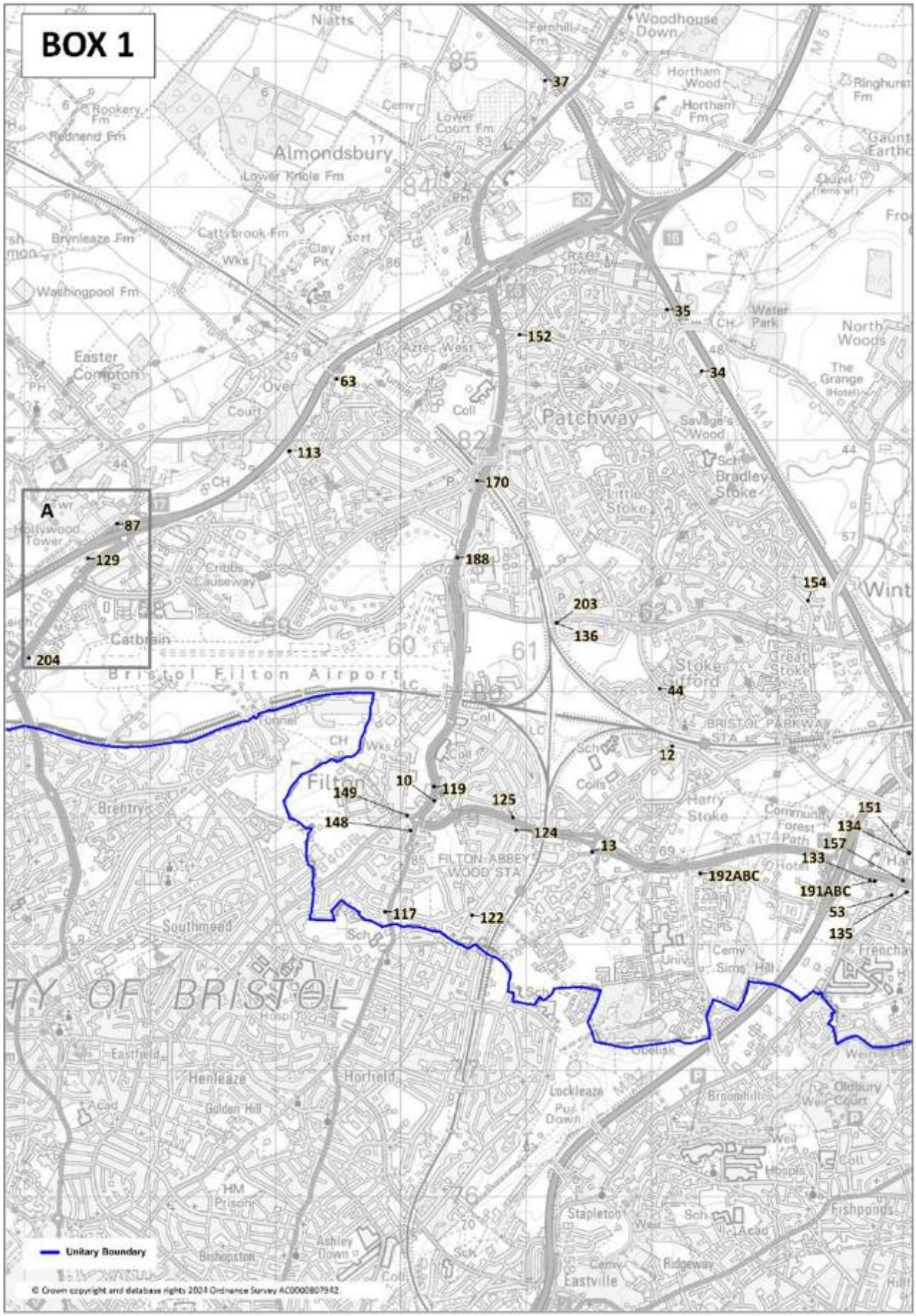


Figure D.10 – Diffusion Tube Sites in Cribbs Causeway (Box A Figure D.9)

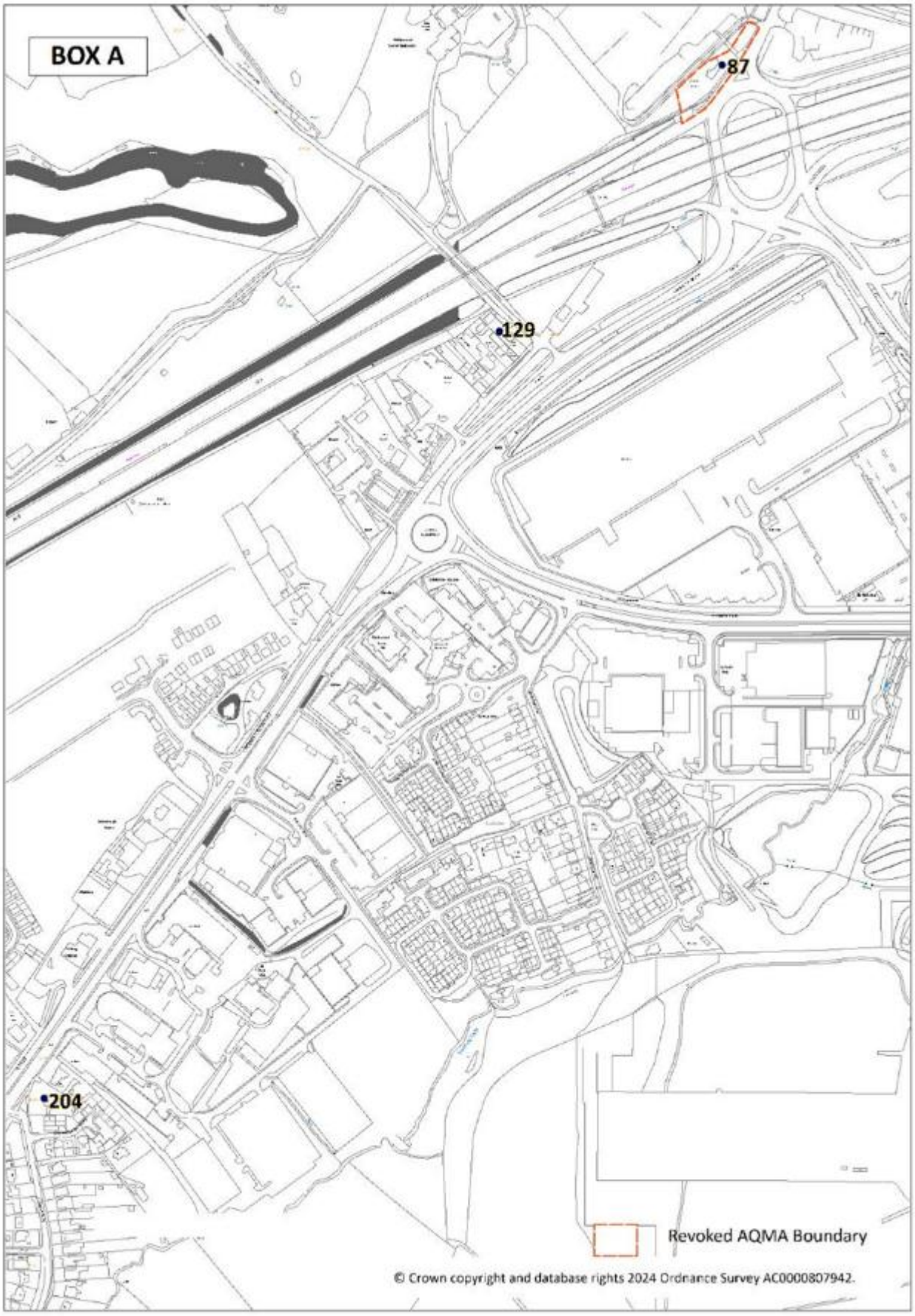


Figure D.11 – Diffusion Tube Sites in Bristol East (Box 2 Figure D.8)

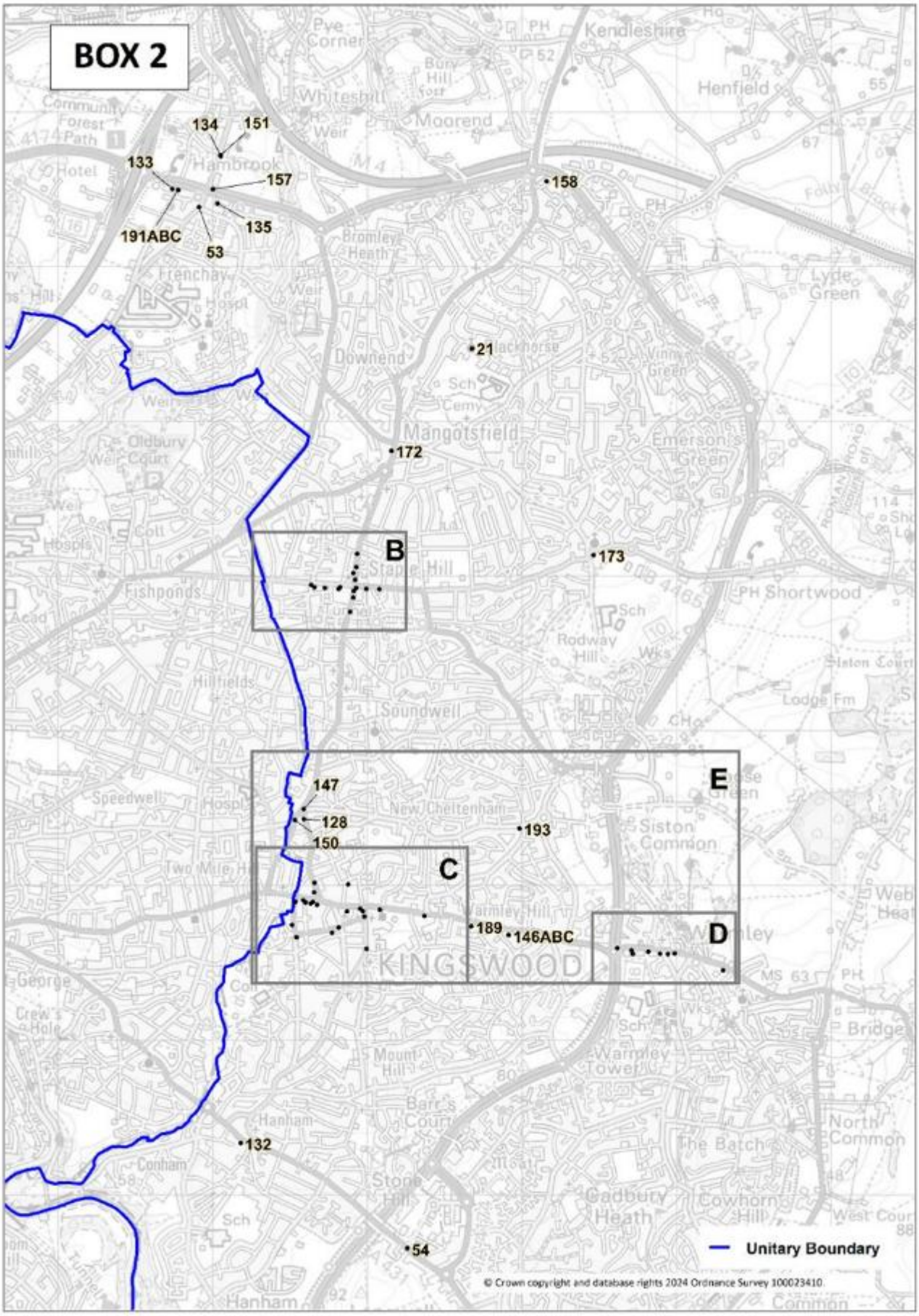


Figure D.12 – Diffusion Tube Sites in Staple Hill (Box B Figure D.11)

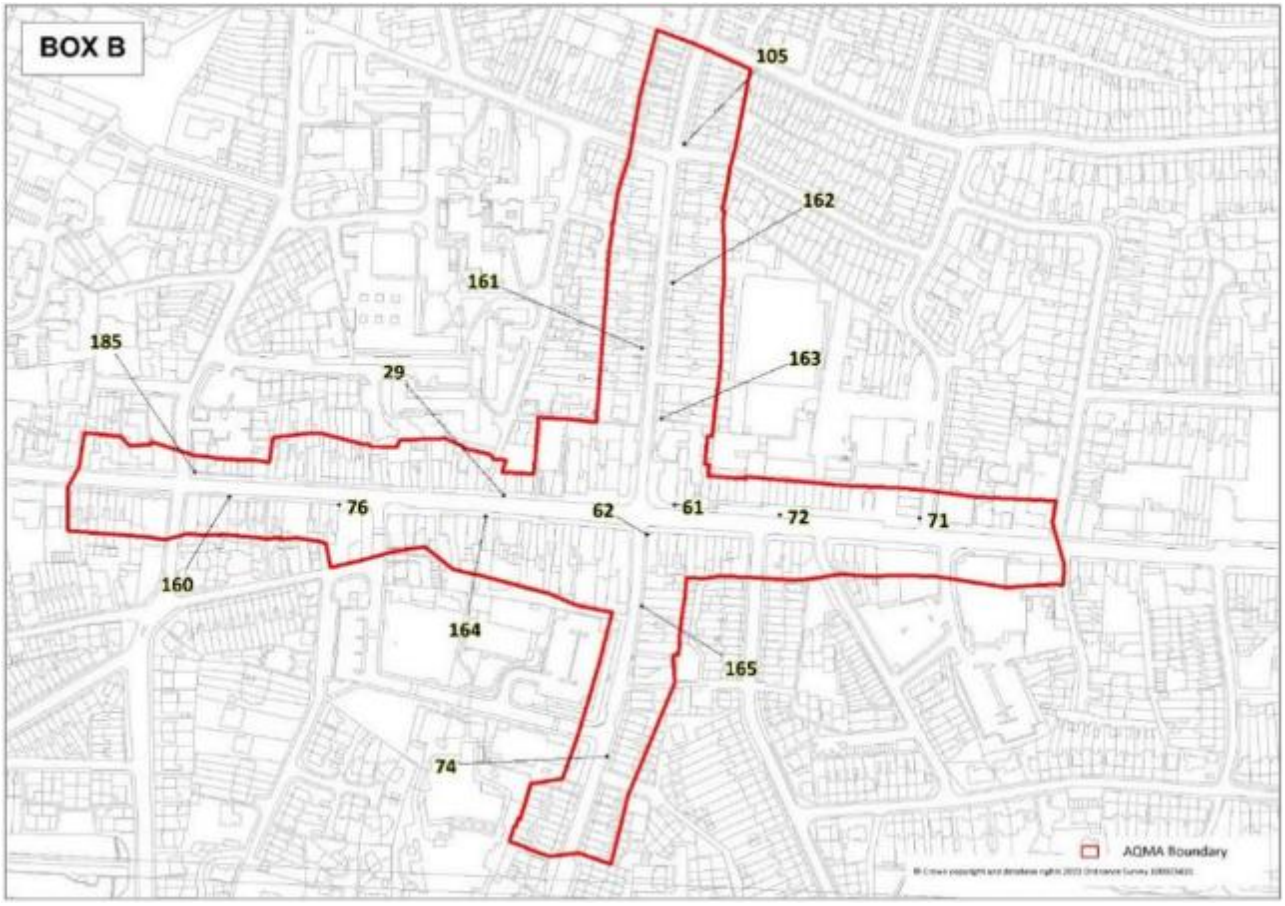


Figure D.13 – Diffusion Tube Sites in Kingswood (Box C Figure D.11)

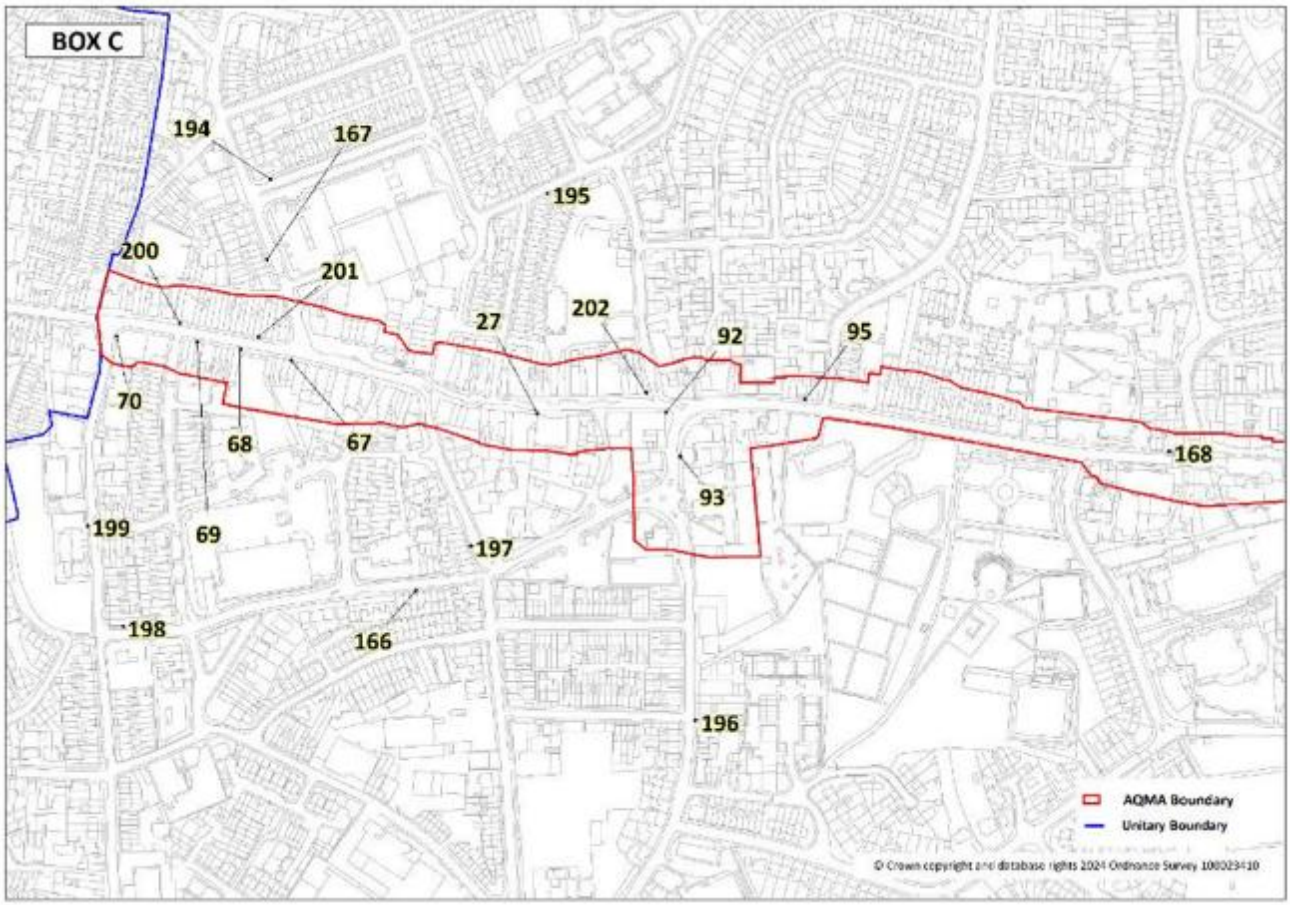


Figure D.14 – Diffusion Tube Sites in Warmley (Box D Figure D.11)

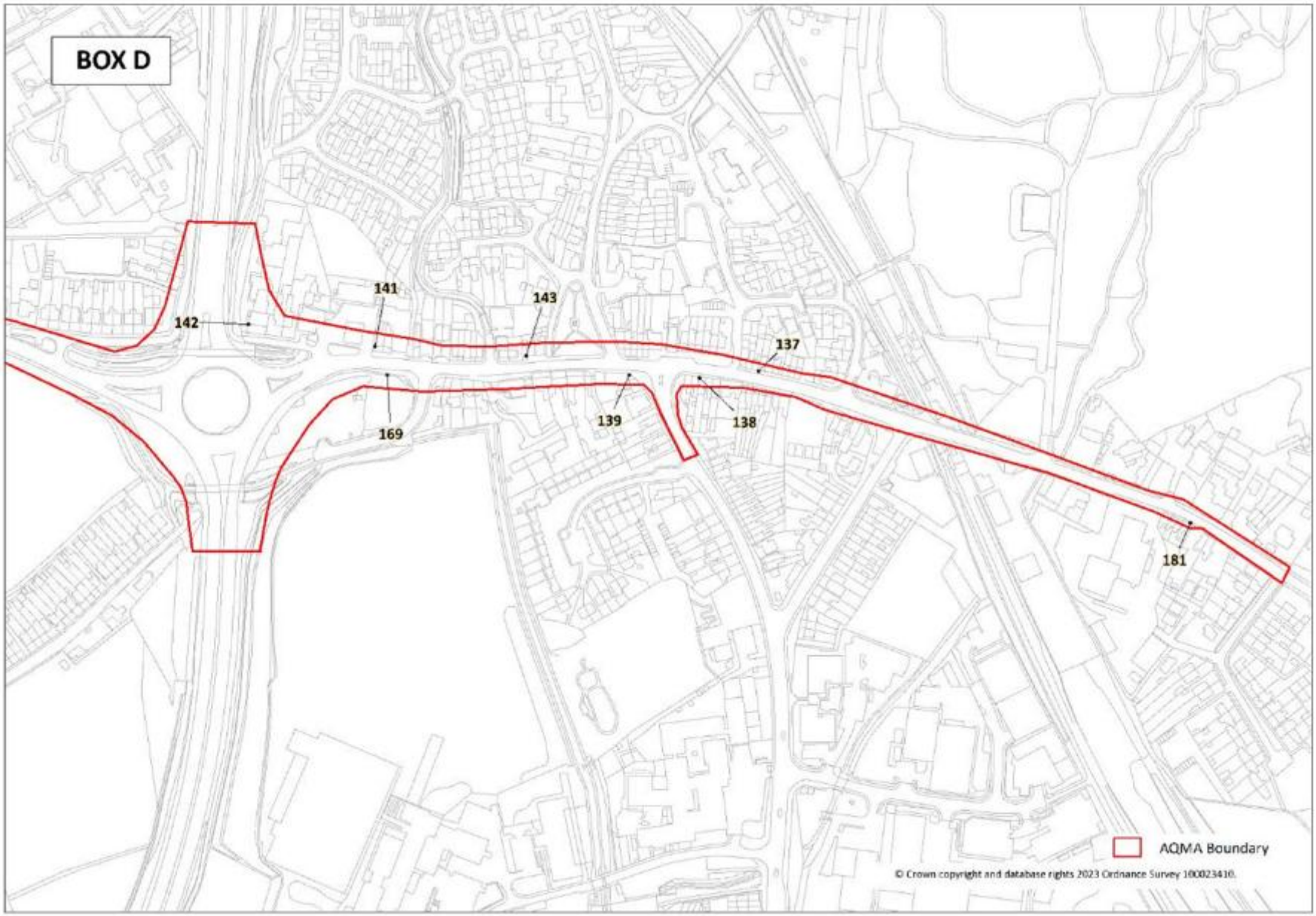


Figure D.15 – Diffusion Tube Sites in Kingswood & Warmley (Box E Figure D.11)

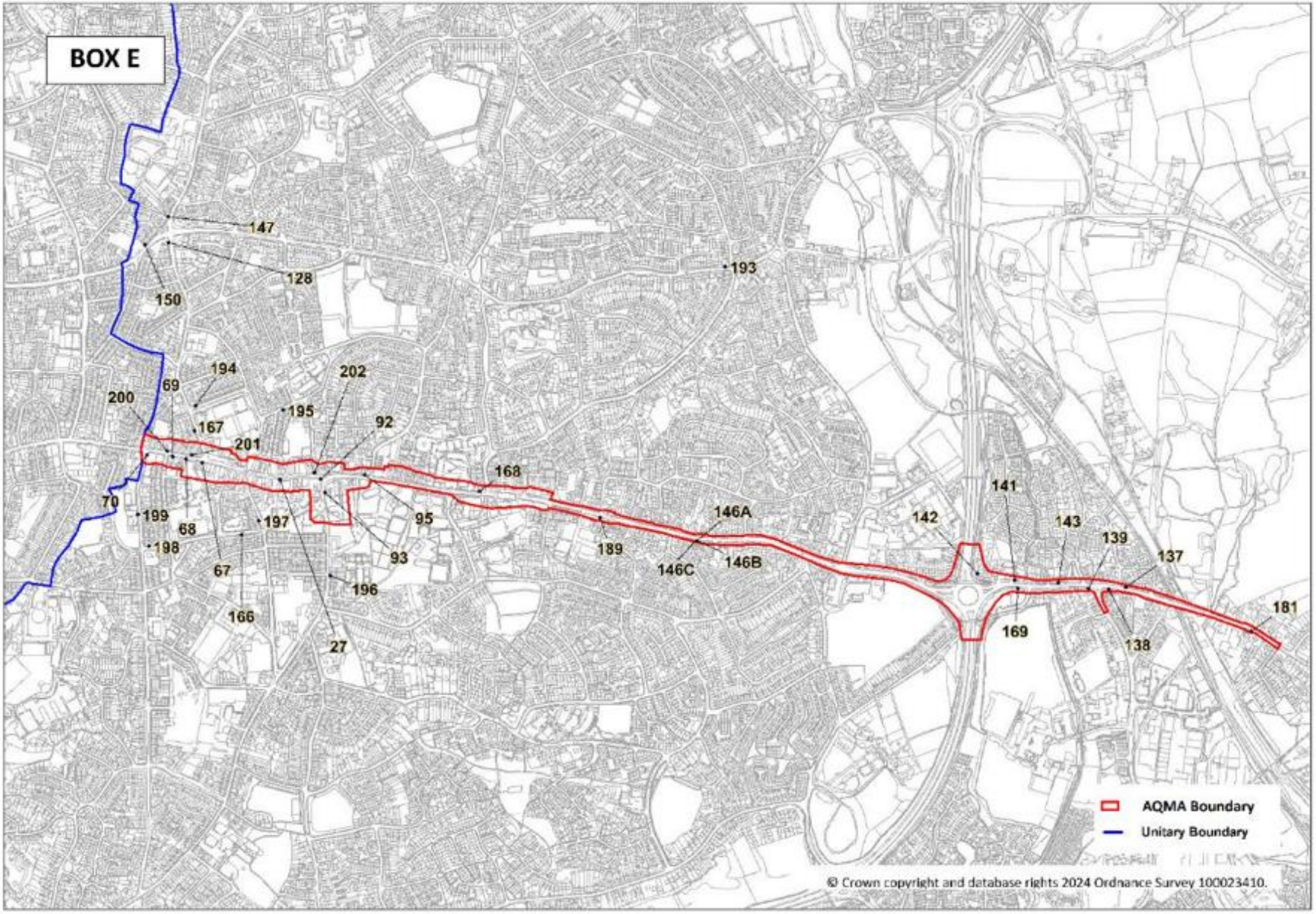


Figure D.16 – Diffusion Tube Sites in Yate & Chipping Sodbury (Box 3 Figure D.8)

Figure D.17 – Diffusion Tube Sites in Winterbourne & Coalpit Heath (Box 4 Figure D.8)

Figure D.18 – Diffusion Tube Sites in Thornbury (Box 5 Figure D.8)

Figure D.19 – Diffusion Tube Sites in Severn Beach and Pilning (Box 6 Figure D.8)

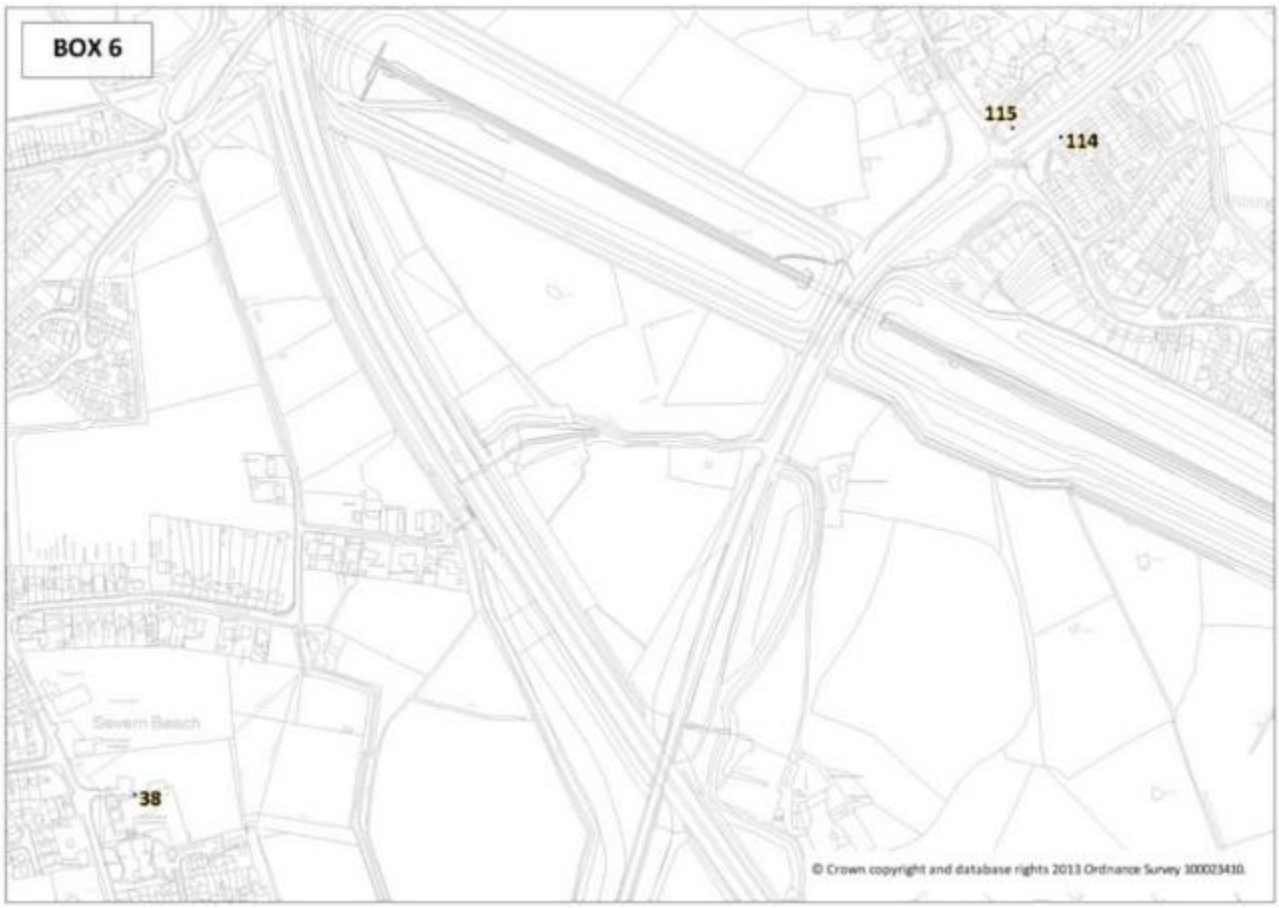


Figure D.20 – Diffusion Tube Site in Wickwar (Box 7 Figure D.8)

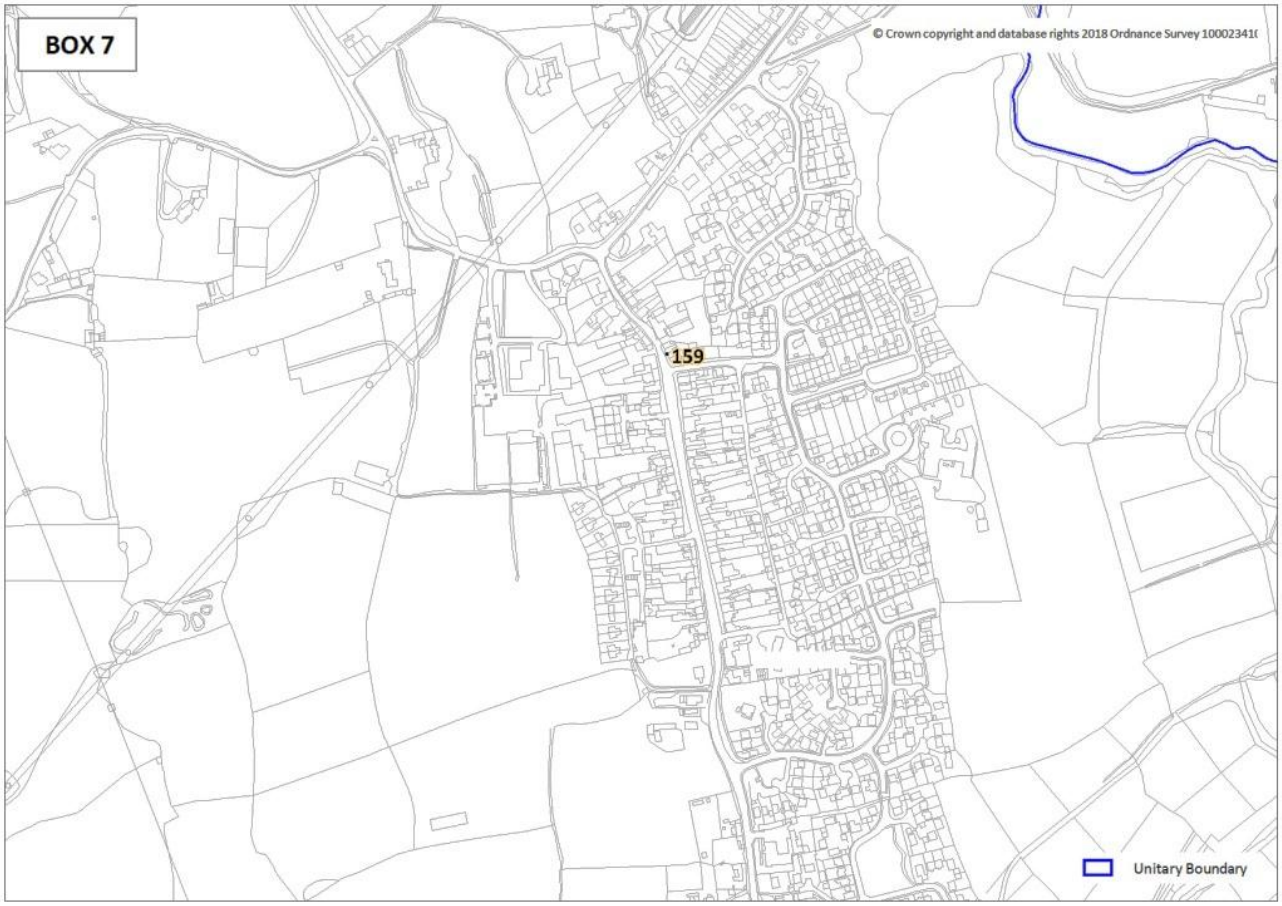
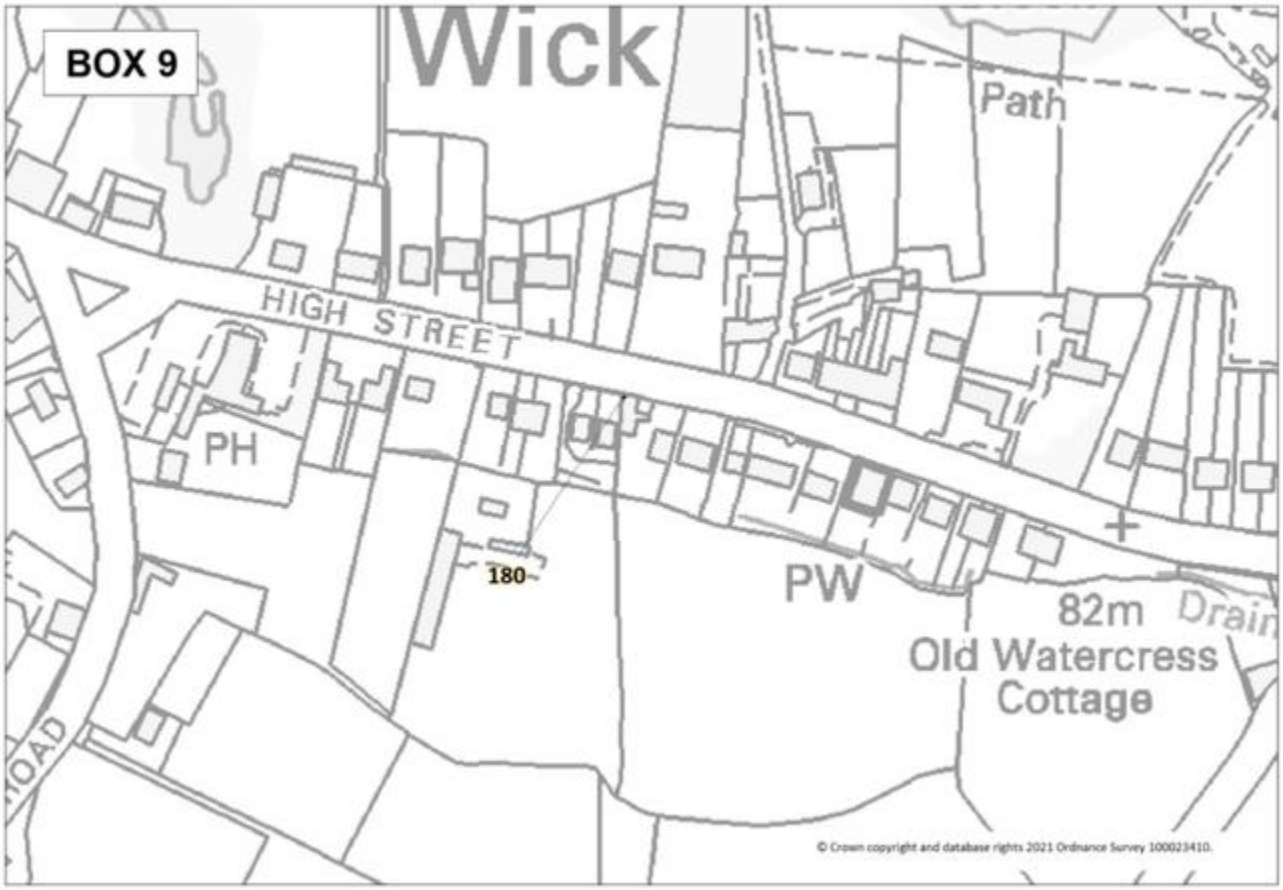


Figure D.21 – Diffusion Tube Site in Charfield (Box 8 Figure D.8)

Figure D.22 – Diffusion Tube Site in Wick (Box 9 Figure D.8)



Appendix E: Summary of Air Quality Objectives in England

Table E.1 – Air Quality Objectives in England[81]

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

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

Appendix F: Ozone Monitoring

Ozone at ground level is a secondary pollutant formed by the photochemical reaction of pollutants, such as nitrogen oxides (NO_x) from vehicle and industry emissions and volatile organic compounds (VOCs) emitted by vehicles, solvents and industry, with sunlight. It is one of the major constituents of photochemical smog. Reductions in NO_x emissions and any resultant reduction in nitrogen dioxide (NO_2) levels are invariably accompanied by an increase in ozone levels. This is of concern due to the health impacts of ozone[82] and because ozone is also a greenhouse gas in the lower atmosphere.

South Gloucestershire Council monitored Ozone (O_3) concentrations at automatic monitoring site (SG2) in Stoke Gifford on the A4174 Ring Road near Coldharbour Lane and UWE during 2024. The Council has previously monitored ozone at a more rural monitoring site in Badminton from 1998 until early 2015 when the site ceased operation.

The transboundary nature of ozone is recognised in the Government's UK Air Quality Strategy[83]. Consequently, the objective for ozone is not included in the Local Air Quality Management regime. However, the ozone objective (100 µg/m^3, measured as a running 8-hour mean, not to be exceeded more than ten times a year) is a guide for the reporting of locally monitored ozone concentrations.

Table F.1 presents the ratified and adjusted monitored O_3 annual mean concentrations and Table F.2 compares the ratified continuous monitored O_3 daily maximum running 8-hour mean concentrations with the ozone objective.

In 2024, the annual mean ozone concentration was 50.8 µg/m^3 compared to 51.3 µg/m^3 in 2023. During 2024, there were 9 days when the maximum running 8-hour mean objective of 100 µg/m^3 was exceeded, the same number of days as in 2023. All 9 days were between 1st April and 30th September when ozone concentrations are likely to be at their highest. As the allowance is 10 days, this objective was not exceeded. The maximum running 8-hour mean was 120.6 µg/m^3 which is lower than in 2023 when it was 140 µg/m^3.

Table A.1 in Appendix A shows the details of the automatic monitoring site and maps showing its location are provided in Appendix D. The automatic ozone monitoring results

[82] Ozone (O_3) - GOV.UK (www.gov.uk)

[83] Air Quality Strategy Vol 1 (publishing.service.gov.uk)

for South Gloucestershire Council are presented on the Air Quality in the United Kingdom (ukairquality.net) website.

Table F.1 – Annual Mean O_3 Monitoring Results (µg/m3)

Site ID	Site Name	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2024 (%) (2)	2021	2022	2023	2024
SG2	Stoke Gifford A4174 Coldharbour Lane	362384	178562	Roadside	98.1	98.1	49.0	51	51.3	50.8

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

Notes:

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

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.

(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%).

Table F.2 – Air Quality Objectives in England 8-Hour Mean O_3 Monitoring Results, Number of O_3 Daily Maximum Running 8-Hour Means > 100 µg/m^3

Site ID	Site Name	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2024 (%) (2)	2021	2022	2023	2024
SG2	Stoke Gifford A4174 Coldharbour Lane	362384	178562	Roadside	98.1	98.1	3	**22**	9	9

Notes:

Results are presented as the number of running 8-hour periods where daily mean concentrations greater than 100µg/m^3 have been recorded during the monitoring period. There is an annual allowance of 10 days. The ozone standard is not set in regulations.

Exceedances of the Ozone guideline objective of 100 µg/m^3 (not to be exceeded more than 10 times/year) are shown in **bold**.

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

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

Appendix G: Supporting Technical Information for the Proposed Revocation of Staple Hill AQMA

Background

The Local Air Quality Management (LAQM) process places an obligation on all local authorities to regularly review and assess air quality in their areas. Where an exceedance, or likely exceedance, of an air quality objective is identified, Air Quality Management Areas (AQMAs) must be declared, as required by Section 83 (1) of the Environment Act 1995, as amended by the Environment Act 2021. An Action Plan must also be prepared setting out the measures that the local authority intends to put in place in order to achieve and maintain the objectives.

Potential exceedances of the annual mean nitrogen dioxide (NO_2) objective (40 µg/m^3) in Staple Hill were identified from the diffusion tube monitoring data in the 2007 Annual Air Quality Progress Report. The exceedances were confirmed following further investigation and additional diffusion tube monitoring in the 2008 Detailed Assessment.

Following consultation on the proposed AQMA in Staple Hill in 2009, an AQMA was declared in April 2010 around the Broad Street (A4175), High Street (B4465), Victoria Street and Soundwell Road (A4107) crossroad junction in the centre of Staple Hill.

The Staple Hill AQMA was extended in May 2012 following further assessment[84] in 2011, which identified new exceedance locations outside of the 2010 declared AQMA, through a combination of additional diffusion tube monitoring and detailed dispersion modelling.

A map of the amended AQMA is provided in Figure D.1 in Appendix D: Maps of Monitoring Locations and AQMAs and maps of the original 2010 AQMA and amended 2012 AQMA can also be found on the Defra UK Air website - AQMA Details - DEFRA UK Air - GOV.UK. The AQMA incorporates the Broad Street (A4175), High Street (B4465), Victoria Street and Soundwell Road (A4017) crossroads; along Broad Street to the junction with York Road; High Street (up to and including nos. 40 and 49); Soundwell Road (up to and

[84] Further Assessment of Air Quality in the Cribbs Causeway, Staple Hill and Kingswood AQMAs

including nos. 16a and 47); Victoria Street to the junction of Clarence Road; and includes any properties that lie within the outlined boundary.

In 2012, the Council produced an Air Quality Action Plan[85] for the Staple Hill and Kingswood AQMAs, which were both declared in 2010, focusing mainly on transport measures. There are 19 measures (SS1 to SL7) included for Staple Hill in the Action Plan which are detailed in Table 2.2. Delivery of these measures have largely been completed where possible. Where there have been, or continue to be, barriers restricting the implementation of the measure, these are also presented within Table 2.2. The key action plan measures considered to have most effectively contributed to reducing pollution in the Staple Hill AQMA are:

- Improvements to traffic signal operations at the Broad Street (A4175), High Street (B4465) and Victoria Street & Soundwell Road (A4017) crossroads in 2012 and at the High Street (B4465), Pendennis Road and Acacia Road crossroads in 2013 following reviews to reduce congestion and improve traffic flows through these junctions. The 2013 improvements were funded by Defra Air Quality Grant funding (Measure SL3).
- Two DfT grant funded cycle route lighting schemes on the nearby Bristol and Bath Railway Path in 2014 and 2016. This work significantly improved conditions for users of this path cycling, walking and running on this major traffic-free corridor which also serves the Staple Hill AQMA. (Measure SM6).
- Improvements in the Bus fleet travelling through the Staple Hill AQMA via OLEV funding in 2017 for buses running on bio-methane and Clean Bus Technology Funding in 2015 and 2018 to retrofit buses with cleaner engines.

A new Air Quality Action Plan, known as the South Gloucestershire Clean Air Action Plan (CAAP), is in the process of being finalised to replace the 2012 Air Quality Action Plan for Kingswood and Staple Hill.

Monitoring Data and Trends

The NO_2 exceedance levels in 2010 when the Staple Hill AQMA was declared are shown in Table 2.1 in Section 2.1 of the report. The highest exceedance was at Site 73 – 11

[85] 2012 Air Quality Action Plan Kingswood and Staple Hill (southglos.gov.uk)

Soundwell Rd (47.9 µg/m^3). The monitored concentration at site 61 – 1 Broad Street (47.3 µg/m^3) is also provided to compare with 2024 data. (These levels would have however been lower if adjusted for distance to the nearest façades to each of these sites).

The maximum monitored annual mean concentration in 2024 is also shown in Table 2.1 for comparison, which was 26.1 µg/m^3 at Site 61. When adjusted for distance, this reduces to 24.8 µg/m^3 at façade. (Site 73 ceased operation at the end of 2019 so was no longer available for comparison). Comparison of the 2010 and 2024 monitored annual mean concentrations for site 61 shows a 45% reduction during that time.

The monitoring undertaken within the AQMA has changed over time to reflect the extension to the AQMA in 2012 and to better represent relevant exposure. A comprehensive review of the monitoring sites within the AQMA was undertaken in 2017. Six additional monitoring sites (Sites 160 – 165) were set up at façade to better represent relevant exposure at potential worse-case locations, where this was possible, given that there are many commercial/retail premises in the AQMA. Five existing monitoring sites in similar locations but closer to the roadside, were retained for comparison until the end of 2019 when they ceased operation (these included site 73 mentioned above and also sites 75, 78, 79 and 102). These changes allowed a more robust assessment of whether concentrations were below the objective where there was relevant exposure and whether the AQMA was still required.

However, there are seven monitoring sites, including site 61 mentioned above, along with sites 29, 62, 71, 72, 74 and 76, that have remained in operation since the AQMA was declared. This enables the long-term trend in the annual mean NO_2 concentrations to be observed over the fifteen year period from 2010 to 2024. A map which includes the locations of these monitoring sites is available in Figure D.12 (Appendix D: Maps of Monitoring Locations and AQMAs).

The monitoring results for these long-standing sites are shown in Table G.1 and Figure G.1 shows the overall downward trend in concentrations at these sites between 2010 and 2024. The results for the sites where exceedances and borderline levels (within 10% of the NO_2 annual mean objective at 36 µg/m^3 or above) were monitored between 2010 and 2024 are also included in Table G.1 and shown in Figure G.1.

This shows the last exceedance in the Staple Hill AQMA was monitored at Site 75 – 118 High Street (40.3 µg/m^3) in 2017. However, relevant exposure was set back from this site and the estimated concentration following distance adjustment was 32.7 µg/m^3 and below the objective. Site 164 – 102 High Street, which was set up at façade in 2017 and

represented relevant exposure better than site 75, showed no exceedance (28.3 µg/m^3). These two sites ran concurrently until monitoring ceased at site 75 at the end of 2019.

In 2018, there were two borderline sites in the AQMA; site 165 – 3 Soundwell Road (38.6 µg/m^3), another of the "new" sites set up at façade in 2017; and site 61 – 1 Broad Street, an existing site which remained at the borderline level (36.0 µg/m^3), following distance adjustment to the nearest façade. Site 75 was borderline before distance adjustment.

In 2019, two sites were borderline; Site 62 – 2 Broad Street (36.3 µg/m^3) and Site 165 – 3 Soundwell Road (39.2 µg/m^3), both at façade. Sites 61, 73 and 75 were borderline but following distance adjustment were below 36 µg/m^3. This was the last year that borderline concentrations were monitored in the AQMA. Defra advice at the time was that AQMAs should remain in place until several years of data below 10% of the objective (i.e. 36 µg/m^3) had been collected which could support revocation.

In 2020 and 2021, the reduced traffic levels as a result of the Covid-19 pandemic restrictions significantly impacted NO_2 concentrations to the extent that there were no exceedences or borderline concentrations within 10% of the objective in the AQMA. However, these years were not considered to be representative of long-term trends in NO_2 concentrations and Defra advice is that revocation of an AQMA should not be based solely on compliance in such years.

Lower NO_2 concentrations than pre-pandemic have continued with annual mean NO_2 concentrations in the AQMA remaining below the annual mean objective and borderline level in 2022, 2023 and 2024. The more recent trends in annual mean NO_2 concentrations in the Staple Hill AQMA are discussed in Section 3.2.1 of this report and shown in Figure A.5 (Appendix A).

The overall downward trend in NO_2 concentrations in the AQMA and across South Gloucestershire particularly since 2019, is likely due to the combination of the Covid-19 pandemic restrictions initially and ongoing change in travel behaviour since, along with a cleaner vehicle fleet as newer, cleaner vehicles, including electric vehicles, replace older, more polluting vehicles. The Bristol Clean Air Zone may have also had a beneficial impact on NO_2 concentrations in South Gloucestershire since its introduction in November 2022 due to the volume of commuter traffic between Bristol and South Gloucestershire.

Defra's appraisal of SGC's 2023 Air Quality Annual Status Report recommended the 2023 and 2024 monitoring data be reviewed to ensure it supports continued compliance before

considering revocation of the AQMA(s). Subsequently, the Defra appraisal of the 2024 ASR advised the Staple Hill AQMA could be considered for revocation.

Revoking an AQMA

Under the Environment Act 1995, Part IV, Section 83, an AQMA can be revoked if following a subsequent air quality review, it is shown that the air quality objectives are being achieved and are likely to continue to be achieved within the designated area.

The Defra Technical Guidance (LAQM.TG22, paragraph 3.61) states that:

"The revocation of an AQMA should be considered following three consecutive years of compliance with the relevant objective as evidenced through monitoring. Where NO_2 monitoring is completed using diffusion tubes, to account for the inherent uncertainty associated with the monitoring method, it is recommended that revocation of an AQMA should be considered following three consecutive years of annual mean NO_2 concentrations being lower than 36 µg/m^3 (i.e. not within 10% of the annual mean NO_2 objective due to uncertainties and yearly variations). There should not be any declared AQMAs for which compliance with the relevant objective has been achieved for a consecutive five-year period."

The monitoring results show that the Staple Hill AQMA has been compliant with the annual mean objective of 40 µg/m^3 for 7 years (2018 – 2024 inclusive) and borderline level (below 36 µg/m^3) for 5 years (2020 – 2024 inclusive).

The duration of compliance supports the proposed revocation of the Staple Hill AQMA and ensures reasonable certainty there would not be further objective exceedances and that below borderline concentrations would be maintained to avoid cycling between revoking and declaring the AQMAs again. Noting that pollutant concentrations may vary significantly from one year to the next due to the influence of meteorological conditions, the duration of compliance also ensures reasonable certainty any future exceedances that might occur in more adverse meteorological conditions are unlikely.

There are no local developments of a scale or type which would be likely to have a significant impact on the NO_2 concentrations in and immediately around the AQMA due to the already developed urban nature of the area.

South Gloucestershire Council has a Clean Air Strategy[86] in place and is finalising the draft South Gloucestershire Clean Air Action Plan (CAAP), which aims to implement the visions and priorities contained within the Clean Air Strategy and fulfil the Council's statutory local air quality management duties to update the 2012 Air Quality Action Plan. The draft CAAP includes a broad range of actions to further improve air quality both within the AQMA(s) and across South Gloucestershire as a whole (see Section 2.2 of this report for further information).

Conclusions

The monitoring data shows that the air quality annual mean NO_2 objective and the precautionary borderline level continue to be met, and there is a downward trend in concentrations. Also there are no local developments which are likely to significantly increase NO_2 concentrations in the AQMA.

Having considered the relevant guidance in the Defra LAQM Technical Guidance (LAQM.TG22)[87] (in particular paragraph 3.61 above) and also as recommended in Defra's appraisal of SGC's 2024 Air Quality Annual Status Report, it is proposed that SGC revoke the Staple Hill AQMA.

Next steps

Following the acceptance of this report and the proposal to revoke the Staple Hill AQMA by Defra, SGC will seek members approval to undertake a consultation on the proposed revocation of the AQMA.

The draft Clean Air Action Plan (CAAP) will be finalised to replace the 2012 Air Quality Action Plan and formal approval sought to enable implementation of the actions to further improve air quality across the district as a whole, including in any remaining and former AQMAs. The SGC Clean Air Strategy will also be reviewed and updated as appropriate.

The monitoring will remain in place to assess the NO_2 levels in the Staple Hill AQMA and the results will continue to be reviewed and reported in subsequent air quality annual status reports.

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[86] Clean Air Strategy 2020 – 2024 BETA - South Gloucestershire Council (southglos.gov.uk)

[87] LAQM-TG22-May-25-v2.0.pdf

Table G.1 – Staple Hill AQMA Annual Mean NO_2 Non-Automatic Monitoring Results: Exceeding, Borderline & Long-Term Sites operational 2010 – 2024 (µg/m^3)

Diffusion Tube ID	Site Name	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
29	Staple Hill - 123 High Street Backhouse Bet	364822	175932	**45.4**	*37.9*	**43.6**	35.2	35.2	31.2	*36.2*	30.9	28.1	28.0	20.8	23.4	24.8	19.3	20.3
61	Staple Hill - 1 Broad Street William Hill	364926	175926	**47.3**	**40.7**	**45.8**	**42.1**	**41.5**	*39.4*	**41.5**	*39.2*	*37.8*	*36.6*	29.3	30.9	31.9	26.2	26.1
62	Staple Hill - 2 Broad Street 501 Bar	364909	175908	**47.4**	**40.3**	**43.7**	*36.4*	*36.0*	*36.4*	*39.2*	34.6	33.6	*36.3*	26.8	28.6	29.2	21.2	21.8
71	Staple Hill - 11 The Square Bunch Florist	365075	175918	30.0	25.5	29.2	25.5	24.7	23.6	26.1	24.6	21.5	22.7	16.7	17.3	17.6	14.5	14.2
72	Staple Hill - 25 Broad Street Prime Vapes	364990	175920	35.4	31.2	**40.3**	34.8	31.9	32.2	*36.2*	31.1	28.1	28.1	22.5	24.5	25.0	20.2	19.8
73	Staple Hill - 11 Soundwell Rd	364902	175843	**47.9**	*37.8*	**40.6**	*39.3*	*39.9*	**40.4**	**40.2**	*37.3*	35.4	*36.0*					
74	Staple Hill - 29-31 Soundwell Rd opp Page Comm Assoc	364885	175772	34.3	30.4	35.3	32.2	28.1	28.5	30.9	27.1	27.0	25.6	18.9	20.8	20.6	17.0	15.8
75	Staple Hill - 118 High Street	364856	175917	**42.8**	**42.7**	**44.2**	**43.6**	**45.3**	**44.8**	**46.1**	**40.3**	*37.2*	*38.0*					
76	Staple Hill - 84-86 High Street Staple Hill Oak Pub	364722	175926	37.8	37.0	38.6	34.9	36.2	34.9	36.9	32.9	29.3	31.2	24.0	24.1	23.8	20.2	22.6
78	Staple Hill – 9 – 11 Victoria Street	364909	176016	**45.5**	**43.0**	**52.8**	**44.4**	**43.4**	**41.5**	**44.9**	*39.0*	35.4	35.1					
79	Staple Hill – 9 – 11 Victoria Street	364913	176067	**41.2**	*39.6*	**45.9**	35.8	*37.5*	*37.5*	*37.2*	34.7	34.1	32.3					

Diffusion Tube ID	Site Name	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
102	Staple Hill - 58 High Street	364637	175934	**44.8**	**42.1**	**47.8**	**41.7**	*39.8*	*38.4*	**40.7**	*37.2*	32.4	34.3					
165	Staple Hill - 3 Soundwell Rd Chinese Kitchen façade	364906	175864								*36.3*	*38.6*	*39.2*	28.7	31.2	29.9	22.8	23.8

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**.

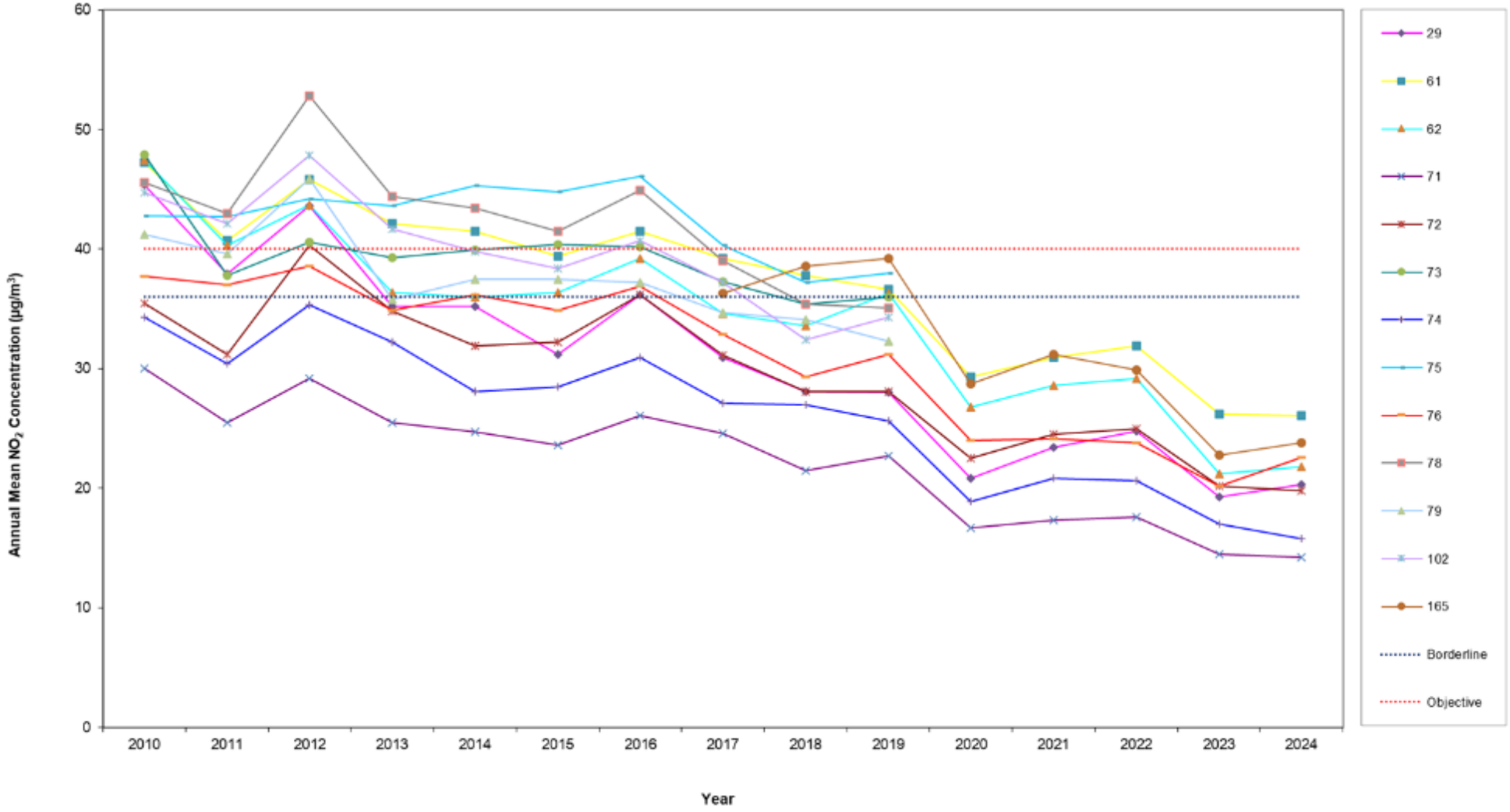
Borderline exceedances i.e. within 10% of the NO_2 annual mean objective at 36 µg/m^3 or above, are shown in *italics*.

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 the relevant LAQM.TG at the time if valid data capture for the full calendar year is less than 75%.

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

Figure G.1 – Staple Hill AQMA Trends in Annual Mean NO_2 Concentrations at Exceeding, Borderline & Long-Term Monitoring Sites between 2010 – 2024



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
AURN	Automatic Urban and Rural Network (National monitoring network)
BAF	Bias Adjustment Factor
BAM	Beta Attenuation Monitor (for Particulate Matter measurement)
CAZ	Clean Air Zone
CBTF	Clean Bus Technology Fund
CO_2	Carbon Dioxide
Defra	Department for Environment, Food and Rural Affairs
DfT	Department for Transport
DPH	Director of Public Health
DT	Diffusion Tube
EV	Electric Vehicle
Exceedance	A period of time where the concentration of a pollutant is greater than the appropriate air quality objective
JAQU	Joint Air Quality Unit between Defra and Department for Transport
JLTP	Joint Local Transport Plan
JSNA	Joint Strategic Needs Assessment
LAQM	Local Air Quality Management
LAQM.PG22	Local Air Quality Management Policy Guidance 2022 (revised 2025)
LAQM.TG22	Local Air Quality Management Technical Guidance 2025
LCWIP	Local Cycling and Walking Infrastructure Plan
LSO	Local Site Operator
LSTF	Local Sustainable Transport Fund

Abbreviation	Description
LTCP	Local Transport Capital Programme
NO_2	Nitrogen Dioxide
NO_x	Nitrogen Oxides
O_3	Ozone
OHID	Office for Health Improvement and Disparities
OLEV	Office for Low Emission Vehicles
PHIP	(South Gloucestershire) Population Health Intelligence Portal
PHOF	Public Health Outcomes Framework
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
SGC/SGDC	South Gloucestershire Council/ South Gloucestershire District Council
SO_2	Sulphur Dioxide
STTY	Sustainable Travel Transition Year (DfT funding)
$\mu g/m^3$	Microgrammes per cubic metre
UKAS	United Kingdom Accreditation Service
VOC	Volatile Organic Compounds
WECA	West of England Combined Authority

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